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The Australian Sciapodinae (Diptera: Dolichopodidae), with a Review of the Oriental and Australasian Faunas, and a World Conspectus of the Subfamily

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ABSTRACT. The Sciapodinae (Diptera: Dolichopodidae) of Australia (including Lord Howe, Norfolk, Cocos-Keeling and Christmas Islands) are treated in detail, and 253 species, 208 newly described, are illustrated and keyed. All described Oriental and extralimital Australasian species are critically reviewed, with notes on diagnostic characters, distribution and generic placement, along with many new combinations and synonymies and some keys. Further, the taxonomy of the subfamily is considered at world level, with redefinition and rearrangement of genera and nomenclatural changes for taxa from all regions. The systematic position of the subfamily is discussed and a preliminary phylogenetic analysis presented. The biogeography and natural history of the Australian fauna are treated in detail. Nine new genera are erected, *Dytomyia*, *Negrobovia*, *Narrabeenia*, *Abbemyia*, *Pseudoparentia* and *Pilbara* from Australasia, *Mascaromyia* and *Ethiosciapus* from the Afrotropical Region, and *Amesorrhaga* from the Orient. Genera incorrectly referred to the Sciapodinae are discussed.

The Sciapodinae show extensive parallel evolution, and almost all diagnostic generic-level characters have evolved independently many times. Historically, this has led to uncertain generic limits and a complicated nomenclatural history. Genera are redefined on a polythetic basis, no character in isolation necessarily being diagnostic for all members.

Male secondary sexual characters (MSSC) are reviewed. In some species the female phenotype shows weakened expression of MSSC. A model is presented whereby MSSC could be incorporated into the phenotype of both sexes and thereby become 'higher level' taxonomic characters.

The Australian fauna is analysed in detail, with discussions of historical and ecological biogeography. The genera *Parentia* and *Heteropsilopus* display classical Bassian distribution patterns and have ties with other southern lands, New Zealand/New Caledonia and India, respectively. The disjunction of *Heteropsilopus* in Australia and southern India suggests a widespread eastern Gondwanan distribution dating from the lower Cretaceous. No direct relationship with the Neotropics is evident. Australian *Nothofagus* rainforests are devoid of Sciapodinae, in contrast to such forests in New Zealand. A Torresian fauna of Oriental-Papuan affinity dominates the northern tropics, and has penetrated southwards along the east coast in association with tropical and subtropical rainforest. The major southern limit of Torresian taxa coincides with the southern limit of subtropical rainforest in New South Wales. Lowland Papuan species occur on Cape York

Peninsula and across monsoonal northern Australia. In contrast to eastern Australia, the aridity of Western Australia prevented southward movement of tropical elements, and the Southwest maintains only a Bassian fauna. The faunas of Norfolk and Lord Howe Islands are of Australian origin, while those of Christmas and Cocos-Keeling Islands are of Greater Sunda origin.

The faunas of all major zoogeographic regions are reviewed, with emphasis on Australasia and the Orient. Widespread and accidentally introduced species are discussed. Fossil amber Sciapodinae are treated, including new information on Dominican Republic material. The subfamily is most diverse on the Gondwana continents, where it undoubtedly arose. The possible sister group relationship with the predominately Laurasian subfamily Dolichopodinae is discussed. Vicariant distributions between Australia and India, Australia and New Zealand, and Africa and South America support a early Cretaceous origin and radiation for the Sciapodinae.

The tribe Mesorhagini is established with three genera. *Amesorhaga* n.gen. contains seven Oriental species and is considered the most primitive sciapodine genus. *Negrobovia* n.gen., from eastern and northern Australia, comprises three species, two of them new. The genus *Mesorhaga* Schiner is redefined and its distinctive morphology reviewed. The Australian fauna comprises 36 species, 35 new.

The tribe Sciapodini is established and with the genera *Sciapus* Zeller, *Mascaromyia* n.gen., *Helioxcerus* Lamb, *Naufra* Bickel, *Dytomyia* n.gen., *Narrabeenia*, n.gen., *Pilbara* n.gen. and *Condylostylus* Bigot. *Sciapus* is greatly restricted in definition and comprises about 65 Holarctic species. The genera *Psilopiella* Van Duzee, *Agastoplax* Enderlein, *Dactylodiscia* Enderlein, *Dactylorhipis* Enderlein and *Placantichir* Enderlein are newly placed in synonymy with *Sciapus*. Many species previously placed in *Sciapus* are newly referred to other genera. *Mascaromyia* includes 15 described species from the western Indian Ocean. *Helioxcerus* occurs on Samoa and New Caledonia. *Naufra* is known only from New Zealand. *Dytomyia* is found primarily Australian sclerophyll habitats and comprises five species, four newly described. *Narrabeenia* is found on the southern Australian coast and comprises two species, one newly described. The genus *Pilbara* has a single new species, *P. octava*, from north-western Australia. *Condylostylus* comprises some 300 species in the Neotropics, Afrotropics and Orient. The New World *C. longicornis* is recorded from French Polynesia. Neotropical species incorrectly regarded as *Chrysosoma* are given new combinations. The Oriental and eastern Palearctic species are keyed. The genus *Eurostomerus* Bigot, based on a *nomen nudum*, is made a synonymy of *Condylostylus*.

The Tribe Chrysosmatini is defined and includes ten genera – *Parentia* Hardy, *Pseudoparentia* n.gen., *Krakatauia* Enderlein, *Heteropsilopus* Bigot, *Chrysosoma* Guérin-Meneville, *Abbemyia*, n.gen., *Ethiosciapus*, n.gen., *Plagiozopelma* Enderlein, *Austrosociapus* n.gen. and *Amblypsilopus* Bigot. *Parentia* has a temperate distribution in southern Australia, New Zealand and New Caledonia. The Australian fauna, comprising 26 species (21 new), is found mostly in drier habitats. *Pseudoparentia*, comprises five new species from interior Australia. *Krakatauia* comprises nine Australian species (8 newly described) in the *evulgata*, *funeralis*, *alanae* and *tristorum* Groups. The Oriental *anthracoides* Group is defined. *Heteropsilopus* comprises three Groups: the *trilagatus* Group from southern India and Sri Lanka, and the *cingulipes* and *brevicornis* Groups with a Bassian distribution in Australia, comprising 17 species, ten newly described. *Chrysosoma* is redefined. The apical arista, previously used as the key generic character, is shown to have been derived many times within the Sciapodinae. The genus is confined to the Old World tropics and is especially rich in the Australasian and Oriental tropics. The Australian fauna comprises 11 species, two newly described. The genus *Megistostylus* is placed in synonymy with *Chrysosoma*, and *C. crinicornis* replaces *M. longicornis* as the name for the common Oriental-Australasian species noted for its remarkable male antenna. The Afrotropical *Kalocheta* Becker is also placed in synonymy with *Chrysosoma*. The *leucopogon* and *proliciens* Groups are rich in Australasia and Sundaland. The common tramp species, *C. leucopogon*, ranges from eastern Africa to Polynesia, including many isolated islands. The Oriental *vittatum* Group, the Papuan *aeneum*, *arrogans*, *lucigena* and *antennatum* Groups, the New Caledonian *noumeanum* Group, the Pacific *lacteimicans* Group, and the Afrotropical *passiva*, *senegalense* and *gemmarium* Groups are defined. The genus *Abbemyia* occurs in Australasia and includes two Australian species, one newly described. *Ethiosciapus* occurs in Africa and the islands of the western Indian Ocean. *Plagiozopelma* includes many species previously regarded as *Chrysosoma*. The genus occurs widely across the Old World tropics but is richest in the Orient. The Australian fauna comprises six species, four newly described. The *flavipodex* Group occurs across the Orient and Australasia, and includes the widespread *P. flavipodex*. The *alliciens* and *annotatum* Groups are Oriental, the *terminiferum* and *angustifacies* Groups Australasian, and the *bequaerti* Group Afrotropical. The new genus *Austrosociapus* comprises 42 Australian species, 35 newly described. The *proximus* Group is eastern Australian, although

A. connexus appears to have been introduced to various Pacific islands and Perth, WA, and *A. proximus* was introduced to New Zealand. The *tumidus* Group, *sarinensis* Group, *muelleri* Group, *dendrohalma* Group (found on eucalypt trunks), and *storeyi* Group, all occur in eastern Australia, while the *hollowayi* Group is known from Western Australia. *Amblypsilopus* is given new status and includes many species previously regarded as *Sciapus*. New combinations and synonymies are presented from all zoogeographic regions. The genera *Australiola*, *Labeneura*, *Sciopolina* and *Leptorhethum* are new synonyms of *Amblypsilopus*. The genus has 87 Australian species, 78 newly described. The *triscuticatus*, *pallidicornis* and *flaviappendiculatus* Groups are found throughout the tropical Orient and Australasia. The *zonatus* Group, from Australia and Norfolk and Lord Howe Islands, often has strikingly modified male wings. The *argyrodendron*, *bertiensis*, *topendensis*, *cyplus* and *trogon* Groups are northern Australian, while the *anomalicornis* and *glaciunguis*, *neoplatypus* and *rimbija* Groups occur in Australia and New Guinea. The *abruptus* Group is found across the Old World tropics.

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Introduction

The Sciapodinae are one of the more cohesive dolichopodid subfamilies, often readily identified by the branched vein M and excavated vertex. These small, metallic green flies with their 'swept-back' wings are frequently seen running on foliage in sunny moist habitats, making them familiar by sight even to casual observers. Sciapodines are often abundant and frequently form a conspicuous component of malaise trap catches from warm mesic forests.

The subfamily is basically pantropical, and although it extends into temperate regions, species richness drops markedly towards higher latitudes. Some 1,200 valid species are now recognised, based on available catalogues, subsequent papers, and new information in this work.

Paleartic: 71 species (C.E. Dyte, personal communication, and new information), of which three also occur in the Oriental region, and one in the Nearctic Region.

Afrotropical: 182 species (Dyte & Smith, 1980), of which three also occur in the Oriental region.

Oriental: 235 species (Dyte, 1975 and new information), of which three also occur in the Palearctic region, three in the Afrotropical region, and 14 in the Australasian and Oceanian region.

Australasian and Oceanian: 396 species (Bickel & Dyte, 1989; Bickel, 1992, and 208 newly described), of which 14 also occur in the Oriental region, one in the Afrotropical region, and one in the New World.

Nearctic: 80 species (Foote, Coulson & Robinson, 1965; Robinson & Vockeroth, 1981), of which 24 also occur in the Neotropical region, one in the Australasian and Oceanian region, and one in the Palearctic region.

Neotropical: 303 (Robinson, 1970b, 1975; Milward de Azevedo, 1980a,b, 1985a,b) of which 24 also occur in the Nearctic region and one in the Australasian and Oceanian region.

This revision treats the Australian Sciapodinae in detail, including the species of Lord Howe Island and the external territories of Norfolk Island, Christmas Island and the Cocos-Keeling Islands (Appendix). In addition, the entire described Oriental and extralimital Australasian sciapodine faunas are critically reviewed, with notes on diagnostic characters, generic placement and synonymies, new distributional records, and some keys. Further, the taxonomy of the subfamily is considered at a world level, with redefinition and rearrangement of genera (and consequent new combinations for many species), a world generic key, the establishment of a tribal classification, and preliminary phylogenetic analysis.

Apart from Becker's revisionary treatments (1918, 1922a,b), the literature for the subfamily consists primarily of original species descriptions. The principal genera have been poorly defined and, in many cases, workers have independently placed a species or even sexes of the same species into different genera. There has been considerable parallel evolution within the subfamily, and almost all characters claimed to be diagnostic at generic level have evolved independently several times. The

uncertain generic limits combined with a complicated and confused nomenclatural history necessitated a much wider scope than the Australian fauna alone. To this end, I studied the type material of most described Australasian and Oriental species in conjunction with sorting of large undetermined museum collections from these regions. As well, I was able to refer to synoptic collections of New World, Palearctic and some Afrotropical Sciapodinae.

The Australian sciapodine fauna is both rich and disparate, comprising southern Gondwanan relicts, isolated groups of uncertain affinity, and northern paleotropical taxa. Many groups have distributions across both the Australasian and Oriental zoogeographic regions.

A number of insights have been gained by studying the Australian fauna in its wider zoogeographical context. First, an understanding of taxonomic relationships. In some cases, groups which are easily separated in Australia are indistinguishable in Oriental-Papuan source areas. As well, seemingly isolated Australian species are shown to be outliers of more widespread groups. Second, information concerning major evolutionary trends, the extent of homoplasy, taxonomic limits and morphological diversity within the subfamily. Third, an indication of the size and distribution of faunas. Considering the increase of the Australian Sciapodinae treated here (253 species, 208 newly described) and personal experience sorting the rich Oriental and Australasian faunas, a conservative estimate for the subfamily is 3,000 world species.

Materials and Methods

This study is based on Australian Sciapodinae housed at major Australian and overseas institutions (see below for listings and abbreviations). As well, I have identified much extralimital material, including all the undetermined Oriental and extralimital Australasian holdings from the following institutions: AMNH, AMS, ANIC, BMNH, CAS, CNC, MCZ, NZAC, PNGK, USNM, ZMUC, and only the Micronesian, New Caledonian and New Zealand material of the extensive BPBM collection. I had identified synoptic collections of Nearctic, Neotropical, Palearctic and some Afrotropical Sciapodinae at hand.

The extant primary type material for almost all Australian, extralimital Australasian, and Oriental species has been examined. Most dolichopodid types described by Becker (1922a) from the Hungarian National Museum, Budapest, and those described by Parent from the Hamburg Museum were destroyed. Also, some types described by Walker, G.H. Hardy, Wiedemann and others are lost. Neotypes have been erected in cases where original descriptions enable accurate identification, although many species are here regarded as *nomina dubia*.

Species are defined primarily on the basis of male genitalia and male secondary sexual characters (MSSC). I have tried to avoid splitting and intraspecific variation is discussed where evident. Isolated females which lack

diagnostic specific characters were left unidentified, but usually assigned to a species group. Keys are based on non-genital characters where possible, although accurate identification sometimes requires clearing the male postabdomen.

Species descriptions and locality data are condensed to avoid unnecessary repetition. In most cases, the figures are critical for accurate identification. Separate species diagnoses are omitted since the keys provide a more readily accessible set of diagnoses. Comments on the etymology of specific names are restricted only to those needing clarification. In most cases, the names have obvious morphological, geographical or patronymic sources.

Drawings of genitalia were made with a camera lucida attached to a compound microscope. The left lateral view of the hypopygium or male genital capsule is illustrated for most species. In describing the hypopygium, 'dorsal' and 'ventral' refer to morphological position prior to genital rotation and flexion. Thus, in figures showing a lateral view of the hypopygium, the top of the page is morphologically ventral, while the bottom is dorsal.

Morphological terminology follows McAlpine (1981). Features common to a group of species are listed in the introductory discussion and not repeated in descriptions unless needing clarification. Measurements are in millimeters and were made on representative dry specimens (often the holotype) but should not be considered as invariable for a species. Body length of males is measured from the base of the antennae to the tip of the seventh abdominal segment. Female body length is generally slightly shorter than that of the male unless otherwise noted. Wing length is the perpendicular distance to the apex from an imaginary extension of the humeral crossvein; wing width is measured from the junction of R_1 with the costa to the opposite side of the wing, perpendicular to the wing's long axis. The CuAx ratio is the length of the m-cu crossvein/distal section CuA. The position of features on elongate structures such as leg segments is given as a fraction of the total length, starting from the base. The relative lengths of the podomeres should be regarded as representative ratios and not measurements.

The ratios for each leg are given in the following formula and punctuation: trochanter + femur; tibia; tarsomere 1/2/3/4/5.

The following abbreviations and terms are used: MSSC – male secondary sexual character(s); non-genital characters found only on male body; FSSC – female secondary sexual character(s); non-genital characters found only on female body; I, II, III – pro-, meso-, metathoracic legs; C – coxa; T – tibia; F – femur; ac – acrostichal setae; ad – anterodorsal; av – anteroventral; dc – dorsocentral setae (a numbering system using subscripts indicates specific dc starting from the posterior end, thus dc_3 is the third seta anterior of the posteriormost seta); dv – dorsoventral; hm – postpronotal setae; np – notopleural setae; pa – postalar setae; pd – posterodorsal; pm – presutural supra-alar setae; ppl – proepisternal setae; pv – posteroventral; sa – postsutural supra-alar

setae; sr – presutural intra-alar setae; t – tarsus; t_{1-5} – tarsomeres 1 to 5.

The Oriental and Australasian zoogeographic regions cover varied landmasses of complex geographical and political association. The term 'Australasian' is used for the zoogeographical region east of Weber's Line. Localities are listed under modern political affiliation and follow Evenhuis (1989). 'Sundaland' includes those lands within the Sunda Shelf purportedly connected during Pleistocene glacials, viz., Malaysia, Indonesia west of Wallace's Line, and Palawan.

The following geographical abbreviations are used: ACT – Australian Capital Territory; NSW – New South Wales; NT – Northern Territory; Qld – Queensland; SA – South Australia; Tas. – Tasmania; Vic. – Victoria; WA – Western Australia.

Any reference to the location of material cited in the text will use the institutional abbreviations designated below: AMNH – American Museum of Natural History, New York; AMS – Australian Museum, Sydney; ANIC – Australian National Insect Collection, CSIRO, Canberra; BMNH – The Natural History Museum, London; BPBM – Bernice P. Bishop Museum, Honolulu; CAS – California Academy of Sciences, San Francisco; CED – C.E. Dye personal collection, Datchet, England; CMNZ – Canterbury Museum, Christchurch, New Zealand; CNC – Biosystematics Research Institute, Agriculture Canada, Ottawa; CUIC – Cornell University, Ithaca, New York; DEI – Institut für Pflanzenschutzforschung der Akademie der Landwirtschaftswissenschaften, Eberswalde-Finow; IRSN – Institut Royal des Sciences Naturelles, Brussels; MLUH – Martin Luther Universität, Halle am Salle; MCZ – Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts; MNHP – Museum National d'Histoire Naturelle, Paris; MVM – Museum of Victoria, Melbourne; NHMV – Naturhistorisches Museum, Vienna; NSW – New South Wales Department of Agriculture, Rydalmere; NRS – Naturhistoriska Riksmuseet, Stockholm; NTMD – Northern Territory Museum and Art Gallery, Darwin; NZAC – New Zealand Arthropod Collection, DSIR, Auckland; PNGK – Papua New Guinea Department of Primary Industries, Konedobu; QDPI – Queensland Department of Primary Industries, Brisbane; QMB – Queensland Museum, Brisbane; RNHL – Rijksmuseum Natuurlijke Historie, Leiden; SAM – South Australian Museum, Adelaide; TDAG – Tasmanian Department of Agriculture, Hobart; TMAG – Tasmanian Museum and Art Gallery, Hobart; TMB – Termesztudományi Múzeum, Budapest; UMO – University Museum, Oxford; UQIC – University of Queensland Insect Collection, Brisbane; USNM – National Museum of Natural History, Smithsonian Institution, Washington, DC; WAM – Western Australian Museum, Perth; ZMH – Zoologiska Museum, Helsinki; ZMHB – Zoologisches Museum, Humboldt Universität, Berlin; ZMUA – Zoologisch Museum, Universiteit van Amsterdam; ZMUC – Zoologisch Museum, Universitets Copenhagen; ZMUH – Zoologische Institut und Zoologisches Museum, Universität von Hamburg; ZSI – Zoological Survey of India, Calcutta.

Nomenclatural Changes

Many changes in sciapodine nomenclature first appeared in Bickel & Dyte (1989) as part of the Catalog of Australasian and Oceanian Diptera. They comprise new synonymy, new combination, and new status. To avoid confusion with the many additional nomenclatural notes in the present work, these previously published changes are not cited again. However, all nomenclatural matters involving Sciapodinae from the 1989 catalogue are discussed and justified in this revision.

Historical Summary

The study of the Australian Sciapodinae began with the description of three species by Walker (1835). During the remainder of the 19th century, additional species were added by Walker (1848-1849, 1852), Macquart (1842-1855), Erichson (1842), Schiner (1868), Thomson (1869) and Bigot (1890). White, the first Australian-based worker, published on the fauna of Tasmania (1917). Becker's 1922a monograph described new species and reviewed the existing literature. The prolific Australian dipterist, G.H. Hardy, provided notes and some descriptions (1930, 1935, 1952, 1959), but his synonymies of older names were often somewhat confused. Parent (1932a) gave an overview of the Australian fauna and described additional species in other papers. A total of 62 specific names were available for Sciapodinae described from Australian locales (excluding extralimital species now known to occur in Australia). Of these, 35 are considered valid (2 of which are unrecognised) and the remainder are in synonymy.

The taxonomic literature of the Oriental and extralimital Australasian regions is large and scattered. Among the important early works are those of Walker (especially his descriptions of the A.R. Wallace collections), Wiedemann and Macquart. Van der Wulp and de Meijere described many species from the Dutch East Indies. Becker's monograph (1922a) on the Indo-australian Dolichopodidae reviewed the existing literature and more than doubled the size of the known sciapodine fauna. In his survey of the pre-1920 literature, Becker omitted de Meijere (1913a), a paper subsequently overlooked by all later workers. Frey (1924-1925) and Lamb (1929), described Sciapodinae from the Philippines and Samoa respectively. Parent, in numerous papers between 1928 and 1941, added many new species and made substantial contributions to the knowledge of the New Zealand (1933b) and Malaysian (1935a) faunas. His studies on the type material of Macquart (1926, 1932e), Bigot (1932d) and Walker (1934a) are particularly valuable. Hollis' papers on the Dolichopodidae of Indonesia (1964a) and Sri Lanka (1964b), Dyte's 1975 catalogue of the Oriental Dolichopodidae, the Bickel & Dyte (1989) catalogue of Australasian and Oceanian Dolichopodidae, and Bickel's (1992) revision of the New Zealand fauna are the most recent

contributions to the literature.

An overview of the New World Sciapodinae is found in Becker (1922b). Subsequently, both Van Duzee and Parent described many species in the Nearctic and Neotropical faunas (see Foote *et al.*, 1965 and Robinson, 1970). Most species of the Palearctic fauna are treated in Parent (1938) and Becker (1918); also see Mueffels & Grootaert (1990). The Afrotropical fauna is catalogued in Dyte & Smith (1980).

The Sciapodine Genera and Their Definition

The historical and nomenclatural problem. The sciapodine genera have a long and confused taxonomic history. Aldrich (1904), in trying to define the genus *Psilopus*, wrote "...and I undertook to ascertain what name ought to be used for *Psilopus*, which has been known for many years to be preoccupied...the main difficulty was the host of subsidiary questions, historical and critical, which rose up to confront me. I have never found anything like it in previous excursions into the realm of nomenclature."

The preoccupied *Leptopus* (Fallén, 1823), is the earliest generic name for species in the Sciapodinae. The name was ignored and never replaced. *Psilopus*, proposed by Meigen (1824), was also preoccupied (Poli, 1795, Mollusca) and replaced with *Sciapus* by Zeller in 1842. (Despite being preoccupied, *Psilopus* was used by some workers until as late as 1958, as will be discussed.) *Sciapus* was broadly interpreted (= *Sciapus* s.l.) and accumulated species from all zoogeographic regions. *Chrysosoma*, and its unnecessary replacement name, *Agonosoma*, were proposed by Guérin-Meneville in 1831 and 1838, respectively. This genus is Old World tropical.

Bigot (1859, 1889, 1890) burdened the literature with many hastily-erected and poorly-defined genera. Fortunately, some of these have the same type species as earlier genera (mostly his own) and thereby are objective synonyms. However, one of Bigot's genera, *Condylostylus*, based on the lost and probably inaccurately described male *Psilopus bituberculatus* Macquart, was used by Becker and subsequently accumulated a large number of species, primarily from the New World.

Although *Psilopus* was known to be preoccupied, many workers continued to use the name, not as a strict equivalent of *Sciapus*, but as a convenient genus to place dolichopodids with an excavated vertex and forked M vein (ie, as an approximation of *Sciapus* + *Chrysosoma* + *Condylostylus*, broadly interpreted). In a practical sense, the use of *Psilopus* enabled authors to avoid the uncertain definition of the valid genera and the confusion created by Bigot. Verrall's mistaken conclusion (1907) that *Psilopus* was in fact available because it had never been used as a mollusc genus gave the name a new lease of life. Kertész (1909) followed Verrall and placed most sciapodine genera in synonymy

with *Psilopus* in his world "Catalogus Dipteriorum". It was almost with a sense of relief ("Ich folge dem Katalog hierin gern..") that de Meijere (1913b) accepted *Psilopus*, and he transferred his earlier species (mostly described in *Agonosoma*) to new combinations with the preoccupied name. Similarly, Van Duzee, who started describing species in *Sciapus*, also changed to *Psilopus* (without explanation) and used the name until 1929 for species later regarded as *Condylostylus* and *Sciapus* s.l. The last published use of *Psilopus* was Frey, 1958 (C.E. Dyte, personal communication).

Becker (1918, 1922a, 1922b) critically reviewed all previous generic names and finally laid *Psilopus* to rest. His definitions were followed in the numerous papers of Parent and other workers.

Prior to this revision, *Sciapus*, *Chrysosoma* and *Condylostylus* were the principal name bearers for the more than 1000 valid sciapodine species. Traditionally these genera have been separated by a combination of arisal position and colour of setae on lower calypter and frons. Yet in the Australian fauna alone, all of these characters are shown to differ among closely related species. Occasionally, both Becker and Parent expressed their uncertainty regarding the placement of species, where the "diagnostic" characters would place a species in one genus while the gestalt (the *air de famille* of Parent) would place it in another. For example, in his treatment of the New Zealand fauna, Parent (1933b) put closely related sciapodine species in different genera, but realising the difficulty of generic placement, also provided a key for separating all species without preliminary generic determination. The confusion in generic limits is reflected in the fact that each of the three major genera, *Chrysosoma*, *Sciapus* s.l. (as *Amblypsilopus*) and *Condylostylus*, now contains species originally described in the other two genera.

Lamb (1922) summarised the problem. "In spite of many efforts made to attain a natural division of the great mass of species appearing under the name *Psilopus*, no generic, or even subgeneric, divisions have so far been proposed that are other than highly artificial and indeed sometimes inconsistent."

Definition of genera. When I started work on the Australian Sciapodinae, it soon became apparent that the genera as defined were inadequate. Often a species had been placed in different genera by authors, and in some cases, even the two sexes of a species were in different genera. Consequently, previous generic concepts were set aside and a higher classification reconstructed up from the species level. The work was expanded to include the Oriental and extralimital Australasian faunas, and eventually a review of the world genera. Only after examining large numbers of species from all zoogeographic regions could a higher classification be constructed, with subsequent application of established and new generic names.

Most sciapodine species are readily recognisable and often distinctive, but genera have proved difficult to delimit. Indeed, it would be possible to construct a

world key to species, but a comprehensive world generic key requires numerous provisos and qualifications, and even then, not all species would be accurately placed. The subfamily shows great plasticity and parallelism, and traditional 'key' morphological characters used in isolation can be misleading. There are few strong defining characters at the generic or even subfamily level which do not show instances of reversal or lack of expression.

Dolichopodid species are defined on diagnostic male secondary sexual characters (MSSC), especially leg modifications and genitalia. Females, on the other hand, have a conservative facies and often cannot be accurately identified in isolation. However, these male characters, which are so useful in defining species, present a problem when used in higher level taxonomy and phylogenetic analysis. Although some taxa are accurately defined by a MSSC or suite of MSSC, in others the characters are more plastic. A given MSSC (which is usually regarded as an apomorphy from a presumed unmodified state) may not always be expressed in an immediate ancestor, sister taxon, or future derivative species, possibly causing related species to be placed in entirely different groups. In such cases of apparent 'reversal', phenotypic expression may merely be suppressed, yet the character is maintained in the genome, perhaps to be released and expressed in a derived species, thereby obscuring phylogenetic relationships.

For example, in the *Chrysosoma leucopogon* Group, many species have a distinctive swollen callus on the male third tibia (TIII). This is an good apomorphy where it occurs, and allows quick placement of numerous Indo-Pacific species. *Chrysosoma callosum* from Australia and the isolated *C. pacificum* from French Polynesia are almost identical in all characters, including genitalia, except *C. pacificum* lacks the callus. *Chrysosoma pacificum* is almost certainly derived from a callus-bearing species (possibly *C. callosum*), but absence of expression of this obvious character could easily lead an inexperienced worker to place the two species in different Groups. However, characters cannot be considered in isolation, and with a wider knowledge of the taxon, the true affinities of the species are recognised.

Yet by correctly including both species in the same group, the group definition is weakened. Instead of "all males with TIII callus," keys must state "*most* males with TIII callus". If, for example, one were to place all callus-bearing species in a well-defined group or genus, it would not be holophyletic (ie, not contain all descendants from an original ancestor) and it would create a paraphyletic residue, defined more by the absence of a callus than any strong character. Many large genera are paraphyletic in this way because they represent the residue after distinctive derived groups are removed. This problem is discussed by Gauld & Mound (1982).

As groups of species are aggregated to form genera, exceptions or reversals become evident in most characters, and potentially strong defining characters are diluted and must be qualified. Therefore, unless dealing

with compact, derived taxa which show little reversal, most large genera have to be defined as a mosaic of characters, a 'polythetic classification', no character in isolation necessarily being diagnostic for all members. This is particularly apparent in tropical taxa, where greater richness and hence potential plasticity dilute definitions. Often seemingly distinct genera in temperate regions break down in the tropics, a frequently heard complaint of North American entomologists when following a genus into the Neotropics. Since most genera are based on attenuated temperate faunas, such problems are to be expected.

Had I restricted myself to the Australian fauna alone, I would have had more clearly defined taxa. For example, in *Chrysosoma*, the *proliciens* and *leucopogon* Groups appear distinct in Australia, but lose their definition in the Papuan and Oriental source areas, where some species appear to 'float', potentially belonging in either group. That the two groups are closely related is not questioned, but combining them does not improve definition, because most *Chrysosoma* Groups overlap with each other. Similarly, *Chrysosoma* is not always distinct from other sciapodine genera. However, hundreds of *Chrysosoma* species must be accommodated, and even poorly-defined overlapping groups which are only approximately monophyletic are preferable to no subdivision at all.

In *Heteropsilopus*, a Gondwanan genus found in southern Australia and southern India, most species have a distinctive sinuate m-cu crossvein (Figs 123a-j, 124a,b), which is considered a synapomorphy. Yet *H. intermedius* from South Australia has an identical male tarsus II (MSSC) to the much larger sinuate crossvein species *H. brevicornis* (compare Fig. 53i and 53b), but it has a straight m-cu crossvein (Fig. 53j). These two sympatric species must be considered sister taxa based on their unique shared MSSC, but their distinctly different venation is a problem. The straight crossvein of *H. intermedius* is probably a reversal, but by placing it in *Heteropsilopus*, the generic definition is weakened. Indeed, if it weren't for the existence of *H. brevicornis*, I would have placed *H. intermedius* in the closely related straight crossvein genus *Austrosciapus* (the 2 genera have similar genitalia and other suites of characters).

In some cases, the conservative morphology of females has proved useful in associating groups based on strikingly different male characters. For example, the *Krakatauia funeralis* and *alanae* Groups are readily separated by radically different male hypopygia, while females are almost indistinguishable.

The limits of most higher sciapodine taxa are of necessity uncertain. Strong fixed apomorphies are rare, and most genera and species groups are defined by a suite of 'core' characters, usually distinctive MSSC, chaetotaxy and genitalic structure. However, as species lose or modify these diagnostic features, few characters may remain to associate them with the 'core', and if these characters also occur in other taxa, even generic placement becomes uncertain.

The mosaic of potential character states are found in

a range of combinations in the world fauna. The appearance of the similar MSSC (either *de novo* or the renewed phenotypic expression of a character state encoded in the genotype) in widely separated and distinct lineages can be very misleading. For example, the convergence of some Neotropical *Condylostylus* with Australasian *Chrysosoma* is striking. Even the convergence of male hypopygia is remarkable, as in the *Krakatauia alanae* Group (Fig. 46a,b) and *Plagiozopelma terminiferum* (Fig. 72a).

Unless a species displays most of the 'core' characters, placement to species group or genus remains uncertain. Thus specimens from the rich montane faunas of New Guinea, Sri Lanka or Burma may be difficult to place since their suites of characters associate them with several genera, or they key out vaguely as '*Chrysosoma*' or '*Amblypsilopus*'. Only the revision of regional faunas can establish the relationships of groups, with their defining core characters and potential range of variation. Then they can be linked to other groups and associated with a genus. In isolation, correct generic placement often remains uncertain.

For example, some New Zealand *Parentia* are close to Australian species and the trans-Tasman distribution of the genus is certain. However, a shift in the range of variability of the New Zealand fauna is evident in comparison with Australian *Parentia*, and some New Zealand species have totally lost the distinctive MSSC of their Australian congeners. Without knowledge of the variation of New Zealand *Parentia*, such species in isolation would only marginally be included with Australian-based *Parentia*. Further, the genus also occurs in New Caledonia, but generic affinity becomes clear only with respect to the variability in New Zealand, not directly to Australia. In other words, there has been a marked shift in the range of variability over space. In isolation, the New Caledonian species might not be associated with *Parentia* as defined in Australia, but considered either unusual endemics or perhaps derivatives from Melanesian *Chrysosoma*.

Many insect genera are of great age, as shown by the essentially 'modern' fauna in early Tertiary Baltic Amber (Larsson, 1979). These genera have persisted and continued to diversify throughout the Cenozoic, in marked contrast to such groups as the mammals, which have undergone both great radiation and extinction during the same time period. The absence of distinct morphological gaps between supra-specific taxa in many insect families may be a direct reflection of a rich diversity which has been only minimally affected by extinction since the early Tertiary.

The difficulty of defining genera brings up a much greater problem: the influence of geographical provenance on taxonomic placement. Consider the *proximus* and *dendrohalma* groups, which are both included in *Austrosciapus* because they have a similar morphology and a similar distribution within Australia. Would they also be placed together if the *proximus* group occurred in Australia and a group of species exactly like the *dendrohalma* group occurred in Africa? Possibly not,

because the two groups do not share strong enough defining characters (let alone synapomorphies) that would *demand* they be placed together. Such an imaginary Afrotropical *dendrohalma* Group could just as well be derived from a distinctly different lineage of African sciapodines. Thus we have the problem of defining taxa partially influenced by geography and then using these taxa to discuss biogeography. This is an underlying difficulty in dealing with rich, widespread insect taxa. Most revisions are regional by necessity, and supposed taxonomic gaps and the placement of marginal species often reflect a regional viewpoint.

In this work, the genera of Sciapodinae are usually based on a mosaic of characters. Not all can be strongly defined, and some are based on plesiomorphic characters. Genera are subdivided into groups of related species, each bearing the name of a prominent included member, and large groups are sometimes further subdivided into assemblages. Such groups are much more useful than subgenera, since they allow flexibility of definition, to be expanded or restricted with future work, and species can be transferred among groups without formal nomenclatural change. Groups of species usually share some diagnostic MSSC, hypopygial form, body habitus, colouration and/or habitat preferences. As such, they represent putative monophyletic taxa and are the most convenient units for discussion of phylogeny, biogeography and ecology. However, it must be remembered that although many diagnostic character states are derived, the ancestral state is not always apparent. For example, a distinctive male cercal configuration could be derived from either a postulated 'unmodified' groundplan state, or another derived state. At best, the groups are monophyletic, or at least paraphyletic.

Some genera newly placed in synonymy, such as *Australiola*, *Sciapolina* and *Megistostylus*, were based only on prominent MSSC (eg, striking wing modifications), yet females of included species are indistinguishable from females of other genera. Such taxa do not deserve generic rank for three reasons: a) males with 'less spectacular' but nevertheless distinctive MSSC are not separated from the major genus; b) retaining their separate status makes the major genus obviously paraphyletic; c) intermediate stages of MSSC modification are often evident. As such, these genera have been placed in synonymy, although often retaining some status as species groups.

New combinations are presented here for all zoogeographic regions, the result of generic reorganisation. Previously, three large genera, *Sciapus*, *Chrysosoma* and *Condylostylus*, contained some 1,000 valid names. Their redefinition and the re-establishment of some previously synonymised genera resulted in many species requiring new combinations. *Sciapus* presented a special problem since the old genus *Sciapus* s.l. included numerous species worldwide. With the restriction of *Sciapus* to a small predominately Holarctic taxon, the residue had to be referred to other genera, with generic decisions and new combinations for species

from all zoogeographic regions. The next available name, *Amblypsilopus*, which had been regarded as a junior synonym of *Sciapus*, received much of the *Sciapus* residue. I have not seen all described species nor are most original descriptions adequate. Thus for many species, *Amblypsilopus* must act as a 'holding genus' until they can be critically reviewed and their correct placement ascertained.

With such complexity, the attractiveness of the old preoccupied name *Psilopus* and its revival at the beginning of the century becomes readily apparent. Although placing species into such a large 'super-genus' solves a nomenclatural problem, the phylogenetic problem remains the same at whatever level taxa are divided. A few character state shifts can mask a species' true affinity, and major regional revisions are required before the world sciapodine genera are fully understood.

Morphology

This section provides an overview of sciapodine morphology and justification for character polarisations used in the Phylogenetic Analysis. Also see discussions of venation and male postabdomen under Systematic Position of the Sciapodinae.

I. General. *Absence of melanisation.* Most dolichopodids have dark coloured body cuticle with metallic reflections. However, various taxa lack such melanisation, and have part of the thorax and/or basal abdominal segments translucent orange-yellow. In most cases, the dorsal mesonotum and/or distal abdominal segments remain at least partially metallic coloured. Such absence of melanisation is regarded as secondary, and has been derived many times throughout the Dolichopodidae. It is particularly evident in the subfamilies Sciapodinae, Sympycninae, Neurigoninae and some Medeterinae. Species with such orange-yellow colouration are found primarily in shaded forest habitats, although closely related more melanised forms are often found in the same habitat.

The prolongation of the legs and abdomen, making flies appear 'delicate', is a marked tendency in the Sciapodinae, especially in *Amblypsilopus* and *Sciapus* (eg, Fig. 93). Also characteristic of such gracile habitus is the general reduction of leg, especially of the tibiae.

II. Head. *Dorsal postcranium.* The dorsal post-occiput is slightly convex in the Sciapodinae, as contrasted with the concave condition in the Medeterinae.

Excavated vertex. The vertex is dorsally excavated between the ocellar tubercle and frons, and usually less deeply excavated in females. In some *Sciapus* (especially the two species previously regarded as *Psilopiella*) and *Pilbara octava* (Fig. 33b), such excavation is very shallow. An excavated vertex is considered part of the sciapodine groundplan.

The excavated vertex in combination with the lateral

expansion of the eyes often gives sciapodine heads a 'dumb-bell' appearance in anterior view (eg, Figs 72e, 90a), in contrast with the circular shape of many Dolichopodinae and Diaphorinae (Robinson & Vockeroth, 1981, figs 4, 7), or the ovate shape of the Medeterinae.

Postvertical setae. Strong postvertical setae (1-2) are usually present, and are positioned as a linear continuation of the postocular setal row.

Vertical seta. Females almost always have a pair of strong vertical setae on the slope of the frons. In males the verticals are either strong, reduced to a weak hair, absent, or indistinguishable among a group of numerous hairs (MSSC) laterally on the frons. In *Condylostylus*, both sexes have the vertical seta arising on a distinct setose mound. The presence of strong verticals in both sexes is considered part of the dolichopodid ground plan. However, vertical setae are totally absent in both sexes of *Amesorrhaga*.

Eyes. The eyes occasionally have the anteroventral facets distinctly enlarged, especially in males. The eyes usually appear bare, with only tiny setulae between the facets, but in some species, eg, *Krakatauia macalpinei*, males have long hairs between the facets (MSSC), while females have only short hairs. However, as pointed out by C.E. Dyte (personal communication), female *Condylostylus umbrinervis* Parent have hairy eyes (the male is unknown), as do both sexes of *Ethiosciapus lasiophthalmus*.

Bulging face. The male face sometimes bulges strongly beyond the eye margin (MSSC), eg, *Dytomyia tumifrons* (Fig. 31b), while in the female, the face usually conforms with the eye curvature in lateral view.

The face and clypeus are usually well developed, and always wider in females than in males, a common condition in Diptera. However, in both sexes of *Mascaromyia* the face is very narrow the eyes are almost joined across the face. Although male holopticism occurs in such dolichopodid subfamilies as the Diaphorinae (where the eyes are sometimes joined across the frons) and the Sympycninae as well as many primitive dipteran families, such a condition in the Sciapodinae is regarded as a reversal or 'apparent plesiomorphy'.

The face and clypeus are often covered by silvery or grey pruinosity which is sometimes orientated, so that according to the angle of view the face appears either silvery or metallic green. In most cases, the anterior view is silvery, with oblique views greater than 45° metallic green.

Frontoclypeal suture. The frontoclypeal suture is usually more evident in males than females, and the male clypeus usually projects anteriorly somewhat. The New Zealand *Parentia dictaeta* (Bickel, 1992, fig. 41) and some undescribed Afrotropical sciapodines (Uganda, CNC) have a greatly prolonged clypeus (MSSC).

The clypeus and proboscis are often narrowed in males, especially in the Chrysosomatini, and appear to be free from the eye margin (MSSC), while in females, the clypeus is almost always adjacent to eye margin (Figs 52a,b, 90a,b). The clypeus adjacent to eye margin

in both sexes is considered plesiomorphic.

Pedicel. The pedicel usually has short dorsal and ventral subapical setae. However, many *Chrysosoma* have long dorsal and ventral setae present, and some male *Condylostylus* and *Parentia* have a ring of long subapical setae encircling the pedicel.

Aristal position and first flagellomere shape. The position of the arista on the first flagellomere has been the most misleading character in the generic classification of the Sciapodinae. Previously, species with an apical arista were referred to *Chrysosoma* while those with a dorsal arista were usually placed in *Sciapus* or *Condylostylus*. As a result, closely related species or even sexes of the same species were placed in different genera.

The shape of the first flagellomere and position of the arista are interrelated. Three arbitrary morphological forms along a continuum of variation are proposed. (i) A subrectangular first flagellomere with the arista arising dorsally near its base and with the first flagellomere retreating under the base of the arista producing a 'dorsal arista' (Figs 18b, 41c). (ii) This grades into the 'dorsoapical arista' (Fig. 67g), where the first flagellomere is triangular and meets the arista along the dorsal margin without retreating. The varying interpretation of dorsoapical aristae as either 'dorsal' or 'apical' (often appearing different according to the angle of view), has caused much of the generic uncertainty. (iii) The 'apical arista' is usually found on the end of a conical or isosceles triangle shaped first flagellomere (perhaps with a slight dorsal asymmetry), and the arista is positioned distinctly at the apex (Figs 62g, 67f).

The dorsal arista is considered primitive for the Sciapodinae and from this, the apical arista has been derived independently several times. The 'apical arista' appears to have originated first in males as a MSSC, then to have become secondarily incorporated into the female phenotype. There are four lines of support for this hypothesis. (i) The Australian *Heteropsilopus cingulipes* Group has species which display aspects of the complete transition: both male and female with dorsal arista (*H. ingenuus*); males with dorsoapical to apical arista (MSSC) and females with dorsal arista (*H. squamifer*); both males and females with an apical arista (*H. tweedensis*). (ii) Development of an apical arista is strongly correlated with prolongation of the arista and often with the development of apical flags on the male. In dorsal-arista sciapodines (eg, most *Amblypsilopus*), the arista is usually not much longer than the head height and is rarely modified in males. However, in species which have secondarily developed apical aristae, as in both sexes of *Amblypsilopus pallidicornis* Group (Fig. 100f), the arista is longer than twice the head height, and longer in males than in females. (iii) Male arisal modifications such as apical flags (MSSC) are found almost entirely in species with an apical arista, at least in the Sciapodinae (however, in the Sympycninae, such as the neotropical *Sympycnus andicola* (Bigot) and the Australian *Yumbera* Bickel, arista flags occur on distinctly dorsal aristae). (iv) Even in *Chrysosoma*, where both sexes typically have an apical arista, some females

(eg, *C. crinorne* and *C. proliciens*, Fig. 62f,h), have a distinctly dorsal arista and appear to retain the ancestral groundplan configuration. Here the male arista is distinctly apical (Fig. 62g), even if strongly modified as in *C. crinorne* (Fig. 62e).

As previously treated, *Chrysosoma* represented a evolutionary grade. The apical arista has evolved independently at least ten times in the Sciapodinae and occurs in the following taxa: *Chrysosoma*, *Plagiozopelma*, some neotropical *Condylostylus*, some *Amblypsilopus* (*pallidicornis* Group), some *Heteropsilopus*, some *Parentia*, *Dytomyia* (*D. tumifrons*), *Ethiosciapus*, *Abbemyia* and some *Krakatauia*. In *Mesorhaga*, *M. lamondensis* has a distinctly dorsal arista on males and an apical or 'distal' arista on females, but the first flagellomere is subrectangular, not triangular (Fig. 20e,f).

Male arisal flags (MSSC). Spatulate or lanceolate flags or flattenings at the apex or along the shaft of the male arista have evolved independently at least six times in the Sciapodinae: the *Chrysosoma leucopogon* Group, *Plagiozopelma* (especially the striking modifications of the Afrotropical *bequareti* Group), *Krakatauia*, some *Parentia* (the New Zealand *P. dictaeta* and *P. mobilis*), some Australian *Heteropsilopus*, and some neotropical *Condylostylus*.

The ventral postcranium is usually covered with pale or sometimes black setae. In the *Plagiozopelma angustifacies* Group, females have additional strong spines projecting from the ventral postcranium (FSSC).

III. Thorax. *The mesoscutum* sometimes has matt brown or bronze vittae over the ac band and laterally above the notopleuron.

The reduction/loss of thoracic chaetotaxy, especially the acrostichal and lateral scutellar setae is often a function of body size. For example, lateral scutellar setae are absent in small members of the *Amblypsilopus flaviappendiculatus* Group, but present in larger species. Such size-related reduction/loss of chaetotaxy is also evident in the Medeterinae and Sympycninae. However, size-related loss of chaetotaxy must be distinguished from both phylogenetic loss and loss from sexual dimorphism.

Acrostichals (ac). The acrostichals are variously developed, ranging from two to five long strong pairs, to reduced or irregular pairs, short setulae, or totally absent. The development of ac is often stable for both sexes at the species group level.

Dorsocentrals (dc). The Sciapodinae have four to six pairs of dc, which in females are almost always strong and well developed. The posteriormost pair is laterally offset from the anterior dc, and the two posterior dc are always strong in both sexes. However, the anterior dc in male *Chrysosomatini* are usually reduced to weak hairs (MSSC). The presence of strong, non-dimorphic dc in both sexes is considered plesiomorphic for the subfamily. However, almost all major genera show instances of reversal, where males within characteristically dimorphic taxa have all dc strong. Such reversal in at

least some species is evident in *Heteropsilopus*, *Austrosociapus*, *Amblypsilopus*, *Parentia*, *Chrysosoma*, *Plagiozopelma* and *Krakatauia*.

Yet even the usually conservative dc facies of females is altered in some species. In female *Austrosociapus crater* and *A. ravenshoensis*, only the two strong posterior dc are present and the anterior dc are totally absent (FSSC), while males have anterior dc reduced to weak hairs (MSSC). As well, female *Amblypsilopus nambourensis* show reduced hair-like dc, normally only a MSSC.

Scutellar setae. Most sciapodines have two pairs of scutellar setae, the median and lateral (however, the relict New Zealand genus *Naufraga* has three pairs of scutellar setae). The median scutellars are always strong. The lateral scutellars are either strong (about two-thirds length of medians), variously reduced in size to tiny weak hairs, or absent. Within species with lateral scutellars normally absent, occasional specimens will have lateral scutellars present as tiny hairs. Normally there is little sexual dimorphism in lateral scutellar development. The reduction/loss of lateral scutellars has occurred independently in the several sciapodine genera, and is also known from other dolichopodid subfamilies (eg, Medeterinae).

Supernumerary setae. The mesoscutum and scutellum sometimes have long fine unpaired or apparently paired supernumerary setae, present either in the main setal rows or elsewhere. Although these are usually found only on males as MSSC, they are sometimes also expressed in the female phenotype (eg, *Parentia nigropilosa*, *P. malitiosa*). Supernumerary setae are often found on large-sized males in the genera *Chrysosoma*, *Heteropsilopus* and *Parentia*.

Propleural seta. In the Sciapodinae, only *Amesohaga* and *Negrobovia* have a strong seta on the lower propleuron. All other sciapodines have a bare propleuron. The presence of a strong lower propleural seta is considered part of the dolichopodid groundplan and plesiomorphic for the Sciapodinae.

The Sciapodinae has *no mesoscutal flattening* of the type found in the subfamilies Medeterinae and Neurigininae.

IV. Legs. *Coxa I vestiture.* Coxa I often has strong distolateral setae, distinct from the remaining short vestiture. Some genera have three strong black distolateral CI setae on both sexes, eg, *Negrobovia*, *Condylostylus*, *Parentia* and some *Chrysosoma*. *Amesohaga* has five to six black CI setae. Possibly the presence of these black distolateral setae are part of the sciapodine groundplan.

In most *Plagiozopelma* species, females have three to seven strong lateral spine-like setae along CI (FSSC). These are only weakly developed in males (Fig. 67b). Female *Heteropsilopus brevicornis* show a similar development with three strong CI setae, absent in males.

CIII usually has a strong lateral seta which is sometimes accompanied by additional long hairs.

Femoral preapical setae. Most sciapodines lack preapical femoral setae. However, *Amesohaga* and

Negrobovia have a strong anterior preapical seta on FII and FIII, and *Sciapus* has one on FIII only. Some female *Chrysosoma*, *Parentia* and *Condyllostylus* have weak, ventrally positioned preapical setae on FII, but these are not here regarded as true homologues of the anterior preapical setae. A weak posterior preapical seta on FII and/ or FIII is evident in some genera. However, these are not always distinct from the surrounding vestiture.

Similar preapical setae are found in other dolichopodid subfamilies, notably the Dolichopodinae and the Sympycninae. Although prominent in most Dolichopodinae, anterior preapicals have also become secondarily reduced/lost in some Australian Sympycninae. The presence of femoral preapical setae (both anterior and posterior) and FII and FIII is regarded as part of the groundplan of the Dolichopodidae.

Other femoral chaetotaxy. The femora show a wide range of chaetotaxy, ranging from long strong av and pv setae, as in many *Parentia* and some *Chrysosoma*, to almost entirely bare with only weak pale ventral hairs.

The female femur I, especially in the genera *Sciapus*, *Mascaromyia*, *Dytomyia*, *Pilbara* and some *Plagiozopelma*, has a group of two to six short, usually pale ventral setae in the basal third, sometimes with each seta on a mound-like pedicel (FSSC). Corresponding males in such genera have FI ventrally bare, with weak pale hairs, or variously with short to long strong basoventral setae.

Male *Negrobovia* species have a *ventral subapical excavation and projection on FI*, which corresponds to a ventral callosity at one-eighth on TI (Fig. 24b) (MSSC). This modification is analogous to modified forelegs in male *Hydrophorus* (Hydrophorinae) and *Sepsis* (Family Sepsidae) and perhaps are similarly used for grasping females while coupling and mate guarding (see Dyte, 1988).

Tibial chaetotaxy. The presence of two to three sets of strong ad and pd setae on TII and/or TIII is considered primitive for the subfamily. The genus *Naufraga* also has similar ad-pd setae present on TI. The ad-pd sets are often slightly offset on the tibia, so that one is slightly basad or distad of the other. Females usually retain this basic chaetotaxy as part of their conservative facies. However in males, it is often reduced/lost, and sometimes replaced with modified setae (MSSC). In some taxa, both sexes have reduced tibial chaetotaxy. As noted previously, gracile long-legged sciapodines usually have strongly reduced tibial setation.

Strong tibial chaetotaxy is found in many other dolichopodid subfamilies, especially the Dolichopodinae and Diaphorinae.

Genera such as *Chrysosoma* and some *Condyllostylus* often have strong dorsal and ventral setae on TI which are often diagnostic at the species level, and sometimes sexually dimorphic.

MSSC variously developed on legs I and II include: crocheted setae; short correct setae, especially on leg II, and flattened, twisted, or prolonged podomeres. Often the male It_1 is slightly flattened with pale ventral pile,

a MSSC occurring in many taxa.

Of particular interest is the posterior curved subapical TI seta found on many Australasian and Oriental *Amblypsilopus*. The occurrence of this seta is discussed further under *Amblypsilopus*.

Males of some Australasian *Amblypsilopus* sometimes have either TI or It_1 greatly elongated, with corresponding shortening in the other podomere (MSSC). For example, in *A. brevitibia*, It_1 is more than twice the length of TI (Fig. 98f,g), whereas in *A. flaviappendiculatus*, TI is more than ten times the length of It_1 (Fig. 112d). In most species, It_1 is about half the length of TI.

Tibia III callus (MSSC). Males of several genera have a dark callus-like swelling variously positioned on TIII (MSSC), but often centred near one-fifth. In some *Parentia* and the *Chrysosoma leucopogon* Group, the posterior surface of the callus is excavated and bears fine hairs. TIII callosities are found in *Parentia*, the *Chrysosoma leucopogon* and *noumeanum* Groups, *Dytomyia*, *Narrabeenia*, some *Krakatauia*, some *Heteropsilopus*, and some *Condyllostylus* (the Afrotropical *C. stenurus*), and possibly arose independently at least six times. In some males of the *Austrosciapus proximus* Group, a brown band is present at one-fifth on TIII, but no swelling or modification is evident.

Flattened and pad-like tarsus III (MSSC). Male $III_{3,5}$, $III_{3,4}$, or $III_{4,5}$ have become flattened with ventral pad-like surfaces (MSSC) at least 8 times independently in the following genera: *Parentia*, *Negrobovia*, *Mesorhaga* (some Nearctic species), *Condyllostylus* (some Neotropical species), some *Krakatauia*, *Chrysosoma*, *Amblypsilopus* (*flaviappendiculatus*, *glaciunguis*, *zonatus* and *abruptus* Groups), and *Austrosciapus* (*storyei* and *sarinensis* Groups).

Enlarged pulvilli (MSSC). Males of some species, such as the Australian *Mesorhaga zborowskii* and *Austrosciapus pulvillus* have enlarged pulvilli subtending the claws on tarsomere 5. Similar enlarged pulvilli are encountered elsewhere in the Dolichopodidae, especially the Diaphorinae.

Enlarged tarsal claws (MSSC). Male have greatly enlarged claws only on tarsus I in the *Krakatauia trustorum* Group.

V. Wing. *Wings are usually hyaline*, although sometimes with a uniform smokey or brownish wash. A number of taxa have distinct maculations, either in both sexes or as a MSSC only. If both sexes have marked wings, the pattern may be similar as in most *Heteropsilopus*, *Condyllostylus*, and the *Austrosciapus proximus* Group, or sexually dimorphic, as in the *Chrysosoma lucigena* Group.

Maculations are sometimes faint in specimens, with only grey clouding representing the normal dark brown pattern. Hardy (1960) noted that the intensity of wing maculation developed with age in live *Heteropsilopus squamifer*. However, I have seen specimens of *Austrosciapus proximus* which appear mature but only a grey smokey wash is present, while on the other hand,

apparently teneral specimens have dark brown maculations. Also, I have collected both weakly and strongly maculated male *A. proximus* together off leaves at Tooloom Scrub, NSW, none of which were teneral. The intensity and extent of maculation is intraspecifically variable in *A. triangulifer* from the Cairns district. Intensity may be therefore a combination of both intraspecific variation and age (Fig. 125f-h).

Maculations are developed as a MSSC in some males. This is often as apical spots, as in *Amblypsilopus zonatus* (Fig. 128a), *A. liepae* (Fig. 128c) and *Krakatauia recta*. In species near the Samoan *Chrysosoma lacteimicans* and in the Sri Lankan *Heteropsilopus pulcherrimus*, males have strongly maculated wings while female wings are hyaline. However, females of the *Austrosclapopus tumidus* Group often show faint wing bands which are absent in males. This group is close to the *proximus* Group where both sexes often have strong banding. Possibly this reflects the more conservative females retaining a faint remnant of an ancestral maculation which was lost in males. Also, in the *Austrosclapopus hollowayi* Group, female *A. pulvillus* have stronger wing maculations than males.

Wing maculations are often convergent in pattern, such as in the dark brown bands of many Neotropical *Condylostylus* and the Australian *Austrosclapopus proximus* Group, and the Sri Lankan *Heteropsilopus pulcherrimus* and the New Guinea *Chrysosoma lucigena*. Yet in each case, they are most closely related to hyaline wing species.

The anal angle is usually present, although sometimes reduced/lost in males as a MSSC, eg, *Amblypsilopus liepae* (Fig. 128d), and occasionally in both sexes, eg, *Austrosclapopus hollowayi* (Fig. 127b,c).

As is characteristic of all Dolichopodidae, vein *Sc* is incomplete and fails to reach the costa. In the Sciapodinae, *Sc* usually fuses with R_1 but sometimes appears to fade out within cell *c*.

M_1 usually forms a concave curve to the wing apex, but sometimes it is strongly recurved as in most *Condylostylus* (Fig. 124c), elbowed, straight, or even slightly convex (as in the *Chrysosoma vittatum* Group). The curvature of M_1 is often diagnostic of species groups or genera, but this character is difficult to polarise.

Branching of *M*. The branching of vein M_2 off the main vein *M* is the most distinctive feature of sciapodine morphology, and allows most members of the subfamily to be recognised at a glance. However, M_2 has become evanescent or lost independently in several lineages, either as a MSSC (eg, *Amblypsilopus zonatus*) or permanently in both sexes (eg, the genera *Mesorhaga* and *Pilbara*, and the *Amblypsilopus topendensis* Group). Vein M_2 is considered part of the groundplan of the Sciapodinae and the Dolichopodidae as a whole, and its loss is derived. (Also see discussion under Systematic Position of the Sciapodinae.)

Crossvein m-cu. The crossvein m-cu is variously straight, externally bowed, or sinuate, and the shape of m-cu is usually stable at the level of species group or

even genus, but is sometimes variable among closely related species (eg, *Chrysosoma crypticum* and *C. arrogans*, and *Heteropsilopus brevicornis* and *H. intermedius*). Since most other dolichopodid subfamilies, including the Dolichopodinae, have a straight m-cu, a sinuate m-cu is regarded as derived.

The strongly sinuate m-cu crossvein of some *Heteropsilopus* species bears an adventitious external stub-vein as a species level character, not an aberration. Negrobov (1978) regarded such stub-veins as possibly representing the rudiments of vein M_3 . However, similar but internally directed stub-veins also occur, as in *Plagiozoplema appendiculatum*, and such veins are best regarded as adventitious. Similar adventitious veins sometimes occur in other dolichopodid subfamilies (Medeterinae, Bickel, 1985) and families of Diptera (Lamb, 1921a).

Crossvein bm-cu. The crossvein bm-cu (= basal crossvein or t_b of authors) which separates the basal medial cell and discal cells is only incompletely developed in most sciapodine genera, except *Mesorhaga* where it is completely absent. This crossvein is absent in other dolichopodid subfamilies. The incomplete development of crossvein bm-cu is regarded as part of the sciapodine groundplan and also a synapomorphy with the possible sister group of the Dolichopodidae, the Parathalassinae and related genera, from the complete condition in primitive Empidoidea (Ulrich, 1991). Thus its total loss has occurred at least twice within the Dolichopodidae, in *Mesorhaga* and in other dolichopodid taxa.

Modified costal setae (MSSC). The male costa sometimes has an anteroventral (av) and/or anterodorsal (ad) crocheted or flattened setae (MSSC), usually extending to vein R_{2+3} . This modification has developed independently at least five times in the Sciapodinae: *Parentia*, some *Pseudoparentia*, some Nearctic *Amblypsilopus*, the *Chrysosoma proliciens* Group, and the *Heteropsilopus triligatus* Group.

Additional MSSC, variously developed in taxa, include blister-like swellings within the wing membrane (*Dytomyia sordida* Group), loss of veins, and the thickening or distortion of veins, costa and/or wing margin.

Haltere. Some genera, especially *Parentia*, *Negrobovia* and some *Mesorhaga*, have species showing sexual dimorphism in haltere colour, being black in males and yellow in females. But in each genus, other species have yellow halteres in both sexes, which is the commonest and probably plesiomorphic condition in the Sciapodinae. Black halteres in such sexually dimorphic species is considered a MSSC. In some taxa (eg, the *Krakatauia funeralis* Group, and some species of the *Amblypsilopus rimbija* Group) both sexes have black halteres.

VI. Abdomen. In many sciapodines with metallic blue-green abdomens, the *tergal overlap of segments 2 to 6* (ie, the distal margin of one segment and the base of the proceeding segment) is often a matt brown-purple colour.

Abdominal plaques. These are ovate dot-like

depressions along the ventral margins of terga 2 to 5, and are often present in Brachycera Orthorrhapha (see Stoffolano *et al.*, 1988 for discussion). In the Sciapodinae, they are well developed in females but in males of many genera they are highly reduced in size and not readily apparent on specimens, without clearing of the abdomen. Abdominal plaques well developed in both sexes is considered primitive and their reduction in males is derived. This has occurred independently several times in the Sciapodinae, and is also known in other dolichopodid subfamilies.

Tergal window. The sciapodine first tergum has a semicircular membranous excavation which adjoins the metanotum (Fig. 1a). This excavation is bordered posteriorly by a band of normally sclerotised cuticle which overlaps tergum 2. The size of this 'tergal window' is variable among Sciapodinae genera but is always much larger in males. There is a functional correlation between the degree of excavation and the dorsoventral flexibility of the abdomen. In males the abdomen is often longer and more flexible (presumably to arch and thrust it during mating) while the female abdomen is tapering, cigar shaped and less mobile. When the abdomen is elevated back against the thorax, the curvature of the metanotum fits into the excavation and thus rests against the tergal window, but when the abdomen is thrust downwards and forwards during mating, the membrane will be stretched. The greatest expanse of membrane is evident in male *Heteropsilopus*.

Although a membranous connection exists between the metanotum and abdomen in other dolichopodid subfamilies, such windows are not so well developed. This 'tergal window' should not be confused with the membranous 'pseudotergit' found between segments 1 and 2 on *Neurigona* (see Parent, 1938).

This tergal window is one of several morphological adaptations to increase abdominal flexibility in mating, and allow the Dolichopodidae, which all mate on a substrate, to couple more effectively in the 'male dorsal' position. Other adaptations in male dolichopodids include an elongate hypopygial peduncle (abdominal segment 7), prolonged abdomen, and in some cases, an enlarged hypopygium. (For discussion of mating see Natural History).

VII. Male postabdomen. Negrobov & Stackelberg (1971) and Ulrich (1974) have used *Sciapus platypterus* to represent sciapodine hypopygial morphology. Although it is the generic type species, its hypopygium is derived and reduced, even within the genus *Sciapus*, and is not characteristic of the subfamily. Genera such as *Heteropsilopus*, *Parentia*, *Chrysosoma* or most *Amblypsilopus* are more representative of general sciapodine hypopygial morphology (Fig. 1b).

Male abdominal sterna 5 to 6 are usually concave and only weakly sclerotised so as to receive the hypopygium and cerci when held at rest under the abdomen.

Male *Austrosciapus riparius* have a pair of sclerotised projections on abdominal sternum 4, which enclose the hypopygium when it is drawn under the

abdomen (Fig. 79c). They do not appear to be related to the membranous 'eversible sacs' present on male sternum 4 of Dolichopodinae which possibly function as pheromone glands (see Crampton, 1942; Couturier, 1975).

Sternum 4 of male *Austrosciapus balli* forms a heavily sclerotised plate distally bearing a pair of elongate internal apodemes which project anteriorly into segment 3 (Fig. 87e,f).

The male tergum and sternum 7, which form the hypopygial peduncle, are variously developed (also see discussion in Systematic Position of the Sciapodinae). Usually tergum 7 is well developed and sternum 7 is reduced to a sclerotised band attached to the ovate sternum 8 which covers the hypopygial foramen. However, in *Mesorhaga* (Fig. 17c), and some *Consylostylus*, sternum 7 is membranous and tergum 7 encloses the base of the epandrium.

The size of the sciapodine hypopygium with respect to body size varies greatly. At one extreme is the great enlargement in *Dytomyia sordida* (Fig. 28), while on the other hand, the minute hypopygium of *Amblypsilopus neoplatypus* (Fig. 91e) seems almost aberrant.

The hypopygial foramen is usually left lateral in position, but has become secondarily basal in some taxa (eg, the *Dytomyia sordida* Group, Fig. 30a).

The hypandrium in most Sciapodinae is asymmetrical, with a 'hood' and a left lateral hypandrial arm arising near its base. This hypandrial structure is considered to be part of the sciapodine groundplan. The hypandrial arm usually parallels the left side of the aedeagus (Figs 48b,c and 53d) but sometimes crosses to the right side. The shape of the hypandrium, and length and relative position of origin of the hypandrial arm are often diagnostic for species groups. In some instances, both the left lateral arm and hood have become shortened and so reduced in size so that the hypandrium appears split, as in *Condylostylus*. In the *Parentia nudicosta* Group, the hypandrial arm is absent, probably a secondary loss, since it is well developed in congeners.

However, there are other configurations: hypandrium symmetrical, tapering narrow and elongate (*Mesorhaga*, Fig. 17a); hypandrium symmetrical but distally expanded with deep U-shaped excavation, distinct hypandrial arm not evident (*Negrobovia*, Fig. 26a).

The aedeagus is usually simple and bladelike. The presence of a distinct 'dorsal angle' (Fig. 1b), or sharp bend midway along the dorsal aedeagal margin is characteristic of most Sciapodini and Chrysosomatini, and is considered derived from an entire margined state. However, the dorsal angle is variously present or absent in *Parentia* species.

Epandrial setae (usually 2, sometimes only 1 or totally absent) are present along the ventral margin, but are sometimes downturned into the genital chamber. Some specimens may show a right-left asymmetry, with one side having the usual two setae, the other side with only one, but this is regarded as an individual developmental variation and not a species character. In the tribe

Mesorhagini, a single strong seta (possibly equivalent to the epandrial seta) is present near the base of the epandrial lobe.

Epandrial lobe. In most Sciapodinae, the epandrial lobe is a collar-like peduncle with strong apical and subapical bristles. This may be variously modified, with reduction and loss of the peduncle, fusion with the surstylus, and/or loss or modification of the bristles. In *Mesorhaga* (eg, Fig. 17d), the epandrial lobe is flattened and ovate, bearing the bristles at midpoint on the inner margin, and apically. The epandrial lobe bristles are sometimes modified, as in the forked bristles of the *Amblypsilopus argyrodendron* Group (Fig. 104a) and the multiple setae of the *A. sideroros* (Fig. 119c).

This single epandrial lobe of the Sciapodinae is the fused homologue of the two epandrial lobes (each bearing a single strong bristle) of the Medeterinae, a subfamily which shows instances of secondary fusion of the lobes, as in *Thrypticus*.

The surstylus characteristically has a large ventral lobe and digitiform dorsal projection, although it is widely modified within the subfamily. The setation and form of the surstylus is often diagnostic at the species and group level.

The extent of fusion of the surstylus with the epandrium varies even among species of the same Group. In some species a distinct suture or zone of weakness is evident, while in others the surstylus and epandrium are fused with no evidence of a suture.

Presence of dorsal appendage. Negrobov (1986) claimed the Sciapodinae has a 'dorsal process' (= dorsal appendage, dorsal anhang, or telomere). However, this

apparent 'dorsal process' in the Sciapodinae (as interpreted in *Sciapus* s.s.) is a semi-detached basoventral section of the cercus (the 'Organ X' of Becker, 1918). It is found only on *Sciapus* and possibly some *Dytomyia* (eg, Fig. 30a,e,g), and is a *de novo* structure derived from the proctiger, as demonstrated by Ulrich (1974). The true dorsal appendage is derived from the epandrium and is a process of the subepandrial sclerite (Fig. 1b), *sensu* Sinclair *et al.* (1993), and is present in various configurations in most sciapodine genera (eg, Figs 32a, 36h, 106h).

The dorsal appendage or process of the subepandrial sclerite is present in the Sciapodinae and Dolichopodinae. Although Ulrich (1974, 1976) was uncertain whether its absence was primitive or derived, I suspect it is a plesiomorphic character.

Cercus. As with most Dolichopodidae, the cerci of the Sciapodinae are enlarged, and often as prominent as the epandrium. Cercal form and setation are often diagnostic for both species and higher taxonomic groupings. An unbranched digitiform cercus is considered plesiomorphic and part of the groundplan for the subfamily, but in some instances could be secondarily derived from a more complex cercus. Derived conditions include deeply cleft or branched cerci (eg, Fig. 106d).

In most *Sciapus* and some *Dytomyia* (Fig. 30a), the cercus has a distinct basoventral section, the 'Organ X' of Becker, 1918 (also see discussion above). This is probably derived from the proctiger. In some *Chrysosoma* and *Krakatauia* (Figs 43c, 60a), an enlarged median subtriangular projection is often present between the cercal bases, and may also originate from the proctiger.

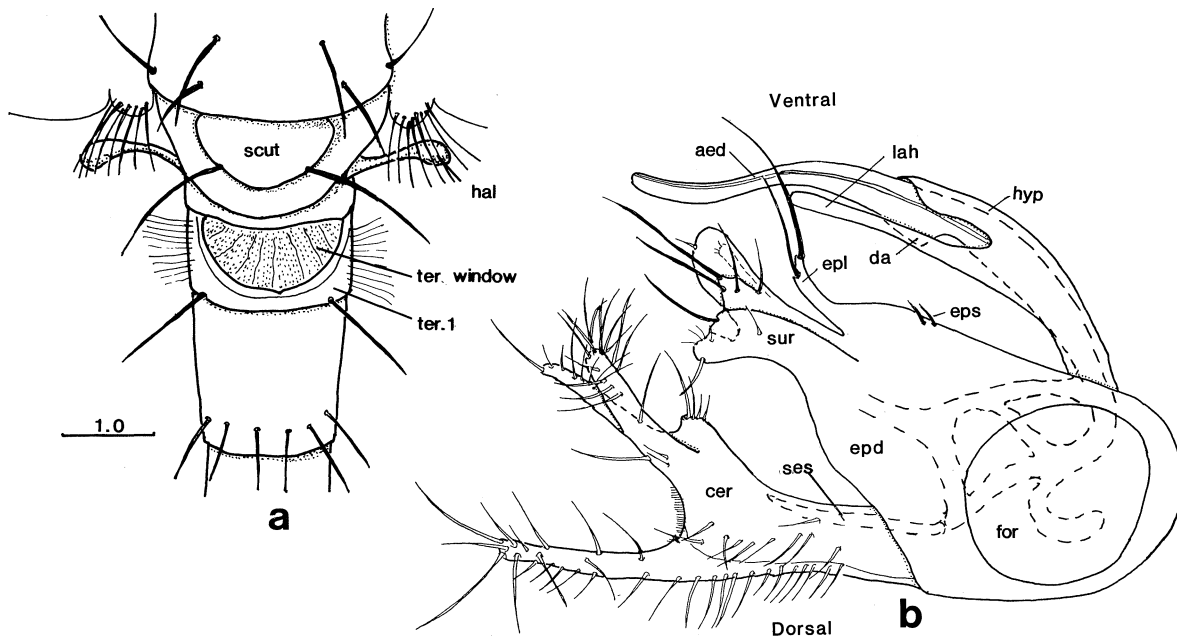


Fig.1. a – tergal window, dorsal view, male *Heteropsilopus ingenuus*; b – generalised sciapodine hypopygium, left lateral. Legend: aed – aedeagus; cer – cercus; da – dorsal angle of aedeagus; epd – epandrium; epl – epandrial lobe; eps – epandrial seta; for – hypopygial foramen; hal – haltere; hyp – hypandrium; lah – lateral arm of hypandrium; ses – process of subepandrial sclerite; sur – surstylus; ter – tergum.

VIII. Female terminalia. Female oviscapt from representative sciapodine taxa are considered together below.

The female oviscapt has the ninth tergum split medially into two sclerites or hemitergites, each bearing three to five strong modified setae, what Chvála (1986) terms the "acathoporous intruded abdomen". Each hemitergite has four to five strong setae, with various of the apical setae modified into strong spinate or spatulate setae. The female sciapodine terminalia can be divided into four morphological types:

(i) Each hemitergite with a row of five strong spines, which surround a crested rise. This form is represented only by *Amesorhaga* (Fig. 2a,b).

(ii) The hemitergites are fused along the midline and not strongly prolonged, as in *Condyllostylus* (*C. scintillans*, Fig. 3a, and *C. nebulosus*, Fig. 3b).

(iii) Each hemitergite long and tapering, with strong apical and subapical setae. The cerci are also prolonged and extend beyond the hemitergites, and bear groups of terminal setae. This configuration is most characteristic for the subfamily and is found in many genera: *Austrosiapus* (Fig. 3c,e), *Amblypsilopus* (Fig. 3d), *Mesorhaga* (Fig. 2d), *Negrobovia* (Fig. 2c), *Plagiozopelma* (Fig. 4d), *Krakatauia* *evulgata* (Fig. 3g), *Chrysosoma* (Fig. 4e,f), *Parentia* (Fig. 3i) and some *Heteropsilopus* (Fig. 4a).

(iv) Each hemitergite broad and often meeting along the midline. The terminal setae on each hemitergite are broad and spatulate, and the cerci are only slightly longer than the hemitergites. This represents a modification of Type ii. The six examples figured and listed below show strong convergence, especially since the species in *Heteropsilopus*, *Austrosiapus* and *Krakatauia* are more closely related to species in Type iii than they are to each other. Examples include: *Heteropsilopus ingenuus* (Fig. 4b), *H. plumifer* (Fig. 4c) [also *H. trifasciatus*, *H. sugdeni* and *H. brevicornis*, not figured], *Austrosiapus hollowayi* (Fig. 3f), *Krakatauia macalpinei* (Fig. 3h), *Dytomyia sordida* (Fig. 2f,g), and *Sciapus constrictans* (Fig. 2e) (see Meuffels & Grootaert, 1990 for figures of similar oviscapt from Palearctic *Sciapus*).

These species are found mostly in coastal habitats (*A. hollowayi*, *K. macalpinei* and *H. brevicornis*) or sandy heath/dry sclerophyll habitats (*H. plumifer*, *H. ingenuus* and *Dytomyia sordida*). Meuffels & Grootaert (1990) record *Sciapus constrictans* as often being associated with dry sandy regions. Spatulate oviscapt setae probably represent an adaptation to oviposition in sandy habitats. Similar oviscapt are characteristic of many sand-ovipositing Brachycera, such as Asilidae and Therevidae, and the independent appearance of analogous oviscapt in sciapodine genera probably represents functional convergence.

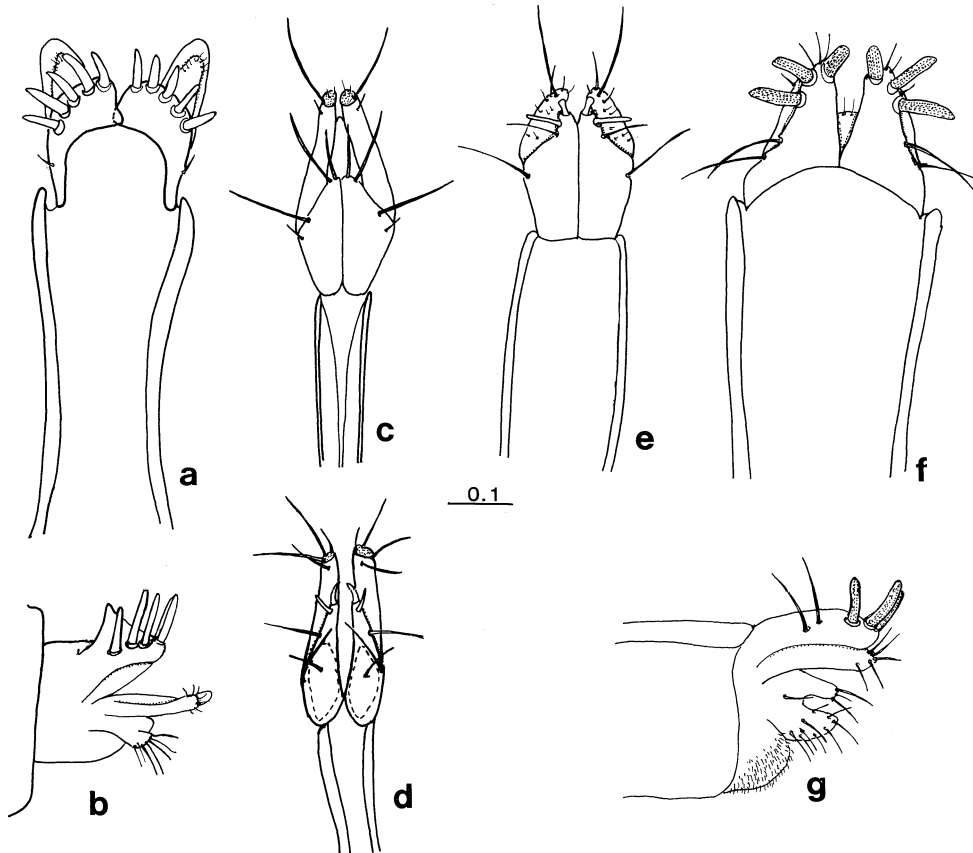


Fig. 2. Female terminalia. a – *Amesorhaga* sp., dorsal; b – *Amesorhaga* sp., left lateral; c – *Negrobovia aculicita*, dorsal; d – *Mesorhaga geoscopa*, dorsal; e – *Sciapus constrictans*, dorsal; f – *Dytomyia sordida*, dorsal; g – *D. sordida*, left lateral.

Aberrations

Two specimens were found to show aberrations in development of sexual characters: (i) a specimen of *Parentia perthensis* has a female abdomen and legs, but one wing has crocheted costal cilia (MSSC), while the other is nonciliate; (ii) a male specimen of *Austrosciapus collessi* from Lake Barrine, Qld has Ilt unmodified, and therefore lacks the characteristic *proximus* Group Ilt MSSC.

Secondary Sexual Characters, Genitalia and Evolution

In the Dolichopodidae and most other Diptera, species are based on diagnostic male genitalic and secondary sexual characters. Females, on the other hand, have a conservative facies and often cannot be identified in isolation. Since the distinctive and sometimes bizarre male structures demand so much attention in illustration and description, they eventually become a major focus for the systematist. This section sets forth some speculative thoughts on the role of genitalia and male secondary sexual characters (MSSC) and brings together observations which otherwise would be scattered throughout the taxonomic section.

Male secondary sexual characters (MSSC). Given the morphological species concept which must be followed in basic 'alpha-level' taxonomy, species are of necessity defined on the basis of stable distinguishing characters. Essentially, species represent the lowest morphologically cohesive taxonomic unit which can be conveniently recognised. That these morphospecies show negligible variation over wide geographical areas provides support for the assumption that they correspond to true biological species or sibling complexes.

Although most species appear morphologically constant, some polytypic species are variable in readily observable characters. For example, *Parentia tricolor* shows some variation in the strength and colour of its femoral bristles whereas in most *Parentia*, these characters are fixed and diagnostic for species. Such a polytypic species may constitute a sibling complex which is difficult to resolve with only limited study material.

Species are distinguished from congeners by a combination of MSSC and male genitalic features (often cercal modification). Since MSSC and genitalic modifications are undoubtedly significant in mate recognition, they provide a valid basis for defining species. Yet in defining higher categories, MSSC must be used with care, since they are frequently subject to homoplasy.

What are the critical number of MSSC and/or genitalic differences required to ensure intraspecific recognition?

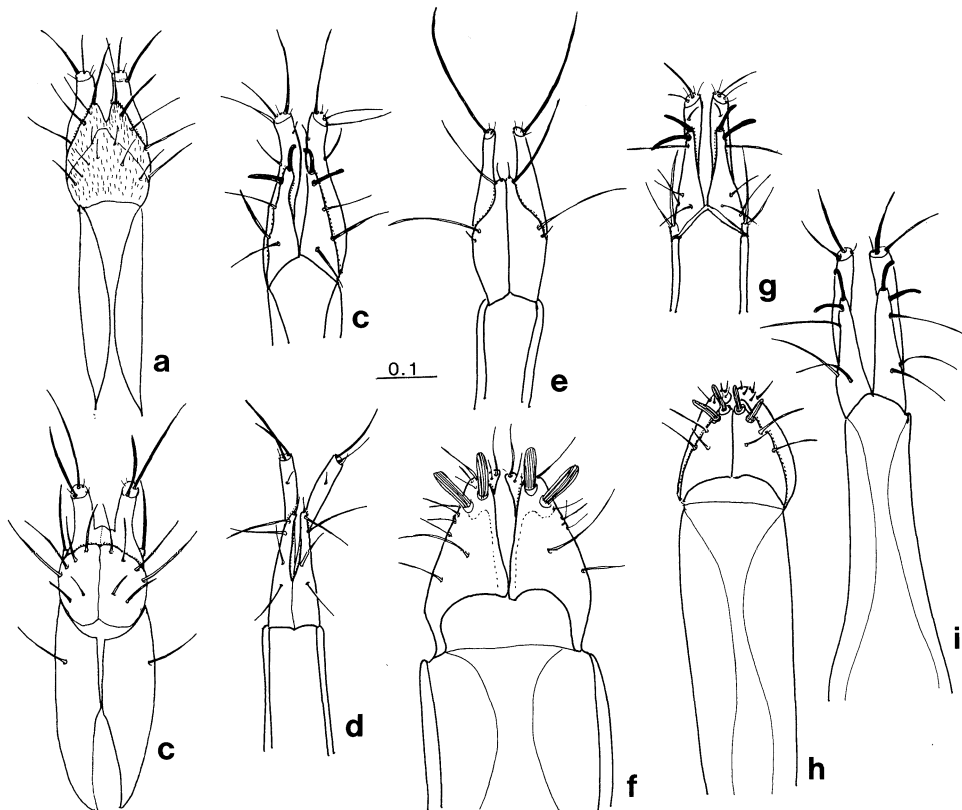


Fig.3. Female terminalia. a – *Condylostylus scintillans*, dorsal; b – *Condylostylus nebulosus*, dorsal; c – *Austrosciapus proximus*, dorsal; d – *Amblypsilopus triscutatus*, dorsal; e – *Austrosciapus dendrohalma*, dorsal; f – *Austrosciapus hollowayi*, dorsal; g – *Krakatauia evulgata*, dorsal; h – *K. macalpinei*, dorsal; i – *Parentia tricolor*, dorsal.

In theory, related sympatric species should be distinct enough to prevent interspecific mating. Most species are in fact distinguished by distinctive genitalia and MSSC. However, in some cases, close sympatric species can be distinguished only by 'minor' morphological differences (eg, *Austrosciapus crater* and *A. collessi*). Behavioural repertoires, such as mating display, may function to aid recognition in such circumstances. At the other extreme are isolated species which display a large number of MSSC, such as *Krakatauia macalpinei*, which has nine striking MSSC in addition to a distinctive hypopygium.

Similar MSSC have arisen independently in geographically isolated lineages, a reflection of extensive parallel evolution within the Sciapodinae. Such characters can be misleading when used out of context in keys. The following characters have developed several times in sciapodine genera: apical arisal flags (7 times); TIII callosities or swellings (6 times); flattened pad-like tarsomeres on leg III (6 times). That a given MSSC has the tendency to develop 'independently' in different taxa may be an inherent feature or potentiality of a character, what Saether (1986) terms "underlying synapomorphy". In other words, it is the *most likely* physical change from the ancestral unmodified state. However, the independent or *de novo* origin of a character may be difficult to distinguish from the renewed phenotypic expression of an ancestral character encoded in the genotype.

Some MSSC are used in a similar manner during

courtship, and function as 'releasers', either visually, such as arisal flags, or tactually, such as pad-like leg III tarsomeres or the ventral pile on basitarsus I. Described mating behaviour of species indicate some leg MSSC are highly visible to females during the initiation of coupling (as in *Sciapus platypterus*), whereas others are distinctly tactile and probably function to hold females during mate guarding (as in the modified tarsus II in *Austrosciapus connexus*) (see Mating Behaviour).

Similar morphological mating adaptations and MSSC might reflect similar mating behaviours. However, the same signal can be expressed in various ways. For example, an apical arisal flag or flattened apical tarsomere could have the same effect if displayed in an analogous manner. Such physical 'transference' of MSSC function is evident even in closely related species. *Amblypsilopus glaciunguis* from northern Queensland bears a modified silvery seta (MSSC) on leg II tarsomere 4 (Fig. 105c). However, a closely related undescribed species from montane New Guinea has a similar transverse silvery flag arising from It_5 , not It_4 . The MSSC are similar but occur on both different legs and tarsomeres. This may not affect their actual function since both are developed at the end of an elongate leg, but the shift of such a distinctive MSSC between legs I and II on probable sister species is remarkable. However, since legs I and II are serially homologous, only minor genetic/developmental change might be involved in the transference of expression between legs.

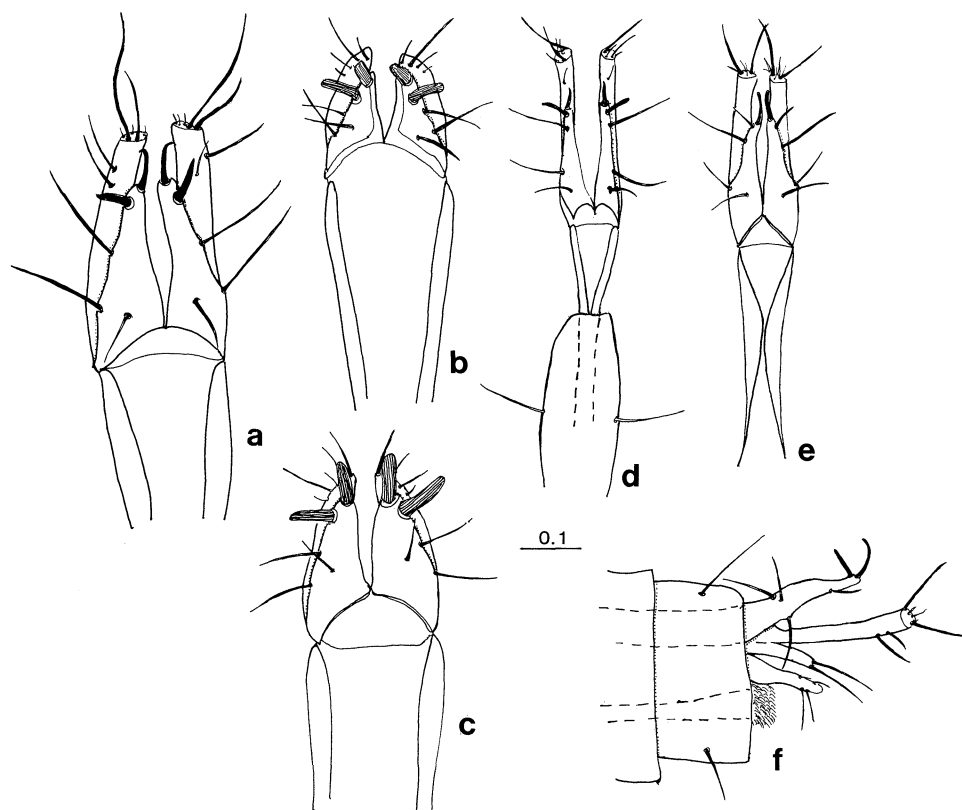


Fig.4. Female terminalia. a – *Heteropsilopus cingulipes*, dorsal; b – *H. ingenuus*, dorsal; c – *H. plumifer*, dorsal; d – *Plagiozopelma flavipodex*, dorsal; e – *Chrysosoma leucopogon*, dorsal; f – *C. leucopogon*, left lateral.

Transference of MSSC between different podomeres of the same leg is evident in the Queensland *Amblypsilopus fustis*. This species has a long curved subapical seta on male It_1 (MSSC) (Fig. 104e), a seta similar in structure and position to a tibia I seta found in many male Australasian *Amblypsilopus* (Fig. 93; also see discussion under *Amblypsilopus*). Although no male in the *argyrodendron* Group (which includes *A. fustis*) has such a TI seta, it possibly was present in the ancestor to the Group. The phenotypic expression of this MSSC was suppressed on TI, yet probably encoded in the genome, to be expressed on next distal podomere in the derived *A. fustis*.

Some MSSC appear to be neither tactile nor visual, but may be pleiotropically linked to other expressions of 'maleness', for example the weak hair-like anterior dorsocentral setae of most Chrysosomatini.

Kaneshiro (1987, also see review in 1988) argued that some secondary sexual characters are not under direct sexual selection, but may be maintained pleiotropically due to selection for other phenotypic (or behavioural) traits. His model is based on differential sexual selection between males and females and has its origin in behavioural and experimental studies of Hawaiian *Drosophila* (Drosophilidae), a group which mirrors the Sciapodinae in its species richness and variety of MSSC.

The wide array of secondary sexual characters shown by the Sciapodinae (and Dolichopodidae generally) suggests that most speciation is initiated by sexual selection. The subfamily thus comprises many "behavioural species", a term Ringo (1977) used to characterise Hawaiian *Drosophila*. He proposed that the speciation in the Hawaiian Islands is the result of runaway sexual selection, and species which exhibit strong sexual dimorphism are more likely to speciate into new behavioural niches as opposed to ecological niches.

Female secondary sexual characters (FSSC). Many female characters, especially those of chaetotaxy, are conservative and predictable. They are considered part of the basic sciapodine groundplan and not any special development of secondary sexual characters.

However, females sometimes show unusual character development which may be diagnostic at a higher taxonomic level. In *Plagiozopelma*, females of the *flavipodex* Group have strong lateral CI spines (eg, Fig. 67b) and sometimes anteromedian setal fields, while males have only weak distolateral setae, and females of the *angustifacies* Group have strong projecting spines on the ventral postcranium. As well, female *Sciapus*, *Dytomia* and some *Plagiozopelma* have strong pedunculate basoventral setae on FI, which are absent on males. In female *Austrosciapus crater* and *A. ravenshoensis*, only the two strong posterior dc are present and the anterior dc are totally absent (FSSC), while males have anterior dc reduced to weak hairs (MSSC).

In most sciapodine species, males are larger than females. However, in *Narrabeenia difficilis*, females are

distinctly larger than males. Although unusual in the Sciapodinae, such sexual dimorphism in size occurs in another dolichopodid subfamily, the Hydrophorinae, where males of some *Hydrophorus* species are known to ride on the backs of females during mate guarding (Dyde, 1988).

Male genitalia. Eberhard (1985) reviewed the variety and role of animal genitalia and proposed female choice as the primary selective force behind the wide diversity of male genitalia. The female choice hypothesis postulates the accumulation of small changes in male genitalia over time.

Most sciapodine species display constant genitalia with only minor discernable variation, and indeed, some apparent differences may be a reflection of body size. Even *Chrysosoma leucopogon*, with widely scattered and isolated populations across its vast Indo-Pacific range, shows only minor variation. I have seen little evidence for gradualist change in genitalia. On the contrary, there is strong support for sudden change in genitalia, probably associated with speciation, followed by periods of relative morphological stasis. Admittedly, the morphological species concept followed here makes this evidence somewhat circular, since I have no biological evidence for species limits, and significant differences or gaps between congeners are usually treated as interspecific rather than intraspecific.

Some genitalic modifications are striking. For example, the hypopygium of the *Austrosciapus connexus* (compare Fig. 77c with Fig. 77b) is radically different from the remainder of the *proximus* Group, and no intermediate forms are known. Only the distinctive leg MSSC, wing maculation and other habitus characters give reliable indications that this species is indeed a member of the Group.

Male secondary sexual characters and the female phenotype. In the Dolichopodidae and many other fly families, male secondary sexual characters are the richest source of morphological innovation. These range from relatively trivial (such as a curved leg seta or arisal flag) to major, often bizarre modification of legs, antennae and wings. In most cases these modifications are confined to males while females are unaffected and retain the generalised conservative facies of their taxon.

However, there are several examples from the Sciapodinae, in which MSSC, normally found in males only, have become secondarily incorporated into the female phenotype.

a) In *Amblypsilopus brevitibia*, male tibia I is very short and basistarsus I unusually long (Fig. 98f), almost three times the length of its tibia (in most other congeners, male tibia I is longer than basistarsus I). This extreme leg dimorphism has also affected the female phenotype so that It_1 is subequal to TI (Fig. 98g), whereas in all related females, It_1 is distinctly shorter than TI.

b) Male *Parentia nigropilosa* and *P. malitiosa* show a great accentuation of setal fields, such that normal setal groups are greatly increased in number and

strength on the ocellar tubercle, palps, pedicel, mesonotum and scutellum (all MSSC). This pilosity is also expressed in the female, such that the mesonotum and scutellum also bear extra setae, but not as numerous or strong as on the male.

c) Males of *Austrosciapus balli* have a long projecting pale anterior seta on coxa I, almost as long as coxa itself (MSSC). Females of the species also have such a seta, but not as strongly developed, only about half the coxal length.

d) The transition in arista position from male dorsal-female dorsal to male apical-female dorsal to male apical-female apical is evident in Australian *Heteropsilopus* and the *Chrysosoma proliciens* Group. Arista position has 'generic level' significance in other dolichopodid taxa, but in the Sciapodinae it appears to have arisen originally as a MSSC. The development of an apical arista in both sexes, first as a MSSC, and secondarily in females has occurred several times in the Sciapodinae (see Morphology and taxonomic sections for further discussion).

e) The highly modified and elongate wing of male *Amblypsilopus zonatus* has influenced the female wing phenotype. The female wing is also elongate and has a modified vein M branching configuration, unlike that of female congeners (Fig. 128a,b).

f) In most *Amblypsilopus* species, males have some anterior dc reduced to weak hairs (MSSC), while females have all dc strong. However, female *Amblypsilopus nambourensis* also show reduced hair-like dc, normally only a MSSC.

Similarly, most males in the *Austrosciapus proximus* Group also have anterior dc reduced to weak hairs (MSSC), while females have strong unmodified anterior dc. However, females of two closely related species, *Austrosciapus crater* and *A. ravenshoensis*, totally lack anterior dc. This is probably an influence of the male condition, totally suppressing development of the setae which are modified in males.

g) Males of all species in the *Chrysosoma aeneum* Group have a distinctive allantoid or sausage-shaped first flagellomere (MSSC) which in most females is unmodified and triangular. However, in an undescribed New Guinea species, both sexes have allantoid first flagellomeres.

A similar example is found in the *Plagiozopelma alliciens* Group, whose males also have an allantoid first flagellomere as a MSSC. In an undescribed *Plagiozopelma* species from Sarawak, females have developed a similar allantoid first flagellomere.

h) The presence of modified antennae in both sexes of the Afrotropical *Chrysosoma passiva* Group is probably a case of a MSSC becoming secondarily fixed in the female.

i) Male secondary sexual characters affecting female phenotype are also known from other dolichopodid subfamilies, such as the bizarrely modified wing of *Hydrophorus titicaca* (Hydrophorinae) (Becker, 1922b), and the leg chaetotaxy of *Medetera dorrigensis* (Medeterinae) (Bickel, 1987).

Therefore, in at least some cases, typically male secondary sexual characters have influenced the female phenotype, either with reduced or weakened expression (examples a-e, i), or at full strength (examples f-h). It is apparent from the above examples that genes for expression of MSSC are not confined to the male sex-chromosome, but are on autosomal genes with sex-limited expression. This has been shown for Hawaiian *Drosophila*. Working on the inheritance of a row of cilia which occurred only in males of a single population of *D. silvestris*, Carson & Lande (1984) demonstrated that character expression had a polygenic basis, 30% contributed by sex-linked genes, while genes from two autosomes accounted for the remaining 70%.

If indeed the expression of MSSC is controlled by both sex-linked and autosomal genes, and Kaneshiro's (1987) assertion that some secondary sexual characters are pleiotropic effects not directly acted upon by sexual selection is correct, then a scenario emerges in which characters that originated as MSSC could find expression in females. In particular, 'weakened' expression of MSSC in females (examples a-e, i) would reflect the absence of male sex-linked genes in a polygenic system.

If a MSSC becomes fixed in the female phenotype and the species forms a stem group, it may prove to be diagnostic for both sexes at a higher taxonomic level. At least some of the distinctive characters separating genera may have originated as MSSC which became secondarily incorporated into the phenotype of both sexes. This partially accounts for the seemingly 'trivial' and 'non-adaptive' diagnostic characters used in the higher taxonomy of the Dolichopodidae and other families of Diptera. Indeed, it is the very triviality of characters originating as MSSC which would make selection against them weak, and thus likely to be retained in descendants regardless of other strong morphological selection.

Systematics

Position of the Sciapodinae within the Dolichopodidae. Negrobov (1986) regarded the Sciapodinae as one of the most primitive dolichopodid subfamilies based on the following characters: (i) presence of vein M_2 , (ii) crossvein t_b (= bm-cu) incomplete (see discussion in Morphology), (iii) male abdominal segment 7 external and setose, and (iv) hypopygium with a 'dorsal process' (see discussion under Morphology).

Further, he considered the dolichopodid subfamilies Neurigoninae, Medeterinae, Systeninae (now included in the Medeterinae), and Dolichopodinae as a group (presumably monophyletic) in which male sternum and tergum 7 are well developed and form a petiole or peduncle for the hypopygium. However, the Sciapodinae (apart from the derived membranous sternum 7 of male *Mesorhaga*) has this structure and thus also belongs in this group of subfamilies.

I agree with Negrobov that the Sciapodinae display a number of primitive features. These and additional

characters must be examined to determine the groundplan and phylogenetic position of the Sciapodinae in the context of other dolichopodid subfamilies. Although all important characters are considered under Morphology, some require further discussion.

Wing. The presence of vein M_2 is the most distinctive feature of sciapodine morphology, and allows most members of the subfamily to be recognised at a glance. However, M_2 has become evanescent or lost independently in several lineages, either as a MSSC, or permanently in both sexes and therefore useful for higher taxonomic definition (eg, *Mesorhaga* and *Pilbara*). The lost vein is usually indicated by a bend on M where the it would have arisen. Even in the genus *Mesorhaga*, which rarely shows evidence of any branching, some species have a short stub vein where the ancestral M_2 would have arisen (Fig. 120g).

Vein M_2 is absent in most other dolichopodid lineages, except the Dolichopodinae, where it present as a distinct stub vein in several taxa (some *Dolichopus*, eg, *D. cuprinus*, and the related genus *Lichtwardtia*). Thus, although retained in most sciapodine genera, M_2 was lost in most Dolichopodinae, although in a similar manner, with a bend on vein M indicating the ancestral divergence of M_2 (see *Dolichopus* wing figures in Van Duzee *et al.*, 1921).

The parallel loss of M_2 in both the Sciapodinae and Dolichopodinae has given rise to similar forms of M curvature here with those in Robinson & Vockeroth, 1980 and Van Duzee *et al.*, 1921): *Pilbara octava* (Fig. 120j) and *Pelastoneurus*; *Amesorrhaga* (Fig. 120a) and *Paraclius*; and *Mesorhaga* (Fig. 120d-i) and some *Dolichopus*.

The branched M is therefore primitive for the Dolichopodidae and part of the family's groundplan. In the Microphoridae, the empidoid sister group of the Dolichopodidae (Chvála, 1983, 1986, 1987, 1988; Ulrich, 1991), three branches arise from the discal cell, M_1 , M_2 and CuA_1 (= M_3 of authors). The dolichopodid groundplan retains all these veins. In the Dolichopodidae, crossvein m-cu is not connected to M_2 causing vein M to branch distad of the discal cell, Sc is incomplete, and crossvein tm-cu is absent but usually incomplete in

the Sciapodinae (Fig. 5). Negrobov (1978) and Chvála (1988) provide further discussion of the dolichopodid wing.

In summary, branched vein M is considered a symplesiomorphy of the Sciapodinae + Dolichopodinae, and is a feature of the dolichopodid groundplan. Although vestigial and lost in most Dolichopodinae lineages, M_2 is retained in most Sciapodinae. Possibly the "bosse alaire" of Parent, the flexion and slight concavity on vein M of such dolichopodid subfamilies as the Sympycninae and Hydrophorinae, represents the position of the lost fork, or some structural compensation for its loss in terms of wing aerodynamics.

Male postabdomen. If at least some of the pedunculate dolichopodid subfamilies form a possible monophyletic group as suggested by Negrobov (1986), is the dolichopodid postabdomen primitively pedunculate or 'encapsulated'? Although I previously (Bickel, 1985) regarded the peduncle as being derived from the encapsulated hypopygium, I now believe the polarity is reversed. Support for the pedunculate hypopygium as primitive is seen in the Microphoridae, the empidoid sister group of the Dolichopodidae. In *Microphor* (Ulrich, 1988), the hypopygium is distinctly pedunculate with an exserted hypopygium. Thus the pedunculate hypopygium is probably plesiomorphic for the Dolichopodidae and the retracted or encapsulated condition derived.

As noted by Negrobov, male abdominal segment 7 in most Sciapodinae is strongly setose. The loss of strong setae on segment 7 is probably apomorphic for the other pedunculate subfamilies.

Groundplan of the Sciapodinae. The subfamily Dolichopodinae (review in Negrobov, 1979) seems to be the most likely sister group for the Sciapodinae. I have not found any synapomorphy to unite the two subfamilies, but they share many primitive character states, or symplesiomorphies, reflecting a common groundplan. The sciapodinae genus *Amesorrhaga* shows greatest similarity to the Dolichopodinae.

Groundplan Character States of both the Sciapodinae and Dolichopodinae (all shared ancestral characters or

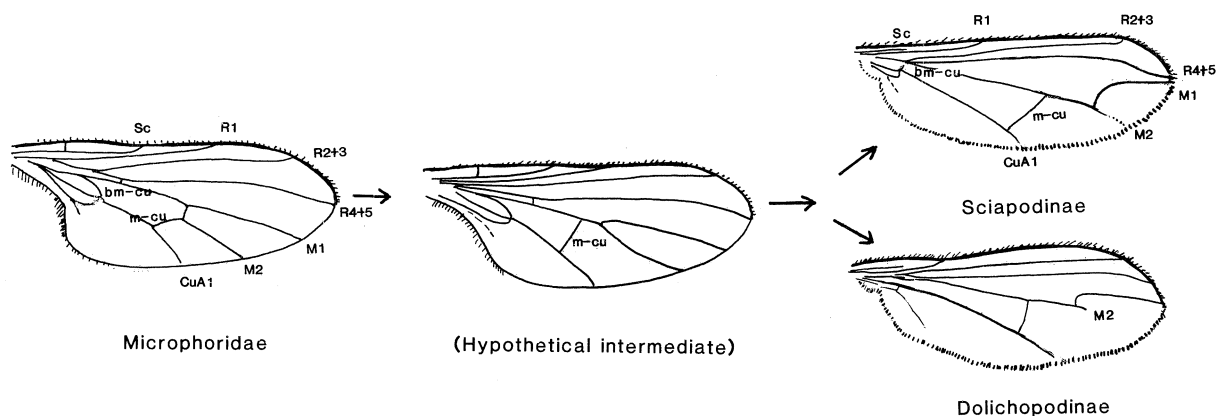


Fig.5. Evolution of the Sciapodine wing.

symplesiomorphies): vertical seta strong in both sexes; first flagellomere subrectangular, arista dorsal; single strong propleural seta present; both ac and dc thoracic setae strong and well developed; strong tibial chaetotaxy; FII and FIII with strong anterior preapicals; vein M_2 present; crossvein m-cu straight; tergum and sternum 7 both well developed on male abdomen, and exerted, forming a hypopygial peduncle; hypopygial foramen left lateral in position.

Groundplan of the Sciapodinae: excavated vertex (synapomorphy); scape dorsally bare (plesiomorphy); M_2 curved out from M_1 (synapomorphy); crossvein bm-cu incomplete (plesiomorphy); hypandrium with left lateral arm (synapomorphy); epandrial lobe with strong apical and subapical setae.

Phylogenetic Analysis

My approach to the systematics of the Sciapodinae is discussed in the sections The Sciapodine Genera and Their Definition, and Secondary Sexual Characters, Genitalia and Evolution. Most characters useful in defining sciapodine taxa are subject to extensive homoplasy and reversal. Indeed, the number of characters subject to homoplasy greatly exceeds the fixed, informative characters. As such, I do not believe that a reductionist approach to phylogeny is applicable and concur with many of Saether's (1986) criticisms of "phylogenetic

objectivity". Personal experience is essential in associating and interpreting taxa which show such complex and variable suites of characters.

A tentative cladogram for the major sciapodine genera is presented (Fig. 6). Character states and justifications for their polarity are discussed in detail under Morphology. All MSSC and FSSC are considered apomorphies from a postulated unmodified state in the Sciapodine groundplan. The genera and their possible relationships are discussed in detail in the taxonomic section.

List of characters. The following list gives significant characters which can be used in phylogenetic analysis of the Sciapodinae. Many unique autapomorphic characters are not listed. Characters are summarised in the following format: "Character: plesiomorphic (ancestral) state/apomorphic (derived) state".

- Head:* 1) vertex: not excavated/strongly excavated
 2) male frons: curved/strongly flattened (MSSC)
 3) vertical seta (female): strong/absent
 4) vertical seta (male): strong/reduced to absent (MSSC)
 5) frons (both sexes): unmodified/with setose mound bearing vertical seta
 6) male face: conformable with eye curvature/strongly bulging (MSSC)
 7) male clypeus: broad, adjacent to eye margin/narrowed and free from eye margin (MSSC)

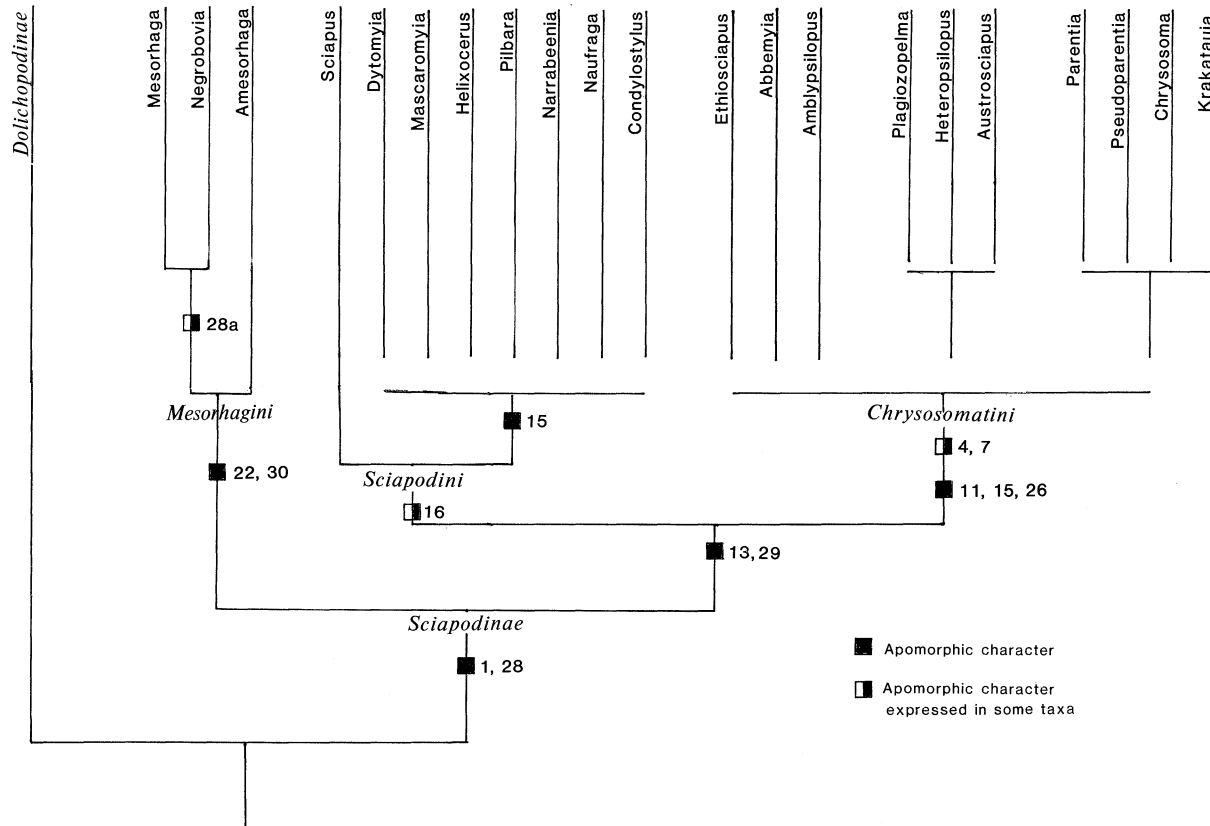


Fig.6. Cladogram of the genera of Sciapodinae.

- 8) male scape: unmodified/swollen and vaselike (MSSC)
- 9) arisal position: dorsal/dorsoapical to apical.

Thorax: 10) acrostichal setae (ac): strong, paired/reduced or absent, irregular pairs

- 11) male dorsocentral setae (dc): strong/some anterior dc reduced to weak hairs (MSSC)
- 12) lateral scutellars: strong/reduced to weak hairs or absent
- 13) propleuron: with strong ventral seta/bare.

Legs: 14) female CI: unmodified/with strong spine-like setae (FSSC)

- 15) anterior preapical seta on FIII: present/absent
- 16) female FI: bare/with 2-6 strong basoventral setae, each on mound-like pedicel (FSSC)
- 17) male FI: unmodified/with subapical projection opposite ventral callosity on TI (MSSC)
- 18) male TI: unmodified/with crocheted posterior seta (MSSC)
- 19) male It₁: unmodified/flattened with pale ventral pile (MSSC)
- 20) male TIII: unmodified/with swollen callus or irregularity, often with posterior slit (MSSC)
- 21) male III_{3.5}: unmodified/flattened and padlike (MSSC).

Wing: 22) vein M₂: present/absent

- 23) crossvein m-cu: straight/bowed or sinuate
- 24) male costa: unmodified/with crocheted or flattened setae (MSSC)
- 25) crossvein bm-cu: incomplete/absent.

Abdomen: 26) male abdominal plaques: well developed/reduced in size, smaller than those of female

- 27) male sternum 7: at least partially sclerotised/membranous
- 28) left hypandrial arm: absent/present
- 28-a) hypandrium: short hood, asymmetrical/prolonged, symmetrical
- 29) dorsal angle on aedeagus: absent/present
- 30) epandrial seta(e): along ventral margin/near epandrial lobe
- 31) epandrial lobe: cylindrical/flattened
- 32) cercus: unmodified/with detached basoventral section.

Discussion. The Dolichopodinae is suggested as the possible sister group of the Sciapodinae based on shared ancestral characters. As previously noted, I have not found any synapomorphies to link the two subfamilies.

The Mesorhagini is the most primitive sciapodine tribe, and is the residue from the more strongly defined Sciapodini + Chrysosomatini. It is united by the reduction/loss of M₂ and the presence of a strong epandrial seta at base of the epandrial lobe.

The Sciapodini + Chrysosomatini form a monophyletic group defined by the presence of a dorsal angle on the aedeagus and loss of the propleural seta.

The Sciapodini is rather weakly defined by female femora in many genera with strong basoventral setae. Although preapical femoral setae are present in *Sciapus*,

they have been lost in all other genera.

The Chrysosomatini comprises most complex and species-rich tribe in the Sciapodinae. All genera have anterior femoral preapical setae absent, abdominal plaques reduced in size in males, and usually some anterior male dc reduced to weak hairs. Most genera have the male vertical seta reduced to absent and the male clypeus narrowed and free from the face (MSSC). I have not found strong synapomorphies to unite the genera, but as discussed elsewhere, (a) *Parentia*, *Pseudoparentia*, *Krakatauia*, *Chrysosoma* and *Plagiozopelma*, and (b) *Austrosciapus* and *Heteropsilopus* are closely related.

Biogeography I: Australia

Analysis of the Australian Fauna

Introduction

Many Australian sciapodine species are widespread and well represented in collections. However, about 35% are known only from their type localities. While some of these are local endemics, others probably have wider ranges but with restricted flight period or patchy distributions. Many such 'rare' species have become known only as a result of continuous sampling with malaise traps. For example, a disturbed mixed wet sclerophyll-subtropical rainforest site "Lorien" near Lansdowne, NSW has yielded four apparently local endemic species and even the rather impoverished montane woodland habitat at Black Mountain, ACT has one. A recent mass sampling effort in Cape York Peninsula monsoonal woodland ("CYPLUS" collections in ANIC) yielded thousands of dolichopodids, and whereas most were common species, there were small numbers of six new species in the Sciapodinae.

Even if these 'rare' species are widespread and only difficult to collect, many more such species await discovery, especially from northern Australia. Indeed, undescribed species were continually being discovered during my work on this revision, the result of personal collecting and continuous mass sampling from the northern New South Wales and the Cape York Peninsula. Intensive collecting in the Cairns district rainforests will undoubtedly yield many additional taxa. Thus the 253 species treated here do not represent the complete fauna, and with the inclusion of ten undescribed species known only from distinctive females, a conservative estimate for the actual Australian fauna is 300 species.

In the following analysis, only the 250 species from continental Australia, Tasmania, Lord Howe Island and Norfolk Island are considered (the three species exclusive to the Australian Territories of Christmas Island and the Cocos-Keeling Group are discussed separately under World Fauna and History). Selected districts were chosen for comparison (Fig. 7). These districts vary in size, physiography and habitat diversity, and do not necessarily coincide with established biogeographic

divisions. However, they represent centres of collecting activity which provide most of the distributional data, and are useful in showing broad continental faunal patterns. More than 95% of all specimens were collected within the designated districts. Species known only from outside designated districts are not included in the analysis, and thus only 229 of the 250 Australian Sciapodinae are considered (Fig. 8). In some respects the analysis is made easier by the restriction of most species to the moister and elevated regions bordering the Australian coast, allowing for sequential comparison around the continent. Admittedly, the eastern coast and ranges have been intensively collected, but the interior fauna is comparatively impoverished. Elevation and habitat associations strongly affect faunal composition within many of the districts, although appropriate data are absent from most specimen labels.

Australia has been best-sampled from southern New South Wales and the Australian Capital Territory to south-eastern Queensland, and the Cairns district, Queensland. In particular, the northern New South Wales coast and ranges have been the target of intensive collecting, which may make that fauna seem rather large when compared with the Cairns district. Many more undescribed species await collection from the Queensland tropics and uplands elsewhere on the continent. At the time of publication, the following regions are poorly collected for Sciapodinae: the ranges between Townsville and Bundaberg, Queensland, the Western District, Victoria, northern Western Australia, the Gulf of

Carpentaria, and interior Australia generally.

The maps (Figs 8-15) show the number of species in a taxon collected in each district, and in parentheses, the number of endemics known only from that district. Connecting lines between districts indicate the number of shared species. If a species' range encompasses a district but is not actually recorded there, it is included in the total of that district only if suitable habitat is present and it is *likely* to occur there. For example, a species known from both the Brisbane and Sydney districts is included in the tally for the Hastings-Manning district, even if it had not been collected there.

The following list of districts also indicates the major repositories of specimens, in decreasing order of importance.

ADL – Adelaide district, South Australia, the south-eastern corner of South Australia and the lower Murray River (SAM, ANIC).

ASP – Alice Springs district, Northern Territory, including the Todd River drainage (ANIC).

ARN – Arnhem Land, Northern Territory, including offshore islands and Darwin, a region strongly affected by seasonal monsoons (ANIC, AMS, NTMD).

BRI – Brisbane district, Queensland-New South Wales, the coastal drainage from Bundaberg and the Conondale Ranges south to the Richmond drainage, New South Wales, including the McPherson Ranges, and equivalent to northern part of the "Macleay-McPherson Overlap" of authors (QDPI, UQIC, ANIC, AMS).

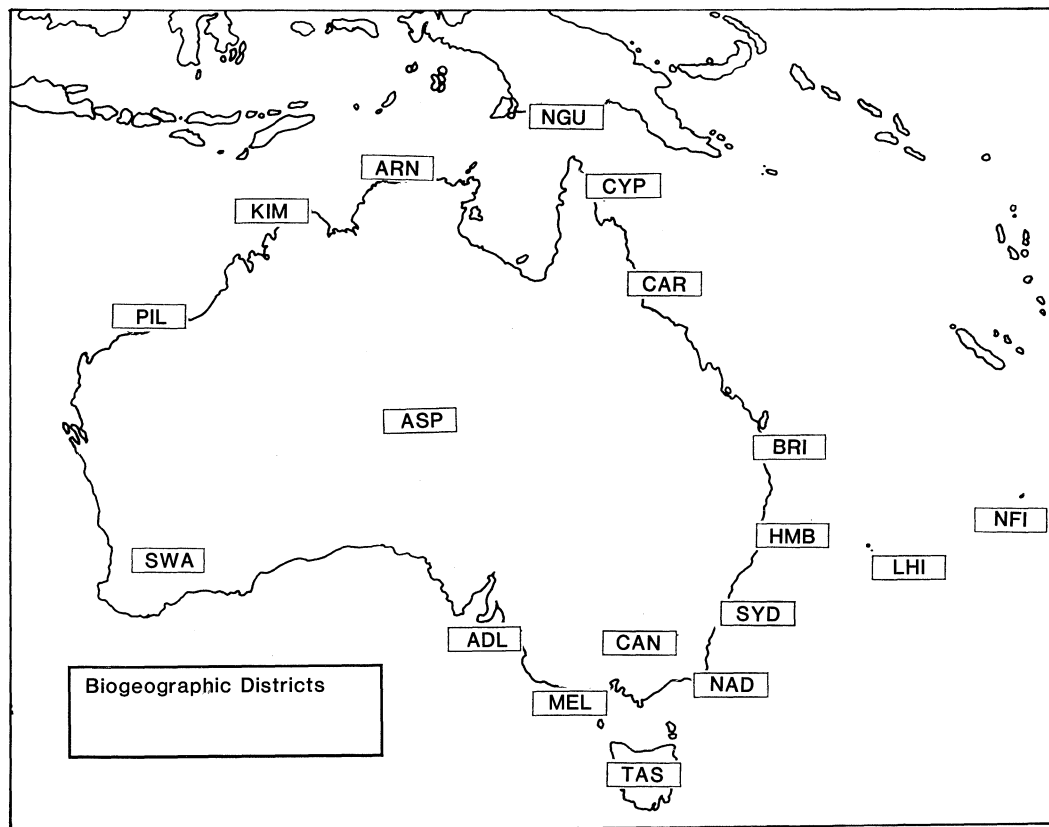


Fig.7. Biogeographic district abbreviations (see text for explanation).

- CAN – Canberra district, Australian Capital Territory, including the Brindabella Range and the well-sampled Black Mountain site (ANIC).
- CAR – Cairns district, Queensland, the area between Cooktown and Ingham, including the Paluma ranges, and the Atherton and Windsor Tablelands. It is equivalent to the “base-of-peninsula” rainforests of Darlington (1961) (ANIC, QDPI, AMS, UQIC).
- CYP – Northern Cape York Peninsula, Queensland. The Cape York Peninsula north of 14°S and the Torres Strait islands, including the Iron and McIlwraith Ranges. The “tip of peninsula” and “mid-peninsula” rainforests of Darlington (1961) are part of this district. The Cape York Peninsula Land Use Survey (CYPLUS) and Heathlands surveys have generated much recent material (ANIC, AMS, UQIC, QDPI).
- HMB – Hastings-Manning district, New South Wales, including the Barrington Tops drainage. An area of recent collecting activity, including year-round malaise trapping at “Lorien”, near Lansdowne, north-east of Taree (AMS).
- KIM – Kimberley District, Western Australia, a poorly collected region (also see Common & Upton, 1977) (ANIC).
- LHI – Lord Howe Island (ANIC, AMS).
- MEL – Melbourne district, Victoria, including the Dandenong Ranges (MVM).
- NAD – Nadgee district, New South Wales, the coastal

drainage from Bega to the Victorian border, including the Nadgee Reserve and Brown Mountain (AMS, ANIC).

NFI – Norfolk Island (ANIC).

NGU – New Guinea, considering only those New Guinea species known to occur in Australia (BPBM, AMS, PNGK, QDPI, ANIC).

PIL – Pilbara District, Western Australia, a poorly collected region, known mostly from Millstream and surrounding area of the Fortescue River. (ANIC).

SWA – South-west Western Australia, the south-western continental corner, from Geraldton to Esperance, including Perth and the Stirling Ranges (AMS, ANIC).

SYD – Sydney district, New South Wales, between Gosford and the Illawarra Escarpment, including Royal National Park, the Blue Mountains and the Nepean-Hawkesbury drainage (AMS, ANIC).

TAS – Tasmania (AMS, MVM, ANIC).

Major Patterns in the Australian Fauna

The following discussion considers the major distributional patterns for the entire subfamily (Fig. 8).

The forests of the Cairns district support the richest fauna with 65 species, about 40% of them endemic. The diverse montane habitat of this district has facilitated

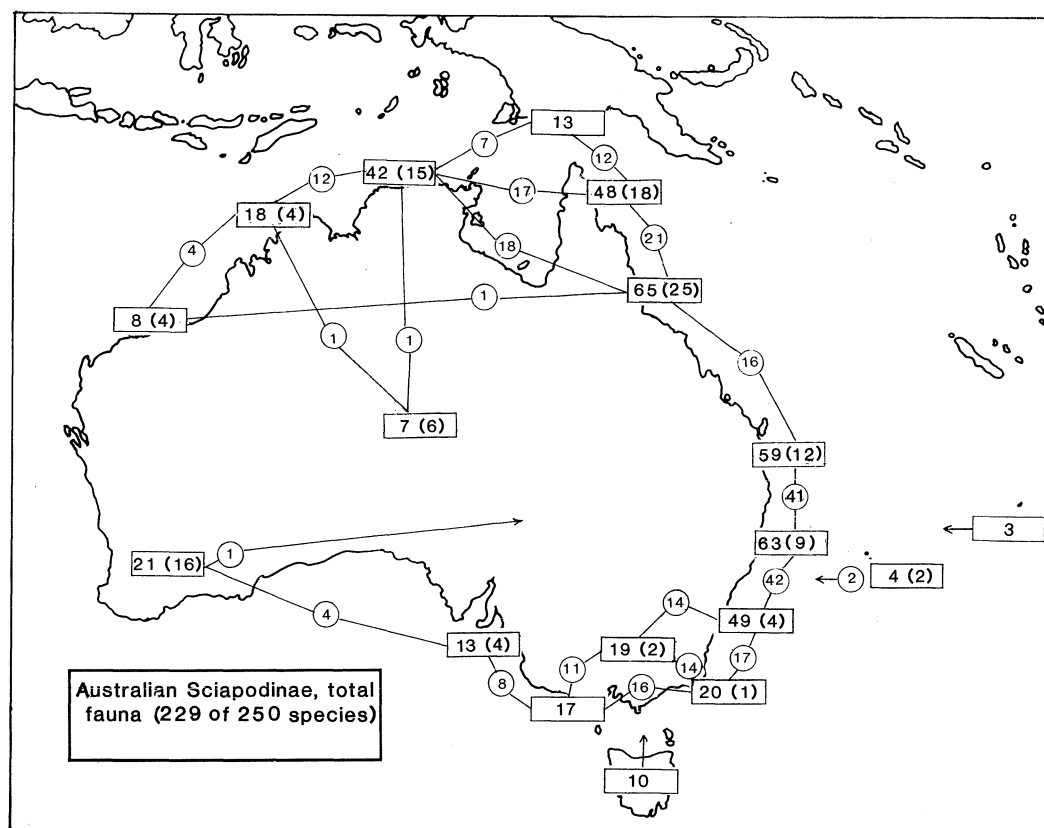


Fig.8. Australian Sciapodinae, total fauna except Christmas and Cocos-Keeling Islands. The boxes show species numbers for each district, and in parentheses, the number of endemic species. Circled numbers on connecting lines indicate species shared between districts.

The Brisbane and Hastings-Manning districts are also rich but have fewer endemics. They share much of their fauna with the only slightly less rich Sydney district. [The relatively high species richness of the Hastings-Manning district (Fig. 8) is the direct result of recent intensive collecting.] Essentially, the coasts and ranges from south-eastern Queensland to south of Sydney, New South Wales form a cohesive zoogeographic unit with a large common fauna. It should be noted that the Hunter River Gap, a major biogeographic barrier for many less vagile taxa, has little significance in sciapodine zoogeography, since more than three quarters of the Sydney species occur in Hastings-Manning district.

Arnhem Land has a rich fauna which includes Papuan

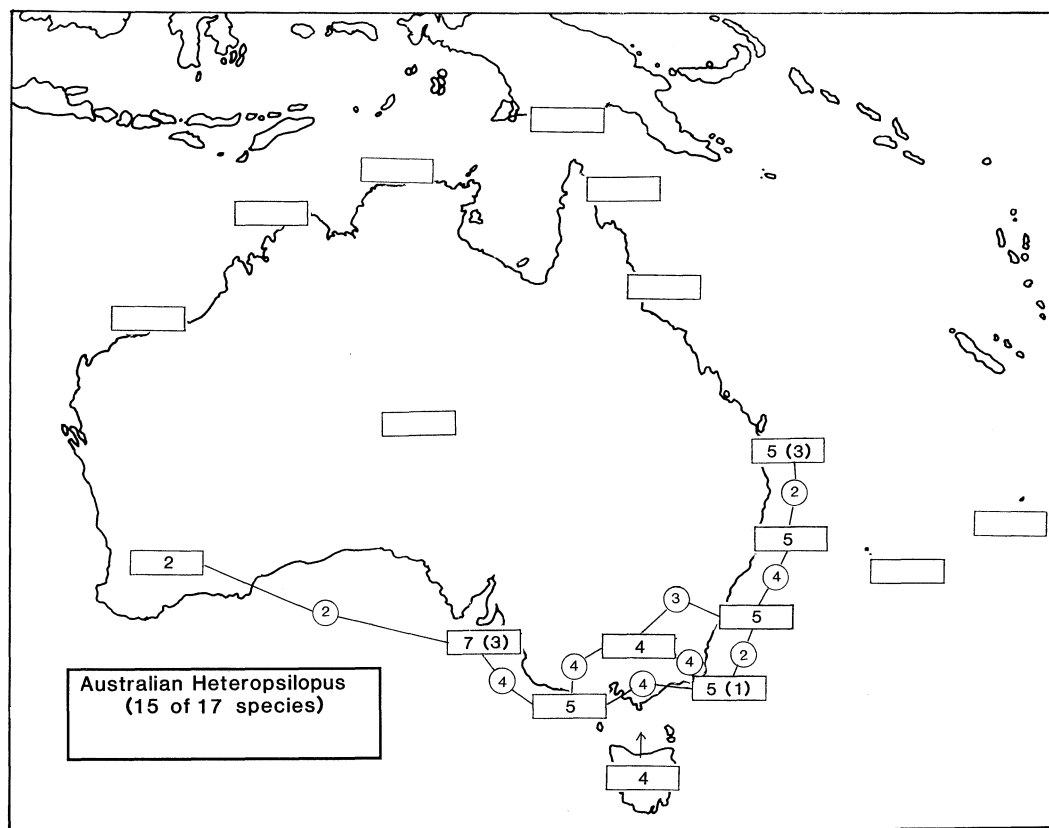


Fig. 9. Australian *Heteropsilopus*. The boxes show species numbers for each district, and in parentheses, the number of endemic species. Circled numbers on connecting lines indicate species shared between districts.

elements which range across the tropical North as well as species or species-pairs shared with the Cape York Peninsula and the Cairns district. This reflects a fauna common to the monsoonal woodland of northern Australia. The Kimberley and Pilbara districts show progressive impoverishment in species richness from Arnhem Land.

The Alice Springs fauna of seven species is almost totally endemic. If such endemism is present in only one district of the arid interior, undoubtedly many more such species await discovery in the desert ranges of Central Australia.

Lord Howe Island has four species, all from the *Amblypsilopus zonatus* Group. Two of these, *A. guntheri* and *A. zonatus*, appear to have dispersed to the island from the eastern Australian coast. The two endemic species, *A. paramonovi* and *A. liepae*, both arose on Lord Howe Island from *A. zonatus* (for further discussion of the Lord Howe Island fauna see Fig. 101, and Remarks for the *zonatus* Group).

By contrast, Norfolk Island has no endemics and only three species of Australian origin, *Parentia vulgaris*, *Amblypsilopus careelensis* and *Austrosciapus connexus*. The last species has been accidentally introduced elsewhere in Australasia and probably also to Norfolk Island.

The Sciapodinae is a composite of taxonomic units, each with individual distribution patterns and ecological preferences. Only by breaking the subfamily into

putative monophyletic components can the following questions be answered.

1. What are the distribution patterns of taxa within the Sciapodinae and how do established zoogeographic subregions correspond to these patterns?
2. What causes changes in faunal richness over relatively short distances?
3. What are the ecological determinants of distribution in Australia, the effects of vegetation, especially the occurrence of rainforest?
4. What are the historical factors determining distribution, the age, length of association with the Australian landmass and extralimital occurrence of taxa?

Zoogeographic Subregions

Several zoogeographic subregions have been proposed for Australia. These are based on vertebrate distributions and mostly modified from Spencer's (1896) original system (see reviews by Archer & Fox, 1984; Heatwole, 1987). Schodde & Callaby (1972) include New Guinea as an integral component of Australian zoogeography.

Although these subregions provide a framework, this paper treats primary new information and is not a review of previous work. The Sciapodinae has its own histories, habitat requirements and dispersal capabilities,

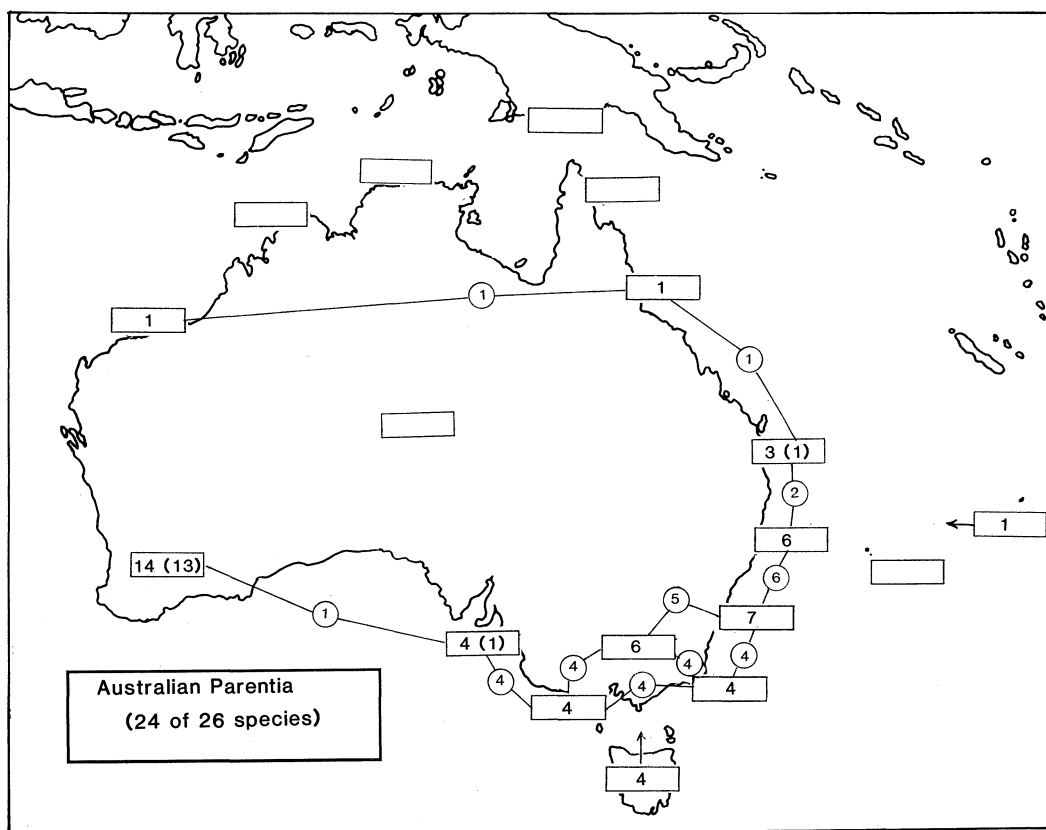


Fig.10. Australian *Parentia*. The boxes show species numbers for each district, and in parentheses, the number of endemic species. Circled numbers on connecting lines indicate species shared between districts.

and existing subregional classifications have therefore been modified to accommodate distributions within the subfamily (Fig. 16). Because of the vagility of the subfamily, extensive zoogeographic overlap is evident.

As well, although a taxon may be associated with a given subregion, it often includes species which have radiated outside their characteristic habitat. For example, in the typically Bassian genus *Parentia*, one species, *P. vulgaris*, has successfully entered the tropics (Fig. 35), while in the Torresian rainforest-associated *triscutatus* Group, *Amblypsilopus montanorum* occurs in southern montane woodland.

Bassian. Spencer's original concept of the Bassian subregion is useful, except the northern boundary should extend almost to the Tropic of Capricorn to encompass the central Queensland highlands. Like Spencer, I include both Tasmania (having all species in common with the mainland) and south-western Australia (sharing many species with south-eastern Australia and similar at the higher taxonomic level). Bassian sciapodines are usually found in wet and dry sclerophyll forests, and in open heaths. *Heteropsilopus* (Figs 9, 47, 54) and *Parentia* (Figs 10, 35) are characteristic genera.

Torresian. These elements are richest in the tropical north, especially north-eastern Queensland, and decrease southwards where they become increasingly restricted to moist coastal and montane habitats. Most Torresian genera and species groups are also rich in New Guinea.

Individual elements show varying degrees of penetration into Australia, some only skirting the northern continental margin, as in *Chrysosoma* (Fig. 12, also Figs 57, 61, 63) and other genera (Figs 45, 69, 71), while others extend variously down the eastern coast to New South Wales, as in *Amblypsilopus* (Fig. 15, also Figs 89, 111). I prefer to use the term Torresian in its original sense to include monsoonal Northern Territory and Western Australia, a region designated "Timorian" by Horton (1973), and thought to have affinities with the Banda Arc. Although this "Timorian" region has endemic elements, it shares many species and most higher taxa in common with northern Queensland. Also, with the almost complete lack of specimens from the Lesser Sundas and Banda Arc, I have no real grounds for separation. The only major departure from Spencer's scheme would be to extend the boundary of the Torresian subregion to the southern coast of New South Wales. Torresian taxa comprise the richest component of the Australian sciapodine fauna.

Based on bird and mammal distributions, Schodde & Calaby (1972) designated two additional faunal zones or divisions, both extending into New Guinea, the Irian and Tumbunan. These zones also have a bioclimatic basis (Nix, 1982). The Irian zone encompasses lowland New Guinea and also the rainforests at the tip of Cape York Peninsula and the Iron and McIlwraith Ranges. The Tumbunan zones includes montane New Guinea above 1200 m, and Australian tropical and subtropical rainforests from Cooktown to the Illawarra region of

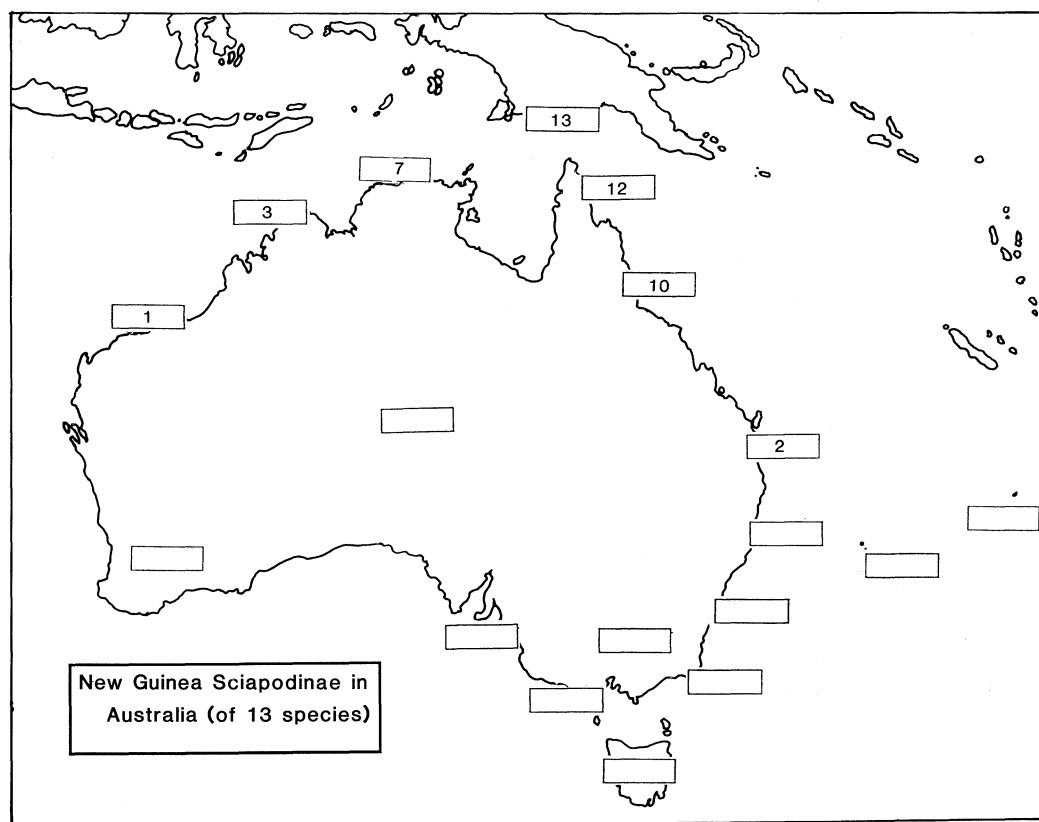


Fig.11. New Guinea Sciapodinae occurring in Australia.

southern New South Wales.

Many sciapodine taxa correspond well to the Irian zone, for example, *Amblysilopus neoplatypus* (Fig. 89) *Krakatauia claudiensis* (Fig. 45), the *Plagiozopelma angustifacies* Group (Fig. 69) and *Plagiozopelma terminiferum* (Fig. 71). However, other lowland New Guinea elements are widespread and common in the Cairns district and even further south (Fig. 11). The *Amblysilopus triscuticatus* Group, which corresponds well to the Tumbunan zone in Australia, is a species-rich tropical group which extends from Sundaland to Melanesia, and is present in *both* lowland and montane New Guinea. Thus, although the concepts of the Irian and Tumbunan zones are potentially useful, the vagility of the Sciapodinae allows for wider distributions than in more sedentary bird and mammal species. As well, too little is known about the New Guinea Sciapodinae and its altitudinal zonation to make significant comparisons with the Australian fauna. Rather than separate out the Tumbunan and Irian zones, I prefer to lump them under the general term "Torresian" for the present time.

Eastern Forest. I have been unable to find an appropriate term from the existing literature to cover this zone, although Matthew's (1992) "Eastern Pattern" for tenebrionid beetles is roughly equivalent. Also, there is some similarity with the Kosciuskian zone of

Kikkawa & Pearse, 1969 (as modified by Horton, 1973) based on birds, but they specifically exclude the Cairns district rainforests, which I would include.

The Eastern Forest zone encompasses wet and dry sclerophyll forest as well as subtropical and montane tropical rainforest of the coasts and ranges from Victoria to the Cairns District. Eastern Forest taxa have had only limited success in invading the monsoonal north, and are unknown outside Australia (apart from accidental introductions), and constitute apparently autochthonous elements. They have the richest faunas in the forests of northern New South Wales and south-eastern Queensland. The genus *Austrosclapopus* (Fig. 14) is a good example of an Eastern Forest element, apart from a small outlier in Western Australia. The *Austrosclapopus tumidus* and *proximus* Groups include species which have also entered the dry sclerophyll habitat on the Murray-Darling drainage.

Eyrean. The Alice Springs district has a largely endemic fauna of seven species, suggesting that more isolated endemic species await discovery in the desert ranges of Central Australia. Many *Parentia* species occur in semi-arid heaths and mallee, especially in Western Australia. Also, there are a number of interior *Mesorhaga* species, and species of the *Dytomyia sordida* Group are found on tree trunks in the semi-arid zone.

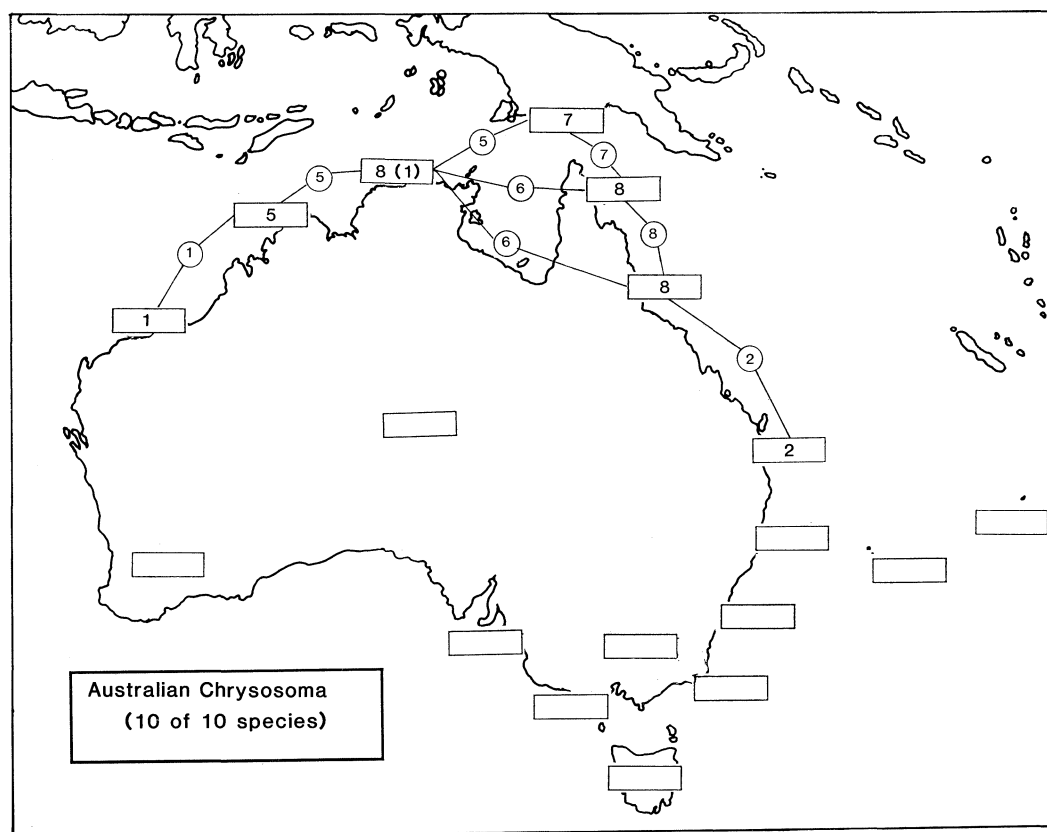


Fig.12. Australian *Chrysosoma*. The boxes show species numbers for each district, and in parentheses, the number of endemic species. Circled numbers on connecting lines indicate species shared between districts.

Ecological Biogeography of the Australian Fauna

Ecological and historical aspects of biogeography are interrelated and cannot always be distinguished. However, this section will concentrate on ecological determinants of sciapodine distribution in Australia. Sciapodinae generally favour moist habitats, especially rainforests and watercourses, although some have adapted to dry sclerophyll forests and semi-arid habitats.

Eastern rainforests. Australian rainforests are not derived from the northern Malesian flora as once thought, but constitute autochthonous formations developed from a Tertiary Gondwanan flora (Barlow & Hyland, 1988). Apart from floristic considerations, the extent and type of rainforest which develops at any site is subject to a variety of historical, climatic and edaphic factors.

Rainforest or closed forest is discontinuously distributed along the eastern coasts and ranges and represent remnants of a widespread Tertiary vegetation. Progressive continental drying since the Miocene reduced rainforest to a series of refugia now separated by gaps of sclerophyll vegetation. The most important of these gaps extends between Townsville and south-eastern Queensland and divides the tropical rainforest of the Cairns district (with a major outlier on the Eungella Plateau) from the subtropical and warm

temperate associations which extend from southern Queensland to eastern Victoria.

However, it must be noted that even now, these refugia or 'islands' of rainforest are not entirely isolated, to be reached only by chance dispersal across 'oceans' of dry sclerophyll forest or grassland. Suitable habitat for many rainforest insects occurs as mixed wet sclerophyll-rainforest vegetation along creeks. These form secondary refugia and even pathways to the upland rainforests. Even coastal regions dominated by sclerophyll vegetation have wet gully forests. For example, the dry sclerophyll woodland and heath on Sydney Hawkesbury Sandstone support Bassian and Eastern Forest species, while the rainforest developed along creeks cut into the sandstone harbour sciapodines of Torresian affinity.

Torresian sciapodines are most species rich in the Cairns District and Arnhem Land, with richness decreasing southward (eg, Fig. 5). They are almost entirely restricted to tropical and subtropical rainforest (including monsoonal vine forests and wet sclerophyll-rainforest mixtures), or moist disturbed habitats along the eastern coast.

Subtropical rainforests decrease in elevation southward and become increasingly restricted to favoured sites around the New South Wales central coast (see Adam, 1987 for review). Historically, the southernmost major occurrence of subtropical rainforest was the Illawarra region south of Sydney (now reduced to

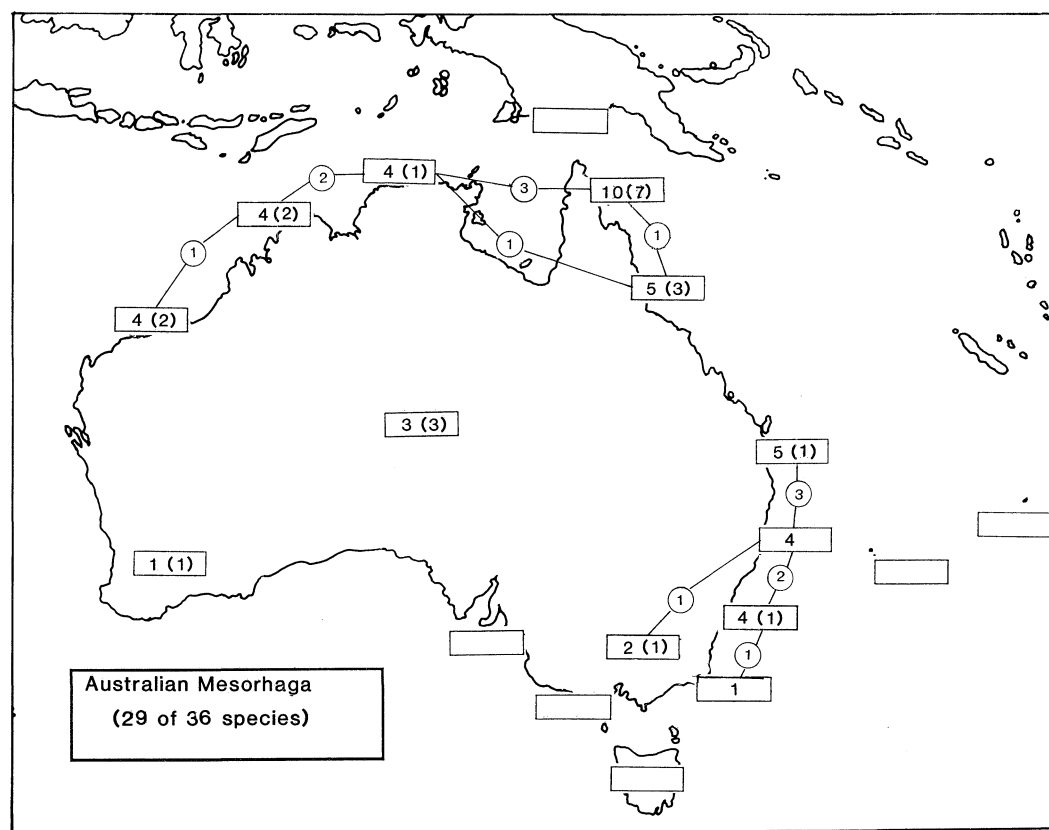


Fig.13. Australian *Mesorhaga*. The boxes show species numbers for each district, and in parentheses, the number of endemic species. Circled numbers on connecting lines indicate species shared between districts.

remnants), and only a few patches are present along creeks further south.

The southern limit for Torresian Sciapodinae in Australia appears to be the limit of subtropical forest on the New South Wales coast. I have taken only one Torresian species (*Amblypsilopus triscuticatus*) in the coastal Nadgee area near the New South Wales border, just beyond the range of subtropical rainforest (Fig. 94). However, none were present in Gippsland warm temperate rainforest sites, such as Cabbage Tree Creek near Orbost, Victoria. This habitat change accounts for the sharp drop in species richness between the Sydney and Nadgee districts (Figs 8, 15), over a relatively short distance. Possibly some microclimatic or structural characteristic of subtropical rainforests enable Torresian sciapodines to persist so far south into temperate Australia.

Australian warm temperate rainforest is not always clearly distinguished from subtropical formations. It harbours a mixture of Eastern Forest and Bassian sciapodines, with some Torresian elements at lower elevations in northern New South Wales.

Australian cool temperate rainforests (*Nothofagus* and *Eucryphia* associations) are almost devoid of Sciapodinae. I have collected extensively in Tasmanian rainforests and operated a malaise trap for almost two months in *N. moorei* forest at Gloucester Tops, NSW, but took no specimens. The subfamily is also apparently absent from the temperate forests of southern South

America (F.W. Edwards in Van Duzee, 1930, and personal examination of CNC collections). By contrast, *Parentia* is abundant in New Zealand *Nothofagus* forests, even in cold subalpine South Island associations (Bickel, 1992).

The absence of Sciapodinae from Australian cool temperate forests is therefore puzzling, especially since *Nothofagus* was an important constituent of Australian Tertiary vegetation, and Bassian or Eastern Forest elements might be expected there. However, Hill (1990) cites two major lines of evidence that the composition and ecophysiology of Australian *Nothofagus* forests have shifted since the mid-Tertiary. Palynological analyses indicate that the *Nothofagus brassii* Group was dominant in Australia until the late Miocene, but today only occurs in New Guinea and New Caledonia. As well, early Tertiary leaf macrofossils from Tasmania suggest a similar forest ecophysiology to that found today in montane New Guinea. Thus, as Australian *Nothofagus* forests changed floristically and became restricted to cooler high elevation and southern habitats, the forest sciapodines remained in habitats probably not unlike the present subtropical or warm temperate rainforest. In New Zealand, on the other hand, where the *N. brassii* Group also went extinct, sciapodines have retained a closer association with the present *Nothofagus* forests, possibly because equivalent rainforest (ie, mixed podocarp forests) is limited and much of the land was affected by heavy glaciation during the Quaternary

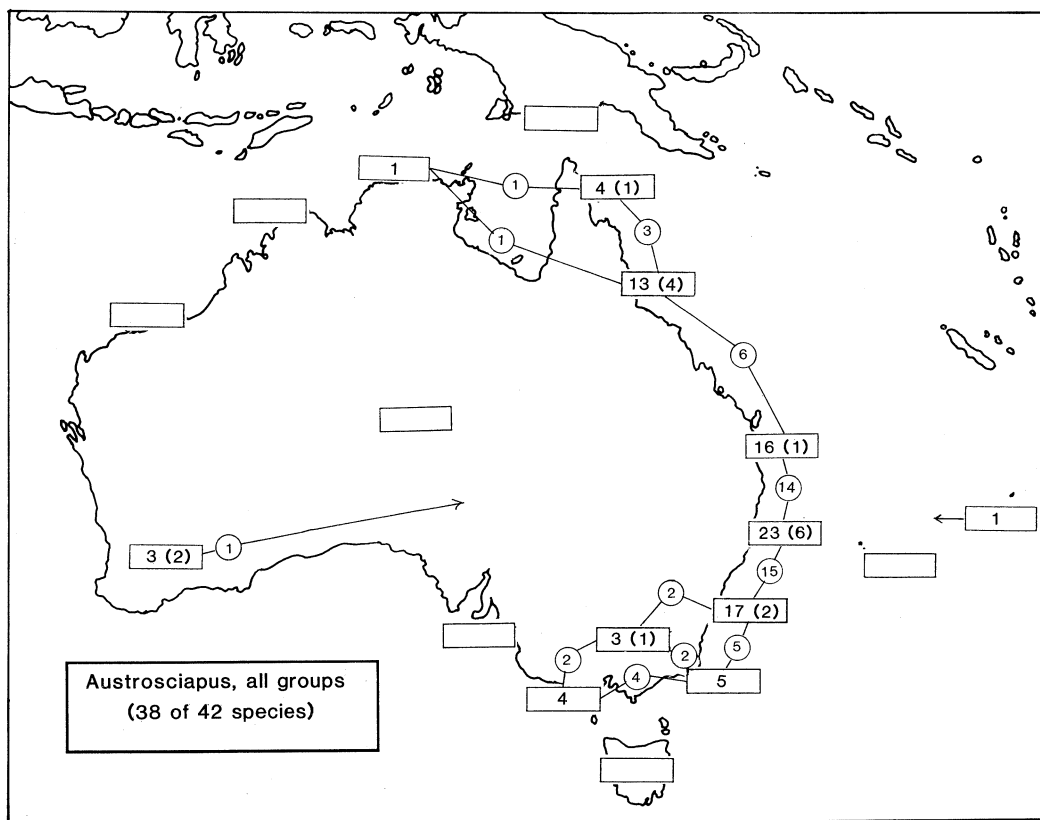


Fig.14. *Austrosciapus*, all groups. The boxes show species numbers for each district, and in parentheses, the number of endemic species. Circled numbers on connecting lines indicate species shared between districts.

(see Stevens, 1988).

Littoral rainforest is a distinctive association with a patchy distribution along the coastal eastern New South Wales and southern Queensland (the name is somewhat a misnomer and should be more properly called maritime rainforest). *Krakatauia macalpinei* is a characteristic species which is often abundant in this habitat.

As noted previously, the coast and ranges from south-eastern Queensland to south of the Sydney district form a cohesive zoogeographical unit which is only slightly less species rich than the Cairns district rainforests. This area has considerable elevation and a wide range of habitats, and is both cool enough to support Bassian fauna (absent in the Cairns district) and warm enough to maintain Torresian elements.

Sclerophyll habitats. The *Eucalyptus*/*Acacia* associations which dominate so much of the Australian landscape evolved in response to the increasing late Tertiary aridity and much of its dry-adapted fauna appears to have evolved from Bassian elements originally adapted to cool-moist habitats. The Bassian *Heteropsilopus* and *Parentia* contain species adapted to both wet and dry sclerophyll habitats across the southern half of the continent. *Parentia* is often found in open heath country, especially in Western Australia.

Many *Austrosclipus* species occur in dry sclerophyll forest, especially the *tumidus* Group and some *proximus*

Group species. These elements predominate in the woodlands of the eastern tablelands and on the slopes of the Murray-Darling drainage, but some also occur in wet sclerophyll forests along the eastern coast and ranges. Similarly, *Dytomyia sordida*, is found on tree trunks in both semi-arid woodland and coastal wet sclerophyll forests (Fig. 29). *Heteropsilopus brindabellensis* (Fig. 56) and *H. araluensis*, are found in cold montane woodland.

Arid interior. A number of endemic genera and species groups are associated with the Australian interior, including *Pseudoparentia*, most *Dytomyia*, some *Mesorhaga*, and some *Amblypsilopus*.

The fauna of the Alice Springs district and comprise mostly endemic species. Probably this inland fauna was restricted to water courses in desert ranges during the increasing aridity of the late Tertiary. In some cases, these inland species appear quite isolated and are not readily associated with taxa from moister regions of the continent.

Monsoonal north. In addition to the lowland New Guinea fauna in tropical Australia (Fig. 11), there is a distinctive monsoonal fauna across much of the north, extending from Cape York Peninsula to Arnhem Land and the Kimberley Ranges. This comprises widespread species or sister species between Cape York Peninsula and Arnhem Land. Although most species are associated with vine forests along watercourses, they

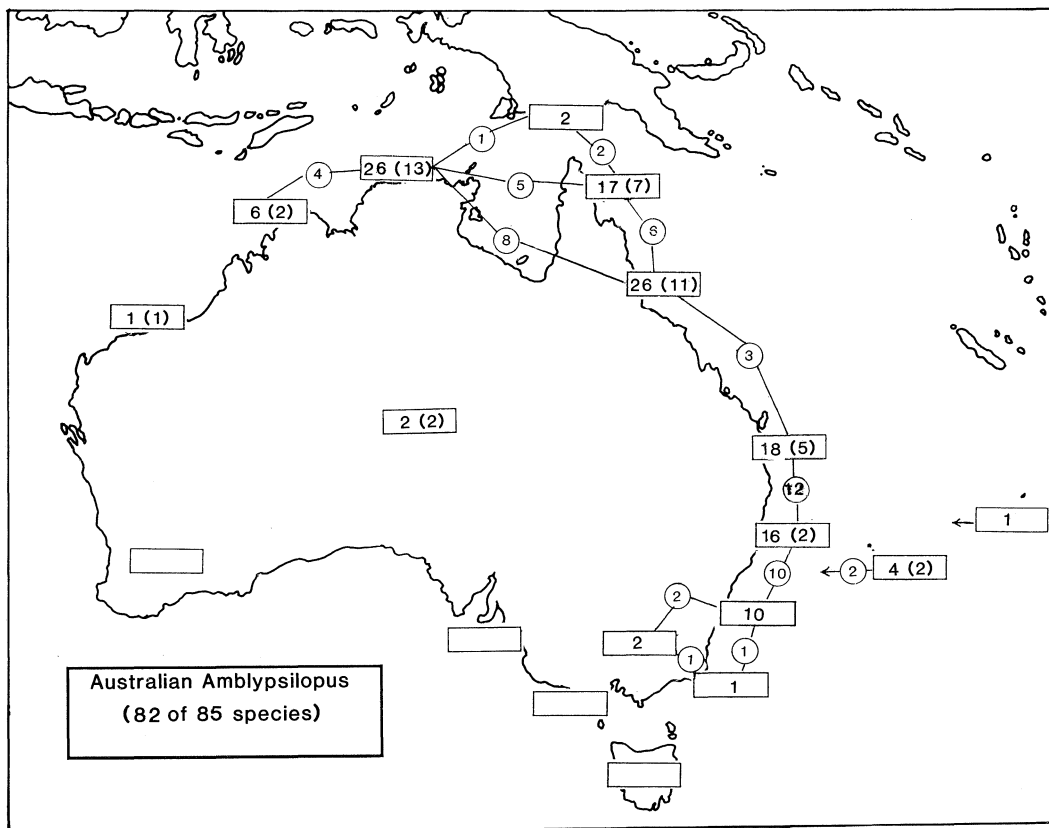


Fig.15. Australian *Amblypsilopus*. The boxes show species numbers for each district, and in parentheses, the number of endemic species. Circled numbers on connecting lines indicate species shared between districts.

also occur in monsoonal woodlands (*Eucalyptus tetrodonta* – *E. miniata* association) during the wet season from December to April, especially if the forests have not been burnt (see discussion under Conservation Biology). This monsoonal fauna included species in *Chrysosoma*, *Mesorhaga*, and especially *Amblypsilopus*.

Coastal habitats. Several sciapodine taxa in Australia are associated with coastal habitats, mostly around the eastern, southern and western continental margin. *Narrabeenia* has two species, one from tropical Queensland to South Australia (including Tasmania), the other from South Australia to Western Australia. Other coastal taxa include the *Austrosciapus hollowayi* from south-western Australia, *Abbemyia nigrofasciata* and *A. taree* from eastern Australia, and a number of *Mesorhaga* species. Label data usually indicate dunes or coastal vegetation.

Affinities and History of the Australian Sciapodinae

Mackerras (1950, and modified in Main, 1981) divided the Australian insect fauna into four major zoogeographic elements based on extralimital affinities, distributions, fossil history and dispersal capacity:

Archaic (Pangaeon), Southern (Gondwanan), Old Northern (Asia Tertiary) and Young Northern (Modern).

Pangaeon element (Archaic). Insect taxa which were well differentiated and widespread before the breakup of Pangaea (ie, pre-Cretaceous) comprise this element. The Dolichopodidae probably had not emerged before this time.

Gondwanan element (Southern). This element is characteristic of temperate regions of the southern landmasses which once formed Gondwana. The split-up of Gondwana and the isolation of Australia which occurred by the early Tertiary, ensured that little subsequent interchange between these lands. In Australia, Gondwanan insects often display a Bassian distribution and are associated with cool and humid conditions, although some have radiated into sclerophyll and cool semiarid habitats. Two genera, *Parentia* and *Heteropsilopus*, display classical Bassian distributions and each has ties with other southern landmasses (New Zealand and New Caledonia, and southern India, respectively).

The Australian and New Zealand *Parentia* are morphologically close, and interchange possibly occurred before the two landmasses were separated in the late Cretaceous, 80 million years ago (Fig. 35).

The occurrence of *Heteropsilopus* in Australia,

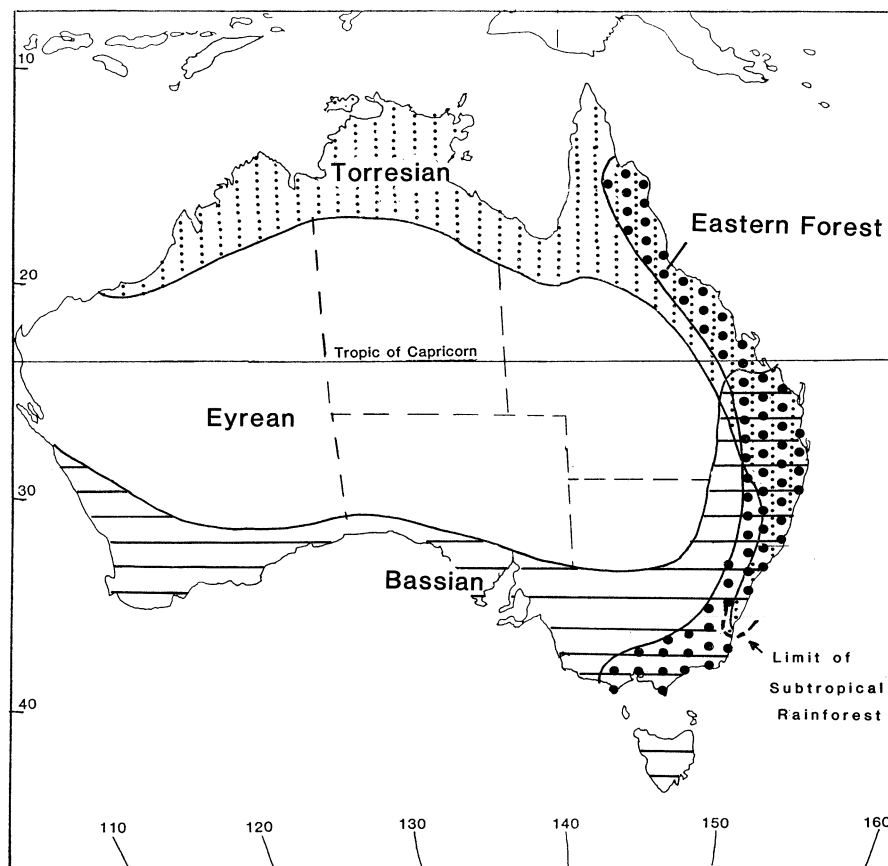


Fig.16. Australian zoogeographic subregions based on the Sciapodinae.

South India and montane Sri Lanka (Fig. 47) is of particular interest. In India the genus is restricted to mountains above 900 m in the elevated physiographic region of the 'Western Ghats' or 'Southern Blocks', and is unknown from the lowlands. Mani (1974) notes that this region supports numerous Gondwanan relict taxa. However, the Indian subcontinent was one of the first landmasses to break away from Gondwana, and Powell *et al.* (1981) suggest that by the Lower Cretaceous (125 million years ago) India would have been separated by more than 1,000 km of open ocean from Australia/Antarctica, making chance dispersal between the landmasses unlikely. This vicariant distribution strongly suggests a Lower Cretaceous Gondwanan origin for the subfamily, and therefore at least that age for the Dolichopodidae, much earlier than previously suspected (see discussion under Age of the Sciapodinae and Dolichopodidae). A vicariant scenario to account for the Australia – India disjunction would have *Heteropsilopus* widespread in eastern Gondwana in Lower Cretaceous time, across a landmass which included India, Antarctica and Australia. This hypothesis would have additional support if the genus were discovered in Madagascar, since at that time, India and Madagascar were joined (Howarth, 1981).

Although revisionary treatments are required for the Neotropical Sciapodinae, there is no evidence of a faunal connection with South America (the A-S groups of Hennig, 1966), and the principal genus *Condylostylus* definitely is not present in Australia/New Zealand. By contrast, the dolichopodid subfamily Sympycninae, which dominates the dolichopodid faunas of temperate South America, New Zealand, Australia and Tasmania, may well contain elements which are clearly A-S groups.

The Eastern Forest taxa (such as *Austrosciapus*) have few species extending north of the Cairns district, and they are unknown from New Guinea. Eastern Forest group are probably Gondwanan in origin and were once widespread in mid-Tertiary Australian forests, contracting eastwards as the continent became increasingly arid. Indeed, *Austrosciapus* has a common origin with the Gondwanan genus *Heteropsilopus*. Montane New Guinea possibly contains Gondwanan elements which are relicts of the Australian early Tertiary biota (also see New Guinea under World Fauna and History).

Some taxa could have evolved in New Guinea from Australian Gondwanan stocks and secondarily reinvaded Australia. In such cases, their distribution pattern would be Torresian and would appear to have invaded along with Asia Tertiary Elements. *Chrysosoma* probably arose from *Parentia* on the leading edge of the Australian Plate in what is now New Guinea, radiated there and re-entered Australia from the North.

Asia Tertiary element (Old Northern). As the Australian plate drifted north during the Tertiary, opportunities for dispersal from Asia would have increased. There may have been multiple invasions through time. The earliest invaders would have been able

to penetrate deep into Australia and speciate among the widespread forests, leading to a gradual masking of their northern origin. As forests contracted eastwards during post-Miocene drying, the descendants of these early arrivals would show a distribution pattern more like that of Eastern Forest rather than Torresian taxa.

The Zoogeographic Analysis suggests that much of the northern Australian fauna is derived from Oriental/Papuan sources probably since the mid-Tertiary, when the Australian plate was near enough to Asia for dispersal. These all show Torresian distribution patterns in Australia with a marked decrease in species richness southwards. This Asia Tertiary Element includes all *Chrysosoma*, *Plagiozopelma* and the *Amblypsilopus triscuticatus*, *flaviappendiculatus* and *anomalicornis* Groups (the *zonatus*, *topendensis*, and *trogon* Groups were derived from these ancestral groups within Australia). The major entry point for the Asia Tertiary element is assumed to have been across the shallow Sahul Shelf which would have formed a broad corridor with lowered sea levels. However, the Arnhem Land and north-western Australian fauna may have been directly influenced from the Banda Arc.

Modern element (Young Northern). The most recent component of the Australian fauna are lowland New Guinea species (Fig. 11). Five of these 13 species also are widespread Oriental/Australasian tramp species (eg, Figs 57, 61, 71). Only one montane New Guinea species occurs in Australia (*Amblypsilopus sideroros*) although many close species pairs and species groups are shared between montane New Guinea and Cairns district rainforests.

Elements of uncertain affinity. The cosmopolitan genus *Mesorhaga* is found in a variety of habitats throughout the continent (Fig. 13). It displays no clear distributional pattern which suggests strong extralimital affinities. Although the genus is unusually rich within Australia, the faunas of other regions need more work before relationships can be established.

Biogeographic Summary of Australian Sciapodinae

1. Gondwanan Sciapodinae occur mostly in wet to dry sclerophyll forests and heaths of southern Australia. Two genera, *Parentia* and *Heteropsilopus*, display classic Australian Bassian distribution patterns and have ties with other Gondwanan landmasses, New Zealand and New Caledonia, and southern India, respectively. The disjunction of *Heteropsilopus* in Australia and India suggests a widespread eastern Gondwanan distribution in place during the Lower Cretaceous. No relationship with the southern Neotropical fauna is evident. Montane New Guinea possibly maintains a Gondwanan fauna relict from the early Tertiary Australian biota.

2. Australian *Nothofagus* forests are devoid of Sciapodinae, in marked contrast to such forests in New

Zealand.

3. A Torresian fauna of Oriental-Papuan affinity dominates the northern tropics, and has penetrated southwards along the eastern Australian coast and ranges, but only in association with tropical and subtropical rainforest. The southern limit of Torresian taxa in eastern Australia coincides with the southern limit of subtropical rainforest in New South Wales.

4. The coasts and ranges from southern Queensland to Sydney support a rich fauna, only slightly less rich than that of the Cairns district. This region is both cool enough to support the older Bassian fauna, and warm enough for more recent Torresian elements. Faunal richness drops sharply south of the subtropical rainforests and on the eastern tablelands where only Bassian elements dominate.

5. Lowland Papuan species occur on the Cape York Peninsula and some have spread across monsoonal northern Australia.

6. Although species groups are shared between montane New Guinea and the Cairns district, only one exclusively montane New Guinea species occurs in Australian rainforests.

7. The broad arid zone of Western Australia has prevented the southward movement of tropical elements, and the south-west maintains only a Gondwanan fauna dominated by *Parentia*.

8. The ranges of interior arid Australia support isolated endemic faunas.

9. Norfolk Island supports three species which also found on the Australian mainland. Lord Howe Island has four species, two which also occur on the eastern Australian coast, and two endemics derived from one of these Australian species.

Biogeography II: World Fauna and History

Widespread species. Tramp species or "Stage I" species (Wilson, 1959) have distributions across wide areas, and frequently occur on isolated oceanic islands. They often show broad ecological tolerance and are adapted to survive in disturbed lowland areas, thereby increasing their chance of dispersal by wind or human transport. Many generalist lowland species are therefore 'preadapted' to becoming tramps. Such species usually display only minor intraspecific variation, and are single species or closely-knit sibling complexes. Thus the apparent paradox that the best potential colonising species seem to have genotypes that are resistant to changes by the founder effect (Carson & Templeton, 1984).

A number of tropical Oriental and Australasian sciapodines have broad distributions spanning wide stretches of ocean. I have divided them into two groups, those which appear to have dispersed naturally with only incidental human aid, and those whose distributions are almost certainly the result of accidental human introduction.

Naturally widespread species. *Chrysosoma leucopogon* has the most striking distribution of any sciapodine (Fig. 57), ranging from the east African coast and Madagascar to French Polynesia, and occurring on isolated oceanic islands as well as continental landmasses. A similar distribution is found in the medeterine dolichopodid *Medetera grisea* (compare Bickel, 1987, fig. 21). Other wide-ranging Oriental-Australasian species include: *Chrysosoma crinicornis* (Fig. 61), *C. proliciens*, *C. complicatum*, *Krakatauia evulgata*, *K. recta*, *Plagiozoplema flavipodex* (Fig. 66), *Amblypsilopus humilis*, *A. flaviappendiculatus* (Fig. 111) and *A. abruptus* (see discussions under individual species). Two of these species, *Chrysosoma leucopogon* and *Plagiozoplema flavipodex*, have been taken together in large numbers in malaise traps and yellow pans in Australasian lowlands (Christmas Island and northern Queensland), suggesting they are often extraordinarily abundant as well as being widespread, thereby increasing their chances of waif dispersal.

Condylostylus longicornis has reached the Galapagos and French Polynesia from the Neotropics, one of the few New World insects to naturally colonise Polynesia.

Accidental introductions. Some distributions appear to be the result of accidental human introduction, especially where exotic species occur only near port cities, such as the Australian *Austrosciapus proximus* in Auckland, New Zealand (Fig. 73) and the eastern Australian *A. connexus* in Perth, Western Australia (Fig. 76), or show extraordinary disjunctions, such as *Chrysosoma palapes* in Sri Lanka and Hawaii. The presence of the Oriental *Amblypsilopus pallidicornis* in the Seychelles, Hawaii and French Polynesia, the Chinese *Chrysosoma globiferum* in Hawaii, the eastern Australian *Austrosciapus connexus* in Norfolk Island, Hawaii and French Polynesia (Fig. 76) all suggest accidental introduction. [However, *A. connexus* could have reached Norfolk Island unaided, since Australian moths occur on the island (Holloway, 1977) and Australian sciapodines such as *Amblypsilopus zonatus* have naturally dispersed to Lord Howe Island. Nevertheless, since most shipping to Norfolk Island is from Sydney and Brisbane, accidental introduction is equally likely.] The reported occurrence of the common Indo-Australian *Chrysosoma crinicornis* in Brazil cannot be confirmed (see species discussion), but if present, it would also represent accidental introduction.

Individuals are probably transported as immatures in soil. *Amblypsilopus exul*, known only from greenhouses in France and the Netherlands, is not of Palearctic origin, but is a member of the Oriental-Australasian *pallidicornis* Group. *Parentia vulgaris*, an Australian species also found on Norfolk Island, has been reared from orchid compost, which suggests ease of transfer through horticultural trade. This is confirmed by R.C.L. Perkins (cited in Lamb, 1922: 370-371), who bred Dolichopodidae "from damp earth in which plants were being reared for use in Hawaii".

Austrosciapus connexus has the qualities of a lowland

tramp species, being abundant in both undisturbed wet forest and urban parks and gardens along the eastern Australian coast (Fig. 76). It was accidentally introduced to Perth, Western Australia, where it is common on ornamental plants in the well-watered metropolitan area. However, it is unable to survive in the surrounding dry sclerophyll vegetation. Thus, in Western Australia, it is essentially restricted to an urban 'island'.

Amblypsilopus triscuticatus is a species I suspect would have good potential for accidental dispersal. It has a similar original range and abundance as *Austrosciapus connexus*, and is also common in disturbed lowland habitats. However, its presence in Canberra, ACT, a rather cold montane environment, seems anomalous for this essentially subtropical species. Possibly it was accidentally introduced there and also survives because of human habitat modification.

World Biogeographic Summary

Melanesia and the Pacific. Pacific sciapodines show a pattern of both long range dispersal and speciation on high islands (for discussion of Pacific insects, see Gressitt, 1961). Not only have Papuan/Sundaland elements spread to the eastern Pacific, but a Neotropical species, *Condylostylus longicornis*, appears to be one of the few insects to naturally colonise Polynesia from the New World (review in Adamson, 1939). Although some species occur across several island groups, many archipelagoes have common endemic lowland species which serve as geographic indicators, and most high islands in the western Pacific support endemic species of the *Chrysosoma leucopogon* Group.

New Guinea and Bismarck Archipelago. New Guinea and its surrounding islands have a rich fauna, only a fraction of which is known. Most of the approximately 50 described species are *Chrysosoma*, *Krakatauia* and *Plagiozopelma*. Becker's (1922a) New Guinea "*Sciapus*" are mostly lost and/or his descriptions are inadequate for identification. Many small-sized sciapodines were overlooked by earlier collectors, but recent mass-trapping samples indicate very rich faunas in the Papuan region. Although large monographic revisions are required before detailed biogeography can be established, certain trends are evident.

New Guinea has a three-fold origin: part Asian plate, part Australian plate, and part newly formed mountains (see papers in Gressitt, 1982). The mixing of Australian and Oriental faunas allowed for extensive radiation in the newly formed ranges. New Guinea itself appears to be the center of diversity for a number of sciapodine taxa, *Krakatauia* (with many undescribed montane species), and the *Chrysosoma aeneum*, *lucigena*, *antennatum*, *arrogans* and *proliciens* Groups. Papuan elements have radiated into Oriental and Australian areas to varying degrees. For example, the *Chrysosoma arrogans* Group is centered in Melanesia but extends

as far west as Timor and the Philippines, and the *proliciens* Group extends from India to northern Australia and Melanesia. The excellent dispersal ability of such groups has tended to obscure such faunal boundaries as Wallace's and Weber's Lines. Oriental and Afrotropical taxa such as *Plagiozopelma* and the *Amblypsilopus abruptus* Group have spread eastwards into New Guinea, northern Australia and Melanesia where they show diminished richness. In general, although species composition varies, the Sundaland and Papuan archipelagos share many elements at the level of genus and species group. Only two lowland taxa which are widespread in the Orient and Afrotropics, *Condylostylus* and the *Chrysosoma vittatum* Group, have failed to cross east of Lydekker's Line.

The relationship of the montane Papuan fauna with that of Australia is of particular interest (also see previous discussions of Zoogeographic Subregions and Ecological Biogeography of the Australian Fauna). Indeed, *Chrysosoma* possibly arose from *Parentia* in the Papuan archipelago on the leading edge of the Australian Plate. (Australian *Parentia* has a strong Bassian distribution, with only 1 species in the tropics; Fig. 35). Hill (1990) has established the vegetative and floristic similarity of montane New Guinea rainforest and the early Tertiary Tasmanian flora. As well, Schodde & Calaby (1972) regard the bird and mammal faunas of the eastern Australian rainforests south of Cape York Peninsula and montane New Guinea as representative of the old Australian fauna. The possibility that the New Guinea uplands retain elements of an original Australian Tertiary biota invites further investigation.

The sclerophyll adapted *Dytomyia sordida* Group is apparently the only Australian autochthonous supra-specific taxon in New Guinea. Undescribed species occur in savannah woodland near Port Moresby.

Although sharing many taxa with New Guinea, the Bismarck Archipelago has some endemic species, *Chrysosoma antennatum* being the most distinctive.

Solomon Islands. The Solomon Islands are dominated by taxa of Papuan origin, although with a high endemicity. Characteristic lowland species include *Chrysosoma leverii*, *C. obscuripes*, *C. salomonis*, *C. ludens* and *C. mutilatum*. Montane Guadalcanal has undescribed *Chrysosoma* of uncertain affinity.

Vanuatu. The Vanuatu fauna is poor in comparison with that of the Solomons, Fiji or New Caledonia. *Chrysosoma provocans* is a common species endemic to the archipelago.

Fiji and Tonga. Fiji is a relatively old landmass, and appears to have been a center of radiation for the Sciapodinae, from which species spread to surrounding island groups. These include species near *Amblypsilopus pulvillatus*, and *leucopogon* Group species such as *Chrysosoma complicatum* and *C. feriferum*. Montane Viti Levu has a number of isolated species of uncertain affinity, such as *Amblypsilopus cosmochirus*. The low-

lying Tonga islands have a fauna of Fijian affinity.

Samoa Islands. The Samoan fauna has several interesting taxa, the genus *Helixocerus*, also found on New Caledonia, and distinctive species in the *Chrysosoma lacteimicans* Group, whose males all have dark brown wings.

French Polynesia. At least three *leucopogon* Group species are found in these archipelagos, including *Chrysosoma pacificum*, *C. tuberculicorne*, and an undescribed species whose distribution includes Henderson Island. However, of particular interest is the presence of the New World *Condylostylus longicornis* in the Marquesas, Society and Austral groups.

Hawaiian Islands. The Hawaiian fauna comprises four species, all of which occur elsewhere in the Pacific or Orient: *Austrosclaparus connexus* (Australia, Norfolk Island and French Polynesia), *Amblypsilopus pallidicornis* (Seychelles, Taiwan, Micronesia and French Polynesia), *Chrysosoma globiferum* (China) and *C. palapes* (Sri Lanka). Williams (1931) cites the first three listed species as occurring in Hawaiian sugar cane fields. The absence of endemic species suggests all Hawaiian Sciapodinae are of the recent arrival via human agency (see Accidental Introductions, above). Speciation probably would have occurred had they reached the Hawaiian Chain by prehistoric waif dispersal, especially since the Hawaiian environment has facilitated explosive radiation in other dipteran genera, and sciapodines have readily speciated on most high islands in the Pacific.

Micronesia. The Micronesian Sciapodinae is derived from Sundaland, Philippines and Papuan sources in the west, and from the Solomons, Vanuatu and Fiji to the south and east. It comprises 24 species. The high volcanic islands of Micronesia have local endemics (*Chrysosoma* and *Amblypsilopus* species), while the isolated coralline atolls support only widespread species (see Bickel, in press).

New Zealand. The New Zealand Sciapodinae (Bickel, 1992) comprises 27 species (including a species on the Chatham Islands) in the trans-Tasman genus *Parentia*, and the monotypic endemic genus *Naufraga*. As well, *Austrosclaparus proximus* is known only from Auckland, undoubtedly an accidental introduction from eastern Australia. New Zealand is too far south and isolated to have received any tropical Pacific or Melanesian taxa, a pattern also reflected in *Medetera* (Medeterinae) (Bickel, 1985). Although related to the New Caledonian *Parentia*, the New Zealand fauna has had no influence on the fauna of Lord Howe Island, nor any Polynesian group. Collections of Dolichopodidae from the Kermadec Islands (BPBM) do not contain sciapodines.

New Caledonia. New Caledonia has a rich endemic fauna. I found only two described species in collections (BPBM, MNHP), the widespread Indo-Pacific *Chrysosoma*

leucopogon and the endemic *C. noumeanum*. Represented among the approximately 25 undescribed species are *Amblypsilopus*, the *Chrysosoma noumeanum* Group, *Parentia*, *Helixocerus*, the latter also known from the Samoan Islands, and *Abbemyia*, also known from Australia and elsewhere in the Pacific. A revision of the New Caledonian fauna is in preparation.

Norfolk and Lord Howe Islands. (See discussion under Biogeography I: Australia).

Oriental Region. The Oriental fauna has been described mostly from Sri Lanka, southern India, Malaysia, Java, the Philippines, and Taiwan (see Dyte, 1975). Only isolated species are known elsewhere, and many remote and montane regions remain virtually uncollected. However, common lowland species can be identified using Becker (1922a) and Parent (1935a). As with the Australasian region, few small-sized sciapodines have been described or can be identified, so this discussion is based largely on the distributions of *Chrysosoma*, *Plagiozopelma* and *Condylostylus*.

Apart from widespread paleotropical elements, a number of groups or assemblages (especially within *Plagiozopelma*) are known from only Sundaland and the Indian subcontinent, often only Java and Sri Lanka, suggesting a shared lowland tropical fauna across the region. The extent of 'intrusion' of Papuan elements into the Orient is not clear. Of particular interest would be the analysis of recent collections from Sulawesi, an island partially composed of the Australian Plate. As noted previously, some widespread Oriental-Afrotropical taxa have ranges which encompass New Guinea.

Sundaland, Philippines. A number of *Chrysosoma leucopogon* Group assemblages (IIC, IIE) suggest a common origin for many Sundaland species, and there is an especially close link between the faunas of the Philippines and Borneo. These assemblages show varying geographical ranges, and some extend to Maluku and Irian Jaya. The *Krakatauia anthracoides* Group is centred on Sundaland and South-east Asia.

South-eastern Asia. The fauna of Taiwan is known in some detail (Becker, 1922a, 1924). It is an extension of the Sundaland fauna and is especially rich in species of the *Plagiozopelma flavipodex* Group, but at least one species of the largely Holarctic genus *Sciapus* is also present. Several Oriental *Condylostylus* species extend at least to Taiwan, and *C. nebulosus* and *C. japonicus* are also found in Japan. Few species have been described from Indochina, Burma, Thailand or mainland China.

Christmas Island and Cocos-Keeling Groups. These two Australian Indian Ocean territories have a fauna derived from the Greater Sundas. Four species are known from Christmas Island, three being widespread, *Chrysosoma leucopogon*, *Plagiozopelma flavipodex* and *Amblypsilopus abruptus*, and the endemic *A. natalis*,

which is close to *A. renschi* from Lombok. The Cocos-Keeling Group has three species, *Chrysosoma leucopogon*, *A. abruptus* and *A. pectinatus*, all of which occur in the Greater Sundas.

Indian Subcontinent. Sri Lanka and the uplands of South India have a rich fauna, comprising the old relict genus *Heteropsilopus* as well as *Plagiozopelma* and other taxa. The *Plagiozopelma annotatum* Group is confined to the subcontinent. The richness of *Plagiozopelma* in India suggests it arose there, possibly from a taxon near the *Heteropsilopus triligatus* Group, and subsequently spread east to Sundaland and Australasia, and west to Africa.

Afrotropical Region. The Afrotropical and Indian faunas have similarities at the generic level but each has characteristic elements. They share only *Condylostylus* with South America, suggesting that the genus was in place before the opening of the South Atlantic, and that characteristic elements of Oriental affinity arrived in Africa after separation. Distinctive and widespread Afrotropical taxa include the *Chrysosoma senegalense* and *gemmarium* Groups, the *Plagiozopelma bequaerti* Group, and the new genus *Ethiosciapus*. The widespread *Chrysosoma vittatum* Group has undergone considerable diversification in Africa. Of particular note is *Mascaromyia* in the Seychelles and Mascarenes of the western Indian Ocean. The fauna of Madagascar is very poorly known.

Neotropical Region. South and Central America are dominated by some 240 species of *Condylostylus*, with more awaiting description. Species groups with similar genitalia are shared between the Neotropical and Afrotropical regions, suggesting the vicariance of a common fauna by the opening of the South Atlantic. However, the absence of *Chrysosoma* and *Plagiozopelma* from the Neotropics suggest these genera entered Africa long after South America had separated. *Condylostylus* is absent from southern South America (F.C. Edwards in Van Duzee, 1930, and CNC collections). The definition of Neotropical *Amblypsilopus* is not clear.

Nearctic Region. The Nearctic fauna is relatively small, with about 80 species. The Nearctic *Condylostylus* is a northern extension of the rich Neotropical fauna. *Amblypsilopus* is rich in the southern United States but its relationships and definition awaits investigation. There are seven species of North American *Sciapus*, some of which may be synonyms of Palearctic species.

Palearctic Region. The Palearctic fauna is also small and dominated by some 55 species of *Sciapus*. The arid and mountainous barriers which extend from northern Africa to the eastern Himalayas have prevented interchange with the rich faunas of the Afrotropical region and the Indian subcontinent. Only the lowlands of eastern Asia provided a route for Oriental taxa to enter the Palearctic region, with *Amblypsilopus*,

Mesorhaga and *Condylostylus* variously recorded from northern China, Siberia and Japan. *Chrysosoma globiferum* is known from just inside palearctic China.

Fossil Sciapodinae

Meunier (1907, 1908b) described three species of *Psilopus* from Baltic Amber. The wing and hypopygium figures clearly indicate that the specimens are sciapodine, possibly true *Sciapus*. Meunier (1907, 1908a, 1908b) also described four species of *Nematoproctus* (Sympycninae) but his figures for the wing and male postabdomen suggest these are possibly *Mesorhaga*. I have seen *Mesorhaga* from Baltic Amber (AMNH, specimens WB-148, WB-169).

Dolichopodidae are present in many other amber faunas (Spahr, 1985), and the Sciapodinae are undoubtedly well represented. For example, the fine AMNH collection of Dominican Republic amber of mid- to late Tertiary age includes at least five species in four genera: banded wing *Condylostylus* sp. (female, AMNH 11867), clear wing *Condylostylus* sp. (females, AMNH 11782, AMNH 11646), *Sciapus* sp. (male, AMNH 11869; female, AMNH 11828), specimen between *Condylostylus* and *Amblypsilopus* (male, PB 297), and *Mesorhaga* sp. (male, AMNH 11757; female, AMNH 11855).

Sciapodines have also been described from impression fossils, a species from the Oligocene of France (Timon-David, 1944) and two species from the Miocene of Germany (Statz, 1940). The descriptions and figures of all three species confirm they are 'dorsal-arista' sciapodines, probably *Sciapus* s.s.

As suggested by Baltic Amber faunas generally (Larsson, 1978), most recent insect families had radiated by the early Tertiary. Indeed, this is the case for the Dolichopodidae, and in particular, sciapodine genera appear well defined and essentially modern at that time.

The provenance of these fossils does not provide any surprises, since their genera (*Sciapus* and possibly *Mesorhaga* from Europe, and *Condylostylus*, *Sciapus*, *Mesorhaga* and possibly *Amblypsilopus* from the Caribbean) can still be collected near their respective fossil sites. Here it must be noted that the European Tertiary fauna does not have any Gondwanan paleotropical elements, and the western Palearctic region appears to have been isolated to recent time.

Historical Biogeography of the Sciapodinae

Most sciapodine evolution occurred on the Gondwanan continents (Gondwanaland), probably under warm humid conditions. The subfamily is most diverse in the Old World south of the ancient Tethys Sea, ie, subsaharan Africa, the Indian subcontinent, south-eastern Asia and Australasia. Although south-east Asia – Sundaland was part of Laurasia during this time, its fauna is possibly a combination of elements from the

Indian subcontinent and the Australian plate rather than any northern source. Only one true Laurasia taxon is known, *Sciapus*, a small genus of some 65 species.

There has been only limited entry of the northern temperate zone by the Sciapodinae. In the New World, sciapodines were able to move north along the Cordillera and Caribbean archipelagoes to North America. By contrast in the Old World, the arid and mountainous regions which extend from northern Africa to the eastern Himalayas have prevented northward movement of the rich Afrotropical and Indian faunas. Only the eastern Asian lowlands have provided a route for genera such as *Amblypsilopus*, *Chrysosoma*, *Condylostylus* and *Mesorhaga* to enter the eastern Palearctic. However, as suggested by both fossil and recent distributions, the western Palearctic has been relatively isolated since the early Tertiary.

If the Dolichopodinae and Sciapodinae are possible sister taxa as discussed under Systematic Position of the Sciapodinae, their present distributions may reflect the ancient paleogeographic division between Laurasia and Gondwana.

The Dolichopodinae is dominant across the Holarctic region and China and comprises large genera such as *Dolichopus* (500+ species), *Hercostomus*, *Paraclius* and *Pelastoneurus*. India, which is a Gondwanan accretion to the Asian landmass, has a poor representation of the subfamily. The Dolichopodinae is depauperate in Sundaland and Australasia, with only lowland/coastal taxa such as *Paraclius* or *Lichtwardtia* having been able to cross the Equator into Australia and western Melanesia. However, four species of *Hercostomus* are known from New Zealand, a disjunct occurrence of a primarily Holarctic genus which requires further investigation. The subfamily is present in central and eastern Africa, but has few species in southern Africa. Because the New World has natural dispersal corridors along the Cordillera, the Dolichopodinae is well represented in central and montane South America, especially by the genera *Paraclius*, *Pelastoneurus* and *Tachytrechus*.

In summary, the Sciapodinae is most diverse in the tropics of the Gondwanan landmasses while the Dolichopodinae is most diverse in Laurasia. In the Old World, the east-west mountain ranges and arid lands have proved a major barrier to the exchange of faunas, although the Dolichopodinae have been able to penetrate south of these barriers more effectively than the Sciapodinae has moved north. By contrast, the north-south physiography of the New World has allowed much greater movement of the Dolichopodinae into South America, and the Sciapodinae into North America.

The Age and Origin of the Sciapodinae and Dolichopodidae

Biogeographic data suggest a minimum Lower Cretaceous (125 million years ago) age for the Sciapodinae. Three vicariant distributions support this.

1. *Heteropsilopus* occurs only in southern India and temperate southern Australia (Fig. 47) suggesting land connections through East Gondwana (southern Africa/Antarctica) before the Indian subcontinent broke off and drifted free in the Lower Cretaceous Hauterivian Stage, approximately 125 million years ago (Powell, 1981) (see additional discussion under Affinities and History of the Australian Sciapodinae, and under the genus *Heteropsilopus*).

2. *Condylostylus* was present as part of a common fauna in South America and Africa before the opening of the South Atlantic Ocean. Final separation of the two landmasses which would have prevented later Oriental/Afrotropical taxa reaching South America occurred at the beginning of the Upper Cretaceous, in the Turonian-Cenomanian Stages, about 85-95 million years ago (Howarth, 1981).

3. *Parentia* is well diversified in both New Zealand and southern Australia, and also occurs in New Caledonia. Although trans-Tasman dispersal from Australia is possible (well documented for recent Lepidoptera and Odonata), the extensive diversification of the New Zealand fauna (Bickel, 1992) suggests a vicariant pattern, with separation of the two landmasses also about 80 million years ago (Stevens, 1988).

If the Sciapodinae were differentiated in Lower Cretaceous time, as suggested by the vicariant distribution of *Heteropsilopus*, then the origin of the family Dolichopodidae is earlier still. However, since the Sciapodinae retains many plesiomorphic characters, it could well have diverged near the time of origin of the family.

A Lower Cretaceous age for the Dolichopodidae is much earlier than previously suggested. Negrobov (1978) and Chvála (1981, 1983) support an Upper Cretaceous origin for the family based on fossils of the same age which appear dolichopodid-like yet retain some wing and antennal structures more characteristic of the Microphoridae. These fossils, which appear intermediate between the two families, are probably terminal lineages which, instead of representing the ancestral stem-group of the Dolichopodidae, were contemporaneous with the family. Also, it must be remembered that all Cretaceous amber deposits are located in Laurasian landmasses. If the Dolichopodidae arose in Gondwana, as the primitive subfamily Sciapodinae most certainly did, the family might not have been present in the regions where Cretaceous fossils were formed.

Natural History

Microhabitats. Adult sciapodines occur on leaves, tree trunks, river rocks, and other surfaces. These sites are used both for mating and opportunistic feeding on soft-bodied invertebrates.

Foliage. Sciapodines are frequently seen on exposed leaf surfaces, especially at the edge of forests. Individuals

rarely rest for long periods, but move with short quick flights among foliage. When two individuals land on the same leaf, they often confront each other head-on, and then both fly away, one appearing to chase the other. Although their movements are rapid and difficult to follow, this chasing appears to be between males, and has been observed in *Austrosciapus connexus*, *A. proximus*, *A. quadrimaculatus* and *Amblypsilopus triscuticatus*.

Sciapodines prefer large-sized leaves and are often attracted to broad-leaved ornamentals and exotic weeds in preference to native narrow-leaved sclerophyllous vegetation. This is especially evident in disturbed and ecotonal habitats. For example, *Heteropsilopus brindabellensis* was common on exotic blackberry plants near Bendoc, Victoria, but no specimens were seen on any local native plants.

In New South Wales subtropical rainforest sciapodines (as well as sympycnine dolichopodids) are often seen resting on the foliage of the groundcover plant *Hydrocotyle pedicellosa* (Apiaceae) in open glades.

Tree canopy. Townsend (1928) studied the vertical migration of selected flies with traps at ground-level and 16 m directly above in the canopy of deciduous forest in central United States. He noted that the common eastern North American *Condylostylus siphon* shifted suddenly in abundance from ground level to the canopy. This change was correlated with a sharp decrease in ground level humidity, the result of mowing understory vegetation. Thus some species appear to migrate vertically in response to humidity.

I have examined Dolichopodidae collected from canopy trapping at Mount Glorious (AMS, see Basset, 1988, 1991) and canopy insecticide fogging in Lamington National Park (ANIC), both subtropical rainforest sites in south-eastern Queensland. Seven sciapodine species occurred in the traps: *Amblypsilopus argyrodendron*, *A. canungra*, *A. basseti*, *A. uneorum*, *Austrosciapus sarinensis*, *Heteropsilopus khooi*, and a female *Parentia vulgaris*. Of these, only *A. uneorum* is known exclusively from the canopy, while the other species have also been taken at ground-level. Indeed, the sciapodine fauna which can be obtained by ground-level collecting at these sites is much richer than that taken by canopy fogging, and this applies to other dolichopodid subfamilies as well.

Samples (BPBM) collected by canopy fogging of *Lithocarpus* and *Castanopsis* trees in montane Papua New Guinea contain *Chrysosoma* (principally the *lucigena* Group), *Krakatauia* (species near *K. digitula*) and *Amblypsilopus* species. Since this material is mostly undescribed, any exclusive association with the canopy cannot be assessed.

Possibly the direct sunlight and humidity stress of eucalyptus canopies in dry sclerophyll habitats would prove unsuitable for most moisture sensitive dolichopodids, although two species, *Austrosciapus tumidus* and *Mesorhaga canberrensis*, were taken as single specimens during mid-summer (January), and

Heteropsilopus cingulipes was taken in October by canopy fogging of eucalypts in dry sclerophyll woodland west of Sydney. All three species occur at ground level in sclerophyll habitats elsewhere.

Tree trunks. Many Australian Dolichopodidae have become associated with smooth-barked tree trunks. In addition to the subfamilies Medeterinae and Neurigoninae (which are mostly trunk-associated throughout their cosmopolitan ranges) and some Diaphorinae, several groups of Australian Sciapodinae independently have become trunk-associated. Possibly the prominence of smooth-barked trees in the Australian landscape has led to association of dolichopodid taxa with trunks, to an extent not evident in other zoogeographic regions. It is therefore of interest that the Sciapodinae characteristically associated with tree trunks, the *Austrosciapus dendrohalma* Group, some *Heteropsilopus* (especially *H. squamifer* and *H. cingulipes*), and *Dytomyia sordida*, are all older Australian endemic taxa which have had a long association with eucalypt forests. These taxa are found on the smooth-barked *Eucalyptus* and *Angophora* trunks in wet and dry sclerophyll forests, but not in rainforest. However, *Amblypsilopus arboreus*, in the presumably more recently arrived *triscuticatus* Group, also occurs on smooth eucalypts in Northern Territory monsoonal woodland, and at least some specimens of the tropical *Chrysosoma lucare* were taken off eucalypt trunks.

By contrast, Australian *Medetera* is most diverse in rainforest and wet sclerophyll forest (Bickel, 1987), reflecting its northern origin from Oriental-Papuan rainforests. However, the endemic medeterine genera *Corindia* and *Atlatlia* are characteristic of sclerophyll forests.

Compared to the Medeterinae, which usually rest with the body leaning out from the surface, all trunk-associated Sciapodinae rest with body parallel to the trunk. Most trunk associated dolichopodids rest head upward, and only some Australian *Diaphorus* (Diaphorinae) orientate with head towards the ground.

Individuals of the *Austrosciapus dendrohalma* Group bound rapidly up trunks in a series of short jump-like flights, and generally only two or three individuals are present on any given tree. A similar but slower movement was observed in *Amblypsilopus arboreus*. On the other hand, *Dytomyia sordida* and especially *Heteropsilopus squamifer* are often found in large numbers on trunks, and both make short flights laterally and vertically up the trunks (in this respect, a more 'medeterine' movement). As well, the palearctic *Sciapus platypterus* and *S. wiedemanni* are often found on trunks and vertical walls (Pollet & Grootaert, 1987). These trunk congregations probably serve to facilitate mating and possibly should be regarded as leks. In all the above-mentioned taxa I have seen males approaching females from behind but have not observed mating behaviour or coupling.

River rocks. Two species of Australian Sciapodinae

are known to occur on river rocks, although this microhabitat is more characteristic of the dolichopodid subfamilies Sympycninae and Diaphorinae. *Austrosclapup ripariu*s was seen in numbers on large rocks along the sides of a large creek. Individuals would run about on a boulder and then fly a short distance to the next one, using the rocks in a manner similar to foliage. No mating behaviour was observed but individuals were seen disturbing one another. *Parentia kirrawak* was observed on river rocks along a narrow forested creek.

Blossoms. Sciapodines are sometimes associated with flowers. *Mesorhaga coolumensis* was taken on blossoms of *Waterhousia floribunda* in lowland riverine rainforest in northern New South Wales. As well, I have swept *Austrosclapup proximu*s from eucalypt blossoms, although specimens were also resting on adjacent foliage.

Mating Behaviour

I have rarely observed mating behaviour in sciapodines. In a mating pair of *Austrosclapup connexus* on a leaf, the male was positioned over the female in the "male dorsal position". They remained in copula for several minutes before flying off, apparently separated. On another occasion, I observed what must be considered "mate guarding" (see Dyte, 1988) in the same species. Here the male was positioned behind the female and holding her hind tarsi with his mid tarsi (see Fig. 75c). Both sexes had their wings held outward and the female's hind legs were kept spread apart by the male's midlegs. Thus attached, the male would jump up and down and rotate his wings in display. The pair flew among the foliage in this manner but no coupling was observed. Here it must be noted that male *A. connexus* has modified hairs on tarsus II (MSSC), as do most *Austrosclapup* and the related genus *Heteropsilopus* (eg, see Fig. 48d), and these probably serve a tactile function in both initiating contact and holding the female.

Grootaert & Mueffels (1988) provided an illustrated account of mating in *Sciapup platypterus*, which only lasts a few seconds. In copula: a) the male rests its coxae on the female's folded wings; b) its forelegs extend anteriorly over the female's thorax with the tarsi resting or tapping on the female's eyes; c) its midlegs are extended laterally and waved rapidly, so that the white flattened tarsi (MSSC) are laterad of the female's eyes and clearly visible; d) only the male's hindlegs rest on the ground. Of particular note is the position of legs I and II, making the tarsi readily visible. In the male Sciapodinae generally, the distal tarsomeres of legs I and II are frequently modified with highly visible flags and/or setae (MSSC), and many male basitarsus I have ventral pile (MSSC) which probably has a tactile function while resting on the female's thorax.

Van Oostroom (1944) gave an account of mating in *Amblypsilopus exul*, an exotic species introduced to European greenhouses. The male follows the female and

then approaches the female while moving its wings back and forth. When close, the male puts its forelegs on the female's wing and they couple. During copulation, the wings of the male remain extended and vibrating.

Irwin (1974) noted courtship behaviour on foliage of the South African *Amblypsilopus* (as *Sciopolina*) *macularivenus* but did not observe coupling.

Feeding Habits

Sciapodines are predaceous on small soft-bodied invertebrates, as are most adult dolichopodids. Individuals are sometimes seen bending forwards to pick up tiny prey with their labellae off the substrate. Information on prey species is sparse but Hughes (1972) notes that *Heteropsilopus cingulipes* (as *Chrysosoma micans*) is a voracious predator on the aphid *Myzus persicae* taken in flight traps at Canberra. I have collected the same species and *H. squamifer* both with psocid prey. *Austrosclapup connexus* has been observed feeding on the psyllid *Mycopsylla fici* on Morton Bay figs (*Ficus macrophylla*) in the Sydney Botanical Gardens. Also, a female *Negrobovia* sp. had an adult chironomid between its labellae.

Sciapodines are sometimes prey of spiders and occasionally are seen in webs. The colour cover photograph on the magazine Australian Natural History for March 1974 shows a *Parentia* sp. entrapped on the sticky glands of the carnivorous sundew plant *Drosera spathulata*. Both *Parentia* and *Drosera* are diverse in Australian wet heaths.

Seasonality

From limited label data it is impossible to determine the flight periods of most species. However, combined data for common species and evidence from continuously operating malaise traps, especially the "Lorien" site near Lansdowne, NSW, Black Mountain, ACT, and Berry Springs, NT, have produced data on adult activity. Some species appear to have continuous overlapping generations throughout the warm months. For example, *Negrobovia aculicita* was taken almost continuously from September to June at "Lorien", and *Parentia vulgaris* occurs from late September to May in Sydney. As might be expected, widespread species have a longer flight period in the tropics than in the temperate zone. For example, the common *Austrosclapup connexus* is found in northern Queensland from September to May, and in Sydney, NSW, from October to April.

At the montane Black Mountain, ACT site, *Austrosclapup tumidus* is found from early November to early April. Other records from Black Mountain indicate strong seasonality. *Parentia nigropilosa* has an early flight period, from late September to early December, while *P. dispar* is decidedly later, from late December to April (most specimens February to March). Restricted

flight periods, possibly representing an annual univoltine cycle, is indicated for such species as *Amblypsilopus loriensis*, endemic to the Taree district, known from mid-January to late February.

In the north-eastern Queensland tropics, some species are probably present throughout the year, although there are few continuous records to support this hypothesis. Insect numbers drop markedly in the drier months, from July to November (see Frith & Frith, 1985), which presumably affects the Sciapodinae. I have seen little material collected during these months, as there is a bias against collecting in this season.

Similarly, in the region around Darwin, NT, few specimens were taken during the dry season from July to November except in monsoonal vine forests near permanent water. Even in these closed forests, numbers are low. However, with the onset of the rains leading to the monsoonal conditions, populations increase markedly with the growth of vegetation. The most productive collecting period in the Australian monsoonal zone appears to be in April and May, just after the heavy rains have ceased.

Southward from the Brisbane district, winter has a marked effect on the fauna, and few specimens are recorded between May and September. In general, Bassian taxa such as *Parentia* and *Heteropsilopus* are present from early spring to early summer in the northern part of their range and in arid habitats, but later in cooler montane or southern localities, a general trend noted by Mackerras (1950). However, calendar emergence times can vary as a result of weather. For example, in the unusually warm and dry winter-spring of 1980, *Heteropsilopus squamifer* was present in numbers on tree trunks in Sydney by mid-September. However, in the cool wet spring of 1986, the same species was not evident until late October.

In most of temperate Australia, the peak flight period is from late spring to early summer corresponding to a favourable combination of warmth and sufficient moisture. Both numbers and richness drop markedly during the height of summer, especially if dry conditions prevail. Only in rainforest with permanent running water do numbers seem to be maintained throughout the summer. During January 'heat wave' conditions in Kuring-gai Chase National Park, near Sydney, I have observed many diptera in a rather torpid state congregated in rainforest gullies to escape the hot winds on the exposed sandstone plateaus. However, I did not find dry sclerophyll and heathland sciapodines among them, as their spring flight period was already finished. Yet some sciapodines seem heat tolerant. *Parentia* species were taken by yellow pan traps in January in dry south-western Australian heathlands with no permanent water and little shade (T. Moulds, personal communication).

Immature Stages

This work does not treat immature stages. The only description of sciapodine larval and pupal morphology

is a brief unillustrated account of the palearctic *Sciapus platypterus*, based on specimens collected in beech leaf litter (Beling, 1882). Although keys to dolichopodid larvae and pupae are useful (Robinson & Vockeroth 1981; Smith 1989; also Dyte, 1967), so few immature dolichopodid taxa are known that diagnostic generic and subfamily characters remain uncertain. Most Sciapodinae larvae are probably associated with leaf litter or soil, and are presumably predacious. The larval habitats of Australian species are known only from associated label data, the rearing of *Parentia vulgaris* from orchid compost, and *Austrosciapus cantrelli* from debris at the base of a tree. Considering the adult populations of some species, larvae must be present in large numbers.

Collecting Techniques

Sampling dolichopodids with malaise and pan traps has proven much more effective than the traditional method of sweeping with nets. Strategically placed malaise traps accumulate a local fauna and reflect seasonal abundances and flight periods. However, malaise traps have a tendency to take many more females than males, probably because females are searching for oviposition sites, while males tend to remain near microhabitats favourable for mating.

Pan or water traps, comprising shallow plastic pans (usually yellow or other colours) filled with water and a few drops of detergent to break surface tension, are a simple and productive method of sampling Dolichopodidae (also see Pollet & Grootaert, 1987, and Couturier & Duviard, 1976). Small flying insects attracted to the pans hit the surface, become entrapped, and sink to the bottom. At most collecting sites, I set up a 'trap-line' of ten to 15 yellow pans, usually along a creek. When serviced after one to two days, specimens are strained off and placed in 70% alcohol. Pan traps can be used to target specific microhabitats, such as rock seepages, which are difficult to collect by conventional means. Even when left for only a few hours, they yield worthwhile catches. Often 'rare' species are taken in pan traps, for two possible reasons: a) the pan colour attracts species from distant microhabitats, such as the tree canopy; b) pans left for 24 hours entrap insects with specific flight periods, such as species which are active only at dusk or early morning. Although there has been discussion as to the most effective pan colour (Roth & Couturier, 1966; Kirk, 1984; Pollet & Grootaert, 1987), I have found that both yellow and white pans produce good results. However, even with yellow pans alone, there is often great variation in catches among individual pans within an apparently uniform habitat, perhaps reflecting microhabitat texture or localised occurrences. Also of interest, Pollet & Grootaert (1987) note that blue pans attract arboreal palearctic *Sciapus*.

Pan traps often give an impression of the local population size of some species. For example, five yellow pans were spaced along 50 m of the Nadgee River, NSW, in wet sclerophyll forest. Most pans had

30+ individuals of *Heteropsilopus ingenuus* for each day, and this was repeated over two days. Also, I collected the type series of 32 *Parentia kirrawak* from two yellow pans within 45 minutes. Specimens waiting on adjacent rocks were seen flying into the pans. The species was previously known from one specimen taken by sweeping.

The sex ratios of pan trap catches are variable, but usually more males are taken, and rarely do pans yield a long series of females without associated males, as is common in malaise trap samples. For example, 15 yellow pans left for one day in dry sclerophyll forest near Lake Hayward, WA produced 45 males and 43 females of *Parentia perthensis*, and 65 males and three females of *P. nudicosta*.

Dolichopodids are rarely attracted to light (eg, see records in Milne & Milne, 1945), and apart from the occasional vagrant in the immediate vicinity of the sheet, night collecting for the family is generally unproductive. However, a large number of Australian *Mesorhaga* were collected at light, almost exclusively from the tropical monsoonal north and arid interior. Such phototropism is possibly a distinguishing feature of *Mesorhaga* behaviour. However, this may also be a habitat effect of aridlands, where diurnal insects are quiescent during the heat of the day and resume activity approaching sunset, thereby increasing their chance of interception by light traps or collecting sheets. Other scattered records of Australian sciapodines taken at light are from the genus *Amblypsilopus*, again predominately in the monsoonal north and arid interior.

Conservation Biology

It is difficult to assess whether insect species are threatened with extinction on the basis of surveys or specimen data. Indeed, reports listing species as 'threatened' because they are only known from a few localities can be misleading.

Some species are acknowledged to be common, and are regularly found in numbers over a wide geographical area. By contrast, rarity is a more difficult concept to define. Many species are by their nature 'rare', not in a sense that threatens their survival, but that they are infrequently encountered. Such rarity is a reflection of difficulty in collecting, restricted flight period, seasonal vagaries or patchy distribution. As well, the fact that identification and all knowledge of distribution is based on adults, means species are not seen for most of the year and cannot be assessed, unlike populations of most vertebrates and plants.

As discussed in the biogeographical analysis of the Australian Sciapodinae, about 35% of species are known only from their type localities. Many of these 'rare' species are from sites surrounded by relatively large tracts of intact habitat. This probably ensures their survival, even if they are endemics of localised distribution.

However, when such species which are only known from small blocks of remnant or disturbed vegetation, their long-term survival is more problematical, especially in highly altered agricultural districts. For example, *Heteropsilopus tantanoola* is known only from a remnant block of dry sclerophyll vegetation in South Australia surrounded by a wide region of cleared land, and *Amblypsilopus lismorensis* is known only from small riverine rainforest patches along the northern New South Wales coast. Such species may indeed be threatened, especially if their remnant habitats are degraded by burning, grazing, clearing or invasion by exotic weeds.

Also of concern are land management practices, particularly prescribed burning. During the cooler months, large tracts of Australian sclerophyll forest and monsoonal woodland are burnt to eliminate understory litter. Burning is conducted to lessen the possibility of wildfire during the summer or to encourage new growth for grazing. Although much of the Australian sclerophyllous flora is 'fire-adapted', there has been wide debate as to the frequency and timing of prescribed burning and its effect on native biota (eg, see Considine, 1984). Frequent burning with low-intensity fire is known to alter plant community composition in the understory, and the combustion of leaf litter and heating of soil must destroy associated invertebrates, in particular, immature insects. Although forests (including national parks) are burnt to produce a vegetation recovery mosaic over time and space, frequent burns undoubtedly would eliminate many litter dependant invertebrates.

Regarding the effect of burning on the Sciapodinae, I have only brief collecting evidence from monsoonal eucalypt woodland near Darwin, NT. Much of this habitat is annually burnt during the dry season. I sampled a section of burnt woodland at the onset of the wet season in January, 1992. Despite the lush green regrowth, this woodland yielded few dolichopodids. At the same time, I was also able to collect in monsoonal woodland near Humpty Doo which had remained unburnt for some ten years and had accumulated a thick leaf litter. This site produced a rich dolichopodid fauna, including delicate sciapodines in the genus *Amblypsilopus*, which I previously associated with moister monsoonal vine forest. These sciapodines were probably breeding *in situ* and surviving the dry period as pupae in the leaf litter. Possibly annual burning would eliminate these species from eucalypt woodland.

World List of Sciapodine Genera

The following list includes all genera which have been referred to the Sciapodinae. The tribes of the Sciapodinae are defined and briefly discussed. Generic synonymies (including those first published in Bickel & Dyte, 1989) are considered in the taxonomic part of this paper.

SCIAPODINAE

MESORHAGINI, n.tribe

The Mesorhagini is united by the reduction/loss of M_2 and the presence of a strong epandrial seta at base of the epandrial lobe. *Amesorrhaga* is the most primitive sciapodine and close to the subfamily groundplan. Although the left hypandrial arm (asymmetrical hypandrium) is considered a strong defining character of the Sciapodinae, in *Negrobovia* and *Mesorhaga* the hypandrium has become elongate and secondarily symmetrical. Of this tribe, *Mesorhaga* is the most derived genus. Included genera:

Amesorrhaga n.gen.

Mesorhaga Schiner, 1868; *Aptorthus* Aldrich, 1893

Negrobovia n.gen.

SCIAPODINI, n.tribe

The Sciapodini is rather weakly defined by female femur I in many genera having strong basoventral setae. Although preapical femoral setae are present in *Sciapus*, they are absent in all other genera. Included genera:

Condylostylus Bigot, 1859

Eurostomerus Bigot, 1859; *Dasypsilopus* Bigot, 1859;

Aedipsilopus Bigot, 1859; *Oedipsilopus* Bigot, 1859;

Tylochaetus Bigot, 1889; *Laxina* Curran, 1934

Dytomyia n.gen.

Helixocerus Lamb, 1929

Mascaromyia n.gen.

Naufraga Bickel, 1992

Narrabeenia n.gen.

Pilbara n.gen.

Sciapus Zeller, 1842

Leptopus Fallen, 1823; *Psilopus* Meigen, 1824;

Stenarus Gistel, 1848; *Psilopodius* Rondani, 1861;

Psilopodinus Bigot, 1889; *Psilopiella* Van Duzee,

1914; *Agastoplax* Enderlein, 1936, n.syn.; *Dactylodiscia*

Enderlein, 1936, n.syn.; *Dactylorhipis* Enderlein, 1936;

Placantichir Enderlein, 1936

CHRYSOSOMATINI, n.status

Tribal names are family group names, and the name Chrysosomatinae has been used as a subfamily name. Thus the name is not new but its status is.

The Chrysosomatini is the most complex and species-rich tribe in the Sciapodinae. All genera have the anterior femoral preapical setae absent, abdominal plaques reduced in males, and some anterior male dc reduced to weak hairs. Most genera have the male vertical seta reduced to absent and the male clypeus narrowed and free from the face. Included genera:

Abbemyia n.gen.

Amblypsilopus Bigot, 1889

Gnamptopsilopus Aldrich, 1893; *Leptorhethum* Aldrich,

1893; *Sciopolina* Curran, 1924, n.syn.; *Australiola*

Parent, 1932; *Labenuera* Parent, 1937

Austrosciapus n.gen.

Chrysosoma Guérin-Meneville, 1831; *Agonosoma* Guérin-Meneville, 1838; *Margaritostylus* Bigot, 1859; *Megistostylus* Bigot, 1859; *Mesoblepharius* Bigot, 1859; *Oariostylus* Bigot, 1889; *Eudasyus* Bigot, 1889; *Oariopherus* Bigot, 1889; *Spathiopsilopus* Bigot, 1889; *Spathipsilopus* Bigot, 1890; *Kalocheta* Becker, 1923

Ethiosciapus n.gen.

Heteropsilopus Bigot, 1859

Krakatauia Enderlein, 1912

Parentia Hardy, 1935

Plagiozopelma Enderlein, 1912

Pseudoparentia n.gen.

Genera Incorrectly Referred to the Sciapodinae

1. *Anchineura* Thomson, 1869 (Diaphorinae). Although originally considered related to *Psilopus*, Robinson (1970b) placed *Anchineura* in synonymy with the diaphorine genus *Asyndetus*.

2. *Camptoneura* Parent, 1930 (Dolichopodinae). This genus, which is preoccupied and also a junior synonym of *Argyrochlamys* Lamb, 1922, was originally described as a sciapodine by Parent, on account of its habitus and wing venation. However, the hypopygium and leg setation of *Argyrochlamys* are characteristic of the Dolichopodinae, where Lamb originally placed the genus.

While surveying various Afrotropical genera which might be related to the Sciapodinae, I examined specimens (CED) of *Halabia cavicola* Parent from Somalia. In venation, leg setation, hypopygial structure, general habitus, and even the dense body pruinosity, *Halabia* is close to *Argyrochlamys*, and the two genera are probably sister taxa. Both appear to be associated with marine beach habitats. Although *Halabia* has been placed in the Rhaphiinae (eg, Dyte & Smith, 1980), Ulrich (1981) suggested it belongs in the Dolichopodinae. Indeed, *Halabia* and *Argyrochlamys* are both in the Dolichopodinae.

3. *Chaetogonopteron* de Meijere, 1913 (Sympycninae). The male wing of the type species, *C. appendiculatum* de Meijere, is highly modified (MSSC) and almost sciapodine in appearance. Yet the female wing is unmodified and by all other characters, the genus is clearly in the Sympycninae, as placed by Becker (1922a). However, Hollis (1962) misinterpreted Becker's remarks and claimed that de Meijere regarded the genus as Chrysosomatinae (= Sciapodinae). In fact, de Meijere did not place the genus in a subfamily, nor did he compare it to any sciapodine.

4. *Craterophorus* Lamb, 1922 (Medeterinae). Lamb (1922) described the genus *Craterophorus* with three included species from montane forests in the Seychelles. He had previously (1921b) discussed the remarkable cup-like MSSC found on the abdomen of *C. mirus*. Although uncertain of its subfamily, Lamb placed the genus in the Chrysosomatinae (= Sciapodinae)

despite the complete absence of a forked vein M. He cited head setation and structure (including a slightly excavated vertex of one species), dorsal arista, long legs, thoracic structure, and diversity of MSSC as supporting its inclusion in the subfamily. The genus subsequently was referred to the Diaphorinae (Dyte & Smith, 1980) but retained in the Sciapodinae by Ulrich (1981).

I have studied specimens and prepared the male genitalia of *C. mirus* (BMNH). *Craterophorus* does have a similar habitus to many small sciapodines. Even the total loss of M_2 and weakly excavated vertex is found in such genera as the newly described *Pilbara*. However, it has a concave dorsal postcranium, characteristic of most Medeterinae. As well, the male hypopygium, with its elongate epandrium, hypandrium and simple aedeagus arising from the base of the epandrium, the short epandrial lobe and simple cercus are similar to the structure of a generalised medeterine hypopygium. The venation could easily be medeterine, as noted by Lamb, and the legs lack strong setae, also characteristic of the subfamily. The presence of a flattened posterior mesoscutum would definitely place *Craterophorus* in the Medeterinae. However, the two specimens I studied both have somewhat corroded minutin pins through the posterior mesoscutum and it is impossible to determine the structure. Possibly all the *Craterophorus* specimens were pinned this way since Lamb does not mention the posterior mesoscutum in any of his detailed descriptions. Overall, I believe the genus is best placed in the Medeterinae.

5. *Gymnoceromyia* Bigot, 1890 (Sympycninae). Bigot regarded this genus close to *Psilopus*, and Becker (1918), not having seen the type material, placed it in synonymy with *Condyllostylus*. However, F.W. Edwards had access to the Bigot collection and as a result of his comparative studies, *Gymnoceromyia* was correctly placed in synonymy with *Sympycnus* (in Van Duzee 1930).

6. *Lichtwardtia* Enderlein, 1912 (Dolichopodinae). Although Enderlein described this genus in a paper on the "Tribus Psilopodini", it is clearly in the subfamily Dolichopodinae.

7. *Tenuopus* Curran, 1924 (Neurigoninae). When Curran (1924) described this predominately Afrotropical genus, he placed it tentatively in the Neurigoninae, but noted that it lacked the mesonotal depression so characteristic of the subfamily. In a later paper (1927), he regarded *Tenuopus* as Chrysosomatinae (= Sciapodinae) because of its rather broad thorax and the bent vein M with a trace of a branch M_2 . I have examined the male postabdomen of *T. acrosticalis*. The epandrium has distolateral appendages (= parameres?) and the hypopygium is encapsulated at the tip of the abdomen, both of which exclude it from the Sciapodinae. *Tenuopus* probably does not belong in the Neurigoninae, but until revisionary work is undertaken, it is convenient to keep the genus there.

Species Groups of Sciapodine Genera

The following list includes all sciapodine genera and species groups and their distribution, as proposed in this revision and Bickel (1992).

MESORHAGINI

Amesorrhaga (Orient)
Mesorrhaga (widespread) – *canberrensis* Group (Australia); *flavicoma* Group (Australia); *geoscopa* Group (Australia, New Guinea); *koongarra* Group (Australia)
Negrobovia (Australia)

SCIAPODINI

Condyllostylus (Neotropics, Nearctic, Afrotropics, Orient, eastern Palearctic)
Dytomyia (Australasia) – *flaviseta* Group (Australia); *sordida* Group (Australia, New Guinea)
Helixocerus (Samoan Island, New Caledonia)
Mascaromyia (Seychelles, Mascarene Island)
Narrabeenia (Australia)
Naufraga (New Zealand)
Pilbara (Australia)
Sciapus (mostly Holarctic)

CHRYSOSOMATINI

Abbemyia (Australia, Pacific)
Amblypsilopus (widespread) – *abruptus* Group (Old World tropics); *anomalicornis* Group (Australia, New Guinea); *argyrodendron* Group (Australia); *bertiensis* Group (Australia); *cyplus* Group (Australia); *fasciatus* Group (Afrotropics); *flaviappendiculatus* Group (Australasia, Orient); *glaciunguis* Group (Australia, New Guinea); *lenga* Group (Afrotropics); *neoplatypus* Group (Australia, New Guinea); *pallidicornis* Group (Australasia, Orient); *rimbija* Group (Australasia); *topendensis* Group (Australia); *triscuticatus* Group (Australasia, Orient); *trogon* Group (Australia); *zonatus* Group (Australia)
Austrosciapus (Australia, Pacific) – *dendrohalma* Group (Australia); *hollowayi* Group (Australia); *muelleri* Group (Australia); *proximus* Group (Australia, Pacific); *sarinensis* Group (Australia); *storyei* Group (Australia); *tumidus* Group (Australia)
Chrysosoma (Old World tropics) – *aeneum* Group (Australasia); *antennatum* Group (New Guinea); *arrogans* Group (Melanesia); *lacteimicans* Group (Central Pacific); *leucopogon* Group (Australasia, Orient, Afrotropics); *lucigena* Group (New Guinea); *noumeanum* Group (New Caledonia); *passiva* Group (Afrotropics); *proliciens* Group (Australasia, Orient); *vittatum* Group (Orient, Afrotropics)
Ethiosciapus (Afrotropics, Indian Ocean)
Heteropsilopus (Australia, Indian subcontinent) – *brevicornis* Group (Australia); *cingulipes* Group (Australia); *triligatus* Group (India, Sri Lanka)

Krakatauia (Australasia, Orient) – *alanae* Group (Australia, Melanesia); *anthracoides* Group (Sundaland, south-eastern Asia); *evulgata* Group (Australasia, Orient); *funeralis* Group (New Guinea, Australia); *trustorum* Group (Australia)

Parentia (Australia, New Zealand, New Caledonia) – *dispar* Group (Australia); *fuscata* Group (New Zealand); *gemmata* Group (New Zealand); *malitiosa* Group (New Zealand); *milleri* Group (New Zealand);

nudicosta Group (Australia); *tonnoiri* Group (New Zealand)

Plagiozopelma (Old World tropics) – *alliciens* Group (Orient); *angustifacies* Group (Australasia); *annotatum* Group (Indian subcontinent); *bequaerti* Group (Afrotropics); *flavipodex* Group (Orient, Australasia); *terminiferum* Group (New Guinea, Australia)

Pseudoparentia (Australia)

Key to World Genera of Sciapodinae

The following key is complex, reflecting extensive homoplasy within the Sciapodinae. Some species may not be accurately placed, especially those from regions outside the focus of this revision, or where genera are defined by a variable mosaic of characters.

1. FII and/or FIII with distinct anterior preapical setae 2
 - Femora without strong anterior preapical setae 4
2. FIII only with anterior preapical seta; propleuron without strong ventral seta; ac short or absent; lateral scutellar setae short and hairlike (Holarctic, Taiwan) *Sciapus*
 - Both FII and FIII with anterior preapical setae; propleuron with strong ventral seta; ac present as 2-4 long pairs; lateral scutellar setae strong 3
3. Male FI with ventral subapical excavation and projection, and TI with ventral callosity at one-eighth (Fig. 26b); M strongly curved or recurved, with M₂ sometimes present only as weak stub vein (Fig. 120b); hypandrium without left lateral arm, but apically expanded with deep U-shaped excavation (Fig. 26a); scape elongate (Fig. 26c) (Australia) *Negrobovia*
 - Male FI unmodified; M with strong angled bend, but without stubvein (Fig. 120a); hypandrium with left lateral arm extending to apex of hood (Fig. 24a); face and clypeus often with dense silvery pruinosity (Orient) *Amesorrhaga*
4. Vein M₂ absent, without fold or indication on membrane; dc strong on both sexes; arista usually dorsal; strong vertical seta present in both sexes; clypeus adjacent to margin of eye 5
 - Vein M₂ present, even if as fold or indication on membrane; other features various 7
5. Vertex deeply excavated; wings (Fig. 120d-i); ac various; base of hypopygium enclosed by segment 7 (Fig. 17c); hypandrium narrow; epandrial lobe usually flattened and ovate; surstylus with 3-4 overlapping arms; cercus curved and tapering, aedeagus elongate, without dorsal angle; tibiae without major setae (cosmopolitan) *Mesorrhaga*
 - Vertex very shallowly excavated (Fig. 32b); M with gentle bend; ac very short or absent; hypopygium free from segment 7; hypandrium broad, with left lateral arm; epandrial lobe cylindrical; surstylus lobate; lateral scutellar setae small or absent (tropical Australia) 6

6. Major setae yellow; male TI swollen, with pv row of curved setae (MSSC); wing (Fig. 128f); cercus elongate and filiform; scape and pedicel black, first flagellomere yellow *Amblypsilopus topendensis* Group
- Major setae black; male TI unmodified; anal angle greatly reduced (Fig. 120j); cercus short and forked; male It_1 with pale basoventral pile *Pilbara*
7. Frons of both sexes with raised setose mound bearing strong vertical seta; M_1 beyond M_2 usually sharply recurved basad (Fig. 124c); both pairs of scutellar setae long; wing often with dark brown bands, sometimes enclosing clear window; arista dorsal to dorsoapical; pedicel with long dorsal and ventral setae; both sexes with 4-5 strong dc; hypopygium often rather small (New World, Afrotropics, Orient, eastern Polynesia) *Condylostylus*
- Frons with vertical seta present or absent, but without vertical seta arising on setose mound; M_1 with gentle arc to apex, at most with rounded right angle bend, but not recurved basad; other features various 8
8. Crossvein m-cu strongly sinuate, almost S-shaped, and sometimes with external stub vein (Fig. 123a-i), or if crossvein m-cu straight, then male II_t_2 with apical hook as in Figure 53i; FI and TI usually bare of major setae; wing sometimes with brown maculations; male cercus relatively simple, digitiform (Australia, India, Sri Lanka) *Heteropsilopus*
- Crossvein m-cu straight, bowed or only slightly sinuate (if appears strongly sinuate, then FI and/ or TI with rows of very long black ventral setae); other features various 9
9. Arista usually apical on triangular first flagellomere (if females sometimes with distinctly dorsal arista, then TI with strong dorsal and ventral setae, and lateral scutellars strong); m-cu often sinuous; arista usually long, and more than half body length in females; male arista sometimes with apical flag; TI often with long setae 10
- Arista usually distinctly dorsal on subrectangular first flagellomere, and rarely longer than head width, or if apical or dorsoapical, then always with following characters: male arista rarely with apical flag; tibial chaetotaxy often weak, especially on males; m-cu usually straight 14
10. Epandrial lobe greatly prolonged and curved (Fig. 65a,d); cercus short and straight; male clypeus adjacent to sides of eyes; lateral scutellar setae absent; m-cu straight (Australia, New Caledonia, Fiji) *Abbemyia*
- Epandrial lobe not greatly prolonged; lateral scutellars usually present, even if as weak hairs; male clypeus usually narrowed and free from sides of eyes 11
11. Crossvein m-cu straight; head (Fig. 100f); 2 long ac present; pleura usually yellow; legs elongate, with few major setae; male TI with strong curved posterior subapical seta (Australasia, Orient, Pacific) *Amblypsilopus pallidicornis* Group
- Crossvein m-cu sinuous; tibiae often with major setae; cercus usually deeply forked 12

12. Lateral scutellar setae strong, about two-thirds length of medians; male frons with abundant hairs; haltere black in both sexes; wing smokey; stout, often dark-coloured flies (Australasia) *Krakatauia* (part)
- Lateral scutellar setae usually less than one-third length of medians; haltere usually yellow; wing usually hyaline or with distinct brown maculations (Australasia) 13
13. Frons highly polished metallic blue-green; male frons bare or with single weak vertical seta only; male scape often swollen and vaselike; CI with either 3-7 strong lateral spine-like setae (stronger in females than males), or CI with 3 strong black distolateral setae; FI and TI in both sexes usually without major setae (Old World tropics) *Plagiozopelma*
- Vertex and frons usually with pruinosity; male frons often with hairs on lateral slope; male scape rarely swollen and vaselike; CI without strong lateral spine-like setae; FI and TI usually with long setae; pedicel often with long ventral and dorsal setae; male frons often with dense hairs (Old World tropics) *Chrysosoma*
14. M_2 arcuate and forming a broad U-shape with M_1 (Fig. 122a,b); male $III t_{3-5}$ usually flattened and padlike ventrally; male often with crocheted cilia on costa; male TIII often with callus or irregularity 15
- M_2 straight or curved, but usually not forming U-shape figure with M_1 ; male costa rarely with row of crocheted cilia; male TIII rarely with callus or irregularity; male $III t_{3-5}$ sometimes flattened and padlike 16
15. Lateral scutellar setae reduced to tiny hairs or absent; male TIII callus variously positioned; ac highly reduced or absent; 4 dc present, all strong; femora mostly bare (interior Australia) *Pseudoparentia*
- Lateral scutellars usually strong, more than half length of medians; male TIII callus positioned at one-fifth; ac usually strong; posterior 2 dc strong, anterior dc reduced to weak hairs; femora often with long av and pv setae (Australia, New Zealand, New Caledonia) *Parentia*
16. Male cercus tapering with distinctive sclerotised basal hook; male It_1 flattened and forming ventral cushion with dense pale pile; lateral scutellar setae absent (Afrotropics, western Indian Ocean) *Ethiosciapus*
- Male cercus without sclerotised basal hook; other features various 17
17. Dc all strong in both sexes; strong vertical setae present on both sexes; female FI usually with stout basoventral setae 18
- Males usually with some anterior dc weak and hairlike; vertical setae in males usually strongly reduced, or lateral frons with dense hairs; female FI rarely with strong basoventral setae 22
18. Face and clypeus wide, distinctly separating eyes; lateral scutellar setae present; frons with pruinosity; head usually wider than high; stout bodied, and legs not prolonged 19
- Face and clypeus narrow in both sexes, eyes almost holoptic; lateral scutellar setae absent; frons shining metallic blue-green; head often higher than wide; body appearing delicate; legs elongate 21

19. TI with distinct ad-pd setal pairs; sides of face converging ventrally; scutellum with 3 pairs of marginal setae; male It_1 not forming basoventral cushion (New Zealand) *Naufraga*
- TI without ad-pd setal pairs; sides of face subparallel; scutellum with only 1-2 pairs of marginal setae; male It_1 swollen and forming basoventral cushion with dense pale pile; male TIII sometimes with irregular swelling at half (Australia) 20
20. Cercus divided into distinct dorsal and ventral sections; hypopygium often globular with basal foramen (Fig. 28) *Dytomyia*
- Cercus elongate and undivided; TI swollen, with strong ventral setae and short spines; TI bent apically, making It_1 appear offset; IIT complexly modified; TIII with swelling at half *Narrabeenia*
21. Face and clypeus narrow, with eyes almost holoptic in both sexes; 5-7 dc present; male cercus usually short (Indian Ocean) *Mascaromyia*
- Face wide in both sexes; 4 dc present; male cercus elongate (Samoan Islands, New Caledonia) *Helixocerus*
22. Male frons strongly flattened, with abundant pale or black hairs; It_2 often shorter than It_3 ; m-cu slightly sinuous; It_{2-5} each very short; arista dorsal to dorsoapical; haltere either yellow or black (Australasia, Orient) *Krakatauia* (part)
- Male frons not flattened in most species; arista usually dorsal; m-cu straight 23
23. Male clypeus narrowed and free from eye margin; male vertical seta usually reduced; body sometimes appearing delicate, with elongate legs (cosmopolitan except western Eurasia) *Amblypsilopus*
- Male clypeus adjacent to eye margin; vertical seta usually strong in both sexes; body more robust (Australia, Pacific islands) *Austrosciapus*

Mesorhaga Schiner

Mesorhaga Schiner, 1868: 217. Type species *Mesorhaga tristis* Schiner, 1868, by monotypy.

Aptorthus Aldrich, 1893: 48. Type species *Aptorthus albiciliatus* Aldrich, 1893, subsequently designated by Coquillett, 1910: 509.

Diagnosis. *Head.* Vertex often deeply excavated in male, with ocellar tubercle prominent, but less strongly excavated in female; 2-4 strong postvertical setae present at end of postocular row; vertical seta (long or short) present and not sexually dimorphic; male sometimes with hairs on lateral frons (MSSC); male face not bulging beyond anterior eye margin; clypeus adjacent to margin of eyes (Fig. 18c); pedicel with short dorsal and longer ventral setae (Fig. 18b); first flagellomere subrectangular; arista usually dorsal in both sexes (Figs 18b, 20e).

Thorax. Ac variously developed, from 3-4 pairs long setae to reduced or absent; 5 strong dc present, not sexually dimorphic; lateral scutellar setae about one-quarter to half length of medians; propleural seta absent.

Legs. Males usually without major MSSC (however, the Neotropical *M. jucunda* has flattened leg III tarsomeres, the Neotropical *M. lacrymans* has It_5 flattened, and the Australian *M. zborowskii* has enlarged pulvilli on the flattened male tarsus I and a basoventral mound on FII, all MSSC); femora usually with only weak ventral hairs; FII and FIII without preapical setae; tibiae mostly bare, without major ad-pd setae.

Wing. Usually hyaline or sometimes with smoky membrane (however, the wing of the Neotropical *M. lacrymans* has a large dark brown maculation in both sexes); vein M_2 absent or rarely present as short stub (as in Fig. 120g); M variable in curvature, from slightly curved to strongly recurved (see Fig. 120d-i); crossvein bm-cu totally absent; crossvein m-cu straight; haltere sometimes black in males and yellow in females.

Abdomen. Male tergum 1 often with posterolateral row of long setae (MSSC); abdominal plaques reduced in size in males; tergum 7 enclosing elongate epandrial base, sternum 7 lost or fused with tergum 7 (Fig. 17c); epandrium usually elongate and cylindrical; hypopygial foramen left laterodorsal and positioned from one-third

to half along epandrium; aedeagus and hypandrium arising from base of epandrium; hypandrium tapering, narrow and symmetrical, without left lateral arm; aedeagus very long and narrow, and can be protruded out from the epandrium; dorsal angle not present; epandrial lobe usually flattened and ovate, bearing strong seta on inner margin and apically; strong epandrial seta present at base of epandrial lobe; surstylus usually with 3-4 short overlapping arms (however, the Nearctic *M. pallidicornis* has massively developed surstyli); cercus curved and tapering, usually with strong basolateral setae and with species-specific distal setae and structure.

Remarks. *Mesorhaga* is a cohesive and strongly defined cosmopolitan genus recognised by a combination of distinctive venation and male postabdominal structure. The unbranched and curved vein M of *Mesorhaga* has been used as a key character for the genus, although dolichopodid genera from other subfamilies have a similar curvature (eg, *Paraclius*, *Neurigona*) and some species have therefore been incorrectly placed in *Mesorhaga*. As well, the loss of M_2 (ie, an unbranched M) has been independently derived several times within the Sciapodinae, variously as a MSSC or in both sexes (see discussion under Morphology). The venation of *Negrobovia* is similar to that of the *Mesorhaga geoscopa* Group.

The male postabdomen of *Mesorhaga* is quite distinct from that of other Sciapodinae, with tergum 7 enclosing the base of the epandrium and sternum 7 lost or fused with tergum 7, the elongate and cylindrical epandrium, aedeagus and hypandrium both tapering and narrow and arising from base of epandrium, epandrial lobe flattened and ovate with strong basal epandrial seta, surstylus with 3-4 short overlapping arms, and cercus curved and tapering.

Becker (1922b) claimed that the *Mesorhaga* male abdomen had only six visible segments, in contrast to the normally visible seven segments of other Sciapodinae. However, seven segments are clearly present, although tergum 7 has been modified so that it encloses the elongate epandrial base, and is not free, as in other Sciapodinae (eg, compare Fig. 17c with 24g). Sternum 7 appears to be totally lost. This modification allows free movement of the elongate hypandrium and aedeagus, both of which originate from the base of the epandrium.

Mesorhaga shows rather poor development of MSSC, in strong contrast with other Sciapodinae where diagnostic MSSC can be used to define species. In many species however, females are distinctly smaller than males.

The distinctive overall habitus, venation (especially the total loss of crossvein bm-cu), and highly derived male postabdomen make *Mesorhaga* one of the few demonstrably monophyletic sciapodine genera. Indeed, it might qualify as a monobasic subfamily within the Dolichopodidae, since the only strong apomorphy which associates the genus with the Sciapodinae is the excavated vertex. However, on the basis of this synapomorphy it is closer to the Sciapodinae than any

other subfamily and is thus included.

Mesorhaga comprises 72 species: six Palearctic (Negrobov, 1984), six Neotropical (Robinson 1970b), nine Nearctic (Robinson & Vockeroth, 1981), with a further two species occurring in both regions (see key in Parent, 1939c), two Afrotropical, including Madagascar (Dyte & Smith, 1980), ten Oriental (Dyte, 1975) (see below), and 37 Australasian species. Only ten of the 17 Oriental species described as *Mesorhaga* belong in the genus. The remaining seven species form a clearly defined new genus, *Amesorrhaga*, q.v. The Palearctic *Mesorhaga* species are confined to northern China, Japan and the Russian Far East, and appear to be of eastern Oriental origin (Negrobov, 1984). *Mesorhaga janata*, one of the three species described in Negrobov (1984), is not *Mesorhaga*, but belongs in *Amblypsilopus* (see Notes on Palearctic *Amblypsilopus*).

The Australian fauna of 36 species is unusually rich, even if many species await description from other zoogeographic regions. Most Australian species are known only from their type localities and the extent of intraspecific variation is not known. Subtle but distinct cercal differences are often used to separate related species. Although the tropical North has the greatest diversity, the genus is found throughout Australia except for Tasmania (Fig. 13). *Mesorhaga* occurs in New Guinea but is not known from eastern Melanesia, New Zealand, or Oceania.

The life-histories of Australian species are unknown, although many species are found in dry interior and monsoonal woodland habitats. Some occur in coastal habitats, including sand dunes, and *Mesorhaga wirthi* was collected at a crab-hole. Of interest is the large number of *Mesorhaga* specimens taken at light, especially in the northern and arid regions of the continent. By contrast there are few records of other Sciapodinae appearing at light (see discussion under Natural History).

The Australian *Mesorhaga geoscopa* Group and *Negrobovia* appear similar in wing venation (compare Fig. 120b,i) and both have a symmetrical hypandrium. The more derived *Mesorhaga* probably arose from a *Negrobovia*-like ancestor, possibly in early Gondwanan Australian forests. *Mesorhaga* is distinctly present in early Tertiary Baltic Amber (see Fossil Sciapodinae).

The Australian and New Guinea species are divided into the following Groups, separated in the text key.

1. The *geoscopa* Group is confined to rainforest in north-eastern Queensland and New Guinea and includes the following: *M. geoscopa*, *M. lata* and *M. queenslandensis*. *Mesorhaga danielsi* appears intermediate between the *geoscopa* and *canberrensis* Groups.

2. The *koongarra* Group is predominant across northern tropical Australia, the arid interior, and Western Australian coast, and includes the following: *M. cockatoo*, *M. decembris*, *M. emmensis*, *M. gatesae*, *M. koongarra*, *M. longipenis*, *M. martius*, *M. muchei*, *M. naumanni*, *M. nerrensis*, *M. petrensis*, *M. tindali*, *M. toddensis*, *M. turneri*, *M. varicornis*, *M. wanbi*, *M. weiri* and *M.*

zborowskii.

3. The *canberrensis* Group is confined to coastal and montane eastern Australian. Many of the species are separated by subtle but distinct differences in the surstylus and cercus. The *canberrensis* Group includes the following: *M. actites*, *M. canberrensis*, *M. chillagoensis*, *M. coolumensis*, *M. didillibah*, *M. gingra*, *M. lamondensis*, *M. prima*, *M. schneiderae*, *M. tarooma*, *M. wirthi* and *M. yarratt*.

4. The *flavicomma* Group occurs in interior and northern Australia, and includes three species: *M. flavicomma*, *M. maceveyi* and *M. similis*.

The Oriental and Australasian *Mesorhaga* comprise:

actites n.sp. Australia (Qld).

canberrensis n.sp. Australia (ACT, NSW, Vic.).

chillagoensis n.sp. Australia (Qld).

circumflexa Parent, 1937a: 144 (BMNH, examined), India.

cockatoo n.sp. Australia (Qld).

coolumensis n.sp. Australia (Qld).

danielsi n.sp. Australia (Qld).

decembris n.sp. Australia (NT).

didillibah n.sp. Australia (Qld, NSW).

dispar Becker, 1922a: 232 (DEI, not seen), Taiwan.

emmensis n.sp. Australia (WA).

flavicomma n.sp. Australia (SA, WA, NT, Qld).

gatesae n.sp. Australia (Qld).

geoscopa n.sp. Australia (Qld).

gingra n.sp. Australia (NSW).

koongarra n.sp. Australia (NT, Qld).

lamondensis n.sp. Australia (Qld).

lata Becker 1922a: 232 (TMB, lost, female only), Papua New Guinea.

The venation (Becker 1922a, Fig. 217) shows M to be strongly recurved, similar to the *geoscopa* Group.

longipenis n.sp. Australia (WA).

maceveyi n.sp. Australia (Qld).

martius n.sp. Australia (WA, NT).

muchei n.sp. Australia (NSW).

naumanni n.sp. Australia (WA).

nerrensis n.sp. Australia (WA).

nigrobarbata Parent, 1937a: 145 (BMNH, examined), India.

nigroviridis Becker, 1922a: 235 (ZMHB, not seen), Sri Lanka.

obscura Becker, 1922a: 232 (TMB, lost), Sri Lanka.

ovalis Parent, 1932b: 113 (MLUH, examined), Indonesia (Flores).

paupercula Parent, 1937a: 146 (BMNH, examined, female only), India.

petrensis n.sp. Australia (Qld).

prima Parent, 1932a: 170 (ANIC, examined, female only), Australia (ACT).

queenslandensis n.sp. Australia (Qld).

schneiderae n.sp. Australia (Qld).

septima Becker, 1922a: 234 (TMB, lost), Taiwan.

similis n.sp. Australia (WA).

stylata Becker, 1922a: 233 (TMB, lost), Taiwan.

subsp. *halteralis* Frey, 1925: 19 (ZMH, not seen), Philippines.

tarooma n.sp. Australia (Qld).

termialis Becker, 1922a: 233 (DEI, not seen), Sri Lanka.

tindali n.sp. Australia (NT).

toddensis n.sp. Australia (NT).

turneri n.sp. Australia (WA).

varicornis n.sp. Australia (NT).

wanbi n.sp. Australia (SA).

weiri n.sp. Australia (NT, Qld).

wirthi n.sp. Australia (NSW).

yarratt n.sp. Australia (Qld, NSW).

zborowskii n.sp. Australia (Qld).

Key to Australian Male *Mesorhaga*

The key to *Mesorhaga* is difficult, and identification usually involves clearing the hypopygium and close examination of the cercus. *Mesorhaga prima*, known only from a female, is not included.

1. Vein M with strong 90° bend (Fig. 120i); wing membrane brownish; 3 pairs long ac present, subequal to dc; haltere club black; frons with abundant black setae; apex of cercus clavate with modified setae (*geoscopa* Group, in part) 2
- Vein M with only gentle bend (Fig. 120d); wing membrane hyaline; ac, if present, usually shorter than dc; frons and haltere club various 3
2. TIII yellow; cercus strongly curved with group of strong dark lateral setae basally; distal cercus clavate, forked, with setose outer arm and expanded inner arm which bears 4 blade-like modified setae (Fig. 17b) (Qld) *M. queenslandensis*
- TIII dark brown; cercus with strong lateral setae basally, apically expanded into club bearing 2 spatulate setae and various protuberances (Fig. 17a) (Qld) *M. geoscopa*

3. Cercus unbranched, as single tapering curved arm or distally expanded and truncate, at most with shallow excavation; usually only 2 postverticals present (*koongarra* Group) 4
 - Cercus branched or with deep distal U-shaped excavation; usually 3-4 strong postverticals present or lateral frons with abundant hairs 22
4. Cercus distally expanded, and truncate or clavate at apex, or subapically expanded, cercus at most shallow terminal excavation 5
 - Cercus distally tapering, sometimes with apical tooth-like seta 15
5. Femora mostly yellow 6
 - Femora mostly dark metallic green 10
6. CI yellow 7
 - CI mostly dark brown/green, although sometimes yellow distally 9
7. TI with pv row of short seta which slightly decrease in size distally; FII with row of pale erect ventral hairs from base to three-fifths; cercus (Fig. 130g) curved and apically expanded, with 2 inner apical seta and curved outer flap bearing curved apical setae (NT) *M. decembris*
 - TI and FII unmodified 8
8. Cercus with wide base bearing some strong setae and constricted at midlength and expanded, clavate distally with external apical curved blade-like seta and lobate division bearing straight blade-like seta (Fig. 19d) (WA) *M. longipenis*
 - Cercus (Fig. 130f) with some very long basolateral setae, and apically clavate, with some short setae on outer lobe and 3 broad subapical blade-like setae (Qld) *M. cockatoo*
9. Haltere yellow 10
 - Haltere brown to black 11
10. M with only slight curve and subparallel with R_{4+5} beyond bend (Fig. 120g); cercus (Fig. 20a) broad basally with some strong lateral setae, constricted, appearing twisted at midlength, and somewhat expanded distally, with outer short strong seta and apical digitiform projection with short setae (NT, Qld) *M. weiri*
 - M and R_{4+5} converging to apex; cercus (Fig. 130e) curved and distally expanded, then tapering to apex, with 5 apical setae, 3 shorter setae on outer margin and with row of 6-7 setae on median surface (WA) *M. emmensis*
11. Tergum 6 ventrally enlarged and bearing field of long posterior setae (Fig. 20h); apex of cercus shallowly excavated, bearing truncate apical seta (Fig. 20g) (NSW) *M. muchei*
 - Tergum 6 not enlarged, and with normal vestiture 12

12. All femora and tibiae brown; cercus broad basally with some strong lateral setae, expanded and somewhat clavate apically, and with 2 strong thorn-like apical setae; hypandrium expanded and hood-like distally (Fig. 23a) (WA) *M. turneri*
- Some femora at least partially yellow, all tibiae yellow 13
13. FI and FII mostly yellow; cercus apically clavate with external field of curved setae (Fig. 23d) (Qld) *M. gatesae*
- FI and FII basally dark brown with yellow knees 14
14. Cercus basally with some strong dark lateral setae, and expanded distally into blunt club with some apical setae (Fig. 20b) (SA) *M. wanbi*
- Cercus basally with weaker setae and expanded distally into club with distinctive apical setae; broad external seta and elongate L-shaped internal seta (Fig. 20c) (WA) *M. nerrensis*
15. CI and femora yellow; head setae often yellowish; ac absent 16
- CI and femora mostly dark green-brown; head setae black; ac various 19
16. Antenna dark brown to black; setal colour various 17
- Scape and pedicel yellow; first flagellomere brown; major head and thoracic setae yellow 18
17. Head and thoracic setae brownish to black; TII and II₁ with row brownish dorsal setae; cercus curved and tapering, with 2 long strong ventral setae basally, and with apical seta (Fig. 18e) (WA, NT) *M. martius*
- Head and thoracic setae distinctly yellow; TII and II₁ unmodified; cercus curved and tapering, with ventral setae basally, and with 2 distinctive digitiform apical setae (Fig. 18d) (NT) *M. tindali*
18. It₃ (Fig. 130b) flattened with long dorsal setae and pair greatly enlarged pulvilli; FII (Fig. 130c) with 3-4 long pale ventral setae on distinct basoventral mound; 2-3 irregular pairs ac present; lateral scutellar setae present; cercus (Fig. 130a) curved and with strong and somewhat weaker apical tooth-like setae (Qld) *M. zborowskii*
- It₃ and FII unmodified; ac absent; lateral scutellar setae absent; hypandrium deflexed apically with distinctive subapical tooth-like prominence; cercus stout, tapering, with some strong dark lateral setae basally, lacking apical projections (Fig. 19b) (NT) *M. varicornis*
19. Haltere entirely brown; lateral frons with cluster of 8-10 strong pale setae; cercus curved and tapering, and with 3 strong dark basolateral bristles, strong seta at two-thirds, and with apex sharp and bare (Fig. 19a) (NT) *M. toddensis*
- At least haltere club yellow; lateral frons bare or with some dark setae 20
20. Ac with 4 short anterior pairs and longer posterior pair; cercus with broad base and abundant dark lateral setae; narrow distal part of cercus arising at right angle from base and bearing 3 strong apical setae (Fig. 18f) (WA) *M. naumannii*
- Ac absent 21

21. Cercus (Fig. 18a) with tooth-like apical seta (NT, Qld)..... *M. koongarra*
- Cercus (Fig. 130d) with 5 long apical setae, 2 long setae on inner margin, long outer seta (Qld)..... *M. petrensis*
22. Haltere club yellow; postvertical and antennal pedicel setae pale; lateral frons with pale hairs (*flavicomma* Group)..... 23
- Haltere club infuscated to black; postvertical and pedicel setae black; lateral frons with black hairs, if present (*canberrensis* Group) 25
23. All femora yellow; thoracic setae pale; cercus with short arm followed distally by 2 external setae, with group of apical blade-like setae (Fig. 23e) (Qld) *M. maceveyi*
- Femora black at least basally; thoracic setae black 24
24. Cercus with group of basal setae, with outer arm of apical fork with apical and subapical setae, inner arm with outer lobe and digitiform inner lobe with curved setae (Fig. 22e) (SA, WA, NT, Qld) *M. flavicomma*
- Cercus with 2 spine-like basal setae; outer arm of apical fork with short curved blade-like seta, subtended by cuticular lobe, inner arm of fork with strong curved apical seta subtended by shorter setae (Fig. 22d) (WA) *M. similis*
25. Ventral postcranium with black setae 26
- Ventral postcranium with pale setae 29
26. Three offset pairs of long ac present; cercus strongly recurved and narrowed at bend, with group of strong black basolateral setae, and apically with 2 elongate clavate setae (Fig. 17d) (Qld) *M. danielsi*
- Five pairs of shorter ac present; cercus not strongly recurved 27
27. Surstylus not strongly projecting; cercus apically forked with narrower outer arm with apical setae, broader inner arm apically with 3 elongate blade-like setae subtended by 2 long setae; femora with black ventral setae (Fig. 21c) (Qld) *M. schneiderae*
- Surstylus projecting from epandrium 28
28. Cercus apically blunt with outer cuticular leaf-like projection and inner group of 3 strong apical setae subtended by 4 medianly projecting tooth-like setae; femora with black ventral setae (Fig. 22c) (Qld) *M. actities*
- Cercus clavate distally with short external arm bearing fine apical seta, longer internal arm with strong apical blade-like seta (Fig. 23b); femora with pale ventral setae (Qld, NSW)..... *M. yarratt*
29. TI and It₁ with pd and pv rows of long dark setae (MSSC); cercus with strong lateral setae, cercus with outer arm bearing apical striated tooth-like seta, and inner arm with 3 strong medianly directed setae (Fig. 20d) (Qld) *M. lamondensis*
- TI and It₁ without rows of long dark setae; cercus without striated tooth-like seta 30

30. Surstylus with distinct dorsoapical U-shaped excavation 31
- Surstylus with overlapping arms only, without apical U-shaped excavation 33
31. Lower calypter with fan of pale setae; cercus deeply cleft, with internal projection bearing 4 strong apically crocheted setae, with external arm bearing short setae (Fig. 21a) (ACT, NSW, Vic.)..... *M. canberrensis*
- Lower calypter with fan of brown-black setae; cercus not so deeply cleft 32
32. All coxae with pale setae; dorsal arm of surstylus shallowly excavated; cercus apically forked, with strong seta arising from crotch of fork, longer inner arm with 4 blunt setae at apex (Fig. 21e) (Qld, NSW)..... *M. coolumensis*
- All coxae with black setae; cercus apically forked, with inner arm bearing 3 strong apically crocheted setae (Fig. 22b) (NSW) *M. gingra*
33. Lower calypter with fan of black setae 34
- Lower calypter with fan of pale setae 35
34. Cercus clavate, with apical transverse digitiform projection, distinctive branched seta, and row of 3 setae, one of which is twisted (Fig. 22a) (NSW) *M. wirthi*
- Outer arm of cercus knifelike and without major setae, and inner arm with expanded hook-like seta subtended by 4 strong setae at apex (Fig. 21d) (Qld, NSW) *M. didillibah*
35. Shorter outer arm of cercus with branched setae and longer inner arm with 2 long apical setae subtended by long subapical seta (Fig. 21b) (Qld) *M. chillagoensis*
- Dorsal arm of surstylus large and boat shaped; cercus with short external arm bearing fine apical seta, and longer internal arm with strong apical setae (Fig. 23c) (Qld) *M. tarooma*

The *geoscopa* Group

Mesorhaga geoscopa n.sp.

Type material. HOLOTYPE male, PARATYPE male, Queensland, Bellenden Ker Range, Cableway Base, 100 m, malaise trap, rainforest, 17 Oct.-9 Nov. 1981, Earthwatch-Queensland Museum (ANIC).

Additional material. Possible female, Queensland – Broken River, Eungella, 9 Dec. 1961 (AMS).

Description – male. Length, 3.0; wing length: 2.7 x 1.2.

Head. Vertex not strongly excavated; ocellar tubercle with pair strong diverging ocellars, with 1-2 pairs weak posterior hairs; group of 8-10 black setae present on slope of frons (MSSC); black proclinate vertical seta present; frons, face and clypeus metallic green with

bronze reflections and dusting of silvery pruinosity; palp black; proboscis orange-brown; antenna black; ventral postcranium with abundant pale setae.

Thorax. Dark metallic green with bronze reflections; pleura dark brown; setae black; 3 long irregularly paired ac present; 1 pa, 2 sa, only 1sr (posterior), 2 npl and 1 pm present; lateral scutellar setae about half length of medians.

Legs. Coxae, trochanters and femora dark brown; tibiae and tarsi I and II yellow; TIII and IIIt brown; CI and CII with pale anterior hairs, CIII with strong pale lateral seta; femora with black ventral hairs; podomere ratios similar to those of *M. koongarra*.

Wing. Hyaline with faint brown wash (similar to Fig. 120i); M with strong bend, almost right angle halfway between m-cu crossvein and wing apex; CuAx ratio: 1.1; lower calypter brown with fan of black setae; haltere dark brown.

Abdomen. Metallic black with violet reflections; dark bronze-brown bands present on tergal overlap on

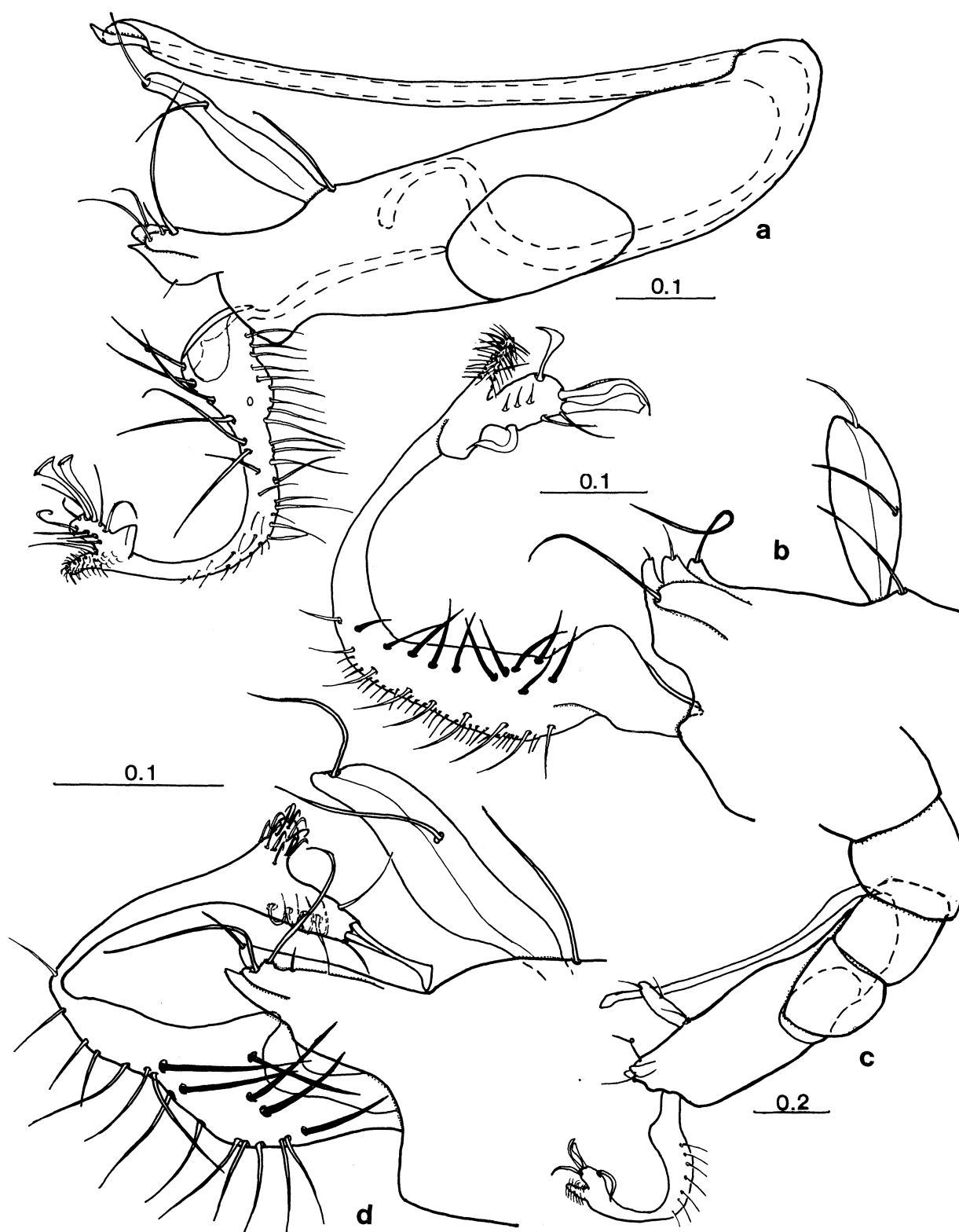


Fig.17. *Mesorhaga geoscopa*, Bellenden Ker, Qld: a – hypopygium, left lateral. *M. queenslandensis*, Bingil Bay, Qld: b – cercus and surstylus, left lateral; c – male postabdomen, left lateral. *M. danielsi*, Claudie River, Qld: d – cercus and surstylus, left lateral.

segments 2-6; hypopygium dark brown (Fig. 17a); surstylus divided into 2 arms, ventral arm bearing setae as figured; cercus strongly curved, with strong basolateral setae, and apically expanded into club bearing 2 spatulate setae, various protuberances, and other setae as figured.

Female. Similar to male except lack MSSC and as noted: group of 3-4 black setae on frons; haltere yellow.

Remarks. *Mesorhaga geoscopa* is found the Cairns district, Qld and is closely related to *M. queenslandensis*. These two species, along with *M. lata* and other undescribed species from Papua New Guinea (AMS, ANIC) form a distinctive group with a recurved clavate cercus, an almost right angle bend in vein M, brownish wing membrane, usually three pairs of long ac, and male with black halteres. (Two neotropical species, *Mesorhaga funebris* and *M. laeta* also have a similar strong bend in vein M, but do not appear to be related to the *geoscopa* Group.) This species is named in honour of the Earthwatch Expedition which collected the species.

Mesorhaga queenslandensis n.sp.

Type material. HOLOTYPE male, PARATYPES 2 females, Queensland, Bellenden Ker Range, Cableway Base, 100 m, malaise trap, 17 Oct.-9 Nov. 1981, rainforest, Earthwatch-Queensland Museum (ANIC). PARATYPES, 2 males, female, 4 km along Black Mountain Road, via Kuranda, 26 Oct.-18 Nov. 1982, malaise trap, (QDPI); male, Bingil Bay, 17°50'S 146°06'E, 29 Aug. 1977 (ANIC).

Additional material. Queensland - 2 males, 7 females, Kuranda, Mareeba Shire, Russet Park, 460 m, 28 Oct. 1987 (CAS); 2 females, Dunk Island, 25 Aug. 1957 (UQIC).

Description - male. Length: 3.7; wing: 3.0 x 1.3; similar to *M. geoscopa* except as noted.

Head. Lateral frons also with black setae (MSSC); ventral postcranium with abundant black setae.

Legs. Coxae, trochanters, basal FI and FII, and all of FIII dark brown; knees of FI and FII, all tibiae, It_1 and IIt_1 yellow; It_{2-5} and IIt_{2-5} and $IIIIt$ dark brown; CI and CII with black anterior hairs, CIII with 2 black lateral setae; femora with pale ventral hairs.

Wing (Fig. 120i). CuAx ratio: 1.1; haltere dark brown.

Abdomen. Metallic green with bronze reflections; postabdomen (Fig. 17c); hypopygium dark brown (Fig. 17b); hypandrium apically bent; epandrium bare along ventral margin; epandrial lobe ovate, with 2 relatively short setae; surstyli with 4 short overlapping lobes, which bear setae as figured; cercus strongly curved with group of strong dark lateral setae basally; distal cercus clavate, forked, with setose outer arm and expanded inner arm which bears 4 distinctive blade-like modified setae.

Female. Similar to male except lacks MSSC; haltere yellow.

Remarks. *Mesorhaga queenslandensis* is known from the Cairns district, Queensland. It occurs sympatrically with the closely related *M. geoscopa*.

Mesorhaga danielsi n.sp.

Type material. HOLOTYPE male, Queensland, Middle Claudie River, Iron Range, at light, G. Daniels (AMS).

Description - male. Length: 3.0; wing: 2.7 x 1.0.

Head. Vertex not deeply excavated; vertex, frons, face and clypeus metallic blue-green, with dusting of grey pruinosity; setae black; palpi and proboscis dark brown; lateral frons with only proclinate vertical seta; ventral postcranium with abundant black setae.

Thorax. Metallic blue-green with bronze reflections; pleura with some grey pruinosity; 3 irregularly paired long ac present, shorter than dc setae; lateral scutellars about one-quarter length of medians.

Legs. Coxae, trochanters, basal five-sixth of FI and FII, and all of FIII dark brown; distal FI and FII, all tibiae, It_1 and IIt_1 yellow; It_{2-5} , IIt_{2-5} and $IIIIt$ brown; CI and CII with black anterior hairs, CIII with 2 black lateral setae; femora with black ventral hairs.

Wing. Hyaline (similar to Fig. 120d); M with bend just beyond one third distance between m-cu crossvein and wing apex; CuAx ratio: 0.9; lower calypter brown with black rim and fan of black setae; haltere dark brown.

Abdomen. Metallic green with bronze reflections; hypopygium dark brown with brown cerci (Fig. 17d); epandrium bare along ventral margin; cercus strongly recurved and narrowed at bend, and with group of strong dark lateral setae basally; distal cercus with setose outer protuberance and apically with 2 elongate clavate setae, and with 4 strong incurved setae.

Female. Unknown.

Remarks. *Mesorhaga danielsi* is known only from Iron Range, Cape York Peninsula. Although it has a strongly recurved cercus like members of the *geoscopa* Group, the lateral frons lacks the group of black setae, and vein M has only a gentle curve in vein M. The species is therefore somewhat intermediate between the *geoscopa* and *canberrensis* Groups.

The *koongarra* Group

Mesorhaga koongarra n.sp.

Type material. HOLOTYPE male, PARATYPES 7 males, 14 females, Northern Territory, Koongarra, 15 km east of Mount Cahill, at light, 6-9 Mar. 1973, D.H. Colless (ANIC).

Additional material. Northern Territory – female, Caranbirini Water Hole, 33 km south-west of Borroloola, 22 Apr. 1976; Queensland – 6 males, 2 females, 3 km north-east of Mount Webb, 15°03'S 145°09'E, at light, 30 Apr. 1981; 2 males, 11°45'S 142°35'E, 2 males, Heathlands, 15-26 Jan. 1992, malaise trap (ANIC).

Description - male. Length: 3.4-4.7; wing length: 2.7-4.0.

Head. Vertex deeply excavated; major setae black; ocellar tubercle with pair strong diverging ocellars, with 1-2 pairs weak posterior hairs; 2-3 strong postvertical setae present, in line with the postoculars; weak proclinate vertical present on lateral frons; vertex, frons, face and clypeus metallic blue-green, and covered with silvery pruinosity; clypeus narrowed distally and adjacent to margin of eyes (Fig. 18b); palp and proboscis yellowish; antenna black; arista dorsal, bare, about as long as head height; ventral postcranium with abundant pale setae.

Thorax. Metallic green with bronze reflections; setae black; pleura with grey pruinosity; ac absent; 1 pa, 2 sa, only 1 sr (posterior), 2 npl, and 1 pm present; lateral scutellar setae about one-quarter length of medians.

Legs. All coxae, FI and FII to knees, and trochanter III and FIII dark green-brown; trochanters and knees I and II, and remaining tibiae and tarsi yellowish; CI and CII with pale anterior hairs, CIII with pale lateral seta; femora with pale ventral hairs; I: 6.0; 7.0; 4.0/2.0/1.2/0.8/0.8; II: 7.0; 8.0; 6.0/2.5/1.5/0.7/0.7; III: 9.0; 10.0; 4.0/4.0/2.5/1.0/0.8.

Wing (Fig. 120d). Veins pale brown; M with gentle curve halfway between m-cu crossvein and wing apex; CuAx ratio: 0.8; lower calypter pale yellow with black rim and fan of pale setae; haltere club yellow, stalk brownish.

Abdomen. Metallic blue-green with bronze reflections and covered with short dark setae dorsally and pale setae ventrally; dark bronze-brown bands present on tergal overlap of segments 2-6; tergum 1 with posterolateral row of long pale setae (MSSC); hypopygium dark brown (Fig. 18a); aedeagus and hypandrium elongate and narrow, with aedeagus extending only slightly beyond the hypandrial apex; epandrial lobe ovate, with setae at half and apex; surstylus with 3 arms and setae as figured; cercus curved and tapering, with some strong dark lateral setae basally, and apically with tooth-like seta.

Female. Similar to male except as noted: wing: 2.8-3.0; ocellar tubercle not so prominent; face and clypeus wider than in male; pedicel with much shorter ventral apical seta; first flagellomere more rounded; ac absent or with 1-2 pairs short ac present anteriorly; abdominal tergum 1 without posterolateral row of long setae.

Remarks. *Mesorhaga koongarra* is found in monsoonal, seasonally dry, tropical northern Australia, from Cape York Peninsula as least as far west as Arnhem Land. This species shows considerable size

range among specimens, although the hypopygial form and colour remain constant.

Mesorhaga zborowskii n.sp.

Type material. HOLOTYPE male, PARATYPES 11 males, 6 females, Queensland, 7 km south of Batavia Downs, 12°43'S 142°42'E, flight intercept trap, 22 June-23 Aug. 1992, P. Zborowski; PARATYPE female, Batavia Downs, 12°39'S 142°42'E, malaise trap, 24 Oct.-23 Nov. 1992 (ANIC).

Description – male. Length: 2.9-3.0; wing length: 2.5 x 1.0; similar to *M. koongarra* except as noted.

Head. Major setae yellowish; palp and proboscis yellow; scape and pedicel yellowish ventrally, brown dorsally; pedicel with long pale ventral seta; first flagellomere brown; arista dorsal, bare, about as long as head height.

Thorax. Setae yellowish; 2-3 irregular pairs ac present; lateral scutellar setae about one-third length of medians.

Legs. CI yellow; CII and CIII dark brown/metallic green but yellow distally; all femora, tibiae, and basal tarsomeres yellow; distal tarsomeres brownish; FI with pale ventral hairs; It₅ (Fig. 130b) flattened with pair of long dorsobasal setae and 5 long dorsal setae distally, and with pair pale greatly enlarged pulvilli which cover the claws (all MSSC); FII (Fig. 130c) with 3-4 long pale ventral setae on distinct basoventral mound (MSSC), and with weaker ventral hairs along length; TII with weak ad and pd seta and with 2 strong apicoventral setae; FIII with pale ventral hairs.

Wing (similar to Fig. 120e). Veins brown; M with gentle curve halfway between m-cu crossvein and wing apex; CuAx ratio: 0.9; lower calypter pale yellow with black rim and fan of pale setae; haltere yellow.

Abdomen. Metallic blue-green with bronze reflections and covered with pale vestiture; tergum 1 with posterolateral row of long pale setae (MSSC); hypopygium (Fig. 130a) dark brown with black cercus; epandrial lobe ovate, with setae at three-quarters and apex; surstylus with 3 arms and setae as figured; cercus curved with strong and somewhat weaker apical tooth-like setae, and with additional subapical toothed seta.

Female. Similar to male except as noted: ocellar tubercle not so prominent; face and clypeus wider than in male; pedicel with much shorter ventral apical seta; femora with only short pale hairs; It₅ unmodified, without long setae, and with pulvilli short and unmodified; FII without basoventral mound; abdominal tergum 1 without posterolateral row of long setae.

Remarks. *Mesorhaga zborowskii* is known only from the Batavia Downs type locality on Cape York Peninsula. The enlarged pulvilli on the flattened male tarsus I and the basoventral mound of FII are both diagnostic MSSC which are unusual in *Mesorhaga*.

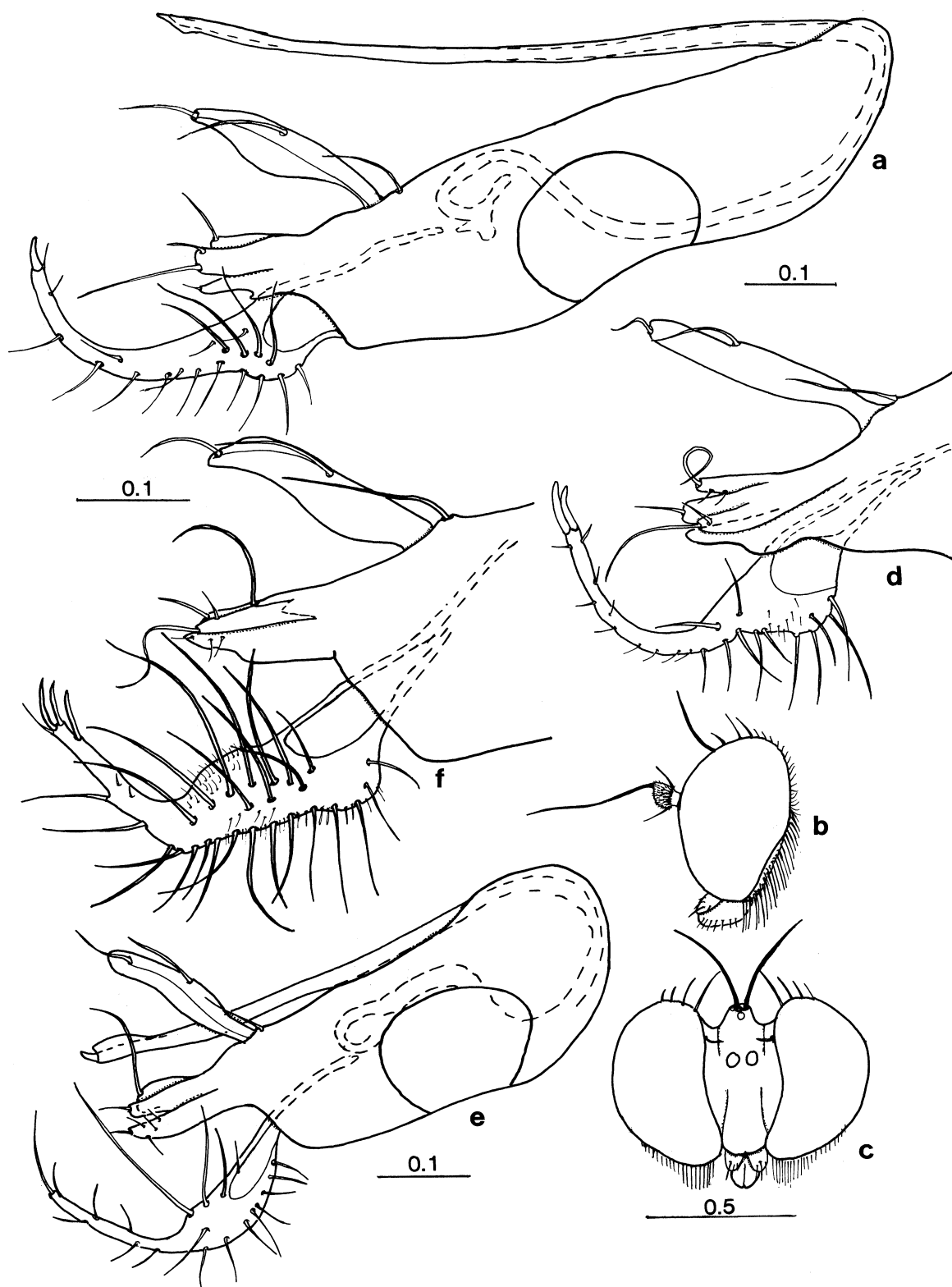


Fig.18. *Mesorhaga koongarra*, Mount Cahill, NT: a – hypopygium, left lateral; b – male head, left lateral; c – male head, anterior. *M. tindali*, Groote Eylandt, NT: d – cercus and surstylyus, left lateral. *M. martius*, Mount Cahill, NT: e – hypopygium, left lateral. *M. naumanni*, Mitchell Plateau, WA: f – cercus and surstylyus, left lateral.

Mesorhaga petrensis n.sp.

Type material. HOLOTYPE male, PARATYPES 6 males, 2 females, Queensland, Split Rock, 15°39'S 144°31'E, malaise trap, monsoonal woodland, 13 Dec. 1992-13 Feb. 1993, P. Zborowski (ANIC).

Description – male. Length: 2.6; wing length: 1.8 x 0.8; similar to *M. koongarra* except as noted.

Head. Palp yellow; proboscis dark brown; antenna black; ventral postcranium with abundant pale setae.

Thorax. Setae black; ac absent; lateral scutellar setae about one-quarter length of medians.

Legs. All coxae and femora to knees dark green; femoral knees, tibiae and basitarsis I and II yellow, although distal TIII infuscated; distal tarsomeres I and II and III_t dark brown; CI and CII with pale anterior hairs, CIII with pale lateral seta; femora with pale ventral hairs.

Wing. M with very gentle one-third of distance between m-cu crossvein and wing apex (similar to Fig. 120f); CuAx ratio: 0.6; lower calypter pale yellow with fan of pale setae; haltere yellow.

Abdomen. Mostly metallic blue-green, except tergum 7 dark brown; hypopygium (Fig. 130d) elongate, about two-thirds length of preabdomen, and dark brown with yellow cerci; aedeagus and hypandrium elongate and narrow, with microtrichia on distal hypandrium; aedeagus extending only slightly beyond the hypandrial apex; epandrial lobe ovate, with setae at half and five-sixths; surstylus with setae as figured; cercus curved and unbranched, with some strong lateral setae basally, and distally with 5 long apical setae, 2 long setae on inner margin, and long seta on outer margin.

Female. Similar to male, except lack MSSC.

Remarks. *Mesorhaga petrensis* is known only from a monsoonal woodland site on the Cape York Peninsula. This species is close to *M. koongarra*.

Mesorhaga martius n.sp.

Type material. HOLOTYPE male, PARATYPES male, 9 females, Northern Territory, Koongarra, 15 km east of Mount Cahill, at light, 6-9 Mar. 1973, D.H. Colless (ANIC).

Additional material. Northern Territory – male, Wildman River, cashew plantation, 15 Feb. 1990 (NTMD); female, McArthur River, 2 km south-south-east of Borroloola, 20 Apr. 1976. Western Australia – male, Mitchell Plateau, Kimberley District, mining camp, 14°49'S 125°50'E, 9 May 1983 (ANIC).

Description – male. Length: 2.7; wing length: 2.5 x 1.0; similar to *M. koongarra* except as noted.

Head. Vertex not so strongly excavated; setae brownish; antenna black.

Thorax. Setae brownish to black; ac absent.

Legs. CI, femora, tibiae and basal tarsomeres yellow; CII and CIII, dark green; distal tarsomeres infuscated; setae brownish; FI and FII with some pale ventral hairs; TII and III_t with row brownish dorsal setae which is stronger than normal vestiture (MSSC).

Abdomen. Hypopygium dark brown with yellow cerci (Fig. 18e); epandrial lobe with seta at half and subapically; surstylus with 3 overlapping arms and with long seta on ventralmost lobe; cercus curved and tapering, with 2 long strong ventral setae basally, and with apical seta.

Female. Similar to male except as noted; body length: 2.4; wing length: 1.7 x 0.8; vertex not strongly excavated; ac also absent; vein M₁ not so strongly bent; leg II vestiture normal.

Remarks. *Mesorhaga martius* is found from the Kimberley district, Western Australia to the Gulf of Carpentaria, Northern Territory. This species is somewhat smaller than both *M. koongarra* and *M. tindali*, but is closely related to them.

Mesorhaga tindali n.sp.

Type material. HOLOTYPE male, PARATYPES, 7 males, Northern Territory, Groote Eylandt, no date, N.B. Tindale (SAM; paratypes SAM, ANIC).

Description – male. Length: 4.0; wing: 3.3 x 1.2; similar to *M. koongarra* except as noted.

Head. Setae yellow; antenna dark brown; pedicel with brownish dorsal and ventral setae; first flagellomere rounded.

Thorax. Metallic green with bronze reflections; setae yellow; ac absent.

Legs. CI, femora, tibiae and tarsi yellow; CII and CIII yellowish to brownish; FI and FII with pale ventral hairs.

Wing. Veins yellow; M with gentle curve halfway between m-cu and apex; CuAx ratio: 1.0; haltere yellow.

Abdomen. Hypopygium dark brown with yellow cerci (Fig. 18d); epandrial lobe with seta at two-thirds and apically; surstylus with long setae as figured; cercus curved and tapering, with ventral setae basally, and with 2 distinctive digitiform apical setae.

Female. Unknown.

Remarks. *Mesorhaga tindali* is known only from the type locality in the Gulf of Carpentaria. This species is closely related to *M. martius* but is larger, has distinctly yellow setae, and has two apical digitiform setae on the apex of the cercus.

Mesorhaga naumanni n.sp.

Type material. HOLOTYPE male, Western Australia, Mitchell Plateau, Mining Camp, 14°39'S 125°50'E, 9-10 May

1983, I.D. Naumann & J. Cardale; PARATYPE female, same, but 10 km north-west of Mining Camp, 11 May 1983 (ANIC).

Description – male. Length: 4.2; wing: 3.8 x 1.3; similar to *M. koongarra* except as noted.

Head. Palpi and proboscis dark brown.

Thorax. Four pairs of ac anteriorly, separated by gap from longer posterior pair.

Legs. All coxae, basal FI and FII, trochanter and FIII dark green-brown; trochanters and femoral knees I and II, TI, TII, basal half of TIII, It₁₋₂ and IIt₁₋₂ yellow; distal TIII, IIIIt, and distal tarsomeres I and II dark brown; CI and CII with pale anterior hairs, CIII with pale lateral seta; FI and FII with pale ventral hairs.

Wing. Veins pale brown; M with gentle curve halfway between m-cu crossvein and wing apex; CuAx ratio: 0.9; haltere yellow.

Abdomen. Tergum 1 with posterolateral row of long pale setae (MSSC); hypopygium dark brown (Fig. 18f); surstylus with 3 overlapping arms and with long apical and basal setae; cercus with broad base with abundant strong dark lateral setae; narrower distal part of cercus arising at right angle from base and bearing 3 strong apical setae as figured.

Female. Similar except lack MSSC and as noted: only basal one-eighth of TIII yellow.

Remarks. *Mesorhaga naumanni* is known only from the Mitchell Plateau, Western Australia.

***Mesorhaga toddensis* n.sp.**

Type material. HOLOTYPE male, Northern Territory, Todd River, 9 km north-east of Alice Springs, malaise trap. 11 Oct. 1978, D.H. Colless (ANIC).

Description – male. Length: 3.6; wing 2.7 x 1.1; similar to *M. koongarra* except as noted.

Head. Vertex, frons, face and clypeus metallic blue with dusting of grey pruinosity; lateral frons with group of 8-10 strong pale setae; palp, proboscis dark brown; first flagellomere rounded.

Thorax. Dorsum metallic blue-green; 3 pairs strong ac present.

Leg. Coxae, trochanters, basal FI and FII, and all FIII dark green-brown; femoral knees I and II, FII, tibiae and basal tarsomeres I and II yellowish; apex of TIII, all of IIIIt, and distal tarsomeres I and II brown; CI and CII with pale anterior hairs, CIII with strong pale lateral seta; FI and FII with pale ventral hairs.

Wing. M₁ with gentle bend at one-third; CuAx ratio: 0.7; haltere entirely brown.

Abdomen. Hypopygium dark brown (Fig. 19a); surstylus with 3 arms and strong setae as figured; cercus curved and tapering, with 3 strong dark basolateral setae, strong external seta at two-thirds, and with apex sharp and bare without setae.

Female. Unknown.

Remarks. *Mesorhaga toddensis* is known only from the type locality near Alice Springs in central Australia. The cerci were held against the surstyli (as in Fig. 19a) in all specimens. *Mesorhaga toddensis* has a hypopygium similar to *M. varicornis*.

***Mesorhaga varicornis* n.sp.**

Type material. HOLOTYPE male, Northern Territory, Entire Creek, 155 km north-east by east of Alice Springs, 13 Oct. 1978, D.H. Colless (ANIC).

Description – male. Length: 3.6; wing length: 2.7 x 1.0.

Head. Vertex not deeply excavated; head setae pale yellow; clypeus very short (Fig. 19c); palp, proboscis brown; scape and pedicel yellow; first flagellomere brown, subrectangular.

Thorax. Metallic blue-green with dusting of whitish pruinosity; pleura with dense pruinosity; setae pale yellow; ac absent.

Legs. CI, trochanters, femora, tibiae and all t₁₋₃ yellow; CII and CIII and all t₄₋₅ dark brown; setae pale yellow; CI and CII with pale anterior hairs, CIII with strong pale lateral seta; I: 5.0; 5.0; 2.5/1.0/1.0/0.8/1.0; II: 5.5; 5.0; 3.0/1.0/0.8/0.8/0.8; FII with 3-4 long pale ventral setae along basal half; III: 7.0; 6.0; 3.0/2.0/1.0/0.8/0.8.

Wing (similar to Fig. 120d). Veins pale yellow; M with bend halfway between m-cu crossvein and wing apex; CuAx ratio: 0.6; haltere stalk yellowish and club pale yellow.

Abdomen. Metallic green with dusting of grey pruinosity; all setae pale; dark bronze-brown bands present on tergal overlap on segments 2-6; tergum 1 with posterolateral row of long pale setae (MSSC); hypopygium brown with yellow cercus (Fig. 19b); epandrium elongate, subrectangular; hypandrium deflexed apically with distinctive subapical tooth-like prominence; cercus relatively short, stout and tapering, with some strong dark lateral setae basally; cercus without apical projections or distinctive setae.

Female. Unknown.

Remarks. *Mesorhaga varicornis* is known only from the isolated type locality at the edge of the Simpson Desert. The species is distinctive and displays the pale colouration often found in arid-lands Diptera.

***Mesorhaga longipenis* n.sp.**

Type material. HOLOTYPE male, Western Australia, Millstream, 8 Apr. 1971, D.H. Colless (ANIC); PARATYPE male, Kimberley Research Station, 6 Feb. 1952 (WADA).

Additional material. Western Australia – male, Kimboldton, 26 Oct. 1982 (ANIC).

Description – male. Length: 2.7; wing: 2.2 x 0.9; similar to *M. koongarra* except as noted.

Head. Palp, proboscis brown.

Thorax. Metallic blue-green; 3-4 irregular pairs short ac present.

Legs. CI and trochanter I, all femora, tibiae, It_{1-3} and

II_t yellow; coxae and trochanters II and III, tarsus III and remaining tarsomeres dark brown; FII only with pale ventral hairs.

Wing (similar to Fig. 120f). M with gentle curve halfway between m-cu crossvein and wing apex; M and R_{4+5} converging slightly apically; CuAx ratio: 0.9; haltere yellow.

Abdomen. Metallic blue-green; hypopygium dark brown with yellowish cerci (Fig. 19d,e); aedeagus very long,

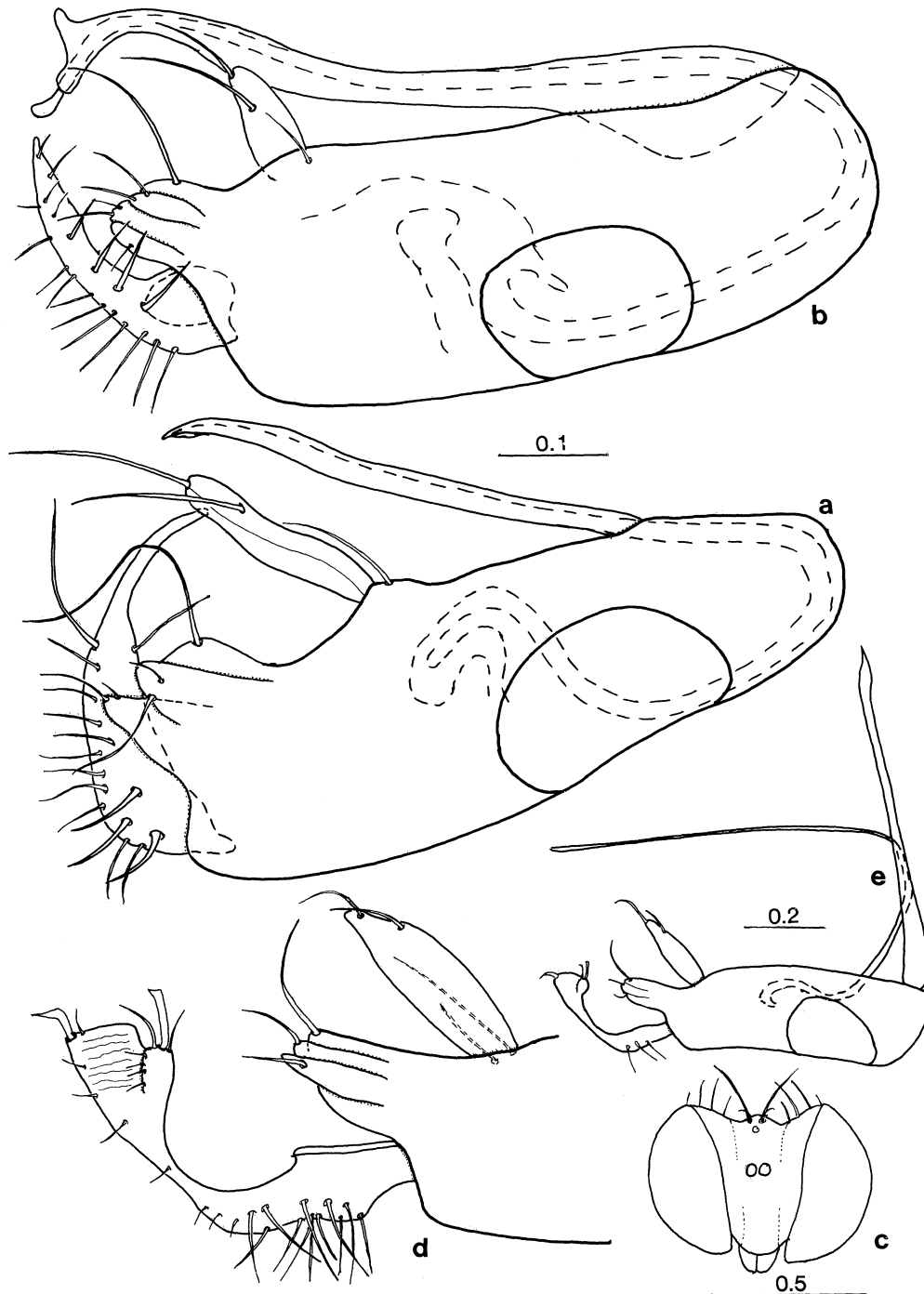


Fig.19. *Mesorhaga toddensis*, Todd River, NT: a – hypopygium, left lateral. *M. varicornis*, Alice Springs, NT: b – hypopygium, left lateral; c – male head, anterior. *M. longipenis*, Millstream, WA: d – surstylus and cercus, left lateral; e – hypopygium, left lateral.

extending almost one third of its length beyond apex of hypandrium; 2 epandrial setae present adjacent to epandrial lobe; cercal base wide and bearing some strong setae; cercus constricted at midlength and expanded, clavate distally with external apical curved blade-like seta and with lobate division bearing straight blade-like seta and other setae as figured.

Female. Unknown.

Remarks. *Mesorhaga longipenis* is found in tropical Western Australia. It has a long aedeagus which when extended, projects well beyond the apex of the hypopygium.

***Mesorhaga emmensis* n.sp.**

Type material. HOLOTYPE male, Western Australia, Emma Gorge, El Questro Station, East Kimberley, 28 Dec. 1991, M.S. & B.J. Moulds (AMS).

Description – male. Length: 2.6; wing length: 2.0 x 0.8; similar to *M. koongarra* except as noted.

Head. Major setae black; 3 postvertical setae present, in line with the postoculars; vertical seta not evident on specimen; vertex, frons, face and clypeus metallic blue-green, with silvery pruinosity; palp dark brown; proboscis yellowish; antenna black.

Thorax. Metallic green with bronze reflections; setae black; pleura with grey pruinosity; ac absent; lateral scutellar setae about one-third length of medians.

Legs. Coxae mostly dark brown, although CI yellow distally; FI, FII, and all tibiae and basitarsi yellow; distal tarsomeres brown; CI and CII with pale anterior hairs, CIII with pale lateral seta; femora with pale ventral hairs.

Wing. M with very gentle curve halfway between mcu and wing apex; CuAx ratio: 0.7; lower calypter yellow with fan of pale setae; haltere yellow.

Abdomen. Metallic blue-green; hypopygium with yellowish cerci; aedeagus and hypandrium elongate and narrow, with aedeagus extending slightly beyond the hypandrial apex; epandrial lobe ovate, with setae at three fifths and apex; cercus (Fig. 130e) curved and distally expanded, then tapering to apex, with 5 apical setae, 3 shorter setae on outer margin and with row of 6-7 setae on median surface.

Female. Unknown.

Remarks. *Mesorhaga emmensis* is known only from the Kimberley region, Western Australia. The cercal shape is distinctive.

***Mesorhaga gatesae* n.sp.**

Type material. HOLOTYPE male, Queensland, 16 km north-east of Heathlands, 11°41'S 142°42'E, at light, 15 Mar. 1992, G. Daniels & M.A. Schneider (McEvey Number 10147);

PARATYPES 2 females, Bertie Creek pump, near Heathlands, 11°46'S 142°36'E, malaise trap, 16 Mar. 1992 (McEvey Numbers 9779, 9782); female, lookout, 22 km north-east of Heathlands, 11°38'S 142°44'E, malaise trap, 15 Mar. 1992 (McEvey Number 9508) (AMS).

Additional material. Queensland – male, 2 females, Cockatoo Creek, 17 km north-west of Heathlands, 11°38'S 142°27'E, 15-26 Jan. 1992, open forest (ANIC).

Description – male. Length: 3.5; wing length: 2.7; similar to *M. koongarra* except as noted.

Legs. CI metallic green basally, yellow distad; CII, CIII and FIII metallic green-brown; FI, FII, all tibiae and basitarsi yellow (except FII infuscated posterobasally); distal tarsomeres brown.

Wing (similar to Fig. 120d). CuAx ratio: 0.9; haltere brownish.

Abdomen. Tergum 1 without posterolateral row of long pale setae; hypopygium dark brown; surstylus with 3 arms and setae as figured; cercus (Fig. 23d) curved, with some strong dark basolateral setae, with clavate apex which bears an external field of curved setae and other setae as figured.

Female. Similar to male except as noted: ocellar tubercle not so prominent; face and clypeus wider than in male; CI also yellowish distally; FI and FII dark metallic green with yellow knees; haltere yellow.

Remarks. *Mesorhaga gatesae* is known only from northern Cape York Peninsula. It is named for Ms Jenny Gates, who had the unenviable job of editing this manuscript for publication.

***Mesorhaga cockatoo* n.sp.**

Type material. HOLOTYPE male, Queensland, Cockatoo Creek, 17 km north-west of Heathlands, 11°38'S 142°27'E, 15-26 Jan. 1992, open forest, T. Weir & I. Naumann (ANIC).

Description – male. Unique holotype missing head but length of thorax and abdomen: 1.5; wing 1.8 x 0.7; similar to *M. koongarra* except as noted:

Head. Missing from specimen.

Legs. CI yellow; CII and CIII dark brown; all trochanters, femora, tibiae and basal tarsi yellow, only distalmost tarsomeres infuscated; CI and CII with pale anterior hairs, CIII with pale lateral seta; femora with pale ventral hairs.

Wing (similar to Fig. 120d). CuAx ratio: 0.7; lower calypter pale yellow with black rim and fan of pale setae; haltere entirely yellow.

Abdomen. Metallic blue-green with bronze reflections and covered with short yellowish vestiture; tergum 1 with posterolateral row of long pale setae (MSSC); hypopygium (Fig. 130f) dark brown with yellow cerci; aedeagus and hypandrium elongate and narrow, with

aedeagus extending only slightly beyond the hypandrial apex; epandrial lobe elongate, with very strong seta at two-thirds and much shorter seta at apex; surstylus with 3 arms and setae as figured; cercus with some very long basolateral setae, and apically clavate, with some short setae on outer lobe and with 3 broad blade-like setae subapically.

Female. Unknown.

Remarks. *Mesorhaga cockatoo* is known only from northern Cape York Peninsula, where it occurs sympatrically with the closely related *M. gatesae*. Both species have similar clavate cerci, but *M. cockatoo* is distinctly smaller and has all femora yellow.

***Mesorhaga decembris* n.sp.**

Type material. HOLOTYPE male, PARATYPES 2 females, Northern Territory, 40 km south-east of Borrooloola, 22 Dec. 1991, yellow pans, M.S. & B.J. Moulds (AMS).

Description – male. Length: 2.2; wing length: 1.7 x 0.8; similar to *M. koongarra* except as noted.

Head. Setae black; single strong postvertical setae present.

Legs. CI yellow; CII brown; CIII yellowish; trochanters, femora, tibiae and basal tarsomeres yellow; distal tarsomeres infuscated; CI and CII with pale anterior hairs, CIII with pale lateral seta; TI with pv row of short setae which slightly decrease in size distally (MSSC); pulvilli on all tarsi slightly enlarged (MSSC); FII with row of pale erect ventral hairs from base to three fifths (MSSC).

Wing. M with gentle curve one-third of distance from m-cu crossvein to wing apex; CuAx ratio: 0.4; lower calypter pale yellow with fan of pale setae; haltere entirely yellow.

Abdomen. Metallic blue-green with short dark vestiture; hypopygium (Fig. 130g) dark brown with distal cerci yellow; aedeagus and hypandrium elongate and narrow; epandrial lobe elongate and ovate, with very strong seta at half and much weaker seta apically; surstylus with setae as figured; cercus curved and apically expanded, with 2 inner apical seta and curved outer flap bearing curved apical setae.

Female. Similar to male except as noted: TI and FII without modified setae; pulvilli all small.

Remarks. *Mesorhaga decembris* is known from Borrooloola, Northern Territory, near the Gulf of Carpentaria.

***Mesorhaga muchei* n.sp.**

Type material. HOLOTYPE male, New South Wales, Pilliga Scrub, 30 Nov. 1984, G. Hangay & H. Mucche (AMS).

Description – male. Length: 2.9; wing dimensions: 2.2 x 1.0; similar to *M. koongarra* except as noted.

Head. Vertex only shallowly excavated.

Legs. All coxae, FI and FII to knees, and trochanter III and FIII dark green-brown; trochanters I and II, femoral knees I and II, tibiae and tarsi I and II yellowish; TIII and IIIt brown.

Wing (similar to Fig. 120f). CuAx ratio: 0.7; haltere brown.

Abdomen. Metallic blue-green with bronze reflections and covered with short pale setae; tergum 6 ventrally expanded and densely setose (Fig. 20h); hypopygium (Fig. 20g); surstylus with 3 arms and setae as figured; cercus curved and with shallow apical excavation, with apical truncate seta and row of 3 short curved median setae.

Female. Unknown.

Remarks. *Mesorhaga muchei* is known only from the Pilliga Scrub, interior New South Wales. The ventrally expanded and setose tergum 6 is distinctive. This species is named for the coleopterist Heinz Mucche, who helped collect the specimen.

***Mesorhaga weiri* n.sp.**

Type material. HOLOTYPE male, PARATYPES 5 males, 9 females, Northern Territory, Rimbija Island, Wessel Group, 11°01'S 136°45'E, malaise trap, 3-14 Feb. 1977, T. Weir; PARATYPES 5 males, 5 females, same but 15-21 Jan. 1977; female, South Point, Coburg Peninsula, 11°07'S 132°08'E, 10 Feb. 1977 (ANIC); male, female, Queensland, Sue Island, Torres Strait, 17-23 May 1985 (QDPI); male, Saibai Island, 26 Mar. 1985 (QDPI).

Additional material. Queensland – male, Newell, 6.4 km north-east of Mossman, 12 July 1971; 2 males, 3 females, Bertie Creek, 11°50'S 142°30'E, 16-29 Jan. 1992; 3 males, Heathlands, 11°45'S 142°35'E, 15-26 Jan 1992, at light; 5 females, Cockatoo Creek, 11°38'S 142°27'E, 16-26 Jan. 1992, open forest; 4 females, 11°50'S 142°41'E, Dulhunty River, 19 Mar. 1992; 2 males, 2 females, Gunshot Creek, 11°43'S 142°28'E, 20 Mar. 1992 (ANIC).

Description – male. Length: 2.7; wing: 2.0 x 0.8; similar to *M. koongarra* except as noted.

Head. Vertex not deeply excavated; strong proclinate vertical present; palp, proboscis brown; first flagellomere subrectangular; arista dorsal and as long as head height.

Thorax. Metallic blue-green; 2-3 irregular pairs short ac on anterior slope only, posterior ac band bare.

Legs. Coxae, basal femora and trochanters II and III, dark brown; trochanter I, femoral knees, TI, TII and basal tarsomeres of legs I and II yellow; TIII, IIIt and distal tarsomeres I and II brown; CI and CII with brown anterior hairs.

Wing (Fig. 120g). M and R₄₊₅ almost subparallel; M

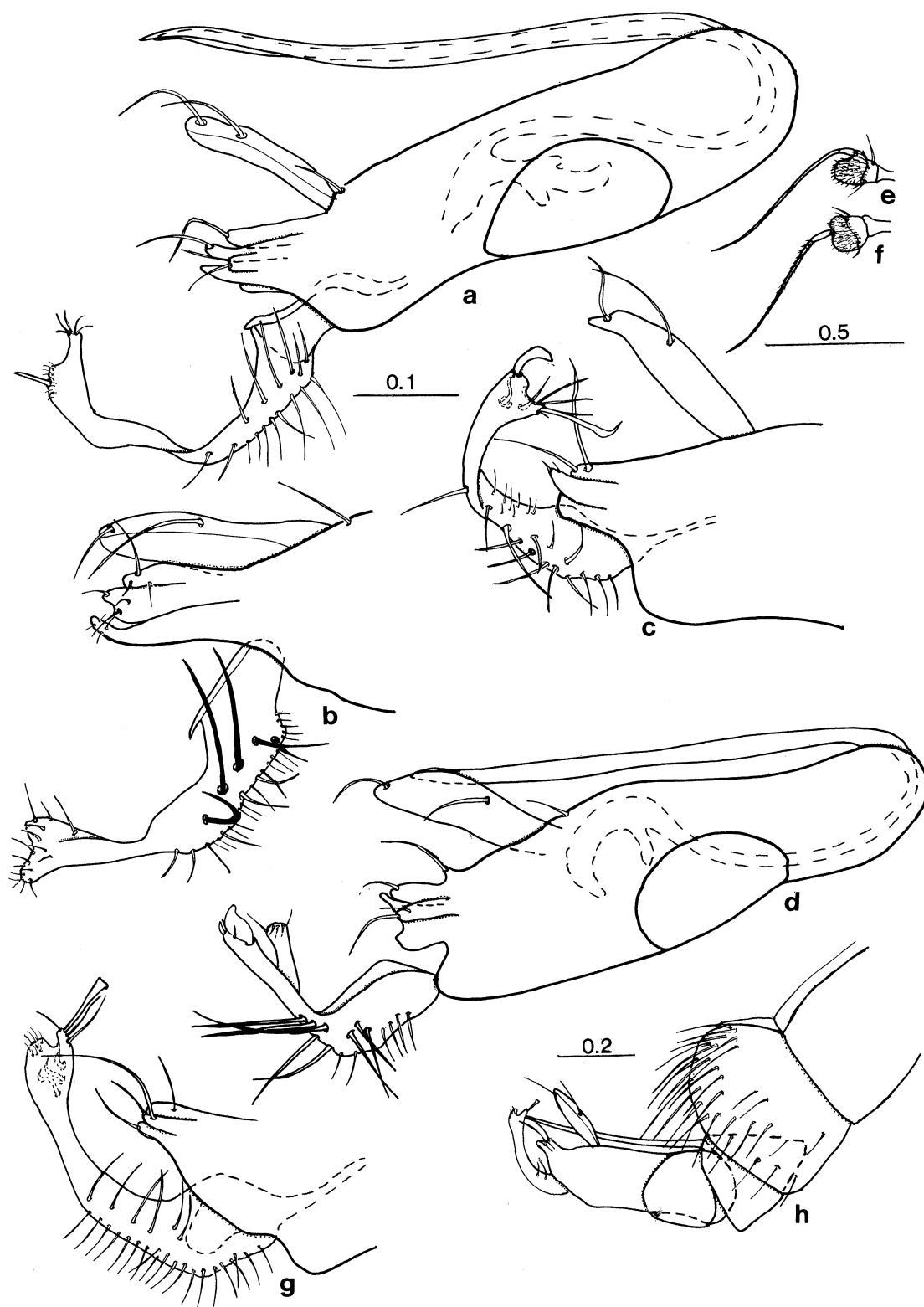


Fig.20. *Mesorhaga weiri*, Wessel Islands, NT: a – hypopygium, left lateral. *M. wanbi*, Wanbi, SA: b – surstylus and cercus, left lateral. *M. nerrensis*, Galena, WA: c – surstylus and cercus, left lateral. *M. lamondensis*, Iron Range, Qld: d – hypopygium, left lateral; e – male antenna, left lateral; f – female antenna, left lateral. *M. muciei*, Pilliga Scrub, NSW: g – surstylus and cercus, left lateral; h – male postabdomen, left lateral.

with only slight bend and sometimes with tiny stub vein; CuAx ratio: 0.4; haltere yellow.

Abdomen. Hypopygium dark brown with cercus basally yellow and distally brown (Fig. 20a); epandrial setae absent; surstylus with 3 narrow arms and setae as figured; cercus broad basally with some strong lateral setae, constricted and appearing twisted at midlength, but somewhat expanded distad, with outer short strong seta and apical digitiform projection with short setae as figured.

Female. Similar to male except shorter, wing length: 1.7; also with strong proclinate vertical.

Remarks. *Mesorhaga weiri* occurs in northern monsoonal Australia, and is known from Arnhem Land, Northern Territory and the Cape York Peninsula, Queensland, from the Torres Strait south to the Cairns district.

Mesorhaga lamondensis n.sp.

Type material. HOLOTYPE male, Queensland, Claudie River, near Mount Lamond, Iron Range, malaise trap, 18 Dec. 1971, D.K. McAlpine & G.A. Holloway; PARATYPES 7 females, same but 14-18 Dec. 1971 (AMS).

Additional material. Queensland – 60 males, 7 females, Iron Range, West Claudie River, at light, 4 Dec. 1986 (UQIC).

Description – male. Length: 2.3; wing: 2.0 x 0.8; similar to *M. weiri* except as noted.

Head. Palp and proboscis brown; scape relatively narrow; black proclinate vertical present; first flagellomere distinctly rounded subtriangular with dorsal arista (Fig. 20e) (MSSC).

Thorax. Dark metallic green with bronze reflections; 4-5 irregular pairs ac, with posterior pair strong.

Legs. Coxae, trochanters, and basal femora dark brown; knees, tibiae and basal tarsomeres of legs I and II yellow, although TIII infuscated; IIIIt and distal tarsomeres I and II brown; CI and CII with brown anterior hairs; femora with pale ventral setae; TI and It₁ with pd and pv rows of long dark setae (MSSC).

Wing. Similar to Figure 120h but M with slightly stronger bend; veins dark brown; M and R₄₊₅ subparallel; CuAx ratio: 0.5; lower calypter pale yellow with black rim and fan of black setae; haltere stalk yellowish with brownish club.

Abdomen. Tergum 1 with posterolateral row of long dark setae (MSSC); hypopygium dark brown with brown cercus (Fig. 20d); surstylus with strong slightly pedunculate ventral seta and other setae as figured; cercus broad basally with strong lateral setae, but distally narrowed and bent at right angle to base, and with outer arm bearing distinctive apical striated tooth-like seta, and inner arm with 3 strong medianly directed setae.

Female. Similar to male except lacking MSSC and as noted: shorter, wing length: 1.7; first flagellomere rounded subrectangular with apical arista (Fig. 20f); FI and It₁ without pd and pv rows of setae; haltere club yellow.

Remarks. *Mesorhaga lamondensis* is known only from Iron Range, northern Cape York Peninsula. This species is distinctive in having obvious sexual dimorphism in antennal shape, leg setation and haltere colour. A related undescribed species from Port Moresby, Papua New Guinea (AMS) shows similar male-female antennal dimorphism.

Mesorhaga wanbi n.sp.

Type material. HOLOTYPE male, PARATYPES male, 2 females, South Australia, Wanbi, December, 1977, from W.A.R.I. Aphid Migration Project, R. Laughlin (ANIC).

Description – male. Length: 2.8; wing: 2.4 x 1.0; similar to *M. weiri* except as noted.

Head. Vertex not deeply excavated; strong proclinate vertical also present; vertex, frons, face and clypeus metallic green with bronze reflections, and covered with dusting of whitish pruinosity; palp, proboscis brown.

Thorax. 2-3 irregular pairs long ac present.

Legs. Coxae, trochanters II and III and basal femora dark brown; trochanter I, femoral 'knees', TI, TII, It₁ and IIIIt₁ yellow; TIII, IIIIt and distal tarsomeres I and II brown; CI and CII with brown anterior hairs; femora with pale ventral hairs.

Wing (Fig. 120h). M with bend at one-third distance between m-cu and wing apex and strongly converging towards R₄₊₅ to apex; CuAx ratio: 0.4; haltere brown.

Abdomen. Hypopygium dark brown with brown cerci (Fig. 20b); surstylus with 3 narrow arms and setae as figured; cercus broad basally with some strong dark lateral setae, somewhat constricted beyond midlength and expanded distally into blunt club with setae as figured.

Female. Similar to male except lacking MSSC and as noted: shorter, wing length: 1.9; haltere club pale yellow.

Remarks. *Mesorhaga wanbi* is known only from south-eastern South Australia. The converging veins M and R₄₊₅ are distinctive in both *M. wanbi* and the following species, *M. nerrensis*.

Mesorhaga nerrensis n.sp.

Type material. HOLOTYPE male, PARATYPE female, Western Australia, 17.7 km south of Nerren Nerren

Homestead, near Galena, Northwest Coast Highway, 27 Sept. 1973, L.P. Kelsey (ANIC).

Description – male. Length: 2.9; wing: 2.4 x 1.0; similar to *M. wanbi* except as noted.

Wing. Similar, with converging M and R₄₊₅.

Abdomen. Hypopygium dark brown with brown cerci (Fig. 20c); surstylus with 2 long setae as figured; cercus broad basally with some lateral setae, somewhat constricted beyond midlength and expanded distally into club with distinctive apical setae: broad external seta and elongate L-shaped internal seta.

Female. Similar to female *M. wanbi*.

Remarks. *Mesorhaga nerrensis* is known only from northern Western Australia. In venation and cercal structure it is very close to *M. wanbi*.

Mesorhaga turneri n.sp.

Type material. HOLOTYPE male, Western Australia, Dongara, 26 Sept.-3 Oct. 1935, R.E. Turner (BMNH).

Additional material. Western Australia – male, 2 females, Yalgorup National Park, Preston Beach, yellow pans, sand dunes, 2 Nov. 1991 (AMS).

Description – male. Length: 2.6; wing: 2.3 x 1.0; holotype shriveled; similar to *M. wanbi* except as noted.

Head. First flagellomere short subrectangular.

Thorax. Metallic blue-green; 3 irregular pairs long ac present.

Legs. Dark brown with metallic green reflections; femora with black setae on anterior face, and pale ventral hairs.

Wing (similar to Fig. 120h). CuAx ratio: 0.8; lower calypter pale yellow with fan of long pale setae; haltere black.

Abdomen. Hypopygium dark brown with yellow cercus (Fig. 23a); hypandrium expanded and hood-like distally; epandrial lobe broad and leaf-like; epandrial setae present; surstylus with 3 short arms and setae as figured; cercus broad basally with some strong lateral setae, expanded and somewhat clavate apically, with 2 strong thorn-like apical seta and other setae as figured.

Female. Similar to male.

Remarks. *Mesorhaga turneri* is found along the Western Australian coast, from near Geraldton to south of Perth. The Preston Beach specimens were taken in yellow pans on vegetated sand dunes. In cercal morphology, it is most closely related to *M. wanbi*.

The *canberrensis* Group

Mesorhaga canberrensis n.sp.

Type material. HOLOTYPE male, Australian Capital Territory, Black Mountain, light trap, 5 Jan. 1968, I.F.B. Common; PARATYPES 6 males, 5 females, same data but 4 Jan.-24 Feb. 1967, 2-3 Feb. 1980, 20 Feb. 1969, 8 Dec. 1964, 11-15 Nov. 1979, 17 Mar. 1969, 14 Dec. 1966, 5 Dec. 1961 (ANIC).

Additional material. New South Wales – male, 33 km north-east of Singleton, "Tuglo", 17 Nov. 1985; male, Scheyville, Jan. 1988, pyrethrin knockdown in 15 m canopy of grey box, *Eucalyptus mollucana*; possible female, 7 km south of Mendooran, 19 Feb. 1972 (AMS). Victoria – possible female, Mitta Mitta Creek, Dartmouth River Survey, 6 Mar. 1973 (MVM).

Description – male. Length: 4.0-4.2; wing length: 3.3 x 1.4.

Head. Vertex deeply excavated; ocellar tubercle with pair strong diverging ocellars, with 1-2 pairs weak posterior hairs; 3 long postvertical setae present, in line with postoculars; single proclinate vertical seta present; vertex, frons, face and clypeus metallic blue-green, with silvery pruinosity; setae black; palp, proboscis dark brown; antenna black; arista dorsal and about as long as head height; ventral postcranium with abundant pale setae.

Thorax. Metallic green with bronze reflections; setae black; pleura with some grey pruinosity; 5-6 irregular pairs ac present; 1 pa, 2 sa, only 1 sr (posterior), 2 npl, and 1 pm present; median scutellars strong, laterals about half length of medians.

Legs. Coxae, basal FI and FII and all leg III dark brown; TI and TII, basal tarsomeres I and II yellowish, with distal tarsomeres I and II brown; CI and CII with pale anterior hairs, CIII with pale lateral seta; all femora with pale ventral hairs; relative podomere ratios similar to *M. koongarra*.

Wing (Fig. 120e). CuAx ratio: 0.8; lower calypter brown with fan of pale setae; haltere club dark brown.

Abdomen. Metallic blue-green with bronze reflections and covered with short dark setae dorsally and pale setae ventrally; dark bronze-brown bands present on tergal overlap on segments 2-6; hypopygium dark brown (Fig. 21a); surstylus with 3 arms and with distinctive U-shaped notch on dorsal arm; cercus curved and tapering, with some strong dark lateral setae basally, and apically with digitiform projection which bears 4 strong crocheted setae, and with external arm bearing short setae.

Female. Similar to male except smaller, wing 3.0 x 1.2; ac totally absent.

Remarks. *Mesorhaga canberrensis* is found in montane habitats from Barrington Tops, New South Wales to the Canberra district, and possibly into

Victoria. This species is very closely related to *M. gingra* being separated by colour of the lower calypter setae, leg setal colour, details of the cercus, and position of the U-shaped notch on the dorsal surstylar arm.

***Mesorhaga gingra* n.sp.**

Type material. HOLOTYPE male, New South Wales, Blue Mountains, Kanangra-Boyd National Park, Kowmung River and Gingra Creek, 12 Oct. 1980, D.J. Bickel (ANIC).

Additional material. New South Wales – male, Putty Road and Darkey Creek, yellow pans, 19 Nov. 1990; male, female, Nadgee Nature Reserve, Merrika River, dry sclerophyll forest, yellow pans, 18 Feb. 1987 (AMS); Boolijah Creek, near Sassafras, 22 Nov. 1979 (ANIC).

Description – male. Length: 3.0; wing length: 2.8 x 1.3; similar to *M. canberrensis* except as noted.

Thorax. Three to 4 irregular pairs ac present.

Legs. Coxae, basal FI and FII and all leg III dark brown; TI and TII, basal tarsomeres I and II yellow, with distal tarsomeres I and II brown; CI and CII with black anterior hairs, CIII with black lateral seta; all femora with black ventral hairs.

Wing (similar to Fig. 120e). CuAx ratio: 1.0; lower calypter brown with fan of black setae; haltere club dark brown.

Abdomen. Hypopygium dark brown (Fig. 22b); surstylus with 3 arms and with distinctive recessed U-shaped notch on dorsal arm; cercus curved and tapering, with some dark lateral setae basally, and apically with short digitiform projection which bears 3 strong apically crocheted setae, and with short external arm bearing short setae.

Female. Similar to female *M. canberrensis*.

Remarks. *Mesorhaga gingra* is found in southern New South Wales, from the Hunter River to the Budawang Range, and south to Nadgee. It is closely related to *M. canberrensis*.

***Mesorhaga prima* Parent**

Mesorhaga prima Parent, 1932a: 170.

Type material. Parent described *Mesorhaga prima* from a single female taken at Cotter River, ACT (ANIC, examined). The type is unusually small for the genus (length 2.0), and I have been unable to associate it with other *Mesorhaga* from the Australian Capital Territory or southern New South Wales. The black lower calypter setae and size distinguish it from the apparently related *M. canberrensis*.

***Mesorhaga chillagoensis* n.sp.**

Type material. HOLOTYPE male, Queensland, 6 km south-east of Chillagoe, 17°12'S 144°33'E, 26 Nov. 1981, D.H. Colless (ANIC).

Additional material. Probable female, Queensland – Palmerston National Park, 23 km east by north of Ravenshoe, 14 Nov. 1981 (ANIC).

Description – male. Length: 3.3; wing: 2.4 x 1.2; similar to *M. canberrensis* except as noted.

Head. Vertex not as deeply excavated; without strong postvertical setae on frons.

Thorax. Metallic blue-green with bronze reflections; 4 irregular pairs ac present, about three-quarters length of dc.

Legs. Coxae, trochanters, basal FI and FII, and all of leg III dark brown; knees of FI and FII, and all of TI, TII, basal tarsomeres I and II yellow; distal tarsomeres I and II dark brown; CI and CII with pale anterior hairs, CIII with strong pale lateral seta; femora with av and pv rows of pale ventral hairs.

Wing. CuAx ratio: 0.6; haltere brownish with black club.

Abdomen. Hypopygium dark brown (Fig. 21b); epandrium with short setae along ventral margin; surstylus with dorsalmost arm broad and bearing setae as figured; cercus curved and tapering, and apically forked with shorter outer arm with branched setae and longer inner arm with 2 strong apical setae subtended by subapical seta, and with 3 median setae.

Female. Similar to male except lack MSSC and as noted: only 2 pairs ac present; femora with very short ventral hairs.

Remarks. *Mesorhaga chillagoensis* is known from northern Queensland.

***Mesorhaga schneiderae* n.sp.**

Type material. HOLOTYPE male, Queensland, Bribie Island, 26 Sept. 1984, M.A. Schneider (UQIC).

Description – male. Length: 3.5; wing 2.7 x 1.2; similar to *M. canberrensis* except as noted.

Head. Vertex, frons, face and clypeus with dusting of brown pruinosity; ventral postcranium with abundant black setae.

Thorax. Metallic green with brownish pruinosity; 5 pairs ac present, about three-quarters length of dc.

Legs. Coxae, trochanters, basal FI and FII, and all of leg III dark brown; knees of FI and FII, TI, TII, It₁ and IIt₁ yellow; distal tarsomeres I and II dark brown; CI and CII with black anterior hairs, CIII with 2 strong black lateral setae; femora with black ventral hairs.

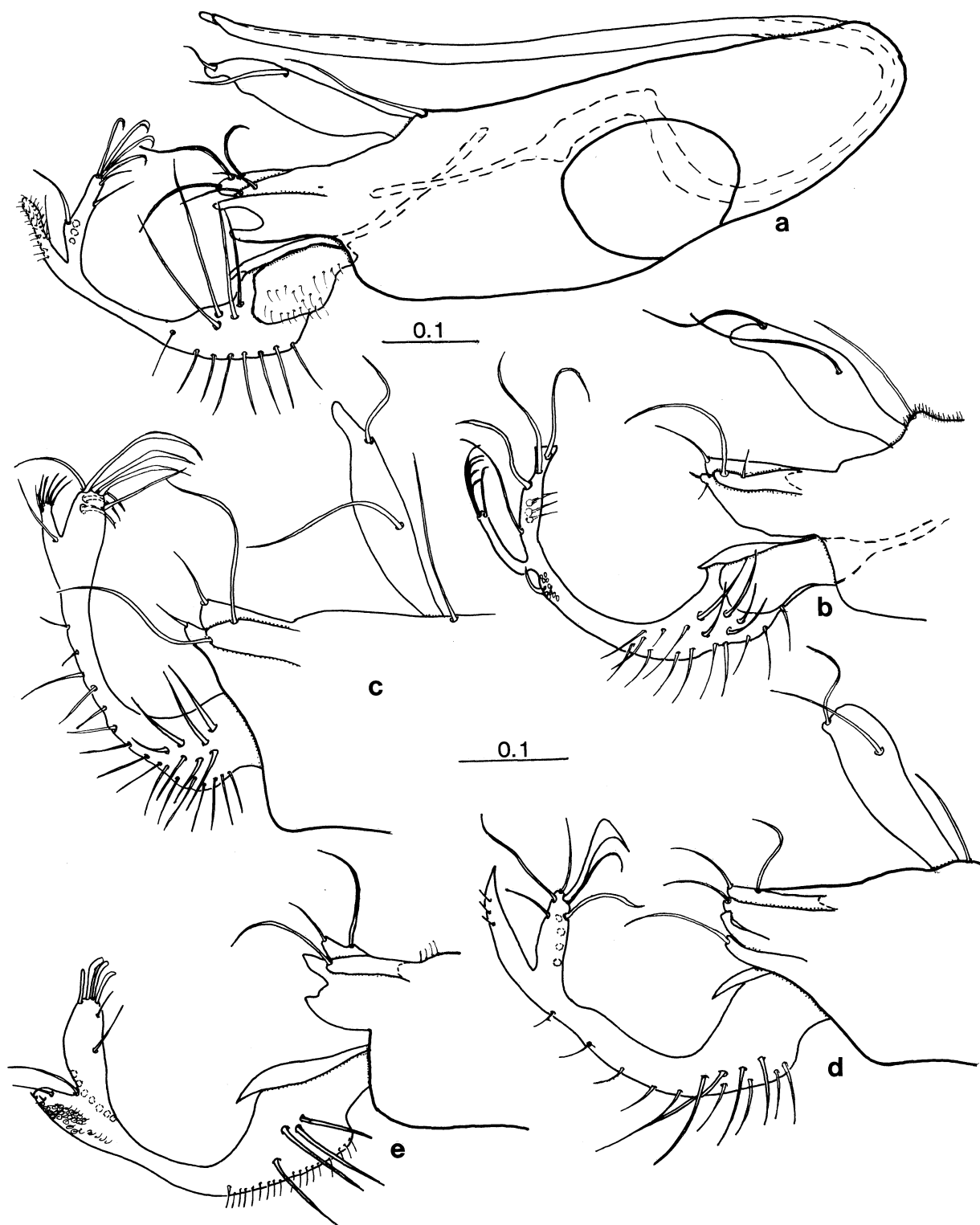


Fig.21. *Mesorhaga canberrensis*, Black Mountain, ACT: a – hypopygium, left lateral. *M. chillagoensis*, Chillagoe, Qld: b – cercus and surstylius, left lateral. *M. schneiderae*, Bribie Island, Qld: c – cercus and surstylius, left lateral. *M. didillibah*, Didillibah, Qld: d – cercus and surstylius, left lateral. *M. coolumensis*, Coolum, Qld: e – cercus and surstylius, left lateral.

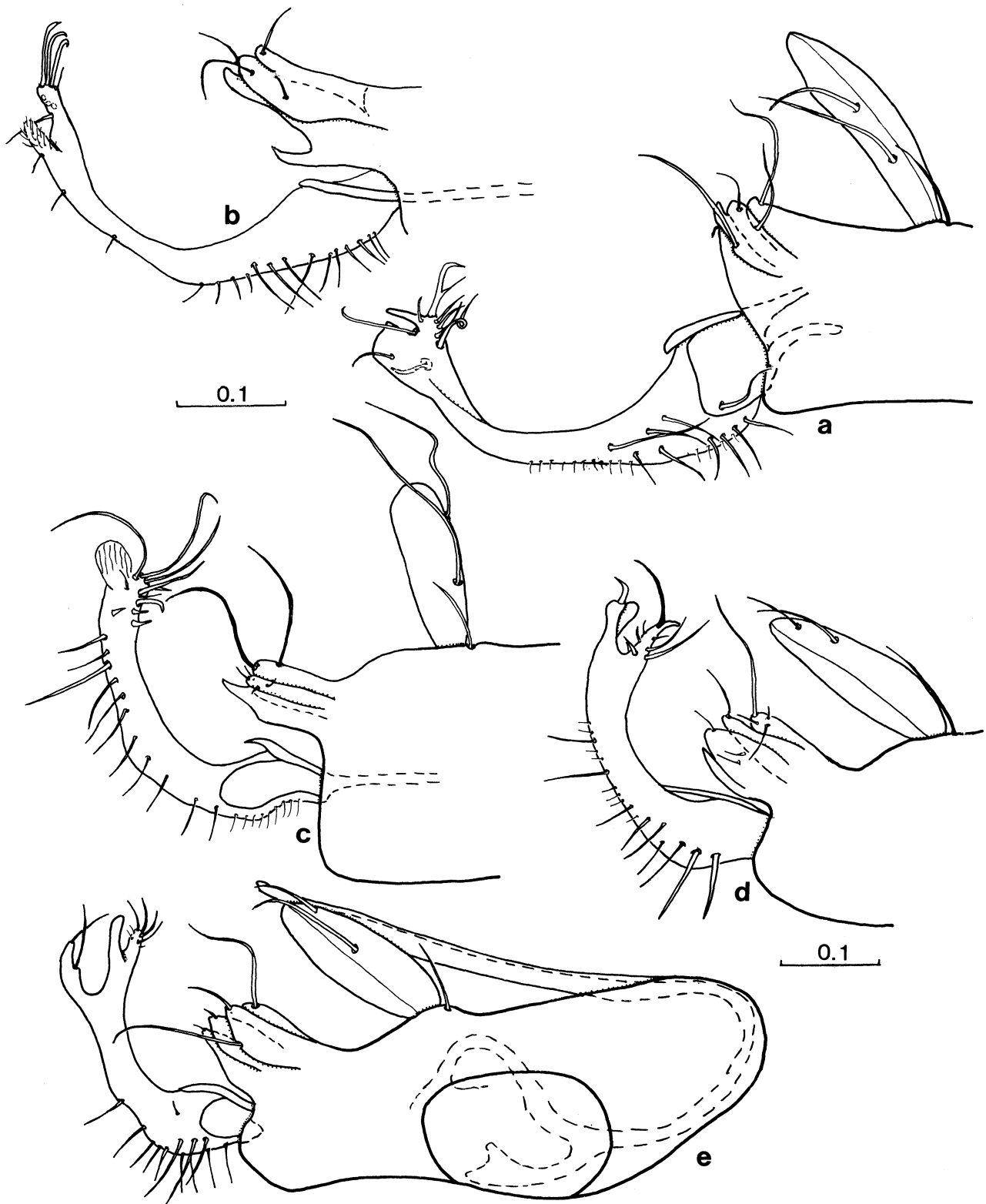


Fig.22. *Mesorhaga wirthi*, Cronulla, NSW: a – cercus and surstylius, left lateral. *M. gingra*, Kowmung River, NSW: b – cercus and surstylius, left lateral. *M. actities*, Ellis Beach, Qld: c – cercus and surstylius, left lateral. *M. similis*, Cape Bertholet, WA: d – cercus and surstylius, left lateral. *M. flavicoma*, Stuart Creek, SA: e – hypopygium, left lateral.

Wing. M with bend just beyond one-third distance between m-cu crossvein and wing apex; CuAx ratio: 0.7; lower calypter brown with black rim and fan of black setae; haltere dark brown.

Abdomen. Tergum 1 with posterolateral row of long black setae; hypopygium dark brown (Fig. 21c); epandrium bare along ventral margin; surstylus not strongly projecting from epandrium; surstylus with broad dorsalmost arm; cercus curved and tapering, with strong black basolateral setae, and apically forked with narrow outer arm with apical setae, and broader inner arm with 3 elongate blade-like setae subtended by 2 long setae, and with 3 long median setae.

Female. Unknown.

Remarks. *Mesorhaga schneiderae* is known only from south-eastern Queensland.

***Mesorhaga tarooma* n.sp.**

Type material. HOLOTYPE male, Queensland, 6 km north of Taroom, 25°36'S 149°46'E, 14 Jan. 1991. G. & A. Daniels (AMS).

Description – male. Length: 3.3; wing length: 3.0 x 1.3; similar to *M. canberrensis* except as noted.

Head. Ventral postcranium with pale setae.

Thorax. Three irregular pairs of long ac setae present.

Legs. Coxae and all femora black; legs I and II with femoral knees, tibiae and basitarsi yellow; TIII yellowish; distal tarsomeres I and II and all IIII dark brown; CI and CII with pale anterior hairs, CIII with pale lateral seta; all femora with pale ventral hairs.

Wing. CuAx ratio: 0.7; lower calypter brown with fan of pale setae; haltere club dark brown.

Abdomen. Hypopygium dark brown (Fig. 23c); surstylus with 3 arms, dorsal arm large and boat shaped; surstylus without U-shaped notch; cercus curved and with short external arm bearing fine apical seta, and longer internal arm with strong apical setae and other setae as figured.

Female. Unknown.

Remarks. *Mesorhaga tarooma* is known only from the southern inland Queensland type locality.

***Mesorhaga yarratt* n.sp.**

Type material. HOLOTYPE male, PARATYPES 2 males, New South Wales, Yarrat State Forest, near Taree, wet sclerophyll forest, 30 Jan. 1993, G. Williams (AMS).

Additional material. New South Wales – male, "Lorien", 3 km north of Lansdowne, 29 Mar.-5 Apr. 1987 (AMS). Queensland – male, Moggill Farm, west of Brisbane, 23-27

Jan. 1961, 25 m, malaise trap (BPBM).

Description – male. Length: 2.7; wing length: 2.6 x 1.2; similar to *M. canberrensis* except as noted.

Head. Four to 5 postvertical setae present, in line with postoculars; single proclinate vertical seta present; ventral postcranium with abundant black setae.

Thorax. Lateral scutellars about half length of medians.

Legs. Coxae, basal FI and FII and all leg III dark brown; TI and TII, basal tarsomeres I and II yellowish; distal tarsomeres I and II brown; CI and CII with black anterior hairs, CIII with black lateral seta; all femora with pale ventral hairs.

Wing. CuAx ratio: 0.7; lower calypter brown with fan of black setae; haltere club dark brown.

Abdomen. Hypopygium dark brown (Fig. 23b); surstylus with 3 arms, but without U-shaped notch; cercus curved and twisted, clavate distally with short external arm bearing fine apical seta, and longer internal arm with strong apical blade-like seta and other setae as figured.

Female. Unknown.

Remarks. *Mesorhaga yarratt* is known from south-eastern Queensland and the mid-north coast of New South Wales.

***Mesorhaga didillibah* n.sp.**

Type material. HOLOTYPE male, Queensland, Didillibah, on custard apple foliage, 24 Nov. 1960, H.G.G.; PARATYPE female, same except on leaf of french bean, 17 Nov. 1960 (UQIC).

Additional material. New South Wales – male, Hornsby, 7 Feb. 1957; male, Sydney, 10 Jan. 1923; male, 0.5 km south-east of Lansdowne, riverine rainforest, on foliage, 19 Dec. 1992; male, Conglomerate State Forest, 30°04'S 153°06'E, 18 Mar. 1992 (AMS); male Bawley Point, 35°30'S 150°42'E, 30 Nov. 1992, at light; Pigeon House, near Ulladulla, at light, 12 Nov. 1976 (ANIC).

Description – male. Length: 3.4; wing 2.4 x 1.2; similar to *M. canberrensis* except as noted.

Thorax. Metallic green with brownish pruinosity; ac destroyed on specimens; lateral scutellars about half length of medians.

Legs. Coxae, trochanters, basal FI and FII, and all of leg III dark brown; knees of FI and FII, TI, TII, It₁ and II₁ yellow; distal tarsomeres I and II dark brown; CI and CII with pale anterior hairs, CIII with 2 strong pale lateral setae; femora with pale ventral hairs, about as long as width of femur.

Wing. M with bend just beyond one-third distance between m-cu crossvein and wing apex; CuAx ratio: 0.8; lower calypter brown with black rim and fan of black setae; haltere dark brown.

Abdomen. Metallic blue-green with bronze reflections;

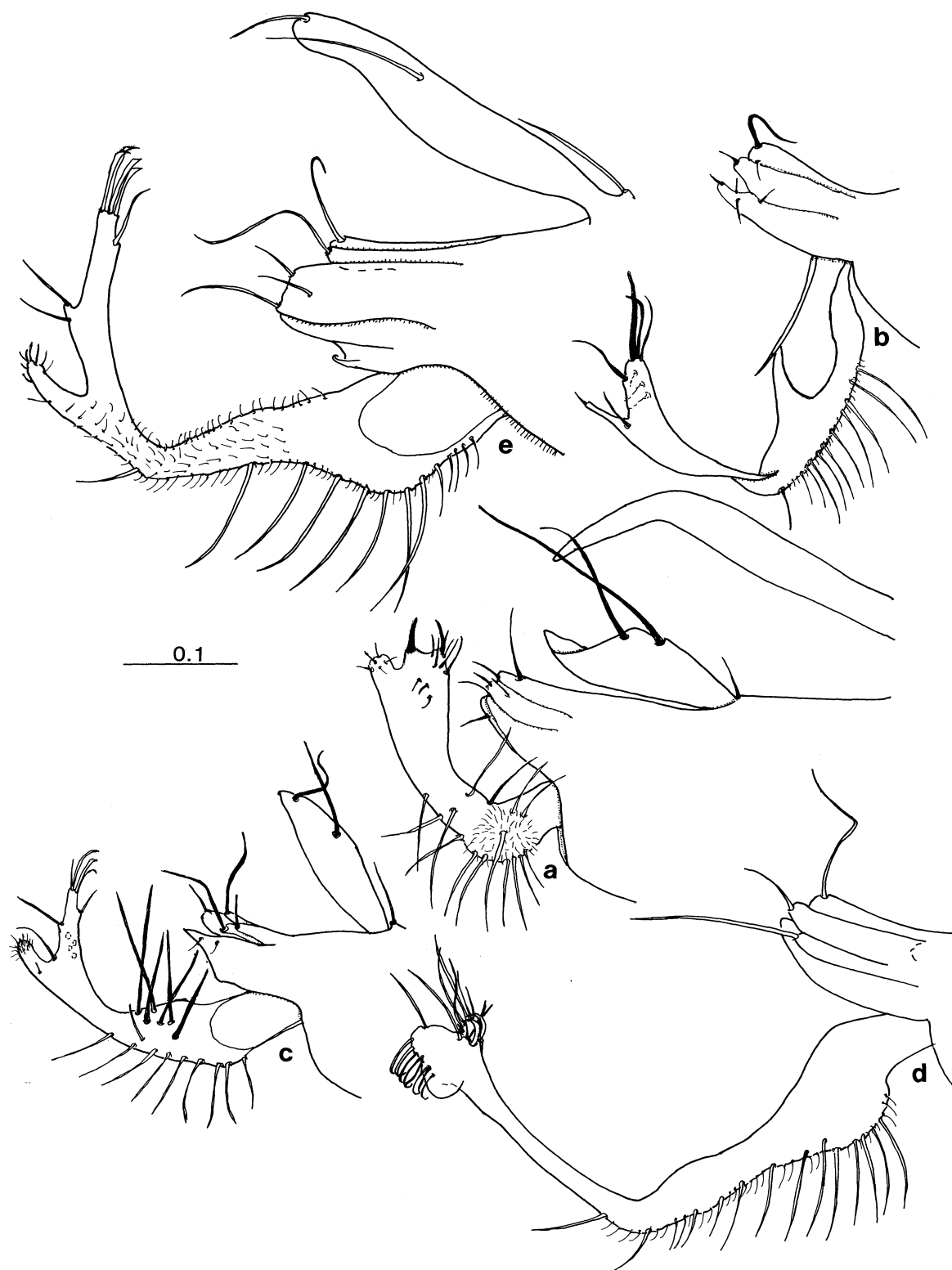


Fig.23. *Mesorhaga turneri*, Dongara, WA: distal hypopygium, left lateral. *M. yarratt*, Moggil Farm, Qld: b – cercus and surstylius, left lateral. *M. tarooma*, Taroom, Qld: c – cercus and surstylius, left lateral. *M. gatesae*, Heathlands, Qld: d – cercus and surstylius, left lateral. *M. maceveyi*, Heathlands, Qld: e – cercus and surstylius, left lateral.

hypopygium dark brown (Fig. 21d); epandrium bare along ventral margin; surstylus with 4 narrow overlapping arms; cercus curved and apically forked, with distinctive knife-like outer arm, and inner arm with expanded clavate seta subtended by 4 strong setae at apex, and with 4 strong median setae.

Female. Similar to male except lack MSSC and as noted: only 2 pairs ac present; femora with very short ventral hairs.

Remarks. *Mesorhaga didillibah* occurs from south-eastern Queensland to near Bateman's Bay on the New South Wales southern coast. There is some intraspecific variation in the shape of the clavate seta on the inner arm of the cercus.

Mesorhaga coolumensis n.sp.

Type material. HOLOTYPE male, Queensland, Coolum, 10 Jan. 1971, G.R.M. Grant (UQIC).

Additional material. New South Wales – metropolitan Sydney: male, Warwick Farm, 7 Nov. 1964; male, Cabramatta, 16 Dec. 1961 (BMNH); Wingham, riverine rainforest, 19 Nov. 1991, on blossoms of *Waterhousia floribunda* (AMS). Queensland – male, 4 females, Carnarvon National Park, Carnarvon Creek, yellow pans, riverine forest, 28 Nov. 1992 (AMS).

Description – male. Length: 3.4; wing 2.6 x 1.1; similar to *M. canberrensis* except as noted.

Thorax. Metallic green with brownish pruinosity; 3 irregularly paired ac present, about two-thirds length of dc.

Legs. Coxae, trochanters, FI and FII, and all of leg III mostly dark brown; femorals knees of FI and FII, TI, TII, It₁ and II_{1,2} yellow; distal tarsomeres I and II dark brown; CI and CII with pale anterior hairs, CIII with 2 strong pale lateral setae; femora with short pale ventral hairs, about as long as width of femur.

Wing. M with bend just beyond one-third distance between m-cu crossvein and wing apex; CuAx ratio: 0.8; lower calypter brown with black rim and fan of brownish setae; haltere dark brown.

Abdomen. Metallic blue-green with bronze reflections; hypopygium dark brown (Fig. 21e); epandrium bare along ventral margin although some setulae present between epandrial lobe and base of surstylus; surstylus with broad dorsal arm and distally excavated, and with setae as figured; cercus curved, with 4 strong dark basolateral setae, and forked, with numerous short setae on outer arm, strong seta arising from base of fork, and longer inner arm with 4 blunt setae at apex; cercus also with 5 median setae near fork.

Female. Similar to male except lacks MSSC.

Remarks. *Mesorhaga coolumensis* ranges from central and south-eastern Queensland to the Sydney district, New South Wales.

Mesorhaga wirthi n.sp.

Type material. HOLOTYPE male, New South Wales, Cronulla, salt marsh, 12 Jan. 1957, W.W. Wirth (USNM, deposited ANIC).

Additional material. New South Wales – 3 females, Mosman, at crab hole, 12 Jan. 1957 (USNM, ANIC).

Description – male. Length: 3.0; wing length: 2.8 x 1.0; similar to *M. canberrensis* except as noted.

Thorax. Metallic green with brownish pruinosity; 3-4 irregular pairs ac present.

Legs. Entirely dark brown; CI and CII with black anterior hairs, CIII with black lateral seta; all femora with black ventral hairs.

Wing. Lower calypter brown with fan of black setae; haltere club dark brown.

Abdomen. Hypopygium dark brown (Fig. 22a); surstylus with 3 short somewhat ventrally curved arms; cercus curved and clavate, with some lateral setae basally, and apically with transverse digitiform projection, distinctive branched setae, and row of 3 setae, one of which is twisted.

Female. Similar to male, except TI somewhat yellowish; haltere also dark brown.

Remarks. *Mesorhaga wirthi* is found in salt marshes and littoral habitats in the Sydney district. The apparent association of females with crab holes invites further investigation.

Mesorhaga actities n.sp.

Type material. HOLOTYPE male, Queensland, Ellis Beach, north of Cairns, 21 Apr. 1967, D.H. Colless (ANIC).

Description – male. Length: 3.2; wing: 2.4 x 1.2; similar to *M. koongarra* except as noted.

Head. Vertex, frons, face and clypeus metallic green with bronze reflections, and covered with some silvery pruinosity; ventral postcranium with abundant black setae.

Thorax. Metallic green with bronze reflections; 5 pairs ac present, about half length of dc setae.

Legs. Coxae, trochanters, basal FI and FII, and all of leg III dark brown; femoral knees I and II, TI, TII, It₁ and II₁ yellow; distal tarsomeres I and II brown; CI and CII with black anterior hairs, CIII with black lateral seta; femora with av and pv rows black ventral hairs.

Wing. M with gentle curve at one-third distance

between m-cu crossvein and wing apex; CuAx ratio: 0.7; lower calypter brownish with black rim and fan of black setae; haltere dark brown.

Abdomen. Metallic blue-green with bronze reflections; hypopygium dark brown (Fig. 22c); epandrium bare along ventral margin; surstylus strongly projecting from epandrium, with broad dorsal arm; cercus curved and apically blunt with outer cuticular leaf-like projection and inner group of 3 strong apical setae subtended by 4 median tooth-like setae.

Female. Unknown.

Remarks. *Mesorhaga actites* is known only from the Cairns district, Queensland.

The *flavicomma* Group

Mesorhaga flavicomma n.sp.

Type material. HOLOTYPE male, PARATYPES 2 males, Western Australia, 8 km south of Cape Bertholet, at light, 19 Apr. 1977, D.H. Colless (ANIC). PARATYPES male, South Australia, 10 km east-north-east of Stuart Creek Homestead, 10-11 Mar. 1975 (SAM); male, 7 km west of Immarna, on *Grevillea* sp. (Proteaceae), 8 Nov. 1975 (SAM); female, Victory Well, Everard Park Station, 31 Oct. 1970 (SAM).

Additional material. Northern Territory – female, Groote Eylandt, no date (SAM); female, McArthur River, south by west of Cape Crawford, 12 Apr. 1976 (ANIC). Queensland – female, Nocundra, 13 Nov. 1949 (ANIC); male, near Point Lookout, Stradbroke Island, 27°26'S 153°30'E, 3 Apr. 1992, at light (UQIC). Western Australia – female, 8 km and 5 km south-west of Cape Bertholet, 16-22 Apr. 1977; female, 3 km east-north east of Cape Borda, West Kimberley, 27 Apr. 1977; female, Kimberley Research Station, Oct. 1961, 9 Jan. 1961; female, Drysdale River, 3 Aug. 1975; female, Martin's Well, West Kimberley, 24 Apr. 1977 (ANIC).

Description – male. Length: 3.9; wing: 3.0 x 1.2; similar to *M. koongarra* except as noted.

Head. Postvertical setae pale, but postoculars black; lateral frons with abundant pale setae, and with pale proclinate vertical seta; palpi, proboscis dark brown.

Thorax. Dorsum metallic blue-green; 3 irregular pairs strong ac present.

Legs. Coxae, trochanters, basal FI and FII, and all FIII dark green-brown; knees of FI and FII, tibiae and basal tarsomeres I and II yellowish; apex of TIII, all of IIII, and tarsomeres 3-5 on I and II brown; CI with strong pale basolateral setae; CI and CII with pale anterior hairs, CIII with 2 pale lateral setae.

Wing (Fig. 120f). M_1 with gentle bend at one-third; veins pale brown; CuAx ratio: 0.7; haltere club yellow, with stalk infuscated.

Abdomen. Metallic blue-green; tergum 1 with fan of long pale lateral setae (MSSC); hypopygium dark brown (Fig. 22e); surstylus with 3 arms which bear strong setae as figured; cercus curved and wide, with apical fork, outer arm of fork with apical and subapical setae, and inner arm of fork with cuticular lobe and digitiform projection with curved setae.

Female. Similar to male except lack MSSC and as noted: also with pale postverticals and abundant setae on lateral slope of frons; vertical seta black, however 2-3 irregular pairs ac present somewhat shorter than in male.

Remarks. *Mesorhaga flavicomma* is a distinctive species found distributed across much of arid interior Australia, from northern Western Australia to Queensland and South Australia. It is also known from Stradbroke Island in south-eastern Queensland. It has distinctive pale setation. Also see Remarks for *Mesorhaga similis*.

Mesorhaga similis n.sp.

Type material. HOLOTYPE male, PARATYPES 2 males, Western Australia, 8 km south of Cape Bertholet, at light, 16-19 Apr. 1977, D.H. Colless (ANIC); PARATYPE male, same, but 5 km south-south-west of Cape Bertholet, at light, 21 Apr. 1977 (ANIC).

Additional material. Western Australia – male, Langi Crossing, 10 m, 13 Oct. 1962 (CAS).

Description – male. Length: 3.3; wing 2.7 x 1.2; almost identical to *M. flavicomma* except for details of cercus.

Abdomen. Metallic blue-green; tergum 1 with long pale lateral setae (MSSC); hypopygium dark brown (Fig. 22d); cercus curved and wide, with 2 strong spine-like basal setae; cercus with apical fork, outer arm of fork with apical short curved blade-like seta, subtended by cuticular lobe, and inner arm of fork with strong curved apical seta subtended by various shorter setae as figured.

Female. Unknown.

Remarks. *Mesorhaga similis* is known only from males taken at Cape Bertholet, Western Australia, where it occurs sympatrically with the more widespread *M. flavicomma* (some of the females listed under *M. flavicomma* may belong to *M. similis*).

Mesorhaga similis and *M. flavicomma* are almost identical except for differences in the cercus and a distinct size difference. The male cercal differences between the two species appear constant, but possibly the species are conspecific.

***Mesorhaga maceveyi* n.sp.**

Type material. HOLOTYPE male, Queensland, Bertie Creek pump, near Heathlands, 11°46'S 142°36'E, malaise trap, 16 Mar. 1992, G. Daniels, M.A. Schneider & S. McEvey (McEvey Number 9736) (AMS).

Additional material. Queensland – male, female, Heathlands, 11°46'S 142°35'E, 15-26 Jan 1992, at light; male, female, Cockatoo Creek, 17 km north-west of Heathlands, 11°38'S 142°27'E, 15-26 Jan. 1992, open forest; male, 9 females, 12°39'S 142°41'E, 4 km north-east of Batavia Downs, 11 Dec. 1992-17 Jan. 1993 (ANIC).

Description – male. Length: 4.1; wing length: 2.7-4.0; similar to *M. koongarra* except as noted.

Head. Head wide; major setae pale; ocellar tubercle with pair strong ocellars, and with 2 pairs weak posterior hairs; strong postvertical seta present; weak proclinate vertical seta present on frons; vertex, frons, face and clypeus metallic green, and covered with dense silvery pruinosity; palp and proboscis yellow; antenna yellow but first flagellomere infuscated dorsally; pedicel with longer ventral and shorter dorsal setae.

Thorax. Metallic bronze green; setae pale; ac absent; lateral scutellar setae about one-third length of medians.

Legs. CI, femora, tibiae and basal tarsomeres yellow; CII and CIII metallic green; leg vestiture pale; femora with pale ventral hairs.

Wing (similar to Fig. 120d). M with gentle curve at one-third between m-cu crossvein and wing apex; CuAx ratio: 0.8; lower calypter pale yellow with black rim and fan of pale setae; haltere yellow.

Abdomen. Metallic green-bronze and covered with pale vestiture; hypopygium dark brown with yellow cerci; epandrial lobe ovate, with long seta at half and short apical seta; cercus (Fig. 23e) with V-shaped indentation, followed distally by 2 external setae and with group of 4-5 apical blade-shaped setae.

Female. Unknown.

Remarks. *Mesorhaga maceveyi* is known from monsoonal woodland in northern Cape York Peninsula. It is close to *M. similis* and *M. flavicomis*.

***Amesorrhaga* n.gen.**

Etymology. *Amesorrhaga* is formed adding the prefix "a-", Greek for "away from", to *Mesorhaga*, since all included species are taken out of their original combination with *Mesorhaga*. The gender is feminine.

Type species. *Mesorhaga femorata* de Meijere, 1916, here designated.

Diagnosis. General. Body relatively stout and compact, legs not greatly elongate.

Head. Vertex excavated in male, but not as strongly as in other Sciapodinae (Fig. 24b), and less strongly excavated in female; strong postvertical seta developed at end of postocular row; vertical seta absent in both sexes; lateral frons bare of setae (apomorphy); face and clypeus usually with dense silvery pruinosity; male

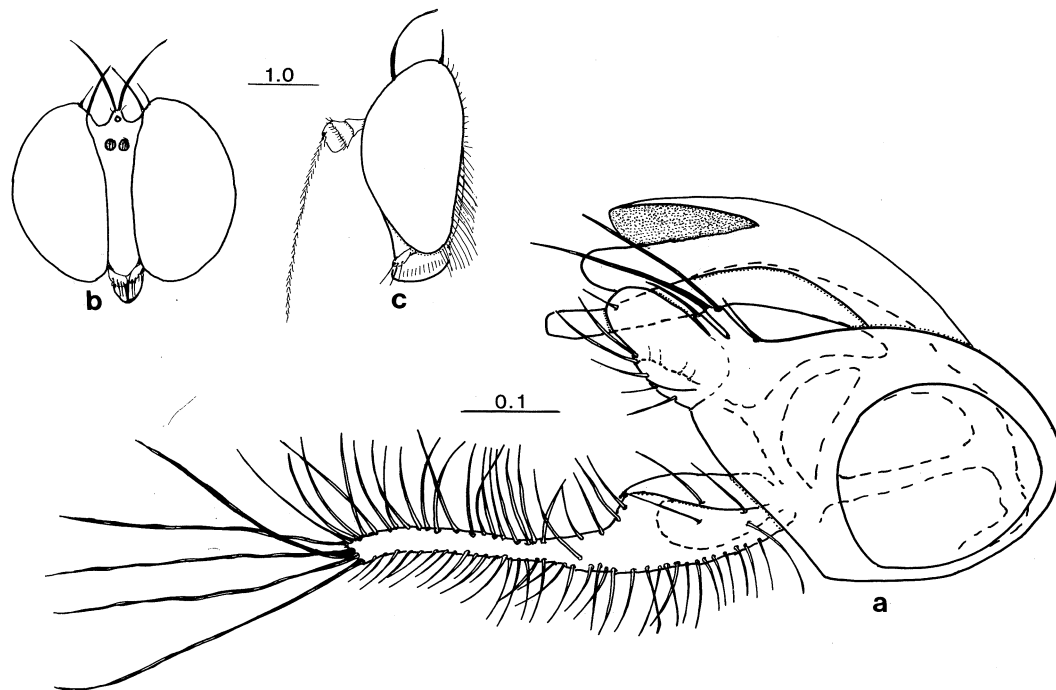


Fig. 24. *Amesorrhaga femorata*, Tjibodas, Java: a. hypopygium, left lateral. *A. breviappendiculata*, Tjibodas, Java: b – male head, anterior; c – male head, left, lateral.

face not bulging beyond anterior eye margin; clypeus adjacent to margin of eyes in both sexes; scape dorsally bare; pedicel with short dorsal and longer ventral setae; first flagellomere subrectangular; arista dorsal (Fig. 24c).

Thorax. Propleuron with strong ventral seta; ac developed as 2-4 pairs long setae; 5 strong dc present, slightly decreasing in size anteriorly, but not sexually dimorphic; lateral scutellar seta present, but weak and hairlike, less than one-quarter length of medians.

Legs. FII with strong anterior and posterior preapical setae, and FIII with strong anterior preapical only; tibiae with strong setae, ad-pd pairs on TII and dorsals on TIII; male FI dorsoventrally flattened in some species (MSSC).

Wing. Broad, and often with smokey membrane (Fig. 120a); vein M unbranched, but with strong bend; crossvein m-cu straight; crossvein bm-cu incomplete.

Abdomen. Both sexes with 3-4 well-developed abdominal plaques on terga 2-5; male segment 7 short, free from hypopygium, with sternum well developed; epandrium rounded, with left lateral hypopygial foramen, and short surstylus (Fig. 24a); hypandrium with broad hood and left lateral arm; aedeagus entire, without dorsal angle; epandrial lobe cylindrical with apical and subapical setae; single strong epandrial seta present at epandrial lobe base; surstylus lobate; cercus simple and digitiform.

Remarks. Although all species of *Amesorrhaga* were originally described as *Mesorrhaga*, authors were not entirely satisfied with the placement. Both de Meijere and Parent noted the venational similarity with *Paraclius* (subfamily Dolichopodinae), and Becker thought *M. breviappendiculata* was possibly close to *Condylostylus*.

Amesorrhaga is indeed different from *Mesorrhaga*. The unbranched vein M was used to place the species in *Mesorrhaga*, but other diagnostic characters, especially in the male postabdomen are not concordant. Even vein M, although unbranched, has a distinctly different bend to that of any *Mesorrhaga*.

The presence of strong preapical setae on FI and FII, and a ventral propleural seta are regarded as plesiomorphic characters in *Amesorrhaga* which have been lost in most other Sciapodinae. Of particular interest is the total absence of vertical setae in both sexes. The hypopygium of *Amesorrhaga* is relatively unmodified, with the aedeagus lacking a dorsal angle and the cercus simple and digitiform (Fig. 24a). *Amesorrhaga* is one of the most primitive sciapodine genera.

Amesorrhaga is entirely Oriental, with seven described species.

angulata Parent, 1935a: 202. (*Mesorrhaga*) (BMNH, examined), West Malaysia, **n.comb.**

argentifacies Parent, 1941: 213. (*Mesorrhaga*) (BMNH, examined), Thailand, West Malaysia, **n.comb.**

The male holotype is missing its head. This species can be distinguished from both the closely related

A. femorata and *A. angulata* by the presence of a long ventral seta at one-sixth on FII (MSSC).

Additional records. West Malaysia, male, near Fraser's Hill Road, 76 km from Kuala Lumpur (AMS).

breviappendiculata de Meijere, 1916: 226. (*Mesorrhaga*) (ZMUA, examined), Java, **n.comb.**

Additional records. Java, male, female, Tjibodas, Mount Gede (1360 m); male, Pelaboean Ratoe (USNM).

femorata de Meijere, 1916: 226. (*Mesorrhaga*) (ZMUA, examined), Java, **n.comb.**

The male FI is d-v flattened and medianly concave (MSSC).

Additional records. Java, male, Tjibodas, Mount Gede (USNM).

malayensis Parent, 1935a: 203. (*Mesorrhaga*) (BMNH, examined), West Malaysia, **n.comb.**

mellavana Hollis, 1964b: 226. (*Mesorrhaga*) (Basel, not seen), Sri Lanka, **n.comb.**

pseudolata Hollis, 1964b: 225. (*Mesorrhaga*) (Basel, not seen), Sri Lanka, **n.comb.**

Negrobovia n.gen.

Etymology. *Negrobovia* is named in honour of Dr O.P. Negrobov, Voronezh University, Russia, a prominent worker on the family Dolichopodidae. The gender is feminine.

Type species. *Psilopus australensis* Schiner, 1868, here designated.

Diagnosis. **Head.** Vertex moderately excavated; postocular row with 2-3 strong setae continuing around dorsal frons, and with separate pair of postvertical setae arising behind vertex (Fig. 26c,d); strong vertical seta present on both sexes; male face not strongly bulging; clypeus adjacent to eye margin in both sexes (Fig. 26d); scape elongate, stalk-like (Fig. 26c); pedicel with long dorsal and ventral setae, the ventrals longer than dorsals; first flagellomere subrectangular; arista dorsal and about as long as head height.

Thorax. Propleuron with strong ventral seta; ac present as 3-4 long pairs; both sexes with 5 strong dc, not sexually dimorphic; lateral scutellar setae strong, about two-thirds length of medians.

Legs. FI with ventral subapical excavation and projection, and TI with ventral callosity at one-eighth corresponding to projection on FI (Fig. 26b) (MSSC) (group autapomorphy); distinct anterior preapical setae present on FII and FIII; female with strong ad-pd setae on TII and TIII, not so strongly developed in males; male III_t₃₋₄ sometimes flattened with ventral pad-like surface (MSSC).

Wing. Membrane with brown smokey colour, with only posterior margin hyaline; M₁ strongly curved as right angle or even slightly recurved, with either M₂ absent or present as stub vein (Fig. 120b,c); crossvein m-cu straight; crossvein bm-cu incomplete, but weakly

sclerotised; haltere colour often sexually dimorphic, with male black and female yellow (except *N. flavihalteralis*).

Abdomen. Both sexes with 3-4 abdominal plaques present on the lateral margins of terga 2-5; male tergum and sternum 7 both well developed (Fig. 26g); hypandrium arising from base of epandrium and arched; hypandrium symmetrical or only slightly asymmetrical: apically expanded with deep U-shaped excavation; aedeagus elongate and entire, without dorsal angle; strong epandrial seta present at base of epandrial lobe; epandrial lobe with 2 strong apical bristles; male cercus elongate and unbranched.

Remarks. The genus *Negrobovia* has the following distinctive characters: scape elongate, strong propleural seta, male FI with ventral subapical excavation and projection, strong preapical setae on FII and FIII, vein M_1 strongly curved with M_2 absent or as stub vein, aedeagus entire, and hypandrium without left lateral arm, but symmetrical with apex expanded and notched.

Male *Negrobovia* have a ventral subapical excavation and projection on FI, which corresponds to a ventral callosity at one-eighth on TI (Fig. 26b) (MSSC). This modification is analogous to modified forelegs in male *Hydrophorus* (Hydrophorinae) and male *Sepsis* (Sepsidae) and perhaps similarly used for grasping females during mate guarding (see Dyte, 1988) as well as mating.

Negrobovia shows venational similarities with the *Mesorhaga geoscopa* Group. As well, some New World *Condylostylus* (eg, *C. longicornis*, *C. sexsetosus*,

C. semicomatus, *C. crinitus*, *C. forcipatus*, and others) have M_2 reduced to a stub vein and M_1 curved in a similar manner to *Negrobovia*. Indeed, the relationship of *Condylostylus* and *Negrobovia* warrants further investigation. In addition to venation similarities, the two genera share similar overall habitus, leg and body setation, and antennal structure (the rather prolonged scape, and long dorsal and ventral setae on the pedicel). However, the hypopygium of *Condylostylus* is rather compact and reduced, and requires further study to make adequate comparisons with *Negrobovia*.

Negrobovia comprises three species and occurs in various forested habitats, from Tasmania to northern Cape York Peninsula, and across to Arnhem Land (Fig. 25). *Negrobovia flavihalteralis* is found in northern and south-eastern Queensland and Arnhem Land, and probably occurs across the monsoonal north. The other two species range from south-eastern Queensland to Victoria and Tasmania. *Negrobovia aculicita* is often abundant in New South Wales moist forests, and was taken almost continuously from September to May in a malaise trap near Lansdowne, New South Wales. Both *N. australensis* and *N. aculicita* are somewhat polytypic and show a range of intraspecific variation (see species Remarks).

Negrobovia includes the following species.

aculicita n.sp. Australia (NSW, Qld, Vic.).

australensis Schiner, 1868: 216. (*Psilopus*) (NHMW, examined, female only), Australia (NSW, ACT, Vic., Tas., Qld), **n.comb.**

flavihalteralis n.sp. Australia (Qld).

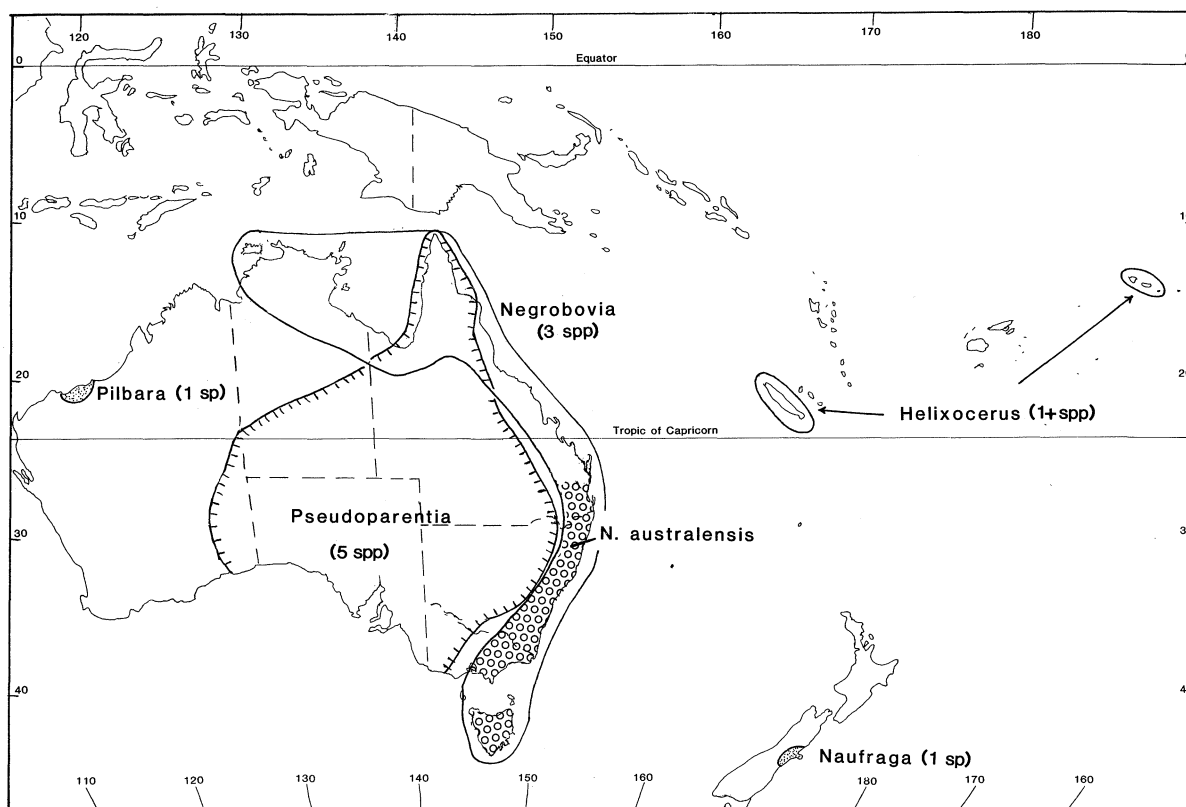


Fig. 25. Distribution, small Australasian genera: *Helixocerus*, *Naufraga*, *Negrobovia*, *Pilbara* and *Pseudoparentia*.

Key to Male *Negrobovia*

1. TI and TII yellow; haltere yellow; vertex and frons shining metallic blue; cercus with basal subtriangular projection which bears fan of long tapering setae (Fig. 26f,g) (Qld, NT) *N. flavihalteralis*
- Legs entirely black; haltere dark brown to black; vertex and frons with grey pruinosity; cercus without basal projection 2
2. IIt₁ and IIt₂ each with ventral comb-like row of short curved black-brownish setae; IIIIt₃₋₄ usually flattened with ventral pads; body longer than 3.5; cercus about twice length of hypandrium (Fig. 26a) (Tas., south-eastern Australia) *N. australensis*
- IIt₁ and IIt₂ without ventral combs; IIIIt₃₋₄ normal; body shorter than 3.5; cercus relatively short, about equal to length of hypandrium (Fig. 26e) (south-eastern Australia) *N. aculicita*

Negrobovia australensis (Schiner), n.comb.

Psilopus australensis Schiner, 1868: 216

Type material. Schiner described *Psilopus australensis* from a single female taken at Sydney, NSW (NHMW, examined). Becker (1922a: 219) described what he considered to be the male and illustrated its distinctive femur I. He referred the species to *Condylostylus*. I have not been able to locate the male examined by Becker and it is not at NHMW. Possibly it was among the specimens collected in Sydney by Biró, in which case it would have been at TMB and lost.

Additional material. Australian Capital Territory – male, female, Jervis Bay, 19 Sept. 1951; male, Mount Gingra, 2 Feb. 1966. New South Wales – 2 males, 3 females, Salvation Creek, Ku-ring-gai Chase National Park, dry sclerophyll forest, 11 Nov. 1990; male, Cathedral Rocks National Park, near Ebor, Barokee Swamp, 1200 m, 21 Nov. 1990; male, Monga, 18 Nov. 1969; male, female, Rutherford Creek, Brown Mountain, 15 Jan. 1969, 3 Jan. 1971; same but 25 Dec. 1974; female, Mosman, 29 Oct. 1980; female, Oxford Falls, 29 Nov. 1947; 2 males, female, Narrabeen, 4 Oct. 1956, 6 Oct. 1980; male, Royal National Park, 6 Oct. 1975; female, Snowy River, 1,670 m, 12 Jan. 1967; male, Alpine Creek, Snowy Mountains Highway, 9 Dec. 1964. Queensland – 2 males, 2 females, North Stradbroke Island, 22 Aug. 1958; female, Brisbane, 8 Sept. 1940; female, Woombye, near Nambour, 10-11 Oct. 1965. Tasmania – female, Lyell Highway at Clarence River, 8 Dec. 1979; female, Mount Wedge at Frodshams Pass, 4-5 Feb. 1989. Victoria – female, Millgrove, 9 Jan. 1957; male, Dandenong Range, 30 Oct. 1898; male, Delegate River & Goonmirk Road, 950 m, 16 Jan. 1991, yellow pans (AMS, ANIC, MVM, UQIC, USNM).

Description – male. Length: 4.0-4.7; wing: 3.3-3.7 x 1.4 (Fig. 27).

Head. Vertex, frons, face and clypeus dark metallic blue with green reflections, and with silvery pruinosity; ocellar tubercle with pair strong black diverging ocellars, 2 pairs weaker posterior setae, and some weak hairs posteriormost; strong black vertical seta present; face only slightly bulging; clypeus adjacent to margin of eyes

and not projecting (Fig. 26c,d); palp dark brown with dark setae; proboscis brownish; ventral postcranium with pale setae; antenna black; pedicel with 1 long and 2 short dorsals, and 3 long ventral apical setae.

Thorax. Dark metallic blue-green with scutellum metallic blue; dorsum with dusting of grey pruinosity, denser on pleura; setae black; 1 pa, 2 sa, 2 sr, 2 npl, 1 hm and 1 long pm present.

Legs. Coxae, legs entirely black; major setae black; CI and CII with pale anterior hairs; CIII with strong black lateral bristle and some short pale hairs; I: 7.5; 6.0; 4.0/1.5/1.2/1.0/1.0; FI with rows of av and pv setae, longer than femoral width, and with group of black posterior setae in distal half, and other pale posterior hairs; FI with ventral subapical excavation and projection, and TI with ventral callosity at one-eighth corresponding to projection on FI (Fig. 26b) (MSSC); TI with some dorsal setae, and with row of black ventral setae, decreasing in size distad (MSSC); II: 8.5; 9.0; 5.0/1.8/1.2/1.0/1.0; FII with row of pale pv in basal three-quarters, and 3-4 long pale ventral setae; TII with ventral row of short strong black setae; IIt₁ and IIt₂ each with ventral comb-like row of short curved brown to whitish setae (MSSC); III: 9.0; 11.0; 3.0/2.5/1.5/1.2/1.0; FIII with some short pale ventral hairs, with long pale basal and 2 long black subapical av, and 2 black subapical anteriors; IIIIt₃₋₄ usually flattened with ventral pad-like surface (MSSC).

Wing (Fig. 120b). M with strong bend, slightly recurved, and often with short stub vein at bend; CuAx ratio: 0.3; lower calypter brown with black rim and fan of black setae; haltere dark brown.

Abdomen. Metallic blue-green with bronze reflections and covered with short dark setae dorsally and pale setae ventrally; dark bronze-brown bands present on tergal overlap on segments 2-6; tergum 1 with posterolateral row of long black setae (MSSC); hypopygium black (Fig. 26a); epandrium subrounded and fused with surstylus; aedeagus with dorsal and ventral subapical teeth, and extending beyond the hypandrial apex; surstylus with ventral triangular

projection, strong apical seta, and dorsoapical digitiform projection; cercus elongate, tapering, setose, with basal mound and group of black undulating apical setae.

Female. Similar to male except lack MSSC and as noted: ocellar tubercle with pair strong ocellars and 2-3 weaker posteriors; face and clypeus wider; FI with short pale ventrals and short black av; FI and TI normal;

TI with 3-4 strong dorsal and 3-4 strong ventral setae; FII with short pale ventrals and some black subapical av; TII with 3 ad and 3 pd setae and 2-3 ventrals; III and IIIa unmodified; haltere with dark brown stalk and yellow club.

Remarks. *Negrobovia australensis* is found along the coast and ranges of eastern Australia, from south-eastern Queensland to Victoria, and in Tasmania

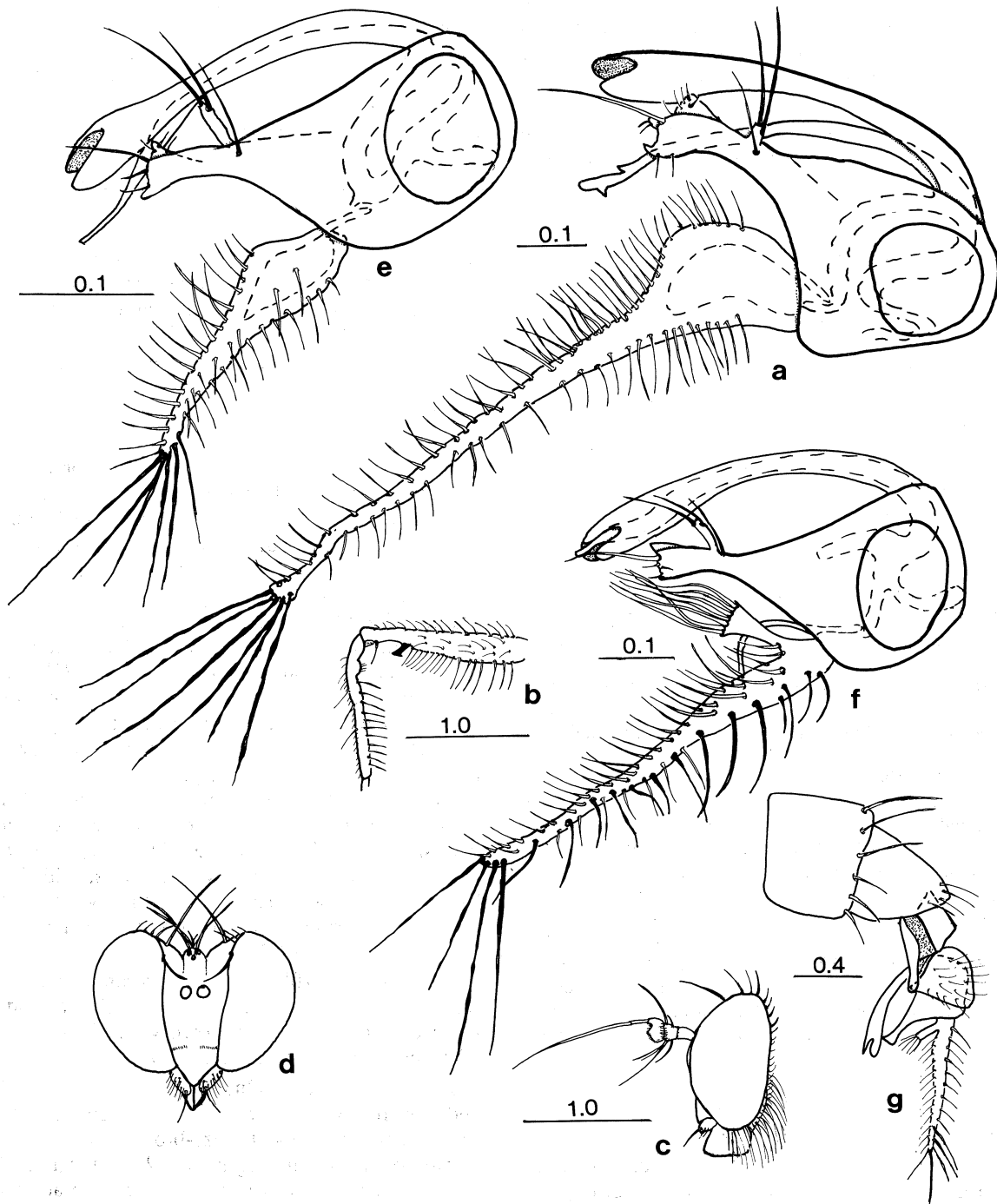


Fig. 26. *Negrobovia australensis*, Dandenong, Vic.: a – hypopygium, left lateral; b – male left leg I, lateral; c – male head, left lateral; d – male head, anterior. *N. aculicita*, Lower Tarwin, Vic.: e – hypopygium, left lateral. *N. flavihalteralis*, Hope Vale, Qld: f – hypopygium, left lateral; g – male postabdomen, left lateral.

(females only) (Fig. 25). Queensland specimens were collected in the early Spring, from August to October, while southern specimens were taken between October and January.

What is here considered to be *Negrobovia australensis* comprises a polytypic species. There is variation in cercal size, from about equal to twice (eg, Fig. 26a) the epandrial length, and the III_t pads (MSSC) are strongly developed on some males, while absent on others. Also, the ventral comb on male II_t₁₋₂ is not always well developed, and some specimens show an additional comb of ventral setae on TII (MSSC). Finally, there is variation in body size and overall pilosity. Since there are so few males, and their variation is not always constant, I have kept them together as one species. Since a significant degree of intraspecific variability is also evident in long series of *N. aculicita*, possibly species in the genus tend to be polytypic.

However, for future reference, the series from New South Wales: Salvation Creek, Ku-ring-gai Chase National Park (AMS), should be regarded as representing *N. australensis*, sensu Schiner & Becker. The isolated females listed above (including all Tasmanian records) are provisionally assigned to the species.

Negrobovia aculicita n.sp.

Type material. HOLOTYPE male, PARATYPES 4 males, 5 females, New South Wales, Kiwarra State Forest, Whites Crossing, 9 km south-west of Taree, yellow pan, 25 Nov. 1987, D.J. Bickel (AMS).

Additional material. New South Wales – Nimmitabel, 18 Jan. 1961; Otford, 24 Nov. 1962; Ulladulla, no date; Gloucester River campground, 2-4 Dec. 1988; Boonoo Boonoo Falls, north-west of Tenterfield, 9 Dec. 1988; Geehi River, 9 Nov. 1961; Brunswick Heads; "Lorien", near Lansdowne, mixed wet sclerophyll forest, malaise trap and yellow pan, numerous specimens, 12 Jan.-24 May 1987, 19 Sept. 1987-5 Mar. 1988, 25 June 1992; Wingham Brush, near Taree, riverine rainforest, 5 Mar. 1988; Wootton, 10 Oct. 1962; Ulladulla, no date. Queensland – Cairncross National Park, near Maleny, 1 Oct. 1956. Victoria – Lower Tarwin, Nov. 1926 (more than 300 specimens, AMS, ANIC, CNC, MVM).

Description – male. Length: 2.7 - 3.3; wing: 2.4 x 1.2; similar to *N. australensis* except as noted.

Legs. FI distally with ventral subapical excavation and only short projection, and TI with only slight ventral callosity at one-eighth corresponding to projection on FI (MSSC); II_t₁ and II_t₂ lacking ventral comb-like row of

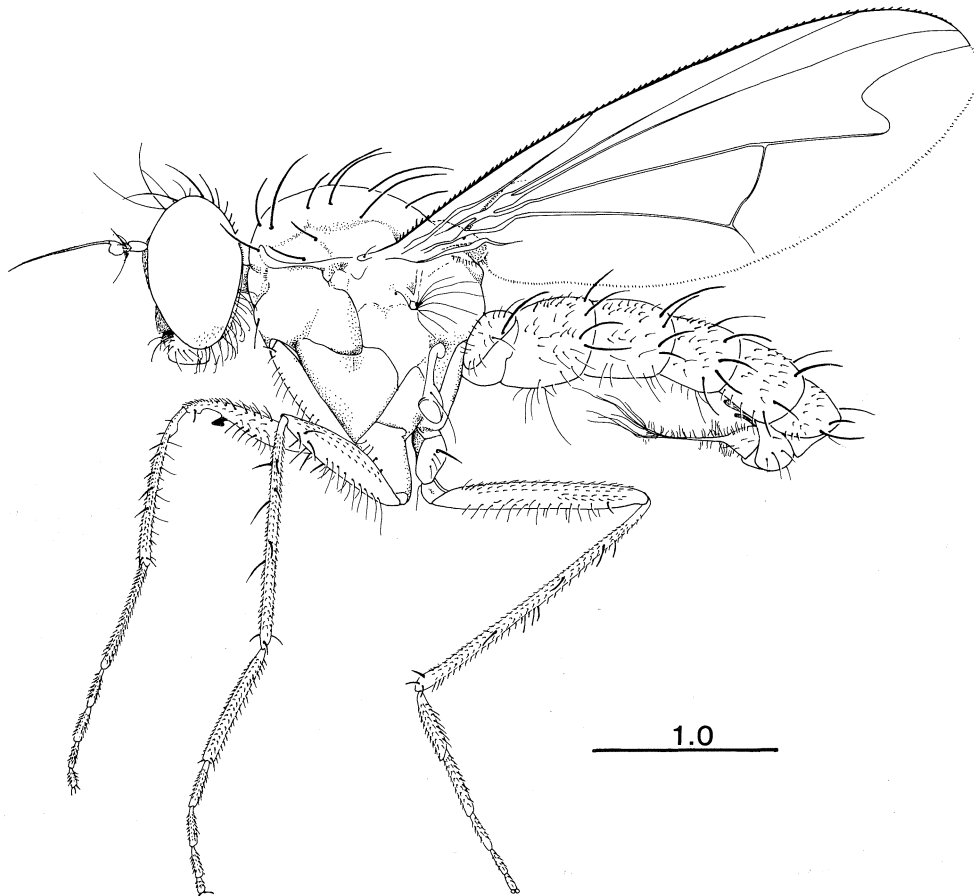


Fig.27. Habitus, male *Negrobovia australensis*.

short black setae; III_t_{3,4} not flattened.

Wing (Fig. 120c). M with strong bend, but not so strongly recurved, and sometimes with M₂ as short stub vein at bend; CuAx ratio: 1.8; haltere club black.

Abdomen. Hypopygium black (Fig. 26e); epandrium subrectangular; aedeagus without subapical teeth, and extending beyond the hypandrial apex; surstylus with apical setae as figured; cercus ranging from 1-2 times length of epandrium, tapering, setose, with weak basal mound and group of black undulating apical setae.

Female. Similar to female *N. australensis*, but smaller; haltere club yellow.

Remarks. *Negrobovia aculicita* occurs in moist forests and marginal habitats such as gardens along the coast and ranges, from Victoria to south-eastern Queensland. It is widely sympatric with *N. australensis*.

Negrobovia aculicita was often very abundant in malaise trap catches between late September and June in a mixed wet sclerophyll-subtropical rainforest site near Lansdowne, New South Wales, and is possibly present throughout the year. Here specimens from even a single catch show intraspecific variation in body length, curvature of vein M₁, vein M₂ present as a short stub vein or absent, and length of the cercus.

Negrobovia flavihalteralis n.sp.

Type material. HOLOTYPE male, Queensland, 3 km north-east of Mount Webb, 15°03'S 145°09'E, at light, 1 Oct. 1980, D.H. Colless; PARATYPE male, 7 km north of Hope Vale Mission, 15°14'S 145°07'E, at light, 4 Oct. 1980 (ANIC).

Additional material. Northern Territory – male, female, Litchfield Park, Ada Creek Jumpup, 24-25 June 1992, yellow pans; male, Melville Island, Pilarumpi, 30 June-6 July 1986, at light (NTMD). Queensland – female, Julatten, edge of forest along creek, intercept trap, 29 Sept.-5 Oct. 1987 (ANIC); male, Cooloola National Park, Roy Webber Plains, yellow pans, low sedge heath, 4 Dec. 1992 (AMS); female, Amity, North Stradbroke Island, 24 Oct 1990 (AMS).

Description – male. Length: 4.0; wing dimensions: 3.3 x 1.2; similar to *N. australensis* except as noted.

Head. Vertex and frons, shining metallic blue.

Thorax. Metallic green with bronze reflections; lateral scutellars about half length of medians.

Legs. Coxae and femora black; knee FI only, TI, TII and It₁ yellow; TIII and II_t₁ yellow but infuscated, and remaining tarsomeres black; CI with fine pale anterior setae and black distal setae; CII with black anterior setae and CIII with strong black lateral bristle; TI with ventral row of 16 black setae (MSSC); FII with pale ventral setae on basal three-quarters, with black setae in distal quarter; TII with 3 strong dorsals, and with ventral row of short strong black setae which continues comb-like onto II_t₁ and II_t₂ (MSSC); III_t_{3,4} not flattened.

Wing. CuAx ratio: 2.8; haltere bright yellow.

Abdomen. Hypopygium black with black cercus (Fig. 26f,g); epandrium subrounded; hypandrium elongate, expanded hood-like distally, and with slightly left asymmetrical U-shaped apical excavation; aedeagus lacking subapical teeth; surstylus with strong apical seta; cercus elongate, with black basolateral and apical setae and distinctive subtriangular basoventral projective which bears fan of tapering setae.

Female. Similar to male except lacks MSSC and as noted: all tibiae, and basal tarsomeres It and II_t yellow; III_t black; TII with ad-pd setal pair at one-fifth.

Remarks. *Negrobovia flavihalteralis* is known from sedge heath in the Cooloola area, south-eastern Queensland, the base of the Cape York Peninsula, and Arnhem Land and Melville Island, Northern Territory. It probably occurs across the monsoonal North and along the eastern Queensland coast. The male has yellow TI and TII, and a yellow haltere, in contrast to the two southern *Negrobovia* species.

Sciapus Zeller

Leptopus Fallén, 1823: 23. Included species *Leptopus longulus* Fallén, 1823 and *Leptopus wiedemanni* Fallén, 1823 [preoccupied by Latreille, 1809].

Psilopus Meigen, 1824: 35. Type species *Dolichopus platypterus* Fabricius, 1805, by subsequent designation of Westwood, 1840: 134 [preoccupied by Poli, 1795].

Sciapus Zeller, 1842: 831 (new name for *Psilopus* Meigen). *Stenarus* Gistel, 1848: x [(unnecessary) new name for *Psilopus* Meigen].

Psilopodius Rondani, 1861: 11 [(unnecessary) new name for *Psilopus* Meigen].

Psilopodinus Bigot, 1889: xxiv. Type species *Dolichopus platypterus* Fabricius, 1805, by original designation.

Psilopiella Van Duzee, 1914a: 438. Type species *Psilopiella rutila* Van Duzee, 1914, by original designation, **n.syn.**

Agastoplax Enderlein, 1936: 114. Type species *Psilopus flavicinctus* Loew, 1857, by monotypy, **n.syn.**

Dactylodiscia Enderlein, 1936: 114. Type species *Psilopus calceolata* Loew, 1859, by original designation, **n.syn.**

Dactylorhipis Enderlein, 1936: 114. Type species *Psilopus bellus* Loew, 1873, by monotypy, **n.syn.**

Placantichir Enderlein, 1936: 114 [unavailable name, genus proposed after 1930 without designation of type species from the five included species].

Placantichir Bickel, n.gen. Type species *Dolichopus nervosus* Lehmann, 1822, here designated [for description to validate proposal of new genus, see generic characters cited for *Placantichir* by Enderlein (1936: 114), **n.syn.**

Sciopus, variant spelling of *Sciapus*.

Diagnosis. **Head.** Vertex often rather shallowly excavated; strong postvertical seta developed at end of postocular row; proclinate vertical setae present in both sexes, often more strongly developed in female; scape usually somewhat prolonged; face and clypeus usually equally broad in both sexes, at least as wide as the width of the antennal bases; arista dorsal, arising from base

of first flagellomere and not much longer than width of head; male head relatively high, higher than wide.

Thorax. Often heavily grey pruinose; black dots sometime present around origin of setae on the pruinose thorax; ac biseriate, 8-10 short pairs present, but sometimes reduced or absent; dc strong, 5-7 present, decreasing in size anteriorly, without sexually dimorphic hair-like dc in males; lateral scutellar setae usually reduced and hairlike.

Legs. FIII with distinct anterior preapical seta in both sexes: male legs often variously modified (MSSC): a) It, and sometimes II_t with distal tarsomeres flattened or ornamented; b) great prolongation of TII and II_t; c) female FI in basal one-third always with group of 3-6 strong ventral setae, each seta arising from a distinct mound-like pedicel (FSSC); these are also sometimes strongly developed on males (eg, *S. nervosus*).

Wing. Sometimes modified in males (MSSC), with distorted venation, wing prolonged and narrowed, or distally expanded.

Abdomen. Elongate; abdominal plaques present on terga 2-5, but reduced in males; aedeagus and hypandrium arising from epandrial base and usually arching over the epandrium; hypandrium asymmetrical, with narrow left lateral arm, arising near base; aedeagus with distinct dorsal angle; epandrium usually with strong projection along ventral margin basad of epandrial lobe, and bearing epandrial setae; epandrial lobe often greatly elongated and projecting distad; surstylus often prolonged; cercus often with strong ventral subtriangular projection ("Organ X" of Becker, 1918) which sometimes is detached from the dorsal cercus (or connected basally within the epandrium), and appears to be derived from the proctiger.

Remarks. Zeller proposed *Sciapus* in 1842 as a replacement name for the preoccupied *Psilopus*. Subsequent authors added unnecessary replacement names.

Sciapus had been broadly interpreted to include species from all zoogeographic (= *Sciapus* s.l.). This heterogeneous assemblage is here divided, and *Sciapus* is restricted to a monophyletic taxon (*Sciapus* s.s.) which is basically Holarctic in distribution. The *Sciapus* s.l. residue has been transferred to *Amblypsilopus* and other genera.

The genus *Psilopiella* has long been an enigma. Van Duzee erected the genus on *P. rutila*, based on a single female collected in Florida. The species is small (1.5 mm in length) and the vertex is very weakly excavated. The ac are absent, and M is distally bent with an evanescent fold near where M₂ would originate in a sciapodine genus (see wing figure of *P. rutila* holotype in Robinson & Vockeroth, 1981). Harmston & Rapp (1968) described a second species from Nebraska but gave only a vague description without any discussion of a generic concept. Although not noted in the descriptions of either Van Duzee or Harmston & Rapp, a distinct anterior preapical seta is present on FIII. The uncertain definition of the genus meant it was not always associated with the

Sciapodinae. Although Foote *et al.* (1965), Robinson (1970b) and Ulrich (1980) placed *Psilopiella* in the Sciapodinae, Robinson (1975) later suggested it might belong in the Neurigoninae.

I was able to compare the holotypes of *Psilopiella rutila* and *P. nebraskaense* together (CAS). The two species are close, and the unique female holotype of *P. rutila* is almost identical to the female allotype of *P. nebraskaense*. Other authors have found the two species close, thus Foote *et al.* (1965) list *P. rutila* as occurring in both Florida and Nebraska (this was before the description of *P. nebraskaense* in 1968), and Robinson & Vockeroth (1981) refer only to *P. rutila*. Formal synonymy must await the finding of a male in Florida.

The male holotype of *Psilopiella nebraskaense* has a typical *Sciapus* hypopygium (with "Organ X" present, arching hypandrium and aedeagus, and prolonged surstylus), and is very close to *S. pallens* in almost all characters (except MSSC on tarsus I). Based on male genitalia, presence of FIII anterior preapicals, the shallowly excavated vertex, reduced ac, wide face in both sexes which is covered with dense pruinosity, the weakly excavated vertex, 5-6 strong dc setae, and general habitus, there is little doubt the two *Psilopiella* species belong in *Sciapus*. The evanescent M₂ is yet another example of the loss of this vein within the Sciapodinae.

The genera of Enderlein (1936), *Agastoplex*, *Dactylodiscia*, *Dactylorhipis* and *Placantichir*, all comprise Palearctic species regarded as *Sciapus*. Only *Placantichir* was proposed without a type species designated or fixed by monotypy. Since the genus was proposed after 1930, I have validated the name by designating *Dolichopus nervosus* Lehmann, as the type species. (C.E. Dyte alerted me to these names.) All four genera are here placed in synonymy.

Many *Sciapus* species have a densely pruinose thorax, in contrast to the metallic green of other Sciapodinae. Dense grey pruinosity is characteristic of many shore-dwelling Diptera (eg, hydrophorine Dolichopodidae, many Ephydriidae), and several such *Sciapus* species are associated with coastal habitats.

The "Organ X" of Becker is a ventral subtriangular projection of the cercus, which sometimes appears distinct from the main cercal body. This structure is characteristic of many holarctic *Sciapus* and an analogous (possibly homologous) structure is found in the Australian *Dytomyia sordida* Group. [Indeed, *Dytomyia* is possibly related to *Sciapus* s.s., and species such as *S. nervosus* and *D. torresiana* show similarities in FI and wing MSSC]. The simple digitiform cercus of some *Sciapus* species is either the result of loss of "Organ X" or the persistence of the groundplan condition. Probably both have occurred. However, species both with and without "Organ X" are similar in morphology and MSSC development.

Sciapus is most diverse in the Palearctic region with some 57 species, and a single species is known from Taiwan. In the Old World, *Sciapus* extends from the Canary Islands and northern Africa to the British Isles

and Fennoscandia, across Europe, Asia Minor and Siberia to the Amur district of the Soviet Far East, with extensions into Afghanistan, and Taiwan. None are recorded from Japan. The Sahara and the high ranges of southern Asia appear to have limited its southward extension, and neither published descriptions nor specimens examined from Nepal and northern India belong in the genus.

The seven Nearctic *Sciapus* species are confined to temperate eastern United States and southernmost Canada. The only western record beyond Nebraska is *S. divergens* from the state of Washington, which is possibly an introduction. Two Nearctic species, *S. pallens* and possibly *S. divergens* (= *S. wiedemanni*?, C.E. Dyte, personal communication), are found in both Nearctic and Palearctic regions. The North American fauna is rather small in comparison with the Palearctic fauna. However, I have seen characteristic male *Sciapus* with both FIII preapical setae and "Organ X" from Dominican Republic amber (AMNH, No. AMNH-11869), indicating that the genus was in the New World at least by mid-Tertiary time. Thus, *Sciapus* is the only exclusively Laurasian taxon of the subfamily, possibly isolated by the ancient Tethys Sea from the main arena of sciapodine evolution on the Gondwanan continents.

The Palearctic *Sciapus platypterus*, although the type species, is markedly different from most other *Sciapus* species. It has a somewhat narrowed face in both sexes. The hypopygium is compact, without prolongation of the surstylus, and it lacks the arching hypandrium + aedeagus. With its compact hypopygium, high head, and somewhat narrowed face, *S. platypterus* shows some similarities to the Indian Ocean *Mascaromyia* (q.v.), and in venation to *Neurigona* (eg, *N. quadrifasciata*). The subfamilies Sciapodinae and Neurigoninae are possibly related and their phylogenetic relationship awaits further investigation.

Sciapus includes the following described species.

I – Palearctic. The following list is based on information supplied by C.E. Dyte and uses currently accepted synonymies. The Palearctic fauna is rather well studied. I have had access to a good synoptic collection, and have been able to examine identified specimens (CED, BMNH, MNHP, NHMW, USNM). As well, the descriptions and figures in Becker (1918), Parent (1938), and subsequent authors enable accurate placement of most species. Meuffels & Grootaert (1990) provide a well-illustrated account of species near *S. constrictans* and a key to species of Belgium and the Netherlands. With the exception of *Sciapus villeneuvei* Parent (1927, nec 1922) and *Sciapus svenhedini* Parent, both newly referred to *Amblypsilopus* (q.v.), all Palearctic species previously regarded as *Sciapus* are *Sciapus* s.s. (* indicates personal examination of identified male specimens).

A. Species with "Organ X" present as separate structure or distinctly fused with cercus: *Sciapus aberrans* Becker, *S. adumbratus* Becker, *S. albifrons* (Meigen)*, *S. albimanus* Becker, *S. albovittatus* Strobl, *S. algirus* (Macquart), *S. basilicus* Meuffels & Grootaert,

S. calceolatus Loew, *S. constrictans* Wiedemann* [= *S. vialis* Raddatz], *S. costae* Mik* (= *S. mediterraneus* Becker, nec Bulli & Negrobov), *S. discretus* Parent*, *S. euchromus* (Loew), *S. euzonus* (Loew)*, *S. euzonus* var. *auresi* Vaillant*, *S. flavicinctus* (Loew)*, *S. flexicornis* Parent*, *S. glaucescens* (Loew)*, *S. gracilipes* Loew, *S. heteropygus* Parent*, *S. judaeus* Parent, *S. lobipes* (Meigen)*, *S. longulus* (Fallén)* [although Meuffels & Grootaert, 1990 claim this species lacks Organ X, it appears to be fused with the cercus], *S. maritimus* Becker* (= *S. flavomaculatus* Ringdahl), *S. matilei* Negrobov, *S. maurus* Parent*, *S. mediterraneus* Bulli & Negrobov (nec Becker), *S. montium* Becker*, *S. opacus* (Loew), *S. pallens* (Wiedemann) (also Nearctic)*, *S. palmipes* Collin, *S. paradoxus* subsp. *paradoxus* Negrobov & Shamshev, *S. paradoxus* subsp. *sachalinensis* Negrobov & Shamshev, *S. roderi* Parent, *S. sibiricus* Negrobov & Shamshev, *S. venetus* Meuffels, *S. vicinus* Parent, *S. wiedemanni* (Fallén)*, and *S. zonatulus* (Zetterstedt).

B. Species with complex cerci but presence of Organ X uncertain: *Sciapus holoxanthos* Parent*, and *S. nervosus* (Lehmann)*.

C. Species with simple digitiform cerci and males mostly with unornamented tarsi: *Sciapus evanidus* Bezzi*, *S. frater* Parent*, *S. incognitus* Negrobov & Shamshev, *S. laetus* Meigen (= *S. villeneuvei* Parent 1922, nec 1927), *S. lesinensis* Mik*, *S. nigricornis* (Loew), *S. oldenbergi* Parent, *S. polozhentsevi* Negrobov, *S. spiniger* (Zetterstedt), *S. spinosus* Parent and *S. sylvaticus* Becker.

D. Species with a distally expanded wing in males (MSSC), somewhat narrowed face in both sexes, male III with MSSC (rather than on It as in most *Sciapus*), and compact hypopygium (at least *S. platypterus*): *Sciapus platypterus* (Fabricius)* and *S. bellus* (Loew).

E. There is inadequate information regarding the hypopygium of the following species: *Sciapus longimanus* Becker, *S. mitis* Parent (described from female only), and *S. tenuinervis* (Loew). The unrecognised *Psilopus fasciatus* Macquart probably belongs in *Sciapus*. As well, *S. corniflexus* Parent is unrecognised (see Meuffels & Grootaert, 1990).

II – Nearctic. Seven species are regarded as *Sciapus* (s.s.). Steyskal (1966) provided keys to Nearctic *Sciapus* s.l. and synonymic notes. All species except *S. rutilus* (male unknown) have "Organ X": *Sciapus delicatus* (Walker)*, *S. divergens* Van Duzee (= the Palearctic *S. wiedemanni*?), *S. filipes* (Loew), *S. nebraskaensis* (Harmston & Rapp)*, *S. pallens* (Wiedemann) (also Palearctic)*, *S. rutilus* (Van Duzee)* and *S. tener* (Loew)*.

The following Nearctic species are newly referred to *Sciapus*:

nebraskaensis Harmston & Rapp, 1968: 251. (*Psilopiella*), (CAS, examined), Nebraska, **n.comb.**

This species is very close to *S. rutilus*, and the two species are possible synonyms (see discussion above). **rutilus** Van Duzee, 1914a: 438. (*Psilopiella*). (CAS, examined, female only), Florida, **n.comb.**

III – Oriental. Only one species:

arctus Becker, 1922a: 197. (TMB, lost), Taiwan.

The description and hypopygium figure place this species in *Sciapus*. The cercus is simple and digitiform, and the male It_5 is flattened (MSSC). *Sciapus arctus* is undoubtedly of temperate palearctic affinity. I have not seen specimens.

***Dytomyia* n.gen.**

Etymology. The genus *Dytomyia* is named for the prominent English student of the Dolichopodidae, C.E. Dyte. The gender is feminine.

Type species. *Sciapus sordidus* Parent, 1928, here designated.

Diagnosis. *Head.* Vertex not strongly excavated, especially when compared with other Sciapodinae; postvertical setae strong; vertical seta strong on both sexes; face and clypeus broad in both sexes, and male clypeus adjacent to lateral eye margins or only slightly separated; first flagellomere rounded subtriangular; arista various, dorsoapical to apical, and length about equal to head height.

Thorax. Ac usually short and irregularly paired, or absent; 4 strong dc present in both sexes, not dimorphic; median scutellar setae strong, laterals absent.

Legs. Mostly yellow, not greatly elongated; female FI with 3-4 short pale basoventral setae; male It_1 swollen, and basally forming ventral cushion with dense pale pile (MSSC); male TIII sometimes with irregular swelling or callus at half (MSSC).

Wing. Crossvein m-cu straight or in gently bowed.

Abdomen. Vestiture rather reduced, consisting

mostly of short hairs, with only a few strong setae along distal tergal margins; abdominal plaques reduced in size on male; aedeagus with dorsal angle; cercus with short ventral section which arises at basally and appears to be freely articulated with main cercal body, and is perhaps homologous with "Organ X" of *Sciapus* (q.v.).

Remarks. *Dytomyia* is a distinctive genus which appears isolated from other Australasian Sciapodinae. The following characters are significant: vertex not strongly excavated, vertical seta strong on both sexes; face and clypeus broad in both sexes, four strong dc present in both sexes, lateral scutellar setae absent, female FI with three to four short pale basoventral setae; male It_1 swollen, with dense pale pile (MSSC); TIII sometimes with irregular swelling or callus at half (MSSC), and cercus with short ventral section which arises at basally and appears to be freely articulated with main cercal body. *Dytomyia* appears to be most closely related to the Holarctic genus *Sciapus* with which it shares a number of characters (see Remarks under the *Dytomyia sordida* Group).

Dytomyia is primarily Australian, but an undescribed species occurs in New Guinea. It adapted to dry sclerophyll, monsoonal and semi-arid habitats (in marked contrast to moist forest frequenting Sciapodinae), which suggests it is an older Australian element which became arid-adapted in the late Tertiary.

Dytomyia is divided into two Groups. The *sordida* Group occurs across much of eastern, central and northern Australia, and is frequently found on tree trunks in dry sclerophyll woodland. The *flaviseta* Group is known from tropical northern Australia.

Key to Australian Male *Dytomyia*

1. TI without long sub-basal seta; hypopygium not globular; hypopygial foramen left lateral; antenna yellow; M_1 in irregular arc to apex, not smoothly curved; cercus with short ventral section (Fig. 31c); head and thoracic setae yellow (WA) *D. flaviseta* (*flaviseta* Group)
- TI with long sub-basal pv seta, hypopygium massive and globular; hypopygial foramen basal; scape and pedicel yellow, first flagellomere dark brown; cercus divided into distinct dorsal and ventral sections (*sordida* Group) 2
2. Wing unmodified (Fig. 121e); face strongly protruding (Fig. 31b); hypopygium (Fig. 31a) (WA, NT) *D. tumifrons*
- Wing often with distorted venation and setose patches; face only slightly protruding 3

3. Both M_1 and R_{4+5} join wing margin separately; wing membrane with blister-like swelling and incurved microtrichia (Fig. 121a); TI with ventral row of short black setae; surstylus downcurved, with apical blade-like bristle; cercus with 3 long intertwined apical setae (Fig. 30a) (SA, Vic., NSW, Qld)..... *D. sordida*
- M_1 and R_{4+5} join before wing apex, closing cell R_5 ; TI without ventral row of short setae; other features various 4
4. Only scape and pedicel yellow, first flagellomere dark brown; M_1 strongly bent to join R_{4+5} and costa basad of apex, costa and anterior veins greatly thickened; wing margin not excised (Fig. 30f); cercus with subequal dorsal and ventral sections, with stout peg-like setae (Fig. 30e) (Qld) *D. bancrofti*
- Antenna entirely yellow; wing excised near join of CuA and margin, M_1 and m-cu strongly curved (Fig. 121c); cercus with long intertwined setae (Fig. 30) (Qld)..... *D. torresiana*

The *sordida* Group

Diagnosis. *Head.* Male face usually very slightly bulging, but sometimes strongly protruded (MSSC); scape and pedicel yellow, first flagellomere dark brown; arista dorsal to apical.

Legs. Male CI with dense strong pale setae along entire length (MSSC); tibiae of both sexes mostly bare of major ad-pd setae; male FI basally swollen with 2 long pale ventral setae at one-fifth, and each seta on small mound (Fig. 30b) (MSSC), these setae are short in females; male TI with long sub-basal pv seta (Fig. 30b) (MSSC); male TI apically bent, making It_1 appear offset (MSSC); male TIII sometimes with distinct swelling at half which bears dorsal tuft of short pale setae (MSSC).

Wing. Male wing usually strongly modified, variously with shortening of wing, blister-like swelling within membrane, thickening and distortion of veins, loss of M_2 , etc (MSSC); crossvein m-cu straight or in gentle convex bow.

Abdomen. Hypopygium massive and globular, dark brown; hypopygial foramen basal in position with only slight asymmetry to left, and covered by cap-like sternum 8 (Fig. 30e); surstylus massive and fused to epandrium, bearing peg-like setae; cercus with short ventral section which arises at basally and appears to be freely articulated with main cercal body, and is perhaps homologous with "Organ X" of *Sciapus* (q.v.).

Remarks. The *Dytomyia sordida* Group is found across much of Australia, including the arid interior and monsoonal north, and in lowland New Guinea. Two species, *D. sordida* and *D. tumifrons*, are often found on tree trunks, a habitat association possibly characteristic of the entire Group. Male wings are often strikingly modified.

The *sordida* Group shows the strongest similarities to *Sciapus*, and even has a similar cercal structure with the

"Organ X" of Becker (1918). As well, the male modified wings, strong basoventral setae on male FI, similar antennal shape and colouration, and even the association with tree trunks makes some *Sciapus* (eg, the Palearctic *S. nervosus*, *S. platypterus*), reminiscent of *sordida* Group species. One striking difference is that *Sciapus* has an anterior preapical seta on FIII and very long legs (especially males), while *Dytomyia* has FIII bare and shorter legs.

The Group is represented in Papua New Guinea by a single female from Bulolo (AMS), similar to female *D. sordida* and *D. bancrofti*, but probably represents an undescribed species. As well, possibly two undescribed Australian species are represented by females only.

Included species:

bancrofti n.sp. Australia (Qld).

sordida Parent, 1928: 193. (*Sciapus*) (ZMUH, lost), Australia (NSW, Qld, Vic., ACT, SA), **n.comb.**
anomalipennis Hardy, 1930: 128. (*Sciapus*) (AMS, paratypes examined), Australia (Qld).

torresiana n.sp. Australia (Qld).

tumifrons n.sp. Australia (WA, NT).

Dytomyia sordida (Parent), n.comb.

Sciapus sordidus Parent, 1928: 193.

Sciapus anomalipennis Hardy, 1930: 128.

Type material. *Sciapus sordidus* was described by Parent from a New South Wales female (ZMUH, lost). Hardy (1930) described *S. anomalipennis* from specimens collected on tree trunks in Brisbane (holotype lost, but 2 male and 2 female paratypes extant, AMS, examined), and subsequently (1935) placed his species in synonymy with *S. sordidus*.

A male neotype is here designated for *Sciapus sordidus*, with the label: "Collaroy, N. Sydney, 20 Jan. 1924, Ferguson" (AMS).

Additional material. Australian Capital Territory – Tarwa, 6 Dec. 1951. New South Wales – Shoalhaven River, 33 km west of Nowra, 24 Dec. 1986; Euston, 2 Nov. 1988; Coonamble, no date; Tarra, Hunter River, 18 Oct. 1928; Broken Hill, 16 Oct. 1944; Cunnamulla, 10 Oct. 1938; Narara, 27 Nov. 1946; near Bourke, 24 Oct. 1949; Sydney, Feb. 1906. Queensland – Crow's Nest, on *Eucalyptus* sp., 5 Dec. 1985; Brisbane, 28 Sept. 1946, Oct. 1923, 3 Sept. 1913, 21 Jan. 1957, 15 Sept. 1940; on *E. maculata*, 10 Sept. 1967; Gatton, 8 Dec. 1931,

7 Sept.-14 Nov. 1981; Emerald, 6-18 Sept. 1982; Caloundra, 4 Oct. 1950; Lake Broadwater, 25 km south-west of Dalby, 12 Apr. 1986; Eidsvold, 6 Apr. 1924; Awoonga Dam, south-west of Gladstone, 10 Nov. 1976; Toowoomba, 7-8 Dec. 1985; Dunwich, North Stradbroke Island, 13 May 1972; 5 km north of Leyburn, 450 m, 25 Dec. 1987, 26 Jan. 1991, 3 Apr. 1993. South Australia – Cold and Wet Station, 19 Nov. 1962; Adelaide, June 1966; Roseberry, 11 Feb. 1991. Victoria – Gorokey, Maryvale Station, east of Romki, 19 Dec. 1964;

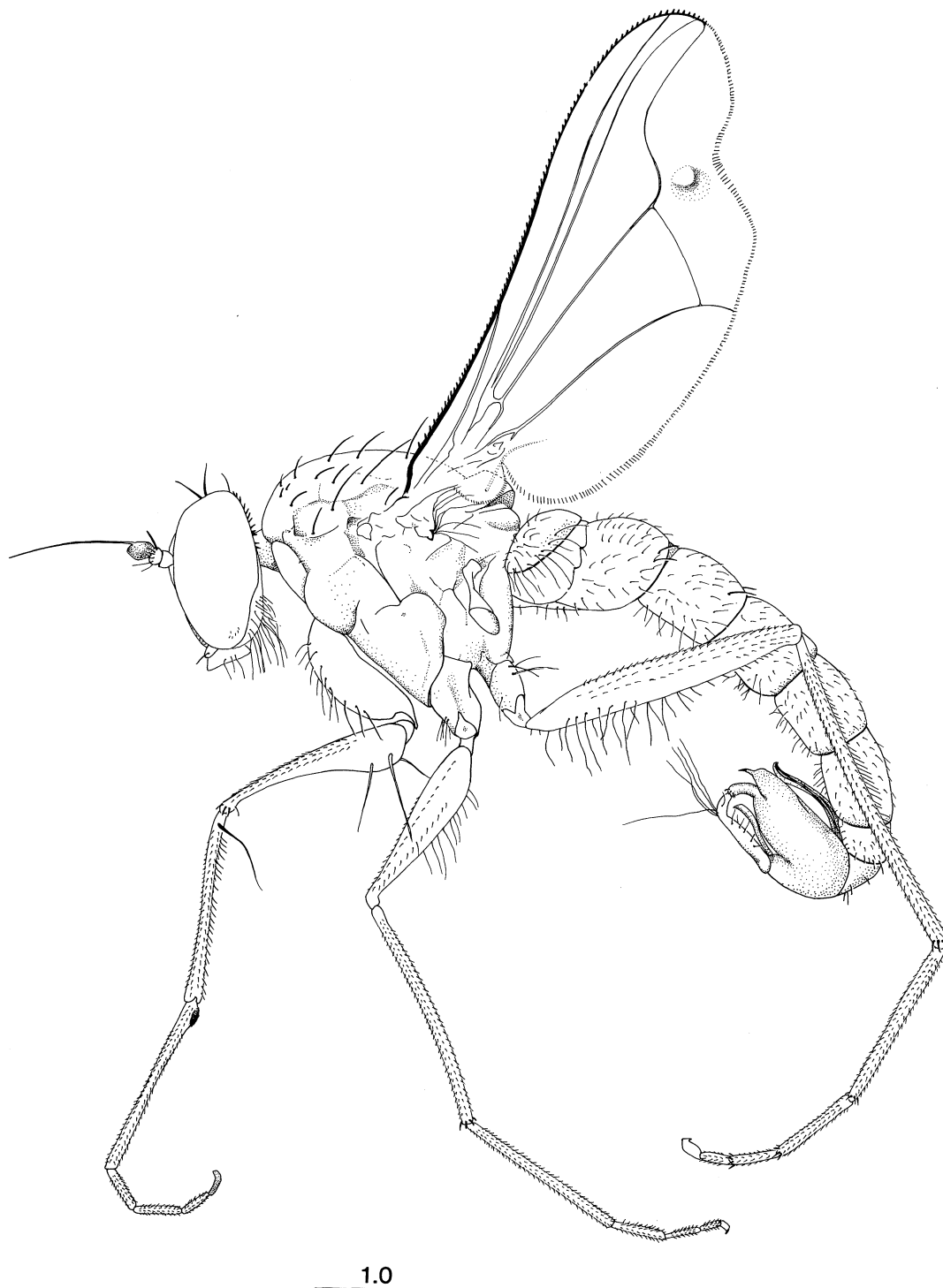


Fig.28. Habitus, male *Dytomyia sordida*.

Cheltenham, 30 Nov. 1919; Caulfield, no date; Seaford, no date; Cobram, 24 Dec. 1966; Carrum, 18 Nov. 1928; Turra River, Cape Everard, 22 Mar. 1970 (97 males, 79 females examined, AMS, ANIC, QMB, UQIC, QDPI, SAM, MVM, BPBM).

Description – male (Fig. 28). Length: 5.9-6.1; wing: 3.8 x 1.5.

Head. Frons metallic green with dusting of grey pruinosity; 2 black postvertical setae present (Fig. 30c,d); face and clypeus metallic blue-green with grey pruinosity; palp with yellow seta; proboscis yellow; ventral postcranium with abundant pale hairs; scape and pedicel yellow; pedicel with short dorsal and longer ventral setae; first flagellomere dark brown, rounded subtriangular; arista black, dorsoapical.

Thorax. Dorsum metallic green with bronze reflections; pleura metallic green with dense grey pruinosity; setae black; 3-4 pairs of short, irregular unpaired ac present; 1 pa, 2 sa, 2 weak sr, 2 np, 1 hm and 1 pm present.

Legs. CI yellow; CII and CIII dark brown with some pruinosity; trochanters, femora, tibiae and tarsi yellow, except all t_5 dark brown; CII with pale anterior hairs, and CIII with 2-3 pale lateral setae; I: 8.0; 8.5; 6.5/1.5/2.0/1.5/1.0; FI basally swollen with 4-5 pale ventral setae between one-fifth and one-quarter, with posterior 2 setae longer, the anterior 2-3 shorter, and each seta on small mound (Fig. 30b) (MSSC); TI with long projecting black subbasal pv seta, slightly less than half tibial length (MSSC); TI with ventral row of short black setae (MSSC); It_1 swollen in basal third, forming ventral cushion with dense pale pile (MSSC); It_1 and It_2 with row of short black ventral setae; II: 9.0; 10.0; 8.5/3.0/2.0/1.0/1.0; FII with long pale av hairs on basal half; TII bare except for apical setae; III: 13.0; 14.5; 7.5/4.0/2.0/1.5/1.0; FIII basally with rows of long pale av and pv hairs; TIII swollen at half with dorsal tuft of short pale setae (MSSC).

Wing (Fig. 121a). Male wing distinctive (MSSC): broad with excavation on posterior margin and with blister-like swelling within membrane which bears incurved microtrichia; venation distorted; M_1 curved to R_{4+5} and then parallel to apex; M_2 curved towards marginal excavation; m-cu straight; CuAx ratio: 3.5; lower calypter yellow with pale yellow setae; haltere yellow.

Abdomen. Dark metallic green with bronze reflections but with matt brown-violet band at tergal overlap of segments 2-6; vestiture consisting of pale hairs, without strong black tergal setae; hypopygium massive, dark brown, with yellow cerci (Fig. 30a); epandrium tapering, subtriangular, and along distal margin with medianly incurved cuticular flap bearing 4 setae; hypopygial foramen basal with slight asymmetry to left; hypandrial arm arising beyond midlength and extending beyond hypandrial hood almost to apex of aedeagus; 2 pedunculate epandrial lobe setae present laterad of diamond-shaped median structure which itself bears 3 setae; surstylus fused to epandrium, slightly downcurved, and bearing apical blade-like bristle and row of 7-8 spine-like setae; cercus with ventral section bearing stout peg-like setae and dorsal section with

ventral setae and 3 very long intertwined black apical setae.

Female. Similar to male except lacking MSSC and as noted: body smaller, length 4.7, but wing longer, 4.0 x 1.5; CI with only pale anterior hairs and 3 stronger distolateral setae, but lacking dense pale setae of male; FI with only 2-3 pale basoventral setae, weaker than in male; TI_1 , It_1 and TIII unmodified; TII with strong

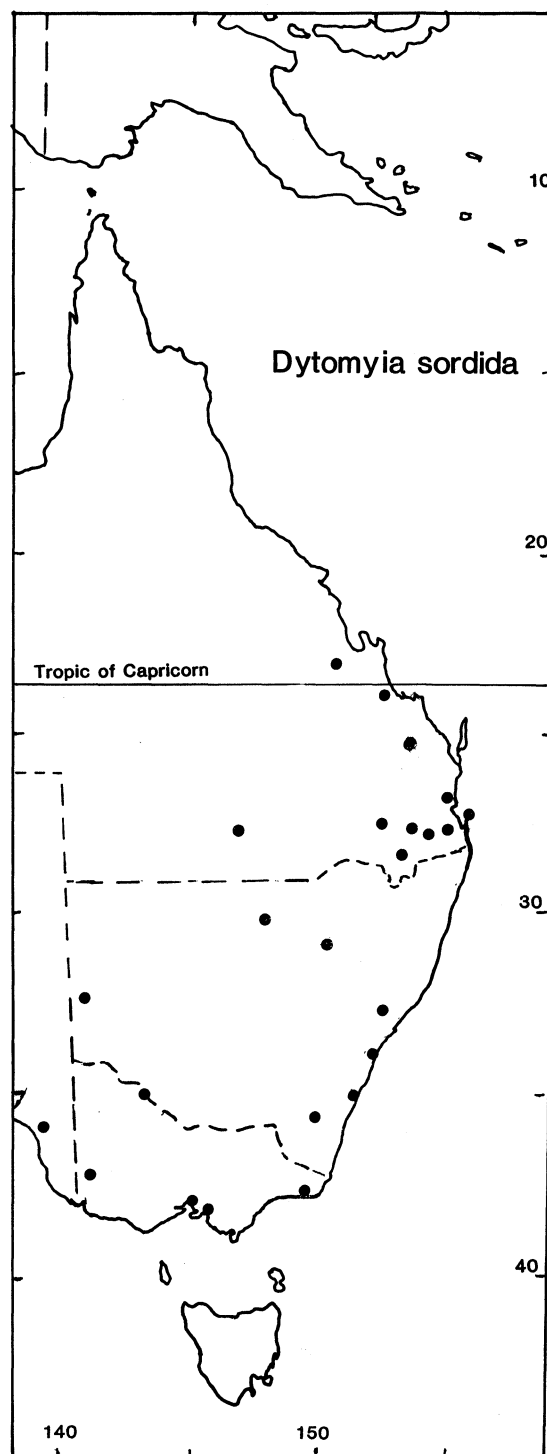


Fig.29. Distribution, *Dytomyia sordida*.

anterior seta at two-fifths; FII and FIII bare ventrally; wing not modified, M_2 present (Fig. 121b), CuAx ratio: 3.7-4.1.

Remarks. *Dytomyia sordida* is found from South Australia and Victoria to central Queensland, in semiarid interior as well as moister eastern coastal habitats

(Fig. 29). An unassociated female from Alice Springs (ANIC) could be this species. However, in the northern part of its range, isolated females may not be separable from such species as *D. bancrofti* or *D. tumifrons*. Males have a strikingly distorted blister-like swelling on the wing.

Dytomyia sordida is often found in numbers resting

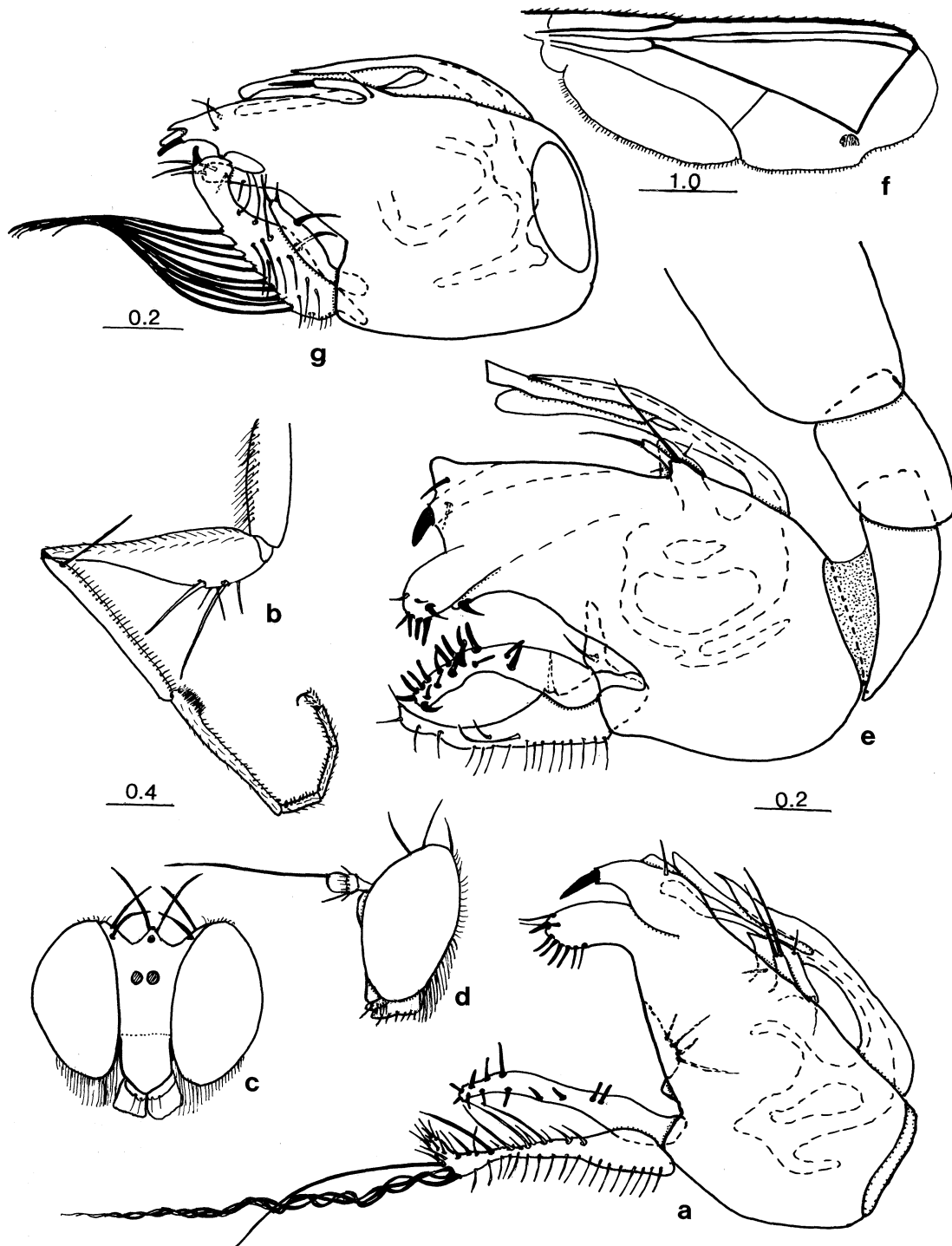


Fig.30. *Dytomyia sordida*, Lake Broadwater, Qld: a - hypopygium, left lateral; b - male left leg I, posterior; c - male head, anterior; d - male head, left lateral. *D. bancrofti*, Palm Island, Qld: e - hypopygium, left lateral; f - male wing. *D. torresiana*, Moa Island, Torres Strait, Qld: g - hypopygium, left lateral.

head upwards on the trunks of smooth-barked *Eucalyptus* species and *Angophora costata*, especially in dry sclerophyll forest. Individuals move up trunks with short lateral and vertical flights.

***Dytomyia bancrofti* n.sp.**

Type material. HOLOTYPE, male, Queensland, Palm Island, no date, T.L. Bancroft (ANIC).

Description – male. Length: 6.0; wing: 3.9 x 1.5; similar to *D. sordida* except as noted.

Head. Pedicel with pale ventral seta.

Thorax. Dorsum metallic green-bronze with grey pruinosity.

Legs. Colour and relative podomere ratios similar; all t_5 dark brown and somewhat expanded; FI also basally swollen, but with 2 long pale ventral setae at one-quarter, each arising from a small mound (MSSC); TI with long projecting black subbasal pv seta at one-tenth (MSSC); It_1 swollen in basal quarter, forming ventral cushion with dense pale pile (MSSC); TII with 3 short black ventral setae on distal half; TIII also with distinct swelling at half which bears dorsal tuft of short pale setae (MSSC).

Wing. Strongly modified (Fig. 30f): costa and anterior veins greatly thickened; M bent at right angle to join R_{4+5} basad of apex, forming closed triangular cell R_5 ; blister-like swelling present near bend of M; M_2 absent; m-cu straight; CuAx ratio: 1.5; lower calypter yellow with pale setae; haltere yellow.

Abdomen. Hypopygium (Fig. 30e); epandrium tapering, subtriangular; hypopygial foramen basal in position with only slight asymmetry to left; hypandrial arm arising beyond midlength and extending beyond hypandrial hood almost to apex of aedeagus; aedeagus simple; 2 strong pedunculate setae (= epandrial lobe setae?) arising laterad of median structure which bears 2 setae; surstylus massive, subrectangular, and bearing stout apical peg which is subtended by dorsal lobe which bears thorn-like setae; cercus with subequal dorsal and ventral sections, ventral section with stout peg-like setae, and dorsal section with ventral setae.

Female. Unknown.

Remarks. *Dytomyia bancrofti* is known only from the unique male holotype from Palm Island, east of Ingham, Queensland. An isolated female from northern Queensland: Annan River, 3 km west by north of Black Mountain, 27 September 1980 (ANIC) is possibly this species. It has only a single strong basoventral seta on FI. (*D. sordida*, whose females have two to three basoventral FI setae but might not be separable from female *D. bancrofti*, is not known to occur so far north).

***Dytomyia torresiana* n.sp.**

Type material. HOLOTYPE male, PARATYPES 3 females, Queensland, Torres Strait, Moa Island, St Pauls, 10°11'S 142°16'E, 10-18 Feb. 1986, at light, K. Houston & E. Hamacet (QDPI); PARATYPES male, 3 females, Moa Island, no date (SAM); 2 females, Prince of Wales Island, 27-30 May 1969 (MVM).

Additional material. Queensland – Lake Wicheura, 10°46'S 142°33'E, 14 Oct. 1992, at light (ANIC).

Description – male. Length: 5.8; wing: 3.3 x 1.2; similar to *D. sordida* except as noted.

Head. Antenna entirely yellow; male face not bulging; pedicel with dark setae; arista black.

Thorax. Dorsum metallic green-bronze with dusting of pruinosity; setae black; ac absent.

Legs. Colouration and relative podomere ratios similar, except tarsi entirely yellow; CI with pale anterior hairs, and CIII with 2-3 pale lateral setae; FI basally swollen with 2 long pale ventral setae near one-fifth, and with additional strong ventral seta near half (MSSC); TI with long projecting black subbasal pv seta (MSSC); TI with ventral row of short black setae along entire length (MSSC); It_1 basally swollen, forming ventral cushion with dense pale pile to one-third (MSSC); It_1 and It_2 without ventral short black setae; FII with some pale basoventral hairs; FIII bare ventrally; TIII with swelling at two-fifths which bears dorsal tuft of short pale setae (MSSC).

Wing (Fig. 121c). Male wing distinctive (MSSC): M_1 strongly recurved basally, and joining R_{4+5} before apex, enclosing cell R_5 ; M_2 making weak arc to margin; m-cu thickened posteriorly and sinuate; distal cell M distorted with blister near m-cu which bears microtrichia; strong marginal excision present near apex of CuAx; lower calypter yellow with black rim and pale setae; haltere yellow.

Abdomen. Hypopygium dark brown, cerci yellow (Fig. 30g); epandrium subrectangular; hypandrial arm extending to apex of aedeagus; epandrial lobe with short strong apical seta and with seta arising from base; surstylus fused to epandrium, massive and tapering, bearing short apical setae and short dorsal thumb-like projection; cercus with short ventral section which bears strong setae, and with elongate dorsal section, with stout apical peg-like seta and distinctive row of long curved and twisted external setae.

Female. Similar to male except lacking MSSC and as noted: CI with only pale anterior hairs and 3 strong distolateral setae; FI with single pale ventral setae at one-fifth; TI, It_1 and TIII unmodified; FII and FIII bare ventrally; wing unmodified (Fig. 121d); m-cu gently sinuate; CuAx ratio: 2.5.

Remarks. *Dytomyia torresiana* is known from the Torres Strait Islands and northern Cape York Peninsula,

Queensland. The highly modified male venation is diagnostic.

Dytomyia tumifrons n.sp.

Type material. HOLOTYPE male, Western Australia, 23 km north of Bow River, 250 m, 19 Oct. 1962, E.S. Ross & D.O. Cavagnaro (CAS).

Additional material. Northern Territory – male, 2 females, Ti-Tree, 7 Nov. 1974, on *Eucalyptus camaldulensis* (UQIC); female, Ross River, 21 Nov. 1978, malaise trap (USNM).

Description – male. Length: 5.8; wing: 4.7 x 1.5; similar to *D. sordidia* except as noted.

Head. Frons metallic green with dusting of grey pruinosity; 2 pale postverticals present; vertical setae black; ocellar tubercle with pair strong black diverging ocellar setae, and with 4-5 pairs pale weak hairs posteriorly; frons with lateral row of weak pale hairs along eye (MSSC); face and clypeus mostly metallic blue-green with grey pruinosity; male face strongly

protruding, and distally shining, bare of pruinosity (MSSC) (Fig. 31b); palp yellow with strong black and weak yellow setae; pedicel with especially strong dorsal and ventral setae, ventral longer than dorsal (MSSC); first flagellomere triangular with apical arista.

Thorax. Dorsum metallic green; setae black; 3 pairs of long irregularly paired ac present, with posterior pair strongest.

Legs. Colour similar except III_{t2-5} dark brown; I: 7.5; 6.5; 7.0/1.5/1.5/1.0/1.0; FI slightly swollen basally, with 2 pairs of long pale ventral setae between one-fifth and one-quarter, the posterior 2 setae longer than the anterior 2 setae (MSSC); TI with projecting brown subbasal pv seta, about one-quarter tibial length (MSSC); TI with ventral row of short pale setae (MSSC); It, slightly swollen in basal third, forming ventral cushion with dense pale pile (MSSC); II: 8.0; 8.5; 7.0/2.5/1.5/1.0/0.8; FII with pale ventral hairs on basal half; TII with strong anterior seta at two-fifths; III: 11.0; 14.0; 6.0/3.5/2.0/1.5/1.0; FIII some pale ventral av and pv hairs; TIII unmodified.

Wing (Fig. 121e). Male wing unmodified; m-cu straight; CuAx ratio: 5.0; lower calypter yellow with pale yellow setae; haltere yellow.

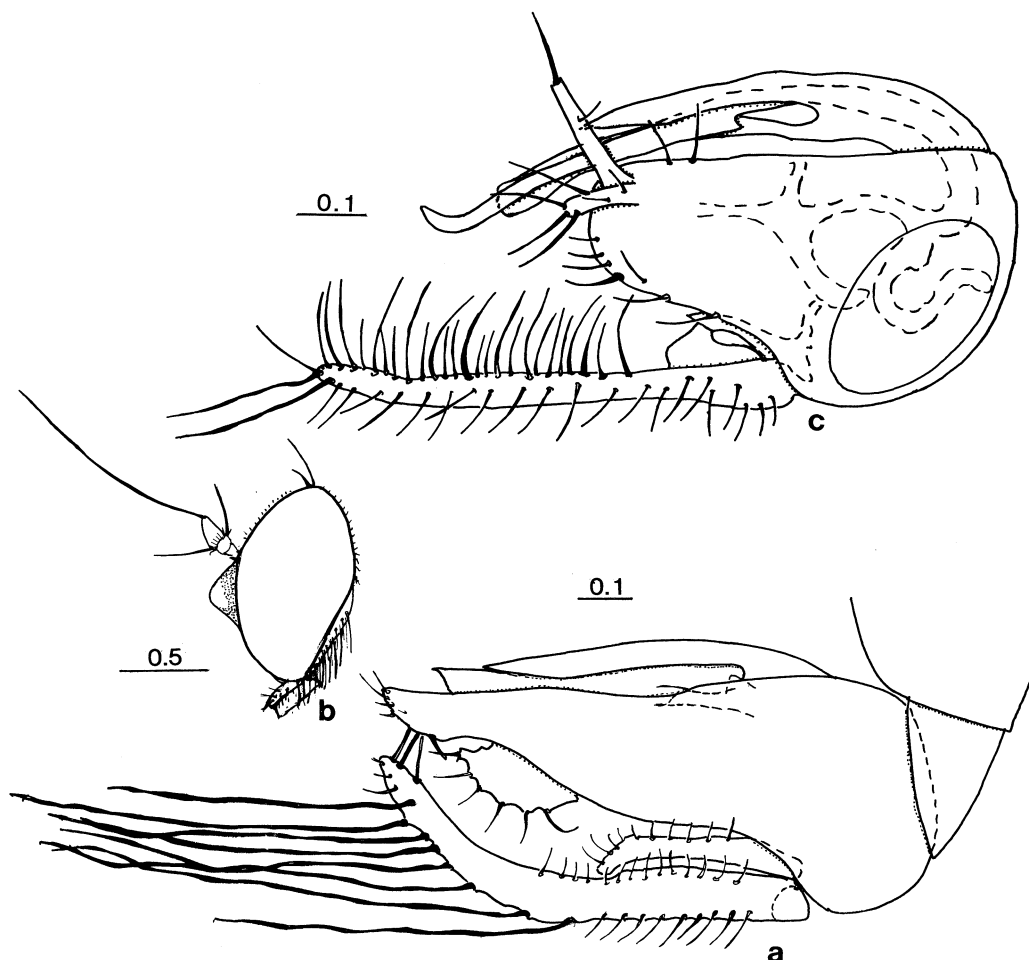


Fig.31. *Dytomyia tumifrons*, Bow River, WA: a – hypopygium, left lateral; b – male head, left lateral. *D. flaviseta*, Monte Bello Islands, WA: c – hypopygium, left lateral.

Abdomen. Hypopygium massive, dark brown, with yellow cerci (Fig. 31a); epandrium elongate and tapering; with ovate dorsal projection which bears 5 strong curved marginal setae; hypopygial foramen basal; surstylus fused to epandrium, with strong dorsal spine-like seta; cercus with short ventral section bearing marginal setae, and with elongate dorsal section with 7-8 very long intertwined black distal setae.

Female. Similar to male except lacking MSSC and as noted: frons without lateral row of weak hairs; face only slightly protruding; pedicel with relatively short dorsal and ventral setae; arista also apical; FI with only 2 short pale basoventral setae; TI, and It_1 unmodified; FII and FIII with only fine pale ventral hairs; TII also with strong anterior seta at two-fifths; wing similar.

Remarks. *Dytomyia tumifrons* is known from tropical Western Australia and Northern Territory. It has been taken on the trunks of eucalypts in semiarid woodland. The strongly protruded male face is distinctive.

Dytomyia tumifrons has an apical arista in both sexes.

The *flaviseta* Group

Diagnosis. **Head.** Frons, face and clypeus covered with dense silvery pruinosity; male face not bulging; antenna yellow; pedicel with strong dorsal and ventral seta.

Legs. FI with strong basoventral setae in male, weaker in female; It_1 slightly swollen with ventral pile in basal sixth (MSSC); male TIII unmodified, without swelling.

Wing. M_1 with distinctive irregular arc to apex, not smoothly curved lower calypter yellow with pale yellow setae; haltere yellow.

Abdomen. Hypopygial foramen left basal in position; epandrium with setae along distal margin; surstylus modified into distally projecting digitiform projection bearing abundant setae; cercus elongate and with short ventral section internal inside epandrium, probably homologous with the ventral section of the *sordida* Group (= "Organ X" of *Sciapus*, q.v.).

Remarks. The *flaviseta* Group is found in tropical northern Australia. Apart from *Dytomyia flaviseta* in north-western Australia, two undescribed species (possibly conspecific) are known only from females and also have yellow antennae, dense silvery head pruinosity, and M_1 in an irregular arc. However, unlike *D. flaviseta*, they have black head and body setae. These specimens are from Western Australia: Shark Bay, and Northern Territory: east-south-east of Cape Crawford (ANIC).

Although the male of only one species is known, it shows little sexual dimorphism, and has few leg or wing MSSC. By contrast, the *sordida* Group has a rich array of MSSC.

The *flaviseta* Group has a left lateral hypopygial foramen and a small basal and almost internal ventral cercal section, which is probably homologous to the better developed ventral section of the *sordida* Group.

There is one described species: *flaviseta* n.sp. Australia (WA).

Dytomyia flaviseta n.sp.

Type material. HOLOTYPE male, PARATYPE female, Western Australia, 4 km west-north-west of Martin's Well, West Kimberley, 28 Apr. 1977, D.H. Colless (ANIC).

Additional material. Western Australia – male, Monte Bello Group, Trimouille Island, Cocoa Beach, 10 Nov. 1953 (ANIC).

Description – male. Length: 3.4; wing, 2.7 x 1.1.

Head. Frons, face and clypeus metallic green covered with dense silvery pruinosity; all setae yellow; face wide with clypeus adjacent to eye margins; palp and proboscis yellow; ventral postcranium with pale hairs; antenna pale yellow; first flagellomere subtriangular, with dorsoapical arista about equal to head height.

Thorax. Dorsum emerald green and covered with silvery pruinosity; pleura with dense pruinosity; setae yellow; 2 irregular pairs of ac, with additional short setulae anteriorly; 1 pa, 2 sa, 2 weak sr, 2 np, 1 hm and 1 pm present.

Legs. Coxae, legs and vestiture entirely yellow, although CIII with some lateral infuscation; CI with some silvery pruinosity, with pale anterior hairs and 2 strong distolateral setae; CIII with pale lateral seta subtended by 2 weak setae; I: 6.5; 6.0; 5.0/1.0/0.8/0.8/0.5; FI with strong ventral at one-fifth, more than half length of FI, and with 2 slightly weak av setae between one-fifth to one-quarter, projecting ventrad (MSSC); TI bare; It_1 slightly swollen with ventral pile in basal sixth (MSSC); II: 7.0; 7.0; 5.0/2.1/1.0/0.8/0.5; FII bare; TII with strong ad at one-fifth, and subapical anterior and ventral setae; III: 7.5; 10.0; 4.0/3.0/1.5/1.0/1.0; FIII bare; TIII with strong ad at one-fifth.

Wing (as in Fig. 121f). Veins pale yellow; M_1 in irregular arc to apex, not smoothly curved; m-cu straight; M_2 very faint; CuAx ratio: 1.1; lower calypter yellow with pale yellow setae; haltere yellow.

Abdomen. Metallic green-bronze and with some silvery pruinosity; vestiture short and pale; hypopygium dark brown, cercus pale yellow (Fig. 31c); epandrium subovate with straight ventral margin; and with some setae along distal margin; hypandrial arm extending almost to apex of aedeagus; 2 epandrial setae present; epandrial lobe positioned distally on epandrium, with apical seta and additional seta on peduncle; surstylus modified into digitiform projection which bear numerous setae; cercus elongate and setose, and with short ventral section within epandrium.

Female. Similar to male except face slightly wider and ac weaker; leg chaetotaxy also similar except FI with 3 shorter basoventral setae; It_1 unmodified; wing (Fig. 121f); veins pale yellow; M_1 also in irregular arc to apex.

Remarks. *Dytomyia flaviseta* is known only from two widely separated localities, the Kimberley district and Monte Bello Islands, both in tropical Western Australia. The pale cast of this species is distinctive.

Pilbara n.gen.

Etymology. *Pilbara* is the name of the Precambrian shield which underlies the collection locality of the type species. The name is of Australian Aboriginal origin and I designate the gender as feminine.

Type species. *Pilbara octava* n.sp., here designated.

Diagnosis. General. Small, less than 2.5 in length; body relatively short and compact, legs not elongate.

Head. Rather low and spheroidal (Fig. 32c); vertex only shallowly excavated (Fig. 32b); male face not bulging, but conformable with curvature of eyes; face and clypeus wide in both sexes; clypeus adjacent to eyes in both sexes (Fig. 32b); eyes in both sexes with anteroventral facets enlarged; first flagellomere subrectangular; arista dorsal, as long as head height.

Thorax. Ac totally absent; 4 strong evenly spaced dc

present in both sexes; lateral scutellar setae absent.

Legs. CI with 3 strong pale distolateral setae in both sexes; female FI with 2-3 pale basoventral setae (FSSC), absent on male; male It_1 flattened in basal third, but with pale ventral pile among entire length (MSSC).

Wing. M_2 totally lost and M_1 with gentle bend midway between m-cu and apex (Fig. 120j); anal angle of wing strongly reduced in males (MSSC).

Abdomen. Hypandrium narrow and short, with hypandrial arm extending only to apex of hypandrial hood; aedeagus without dorsal angle; surstylus forked; cercus with relatively short subequal setose arms (Fig 32a).

Remarks. *Pilbara* is characterised by a very shallowly excavated vertex, total loss of vein M_2 (convergent with *Mesorhaga*, although of a different conformation), enlarged anteroventral eye facets in both sexes, absence of ac, four strong dc in both sexes, and females with two pale basoventral FI setae (FSSC).

The single known species, *Pilbara octava*, is relatively short and compact, and lacks the long legs characteristic of many Sciapodines. The head is also relatively low and spheroidal, somewhat reminiscent of *Diaphorus* (Diaphorinae). However, the hypopygium has a characteristic sciapodine structure, especially noting the left lateral hypandrial arm and cercal form. Without knowledge of the male genitalia, the inclusion of the species in the Sciapodinae might be questioned, especially since the genus lacks M_2 and has a very shallowly excavated frons.

Pilbara is confined to northern Western Australia

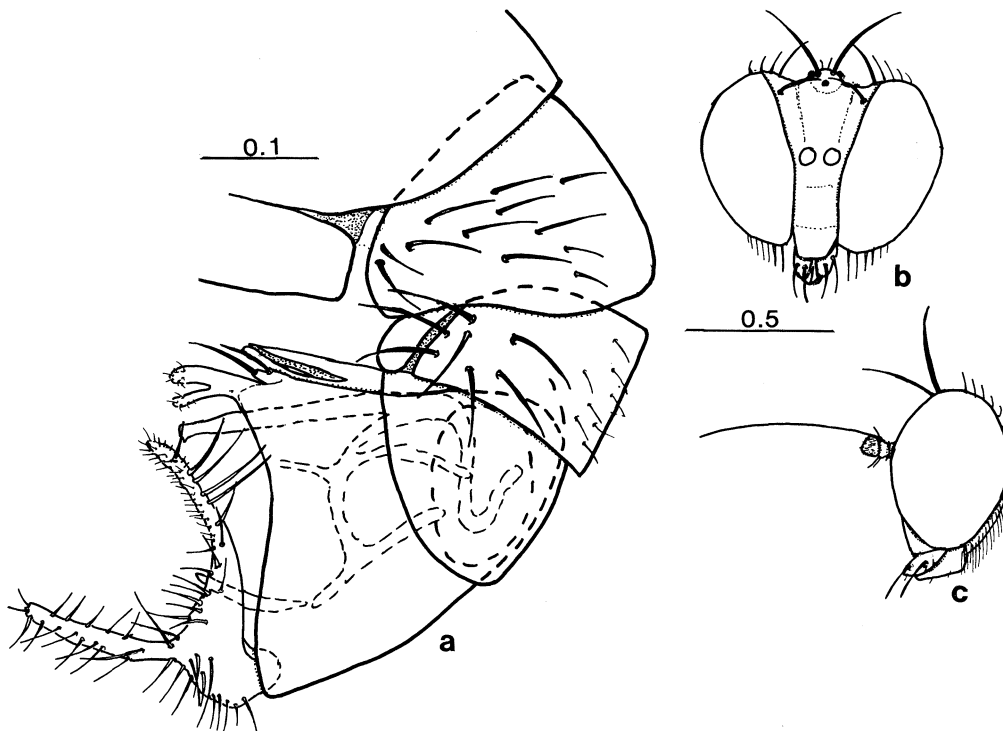


Fig.32. *Pilbara octava*, Millstream, WA: a – male postabdomen, left lateral; b – male head, anterior; c – male head, left lateral.

(Fig. 25). Although morphologically isolated with respect to other Sciapodinae, it is possibly closest to *Dytomyia*. *Pilbara* includes a single species:

octava n.sp. Australia (WA).

***Pilbara octava* n.sp.**

Type material. HOLOTYPE male, PARATYPES 6 males, 8 females, Western Australia, Millstream, 8 Apr. 1971, D.H. Colless; PARATYPE female, same but 12 Apr. 1971 (ANIC).

Description – male. Length: 2.4; wing: 2.0 x 0.7.

Head (Fig. 32b,c). Vertex, frons, face and clypeus metallic green with grey pruinosity; setae black; eyes with anteroventral facets distinctly enlarged; palp yellow, bearing 2 strong setae; proboscis yellow; scape and pedicel yellow, first flagellomere dark brown.

Thorax. Dorsum metallic green-bronze; pleura with grey pruinosity; setae black; 1 pa, only 1 sa, only 1 sr, 2 npl, 1 hm and 1 pm present.

Legs. CI yellow; CII and CIII dark brown; all trochanters and remainder of legs yellow except all t_5 brown; legs relatively short; CI and CII with pale anterior setae; CIII with pale lateral seta; tibiae without major setae; I: 4.1; 3.9; 2.5/1.0/0.7/0.5/0.5; FI bare; II: 4.2; 4.5; 3.0/1.2/0.7/0.5/0.5; FII with 2 very weak basoventral setae, followed distally by row of short black av setae (MSSC); III: 5.0; 6.5; 2.5/1.5/0.8/0.6/0.5.

Wing. Elongate, hyaline (Fig. 120j); M_2 completely absent; M_1 with gentle bend midway between m-cu and apex; anal angle strongly reduced (MSSC); CuAx ratio: 1.0; lower calypter yellow with fan of pale setae; haltere yellowish.

Abdomen. Not elongate; on segments 2-6, basal half of each tergum and narrow band on preceding adjacent matt brown; terga 6 and 7 with some strong setae; segment 7 not elongate (Fig. 32a); hypopygium dark brown with yellow cerci; epandrium subtriangular, without internal setose mound; hypandrium narrow and short, with hypandrial arm arising beyond midlength of hypandrium and extending only to apex of hypandrial hood; epandrial setae absent; epandrial lobe with 2 short bristles; surstylus relatively short and forked; cercus with subequal distal and ventral arms, with ventral arm bearing row of strong inner setae.

Female. Similar to male except lack MSSC and as noted: frons and face slightly wider; chaetotaxy similar; eyes also with enlarged anteroventral facets; FI with 2-3 pale basoventral setae (absent in male); podomere ratios similar, but leg MSSC absent; wing similar but anal angle distinctly present.

Remarks. *Pilbara octava* is known only from Millstream, Fortescue River, in the Pilbara region of Western Australia.

***Mascaromyia* n.gen.**

Etymology. The name *Mascaromyia* combines the main distribution of this genus, the islands of the submarine Mascarene Plateau, with the Greek name for fly, "myia". The gender is feminine.

Type species. *Psilopus pollicifer* Lamb, 1922, here designated.

Diagnosis. General. Rather small, delicate sciapodines with elongate yellow legs.

Head. Male head higher than wide; vertex very shallowly excavated; frons polished metallic green; proclinate vertical setae present in both sexes, often more strongly developed in female; face and clypeus very narrow in both sexes, with male usually holoptic on the face and female almost holoptic; scape usually somewhat prolonged; scape and pedicel usually yellow, first flagellomere black; arista dorsal, arising from base of first flagellomere and not much longer than width of head.

Thorax. Usually metallic green; ac biseriate, but highly reduced and often restricted to anteriormost mesonotum, or totally absent; dc strong, 5-7 present, not sexually dimorphic; lateral scutellar setae absent.

Legs. Some species with av row of black setae on male FIII (MSSC); female FI in basal third almost always with group of 3-5 strong ventral bristles, each bristle arising from a distinct mound-like pedicel; males with FI usually bare; femora without anterior preapical setae.

Wing. Female and unmodified male wings with short M_2 and M_1 arching and becoming subparallel with R_{4+5} ; m-cu straight; male venation of Mauritius species often strongly modified (MSSC).

Abdomen. Male tergum and sternum 7 well developed; hypopygium showing wide range of morphological diversity; sometimes compact, with short modified cerci.

Remarks. Lamb (1922) commented upon the distinctive morphology of a group of Seychelles "*Psilopus*" and noted their similarity to species here regarded as *Sciapus* s.s. and to the genus *Neurigona*. Upon examination of representatives (BMNH), there is little doubt that Lamb's species, along with others from the western Indian Ocean islands of Mauritius, Reunion and Rodrigues form a distinctive group, here raised to generic level and given the new name *Mascaromyia*. C.E. Dyte provided useful manuscript notes on the included species.

Mascaromyia is similar to with *Sciapus* s.s. in thoracic chaetotaxy, and overall habitus. However, *Sciapus* is a compact, natural group, almost certainly monophyletic, and distinguished by anterior preapicals on FIII and a distinctive hypopygium (many species with "Organ X"), both lacking in *Mascaromyia*. Possibly *Mascaromyia* is distantly related to the Pacific genus *Helixocerus* (q.v.).

Species from Mauritius (mostly undescribed, BMNH) tend to have male wings variously modified with distal expansion of membrane, loss of anal angle, distorted

venation, and/or entire loss of M_2 (all MSSC).

In his discussion of the Seychelles species, H. Scott (*in* Lamb, 1922), notes that they predominate in the high montane forests of the island group.

All species here regarded as *Mascaromyia* were referred to *Sciapus* by Dyte & Smith, 1980. *Mascaromyia* contains the following 15 species from the western Indian Ocean Seychelles and Mascarene archipelagos, both of which arise from the submarine Mascarene Plateau.

albitarsis Parent, 1935b: 83. (*Sciapus*), Mauritius, **n.comb.**
amplicaudata Lamb, 1922: 378. (*Psilopus*), (BMNH, examined), Seychelles, **n.comb.**

desjardini Macquart, 1842: 175. (*Psilopus*), (MNHP, examined, female only), Mauritius, **n.comb.**

duplicata Parent, 1932d: 230. (*Sciapus*), Reunion, **n.comb.**

grandicaudata Lamb, 1922: 378. (*Psilopus*), (BMNH, examined), Seychelles, **n.comb.**

guerini Parent, 1935b: 86. (*Sciapus*), Mauritius, **n.comb.**

indistincta Lamb, 1922: 376. (*Psilopus*) (BMNH, examined), Seychelles, **n.comb.**

leptogaster Thomson, 1869: 510. (*Psilopus*) (NHS, examined), Mauritius, **n.comb.**

librativertex Lamb, 1922: 374. (*Psilopus*) (BMNH, examined), Seychelles, **n.comb.**

magnicaudata Lamb, 1922: 377. (*Psilopus*) (BMNH, examined), Seychelles, **n.comb.**

mauritiensis Parent, 1939c: 270. (*Sciapus*) (BMNH, examined, female only), Mauritius, **n.comb.**

parallela Macquart, 1842: 175. (*Psilopus*) (MNHP, examined, female only), Mauritius, **n.comb.**

pollicifer Lamb, 1922: 375. (*Psilopus*) (BMNH, examined), Seychelles, **n.comb.**

rufiventris Macquart, 1842: 174. (*Psilopus*) (MNHP, examined, female only), Mauritius, **n.comb.**

vagabunda Lamb *in* Bezzi & Lamb, 1925: 546. (*Sciapus*) (BMNH, examined), Rodriguez, **n.comb.**

***Helixocerus* Lamb**

Helixocerus Lamb, 1929: 137. Type species *Helixocerus mendosum* Lamb, 1929, original designation.

Diagnosis. *General.* Mostly yellow sciapodines, body length about 3.5, with a glazed cuticle bearing almost no pruinosity.

Head. Vertex not excavated in male, almost straight with only ocellar tubercle evident; frons flat, shining metallic blue-green; vertical setae present in both sexes, but more strongly developed in females; eyes of male with distinctly enlarged anteroventral facets (MSSC); male clypeus not narrowed, but adjacent to sides of eyes; scape prolonged, making antenna appear elongate; first flagellomere as an elongate rounded isosceles triangle; arista dorsal to subapical, not much longer than head height.

Thorax. Yellow with shining metallic green mesoscutum and scutellum; ac developed as 3 pairs (New Caledonian species) or totally absent (Samoan species);

4 dc present, not sexually dimorphic; lateral scutellar setae absent.

Legs. Mostly yellow; femora, tibiae and tarsi mostly bare of major setae; leg MSSC various.

Wing. Elongate; M_2 weak; M_1 with characteristic gentle curve (fig. 7b, Lamb, 1929); Samoan species with modified wings (MSSC); crossvein m-cu straight.

Abdomen. Abdominal plaques well developed on both sexes; hypopygium of characteristic sciapodine appearance, and with very long cercus.

Remarks. Lamb based *Helixocerus* on the Samoan species *H. mendosum*, described from two males and a female. He characterised *Helixocerus* as having a modified male wing with M_1 bowed, M_2 with a field of spine-like subapical microtrichia, and the costa with a row of spines (all MSSC), and a total absence of both ac and dc setae. Both the holotype and female allotype are badly rubbed and lacking dorsal thoracic setae, but dc sockets are evident (a species lacking dc would be most unusual).

I have not found additional specimens of *H. mendosum* in collections. However, I have seen two males of an undescribed species from Western Samoa: Savaii (BPBM) and an undescribed species from New Caledonia: Mount Koghi (BPBM). On the basis of these three species, the genus was diagnosed above.

Helixocerus is known from Samoa and New Caledonia (Fig. 25). The shallowly excavated vertex, antennal structure, presence of four unmodified dc setae, and wing venation characterise the genus. Both Samoan species have the following: arista subapical (MSSC?), CI bare except for with strong black anterior spine-like seta at three-quarters (MSSC?), ac absent, M_1 convexly bowed (MSSC), and wing with hair field (MSSC). The New Caledonian species has a greatly enlarged claw on III_5 (MSSC).

Helixocerus shows some similarities to western Indian Ocean *Mascaromyia*, and both genera have a shining shallowly excavated frons, similar colouration, unmodified dc, long legs with few major setae, similar wings, and modified male wing venation on some Samoan *Helixocerus* and Mauritian *Mascaromyia*. However, none of these similarities can be considered synapomorphies.

Only one species has been described:

mendosum Lamb, 1929: 137. (BPBM, examined), American Samoa, Western Samoa.

The male holotype is missing its left wing and hypopygium, and since both are figured in Lamb's description, they are possibly on slides in Lamb's collection at Cambridge, along with the second male. Only this species has spines along the male costa (MSSC).

***Narrabeenia* n.gen.**

Etymology. The genus *Narrabeenia* derives its name from Narrabeen, NSW, a coastal locale where the genus has been collected. The gender is feminine.

Type species. *Sciapus difficilis* Parent, 1933a, here designated.

Diagnosis. *Head.* Postvertical setae strong; vertical seta strong on both sexes; male frons and upper face shining metallic blue-green, but with patches of pruinosity around base of antennae and on lateral frons; sharp division present between polished upper face and densely pruinose lower face and clypeus (MSSC); face and clypeus broad in both sexes, and male clypeus adjacent to lateral eye margins or only slightly separated; female frons and face uniformly pruinose; male face only slightly bulging; antenna black; pedicel with short dorsal and longer ventral setae; first flagellomere rounded subrounded with dorsal arista.

Thorax. Ac present as irregular row of 6-7 unpaired setae, decreasing in size anteriorly; 5 strong dc present, decreasing in size anteriorly, and not sexually dimorphic; lateral scutellar setae about one-third to half length of medians.

Legs. Mostly yellow, not greatly elongated; CI with 3 strong pale spine-like distolateral setae, and CII with single pale spine-like seta (Fig. 33b,e) (both MSSC); male FI with only pale ventral hairs; female FI with 2-4 pale basoventral setae, absent on male; male TI and TII often strongly modified: swollen and bearing with strong black setae (MSSC); male TI apically bent, making It_1 appear offset (MSSC); male It_1 with ventral concave excavation in basal half, swollen and with pale pile, and with some short dark setae around anterior rim of excavation (MSSC); male It_1 and/or It_2 with ventral projecting pilose pad in basal third (Fig. 33b,e) (MSSC); male IIt_{1-3} strongly modified (Fig. 33c,f): IIt_1 distally expanded with 3 curved dorsal setae; IIt_2 short and distorted, and IIt_3 with distinctive setae (MSSC); male TIII with irregular swelling at half which is bare ventrally and excavated, subtended basoventrally by 3-4 setae (MSSC).

Wing. Elongate, hyaline; M_1 with strong curve to apex (Fig. 121g); crossvein m-cu weakly sinuous and long, making oblique angle with M, and close to wing margin, so that CuAx ratio greater than 4.0.

Abdomen. Terga 2-6 each with 2 strong black dorsal

setae; otherwise abdominal vestiture poorly developed, consisting mostly of pale hairs; hypopygial foramen left lateral in position; hypandrial arm arising beyond midlength and extending to apex of aedeagus; aedeagus with dorsal angle; surstylus with strong ventral setae, apical hatchet-shaped seta, and long peduncle bearing apical seta; cercus elongate and tapering, with long black apical setae.

Remarks. *Narrabeenia* is notable for its highly derived and strong leg MSSC: CI and CII with spine-like distolateral setae, TI swollen, with strong ventral setae and short spines, TI bent apically, making It_1 appear offset, a TIII callus, and especially the complex modification of IIt (Fig. 33e,f). The dc are not sexually dimorphic. The cercus of the *spinipes* Group is long and tapering and the surstylus has a complex of modified setae and projections (Fig. 33a,d).

Female *Narrabeenia difficilis* are distinctly larger than males. Although unusual in the Sciapodinae, such sexual dimorphism in size is found in another dolichopodid subfamily, the Hydrophorinae, where males of some *Hydrophorus* species are known to ride on the backs of females during mate guarding (Dyte, 1988).

Narrabeenia does not have any obvious close relationship with other sciapodine genera. Females of *Narrabeenia* and *Dytomyia* are quite similar in overall appearance, and males have some MSSC in common, which suggests a possible relationship. The genus also shows some similarities to *Abbemyia* in antennal shape, venation, and the presence of strong basoventral setae on FI (at least in females).

The ranges of the two *Narrabeenia* species cover much of the eastern, southern and western continental margin, from Queensland to Western Australia. The genus is primarily coastal, but its specific habitats are unknown, and its southern Australian distribution suggests it is an older element of the fauna.

Included species:

difficilis (Parent), 1933a: 124 (*Sciapus*). (ANIC, examined, female only). Australia (NSW, Qld, Vic., Tas.), **n.comb.**

spinipes n.sp. Australia (SA, WA).

Key to Australian Male *Narrabeenia*

1. FII slightly swollen in basal third, and with posterior row of short black spine-like setae in distal quarter; It_1 only with projecting pilose pad; TII with ventral at half, and strong apical ventral and subapical pd setae; IIt (Fig. 33c); hypopygium (Fig. 33a) (SA, WA)..... *N. spinipes*
- FII swollen at midlength, with subapical dorsal field of short black setae; It_1 and It_2 with projecting pilose pads; TII with row of long posterior setae; IIt (Fig. 33f); hypopygium (Fig. 33d) (Qld, NSW, Vic., Tas.) *N. difficilis*

Narrabeenia spinipes n.sp.

Type material. HOLOTYPE male, South Australia, Belair, 1 Jan. 1972, N. McFarland; PARATYPE male, Sleaford Bay, 9 Jan. 1961 (ANIC).

Additional material. Western Australia – male, Crawley, 25 Feb. 1936; 2 females, Perth, Mount Claremont, 10 Apr. 1968 (ANIC).

Description – male. Length: 7.0; wing: 5.0 x 1.5.

Head. Setae black; strong postvertical seta present, continuation of postocular series; palp yellow with 2 strong black setae and some yellow setae; proboscis yellow; pedicel with short dorsal and longer ventral setae; first flagellomere subrectangular; arista dorsal and about equal to head height; ventral postcranium with abundant pale hairs.

Thorax. Dorsum metallic green-blue; scutellum metallic blue; pleura with dense grey pruinosity; setae black; 5 strong dc present, with short seta laterad of anteriormost

dc (= sr seta?); 1 pa, 2 sa, 0 sr, 2 np, 2 hm and 1 pm present; lateral scutellar setae about one-quarter length of medians.

Legs. CI yellow; CII and CIII dark brown with some pruinosity; trochanters yellow with black distoventral margins; femora, tibiae, It_{1-2} , IIt_1 and $IIIt_1$ yellow; distal tarsomeres dark brown; CIII with strong pale lateral setae subtended by pale hairs; I: 11.0; 10.0; 4.0/3.5/3.8/2.5/1.5 (Fig. 33b); FI with a few pale ventral setae; TI slightly swollen at midlength, with 2 strong black ventral setae at one-third and half (MSSC), and with 5-6 short black spine-like setae in distal half (MSSC); It_2 at one-third with projecting ventral pilose pad (MSSC); II: 13.0; 12.5; 10.0/1.7/3.0/1.5/1.5; FII slightly swollen in basal third, and with posterior row of short black spine-like setae in distal quarter (MSSC); TII greatly swollen at midlength (MSSC), and with ventral at half, and strong apical ventral and subapical pd setae; IIt_2 (Fig. 33c); IIt_1 with dorsal row of short straight setae, and distally expanded with 3 curved dorsal setae (MSSC); $IIIt_2$ black and subrectangular; $IIIt_3$ with distinctive black basal blade-like seta, and with 5 black curved dorsal setae

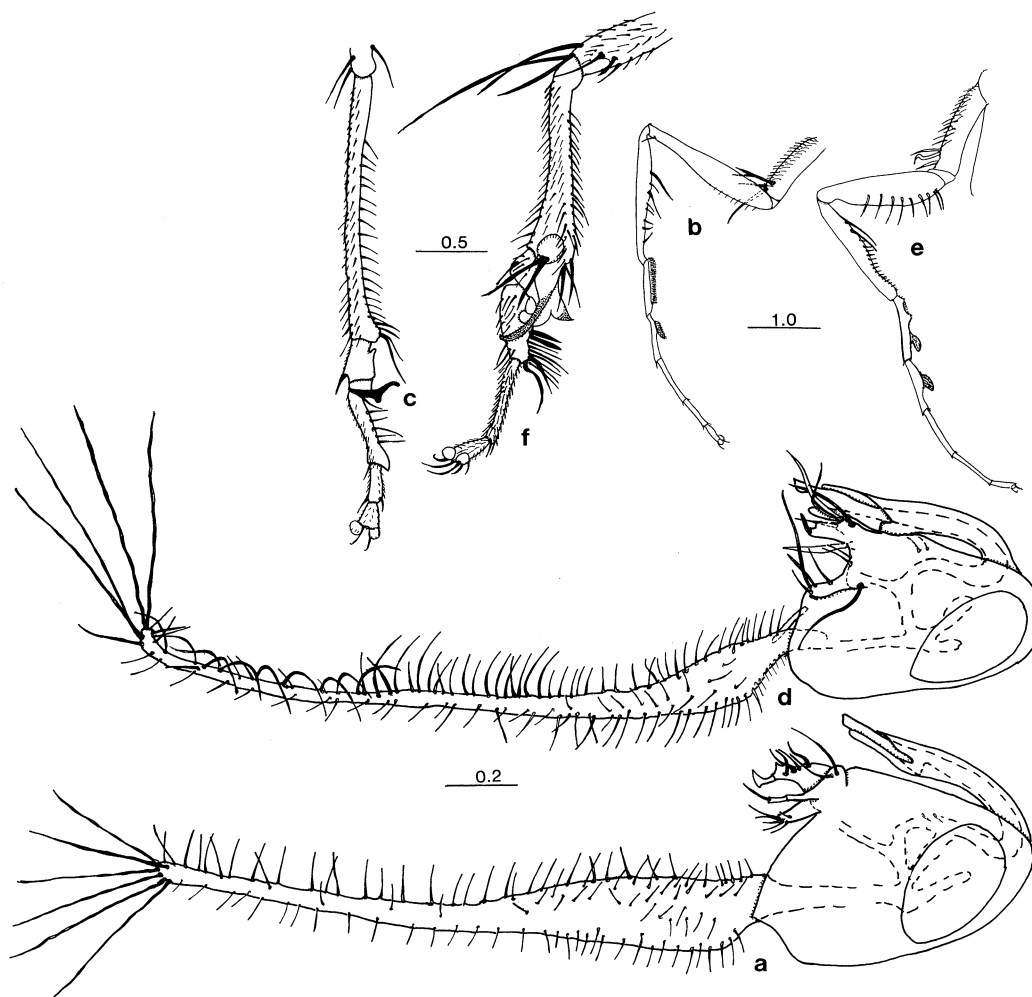


Fig. 33. *Narrabeenia spinipes*, Crawley, WA: a – hypopygium, left lateral; b – male left leg I, posterior; c – male left tarsus II, anterior. *N. difficilis*, Rockhampton, Qld: d – hypopygium, left lateral; Apollo Bay, Vic.: e – male left leg I, posterior; f – male left tarsus II, anterior.

(MSSC); III: 13.0; 18.5; 7.5/4.0/3.0/1.5/1.0; TIII with 3 ad setae.

Wing. Elongate, hyaline with yellowish veins; costa slightly swollen at join with R_1 (MSSC); R_{4+5} somewhat sinuous basally (MSSC); M_2 short, with stub vein and fold continuing to margin; m-cu sinuous, and long, making oblique angle with M; CuAx ratio: 5.0; lower calypter yellow with black rim and pale yellow setae; haltere yellow.

Abdomen. Dark metallic green with bronze reflections but with only narrow matt brown bands at tergal overlap of segments 2-6; tergal window brown; hypopygium dark brown with elongate yellow cercus (Fig. 33a); epandrium subrectangular; 2 setae (= epandrial lobe bristles ?) present on mound; surstylus with strong ventral setae, apical hatchet-shaped seta, and long peduncle bearing apical seta; cercus elongate, with pale lateral setae and long black apical setae.

Female. Similar to male except lacking MSSC and as noted: about same size as males, wing length 4.8; face slightly wider; frons, and upper face also metallic blue-green but completely covered with fine orientated pruinosity; lateral scutellars absent; tarsi mostly yellow except distalmost tarsomeres brownish; CI with 2-3 pale distal setae; I: 9.0; 8.5; 6.0/2.0/2.0/1.0/1.0; FI with 3 pale ventral setae in basal quarter; TI with a few weak ad and pd setae; II: 9.5; 10.0; 7.0/2.2/2.0/1.0/1.0; TII with ad setae at one-fifth, one-third and apically, strong pd at one-third, and ventral at two-thirds, and strong apical av-pv setae; III: 11.0; 15.0; 6.0/3.5 (distal tarsomeres missing); TIII with ad setae at one-tenth, one-third, and strong apical ad seta; III₁ with basoventral seta (FSSC); R_{4+5} straight.

Remarks. *Narrabeenia spinipes* is known from coastal areas extending from South Australia to the Perth district, Western Australia. Females of this species appear to be about the same size as the males.

Narrabeenia difficilis (Parent), n.comb.

Sciapus difficilis Parent, 1933a: 124.

Type material. Parent described *Sciapus difficilis* from a single female collected at Woy Woy, NSW (ANIC, examined).

Additional material. New South Wales – female, Long Reef, Narrabeen, 27 Feb. 1976 (BMNH); female, Jervis Bay, 14 Feb. 1953; female, Pambula Beach, 30 Dec. 1930; female, Broule, 16-17 Jan. 1967 (ANIC). Queensland – male, Rockhampton, no date (AMS). Tasmania – male, Hobart, 29 Dec. 1946 (TMAG). Victoria – male, Apollo Bay, 1 Jan. 1967 (ANIC).

Description – male. Length: 5.7; wing: 5.0 x 1.6; similar to *N. spinipes* except as noted.

Thorax. Lateral scutellar setae about half length of medians.

Legs. CI with 2 strong pale distally hooked distolateral setae, subtended basad by pale hairs (MSSC); CIII with group of strong pale lateral setae; I: 11.0; 10.5; 5.0/4.0/4.5/3.0/2.0 (Fig. 33e); FI basally swollen and with av row of 7-8 strong black setae (MSSC); TI slightly swollen at midlength and with arcuate ventral excavation in distal half, with strong black ventral setae at one-quarter and one-third (MSSC), and ventral serration of short black spine-like setae along arcuate curvature in distal half (MSSC); I₁ at one-third and I₂ at two-thirds each with projecting ventral pilose pad (MSSC); II: 10.0; 13.0; 8.0/1.5/3.0/4.0/1.5; FII swollen at midlength, and with subapical dorsal field of short black setae (MSSC); TII slightly swollen at midlength (MSSC), and in distal half, with row of long, distally lengthening posterior setae, with end apical seta about equal to half TII length, and with very strong black ventral seta (MSSC); II₁ (Fig. 33f): II₁ with dorsal short straight setae, and distally expanded with 3 strong curved dorsal setae, strong ventral setae, and apical pair of strong diverging spike-like projections and long hooked projection (MSSC); II₂ pale and subrectangular, with distal curved claw-like projection (MSSC); II₃ curved, with strong ventral setae in distal half, and with some strong apical setae (MSSC); III: 14.0; 19.0; 7.0/5.0/4.0/2.0/1.5.

Wing. Elongate, hyaline with yellowish veins (as in Fig. 121g); costa and R_{4+5} unmodified; m-cu slightly sinuous and long; CuAx ratio: 5.0.

Abdomen. Hypopygium dark brown with elongate yellow cercus (Fig. 33d); 2 epandrial lobe setae are present on mound which extends dorsad; surstylus complex, with strong setae and projections as figured, and with long external seta arising laterally from surstylar base; cercus slightly tapering, with black lateral seta and long apical setae.

Female. Similar to male except lacking MSSC and as noted: larger than male, with wing length varying from 5.7-6.7; lateral scutellars about one-quarter length of medians; tarsi yellow except distalmost tarsomeres brownish; CI with 2-3 pale distal setae; FI with 4-7 strong pale ventral to av setae in basal half; TI with a few weak ad and pd setae; TII with ad setae at one-fifth, one-third, and apically, strong pd at one-third, and ventral at two-thirds, and strong apical av-pv setae; TIII with ad setae at one-tenth, one-third, and strong apical ad seta; III₁ with basoventral seta (FSSC); wing (121g).

Remarks. *Narrabeenia difficilis* is found along the eastern and southern coasts of Australia from Rockhampton, Qld to western Victoria, and Tasmania.

Females of *Narrabeenia difficilis* are distinctly larger than the males (see Remarks for genus *Narrabeenia*).

Several Tasmanian females have four to five black instead of pale basoventral setae on FI. This is possibly intraspecific variation although I have not seen associated males. They are from: Hobart, no date (MVM); Cambridge, 29 Oct. 1962; Southport, 7 Dec. 1979, on beach (ANIC).

Condylostylus Bigot

Condylostylus Bigot, 1859: 215. Type species *Psilopus bituberculatus* Macquart, 1842, original designation.

Dasyxilopus Bigot, 1859: 215. Type species *Psilopus pilipes* Macquart, 1842, original designation.

Eurostomerus Bigot, 1859: 215. Type species “*Psilopus coerulus* Macquart”, *nomen nudum* (= *Eurostomerus coerulus* Bigot, validated by generic description), **n.syn.**

Aedipsilopus Bigot, 1859: 215, *lapsus* for *Oedipsilopus*.

Oedipsilopus Bigot, 1859: 224. Type species *Psilopus posticatus* Wiedemann, 1830, original designation.

Tylochaetus Bigot, 1889: 215. Type species *Psilopus bituberculatus* Macquart, 1842, original designation.

Laxina Curran, 1934: 230. Type species *Dolichopus patibulatus* Fabricius, original designation.

Agonosoma, authors, not Guérin-Meneville.

Psilopus, authors, not Meigen.

Psilopodinus, authors, not Bigot.

Chrysosoma, authors, not Guérin-Meneville.

Sciapus, authors, not Zeller.

Diagnosis. *Head.* Vertex strongly excavated; strong vertical seta arising from distinct setose mound on frons in both sexes, but not as strongly developed in females (group autapomorphy); male face sometimes bulging beneath antenna; male clypeus broad and close to eye margin; pedicel often with long dorsal and ventral setae, the ventrals usually longer than dorsals; arista usually dorsal, although sometimes dorsoapical.

Thorax. Usually relatively stout and dark metallic green, only rarely with pale thorax or abdomen; usually 2-3 pairs of long ac present; both sexes with 5 strong dc (sometimes 4), without sexual dimorphism; lateral and median scutellars usually equally strong.

Legs. CI with 3 strong black distolateral setae; TI usually without strong setae; TII with ad and pd setae, usually more strongly developed in female than male; MSSC developed on legs I and II: modified setae, crocheted hairs, and shortened tarsomeres; III sometimes with flattened pad-like tarsomeres (MSSC).

Wing. M_1 characteristically with sharp, almost right angle bend at branch with M_2 , sometimes recurved basad, and continuing subparallel with R_{4+5} to apex (eg, Fig. 124c); wing often with dark brown bands, sometimes with enclosed window (this window is either hyaline or with orientated opaque pruinosity giving a silvery reflection when viewed obliquely), although some neotropical species have hyaline wings; crossvein m-cu usually straight (however, some New World species have a slightly sinuate m-cu).

Abdomen. Both sexes with well-developed abdominal plaques on margins of terga 2-5; tergum 7 well developed, but sternum 7 strongly reduced and membranous; hypopygium often relatively small compared with other Sciapodinae, and basally encapsulated within segment 7; epandrium subrectangular and compact, with short lobate surstylus; hypandrial hood often broad and short, and lateral arm of hypandrium reduced or absent; aedeagus bandlike in lateral view; dorsal angle usually present; epandrial lobe not developed or obscured;

usually a strong setal field is present near surstylus-epandrium join which may be homologous to the lobe; cercus usually simple; commonly elongate and filamentous, but sometimes clavate and expanded.

Remarks. The type species of *Condylostylus*, *Psilopus bituberculatus* Macquart, from Brazil, is unrecognised. Macquart described the male as having an arista with two spatulate nodes. The male type is lost, and Parent (1932d) could only locate a decapitated female in the Macquart collection (MNHP, examined). I have scanned large neotropical collections (USNM, AMNH, CNC) but have found no specimens bearing a binodate arista. A few *Condylostylus* have a spatulate apical arisal flag (see below), and the existence of a species with a binodate arista is possible.

The genus *Eurostomerus* Bigot was based on the single included species “*Psilopus coerulus* Macquart”. As noted by Becker (1918), this species is a *nomen nudum*, since it was never described by Macquart. Although a *nomen nudum* has no status in nomenclature, the name *Eurostomerus* is nevertheless valid since it was described before 1930 when it was not mandatory to designate a type species for new genera. *Eurostomerus* is thus a valid name, and the characters given for the genus by Bigot validate the species name with authorship attributed to Bigot (N. Evenhuis, personal communication). I regard *Eurostomerus coerulus* Bigot as a species of *Condylostylus*, and thus *Eurostomerus* is made a synonym of *Condylostylus*.

Becker (1922b) was the first major worker to base a generic concept around Bigot's name *Condylostylus* and referred many neotropical species to it. He defined the genus as having four strong scutellar bristles, a dorsal arista, and black setae on the lower calypter and frons. *Condylostylus* was used by Parent and eventually recognised by Van Duzee (who used *Psilopus* until 1929), and it became established in the literature. The generic concept has served well in the New World, but has been the source of some confusion in the Oriental and Australasian regions. Also, the concept of black versus pale setae on the lower calypter and frons, used in keys to separate *Condylostylus* from *Sciapus* s.l., led to related species being placed in different genera.

The strongly recurved vein M_1 , four strong scutellars, five strong dc, and especially the distinct setose mound on the frons, are usually reliable characters for recognising both sexes of *Condylostylus*. The genus shares a number of features with the Australian endemic genus *Negrobovia* (q.v.), and the two genera are possibly close.

Condylostylus contains approximately 308 described species, with 230 Neotropical (including the Galapagos, and with one species extending into eastern Polynesia), 30 Nearctic, 15 common to both regions, 11 Afrotropical, and 22 Oriental and far-eastern Palearctic species (Fig. 34). Many more species await description. *Condylostylus* shows greatest diversity in the New World tropics where it is the dominant sciapodine element. It has limited diversity in the temperate regions and does not extend

beyond the southern districts of Ontario, Quebec and British Columbia in North America, or into Patagonia and southern Chile in South America. The genus occurs throughout Africa south of the Sahara, and I have seen specimens from Madagascar (AMS).

A strong Neotropical-Afrotropical-Oriental relationship exists and some species groups have a pantropical distribution (also see discussion under Biogeography II: World Fauna and History). For example, the *flagellatus* Group (Milward de Azevedo, 1980a, 1980b), a group with long filiform cerci, includes most Oriental species as well as the neotropical *Condylostylus flagellatus* Becker. The Peruvian *C. filiformis* Becker (Becker, 1922b, fig. 112) has a cercal structure close to that of the Oriental *C. bifilus*.

In the Orient, *Condylostylus* is distributed in a band through the moist tropics from India and Sri Lanka to Sundaland and along the China Sea as far north as Japan. The genus is not known from the interior of Asia. Possibly one species has crossed Weber's Line into the Papuan subregion. I have seen a female from Maluku (Bucan Island) (USNM), and the wing figure of *Chrysosoma nubeculosum* Becker from New Guinea (regarded as *nomen dubium*, q.v.) suggests *Condylostylus* and not *Chrysosoma*. Most Oriental species show some intraspecific variation in the extent and intensity of wing maculation, and in the length of their filiform cerci.

The extension of the widespread neotropical *Condylostylus longicornis* into French Polynesia (Fig. 34) is of considerable interest, indicating long distance dispersal from Central or South America rather than from the usual western sources. Accidental human introduction is unlikely, since the species is found on several isolated island groups, suggesting a long period to allow secondary dispersal within eastern Polynesia. The species is also newly recorded from the Galapagos Islands.

At least two species of *Condylostylus* are present in Dominican Republic amber (AMNH material), mid to late Tertiary in age, one with banded wings, the other with hyaline wings.

The genus *Amblypsilopus* is probably derived from *Condylostylus* and some species have characters intermediate between the two genera. The Neotropical *Amblypsilopus armiger* Van Duzee, for example, has four strong scutellars and a hypopygium like *Condylostylus*, but lacks the recurved M_1 and setose mound on the frons.

Despite its diversity in the New World, *Condylostylus* is of rather fixed habitus and does not show the morphological plasticity found in *Chrysosoma* and *Amblypsilopus*. Of interest, however, is the development of strongly flattened III_{4+5} (MSSC) in the Neotropical *Condylostylus barbipes* Van Duzee, *C. erectus* Becker, and *C. lopesi* Milward de Azevedo, convergent with other sciapodine genera. Also, the strongly modified venation (MSSC) of the common central African *C. pateraeformis* Becker and *C. imitator* Curran is unusual.

Notes on Neotropical *Condylostylus*

Milward de Azevedo (1976a, 1976b, 1976c) treated the 16 species of the New World *caudatus* Group and provided detailed hypopygial figures.

Some New World species originally described in *Chrysosoma* or placed there by Robinson (1970) belong in *Condylostylus*. Although these species have an apical arista similar to Old World *Chrysosoma*, they also have the distinctive *Condylostylus* characters of two pairs of strong scutellars, recurved M_1 , setose mound on the frons, and characteristic

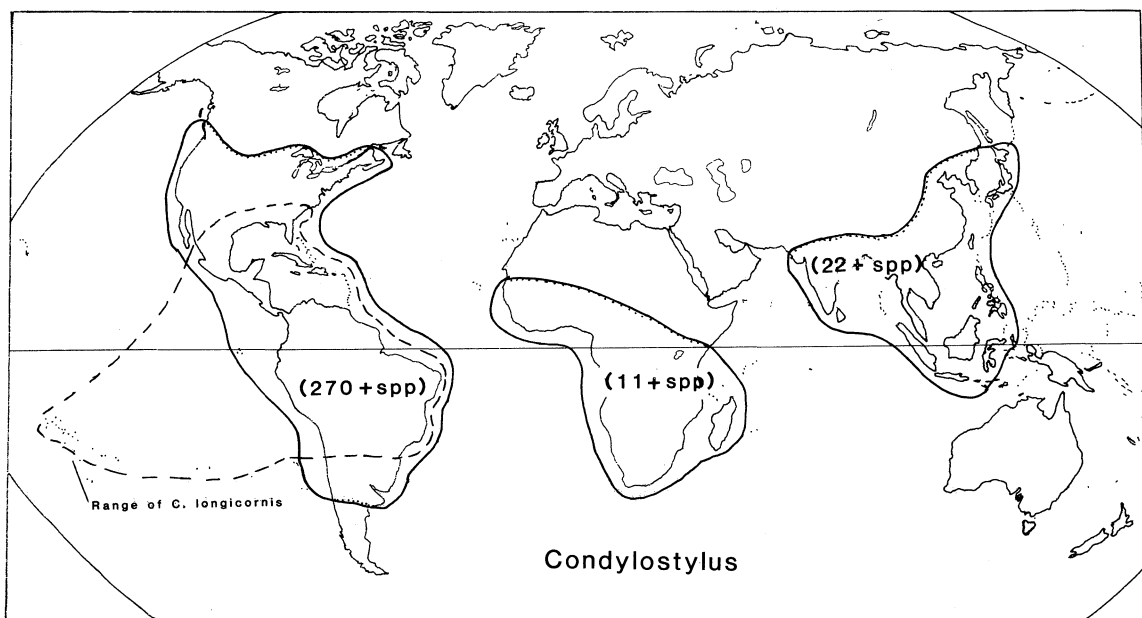


Fig.34. Distribution, *Condylostylus*.

male postabdomen. Four of these New World species, *Condylostylus latipicatus*, *C. mirecilatus*, *C. nobilissimus* and *C. villosipes*, also have developed apical arisal flags (MSSC), similar to those of the Old World *Chrysosoma leucopogon* Group. [The only Neotropical *Chrysosoma* is *C. crinorne*, possibly an accidental introduction to Brazil]. The following Neotropical and Nearctic species were listed as *Chrysosoma* by Robinson (1970). All have been reported from Mexico, Central America and South America, but *C. comatus* and *C. crinitus* were first described from the United States and *C. semicomatus* has also been reported from North America. These three species have been treated as *Condylostylus* (Robinson, 1964, Foote *et al.*, 1965) but Robinson & Vockeroth (1981) key them as *Chrysosoma*. All are here referred to *Condylostylus*; * indicates examination of identified material. [The other two species listed as *Chrysosoma* by Robinson (1970) were species whose provenance was then unknown. They are now regarded as not being from the New World; see elsewhere, *Condylostylus formosus* and *Amblypsilopus exul*.]

barbipes Van Duzee, 1934b: 367.*

comatus Loew, 1861c: 89. (*Psilopus*).*

crinitus Aldrich, 1904: 283. (*Psilopodinus*).*

albiapicatus Parent, 1929b: 206.

inopinatus Parent, 1933b: 163. (*Chrysosoma*) (female only), **n.comb.**

latipicatus Van Duzee, 1933b: 67. (*Chrysosoma*), **n.comb.**

loriferus Parent, 1934b: 163. (*Chrysosoma*), **n.comb.**

mirecilatus Parent, 1928: 177.

nobilissimus Aldrich, 1901: 360. (*Psilopus*), **n.comb.***

perplexus Parent, 1933b: 164. (*Chrysosoma*), **n.comb.**

This species is very close to *barbipes* and *villosipes*.

schmidtii Parent, 1954: 222. (*Chrysosoma*), **n.comb.***

semicomatus Van Duzee, 1929a: 4. (*Psilopus*).*

villosipes Parent, 1933b: 185.

The following species were omitted from Robinson's 1970 Catalog of the Neotropical Dolichopodidae.

pleuralis Thomson, 1869: 510. (*Psilopus*) (NRS, not seen), Puna, Ecuador, **n.comb.**

Becker did not treat this species in either his 1922a or 1922b monographs.

pretiosus Walker, 1849: 648. (*Psilopus*) (BMNH, examined), Brazil.

zonatulus Thomson, 1869: 509. (*Psilopus*) (NRS, not seen), Puna, Ecuador.

Becker (1922a) regarded this species as *Condylostylus* but thought the type locality was Puna, India.

The Oriental, Palearctic and Pacific *Condylostylus*

The following *Condylostylus* species are found in the Oriental region, Japan, or the eastern Pacific.

albifrons Parent, 1932d: 215. (UMO, examined, female

only), Assam.

bifilus Wulp, 1892: 201. (*Psilopus*) (ZMUA, examined), Java, Sumatra, Flores, Lombok.

pulchripennis Parent, 1929: 231. (MLUH, examined, badly damaged and moulded), Java, **n.syn.**

nimbatinervis Parent, 1932b: 106. (MLUH, examined), Flores, **n.syn.**

These three species have the same distinctive cercus and male It_1 with ventral pile. Although the wing maculation of *C. nimbatinervis* is faint, the enclosed opaque white spot behind R_{4+5} is evident. *Condylostylus bifilus* was redescribed and figured by Hollis (1964a: 201).

Additional records. Indonesia: Lombok (ANIC).

brunnicosus Frey, 1925: 18. (ZMH, examined), Philippines.

This species has TIII mostly brown but with yellow at very base and in distal quarter.

Additional records. Philippines: Mount Makling (USNM); Luzon: Acupan, Benguet (MCZ).

caii Parent, 1934c: 118. (MHNP, examined), India and Nicobar Islands.

I have seen specimens from southern India: Chincona, Anamali Hills (CNC) and the Nicobar Islands (ZMUC). Only slight differences distinguish this species from *C. conspectus* and they are possibly conspecific.

conspectus Becker, 1922a: 225. (ZSI, not seen), India, Burma, Nepal, Thailand, Bangladesh.

nigrosetosus Parent 1937a: 142. (BMNH, examined, female only), India, **n.syn.**

The female holotype of *C. nigrosetosus* is identical in wing pattern and colouration to *C. conspectus*.

Additional records. Nepal: Birgang, near Lothar, 130 m (CNC); Thailand: Chiang Mai Province (ZMUC). India: Calcutta. Bangladesh: Dacca (BMNH).

fenestratus Wulp, 1892: 200. (*Psilopus*) (ZMUA, examined), Java, Taiwan, Sumatra, West Malaysia. Parent (1934a: 32) had placed *C. fenestratus* in synonymy with *C. tenebrosus* but Hollis (1964a: 251) correctly re-established it as a separate species.

Additional records. Java: Tjibodas (ZMUC); Taiwan: Sakahen (MCZ); Sumatra: Mount Karintji; West Malaysia: Pahang, Cameron Highlands (BMNH).

formosus Parent, 1934b: 281. (*Chrysosoma*) (BMNH, examined), locality unknown, **n.comb.**

The male holotype of *C. formosus* bears a label reading "Gul 1933" or "Sul 1933", a locale Parent was unable to determine. Its description and figures are similar to those of Oriental *Condylostylus* and it is perhaps a synonym of *C. brunnicosus*. Both species have yellow antennae, unusual in Oriental *Condylostylus*. The type locality may be in the Philippines, or elsewhere in Asia.

impar Becker, 1922a: 226. (TMB, lost; female only), Sri Lanka.

Becker described *C. impar* from one female. This species is distinctive for its small size, all coxae

yellow, CI with 3 black setae, and scape and pedicel black with first flagellomere red-yellow. I have not seen specimens of this species. Perhaps it was described from an unusually small specimen of *C. nebulosus*.

japonicus Kasagi, 1984: 293. (Osaka University, not seen), Japan.

As noted by Kasagi, this species is close to *C. paraterminalis*.

latipennis Parent, 1941: 210. (ZMHB, not seen), China (Hainan Island, Hong Kong), West Malaysia, Burma, Vietnam.

The unusual hypopygium of this distinctive species is similar to that of some Afrotropical and Neotropical species.

Although not mentioned in Parent's original description, the base of It_1 is distinctly flattened with yellow ventral pile (MSSC). Females have 3 strong black setae on CI and 5-6 short black ventral spine-like seta on FI.

Additional records. Hong Kong (ZMUC), West Malaysia: Selangor Kepong (USNM); Kuala Lumpur (BMNH); Templar Park (ZMUC). Burma: Rangoon (BMNH). Viet Nam (CED).

latitarsis Becker, 1922a: 210 (*Sciapus*) (TMB, lost), Taiwan, **n.comb.**

Becker placed this species in *Sciapus* because of its pale lower calypter setae. However, on the basis of thoracic chaetotaxy, venation and cercal structure, it belongs in *Condylostylus*.

longicornis Fabricius, 1775: 783. (*Musca*) (ZMUC, examined), "America"; West Indies, southern USA, Mexico, Central America, Panama, Venezuela, Peru, Bolivia, Brazil, Galapagos Islands, French Polynesia (Austral, Society, Marquesas and Tuamotu Groups), **n.comb.**

chrysoprasi Walker, 1849: 646. (*Psilopus*) (BMNH, examined), "West Indies" (syn. Bickel & Dyte, 1989).

ciliipes Aldrich, 1901: 355 (*Psilopus*) (BMNH, examined), Mexico (syn. Bickel & Dyte, 1989).

The two male syntypes of *Musca longicornis* from "America" (ZMUC) are damaged by pests and mould, and are missing their abdomens and some legs. However, the following features are clearly distinguishable: lateral slope of frons with abundant pale setae; scape with ring of long setae; antenna rather small, and arista about as long as head width; M_1 strongly recurved as is characteristic of *Condylostylus* and approaching R_{4+5} at apex; femora black; TI yellow, TII and TIII black; TII with 12 av setae, and IIt_1 with series of strong black setae (MSSC). Despite Fabricius' original description, "antennae nigrae, pilosae setaeque unica longitudinae fere corpus", the arista is short and not much longer than the head width. The types of *M. longicornis* were compared directly with identified specimens of the common New

World *Condylostylus chrysoprasi* (Walker) and paratypes of its junior synonym, *Psilopus ciliipes* Aldrich and they are identical. Thompson (1981: 16) suggested that the "America" type locality is probably the Virgin Islands.

On the basis of Fabricius' description of the antenna, Becker (1922b) considered *Musca longicornis* to be the senior synonym of the common Indo-Australian *Dolichopus crinicornis* Wiedemann, and he established the widely used combination *Megistostylus longicornis* Fabricius (= *Chrysosoma crinicornis* Wiedemann, q.v.). Becker (1922b: 283) also regarded Wiedemann's (1830: 220) concept of *Psilopus longicornis* as incorrect, and being equivalent to *Psilopus chrysoprasi* Walker, which he thought could not be the Fabrician species. However, Wiedemann had seen the Fabrician types and was correct, even though Fabricius' description does not accurately portray the species. Loew (1864) also suspected that *M. longicornis* and *P. chrysoprasi* were synonyms. (Possibly the *Musca longicornis* specimens are mislabelled, but I can only accept the labels as stand, and must regard Fabricius' description as inaccurate).

Milward de Azevedo (1980a), provided a detailed description of the male hypopygium and Neotropical distribution data.

Additional records. I have seen additional specimens of *Condylostylus longicornis*, identical in all respects to New World material: Ecuador: Galapagos: Isabela Islands, near Villamil, arid forest and mangrove thicket, 20 m; Floreana Island, near Black Beach, arid zone, 120 m (CNC). French Polynesia: Austral Islands: Tubai (BPBM, USNM); Mahi; Rurutu Island, Moera (BPBM). Marquesas Islands: Fatuhiva Island, and Hiva Island (BPBM). Society Islands: Tahiti (CNC, BPBM); Huahiaa Island; Fara Island; Taha'a Island, Mount Tete, 400 m; Raiatea Island, Temehani, 700 m (BPBM), Bora Bora, and Raiea Uturoa (BPBM, BMNH). Tuamotus: Takaroa Atoll; Rangiroa Atoll (BPBM). These new records represent a widespread eastern Polynesia extension of this common Neotropical species.

Lectotype here designated for *Musca longicornis* Fabricius: male with label "longicornis" (ZMUC).

luteicoxa Parent, 1929: 225. (MLUH, examined), Assam, Taiwan, Japan.

The male holotype of *C. luteicoxa* is somewhat moulded and damaged and missing leg II. Hollis (1964a: 250) had interpreted Parent as describing TI with a long apicoventral bristle (as in *C. setifer*). However, on the holotype only a normal short seta is present in that position. According to Parent's description, this species has an ad series of pale crocheted hairs on IIt_1 . Parent also records this species from Taiwan, with additional descriptive notes (1932c) and

Japan (1934c).

A series of 13 males and two females from Darjeeling, India (BMNH), collected by Brunetti (1910-1917) represents a closely related undescribed species. A male from this series bearing the label "*Psilopus vigilans* Beck, det Becker" is not *C. vigilans* as described by Becker and not part of the 1900 series mentioned in Becker's original description. This undescribed Darjeeling species differs from his *C. vigilans* (= *C. nebulosus*) in having long pale ventral hairs on FII, ten to 12 dark crocheted dorsal setae on the distal two-thirds of TII and an ad series of pale crocheted hairs which continues as a close series on II_t (MSSC) (such crocheted leg II setae are similar to those found on some Australian *Heteropsilopus*).

lutheri Frey, 1917: 7. (*Psilopus*) (ZMH, examined), Sri Lanka.

Additional records. Sri Lanka: Kahalia, Katugastota C.P. (CNC)

nebulosus Matsumura, 1916: 374. (*Psilopus*) (Hokkaido University, not seen), Japan, Taiwan, southern China, India (Assam, Bengal), Philippines, Sumatra, Nepal, Sri Lanka.

vigilans Becker, 1922a: 226 (preoccupied by Becker, 1921). (ZMHB, examined and ZSI, not seen), Taiwan and India, **n.syn.**

beckeri Frey, 1925: 19 (n.name for *vigilans* Becker, 1922a; preoccupied by Speiser, 1920), **n.syn.**

theodori Frey, 1925: 77 (n.name for *beckeri*, Frey), **n.syn.**

I have examined long series of *C. nebulosus* from Japan, Taiwan, Nepal, Sri Lanka and the Philippines, and some intraspecific variation in cercal length and intensity of wing maculation is evident. However, variation between regions is not greater than found within a series from a given locale. The only significant difference is the slightly smaller size (4.0-4.5 mm) of high altitude Nepal specimens. The wing of a specimen from Japan is shown in Figure 124c. (Also see discussion under *C. luteicoxa*, above.)

Additional records. Japan: Tokyo, Mount Kurama and Kyoto (CNC). Nepal: Katmandu, Godavari, 1530 m (CNC). China: Kiangsi, Hong San (USNM). Thailand: Chiang Mai Province (ZMUC). Indonesia: Sumatra (USNM). Sri Lanka: Kandy District (CNC, USNM).

Lectotype here designated for *Condylostylus vigilans* Becker: male with label "Formosa Sauter Koshun 1908 x" (ZMHB).

ornatipennis de Meijere, 1910: 86. (*Agonosoma*) (ZMUA, examined), Java, Taiwan, Indochina, Sri Lanka, southern China.

The antenna is black, not yellow as noted in the key by Hollis (1964a: 249).

Additional records. Sri Lanka: Kahalia, Katugastota C.P., 500 m (CNC). China: Hainan Island (USNM).

paraterminalis Dyte, 1975: 227 (n.name for *terminalis* Becker, 1922a), Taiwan.

terminalis Becker, 1922a: 227 (preoccupied by Becker, 1921). (TMB, lost), Taiwan.

Additional records. Taiwan: Taipei (CNC).

perforatus Parent, 1934b: 294. (BMNH, examined, female only), Thailand.

profundus Becker, 1922a: 222. (DEI, not seen), India. *scopulosus* Parent, 1937: 143. (BMNH, examined), India, **n.syn.**

The types of these two species were collected at the same locality. *Condylostylus scopulosus* agrees in every detail with the description and figure of *C. profundus*. The femora and tibiae of the male are black while those of the female are mostly yellow. Parent's description and figures accurately portray this species.

Additional records. India: Manshola, Tinnevely District, 1150 m (BMNH); Kodaikanal, Pulney Hills, 1900 m, (BMNH, CNC); Cinchona, Anamalai Hills, 1060 m (CNC).

setifer Parent, 1929: 235. (MLUH, examined), Java, Sri Lanka.

Additional records. Java: Batu Gebang (USNM); Sri Lanka: Keg District, Kitulgala, Makande (USNM); Kandy District (BMNH).

striatipennis Becker, 1922a: 223. (TMB, lost), Taiwan.

tenebrosus (Walker), 1856: 16. (*Psilopus*) (BMNH, examined, female only), Singapore, Formosa, Sumatra, Java, Sabah, Sarawak, West Malaysia.

jacobsoni de Meijere, 1910: 85. (*Agonosoma*) (ZMUA, examined), Java, **n.syn.**

violaris Enderlein, 1912: 397. (*Psilopus*) (Warsaw, not seen), Sumatra.

atratum Parent, 1935a: 362. (*Chrysosoma*) (BMNH, examined), Sabah, **n.syn.**

Walker described *Psilopus tenebrosus* from a single female. De Meijere noted its strong similarity to his *Agonosoma jacobsoni*. I regard them as synonyms. I have compared paratypes of *Chrysosoma atratum* (AMNH) with the type of *A. jacobsoni* and they are identical. Hollis (1964a: 251) placed *P. violaris* in synonymy with *C. tenebrosus*.

Parent regarded this species as *Chrysosoma* even though the arista is dorsal and M₁ strongly recurved. The white window on the dark brown wing varies somewhat in size among specimens. Parent's description (1935a: 362) accurately portrays the species.

Additional records. West Malaysia: Padang (AMNH); Fraser's Hill (AMS); Cameron Highlands (BMNH). Indonesia: Brastagi, Sumatra (MCZ). Sarawak: Kuching (BMNH). Sabah: Mount Kinabalu, 950-1900 m; Quoin Hill (BMNH).

A closely related undescribed species occurs in Thailand: Chiang Mai Province (ZMUC).

victorisetae Hollis, 1964a: 249. (ZMUA, examined), Sumatra.

Key to Male Oriental and Eastern Palearctic *Condylostylus*

1. TI with 1 or 2 long apicoventral setae 2
 — TI without such long apicoventral setae 5
2. TI with single long apicoventral seta 3
 — TI with 2 long apicoventral setae, although one shorter than other 4
3. CI black (Java, Sri Lanka) *C. setifer*
 — CI yellow (Sri Lanka) *C. lutheri*
4. CI black and femora black; TII bare (Java, Taiwan, Sri Lanka) *C. ornatipennis*
 — CI yellowish; femora yellow with only apices darkened; TII with ad
 and pd setae (Sumatra) *C. victoriseta*
5. All coxae yellow; cercus long and filiform 6
 — At least CII and CIII brown or black; cercus various 8
6. Wing with 2 narrow separate brown bands (Taiwan) *C. latitarsis*
 — Wing with large brown maculation enclosing 2 opaque white spots 7
7. Leg II without pale crocheted setae (widespread Oriental) *C. nebulosus*
 — IIt with ad series of pale crocheted hairs (Assam, Taiwan, Japan) *C. luteicoxa*
8. CI and femora yellow (sometimes with femoral apices infuscated) 9
 — CI and femora mostly black 12
9. Antenna yellow; all femora basally yellow and distally brown; TIII
 basally dark brown with apical quarter yellow; cercus long and
 filiform (Philippines) *C. brunnicosus*
 — Antenna black; femora and tibiae entirely yellow 10
10. Wing dark brown but with distinct white opaque window; cercus
 elongate and filiform; length greater than 6.0; TI with 2 pd setae
 (Indonesia, Malaysia) *C. tenebrosus*
 — Wing dark brown but without white window 11
11. Cercus relatively short; lower calypter with black setae (Taiwan) *C. paraterminalis*
 — Cercus longer; lower calypter with pale setae (Japan) *C. japonicus*
12. Cercus expanded and hatchet-shaped; It₁ basally flattened; femora with
 yellow apices (China, West Malaysia) *C. latipennis*
 — Cercus strap-shaped or filiform, never hatchet-shaped 13

13. Cercus as short bare curved arm, not extending much beyond apex of surstylus and with incurved apical setae (India, Burma, Nepal, Thailand) *C. conspectus*
 (southern India) *C. caii*
- Cercus filiform and extending beyond apex of surstylus 14
14. Wing maculation as narrow bands over posterior veins (Taiwan) *C. striatipennis*
- Wing maculation as broad transverse bands 15
15. It_1 with ventral pile; cercus distinctive with basal lamella from which arises filiform projection (Indonesia) *C. bifilus*
- It_1 without ventral pile; cercus without basal lamella, but entirely tapering and filiform 16
16. Tibiae black; cercus elongate, tapering and setose (southern India) *C. profundus*
- Tibiae yellowish; cercus with distinctive ventral setose mound (Java, Taiwan, Sumatra, West Malaysia) *C. fenestratus*

Naufraga Bickel

Naufraga Bickel, 1992: 36. Type species *Condyllostylus hexachaetus* Parent, 1933b, original designation.

Diagnosis. *Head.* Strong vertical setae present in both sexes; sides of face converging ventrally; pedicel with ring of setae; first flagellomere subrectangular but projecting ventrally; arista distinctly dorsal.

Thorax. Mesonotum broad and rounded; ac setae developed as 2-3 strong irregular pairs; 5 strong dc setae present, not sexually dimorphic; scutellum of both sexes with 3 pairs of marginal setae: inner pair about half length of medians, median pair strong, and lateral pair also about half length of medians; propleuron without strong seta.

Legs. Femora without anterior preapical setae; all tibiae with distinct paired or offset pairs of ad-pd setae.

Wing. M_2 slightly bowed with respect to M_1 .

Abdomen. Appearing slightly annulated; abdominal plaques reduced in size on males; hypandrium asymmetrical, with left lateral arm and hood; aedeagus elongate, but lacking dorsal angle; cercus elongate and with shallow apical bifurcation; each hemitergite of female oviscapt with two spatulate apical setae.

Remarks. Parent described the species *Condyllostylus hexachaetus* from a single female. Bickel (1992) described the male and erected the monotypic genus *Naufraga* to accommodate it. It is known only from the South Island of New Zealand (Fig. 25) and is a Gondwanan relict taxon.

The phylogenetic position of *Naufraga* within the Sciapodinae is unclear. It is unusual in having the sides of the face converging ventrally, three pairs of strong marginal scutellar setae in both sexes [these are primary setae not to be confused with the supernumerary scutellar

setae (MSSC) found on males and sometimes in a weakened expression on females of some *Parentia* species], and strong offset paired ad-pd setae on all tibiae.

It has a number of character states which are plesiomorphic with respect to the sciapodine groundplan: strong vertical setae on both sexes, dc not sexually dimorphic, hypandrium asymmetrical, with left lateral arm and hood and aedeagus without dorsal angle.

Naufraga is somewhat isolated within the Sciapodinae. However, the absence of the FIII anterior preapical seta would associate it with the diverse and complex tribe Chrysosomatini.

Included species:

hexachaeta Parent, 1933b: 343. (*Condyllostylus*) (CMNZ, examined), New Zealand.

See discussion in Bickel, 1992.

Parentia Hardy

Parentia Hardy, 1935: 249. Type species *Condyllostylus separatus* Parent, 1932a [= *Parentia dispar* (Macquart), 1850], by original designation.

Chrysosoma, authors, not Guérin-Meneville.

Condyllostylus, authors, not Bigot.

Sciapus, authors, not Zeller.

Diagnosis. *Head.* Male with pair strongly diverging ocellars and 2-3 pairs of shorter posterior setae on tubercle (MSSC), which are weakly developed in female; postvertical setae strong, positioned as last of the postocular series; strong curved vertical seta present in both sexes; males sometimes with additional hairs on lateral slope of frons (MSSC); face slightly bulging in male; face expanded laterally in males (Fig. 36b); clypeus often separated from face by strong frontoclypeal suture, especially in males (Fig. 36b); clypeus often

semicircular in anterior view (Fig. 36b), and at most only slightly separated from sides of eyes in males; head often relatively wide and 'dumb-bell' shaped, and vertex usually strongly excavated (Fig. 36b); male pedicel sometimes with corona of strong apical setae (MSSC); first flagellomere subrectangular to subtriangular, with dorsal or dorsoapical arista; apical arisal flags (MSSC) developed on some New Zealand species.

Thorax. Ac usually present as 2-4 long pairs, but sometimes reduced; male usually with 2 strong posterior dc, and 3-4 distinctly weaker anterior dc (MSSC); female with 4-5 strong dc; lateral scutellar setae usually strong, about half to two-thirds length of medians, although reduced to weak hairs or absent in some New Zealand species.

Legs. Femora in male often with long, distally decreasing av and pv bristles whose colour, number and size are often species specific; female femora usually with much shorter av and pv setae; TI usually bare of major setae; TII usually with offset ad-pd setal pair in basal quarter, except where modified in males; male TII and III sometimes covered with short black porrect setae or modified with rows of outstanding setae (MSSC); male TIII from one-fifth to half usually with swollen callus with smooth excavated posterior groove (MSSC); male III_t_{3,5} almost always flattened and padlike ventrally (MSSC).

Wing. M₂ usually arcuate and forming a broad U-shaped figure with M₁ (Fig. 122a-f); male costa usually with av row of crocheted or modified setae from base

to end of R₂₊₃ (MSSC) (sometimes absent, especially in New Zealand species); male R₁ very long, extending subparallel to R₄₊₅ to end in distal third of wing; female R₁ usually ending in basal half of costa; crossvein m-cu straight, and forming near right angle with M; haltere usually black in males and yellow in females.

Abdomen. Usually entirely metallic green, without the matt brown tergal bands often found in other Sciapodinae; abdominal terga with long black and sometimes undulating posterior setae, longer than in other Sciapodinae; female terga 2-5 each with 3-4 abdominal plaques, reduced in size in male; hypandrial arm rather short, arising beyond midlength of hypandrium and usually extending only slightly beyond apex of hypandrial hood (eg, Fig. 37a,e), but reduced to absent in the *nudicosta* Group (eg, Fig. 40e); aedeagus elongate, extending well beyond apex of hypandrial arm; dorsal angle present or absent; setose mound often present on lateral walls of genital chamber within the epandrium, dorsad of epandrial lobe (Fig. 37a); male cercus usually with ventral projection or lobe.

Remarks. Hardy (1935) erected *Parentia* on wing characters, to include Australian species with R₁ elongate and costa with a row of crocheted setae (both MSSC). Some species lack these modified costal setae, but a mosaic of other characters such as the arcuate M₂, semicircular clypeus, pad-like III_t_{3,5} (MSSC), TIII callus (MSSC), short hypandrial arm, and cercal structure serve to unite the genus. With the expanded definition, the

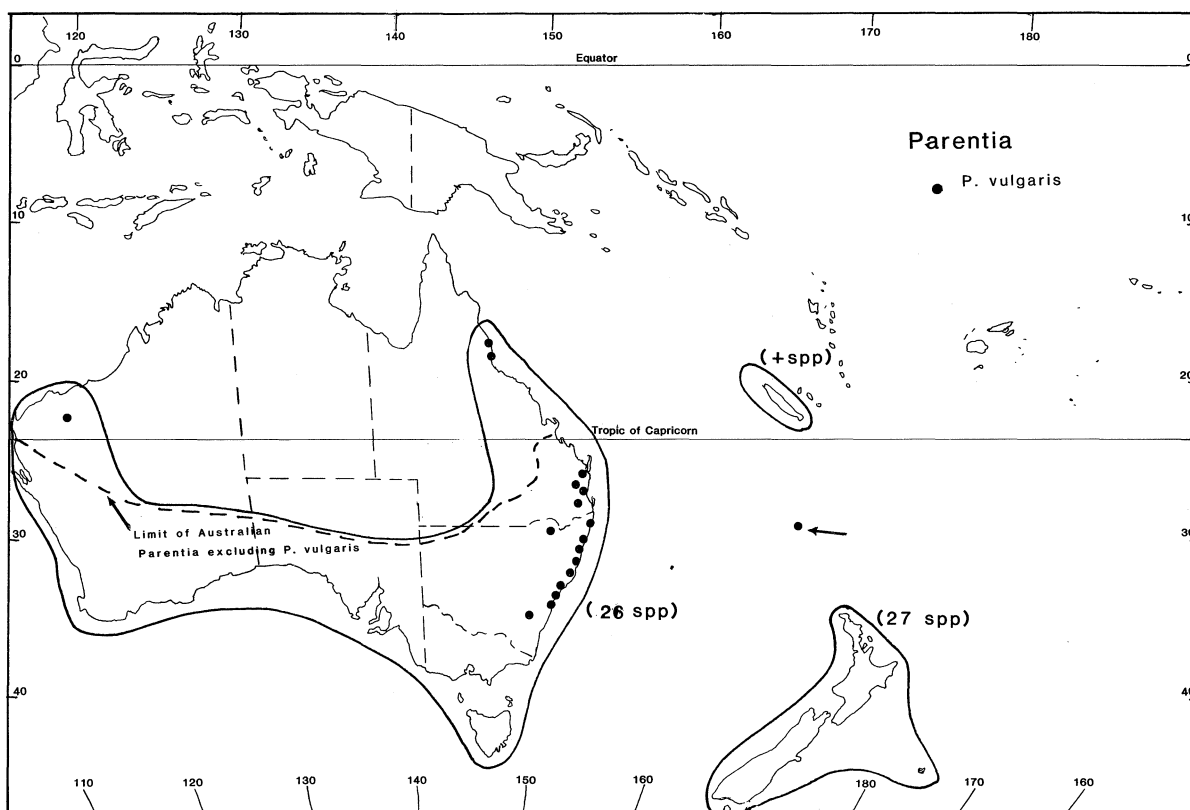


Fig.35. Distribution, *Parentia*.

genus now includes species from Australia, New Zealand, Norfolk Island and New Caledonia (Fig. 35). For a cladogram treating all trans-Tasman *Parentia* groups, see Bickel, 1992.

Parentia is unusual in having the 'dorsal angle' of the aedeagus either present or absent, even among such closely related species as *P. barbarae* and *P. timothyi*. In most other sciapodine genera, the dorsal angle is almost always present.

In Australia, most *Parentia* show a classical Bassian distribution along the southern margin of the continent (Figs 10, 35). *Parentia* is found in wet eucalypt forests, dry sclerophyll woodland, and heaths, and is one of the few sciapodine genera in semiarid to arid habitats, often well away from permanent water. Indeed, while collecting with yellow pans in Western Australia, large numbers of *Parentia* were taken in dry sclerophyll woodland and sandplain heath, while pans set along watercourses attracted very few specimens. This is almost the reverse of collecting experience in eastern Australia, where creeks provide the best collecting. Most *Parentia* species fly from late winter to early summer.

Parentia is the dominant sciapodine element in the New Zealand fauna, further attesting to its south temperate affinities. Bickel (1992) treats the 27 New Zealand species and puts the Australian fauna in a phylogenetic context. There are strong similarities between the faunas of the two landmasses, with a trans-Tasman sister group relationship, and similar morphological developments, such as the excessive pilosity of the Australian *P. nigropilosa* and the New Zealand *P. malitiosa*. However, the New Zealand fauna displays much greater morphological diversity and innovation, with additional MSSC (such as apical arisal flags) and more variable expression of such MSSC as the TIII callus and costal cilia. Many New Zealand *Parentia* are cool-wet adapted and often found in association with *Nothofagus* forests, a habitat devoid of *Parentia* (and Sciapodinae in general) in Tasmania and the Australian mainland. Some undescribed New Caledonian species are close to New Zealand *Parentia*.

Parentia has no close relatives in the cool temperate Neotropical faunas, and is considered an old endemic

trans-Tasman element, perhaps distantly related to *Condylostylus*. However, during the Tertiary, it probably gave rise to two largely tropical genera, *Chrysosoma* (sharing many characters with the *proliciens* Group, q.v.) and *Krakatauia*, along the northern edge of the Australian Plate. Undescribed species from montane New Guinea (BPBM) appear intermediate between *Parentia* and species near *Krakatauia digitula*.

There are 27 New Zealand *Parentia* species (Bickel, 1992):

- anomalicosta* Bickel, 1992: 19.
- aotearoa* Bickel, 1992: 19.
- argentifrons* Bickel, 1992: 20.
- calignosa* Bickel, 1992: 21.
- chathamensis* Bickel, 1992: 21.
- cilifoliata* Parent, 1933b: 339 (*Condylostylus*).
- defecta* Bickel, 1992: 22.
- fuscata* Hutton, 1901: 32 (*Psilopus*).
- huttoni* Parent, 1933b: 336 (*Chrysosoma*).
- gemmata* Walker, 1849: 647 (*Psilopus*).
- griseicollis* Becker, 1924: 130 (*Chrysosoma*).
- subnigrum* Becker, 1924: 128 (*Chrysosoma*).
- insularis* Bickel, 1992: 25.
- johnsi* Bickel, 1992: 26.
- lyra* Bickel, 1992: 26.
- magniseta* Bickel, 1992: 27.
- malitiosa* Hutton, 1901: 33 (*Psilopus*).
- villanum* Parent, 1933a: 177. (*Chrysosoma*).
- milleri* Parent, 1933b: 336 (*Chrysosoma*).
- mobile* Hutton, 1901: 32 (*Psilopus*).
- modesta* Parent, 1933b: 342 (*Condylostylus*).
- nova* Parent, 1933b: 344 (*Leptorhethum*).
- pukakiensis* Bickel, 1992: 31.
- recticosta* Parent, 1933b: 340 (*Condylostylus*).
- restricta* (Hutton), 1901: 33 (*Psilopus*).
- dichaeta* Parent, 1933b: 334 (*Chrysosoma*).
- schlingeri* Bickel, 1992: 33.
- titirangi* Bickel, 1992: 34.
- tonnoiri* Parent, 1933b: 332 (*Sciapus*).
- varifemorata* Bickel, 1992: 35.
- whirinaki* Bickel, 1992: 35.

Australian *Parentia* comprises two groups and an unplaced species, as separated in the key below.

Key to Australian *Parentia* Groups

1. TIII with swollen callus and posterior slit from one-fifth to one-third; costa with av row of crocheted setae; lateral scutellar setae strong, more than half length of medians; femora often with long av and setae; hypandrium with left lateral arm (Australia, Norfolk Island) *dispar* Group
- TIII not noticeably expanded or excavated; costa bare or with only weakly developed crocheted setae; lateral scutellar setae less than one-third length of medians; femora with mostly short pale av and pv setae 2

2. Hypopygial peduncle distinctly longer than epandrium; cercus more than twice length of epandrium, and bladeliike, with dorsal triangular mound at two-thirds (Fig. 41a,b); hypandrium with lateral arm; body longer than 5.0 (Qld) *P. gladicauda*
- Hypopygial peduncle shorter than epandrium; cercus short and not bladeliike; hypandrium without lateral arm; body length less than 2.5 (WA) *nudicosta* Group

The *dispar* Group

Diagnosis. *Thorax.* Ac as 3-5 long pairs; lateral scutellar setae strong, more than half length of medians.

Legs. Femora usually with rows of long av and pv bristles, especially strongly developed on males (MSSC); male TIII usually slightly swollen from one-fifth to half with smooth excavated posterior groove (MSSC).

Wing. Male costa usually with crocheted cilia (MSSC).

Remarks. The *Parentia dispar* Group comprises rather robust dark and dark metallic coloured flies. It is mostly confined to the southern margins of the continent although some species occur on the sandstone plateaus of central Queensland near the Tropic of Capricorn (Fig. 35). Only *P. vulgaris* extends well into tropical Queensland and Western Australia, and also occurs on Norfolk Island (Fig. 35). The *dispar* Group is particularly diverse in south-western Australia. Most Australian species show similar development of MSSC. The male TII has either short porrect hairs (MSSC) or the unmodified condition (similar to that of females) with strong ad setae in basal quarter and subapically.

The *Parentia dispar* Group is divided into the following assemblages.

I. Males with tibiae yellow; some males with halteres yellow; setae not strongly developed on head; southern Australia: *P. dispar*, *P. timothyi* and *P. barbarae*.

II. Male III_{3,4} strongly flattened and cushionlike (MSSC) and femoral setae weak; widespread, including tropical northern Australia: *Parentia vulgaris*.

III. Cercus elongate, more than twice length of epandrium, and with very short basoventral projection; eastern Australia: *P. kiwarra* and *P. yeatesi*.

IV. This assemblage is probably monophyletic. However, the following five sub-assemblages do not necessarily contain most closely related species.

A. Male TII and II₁ covered with short black porrect setae; TII without strong ad setae in basal quarter; Western Australia: *P. perthensis*, *P. solaris*, *P. yunensis*, *P. dongara* and *P. dubia*.

B. Male TII and II₁ without short porrect setae, but TII with ad seta at one-quarter; southern Australia: *P. occidentalis*, *P. caldyanup* and *P. chineyi*.

C. Male abdominal terga 5-7 each with pair of unusually long black undulating posterior setae; ventral cercal arm with 2 strong outer setae; male TII without strong ad-pd setae, and with porrect setae (MSSC);

south-eastern Australia, Tasmania: *P. royallensis*, *P. backyama* and *P. cardaleae*.

D. Male abdominal terga 5-7 each with pair of black undulating posterior setae; male TII without porrect setae; southern Australia, Tasmania: *P. tricolor* and *P. orientalis*.

E. Male scutellum 3-4 pairs marginal setae; setae present on scutellar disc; palp with abundant black projecting setae; pedicel with dense corona of strong black setae; eastern and western Australia: *P. nigropilosa*, *P. gemmans* and *P. tinda*.

The *dispar* Group comprises 22 species, 17 new:

backyama n.sp. Australia (NSW, SA).

barbarae n.sp. Australia (WA).

caldyanup n.sp. Australia (WA).

cardaleae n.sp. Australia (Tas., Vic., NSW).

chineyi n.sp. Australia (WA).

dispar (Macquart), 1849: 125 (*Psilopus*). (MHNP, examined). Australia (NSW, Tas., Vic., SA, WA).

sublectus Walker, 1852: 211 (*Psilopus*). (BMNH, examined). Australia (Tas.).

nigrociliatus Parent, 1932a: 123 (*Sciapus*). (ANIC, examined). Australia (Tas.).

separatus Parent, 1932a: 127 (*Condyllostylus*). (ANIC, examined). Australia (Tas.).

dongara n.sp. Australia (WA).

dubia (Parent), 1929: 201. (*Chrysosoma*). (MLUH, examined). Australia (SA).

gemmans Walker, 1849: 644 (*Psilopus*). (BMNH, examined). Australia (WA). **n.status.**

kiwarra n.sp. Australia (NSW).

nigropilosa (Macquart), 1847: 56 (*Psilopus*). (UMO, examined). Australia (Tas., Vic., ACT, NSW).

occidentalis n.sp. Australia (WA).

orientalis n.sp. Australia (NSW, Qld).

perthensis n.sp. Australia (WA).

royallensis n.sp. Australia (ACT, NSW).

solaris n.sp. Australia (WA).

timothyi n.sp. Australia (WA).

tinda n.sp. Australia (NSW).

tricolor (Walker), 1835: 471 (*Psilopus*). (Types lost, neotype AMS). Australia (NSW, Tas., Vic., SA, Qld).

viduus Schiner, 1868: 216 (*Psilopus*). (NHMV, examined, female only). Australia (NSW).

amoenus Becker, 1922: 219 (*Condyllostylus*). (TMB, lost). Australia (NSW).

vulgaris n.sp. Australia (NSW, Qld, WA), Norfolk Island.

yeatesi n.sp. Australia (Qld).

yunensis n.sp. Australia (WA).

Key to Australian *Parentia dispar* Group

The key requires examination of the male cercus for accurate identification. If the hypopygium is hidden or cercal differences are subtle, the male postabdomen will require clearing. *Parentia dubia* is not included in this key (see species account, below).

1. Males 2
 — Females 21
2. Scutellum 3-4 pairs marginal setae; setae present on scutellar disc; palp with abundant black projecting setae; pedicel with dense corona of strong black setae (eg, Fig. 39g) 3
 — Scutellum usually with only 2 normal pairs marginal setae; scutellar disc bare; palp with normal short setae and pedicel without dense corona setae (Fig. 36c) 5
3. IIt_{4-5} slightly flattened; notopleuron with 8 strong black setae; cercus (Fig. 39e) (WA) *P. gemmans*
 — IIt_{4-5} unmodified (eastern Australia) 4
4. Notopleuron with 12-15 strong black setae; ventral cercal arm clavate and apically truncated with apical blade-like setae (Fig. 39f) (NSW, Tas, Vic, ACT) *P. nigropilosa*
 — Notopleuron with at most 4-6 setae; ventral cercal arm digitiform and apically rounded (Fig. 39c) (NSW) *P. tinda*
5. Some tibiae yellow 6
 — All tibiae brown to dark brown 8
6. Haltere black (rarely yellowish); pale hairs present laterally on frons; cercus with setose distal projection and elongate ventral projection which bears 3 distinctive apical digitiform setae (Fig. 36a) (WA, SA, Vic., Tas., ACT, NSW) *P. dispar*
 — Haltere yellow; frons bare except for vertical seta 7
7. $TIII$ entirely black; TII with irregular ventral excavation at two-fifths, subtended by 3-4 black setae (Fig. 36g); FI with some long pale basoventral setae; costa with crocheted cilia from base to just beyond midwing; cercus elongate with midventral projection and setae as figured (Fig. 36e) (WA) *P. timothyi*
 — $TIII$ with basal eighth yellow; TII unmodified; FI with short basoventral setae; costa with crocheted cilia from base to join of R_{2+3} ; cercus elongate, without ventral projection (Fig. 36h) (WA) *P. barbarae*
8. Cercus elongate, about twice length of epandrium (eg, Fig. 37b,d) 9
 — Cercus length less than that of epandrium 11
9. Cercus with expanded clavate ventral projection which bears 2 strong, slightly diverging dorsoapical tusk-like setae (Fig. 37b); IIt_1 with short porrect setae (ACT, NSW) *P. royallensis*
 — Cercus with only short basoventral projection (Fig. 37d) 10

10. $\text{II}t_1$ covered with short erect hairs; FI with pale ventral setae (Qld) *P. yeatesi*
- $\text{II}t_1$ with anterior row short curved setae; FI with short pale av setae, and row of much longer black pv setae (NSW) *P. kiwarra*
11. Ventral cercal arm with 1 or 2 strong tusk-like external setae (Fig. 37a,c) abdominal terga 5-7 each with pair of long black undulating posterior setae; TII and $\text{II}t$ with porrect setae 12
- Ventral cercal arm without such tusk-like external setae; other features various 13
12. FI with pale av and pv setae; cercus with narrow clavate ventral arm with 2 strong, diverging dorsoapical tusk-like setae, and with ventral digitiform projection (Fig. 37c) (interior NSW, SA) *P. backyama*
- FI with black av and pv setae; cercus with expanded clavate ventral arm which bears 2 strong, slightly diverging dorsoapical tusk-like setae (Fig. 37a) (Tas., Vic., NSW) *P. cardaleae*
- FI with strong black basal av seta and av of shorter pale av setae distad, and with 3 strong black pv bristles; cercus with clavate ventral projection bearing distinctive strong external bristle (Fig. 37e) (NSW, Qld) *P. orientalis*
13. TII and $\text{II}t_1$ covered with short black porrect setae; TII without strong ad seta 14
- TII and $\text{II}t_1$ without short porrect setae; TII various 17
14. All femora with short pale av and pv setae; TII with group of outstanding basal setae (Fig. 37g) cercus subrectangular, truncate (Fig. 37f) (WA) *P. perthensis*
- Strong femoral av or pv bristles present on FI or FII; cercus with enlarged ventral projection 15
15. Ventral projection of cercus with distinctive apical blade-like seta (Fig. 38d) (WA) *P. solaris*
- Ventral surstylar arm not recurved but lying subparallel with dorsal arm 16
16. Cercus with L-shaped ventral projection which bears 2 apical setae and 5-6 wide ventral setae (Fig. 38b) (WA) *P. yunensis*
- Cercus greatly enlarged and with elongate digitiform ventral projection which bears distinctive apical blade-like seta (Fig. 38a) (WA) *P. dongara*
17. FI with short pale av and pv setae; $\text{III}t_{3,5}$ strongly flattened and cushionlike; cercus with fan-shaped ventral projection which bears long marginal setae (Fig. 38f,g,h) (WA, Qld, NSW, Norfolk Island) *P. vulgaris*
- FI with long av and pv setae; $\text{III}t_{3,5}$ not cushionlike 18
18. Cercus with digitiform ventral projection which bears 2 distinctive external setae (Fig. 38e) (WA) *P. occidentalis*
- Cercus otherwise 19

19. FI usually with pv row of 5-6 strong black bristles; cercus with clavate ventral projection which bears apical setae (Fig. 39a,b) (SA, Vic., Tas, NSW) *P. tricolor*
- FI with ventral setae pale 20
20. Cercus with expanded ventral projection which bears 2 tusk-like apical setae and 2 strong external setae (Fig. 38c) (WA) *P. caldyanup*
- Cercus with some strong undulating apical setae and other setae as figured (Fig. 39d) (WA) *P. chaineyi*
21. CI, femora and tibiae yellow *P. dispar*
- CI and all femora mostly dark metallic green to black 22
22. Scutellum with 9-10 marginal setae and with black setae on dorsal scutellar disc; 3-4 npl present *P. nigropilosa*
- Scutellum with 2 pairs marginal setae and with dorsal scutellar disc bare; only 2 npl present 23
23. All tibiae dark brown *P. backyama*, *P. cardaleae*, *P. royallensis*, *P. perthensis*, *P. yunensis*, *P. dongara*, *P. vulgaris*, *P. kiwarrak*, *P. orientalis*
- TI and TII usually yellow *P. tricolor*, *P. caldyanup*, *P. tinda*, *P. solaris*

Parentia dispar (Macquart)

Psilopus dispar Macquart, 1850: 125.

Psilopus sublectus Walker, 1852: 211 (syn. Bickel & Dyte, 1989).

Sciapus nigrociliatus Parent, 1932a: 123 (syn. Bickel & Dyte, 1989).

Condylostylus separatus Parent, 1932a: 127 (syn. Bickel & Dyte, 1989).

Type material. Macquart described *Psilopus dispar* from a series of 8 males and 12 females taken from the eastern coast of Australia and Tasmania (MHNP, examined). He accurately noted the colour dimorphism, with CI and femora metallic green in males and yellow in females. Parent (1926) redescribed Macquart's species and placed it in the genus *Chrysosoma*. The holotype of *Psilopus sublectus* from Tasmania (BMNH, examined) is a female of this species. Parent described *Condylostylus separatus* from a male (ANIC, examined) and *Sciapus nigrociliatus* from a female (ANIC, examined), both taken at Wilmont, Tas. These two specimens are a pair of *Parentia dispar*. Parent may have placed the female in *Sciapus* because of its yellow legs, often found in that genus.

Additional material. Australian Capital Territory – Black Mountain. New South Wales – Tumut; Upper Allyn River, 480 m; Mosman; Hazelbrook, Blue Mountains; Nadgee Nature Reserve, yellow pans; Kosciuszko National Park. South Australia – metropolitan Adelaide; Belair; Kangaroo Island; Fairview Wildlife Reserve, 36°49'S 140°24'E. Tasmania – Hobart; Launceston; Strahan; Speedwell Road; Queenstown; Chain of Lagoons, south-east of St Marys, low estuarine vegetation, yellow pans; 16 km north-west of Ouse; King Island, Bass

Strait; Swansea; 2 km south of Tomahawk, sand dunes. Victoria – metropolitan Melbourne; Wellington River, 17 km north of Licola; Lower Ferntree Gully, Dandenong Range; Kiata; Bunadick Camp, Grampian Mountains; LaTrobe River; Thurra River at Cape Everard. Western Australia – Perth; Bunbury; Crawley; Stokes Inlet (more than 240 specimens examined: ANIC, AMS, SAM, BMNH, MVM); collection dates for 70 males, 63 females, at Black Mountain, ACT: 28 Dec.-13 Apr., various years, with most specimens taken in Feb. and Mar.; collection dates for Tasmanian specimens: 8 Jan.-16 Apr., various years.

Description - male. Length: 5.3-5.4; wing: 4.0 x 1.7.

Head. Frons, face and clypeus shining metallic blue-green, with some pruinosity laterally and along frontoclypeal suture; pair strong diverging ocellars and pair of shorter posterior setae on tubercle; lateral margin of frons with some weak pale hairs (MSSC); face slightly expanded laterally (Fig. 36b); palp brown and bearing 4-5 strong dark setae; proboscis yellow-brown; ventral postcranium with abundant pale hairs; antenna black (Fig. 36c); pedicel with ring of short setae and stronger dorsal seta; arista about twice head height.

Thorax. Dorsum shining metallic blue-green with distinct bronze vittae or reflections on some specimens; scutellum metallic blue; pleura metallic green with dusting of pruinosity; setae black; 3 regularly paired long ac; 1 pa, 2 sa, 2 sr, 2-3 strong npl, 1 weak hm, and 1 pm present.

Legs. Coxae and femora dark metallic green; tibiae and basal It and IIt mostly yellow (brownish on some specimens), with their distal tarsomeres dark brown; TIII yellow only at base only, with callus and distal TIII black,

although sometimes distal TIII yellow; III_{lt} black; CI and CII with pale anterior hairs and CIII with pale lateral setae; I: 7.0; 6.5; 4.5/2.0/1.5/1.0/1.0; FI with av row of distally decreasing pale bristles and pv row of much longer pale setae along entire length; TI with fine long pale ventral hairs along entire length (MSSC); It₁ with some pale ventral pile and some fine

pale pv hairs (MSSC): 9.0; 11.0; 7.0/3.0/2.0/1.5/1.0; FII with av row of short pale hairs and 5-6 long pale pv setae in basal quarter; TII covered with short porrect hairs (MSSC), without distinct ad or pd setae; III: 11.0; 15.0; 7.0/3.0/1.5/1.5/1.0; FIII with only weak pale av and pv hairs; III_{t3.5} flattened, padlike ventrally (MSSC).

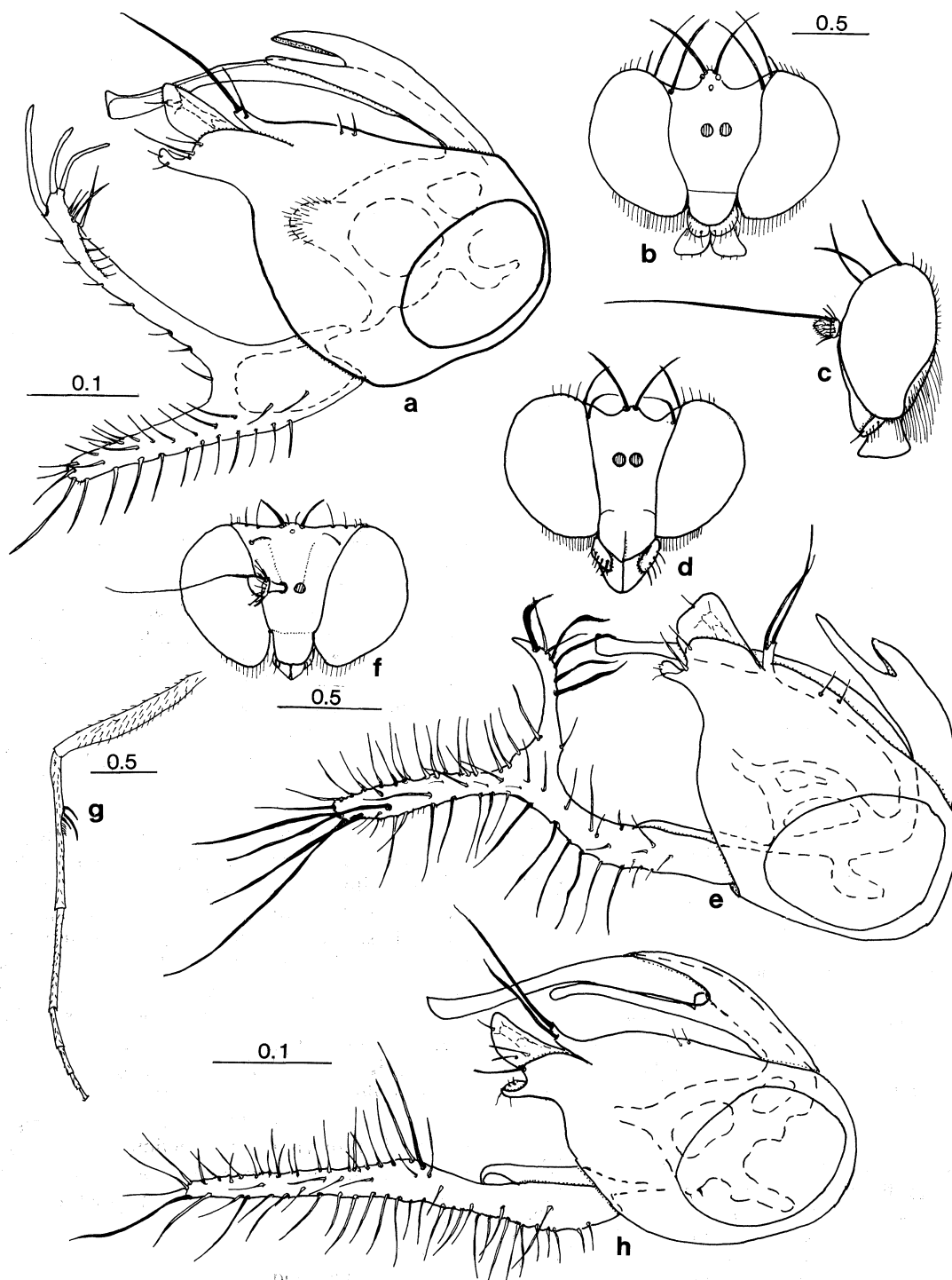


Fig.36. *Parentia dispar*, Bunbury, WA: a – hypopygium, left lateral; b – male head, anterior; c – male head, left lateral; d – female head, anterior. *P. timotheysi*, Cape LeGrande, WA: e – hypopygium, left lateral; f – male head, anterior; g – male left leg II, posterior. *P. barbarae*, Waroona, WA: h – hypopygium, left lateral.

Wing (Fig. 122a). Hyaline; costa with av row of crocheted cilia from base to end of R_{2+3} (MSSC); M in broad curve to R_{4+5} ; CuAx ratio: 1.6; lower calypter brown and with fan of black setae; haltere usually black.

Abdomen. Metallic green with bronze reflections; terga 1-6 with long black posterior setae and pale lateral and ventral hairs; hypopygium dark brown with brown cercus (Fig. 36a); epandrium subtriangular; hypandrial arm extending only slightly beyond apex of hypandrial hood; aedeagus without dorsal angle; 2 short epandrial setae present; surstylus with ventral lobe bearing median projection and with external pedunculate seta; dorsal lobe surstylus with digitiform projection and setae as figured; cercus with setose distal projection and elongate ventral projection which bears 3 distinctive apical digitiform setae.

Female. Similar to male except smaller (length: 4.3-4.4; wing: 3.3 x 1.6.) and lacking MSSC, otherwise as noted: posterior pair of ocellar setae very short; lateral margin of face straight (Fig. 36d); thorax with 3 pairs ac and 4 strong dc present; CI, all femora and tibiae yellow; distal tarsomeres darkened; FI with 4 short almost spine-like pale av in basal third; FII and FIII with pale weak ventral hairs; TII with anterior at one-quarter, and 2 weaker av setae distad; TIII with ad at one-quarter; wing (Fig. 122b); lower calypter yellow with fan of black setae; haltere yellow.

Remarks. *Parentia dispar* is a common species in southern Australia and has a classical Bassian distribution, which includes south-western Australia, South Australia, Victoria, Tasmania and New South Wales as far north as the Barrington Tops drainage. It has been collected in a variety of habitats, from coastal estuarine and dune vegetation to montane dry sclerophyll woodland. Adults are present from late December to April in all localities, a relatively late flight season compared with many spring flying *Parentia*.

The striking leg colour dimorphism might lead one to doubt the association of sexes, but both Macquart (1850) and Hardy (1935) recognised the dimorphism, and long series collected together confirm the association. A few males from the Black Mountain, ACT series have yellowish instead of black halteres.

Parentia timothyi n.sp.

Type material. HOLOTYPE male, PARATYPE female, Western Australia, Israelite Bay, 27 Dec. 1990, yellow pans, T.A. Moulds (AMS).

Additional material. Western Australia – male, Cape Le Grande National Park, 33°58'S 122°07'E, 10 Jan. 1987 (AMS).

Description – male. Length: 3.0; wing: 2.4 x 1.0; similar to *P. dispar* except as noted.

Head. Pair strongly diverging ocellars and pair of short posterior setae on tubercle; lateral frons with black vertical seta only; frons broad and long, such that the antennae appear displaced ventrad, and face shortened (Fig. 36f) (MSSC); frons, face and clypeus tapering ventrally; palp black with short black setae; proboscis yellow; ventral postcranium with pale hairs which continue around base of eyes; antenna black; arista about one and one-half times head height.

Thorax. Dorsum shining metallic blue-green; 2 strong posterior dc setae and 3 shorter but still strong anterior dc setae present; lateral scutellar setae about quarter length of medians.

Legs. Coxae and femora metallic green; femoral knees, tibiae, and basal tarsomeres I and II yellow, with their distal tarsomeres becoming dark brown; TIII and IIII entirely black; CI and CII with pale anterior hairs and CIII with pale lateral setae; I: 5.0; 4.0; 2.5/0.8/0.6/0.6/0.5; FI with av row of short pale setae and with 2-3 long pale pv setae in basal third; II: 5.5; 6.0; 3.8/1.2/1.0/0.8/0.5; FII some short pale ventral hairs; TII with irregular ventral excavation at two-fifths, subtended by 3-4 black curved setae (Fig. 36g) (MSSC); TII also with anterior seta at two-fifths and subapically; III: 6.5; 7.0; 3.0/1.2/1.0/0.8/0.6; FIII with weak pale ventral hairs; TIII with posterior callus at one-fifth (MSSC); IIII₃₋₅ flattened, padlike ventrally (MSSC).

Wing. Hyaline; costa with av row of crocheted cilia from base to just beyond midwing, with cilia decreasing in size distad (MSSC); CuAx ratio: 0.9; lower calypter brown and with fan of black setae; haltere yellow.

Abdomen. Metallic blue-green; terga 1-6 with relatively short black posterior setae; hypopygium dark brown with yellowish cercus (Fig. 36e); hypandrial arm extending only slightly beyond apex of hypandrial hood; aedeagus without dorsal angle; epandrial lobe with strong apical and subapical bristles; surstylus with ventral lobe bearing median projection; cercus elongate with midventral projection which bears some modified setae.

Female. Similar to male except lacking MSSC and as noted: frons not as broad, and face not shortened; palp with longer setae than in male; 4 strong dc present; leg colour similar except knee FIII and TIII yellow; FI with 4 short pale av setae in basal half; FII and FIII bare; TII unmodified, but with strong anterior at one-quarter, with shorter pd seta just basad; TIII unmodified but with strong anterior seta at one-third; wing unmodified; lower calypter yellow with fan of black setae; haltere also yellow.

Remarks. *Parentia timothyi* is known from the coast of south-western Australia from Cape Le Grande to Israelite Bay. The type specimens were collected from dry sandy backdune habitat covered with low vegetation and some stunted eucalypts. This species is named in honour of the collector, Timothy Moulds. This species is very close to *P. barbara*.

Parentia barbarae n.sp.

Type material. HOLOTYPE male, PARATYPES 2 males, Western Australia, Waroona, 4 Jan. 1991, yellow pans, T.A. Moulds (AMS).

Description – male. Length: 3.0; wing: 2.4 x 1.0; similar to *P. timothyi* except as noted.

Head. Frons not as long and face not as shortened.

Thorax. Two strong posterior dc setae and 3 weak hair-like anterior dc setae present.

Legs. Colouration similar except distal third of FI and FII yellow, and FIII knee and basal one-eighth of TIII yellow; relative podomere ratios similar; FI some short pale ventral setae; FII and FIII bare; TII without excavation and totally bare of ad/pd setae; TIII also with posterior callus at one-fifth (MSSC); III_t₃₋₅ flattened, padlike ventrally (MSSC).

Wing. Hyaline; costa with row of crocheted cilia from base to join of R₂₊₃, with cilia decreasing in size distad (MSSC); CuAx ratio: 0.8; lower calypter brown and with fan of black setae; haltere yellow.

Abdomen. Hypopygium dark brown with yellow cercus (Fig. 36h); aedeagus with dorsal angle; cercus elongate, with slight bend and strong seta midventrally.

Female. Unknown.

Remarks. *Parentia barbarae* is known only from the type locality south of Perth, Western Australia and was collected in sandy heath. This species is named in honour of Barbara Moulds.

Parentia kiwarrak n.sp.

Type material. HOLOTYPE male, PARATYPES 16 males, 15 females, New South Wales, Kiwarrak State Forest, Whites Crossing, 9 km south-west of Taree, 25 Nov. 1987, yellow pans, D.J. Bickel (AMS).

Additional material. New South Wales – Mooney Mooney Creek, west of Gosford, 16 Nov. 1978, 3 Dec. 1985; Putty Road and Darkey Creek, 19 Nov. 1990, yellow pans; Mount Kaputar National Park: Waa Gorge, dry rainforest, 300 m, Green Creek, wet sclerophyll forest, 950 m, Bullowa Creek, dry sclerophyll forest, yellow pans 18 Nov. 1990; Warrumbungle National Park, Mapra Creek, 450 m, 17 Nov. 1990; Woko National Park, north of Gloucester, dry sclerophyll forest, 5 Nov. 1990 (42 males, 24 females, AMS).

Description – male. Length: 4.1; wing: 3.7 x 1.1.

Head. Frons, face and clypeus dark metallic blue-green; pair strong diverging ocellars and pair of shorter posterior setae on tubercle; face slightly expanded laterally; palp brown and bearing 4-5 strong dark setae; proboscis brown; antenna black; pedicel with corona of relatively short setae; arista dorsal, relatively thick, and about twice head height.

Thorax. Dorsum shining metallic blue-green; scutellum

metallic blue; pleura metallic green with dusting of pruinosity; setae black; 4 pairs long ac present.

Legs. Entirely dark metallic green; CI and CII with pale anterior hairs and CIII with group of pale lateral setae; I: 6.0; 6.5; 4.0/1.5/1.0/0.8/0.8; FI with some short pale av setae, and row of much longer black pv bristles; II: 8.0; 9.5; 6.5/3.0/2.5/1.5/0.8; FII with row black av setae decreasing in size to half, and pv row of much stronger black setae decreasing gradually in size to apex; TII and II_t₁ without distinct porrect setae, and without strong ad or pd setae; II_t₁ with anterior row of short curved setae along entire length (MSSC); III: 10.0; 12.0; 5.5/2.5/1.2/1.2/0.8; FIII with only pale ventral hairs in basal half, and more sparse black ventral hairs distally; TIII with callus along basal fifth (MSSC) and III_t₃₋₅ flattened and padlike ventrally (MSSC).

Wing. Hyaline; costa with av row of crocheted cilia from base to midway between R₁ and R₂₊₃ (MSSC); CuAx ratio: 1.5; lower calypter brown and with fan of black setae; haltere black.

Abdomen. Dark metallic green with bronze reflections, without matt brown tergal bands; terga 5-6 each with pair long black posterolateral setae (MSSC); tergum 7 setose; hypopygium black with brownish cercus (Fig. 37d); epandrium subtriangular; aedeagus without dorsal angle; ventral arm surstylus with median projection and with external pedunculate seta; dorsal arm surstylus with digitiform projection and setae as figured; cercus elongate, about 3 times length hypandrium with black lateral setae, and with short pale basoventral digitiform projection.

Female. Similar to male except and lacks MSSC, otherwise as noted: arista shorter, only somewhat longer than head height; femora with only pale ventral hairs; TII with ad setae at one-fifth and apically; II_t₁ unmodified; lower calypter yellow with fan of black setae; haltere yellow.

Remarks. *Parentia kiwarrak* is known from both dry and wet sclerophyll forest along the central and northern New South Wales coastal drainage, and the interior Warrumbungle and Nandewar mountains.

The type series of more than 30 specimens was collected in less than an hour from a yellow pan placed along a small stream near Taree, NSW. Specimens were seen resting on stream rocks before flying into the yellow pan. At Waa Gorge in the Nandewar Range, individuals were common on streamside foliage.

Parentia kiwarrak is the sister species of *P. yeatesi*, and both have similar genitalia.

Parentia yeatesi n.sp.

Type material. HOLOTYPE male, Queensland, Mount Moffat, Carnarvon National Park, top shelter shed, 11 Dec. 1987, malaise trap, D.K. Yeates (UQIC).

Description – male. Length: 3.3; wing: 2.8 x 1.0;

similar to *P. kiwarrak* except as noted.

Legs. Also entirely dark metallic green; CIII also with group of pale lateral setae; relative podomere ratios similar; FI with some short pale av setae, and row of pale pv setae (shorter than the much longer black pv setae of *P. kiwarrak*); FII with some long pale basal pv

setae and short pale distal pv setae, and with erect black av setae along distal half; TII and II₁ covered with distinct short erect setae (MSSC), and without strong ad or pd setae; II₂ without other modifications; FIII with some pale ventral hairs in basal half; TIII also with callus along basal fifth and with posterior slit (MSSC); distal

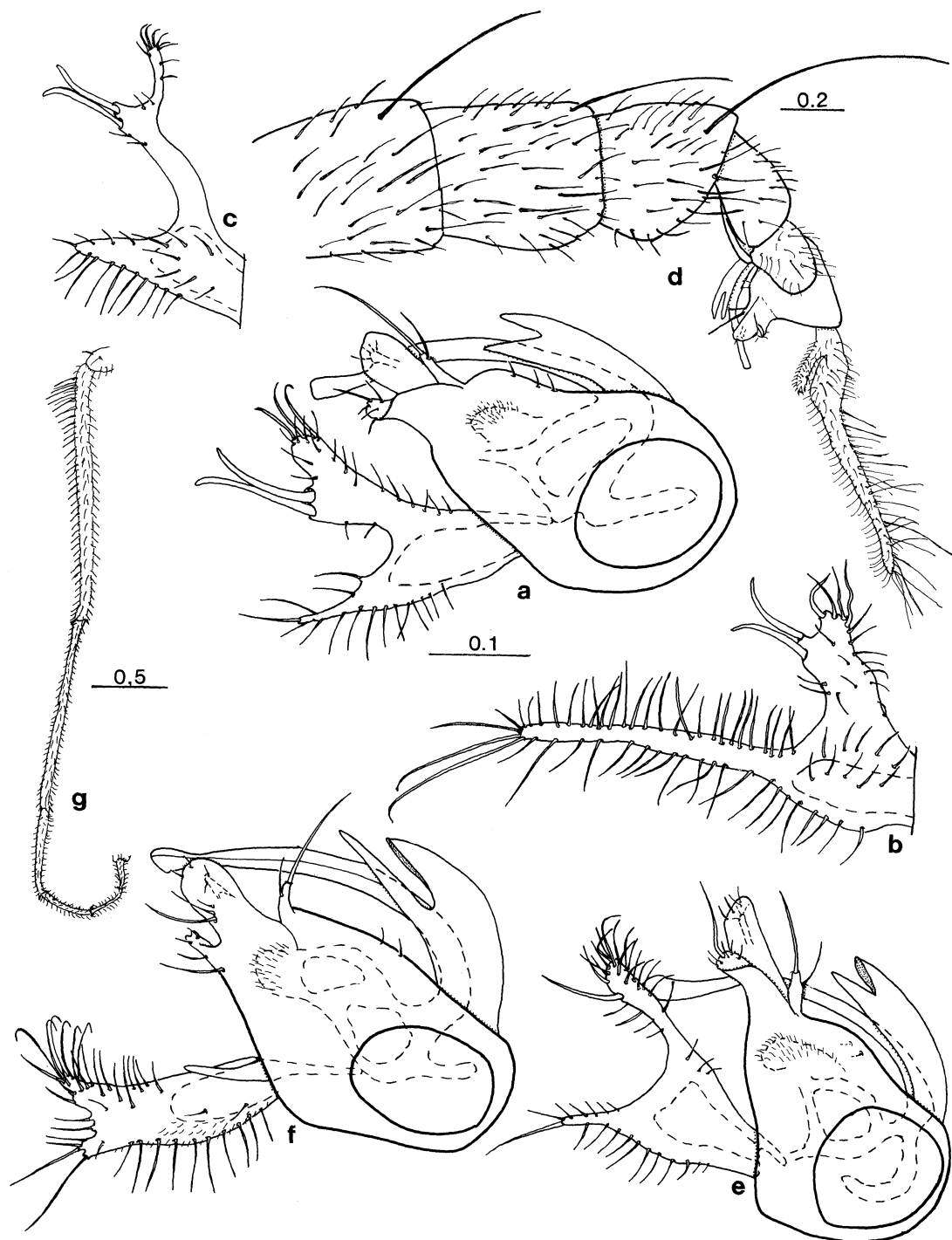


Fig. 37. *Parentia cardaleae*, Cape Otway, Vic: a – hypopygium, left lateral. *P. royallensis*, Royalla, NSW: b – male cercus, left lateral. *P. backyama*, Back Yama State Forest, NSW: c – male cercus, left lateral. *P. kiwarrak*, Kiwarrak State Forest, NSW: d – hypopygium, left lateral. *P. orientalis*, Como West, NSW: e – hypopygium, left lateral. *P. perthensis*, Fremantle, WA: f – hypopygium, left lateral; g – male left leg II, posterior view.

half of III_{t2} and III_{t3.5} flattened and ventrally padlike (MSSC).

Wing. CuAx ratio: 1.5.

Abdomen. Also dark metallic green with bronze reflections; terga 6 only with long black posterior setae; tergum 7 setose; hypopygium (not figured) black with elongate dark brown cercus, and similar to that of *P. kiwarra* (Fig. 37d); also with elongate cercus and short basoventral digitiform projection.

Female. Unknown.

Remarks. *Parentia yeatesi* is known only from Mount Moffat, Carnarvon National Park, in the dissected sandstone plateaus of central Queensland, and near the northern limit of distribution for *Parentia*. This species is the sister species of *P. kiwarra* from New South Wales.

***Parentia orientalis* n.sp.**

Type material. HOLOTYPE male, New South Wales, Como West, near Sydney, 16 Dec. 1972, L.S. Williams; PARATYPES male, female, same data but 5-8 Dec. 1972 and 29 Mar. 1973 (AMS).

Additional material. New South Wales – Colo Vale, 15 Mar. 1957; Mosman, 25 Dec. 1956 (USNM); Ku-ring-gai Chase National Park, open forest, 25 Dec. 1985; Woronora River, near Engadine, 16 Dec. 1976; Nattai River, near Mittagong, 7 Jan. 1964 (AMS); Cabbage Tree Creek, west of Nelligen, 23 Oct. 1970; Wilton, 19 Dec. 1972; Bawley Point, 35°30'S 150°42'E, 6 Jan. 1986, 25 Dec. 1992, at light (ANIC). Queensland – Toowoomba, 3 Jan. 1962 (ANIC); North Mimosa Creek, Blackdown Tableland, 800 m, 29 Nov. 1992, pans; Horse Gully Creek, at southern base of Bunya Mountains, dry sclerophyll forest, 500 m, 26 Nov. 1992, pans (AMS); Mount Moffat, Carnarvon National Park, top shelter shed, 12 Dec. 1987 (UQIC) (18 male, 15 female specimens).

Description – male. Length: 3.7-3.8; wing: 3.3 x 1.3; similar to *P. kiwarra* except as noted.

Head. Proboscis yellowish; antenna black; pedicel also with corona of relatively short setae.

Thorax. Three pairs long ac present.

Legs. Coxae and femora dark metallic green except for yellowish knees on FI and FII; tibiae and tarsi brown; FI with single black basal av, with short pale av distally, and pv row of 3 very strong black basal bristles and 3-4 shorter black bristles distad; FII with av row of short black setae and pv row with 2 long pale basal setae, with long black setae distad; TII only with subapical ad seta; TII and III_t with short vestiture, but not short porrect setae; TIII with callus from one-sixth to one-quarter, and with posterior slit (MSSC); FIII with pale hair-like av and pv setae.

Wing. CuAx ratio: 1.2.

Abdomen. Terga 5-7 each with pair of long black distoventral setae; hypopygium (Fig. 37e); surstylus with

ventral arm bearing median projection and dorsal arm with long apical seta and with other setae as figured; cercus with tapering triangular setose distal projection and clavate ventral projection which bears distinctive strong external bristle.

Female. Similar to male except smaller and lacking MSSC, otherwise as noted: FI with 4 short pale av in basal half and pv as weak pale hairs; FII and FIII with only pale weak ventral hairs; TII with ad seta at one-fifth.

Remarks. *Parentia orientalis* is found from southern New South Wales to the highlands of central Queensland. It has a distinctive external bristle on the ventral projection of the cercus.

***Parentia cardaleae* n.sp.**

Type material. HOLOTYPE male, PARATYPES 4 females, Tasmania, 14 km south-west by south of Wilmont, 31 Jan. 1981, yellow pan trap, I.D. Naumann & J.C. Cardale (ANIC); PARATYPES male, female, Great Lake, 20 Jan. 1960 (UQIC).

Additional material. New South Wales – Minnamurra Falls, 16 Nov. 1960 (ANIC); 'Tuglo' 33 km north-east of Singleton, 17 Nov. 1985; Jindabyne, 22 Feb. 1969; Nimmatebel, 18 Jan. 1961 (AMS). Tasmania – 9 km south of Bronte, 15 Jan.-3 Feb. 1983 (ANIC); Breona, 27 Jan. 1960 (UQIC). Victoria – Cape Otway, 29 Nov. 1966; Glenelg River, north-east of Nelson, 25 Nov. 1966 (MVM) (9 males, 7 females).

Description – male. Length: 4.2-4.3; wing: 4.0 x 1.7; similar to *P. kiwarra* except as noted.

Head. Pedicel with corona of relatively strong setae (MSSC).

Thorax. Four to 5 pairs of long ac present.

Legs. Coxae and femora dark metallic green; remainder of legs black; FI and FII with av and pv rows of long and distally decreasing black setae; TII and III_t covered with short black porrect setae (MSSC); FIII with av row of long black setae and pv row of long pale setae; TIII with callus from one-sixth to one-quarter, and with posterior slit (MSSC); III_{t3.4} padlike ventrally, but not strongly flattened (MSSC).

Wing. Costa with av row of crocheted cilia from base almost to R₂₊₃ (MSSC); CuAx ratio: 1.1; lower calypter brown and with fan of black setae; haltere black.

Abdomen. Terga 1-5 with black posterior setae and pale lateral and ventral hairs; each tergum 5-7 posteriorly with pair long black undulating setae (MSSC); hypopygium (Fig. 37a); epandrium subtriangular; 3 short epandrial setae present; surstylus with ventral lobe bearing median projection; dorsal lobe surstylus digitiform and with setae as figured; cercus with tapering setose distal projection and expanded clavate ventral projection which bears 2 distinctive strong, slightly diverging dorsoapical tusk-like setae.

Female. Similar to male except somewhat smaller, lacking MSSC, and as noted: femora with only short pale ventral hairs; TII with 2 short dorsals and 1 short ventral; TII with ad seta at one-quarter; TII and IIT₁ without porrect hairs; haltere yellow.

Remarks. *Parentia cardaleae* is found in Tasmania, Victoria, and the New South Wales tablelands and eastern escarpments at least as far north as the Barrington Tops drainage.

***Parentia backyama* n.sp.**

Type material. HOLOTYPE male, PARATYPES 2 males, 4 females, New South Wales, Back Yama State Forest, 11 Nov. 1964, D.H. Colless (ANIC).

Additional material. South Australia – male, Wilpena Pound, 26 Nov. 1951 (SAM).

Description – male. Length 3.8-4.0; wing 3.4 x 1.4; similar to *P. cardaleae* except as noted.

Legs. Coxae and femora dark metallic green; remainder of legs dark brown; FI with av and pv rows of long and distally decreasing pale bristles; FII with av and pv rows of long and distally decreasing bristles, pale basally and black distally; TII and IIT₁ covered with short black porrect setae (MSSC); FIII with some pale av and pv hairs basally, but ventrally bare in distal half.

Abdomen. Metallic blue-green with bronze reflections; each tergum 5-7 posteriorly with pair long black setae (MSSC); hypopygium (Fig. 37c); epandrium subtriangular; 3 short epandrial setae present; cercus with tapering setose distal projection and narrow clavate ventral projection which bears 2 distinctive strong, slightly diverging dorsoapical tusk-like setae and a ventral digitiform projection bearing apical setae.

Female. Similar to female *P. cardaleae*.

Remarks. *Parentia backyama* is known from the southern interior slopes of New South Wales and Wilpena Pound in South Australia. Based on cercal structure, this species is closely related to *P. cardaleae* and *P. royallensis*.

***Parentia royallensis* n.sp.**

Type material. HOLOTYPE male, PARATYPE female, New South Wales, Royalla, 29 Mar. 1961, D.H. Colless; PARATYPES 2 males, Australian Capital Territory, Black Mountain, light trap, 6 Mar. 1969, 3 Jan. 1986 (ANIC).

Additional material. New South Wales – male, Pilliga Scrub, Timallallie Creek and Newell Highway, yellow pans, 15 Nov. 1990 (AMS).

Description – male. Length 4.0; wing 3.8 x 1.7; similar to *P. cardaleae* except as noted.

Legs. FI with av and pv rows of long and distally decreasing black setae; FII in basal quarter with long pale av and pv and pv setae, and distally with long black av and pv setae; TII and IIT₁ covered with short black porrect setae (MSSC); FIII with av and pv rows of pale hairs in basal half, but distally bare.

Abdomen. Metallic blue-green with bronze reflections; hypopygium (Fig. 37b); cercus with distal elongate setose projection with long apical setae, and with expanded clavate ventral projection which bears 2 strong, slightly diverging dorsoapical tusk-like setae which are shorter than those of *P. cardaleae*.

Female. Similar to female *P. cardaleae*.

Remarks. *Parentia royallensis* is known from the northern New South Wales interior drainage and from the southern New South Wales and Australian Capital Territory tablelands. It has a greatly prolonged cercus compared with *P. cardaleae*.

***Parentia perthensis* n.sp.**

Type material. HOLOTYPE male, PARATYPE female, Western Australia, Fremantle, 15 Apr. 1954, K.R. Norris (ANIC); PARATYPES male, 2 females, same data but 30 Mar. 1984; male, 2 females, Perth, 20 Apr. 1931 (BMNH); male, Subiaco (WAM).

Additional material. Western Australia – Crawley, 20 Sept. 1934; Mount Claremont, Perth, 10 Apr. 1968 (ANIC); Mullaloo, 21 Apr. 1991; Yalgurup National Park, Lake Hayward, 2 Nov. 1991, dry sclerophyll forest and paperbark swamp fringing brackish lake; Tuart Forest Park, near Ludlow, 2 Nov. 1991, *Eucalyptus gomphocephala* forest, yellow pans; Conspicuous Cliff, near Nornalup, 7 Nov. 1991, vegetated dune; Mandurah, 9 Jan. 1991, yellow pans; Cape Le Grande, 24 Oct. 1988; Yarragil Creek at Murray Road, near Dwellingup, 31 Oct. 1991, jarrah forest (AMS); Bilbra Lake, near Perth, 22 Mar. 1968 (CNC); Hamelin Bay, 26 Sept. 1962 (CAS) (134 males, 115 females examined).

Description – male. Length: 3.6-3.8; wing: 3.3 x 1.4.

Head. Frons, face and clypeus shining metallic blue-green, with some pruinosity laterally and along frontoclypeal suture; pair strongly diverging ocellars and 2 pairs of short posterior setae on tubercle; 3 long postvertical setae present; lateral frons bare; face slightly expanded laterally; palp black, with 4-5 strong black setae; proboscis black; antenna black; pedicel with corona of long black setae (MSSC).

Thorax. Dorsum shining metallic blue-green; setae black; 3 regularly paired long ac present.

Legs. Coxae and femora dark metallic green; remainder of legs black; CI with pale anterior hairs and CIII with pale lateral setae; I: 5.5; 6.0; 4.0/1.2/0.8/0.5/0.4; FI with pale av setae in basal half and row of black pv setae

for entire length, setae not very long; TI with row of short black pd setae (MSSC); II: 9.5; 9.0; 6.0/3.0/2.0/1.5/1.0; FII with only weak pale av and pv setae; TII and IIt covered with short black porrect setae (MSSC), and TII dorsobasally with brush of 6-7 long setae, outstanding from surrounding vestiture (MSSC) (Fig. 37g); III: 9.0; 11.5; 5.0; 2.0/1.2/1.2/0.8; FIII with pale av and pv setae; TIII slightly swollen from one-fifth to half with smooth excavated posterior groove (MSSC); III₃₋₅ padlike ventrally, but not strongly d-v flattened.

Wing. Costa with av row of crocheted cilia from base almost to end of R₂₊₃ (MSSC); CuAx ratio: 1.1; lower calypter brown and with fan of black setae; haltere black.

Abdomen. Metallic green with bronze reflections; hypopygium black (Fig. 37f); dorsal angle of aedeagus present; epandrium ovate; surstylus with large ventral lobe bearing median projection and with seta as figured; dorsal lobe digitiform with setae as figured; cercus subrectangular, truncate, with dorsoapical projection with 2 strong setae and some curved ventroapical setae.

Female. Similar to male except lacking MSSC and as noted: proboscis also black; pedicel with only relatively short dorsal and ventral setae; 4 strong dc present; femora with short pale ventral hairs; TI with dorsal setae at two-fifths and two-thirds; TII with strong ad at one-tenth and one-fifth; IIt without porrect setae; haltere yellow.

Remarks. *Parentia perthensis* is found along the southern Western Australian coast from Perth to Cape Le Grande. It occurs in a variety of sandy coastal habitats, including dry sclerophyll forests, vegetated dunes, and brackish lakes. The species is often abundant and was taken in large numbers by pan traps.

A specimen from Mount Claremont, Perth, is a gynandromorph, with a female abdomen, but the right wing with crocheted costal cilia (MSSC) and the left nonciliate.

Parentia dongara n.sp.

Type material. HOLOTYPE male, PARATYPE female, Western Australia, Dongara [misspelled on label, 'Dongarra'], 23 Aug.-5 Sept. 1935, R.E. Turner, BM 1935-240 (BMNH).

Additional material. Western Australia – male, female, Kalbarri, Gabba Gabba Gully, 19 Sept. 1981, on heath (ANIC); male, 21 km west of Merridin, 15 Sept. 1962; 7 males, 12 females, 20 km east of Ravensthorpe, 23 Sept. 1962 (CAS).

Description – male. Length: 3.4-4.6; wing: 3.3 x 1.3.

Head. Frons, face and clypeus shining metallic blue-green; lateral frons bare; palp brown and bearing 4-5 strong dark setae; proboscis brown; antenna black; pedicel with some short dorsal and ventral setae only.

Thorax. Metallic blue-green with bronze reflections; pleura metallic green with dusting of pruinosity; 3 pairs

long ac present.

Legs. Coxae and femora dark metallic green; tibiae and tarsi dark brown; FI with 3-4 pale basal av bristles, with distal av setae black, and with pale pv row, decreasing in size distad; FII with rows pale av and pv setae, with distal third of FII bare; FII also with row dark posterior setae (MSSC); TII and IIt covered with black porrect setae (MSSC); IIt₅ with slightly enlarged pulvilli (MSSC); FIII with rows pale av and pv hairs; TIII slightly swollen from one-fifth to half with smooth excavated posterior groove (MSSC); III₃₋₅ only slightly flattened (MSSC).

Wing. Costa with av row of crocheted cilia ending before join with R₂₊₃ (MSSC); CuAx ratio: 1.1; lower calypter yellow with fan of black setae; haltere black.

Abdomen. Dark metallic green with bronze reflections; sterna 7 and 8 densely covered with short black setae; hypopygium black (Fig. 38a); surstylus with ventral arm bearing median projection and dorsal arm digitiform, and with setae as figured; cercus with greatly enlarged subtriangular distal projection, which is almost as large as epandrium, and elongate digitiform ventral projection which bears distinctive apical blade-like seta.

Female. Similar to male except smaller, wing: 2.5 x 1.1, and lacking MSSC, otherwise as noted: coxae and femora metallic green-brown; tibiae and tarsi dark brown; FI with short pale ventral av and pv setae; FII and FIII mostly bare, with only pale weak av and pv; TII and IIt without porrect setae, but TII with strong ad-pd setae at one-quarter; haltere yellow.

Remarks. *Parentia dongara* occurs across a broad area of southern Western Australia, from the Geraldton district to near Esperance on the Great Australian Bight. It has an early flight period of August and September. The male cercus is diagnostic.

Parentia yunensis n.sp.

Type material. HOLOTYPE male, PARATYPE female, Western Australia, 50 km north-west of Yuna, malaise trap, 6 Sept. 1981, G.A. Holloway (AMS).

Additional material. Western Australia – male, Stirling Ranges National Park, 49 mile post, 12 Oct. 1970 (ANIC); male, Tammin, 31 Aug. 1926 (AMS).

Description – male. Length: 3.0; wing: 2.8 x 1.2; similar to *P. dongara* except as noted.

Legs. Coxae and femora dark metallic green; tibiae and tarsi dark brown; FI with rows of 5-7 long pale av and pv setae, with some of the pv setae darker; FII with rows short pale av and pv setae; TII and IIt covered with black porrect setae (MSSC); IIt₅ without enlarged pulvilli; FIII with rows pale av and pv hairs; TIII slightly swollen from one-fifth to half with smooth excavated posterior groove (MSSC); III₃₋₅ only slightly

flattened (MSSC).

Wing. Costa with av row of crocheted cilia ending before R_{2+3} (MSSC); CuAx ratio: 0.9; lower calypter yellow with fan of black setae; haltere brown.

Abdomen. Sterna 7 and 8 also densely covered with

short black setae; hypopygium black (Fig. 38b); surstylus with ventral arm bearing median projection and dorsal arm digitiform, and with strong seta arising at base of crotch between arms; cercus with enlarged subtriangular setose distal projection which bears group of 4 strong

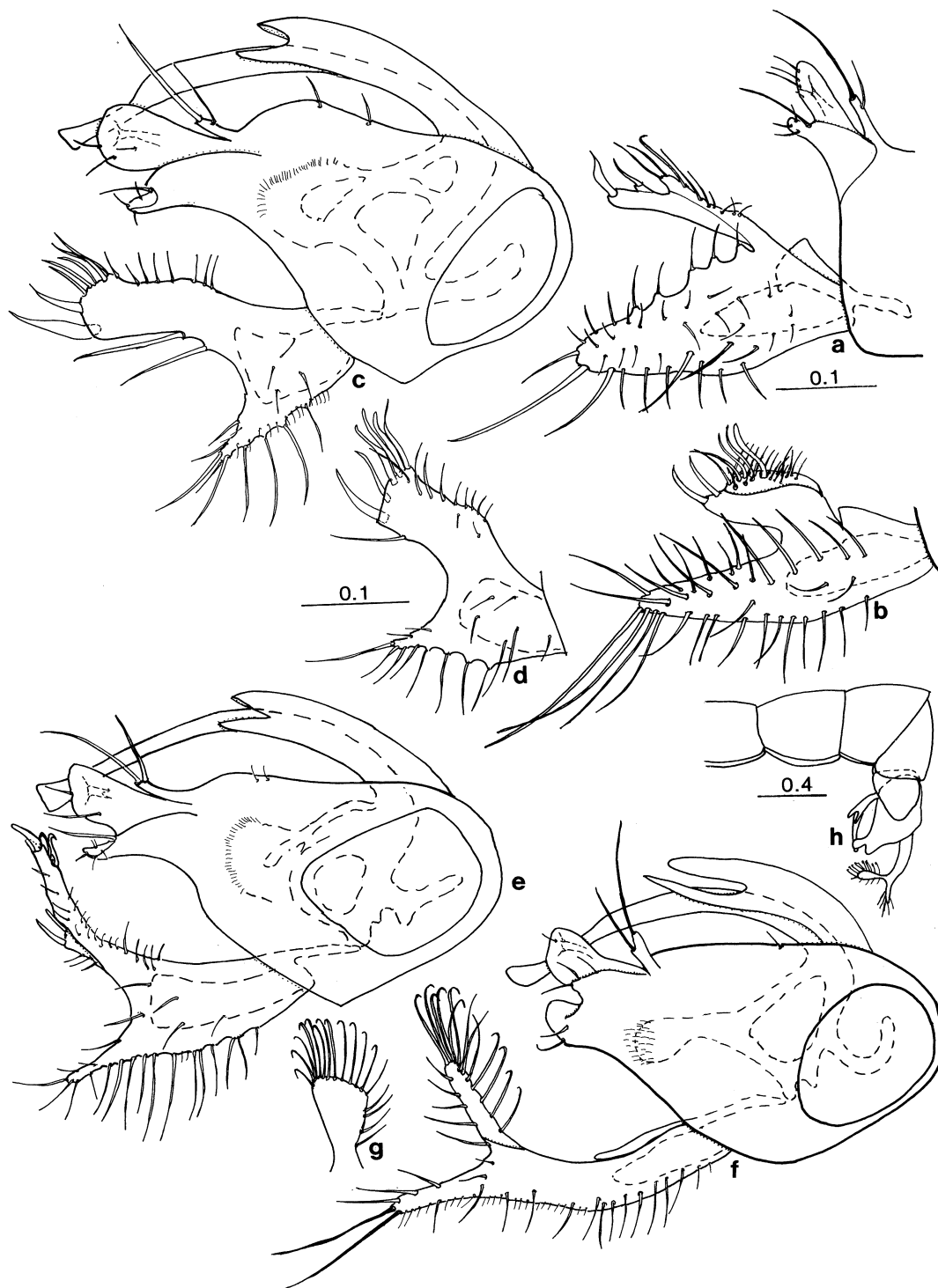


Fig.38. *Parentia dongara*, Dongara, WA: a – male cercus and surstylus, left lateral. *P. yunensis*, near Yuna, WA: b – male cercus, left lateral. *P. caldyanup*, Frankland River, WA: c – hypopygium, left lateral. *P. solaris*, Yarragil Creek, WA: d – cercus, left lateral. *P. occidentalis*, Stirling Ranges, WA: e – hypopygium, left lateral. *P. vulgaris*, Crescent Head, NSW: f – hypopygium, left lateral; g – male left cercus, posterior; h – male postabdomen, left lateral.

apical setae, and with L-shaped ventral arm which arises near a notch in the cercus and bears strong apical seta and strong curved ventral setae.

Female. Similar to male except smaller, lacking MSSC, otherwise as noted: femora with short pale av and pv setae; TII and II_t without porrect setae; TII with strong ad-pd setae at one-quarter; haltere yellow.

Remarks. *Parentia yunensis* is found in heath across much of southern Western Australia, from Geraldton to the Stirling Ranges districts. It is closely related to *P. dongara*.

The Stirling Ranges specimen shows only weak development of porrect setae on TII and II_t.

Parentia solaris n.sp.

Type material. HOLOTYPE male, PARATYPES 43 males, female, Western Australia, Yarragil Creek and Murray River Road, south-east of Dwellingup, jarrah forest, 12 Nov. 1991, yellow pans, D.J. Bickel; PARATYPES 19 males, same data but 31 Oct. 1991 (AMS).

Additional material. Western Australia – 4 males, 8 females, Yarragil via Dwellingup, 11-18 Jan. 1980, 20-27 Nov. 1980, 15-22 Dec. 1981 (QDPI); male, Stirling Ranges National Park, Mount Magog, 8 Dec. 1970 (AMS).

Description – male. Length: 3.0; wing: 2.4 x 1.0.

Head. Frons, face and clypeus shining metallic blue-green; pair strongly diverging ocellars and 2-3 pairs of short posterior setae on tubercle; face slightly expanded laterally; palp brown with black setae; proboscis yellow; antenna black; pedicel with corona of long black setae (MSSC).

Thorax. Dorsum dark metallic blue-green; scutellum metallic blue; pleura metallic green with dusting of pruinosity; setae black; 3-4 pairs long ac present.

Legs. Coxae and femora dark metallic green; tibiae and tarsi dark brown; FI with av and pv rows of pale bristles, decreasing in size distally; FII with dark posterior setae (MSSC); FII with pale av and pv bristles in basal half, and with short black av and pv setae in distal half; TII and II_t covered with short porrect setae (MSSC); FIII with rows pale av and pv hairs; TIII with callus from one-fifth to one-third which is posteriorly excavated (MSSC); III_t₃₋₅ flattened and ventrally padlike (MSSC).

Wing. Costa with av row of crocheted cilia from base almost to end of R₂₊₃ (MSSC); CuAx ratio: 1.2; lower calypter brown and with fan of black setae; haltere black.

Abdomen. Metallic blue-green; hypopygium black with dark brown cercus (Fig. 38d); epandrium subtriangular; 2 long epandrial setae present, but incurved; surstylus with lobate ventral arm and bearing median projection; cercus with tapering digitiform distal projection, which bears long apical seta, and with enlarged ventral projection which bears distinctive apical blade-like seta

and strong seta (sometimes 2 setae present) on outer margin.

Female. Similar to male except lacking MSSC, otherwise as noted [also see remarks below]: thorax and abdomen also of dark metallic green colouration; pedicel with long dorsal and ventral setae only; trochanter I yellowish; femoral knees I and II, TI, TII, It₁ and II_t yellowish; TIII brown; FI with 5-6 pale pv setae on basal third; FII and FIII with only pale weak av and pv; TII without porrect setae and with strong ad at one-fifth; leg III unmodified.

Remarks. *Parentia solaris* is known from inland dry sclerophyll forests of southern Western Australia, from the Darling Escarpment to the Stirling Ranges. The species was taken in large numbers in yellow pans placed within jarrah-marri forest (not along creeks) near Dwellingup.

However, association of females is not clear since only a few females were taken at the type locality, and many similar sized *P. yarragil* were also collected in the same yellow pan traps. The association of the female described above is based on its dark blue-green colouration (females of lighter green-bronze colour are associated with *P. yarragil*) and the similarity to females of the closely-related species, *P. caldyanup*.

Parentia solaris and *P. caldyanup* are probable sister species, as they differ primarily in leg II MSSC and only slightly in cercal details. They appear to be ecologically separated, with *Parentia solaris* in dry sclerophyll forests, and *P. caldyanup* in southern wet heaths and karri forests.

Parentia caldyanup n.sp.

Type material. HOLOTYPE male, PARATYPES 20 males, 4 females, Western Australia, Mount Frankland National Park, Caldyanup Road, 20 km north of Nornalup, 8 Nov. 1991, wet heath, yellow pans, D.J. Bickel (AMS).

Additional material. Western Australia – 49 males, 7 females, Hilltop Road, 2 km south-east Walpole, 8 Nov. 1991, open heath; male, Lake Yeagarup, 18 km south-west of Pemberton, 3 Nov. 1991, marri-jarrah forest; 2 males, 5 females, Inlet River, 20 km north-west of Walpole, 8 Nov. 1991, wet heath; 5 males, 6 females, Gardner River Crossing, Chesapeake Road, 15 Jan. 1991; 2 males, Warren National Park, near Pemberton, 16 Dec. 1970; male, 3 females, Margaret River, 28 Dec. 1970; 7 males, 2 females, Yalgroop National Park, Lake Hayward, 2 Nov. 1991, dry sclerophyll forest near paperbark swamp, yellow pans; male, Stirling Ranges National Park, near Mount Gog, 5 Nov. 1991 (AMS).

Description – male. Length: 3.7; wing: 3.3 x 1.2; similar to *P. solaris* except as noted.

Legs. Coxae and femora dark metallic green except; tibiae and tarsi dark brown; FI with av and pv rows of long and distally decreasing pale setae; FII with av row

comprising 4 pale basal av setae, some longer black setae and short black setae distalmost, and pv row comprising 3-4 strong pale basal setae, and distally decreasing black setae; TII with strong ad seta at one-fifth and subapically, without short porrect setae; FIII with pale av setae in basal half, distally bare, and with pale pv setae in basal half, and short black pv setae distad; TIII with callus (MSSC).

Wing. Costa with av row of crocheted cilia from base to end of R_{2+3} (MSSC); CuAx ratio: 1.3.

Abdomen. Metallic blue-green; hypopygium black with dark brown cercus (Fig. 38c); epandrium subtriangular; hypandrial hood with short left lateral arm; cercus with short digitiform distal projection, and with enlarged ventral arm which bears 2 distinctive apical blade-like seta and 2 strong setae on outer margin.

Female. Similar to male except lacking MSSC, otherwise similar to female *P. solaris*.

Remarks. *Parentia caldyanup* is found in heaths, wet sclerophyll forest, and some inland drier forest from the Stirling Ranges around the southern coastal districts to south of Perth, Western Australia. It is particularly common in the wet heaths and karri forests from Pemberton and the d'Entrecasteaux Coast to Nornalup.

The species is very close to *Parentia solaris* (see above) and females of the two species are indistinguishable.

Parentia vulgaris n.sp.

Type material. HOLOTYPE male, PARATYPES 3 males, 3 females, New South Wales, Bronte, near Sydney, 6 Mar. 1966, D.K. McAlpine; PARATYPES 2 males, 2 females, same data but 14 Nov. 1965, 5 Oct. 1954, 12 Mar. 1966, 1 Nov. 1966 (female, emerged from orchid compost, 1 Nov. 1966, with associated pupal cuticle) (AMS).

Additional material. Australian Capital Territory – Black Mountain, 10 Jan.-6 Feb. 1964. New South Wales – 5-7 km north-east of Harrington, littoral rainforest, 7-14 Oct. 1988; Wingham Brush, riverine rainforest, 3 Nov. 1988; Bawley Point, near Bateman's Bay, 30 Nov. 1992; Upper Allyn River, 480 m; metropolitan Sydney, 28 Apr. 1972, 7 Nov. 1984, 2 Feb. 1962, 14-19 May 1975, 10 Mar. 1986, 7 May 1981, 26 Nov. 1923; Royal National Park, 28 Sept. 1975; Brunswick Heads, Aug. 1963; Corindi Beach, near Coffs Harbour, 17 Mar. 1981; Moree, 20 Dec. 1961; Dorrigo, no date; Engadine, 28 Nov. 1986; Nowra, Oct. 1924; south of Crescent Head, 31 Dec. 1972-7 Jan. 1973; Lake Macquarie, Nov. 1976. Norfolk Island, December, 1968; Rocky Point Reserve, 14 Nov.-2 Dec. 1984. Queensland – Mount Glorious, canopy of *Argyrodendron actinophyllum*, 24 Nov. 1987; Tully, 12 Aug. 1934; Mount Nebo, Sept.-Nov. 1962; Woombye, 17 Dec. 1970; Bunya Mountains, 1010 m, 8 Jan. 1970; Nambour, 18 Mar. 1985; Wallaman Falls, west of Ingham, rainforest, 7 Feb. 1975; Brisbane, 7 Dec. 1959; Stanthorpe, 3 Oct. 1923. Western Australia – Millstream, 8 Apr. 1971, 23-25 Oct. 1970, 25 Oct.-1 Nov. 1970 (64 males,

78 females examined: ANIC, AMS, BMNH, NSWAG, QDPI, UQIC, SAM, CNC).

Description – male. Length: 3.8-5.0; wing: 3.6-4.0 x 1.6.

Head. Frons, face and clypeus shining metallic blue-green; face slightly expanded laterally; palp black; proboscis brown; antenna black; pedicel with long dorsal and ventral setae; arista about 2 times head height.

Thorax. Dorsum shining metallic blue-green; pleura metallic green with dusting of pruinosity; setae black; 4-5 pairs long ac present.

Legs. Coxae and femora dark metallic green; tibiae and tarsi dark brown; CI and CII with pale anterior hairs and CIII with pale lateral setae; FI with av and pv rows of short pale setae; FII with av and pv rows of short pale hairs and with short black pv in distal third; TII bare of ad and pd setae except subapically; FIII with only weak pale av and pv; TIII with distinct callus from one-fifth to half, with posterior excavation (MSSC); III_t_{3,4} very strongly flattened and padlike, almost cushioned ventrally (MSSC).

Wing (Fig. 122d). Costa with av row of crocheted cilia from base almost to R_{2+3} (MSSC); M in broad curve to R_{4+5} ; CuAx ratio: 1.0; lower calypter brown and with fan of black setae; haltere black.

Abdomen. Metallic green with bronze reflections; terga 1-6 with long black posterior setae and pale lateral and ventral hairs; postabdomen (Fig. 38h); hypopygium black (Fig. 37f); epandrium subtriangular; surstylus with ventral lobe bearing median projection and setae as figured; cercus elongate with setose distal projection and ventral projection which appears fan-shaped in posterior view and bears long marginal setae (Fig. 38g).

Female. Similar to male except smaller (length: 3.8-4.0) and lacking MSSC; otherwise as noted: 3 strong ac and 5 strong dc present; all femora with only weak ventral hairs; TII with strong ad at one-fifth; haltere yellow.

Remarks. Unlike most *Parentia*, the range of *P. vulgaris* extends well into the tropics. It occurs in tropical Western Australia, along the coast and ranges from northern Queensland to the southern coast of New South Wales, and on Norfolk Island (Fig. 35). Possibly the species extends across tropical North, but specimens are unknown from the Northern Territory. Since a paratype was reared from orchid compost, its wide range may be partially the result of accidental introductions associated with horticulture.

In the Sydney district, *P. vulgaris* has a long flight season, with adults recorded from late September to May. This large dark *Parentia* species, with its fan-like cercal projection is distinctive. The male III_t_{3,4} are strongly flattened and cushion-like (MSSC). The unplaced *Parentia gladicauda* has similar III_t pads, weak ventral femoral setae, and general habitus, and may be derived from *P. vulgaris*.

Parentia tricolor (Walker)

Psilopus tricolor Walker, 1835: 471.

Psilopus viduus Schiner, 1868: 216.

Condylostylus amoenus Becker, 1922a: 219, **n.syn.**

Type material. Walker described *Psilopus tricolor* based on males from "New Holland" and the type material is lost. The description, however fits the species discussed below. Schiner described *Psilopus viduus* from a single female taken at Sydney (NHMV, examined). Becker's *Condylostylus amoenus*, described from 3 males taken at Mount Victoria, NSW (TMB, lost), was considered a synonym of *Psilopus gemmans* by Parent (1934a). However, *P. gemmans* is now regarded as a valid species confined to Western Australia. I regard *Condylostylus amoenus* as a junior synonym of *Parentia tricolor*.

A male neotype is here designated for *Psilopus tricolor* Walker and bears the label "N.S.W. Como West near Sydney, 16 Dec. 1974, L. Willan" (AMS).

Additional material. New South Wales – Cabbage Tree Creek, west of Nelligen, 23 Oct. 1970 (ANIC); Barridine, Oct. 1964; Hornsby, 22 Nov.-16 Dec. 1974; Hazelbrook, Dec. 1985; Ku-ring-gai Chase National Park, 25 Nov. 1970 (AMS). Queensland – Lake Broadwater, near Dalby, 26 Sept. 1986; Dargonelly Rockhole, Mount Moffat, Carnarvon National Park, 21 Sept. 1986, at light; North Stradbroke Island, 3 Apr. 1992 (UQIC); Mount Tully near Stanthorpe, 25 Nov. 1989 (AMS). South Australia – Eyre Peninsula, Lake Gilles National Park, 13 Nov. 1975; Port Lincoln, 7 Oct. 1979; Kangaroo Island, sweeping *Chloretum glomeratum*, 23 Oct. 1951; Ferris-McDonald National Park, 5 Oct. 1974 (SAM). Tasmania – Hobart, 8 Oct.-3 Nov. (MVM). Victoria – Little Desert, 15 km south of Kiata, Oct. 1948 (AMS); Wyperfield National Park, Lake Brimin, 4 Sept. 1974, 14 Oct. 1975 (ANIC); Melbourne, no date (MVM); 18 km south-east of Rotinvale, 30 Oct. 1982; Eildon Weir, Goulbourn River, 6 Nov. 1927; Lower Ferntree Gully, Dandenong Range, 6 Oct. 1928 (MVM) (64 male specimens examined).

Description – male. Length: 3.8-4.4; wing: 3.3 x 1.3.

Head. Frons, face and clypeus shining metallic blue-green, with some pruinosity laterally and along frontoclypeal suture; pair strongly diverging ocellars and 2-3 pairs of short posterior setae on tubercle; frons with row of weak pale hairs along join with eye (MSSC); face slightly expanded laterally; palp brown with 4-5 black setae; proboscis yellow-brown; ventral postcranium with abundant pale hairs; antenna black; pedicel with corona of short setae; arista about 2 times head height.

Thorax. Dorsum shining metallic blue-green with bronze reflections; scutellum metallic blue; pleura metallic green and covered with some grey pruinosity; setae black; 3 regularly paired long ac; 1 pa, 2 sa, 2 sr, 2-3 strong npl, 1 weak hm, and 1 pm present.

Legs. Coxae and femora dark metallic green except for yellowish knees on FI and FII; tibiae and tarsi dark brown; CI and CII with pale anterior hairs and CIII with pale lateral setae; I: 6.5; 5.5; 4.0/1.2/0.8/0.5/0.5; FI with av row of long and distally decreasing either pale or black bristles, and pv row of 5-6 long black bristles, but

pv row sometimes with 2 long pale bristles basalmost; It₁ with rather long pale ventral pile (MSSC); II: 7.5; 8.5; 6.8/2.0/1.2/0.5/0.5; FII basally with some pale av and pv bristles, and remainder of av and pv rows with black bristles; TII with strong subapical ad seta only, without porrect hairs; III: 9.5; 12.0; 6.0/2.5/1.0/0.8/0.5; FIII with pale av and pv setae in basal half, but bare on distal half; TIII with callus from one-fifth to one-third, and excavated posteriorly; III₃₋₅ only slightly flattened and padlike ventrally (MSSC).

Wing. Hyaline; costa with av row of crocheted cilia from base almost to R₂₊₃ (MSSC); CuAx ratio: 1.2-1.4; lower calypter brown with fan of black setae; haltere black.

Abdomen. Terga 5-7 each with pair of long posterolateral setae; surstylus with ventral arm which bears median projection and dorsal digitiform arm, and with setae as figured; cercus (Fig. 39a,b) with tapering triangular setose distal projection and clavate ventral arm with blade-like apical setae as figured.

Female. Similar to male except smaller 4.3-4.4; wing: 3.3 x 1.6, and lacking MSSC; otherwise as noted: coxae and femora metallic green-brown; femoral knees and tibiae yellow; distal tarsomeres darkened; FI with short pale av and pv setae in basal half; FII and FIII bare or with only pale weak ventrals; TII with ad seta at one-fifth and subapically; lower calypters yellow with fan of black setae.

Remarks. *Parentia tricolor* is a widespread species with an eastern Bassian distribution, including South Australia, Victoria, Tasmania, the coast and western slopes of New South Wales, and south-eastern Queensland, and the sandstone plateaus of central Queensland. Surprisingly, it has not been taken at Black Mountain, ACT.

Parentia tricolor is polytypic with respect to size, colouration of the male ventral femoral setae, and position of apical setae on the ventral cercal arm, and relative length and size of the cercal arm and triangular base (compare Fig. 39a,b), and may constitute a complex of sibling species (Fig. 39b is similar to the neotype). This variation does not appear to be geographical but more study material is needed.

As well, *Parentia tricolor* is closely related to a number of species with similar cerci: *P. chaineyi*, *P. gemmans*, *P. nigropilosa*, *P. tinda* and *P. occidentalis*.

Parentia gemmans (Walker), n.status

Psilopus gemmans Walker, 1849: 644.

Type material. Walker described *Psilopus gemmans* from a single male taken in Western Australia. It was considered to be a junior synonym of *P. tricolor* by Hardy (1935) and was listed as such in Bickel & Dyte (1989). However, it represents a distinct species, although close to *P. tricolor*. The holotype is missing both legs II (BMNH, examined).

Additional material. Western Australia – male, Crawley, 24 July 1934, 3 females, same but 21 Sept. 1934; male, Bilbra Lake, 9 Sept. 1934 (ANIC).

Description – male. Length: 4.7; wing: 4.2 x 1.6; similar to *P. tricolor* except as noted.

Thorax. Eight strong npl present (MSSC); additional

pair of setae present along scutellar margin between lateral and median scutellars; scattered black hairs present on scutellar disc.

Legs. Coxae and femora dark metallic green except for yellowish knees on FI and FII; tibiae and tarsi dark brown; FI with av row of long whitish setae and posterior row of long black setae (MSSC); FII basally with some

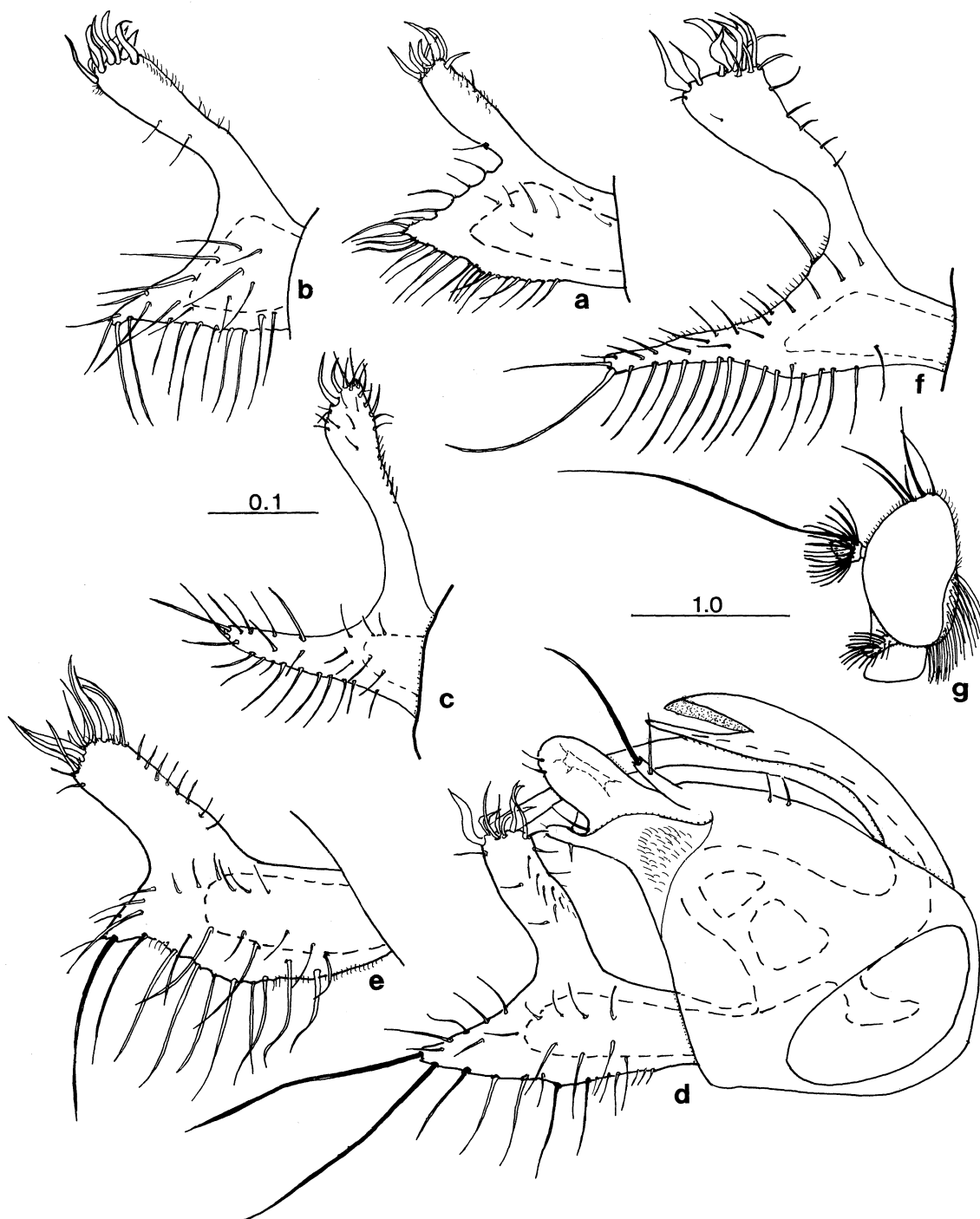


Fig.39. *Parentia tricolor*, Como West, NSW: a – male cercus, left lateral; Little Desert, Vic.: b – male cercus, left lateral. *P. tinda*, Forster, NSW: c – male cercus, left lateral. *P. chaineyi*, Stirling Ranges, WA: d – hypopygium, left lateral; *P. gemmans*, Crawley, WA: e – male cercus, left lateral; *P. nigropilosa*, Katoomba, NSW: f – male cercus, left lateral; g – male head, left lateral.

pale av and pv setae, and remainder of av and pv rows with black setae; TII without strong ad seta in basal quarter, and along with IIt, covered with short almost porrect setae; IIt₄₋₅ slightly flattened (MSSC); FIII with long pale av and pv setae basally, with shorter black av and pv setae in distal quarter.

Abdomen. Cercus (Fig. 39e) with short triangular distal projection and elongate ventral projection with setae as figured.

Female. Similar to male except smaller (wing length 4.0) and lacking MSSC, otherwise as noted: 2 npl present; scutellar margin also with short setae between median and lateral scutellar setae; coxae and femora metallic green-brown; femoral knees and tibiae yellow; distal tarsomeres darkened; FI with short pale av and pv setae in basal half; FII and FIII bare or with only pale weak ventrals; TII with ad seta at one-fifth; IIt unmodified.

Remarks. *Parentia gemmans* is known only from metropolitan Perth, Western Australia. Although the holotype is from an unspecified Western Australian locale, regular ports of call for ships in the early 19th century suggest the type locality is either Perth or Albany on King George Sound.

Male *Parentia gemmans* have extra strong notopleural setae and an additional pair of scutellar seta. Also of interest is the male flattened IIt₄₋₅, the only case of leg II tarsomeres being flattened in *Parentia*. In a manner similar to *P. nigropilosa* and *P. tinda* from eastern Australia, the strong male pilosity of *P. gemmans* has affected the female phenotype. Females similarly have an extra pair of scutellar setae.

Parentia chaineyi n.sp.

Type material. HOLOTYPE male, PARATYPES 8 males, 21 females, Western Australia, Stirling Ranges National Park, 12 km north-east of Kendenup, 5 Nov. 1991, yellow pans, low sandplain heath, D.J. Bickel (AMS).

Additional material. Western Australia – male, Yarragil Creek and Murray Road, south-west of Dwellingup, yellow pans, 31 Oct. 1991, jarrah forest (AMS); male, 9 km north of Mandurah, 28 Sept. 1962 (CAS); 4 males, 8 females, 30 km south-west and 4 km west-south-west of Mount Ragged, 30 Oct.-3 Nov. 1977; male, 9 km south-west of Bindoon, 25 Sept. 1981; male, female, William Bay, west of Denmark, 10 Oct. 1970; male, 28 km north-west of Ravensthorpe, 21 Sept. 1981; male, Kojonup, 20 Sept. 1968 (ANIC).

Description – male. Length: 4.0; wing: 3.3 x 1.3; similar to *P. tricolor* except as noted.

Legs. FI with av and pv rows of long pale setae which decrease in size distally; FII with av row bearing 3-4 pale basal setae and distal short black setae, and pv row bearing 3-4 pale basal setae and in long black distal setae; TII with strong ad seta at one-fifth and subapically;

FIII with pale av and pv setae in basal two-thirds, but bare in distal third.

Abdomen. Hypopygium (Fig. 39d); cercus with tapering triangular setose distal projection and clavate ventral projection which bears outer blade-like apical setae as figured.

Female. Similar to female *P. tricolor*.

Remarks. *Parentia chaineyi* occurs widely across southern Western Australia, from north of Perth to Ravensthorpe. It is particularly abundant in sandplain heath in the eastern part of its range, but is also known from western coastal plain vegetation and jarrah forest.

Parentia chaineyi is very close to *P. tricolor*, and is differentiated primarily on the basis the male femoral setal colour and the presence of a strong ad seta at one-fifth on TII. The pale av and pv setae on FI are diagnostic. However the male genitalia of the two species are similar, especially cercal structure.

Parentia chaineyi is named for John Chainey, who assisted my study of the BMNH collections.

Parentia tinda n.sp.

Type material. HOLOTYPE male, PARATYPES 4 males, 13 females, New South Wales, Putty Road at Tinda Creek, dry sclerophyll woodland, 17 Oct. 1987, D.K. McAlpine (AMS).

Additional material. New South Wales – Sydney, 14 Sept.-6 Oct. 1924; Goondarra Ridge, Royal National Park, 10 Oct. 1970; Pilliga State Forest, Salt Caves Dam, 8 Oct. 1988, at light (AMS); Forster, 3 Sept. 1967 (ANIC) (6 males, 5 females).

Description – male. Length: 5.0-5.3; wing: 4.7 x 1.7; similar to *P. tricolor* except as noted.

Head. Palp with 10-12 densely packed black setae (MSSC); pedicel with corona of longer setae (MSSC).

Thorax. Four to 5 strong npl; 2-3 additional pairs of setae present along scutellar margin in addition to the lateral and median scutellars; scattered black hairs present on scutellar disc.

Legs. Coxae and femora dark metallic green except for yellowish knees on FI and FII; tibiae and tarsi dark brown; FI with av and pv rows of long black bristles (MSSC); FII basally with a few pale av and pv bristles, and remainder of av and pv rows with black bristles; TII usually without strong ad seta in basal quarter, but some specimens with weak ad seta; FIII with a few pale av and pv setae basally, then long black av setae to three-fifths, with distal third bare.

Abdomen. Cercus (Fig. 39c) with triangular setose distal projection and elongate ventral projection with setae as figured.

Female. Similar to female *P. tricolor* except as noted: tibiae brownish; some supernumerary setae present on

the scutellar margin and disc.

Remarks. *Parentia tinda* is found along coastal New South Wales from the Sydney district to Forster. It is similar to *P. tricolor* from which it was probably derived, but is larger and has a greater accentuation of setal fields in males. Another related species which also shows even greater pilosity is *P. nigropilosa* which has a more montane and southern distribution and is not sympatric with *P. tinda*. In a similar manner to *P. nigropilosa*, this species also shows some effect of strong male pilosity on the female phenotype.

Parentia nigropilosa (Macquart)

Psilopus nigropilosus Macquart, 1847: 56.

Type material. Macquart described *Psilopus nigropilosus* from specimens collected in "Nouvelle-Hollande". I have examined 2 male syntypes of this species (UMO). Hardy (1930, 1935) correctly interpreted this species.

Lectotype here designated, a male bearing the label "*Psilopus nigropilosus*, n. spe., Macq. male".

Additional material. Australian Capital Territory – Black Mountain, light and malaise traps, 30 Sept.-29 Nov., various years (female, 11 Jan.). New South Wales – Shoalhaven River, near Braidwood, 6 Nov. 1985; Gunnedah, 23 Aug. 1950; Young, 8 Nov. 1961; Armidale, 13 Oct. 1962, Sept. 1979; Katoomba, 25 Sept. 1955; Snowy-Thredbo junction, 8 Nov. 1961; Gerogery, 10 Oct. 1951; Tasmania – Hobart, 8 Oct. 1916; Launceston, 8 Oct. 1916; Victoria – Lower Ferntree Gully, Dandenong Range, 6 Oct. 1938; Stratford, no date (112 males, 94 females, examined: ANIC, AMS, SAM, MVM, CNC).

Description – male. Length: 4.0-5.1; wing: 3.3 x 1.3 to 4.0 x 1.8; similar to *P. tricolor* except as noted.

Head. Ocellar tubercle with pair strongly diverging ocellars and group 8-10 short dark posterior setae (MSSC); palpus brown and bearing 12-15 dark setae which project anteriorly beyond proboscis (Fig. 39g) (MSSC); proboscis dark brown; pedicel with dense ring of long black apical setae (MSSC).

Thorax. Dorsum shining metallic blue-green; 5-8 pairs long ac present; 2 strong posterior dc, with 5 weak hair-like anterior dc; 1 pa, 2 sa, 2 sr, 1 weak hm and 1 pm present; group 10-15 strong black npl, projecting out from thorax (MSSC); 12-15 long setae present along scutellar margin and more than 20 setae on scutellar disc (MSSC).

Legs. Coxae and femora dark metallic green; tibiae and tarsi dark brown; FI with av and pv rows of long black bristles, distally decreasing in size; TI with some dorsal setae in basal quarter; FII with some pale av and pv setae, followed by av and pv rows of long black bristles, distally decreasing in size; FII also with some black posterior setae; TII without porrect setae; FIII with 2-3 pale basal av, followed by row of black av almost to apex, and with pv row pale setae to four-fifths, with

black pv in distal fifth; III_t only slightly flattened, and not padlike ventrally.

Wing (Fig. 122e). CuAx ratio: 1.4.

Abdomen. Epandrium subtriangular; surstylus with ventral lobe bearing median projection and with external pedunculate seta; dorsal lobe surstylus as digitiform projection with setae as figured; cercus (Fig. 39f) with tapering setose distal projection bearing 2 strong apical setae and with distinctive clavate ventral projection with some distal blade-like setae.

Female. Similar to male except smaller (length: 3.7-3.9) and lacking MSSC; otherwise as noted: pedicel with only few strong dorsal and ventral setae; thorax with 5 pairs ac and 5 strong dc; 3-4 npl present; 9-10 setae present along scutellar margin with some scattered hairs on scutellar disc; FI with 4 short pale av in basal half and some pale hairs distally, and with pale weak pv hairs; FII and FIII with only pale weak av and pv hairs; III_t normal; wing (Fig. 122f).

Remarks. *Parentia nigropilosa* is common in cool south-eastern Australia and has a distribution which includes Tasmania, Victoria, the Australian Capital Territory, and the New South Wales tablelands as far north as Armidale. It has not been collected along the warmer New South Wales coast where another somewhat less pilose species, *P. tinda*, occurs.

Parentia nigropilosa has an early flight period, with most all specimens taken between August and early December.

Male *Parentia nigropilosa* show a great accentuation of setal fields, such that normal setal groups are greatly increased in number and strength on the ocellar tubercle, palps, pedicel, acrostichal band and notopleuron, scutellar margin, and scutellar disc. This male pilosity is also carried over onto the female, such that the ac band, notopleuron, scutellar margin, and scutellar disc also bear extra setae, but not as numerous or as strong as in the male. This represents a particularly strong set of MSSC which has affected the female phenotype much beyond its usual conservative facies.

Some intraspecific size variation is evident in specimens from Black Mountain, ACT.

Parentia occidentalis n.sp.

Type material. HOLOTYPE male, PARATYPES 26 males, 2 females, Western Australia, Stirling Ranges National Park, 12 km north-east of Kendenup, 5 Nov. 1991, yellow pans, low sandplain heath, D.J. Bickel (AMS).

Additional material. Western Australia – 2 males, Stirling Ranges National Park, White Gum Flat, 5 Nov. 1991, yellow pans, *Eucalyptus wandoo* forest (AMS); male, female, 25 km north of Eneabba, 24 Oct. 1984; male, Thomas River Estuary, Esperance district, malaise trap, 8 Nov. 1977; male, 30 km south-west of Mount Ragged, 3 Nov. 1977; male, Capel, 10 Nov. 1940 (ANIC).

Description – male. Length: 2.8-3.4; wing: 3.0 x 1.2; similar to *P. tricolor* except as noted.

Head. Frons dark metallic blue.

Legs. Coxae and femora dark metallic green; tibiae and tarsi dark brown; FI with av and pv rows of strong pale bristles which decrease in size distally; FII with 2-3 pale basal av setae, with remaining av setae short and black, and with 2-3 pale basal pv setae, with remaining pv row as strong black setae; TII with only subapical ad seta; leg II without porrect setae; FIII with pale av and pv setae; TIII with distinct callus and posterior excavation (MSSC); III_t_{3.5} only slightly flattened (MSSC).

Wing. Hyaline; costa with distinct av row of crocheted cilia from base almost to R₂₊₃ (MSSC); CuAx ratio: 1.2.

Abdomen. Hypopygium (Fig. 38e); hypandrial arm short, not extending much beyond hypandrial hood; 2 short epandrial setae present; surstylus with ventral arm bearing median projection; cercus with tapering triangular distal projection and digitiform ventral projection which bears 2 distinctive external setae as figured.

Female. Similar to male except lack MSSC, otherwise as noted: femora also dark metallic green; tibiae and tarsi dark brown; FI with 4-5 strong pale ventral setae; FII and FIII with only pale ventral hairs; TII with strong ad seta at one-fifth; haltere yellow.

Remarks. *Parentia occidentalis* is known from coastal and inland areas of southern Western Australia, from Esperance to the Geraldton district.

Parentia dubia (Parent)

Chrysosoma dubium Parent, 1929: 201.

Type material. Parent described *Chrysosoma dubium* from a male taken at Adelaide, South Australia (MLUH, examined) and later (1932a: 109) transferred the species to *Condyllostylus*. Hardy (1935) placed the species in *Parentia*. From Parent's original wing and hypopygium figures, it is clear that this species is a *Parentia*.

However, the holotype is missing its abdomen and I cannot be certain of its identity. However, TII and III are covered with short porrect setae. I have not seen any specimens which match the description or hypopygium figure. *Parentia dubia* seems close to *P. tricolor*.

The *nudicosta* Group

Diagnosis. *General.* Small sized, body length less than 2.6.

Head. Strong vertical seta present in both sexes; pair strongly diverging ocellars and 2 pairs of short posterior setae on tubercle; 2 long postvertical setae present; face slightly expanded laterally; pedicel with long dorsal and ventral setae, but not corona of setae.

Thorax. Ac present as 3 long pairs; posterior two dc strong, anterior 4-5 dc reduced to weak hairs in males (MSSC); lateral scutellar setae about one-third length of medians.

Legs. Femora usually with av and pv rows of strong pale setae which decrease in size distally; TII with strong ad setae at one-fifth and subapically; male TIII without distinct callus, but only very slightly swollen from one-fifth to one-third, and never with posterior excavation; male III_t_{3.5} only slightly flattened (MSSC).

Wing. Male costa either bare or with av row of short crocheted setae (MSSC); male haltere black or yellow; female haltere always yellow.

Abdomen. Hypandrial hood simple, without left lateral arm; aedeagus without dorsal angle; setose mound often arising from lateral walls of genital chamber within the epandrium, dorsad of epandrial lobe.

Remarks. The *Parentia nudicosta* Group comprises rather small-sized species confined to Western Australia.

Of particular note is the absence of the hypandrial arm and very weak development of characteristic *Parentia* MSSC such as the costal crocheted setae, TIII callus and flattened leg III tarsomeres.

The *nudicosta* Group comprises three species:

kelseyi n.sp. Australia (WA).

nudicosta n.sp. Australia (WA).

yarragil n.sp. Australia (WA).

Key to Males of the *Parentia nudicosta* Group

1. Haltere black; costa with av row of very short crocheted cilia from base almost to R₂₊₃; cercus basally subrectangular, with short knob-like distal projection and elongate ventral projection (Fig. 40c) *P. yarragil*
- Haltere yellow 2
2. Costa with short weak crocheted setae; cercus with ventral projection which bears distal tooth-like setae (Fig. 40a) *P. kelseyi*
- Costa bare; cercus subrectangular, truncate, with dorsoapical and ventroapical digitiform projections (Fig. 40b) *P. nudicosta*

Parentia kelseyi n.sp.

Type material. HOLOTYPE male, Western Australia, Kalbarri, dry heathlands, 21 Sept. 1981, L.P. Kelsey; PARATYPES male, 5 females, Kalbarri National Park near Ranger Station and Gabba Gabby Gully Road, on heath, 5-6 Oct. 1981, 17-27 Sept. 1981; female, near Red Bluff, Kalbarri, 20 Sept. 1981; female, 9 km north-north-east of Geraldton, 22 Oct. 1972 (ANIC).

Description – male. Length: 2.4; wing: 2.0 x 0.8.

Head. Vertex and frons metallic blue-green with dusting of silvery pruinosity; head very wide, much wider than high; face and clypeus metallic blue-green with some grey pruinosity; palp brown with black setae; proboscis yellow; antenna black; first flagellomere rounded; arista dorsal, black, and about as long as head width.

Thorax. Metallic green with bronze reflections; setae black; lateral scutellar setae about one-third length of medians.

Legs. Coxae and femora brown to metallic green; tibiae and tarsomeres brown; CI and CII with pale anterior setae; CIII with pale lateral seta; FI with av and pv rows strong pale setae; FII with pale av and pv setae in basal half only; I: 5.0; 4.5; 2.0/0.7/0.5/0.5/0.5; It_1 with whitish ventral pile (MSSC); II: 4.8; 5.0; 3.0/1.0/1.0/0.5/0.5; TII with strong ad at one-fifth and

strong ventral apical, and without porrect setae; III: 6.0; 6.5; 2.5/1.0/0.7/0.7/0.7; TIII without callus or excavation; III_{t3-5} black, flattened, and with ventral pads (MSSC).

Wing. With brown tint (as in Fig. 122c); veins strongly black; costa with av row of short weak crocheted setae (MSSC); wing veins dark brown; M_1 in gentle arch to apex, almost meeting R_{4+5} ; CuAx ratio: 0.8; lower calypter brown with black setae; haltere yellow.

Abdomen. Metallic green with bronze reflections and with pale setae; both tergum and sternum 7 well developed; epandrium and cerci dark brown (Fig. 40a); epandrium subrectangular; aedeagus without dorsal angle; surstylus relatively short, with larger ventral lobe which bears median setose projection, and digitiform dorsal lobe; cercus somewhat inflated basally, with distal projection bearing 2 tooth-like setae, and with ventral projection which bears distal tooth-like setae and other strong setae.

Female. Similar to male except lacking MSSC and as noted; wing: 2.1 x 0.8 (Fig. 122c); 2-3 pairs ac and 5 strong dc present; FI with pale ventral setae, not as strong as in male; lower calypters yellow with fan of black setae.

Remarks. *Parentia kelseyi* is known only from heath

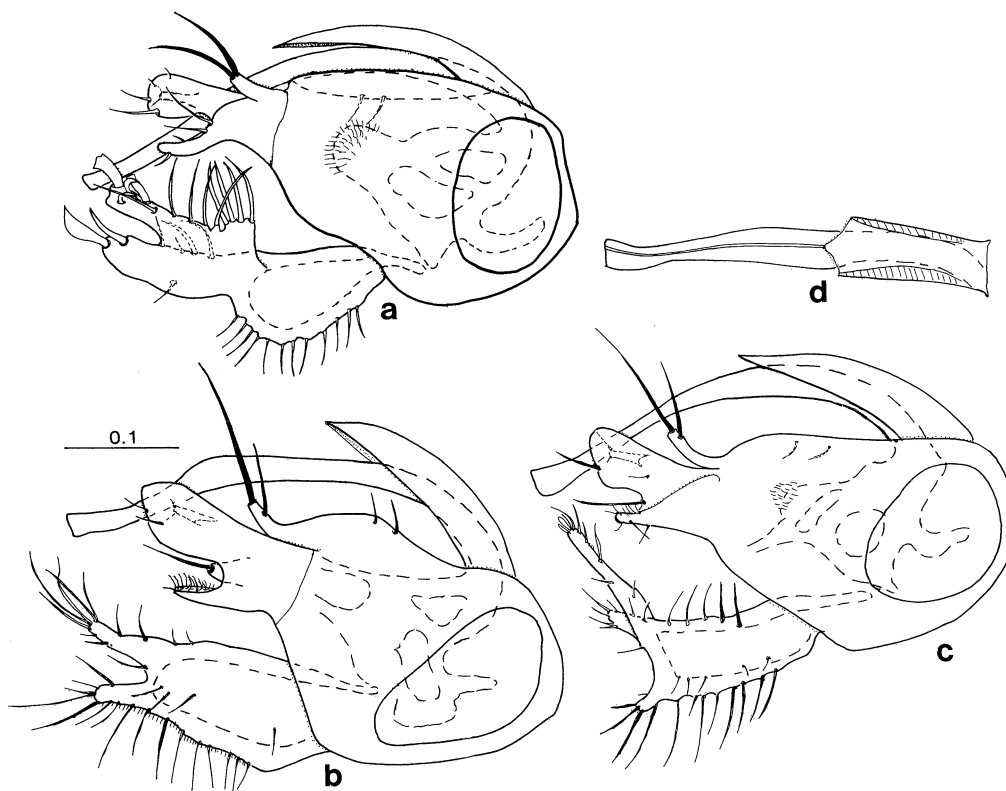


Fig. 40. *Parentia kelseyi*, Kalbarri, WA: a – hypopygium, left lateral. *P. nudicosta*, Lake Hayward, WA: b – hypopygium, left lateral. *P. yarragil*, Yarragil Creek, WA: c – hypopygium, left lateral; d – hypandrium and aedeagus, ventral.

in the Kalbarri-Geraldton district, Western Australia. It is much smaller than other *Parentia* species. The male has only weakly developed costal cilia and totally lacks a TIII callus.

***Parentia nudicosta* n.sp.**

Type material. HOLOTYPE male, PARATYPES 65 males, 3 females, Western Australia, Yalgorup National Park, Lake Hayward, 2 Nov. 1991, dry sclerophyll forest near paperbark swamp, yellow pans, D.J. Bickel (AMS).

Additional material. Western Australia – male, 13 km north of Bunbury, 1 Oct. 1970; male, female, Ludlow Forest, near Busselton, Dec. 1980 (ANIC).

Description – male. Length 2.4; wing: 2.3 x 0.8.

Head. Frons, face and clypeus shining metallic blue-green; pair strongly diverging ocellars and 2 pairs of short posterior setae on tubercle; 2 long postvertical setae present; lateral frons bare; face slightly expanded laterally; palp black; proboscis yellowish; antenna black; pedicel with long dorsal and ventral setae, but not corona of setae.

Thorax. Dorsum shining metallic blue-green; setae black; 3 regularly paired long ac present.

Legs. Coxae and femora dark metallic green; remainder of legs dark brown; CI with pale anterior hairs and CIII with pale lateral setae; I: 4.5; 4.0; 3.0/1.0/0.7/0.5/0.4; FI with av and pv rows of pale setae, long basally, decreasing in size distad; II: 5.0; 5.2; 4.0/1.6/1.1/0.5/0.5; FII with av and pv rows of pale setae; TII with strong ad setae at one-fifth and subapically; III: 6.2; 7.0; 3.5; 1.5/0.8/0.7/0.5; FIII with av and pv pale setae; TIII without callus and posterior groove; III₃₋₅ padlike ventrally, but not strongly d-v flattened (MSSC).

Wing. Costa without crocheted cilia; CuAx ratio: 1.0; lower calypter brown and with fan of black setae; haltere yellow.

Abdomen. Metallic blue-green with bronze reflections; hypopygium black (Fig. 40b); surstylus with large ventral lobe bearing median projection and with seta as figured; strong pedunculate seta present between dorsal and ventral surstylar lobes; cercus subrectangular, truncate, with dorsoapical and ventroapical digitiform projections.

Female. Similar to male except lacking MSSC and as noted: pedicel with relatively short dorsal and ventral setae; knees of FI and FII, TI and TII, yellowish; femora with short pale ventral hairs; TII also with strong ad seta at one-fifth and subapically; haltere also yellow.

Remarks. *Parentia nudicosta* is found along Western Australian coastal plain from south of Perth to Bunbury. It is a rather small sized species. Of particular note is the absence of usual *Parentia* MSSC, so that the male costa is non-ciliate, TIII is not swollen or posteriorly excavated, and the halteres in both sexes are

yellow (normally black in most *dispar* Group males). The only obvious MSSC developed on *P. nudicosta* are the pad-like III₃₋₅ and hair-like anterior dc.

Parentia nudicosta shows superficial cercal similarity to the sympatrically occurring *dispar* Group species, *P. perthensis*.

***Parentia yarragil* n.sp.**

Type material. HOLOTYPE male, PARATYPES 65 males, 2 females, Western Australia, Yarragil Creek and Murray Road, south-west of Dwellingup, yellow pans, 31 Oct. 1991, jarrah forest, D.J. Bickel; PARATYPES 48 males, female, same but 12 Nov. 1991 (AMS).

Additional material. Western Australia – 12 males, Stirling Ranges National Park, White Gum Flat, 5 Nov. 1991, yellow pans, *Eucalyptus wandoo* forest (AMS); male, Solomon's Well, near Cranbrook, 1 Nov. 1972 (ZMUC).

Description – male. Length: 2.5; wing: 2.2 x 0.9; similar to *P. nudicosta* except as noted.

Head. Pedicel also with long dorsal and ventral setae.

Thorax. Dorsum metallic blue-green with bronze reflections; scutellum metallic blue.

Legs. Coxae and femora dark metallic green; tibiae and tarsi dark brown; FI with av and pv rows of strong pale setae which decrease in size distally; FII with pale av and pv setae from base to two-thirds, with dark av and pv setae distad; TII with strong ad setae at one-fifth and subapically; FIII with pale av and pv setae along basal two-thirds; TIII only very slightly swollen from one-fifth to one-third, but not posteriorly excavated; III₃₋₅ only slightly flattened (MSSC).

Wing. Hyaline; costa with av row of very short crocheted cilia from base almost to R₂₊₃ (MSSC); CuAx ratio: 1.1; lower calypter brown with fan of black setae; haltere black.

Abdomen. Hypopygium (Fig. 40c,d) black; hypandrial arm absent; 2 short epandrial setae present; surstylus with ventral arm bearing median projection; cercus basally subrectangular, with short knob-like distal projection and elongate ventral projection with setae and protruding knob as figured.

Female. Similar to male except lack MSSC, otherwise as noted: femoral knees and tibiae I and II yellowish; TIII brown; FI with 4-5 strong pale ventral setae; FII and FIII with only pale ventral hairs; TII also with strong ad seta at one-fifth; haltere yellow.

Remarks. *Parentia yarragil* is known from several localities in south-western Australia. It was collected in large numbers by yellow pans in jarrah forest near Dwellingup.

Parentia yarragil is close to *P. nudicosta* in both cercal structure and expression of MSSC. However, *Parentia yarragil* has a very weak development of both

costal cilia (MSSC) and the TIII callus (MSSC). Also, the two species appear to occupy different habitats, with *Parentia yarragil* in the forests of the Darling Escarpment and Stirling Ranges, and *P. nudicosta* on the coastal plain.

Unplaced Australian *Parentia*

The following Australian *Parentia* species is not associated with any Group:
gladicauda n.sp. Australia (Qld).

Parentia gladicauda n.sp.

Type material. HOLOTYPE male, Queensland, Mount Tamborine, 2 Jan. 1962, C.F. Ashby (ANIC).

Description – male. Length: 5.5; wing: 4.0 x 1.4; a dark metallic green species.

Head. Vertex and frons dark metallic blue-green; 4 black postvertical setae present; strong vertical seta present; face and clypeus metallic blue-green; face slightly expanded laterally (as in Fig. 36b); clypeus semi-circular; palp dark brown with black setae; proboscis yellowish; antenna black; pedicel with strong dorsal and ventral setae; first flagellomere subrectangular, arista dorsal, about as long as head height.

Thorax. Shining metallic blue-green; pleura with grey pruinosity; setae black; 3 pairs long ac present; 2 strong posterior dc, with 5 short, weak anterior dc (MSSC); 1 pa, 2 sa, 2 sr, 1 weak hm, 1 stronger pm and 2 npl present; lateral scutellar setae about two-thirds length of medians.

Legs. Coxae and femora dark metallic green; femoral knees, tibiae, It_1 and II_t_1 yellow; remaining podomeres dark brown; CI and CII with pale anterior setae; $CIII$ with group of pale lateral setae; all femora with pale ventral hairs; I: 7.5; 8.5; 3.0/1.5/0.7/0.5/0.5; TI and It_1 with pv row of pale curved setae (MSSC); II: 9.0; 10.0; 6.5/2.0/1.5/0.7/0.5; TII bare of major setae; III: 9.0; 14.0; 5.0/2.0/1.3/1.0/0.7; $III_{t_{3-4}}$ flattened with thick ventral pad-like surface (MSSC).

Wing. Hyaline with brownish wash; M_2 arcuate with respect to M_1 ; CuAx ratio: 2.7; lower calypter dark brown with black setae; haltere black.

Abdomen. Elongate, almost 3 times length of thorax; metallic blue-green with bronze reflections; segment 7 longer than segment 6 and forming elongate peduncle, with both sternum and tergum 7 well developed (Fig. 41b); hypopygium dark brown with brown cerci (Fig. 41a); epandrium subrectangular; hypandrial arm arising beyond midlength of hypandrium and extending just beyond hypandrial hood; aedeagus with dorsal angle; epandrial lobe with long apical and shorter basal bristle; surstylus with lobate ventral arm which bears

median projectional; cercus bladeli-like and very long, almost 3 times length of epandrium, and with dorsal triangular mound at two-thirds.

Female. Unknown.

Remarks. *Parentia gladicauda* is known only from Mount Tamborine, south-eastern Queensland, probably from subtropical rainforest. The elongate blade-like cercus and prolonged segment 7 are distinctive.

This species is placed in *Parentia* because it possesses a strong vertical seta, male with black haltere, face slightly expanded laterally, strong lateral scutellars, arcuate M_2 , semicircular clypeus, and flattened $III_{t_{3-4}}$ (MSSC). Although lacking the TIII callus and crocheted costal setae (both MSSC) of most *dispar* Group species, it appears most closely related to *P. vulgaris*, with which it shares thick cushion-like $III_{t_{3-4}}$ pads (MSSC) and also rather weak av and pv femoral setae.

Pseudoparentia n.gen.

Etymology. *Pseudoparentia* derives its name from its superficial similarity to the genus *Parentia* Hardy. The gender is feminine.

Type species. *Pseudoparentia centralis* n.sp.

Diagnosis. **Head.** Vertex not strongly excavated; head rather wide, and clypeus semicircular in anterior view (Fig. 42b); vertical seta present on both sexes; male with pair strong diverging ocellars and pair of tiny posterior setae on tubercle; face slightly bulging in male; clypeus often separated from face by strong frontoclypeal suture, especially in males; face not expanded laterally; pedicel with short dorsal and ventral setae; first flagellomere subrectangular to rounded (Fig. 42c); arista dorsal.

Thorax. Major ac setae absent, but sometimes 3-4 pairs tiny setulae present on anterior slope of mesoscutum; 4 strong dc present, slightly decreasing in size anteriorly, but not sexually dimorphic; median scutellar setae strong, laterals present as tiny hairs or absent.

Legs. Femora and tibiae mostly bare of major setae; female FI usually with 1-2 pale basoventral setae, sometimes also present on male; male II_t variously modified: with flattened or bowed tarsomeres, and often longer than TII (MSSC); $TIII$ usually with small callus or irregularity, positioned variously on $TIII$, sometimes with posterior slit (MSSC); male $III_{t_{3-4}}$ sometimes flattened and padlike (MSSC).

Wing. Elongate and M_1 with gentle bend; M_2 present, even if only as faint fold, and arcuate with respect to M_1 ; male costa sometimes with crocheted cilia (MSSC); crossvein m-cu straight and making oblique angle with vein M .

Abdomen. Mostly metallic green with short vestiture; female terga 2-5 each with 3-4 abdominal plaques, reduced in size in male; hypandrial arm arising beyond midlength of hypandrium and usually extending only slightly beyond apex of hypandrial hood; aedeagus elongate, with dorsal angle present; setose mound sometimes arising from the lateral walls of genital

chamber within the epandrium, dorsad of epandrial lobe (Fig. 42a); cercus simple or with ventral digitiform projection.

Remarks. *Pseudoparentia* comprises five species occurring in semiarid and arid and monsoonal interior Australia, from the western slopes of New South Wales

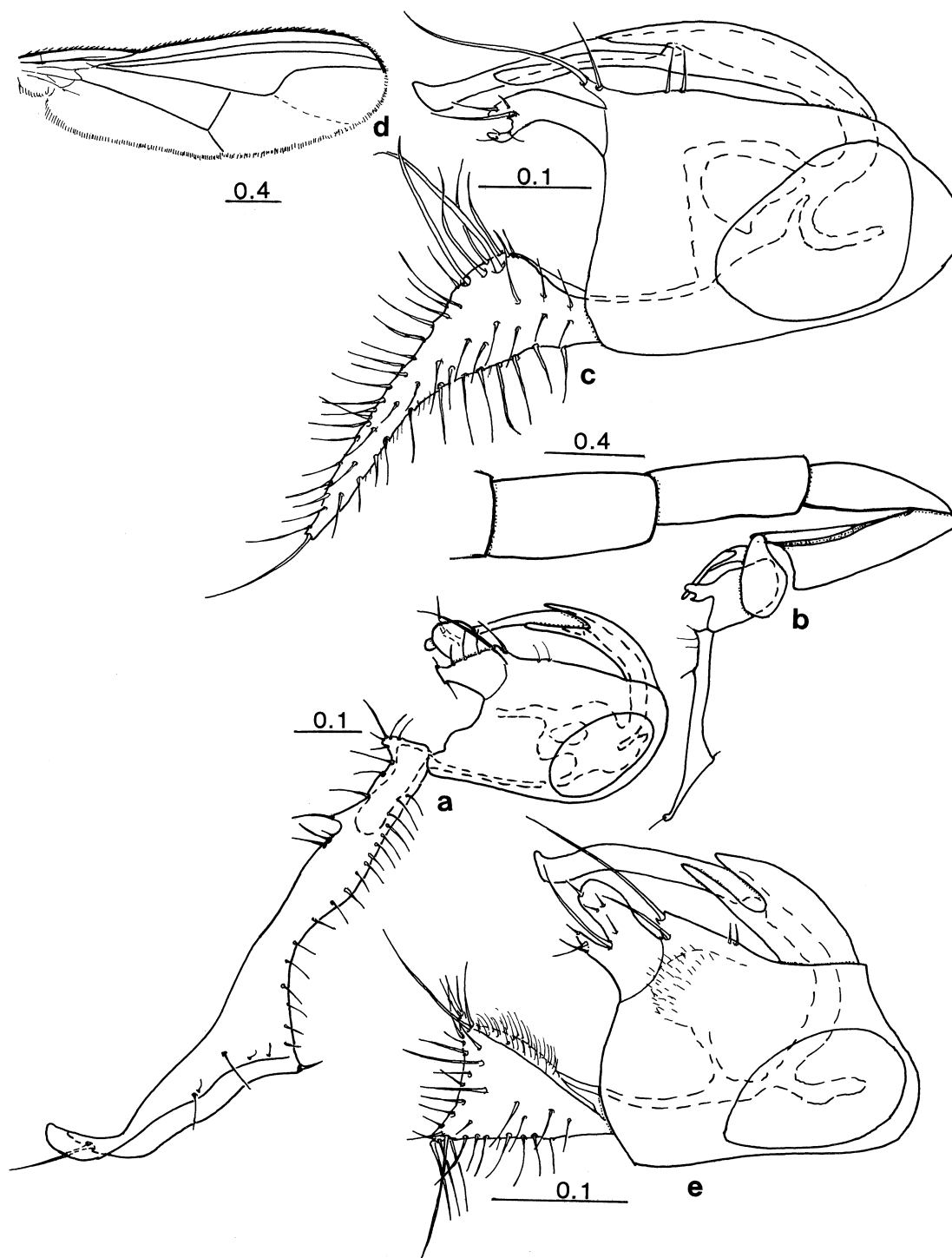


Fig.41. *Parentia gladicauda*, Mount Tamborine, Qld: a – hypopygium, left lateral; b – male postabdomen, left lateral. *Pseudoparentia tricola*, Lake Kenyon, Vic.: c – hypopygium, left lateral; d – male wing, dorsal. *Pseudoparentia advena*, Batavia Downs, Qld: e – hypopygium, left lateral.

to desert regions of the Northern Territory and Western Australia, and the monsoonal woodlands of Cape York Peninsula (Fig. 25).

It could be related to a number of other sciapodine genera occurring in Australia. It appears closest to *Parentia* in having an arcuate M_2 , semicircular clypeus, male pad-like III_{3-5} , although weak (MSSC), a TIII callus (MSSC), although variously positioned and sometimes absent, male costa of one species (*Pseudoparentia hangayi*) with row of crocheted setae (MSSC), and halteres of another species (*P. centralis*) showing colour dimorphism. However, *Pseudoparentia* has only four strong dc in both sexes, a strong vertical seta on both sexes, ac totally absent, femora mostly bare, antennal pedicel with only short setae, male face not expanded laterally, and lateral scutellar setae absent, unlike most *Parentia*. Of the three included species, *Pseudoparentia hangayi* is closest to *Parentia* especially noting the posterior slit on the TIII callus.

Also of note is the posterior crocheted subapical TI seta on male *Pseudoparentia centralis* and *P. tricola*, a MSSC very much like that of *Amblypsilopus* species near the *triscuticatus* Group. As well, *Amblypsilopus aliciensis* and *Austrosciapus actensis* appear similar to *Pseudoparentia* in overall habitus. However, few other characters link *Pseudoparentia* with these genera.

Pseudoparentia hangayi from interior New South Wales shows similar MSSC to the New Zealand *Parentia anomalica* (Bickel, 1992). However, this is a parallel development rather than a direct phylogenetic relationship.

In addition to the five included species, I have seen a female of an undescribed species from Western Australia, Mount Ragged (ANIC):

advena n.sp. Australia (Qld).

centralis n.sp. Australia (NT, SA).

hangayi n.sp. Australia (NSW).

nullaborensis n.sp. Australia (WA, SA).

tricola n.sp. Australia (Vic.).

Key to Males of *Pseudoparentia*

1. Head and thoracic setae yellow; first flagellomere pointed; FI without basoventral setae; FII with 2 long posterior subapical setae; IIt_1 distinctly bowed; TIII with callus and posterior slit at one-fifth; III_{3-4} flattened and pad-like; costa swollen at midlength and subapically, and with av row of long crocheted setae (Fig. 121i) (NSW) *P. hangayi*
- Head and thoracic setae and black; first flagellomere subrectangular; FI with at least 1 basoventral seta; costa unmodified 2
2. Antenna yellow; CI and all femora yellow; antenna entirely yellow; IIt_1 shorter than TII; IIt_1 with short black basoventral setae; apex of each tarsomere IIt_{1-4} produced and scalelike (Fig. 42f); TIII beyond half with slight callus marked posteriorly by smooth area devoid of vestiture; cercus elongate (Fig. 42e) (WA, SA) *P. nullaborensis*
- All coxae and at least part of femora dark brown/metallic green; antenna black; IIt_1 longer than TII 3
3. Small, wing less than 2.5; TI without curved pale posterior seta; FI with single black ventral seta; basal three-fifths of FI metallic green; distal FI, FII, FIII and all tibiae yellow; TII with dorsal row of curved overlapping setae along distal half; cercus triangular (Fig. 41e) (Qld) *P. advena*
- Larger, wing greater than 2.5; TI with curved pale posterior seta; FI with 2 or more pale ventral setae 4
4. Palp and proboscis yellow; IIt_{4-5} expanded as black flag (Fig. 42d); TIII swollen and bare at four-fifths; FI with 2 pale basoventral setae; cercus short with ventral projection bearing 4 strong setae (Fig. 42a) (NT, SA) *P. centralis*
- Palp and proboscis black; IIt_{4-5} only slightly flattened; TIII unmodified; FI with 5 ventral setae in basal half; vein M_1 in gentle arch to apex; cercus elongate, with strong basal mound (Fig. 41c) (Vic.) *P. tricola*

***Pseudoparentia centralis* n.sp.**

Type material. HOLOTYPE male, PARATYPES 4 males, 7 females, Northern Territory, Todd River, 9 km north by east of Alice Springs, malaise trap, 10-11 Oct. 1978, D.H. Colless; PARATYPES 2 males, 3 females, 32 km west-north-west of Alice Springs, malaise trap, 9 Oct. 1978 (ANIC).

Additional material. Northern Territory – male, Ross River, 23 Nov. 1978 (USNM). South Australia – probable female, Oratunga Creek, 11 km east of Parachilma, 4 Oct. 1975 (ANIC).

Description – male. Length: 4.0; wing: 3.0 x 1.0.

Head. Vertex only shallowly excavated (Fig. 42b); lateral frons with strong vertical seta; frons, face and clypeus metallic green with dense grey pruinosity; setae black; face slightly bulging; palp and proboscis yellow; antenna dark brown; first flagellomere subrectangular rounded (Fig. 42c); arista about as long as head width; ventral postcranium with abundant pale setae.

Thorax. Dorsum bright metallic blue-green with dusting of brownish pruinosity; pleura with grey pruinosity; scutellum metallic blue; setae black; ac as 3-4 pairs tiny setulae present only on anterior slope of mesoscutum; 4 strong dc present; 1 pa, only 1 sa, only 1 sr, 2 npl, 1 hm and 1 pm present; lateral scutellars absent.

Legs. All coxae and basal half to two-thirds of both FI and FIII dark brown with pale pruinosity; FII, distal FI and FIII and tibiae yellow; tarsi brownish; legs elongate and slender; CI and CII with pale anterior setae; CIII with pale lateral seta; tibiae without major setae; I: 5.0; 6.0; 4.0/1.5/1.0/0.5/0.5; FI with 2 pale basoventral setae; TI with pale curved posterior subapical seta (MSSC); It_1 ventrally with some pale pile and very weak pale pv setae (MSSC); II: 7.0; 7.5; 8.0/3.5/2.0/1.0/1.5; IIt_1 longer than TII (MSSC); IIt_{4-5} flattened and expanded as black flag (MSSC) (Fig. 42d); III: 8.0; 11.0; 4.0/3.0/1.5/1.0/1.0; TIII at four-fifths with posterior slightly swollen bare spot which is also marked by an irregularity in the rows of vestiture (MSSC); $III_{t_{3-5}}$ weakly flattened and padlike (MSSC).

Wing. Hyaline (Fig. 121h); M_1 in gentle arch to apex; M_2 present only as faint fold; CuAx ratio: 1.7; anal angle present; lower calypter yellow with black rim and with fan of pale setae; haltere brownish.

Abdomen. Elongate; metallic green with bronze reflections; on segments 2-6, basal half of each tergum and narrow band on preceding tergum metallic bronze with matt brown pruinosity; sternum 7 reduced to narrow band; hypopygium dark brown with yellow cerci (Fig. 42a); epandrium subtriangular with internal setose mound; hypandrial arm arising beyond midlength of hypandrium and extending beyond hypandrial hood; aedeagus simple; 2 epandrial setae present; epandrial lobe with 2 bristles; surstylus with digitiform dorsal projection, with membranous attachment to epandrium and with setae as figured; cercus with short deflexed distal projection and with digitiform ventral projection

which bears 4 strong external subapical setae and other setae as figured.

Female. Similar to male except smaller and lack MSSC; 4 strong dc also present; all femora yellow; legs shorter: I: 4.0; 4.5; 3.0/1.0/1.0/0.5/0.5; FI also with 2 pale basoventral setae; II: 5.0; 6.0; 4.0/2.0/1.0/1.0/0.5; IIt_1 shorter than TII; IIt_{4-5} unmodified; III: 7.0; 8.0; 2.5/2.0/1.0/0.8/0.8; TIII unmodified; haltere yellow.

Remarks. *Pseudoparentia centralis* is known only from the Todd River drainage in the Alice Springs district, Northern Territory.

The presence of a pale curved posterior subapical seta on the male TI is similar to that found in species groups near the *Amblypsilopus triscuticatus* Group, although the seta in *Amblypsilopus* is usually at four-fifths. However, the wing venation, presence of strong vertical setae in both sexes, lack of sexually dimorphic dc, hypopygial structure, and the TIII callus argue against any close phylogenetic relationship with *Amblypsilopus*.

***Pseudoparentia tricola* n.sp.**

Type material. HOLOTYPE male, Victoria, Lake Kenyon, Murray-Sunset National Park, 26 Nov. 1992, D.K. McAlpine (AMS).

Description – male. Length: 3.6; wing: 2.7 x 1.0; similar to *P. centralis* except as noted.

Head. Frons with strong vertical seta; frons, face and clypeus dark metallic blue-green and covered with dense grey pruinosity; palp and proboscis black; antenna black.

Thorax. Metallic blue-green and covered with dense grey pruinosity; scutellum metallic blue; ac absent; 4 strong dc present; lateral scutellars absent.

Legs. Coxae and femora dark metallic green/black; femoral knees, tibiae and basal tarsomeres brown, distal tarsomeres dark brown; tibiae without major setae; FI with row 5 pale ventral setae in basal half (MSSC?); TI also with pale curved posterior subapical seta (MSSC); It_1 unmodified; IIt_1 also longer than TII (MSSC); IIt_{4-5} slightly flattened (MSSC); TIII without evidence of callus or swollen irregularity; $III_{t_{3-5}}$ weakly flattened and padlike (MSSC).

Wing. Hyaline (Fig. 41d); M_1 in gentle arch to apex; M_2 only evident as faint fold; CuAx ratio: 1.4; lower calypter yellow with fan of pale setae; haltere yellowish.

Abdomen. Elongate; base colour metallic blue-green with grey pruinosity; on segments 2-6, basal half of each tergum and narrow band on preceding tergum metallic bronze with matt brown pruinosity; hypopygium black with yellowish cerci (Fig. 41c); epandrium subtriangular, without internal setose mound; hypandrial arm arising beyond midlength of hypandrium and extending beyond hypandrial hood; 2 epandrial setae present; epandrial lobe with 2 bristles; surstylus lobate with digitiform dorsal projection, with membranous attachment to epandrium, and with setae as figured; cercus elongate,

with basal mound which tapers distally, and with some strong basoventral setae as figured.

Female. Unknown.

Remarks. *Pseudoparentia tricola* is known from the mallee country of Western Victoria. It is most closely related to *P. centralis*, and both species have a curved posterior subapical seta on TI (MSSC).

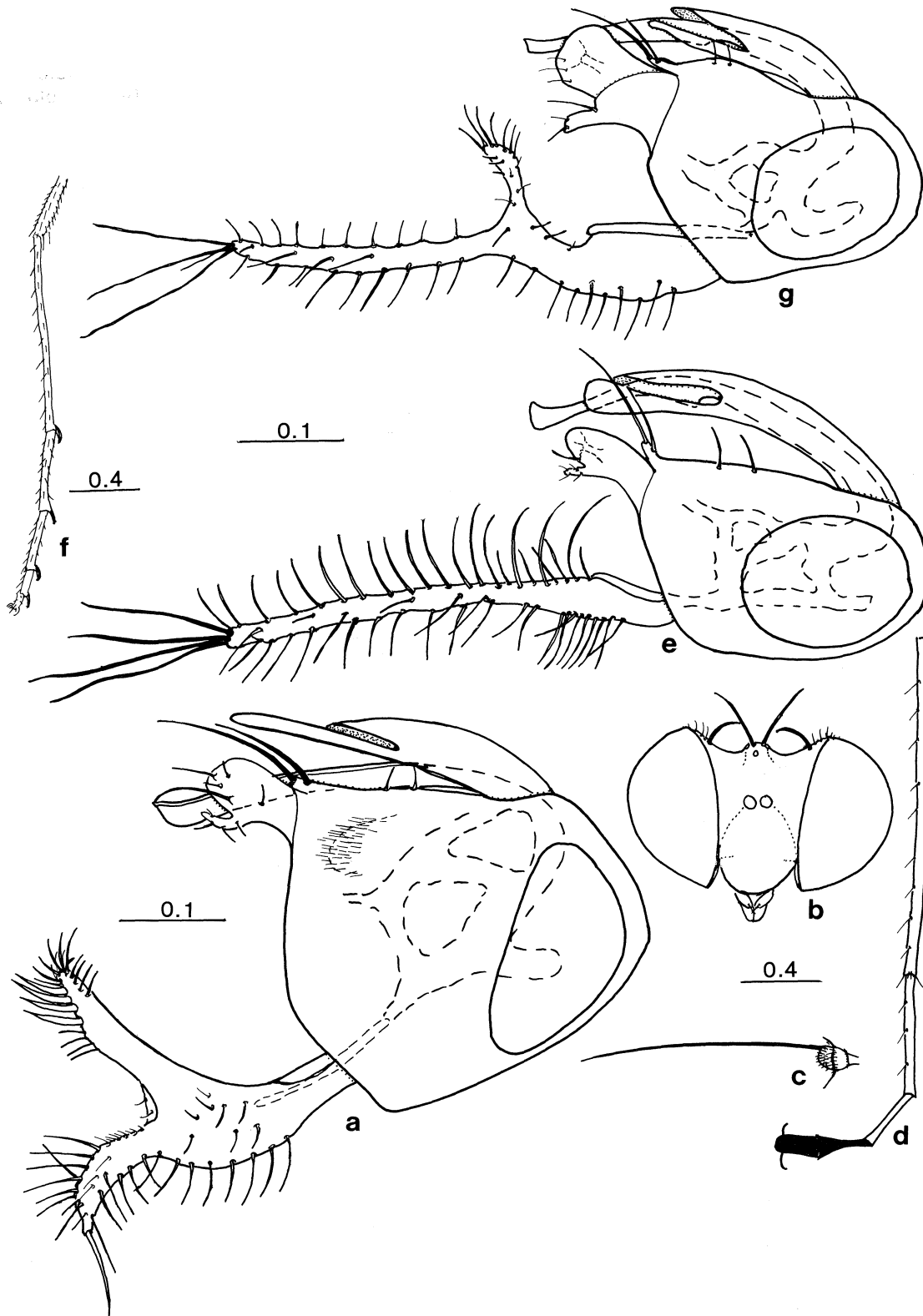


Fig.42. *Pseudoparentia centralis*, near Alice Springs, NT: a – hypopygium, left lateral; b – male head, anterior; c – male antenna, left lateral; d – male left II, anterior. *P. nullaborensis*, Eucla Pass, WA: e – hypopygium, left lateral; f – male left II, anterior. *P. hangayi*, Pilliga Scrub, NSW: g – hypopygium, left lateral.

***Pseudoparentia nullaborensis* n.sp.**

Type material. HOLOTYPE male, Western Australia, 1 km north-north-west of Eucla Pass, 31°41'S 128°52'E, 10 Apr. 1983, E.S. Nielsen & E.D. Edwards; PARATYPE female, South Australia, 42 km east by north of Nullabor, 24 Oct. 1987 (ANIC).

Description – male. Length: 4.0; wing: 3.3 x 1.0; similar to *P. centralis* except as noted.

Head. Face only slightly bulging; antenna entirely yellow, except arista black.

Legs. CII and CIII dark brown; CI, all trochanters and remainder of legs yellow; I: 6.0; 7.0; 5.0/1.5/1.0/0.5/0.5; FI with 2 pale basoventral setae; TI bare; It₁ with some pale ventral pile; II: 7.0; 8.0; 7.0/3.0/2.0/1.0/0.4; IIt₁ with group of short black basoventral setae (MSSC); apex of each segment IIt₁₋₄ apically swollen with scale like projection (MSSC) (Fig. 42f); III: 8.0; 12.5; 5.0/3.0/1.2/1.2/1.0; TIII just beyond half with slightly swollen callus marked posteriorly by smooth area devoid of vestiture; IIIIt₃₋₅ flattened and padlike (MSSC).

Wing. Hyaline; M₁ in gentle arch to apex; M₂ present only as faint fold; CuAx ratio: 2.3; anal angle present.

Abdomen. Hypopygium dark brown with yellow cerci (Fig. 42e); hypandrial arm arising beyond midlength of hypandrium and extending beyond hypandrial hood; 2 epandrial setae present; internal setose mound not evident on epandrium; epandrial lobe with 2 bristles; surstylus lobate with digitiform dorsal arm; cercus elongate, simple and setose.

Female. Similar to male except lack MSSC; FI with 2 basoventral setae, absent in male; IIt₄₋₅ normal; TIII normal.

Remarks. *Pseudoparentia nullaborensis* is known only from the Nullabor Plains along the Western Australia-South Australia border. The MSSC of tarsus II is distinctive.

***Pseudoparentia hangayi* n.sp.**

Type material. HOLOTYPE male, New South Wales, Mount Kaputar National Park, Bullawa Creek, 28 Nov. 1984; PARATYPES 2 males, Pilliga Scrub, 30 Nov. 1984, G. Hangay (AMS).

Description – male. Length: 1.4; wing: 1.3 x 0.4; similar to *P. centralis* except as noted.

Head. Vertex not deeply excavated; weak pale proclinate vertical present; head setae yellow; antenna entirely yellow; first flagellomere distinctly pointed with black dorsal arista.

Thorax. Setae yellow; ac as 3-4 pairs tiny setulae present only on anterior slope of mesoscutum; lateral scutellars present as tiny weak hairs.

Legs. CII and CIII dark brown; CI, all trochanters and remainder of legs yellow; legs elongate and slender; femora with only pale weak ventral hairs; tibiae without

major setae; I: 5.0; 5.5; 3.8/1.2/1.0/1.0/0.5; FI without basoventral setae; TI and It unmodified; II: 8.0; 9.0; 6.0/2.8/2.0/1.0/0.8; FII with 2 long posterior subapical setae (MSSC?); IIt₁ basally with pv callus which bears 4-5 short dark setae (MSSC) and remainder of IIt₁ distinctly bowed (MSSC); IIt₃ somewhat curved, IIt₄ with apical posterior spine-like seta, and IIt₅ with subapical posterior spinelike seta (MSSC); III: 7.0; 10.0; 4.2/2.0/1.5/1.5/0.4; TIII with distinct callus at one-fifth, concolourous with yellow TIII except for darkened posterior slit (MSSC); IIIIt₃₋₄ flattened and pad-like ventrally (MSSC).

Wing. Elongate, and narrow, hyaline (Fig. 121i); costa distinctly modified with slight bulge at midlength and strong subapical bulge (MSSC), also with row of av long crocheted setae (MSSC); anterior wing apex somewhat angular (MSSC); M₂ faint but bowed; CuAx ratio: 1.6; lower calypter yellow with black rim and with fan of pale setae; haltere yellow.

Abdomen. Hypopygium dark brown with yellow cerci (Fig. 42g); epandrium subrectangular; internal setose mound not evident; hypandrial arm arising beyond midlength and extending beyond hypandrial hood; aedeagus with very weak dorsal angle; epandrial lobe with 2 bristles; surstylus lobate with digitiform dorsal arm and setae as figured; cercus elongate, with short pale setae and long black apical setae, and with short digitiform ventral project at one-third.

Female. Unknown.

Remarks. *Pseudoparentia hangayi* is known only from the Pilliga Scrub and the Nandewar Range on the western slopes of northern New South Wales. The male ciliate costa is swollen and truncated apically, not unlike that of the two Nearctic species, *Amblypsilopus costalis* and *A. bradleyi*.

Pseudoparentia hangayi is similar to *Parentia anomalicosta* from New Zealand, in that both have a ciliate costa with deformed and swollen costa (MSSC), curved and modified IIt (MSSC), and similar hypopygia. However, the New Zealand species has ac setae and sexually dimorphic dc, suggesting the two species arose independently but developed similar MSSC.

***Pseudoparentia advena* n.sp.**

Type material. HOLOTYPE male, PARATYPES 4 males, Queensland, 12°39'S 142°41'E, 4 km north-east of Batavia Downs, 11 Dec. 1992-17 Jan. 1993, malaise trap, P. Zborowski (ANIC).

Description – male. Length: 2.3; wing: 2.0 x 0.7.

Head. Vertex very shallowly excavated; lateral frons with strong vertical seta; frons, face and clypeus metallic blue-green with grey pruinosity; setae black; face slightly bulging; palp and proboscis brown; antenna dark brown; first flagellomere subrectangular rounded; arista about as long as head width; ventral postcranium with abundant pale setae.

Thorax. Dorsum metallic blue-green with bronze reflections and dusting of brownish pruinosity; pleura with grey pruinosity; scutellum metallic blue; setae black; ac absent; 4 strong dc present; lateral scutellars absent.

Legs. All coxae dark metallic green brown; all trochanters yellow; basal three-fifths of FI metallic green; distal FI, FII, FIII and all tibiae yellow; tarsi brown; CI and CII with pale anterior setae; CIII with pale lateral seta; I: 2.8; 2.6; 1.6/0.6/0.5/0.4/0.3; FI with strong black ventral seta at one-quarter; TI with strong apical av seta (MSSC?); II: 3.8; 2.8; 3.2/1.3/0.8/0.7/0.5; FII with subapical av seta which projects ventrally (MSSC?); TII with dorsal row of curved overlapping setae along distal half (MSSC) and also with long apical av seta, subtended basad by shorter a-v seta (MSSC); II_t longer than TII (MSSC); III: 4.2; 5.3; 1.8/1.2/0.9/0.7/0.5; FIII with subapical ventral seta, and with subapical pv seta; TIII without evidence of callus or swelling; III_t_{3,4} very slightly flattened (MSSC).

Wing. Hyaline; M₁ in gentle arch to apex; M₂ present as distinct stub vein; CuAx ratio: 0.8; lower calypter yellow with pale setae; haltere yellow.

Abdomen. Metallic green with bronze reflections; on segments 2-6, basal half of each tergum and narrow band on preceding tergum metallic bronze with matt brown pruinosity; hypopygium dark brown with yellow cerci (Fig. 41e); epandrium subrectangular with internal setose mound; hypandrial arm arising beyond midlength of hypandrium and extending slightly beyond hypandrial hood; aedeagus simple; 2 epandrial setae present; epandrial lobe with strong apical bristle and shorter subapical bristle; surstylus with digitiform dorsal projection, with membranous attachment to epandrium and with setae as figured; cercus triangular, with strong apical setae as figured.

Female. Unknown.

Remarks. *Pseudoparentia advena* is known only from monsoonal woodland on the Cape York Peninsula. The triangular cercus is distinctive.

Ethiosciapus n.gen.

Etymology. *Afrosciapus* is formed by adding the prefix "ethio", referring to Ethiopian or Afrotropical provenance of the included species, to the existing generic name *Sciapus*. The gender is masculine.

Type species. *Psilopus bilobatus* Lamb, 1922.

Diagnosis. **Head.** Vertex distinctly excavated; strong postvertical setae present; strong vertical seta present on female; male either with strong vertical seta or group of hairs on frons; male face slightly bulging (MSSC); face and clypeus broad in both sexes, and male clypeus

adjacent to lateral eye margins or only slightly separated; pedicel with strong dorsal and ventral seta; first flagellomere rounded subtriangular; arista dorsal to dorsoapical.

Thorax. Ac present as 3 long pairs or absent; male dc present as 2 strong posterior dc and 3 short weak anterior hairs (MSSC), or with 3 strong posterior and 1 slightly shorter but strong short anterior dc (MSSC); female always with 4 strong dc; lateral scutellar setae absent.

Legs. Male CI with dense strong pale setae along entire length (MSSC); male It₁ flattened and forming ventral cushion with dense pale pile (MSSC).

Wing. Crossvein m-cu straight.

Abdomen. Male abdominal tergum and sternum 7 well developed and mostly free of segment 6, forming a collar in line with the hypopygium/sternum 8, so that the major postabdominal bend occurs between segments 6 and 7; hypopygial foramen left lateral; aedeagus with dorsal angle; cercus broad and tapering with distinctive sclerotised basal hook, which may represent separated sclerite.

Remarks. The species in the new genus *Ethiosciapus* were originally described within the old broad concepts of *Psilopus*, *Sciapus* and *Chrysosoma*. As in some other sciapodine genera, the arista varies in position from dorsal to dorsoapical.

Ethiosciapus is defined primarily by its male postabdominal structure, in particular the distinctive sclerotised hook at the base of the cercus (see Lamb, 1922, figs 2c, 3c and Curran, 1924, fig. 6). As well, the lateral scutellar setae are absent and male It₁ is elongate and flattened with ventral pile (MSSC). In other characters however, the genus is variable and not altogether satisfactory. The following important characters, which are usually generically stable elsewhere in the Sciapodinae, are variable in *Ethiosciapus*: male frons with strong vertical seta or abundant hairs (MSSC), ac present as three pairs or absent, and male dc either sexually dimorphic or similar in both sexes. Although these characters occur in several combinations, as outlined briefly in the group definitions below, I feel *Ethiosciapus* is possibly a monophyletic if polytypic taxon. Too little is known of the Afrotropical fauna to discuss the relationships of the genus, but it shows superficial similarity to Australasian *Krakatauia*, *Narrabeenia*, and the *Amblypsilopus abruptus* Group (especially *A. pectinatus*).

The included species are all from sub-Saharan Africa, Madagascar and the Indian Ocean Seychelle Islands, and can be divided into three Groups.

A. Males with strong vertical setae and with 4 strong dc, the anteriormost short but strong: *E. alluaudi*, *E. lamellatus*, *E. lasiophthalmus*, *E. lutescens* and *E. trochanteralis*.

B. Males with group of hairs laterally on frons (MSSC), and anterior dc hairlike (MSSC): *E. bicalcaratus*, *E. bilobatus*, *E. exarmatus*, *E. latipes* and *E. flavirostris*.

C. Males with group of hairs laterally on frons (MSSC), and 4 strong dc: *E. dilectus*.

Included species:

alluaudi Parent, 1935b: 80. (*Chrysosoma*) (MNHP, examined), Madagascar, **n.comb.**

This species is small sized, with straight m-cu, only short ac and dorsoapical arista. This species is very close to *E. trochanteralis* (compare hypopygium figure with Curran, 1924, fig. 5) and the two species are possible synonyms.

bicalcaratus Parent, 1933d: 37. (*Sciapus*) (Tervueren, not seen), Zaire, **n.comb.**

This species is close to *E. exarmatus*.

bilobatus Lamb, 1922: 372. (*Psilopus*) (BMNH, examined), Seychelles, **n.comb.**

Although not noted in Lamb's original description, the It_1 of this species is flattened and has pale ventral pile. As well, the arista is distinctly dorsal, TI of both sexes have a strong black pv seta at three-fifths and the male has rows of black ventral setae on all femora (MSSC).

dilectus Parent, 1935b: 84. (*Sciapus*) (MNHP, not seen), Tanzania, **n.comb.**

This species has both four strong dc and hairs on the frons.

exarmatus Parent, 1933d: 39. (*Sciapus*) (Tervueren, not seen), Zaire, **n.comb.**

flavirostris Loew, 1858c: 371. (*Psilopus*) (ZMHB, not seen), South Africa, Ethiopia, Mozambique, **n.comb.** Based on Curran's (1924: 220) redescription, this species belongs in *Ethiosciapus*.

lamellatus Parent, 1935c: 118. (*Sciapus*) (Tervueren, not seen), Zaire, Ruwanda, St Helena, Tanzania, **n.comb.** This species has It_1 flattened and strong vertical seta present on the male.

lasiophthalmus Lamb, 1922: 371. (*Psilopus*) (BMNH, examined), Seychelles, **n.comb.**

This species has a strong male vertical seta, dc strong in both sexes, and a distinctive hypopygium. The arista is dorsoapical on a short first flagellomere and the eyes of both sexes are densely pubescent.

latipes Parent, 1930a: 94. (*Chrysosoma*) (MNHP, examined), Madagascar, **n.comb.**

The arista of this species is distinctly dorsal, despite its original generic placement.

lutescens Vanschuytbroeck, 1952: 139. (*Sciapus*) (MNHP, examined), Madagascar, **n.comb.**

This species is close to the Seychelles *E. lasiophthalmus*. The scape yellow with the pedicel and first flagellomere dark brown, and It_1 is flattened and elongate with pale ventral pile (MSSC).

trochanteralis Curran, 1924: 219. (*Sciapus*), South Africa, **n.comb.**

Specimens from Barberton, South Africa (AMNH) identified by Curran were studied. The figure of the *trochanteralis* hypopygium (Fig. 5 in Curran, 1924) omits the basal hook-shaped projection of the cercus. Also, It_1 is strongly flattened with ventral pile (MSSC). The species is close to *E. alluaudi*.

Krakatauia Enderlein

Krakatauia Enderlein, 1912: 408. Type species *Psilopus* (as *Pilopus*) *rectus* Wiedemann, 1830, by original designation. *Sciapus*, authors, not Zeller.

Chrysosoma, authors, not Guérin-Meneville.

Condylostylus, authors, not Bigot.

Diagnosis. *General.* Body relatively compact, with stout thorax; legs and abdomen not greatly prolonged.

Head. Male frons often flattened with abundant pale or black hairs (MSSC), without isolated vertical seta; female frons lacking hairs, but with strong vertical seta; male face bulging (MSSC); clypeus usually distinctly free from margin of eyes in male, adjacent to or near eyes in female; eyes often with pale hairs between facets, longer in males than in females; pedicel usually with only short dorsal and ventral setae; male scape, and/or first flagellomere sometimes modified (MSSC); arista varies from dorsal to apical among species; male arista sometimes with ovate apical flag (MSSC).

Thorax. Ac present as 2-3 long pairs; male with 2 strong posterior dc, and anterior dc represented by 4-5 weak hairs (MSSC); 5 strong dc present in female; lateral scutellar setae vary from about two-thirds length of medians to short and hairlike.

Legs. TI usually bare of major setae; TII with ad-pd setal pairs, especially in female; leg MSSC developed in some species include: a) male It with pale ventral pile; b) $TIII$ with swollen callus; c) III_{3-5} flattened and padlike.

Wing. Often infuscated or with brown maculations; venation often modified, especially M_1 sometimes strongly curved towards R_{4+5} ; crossvein m-cu straight to distinctly sinuous; haltere sometimes black in both sexes.

Abdomen. Aedeagus with dorsal angle; cercus usually branched with large lobate ventral projection and short distal digitiform projection; large subtriangular projection sometimes present between cercal bases.

Remarks. Enderlein based *Krakatauia* on the distinctive venation of male *Psilopus rectus*, which has M_1 straight and joining R_{4+5} before the apex. This character is a MSSC only (the female has an unmodified sciapodine venation) and not sufficient grounds alone on which to base a genus. For this reason Becker (1922a) placed the genus in synonymy with *Sciapus*.

However, *Psilopus rectus* is now included in a distinctive group of generic ranking, and *Krakatauia* is therefore given new status (Bickel & Dyte, 1989) with an expanded definition.

Krakatauia has characteristics of both *Sciapus* s.l. and *Chrysosoma*, which accounts for closely related species being placed originally in different genera. For example, Becker (1922a) noted that the hypopygium of *Sciapus tabulina* and the wing of *S. rectus* (now both in *Krakatauia*) were similar to those found in *Chrysosoma*. Indeed, some species, such as those in the *trustorum* Group could arguably be placed in *Chrysosoma*.

Krakatauia, although not strongly defined by any apomorphies, forms a probable monophyletic group

whose species share the following features in mosaic of combinations: usually abundant setae on the male frons (MSSC), male face bulging (MSSC), eyes often with pale hairs between facets, pedicel usually with rather short dorsal and ventral setae, TI usually bare of major setae, wing often infuscated, venation sometimes modified, haltere sometimes black in both sexes, cercus with large ventral clavate arm and short distal digitiform projection, large subtriangular projection present between cercal bases.

Krakatauia is found in the Australasian and Oriental regions and comprises four Groups: the

evulgata Group in the western Pacific, Australasia, and eastern Orient, the closely related *funeralis* and *alanae* Groups in Melanesia, New Guinea and eastern Australia, the *trustorum* Group in eastern Australia, and the *anthracoides* Group in south-eastern Asia.

Krakatauia was probably derived from the Gondwanan genus *Parentia* on the leading edge of the Australian plate. A number of species in the *Krakatauia funeralis* Group show a general habitus, strong ventral femoral setae, and MSSC such as the black haltere, similar to those found in *Parentia*.

Key to *Krakatauia* Groups and Males of Australian Species

1. Lateral scutellar setae reduced to weak hairs or lost; FI with only weak ventral setae; CI often with 3 strong black distolateral setae; cercus elongate, with strong basoventral clavate projection; arista dorsal to dorsoapical; wing often with solid dark brown maculation (Sundaland and southern China) *anthracoides* Group
- Lateral scutellars at least one-third length of median scutellars, or if shorter, wing without strong dark brown maculations; FI sometimes with strong ventral setae; male M_1 and R_{4+5} often modified; other features various 2
2. Frons strongly flattened, with abundant pale or black hairs; It_2 often shorter than It_3 ; arista dorsal to dorsoapical; haltere either yellow or black (Australasia, Pacific, Orient) (*evulgata* Group) 3
- Male frons not strongly flattened, but also with abundant black hairs; arista dorsoapical to apical, and sometimes with apical flag; wing smoky; haltere black in both sexes; stout mostly black coloured flies 4
3. Antenna entirely black; frons and ventral postcranium with black setae; scape with lateral flange (Fig. 43f); CI with black anterior setae; TIII swollen at one-eighth with abundant black hairs on posterior surface; hypopygium (Fig. 43c) (coastal NSW and Qld) *K. macalpinei*
- First flagellomere yellow; frons and ventral postcranium with pale setae; scape unmodified; CI with pale anterior setae; TIII unmodified; hypopygium (Fig. 43a) (Qld) *K. obversicornis*
4. Male FI with only pale ventral hairs; pedicel with long dorsal and ventral setae (Fig. 46f); It_5 with enlarged claws, about twice as long as those of other tarsi; $III_{t_{3.5}}$ flattened and padlike (*trustorum* Group) 5
- Male FI with 4 long strong black basal setae which continues as pv row of distally decreasing setae; pedicel with rather short setae (eg, Fig. 44b); It_5 with unmodified claw; $III_{t_{3.5}}$ usually unmodified 6
5. Cercus relatively short, not longer than twice length of eandrium (Fig. 46d); TIII and III_{t_1} without pv curved setae (NSW) *K. trustorum*
- Cercus elongate, more than twice length of epandrium, and with basoventral spatulate outer arm and adjacent median setose projection (Fig. 46e) (Qld) *K. remota*

6. Epandrium subtriangular with short surstylus; cercus with setose distal arm and short basoventral arm (New Guinea, Australia) (Fig. 44a,e)..... (*funeralis* Group) 7
- Epandrium prolonged and tapering, with straight dorsal margin; cercus flattened, bladelike and elongate, with scattered setulae and pair of apical bean-shaped setae (Melanesia, Australia) (Fig. 46a,c)..... *alanae* Group 9
7. Arista simple; CI with black anterior hairs; FI-III only with long black ventral setae; cercus with very long distal projection (Fig. 44e) (Qld, PNG)..... *K. claudiensis*
- Arista with white lanceolate apical flag (Fig. 44b); CI with pale anterior hairs; FI-III with some pale ventral setae; black ventral setae; cercus with short distal projection..... 8
8. Surstylus with only short digitiform projection which bears single apical seta; distal cercal arm subtriangular, with basolateral projections as figured (Fig. 44a) (Qld, NSW)..... *K. funeralis*
- Surstylus with elongate digitiform projection bearing 4 distal setae; distal cercal arm digitiform, with basoventral projections (Fig. 44d) (Qld)..... *K. pseudofuneralis*
9. Aristal apex white but not flattened; It_1 flattened with dense modified black setae along anterior margin and white pile ventrally (Fig. 46b); surstylus hatchet-shaped with tapering digitiform projection which bears curved apical setae (Fig. 46a) (Qld, NSW)..... *K. alanae*
- Aristal apex flattened into white ovate flag; It_1 only slightly flattened with ventral white pile (MSSC); surstylus elongate with dorsal digitiform projection, median flange and apical decumbent seta (Fig. 46c) (Qld)..... *K. malanda*

The *evulgata* Group

Diagnosis. General. Thorax and abdomen often metallic green.

Head. Male vertex and frons shallowly excavated, almost flat, with and with abundant pale or black hairs on flattened lateral surface (Fig. 43e,f) (MSSC); male without distinct vertical seta; female vertex slightly flattened and without hairs, but with strong vertical seta; male frons flattened, and sometimes projecting to form protruding antennal base (MSSC); face bulging (MSSC); eyes often with pale setae between facets, longer in males than in females (in species close to *K. evulgata*, eye setose only ventrally); arista varies from dorsal to dorsoapical.

Thorax. Lateral scutellar setae usually more than one-third length of medians.

Legs. It_1 relatively long, and with pale ventral pile, with $It_{2,5}$ each short (MSSC); male It_2 often shorter than It_3 (MSSC).

Wing. M_1 strongly approaching R_{4+5} ; sometimes M_1 approaches R_{4+5} in a broad arc, making cell R_5 hatchet-shaped, in some species M_1 joins R_{4+5} before wing apex, closing cell R_5 ; cross vein m-cu straight to slightly sinuous.

Remarks. The *Krakatauia evulgata* Group is characterised by the male frons flattened with abundant black hairs on flattened lateral surface (Fig. 43e,f), antennal base often bulging; It_1 relatively long, and with pale ventral pile, and vein M_1 strongly approaching R_{4+5} . Many species have a characteristic metallic emerald green body colouration.

The *evulgata* Group is diverse in the Melanesian archipelago, where many species await description. *Krakatauia evulgata* itself is particularly widespread in the western Pacific and is often the only sciapodine present on Micronesian atolls. The presence of *K. evulgata* on low Pacific atolls and the coastal distribution of *K. macalpinei* in Australia suggest that some members of the Group are associated with coastal habitats.

The only common species known from the Oriental region is *K. recta*, found from Sri Lanka to the Philippines and New Guinea. Males have a distinctive apical male wing spot.

The two Australian species, *Krakatauia macalpinei* and *K. obversicornis*, both have relatively broad smokey coloured wings with M_1 approaching R_{4+5} in broad arc, making cell R_5 hatchet-shaped. I have seen females of an undescribed species, possibly near *K. evulgata*, from northern Cape York Peninsula (Heathlands, 18 Mar. 1992, AMS).

Included species:

abbreviata Becker, 1922a: 193. (*Chrysosoma*) (ZMHB, examined), Papua New Guinea: Bismarck Archipelago.

The male tarsus I as figured in the description is distinctive.

The Marshall Island "female" record in Becker (1922a) should be disregarded. The specimen is in fact a male *K. evulgata* (the hypopygium was twisted under the abdomen, and the specimen superficially appeared female). Also, I have not seen *K. abbreviata* in Micronesian holdings (BPBM, USNM).

Additional records. Papua New Guinea: New Britain, Ameli River, near Fullerborn Harbour (AMS).

barbescens Parent, 1939: 156. (*Chrysosoma*) (ANIC, examined), Papua New Guinea.

Male *Krakatauia barbescens* have abundant black setae on the frons and a dorsoapical arista (also see below under *K. nitidifacies*).

evulgata Becker, 1922a: 205. (*Sciapus*) (ZMHB, examined), Papua New Guinea: Bismarck Archipelago, Caroline Islands (Truk, Yap, Ponape), Marshall Islands, Solomon Islands (including Ontong Java Atoll), Trobriand Islands, Nauru, Vanuatu.

frontale Becker, 1922a: 185, as variety of *aldrichi*. (*Chrysosoma*) (ZMHB, examined), Papua New Guinea, Bismarck Archipelago (syn. Bickel & Dyte, 1989).

pressipes Parent, 1929: 244. (*Sciapus*) (MLUH, examined), Caroline Islands (syn. Bickel & Dyte, 1989).

occultus Parent, 1934c: 124. (*Sciapus*) (BMNH, examined), Solomon Islands (syn. Bickel & Dyte, 1989).

Becker described the variety (= subspecies) *Chrysosoma aldrichi frontale* from Papua New Guinea (TMB, lost) and the Bismarck Archipelago (ZMHB). The Bismarck Archipelago specimens are not *C. aldrichi* (*proliciens* Group), but *K. evulgata*. Despite major differences with *C. aldrichi* s.s. (eg, presence of a dorsal arista and lack of strong tibial bristles), Becker designated the specimens as a variety because the hypopygium was similar to de Meijere's figure for *C. aldrichi*. Becker noted that his *frontale* specimens had "stirne zart schwarz behaart". However the frons has the abundant pale hairs characteristic of *K. evulgata* (perhaps the lost Papua New Guinea specimens had black frontal hairs).

The types of *Sciapus evulgatus* and *S. pressipes* were examined together and they are conspecific. *Sciapus occultus* agrees in all respects with the concept of *Krakatauia evulgata*. The Caroline Islands type locality of *S. pressipes* had been interpreted as "Carolina", and as such, the species is listed in the "Catalog of Diptera of America north of Mexico" (Foote *et al.*, 1965). Dyte (1990) established the correct Micronesian provenance of *S. pressipes*.

Krakatauia evulgata is common in collections from the tropical western Pacific, and occurs on many isolated Micronesian atolls. The clavate ventral cercal arm, abundant pale hairs on the frons, and colouration are distinctive. Intraspecific variation is evident in size, haltere colour (ranging from yellow to brown) and the extent of black colouration on basal FI (also noted by Becker). This species is figured and discussed with additional records in Bickel (in press).

Two related but undescribed species are present in the Melanesian archipelago (BPBM, BMNH, ZMUC).

Lectotype here designated for *Chrysosoma aldrichi* var. *frontale*: male, with label "Bismark Arch, 2 June 96 Ralum, Dahl S 1896-97" (ZMHB).

Lectotype here designated for *Sciapus evulgatus*: male, with label "Bismark Arch, 11 June 96 Ralum, Dahl S 1896-97" (ZMHB).

macalpinei n.sp. Australia (NSW, Qld).

melanochira Bezzi, 1928: 63. (*Chrysosoma*) (BMNH, examined), Fiji.

nitidifacies Parent, 1934c: 123. (*Sciapus*) (BMNH, examined), Papua New Guinea (Admiralty Islands, Madang Province).

Krakatauia nitidifacies has a shining blue-violet face and a dense pale beard around the base of the eyes. As well, each tarsomere It_{2-4} is slightly inflated ventrally (MSSC), a character shared by the closely related *K. barbescens*. Among the characters which separate the two species, male *K. nitidifacies* have pale hairs on the frons, while in *K. barbescens* these are black.

nupta Bezzi, 1928: 67. (*Condyllostylus*) (BMNH, examined), Fiji.

This species has an asymmetrical black tear-shaped arisal flag (MSSC).

Additional records. Fiji: Viti Levu: Suva (CAS); Nukulau (USNM).

A related undescribed species from Tonga (USNM) and Niue Island (ZMUC) has a white arisal flag, and an undescribed species from Timor (ANIC) has a black clavate flag.

obversicornis n.sp. Australia (Qld).

platychira Frey, 1924: 121. (*Chrysosoma*) (ZMH, examined), Philippines, **n.comb.**

Males have TI strongly flattened and expanded (MSSC), and a white arisal flag (MSSC). The hypopygium is similar to that of *K. evulgatus*.

Additional records. Philippines: Luzon, Mount Makiling (USNM); Negros Island (AMNH).

recta Wiedemann, 1830: 225. (*Psilopus*) (NHMV, not seen), Sumatra, Borneo, Taiwan, Flores, Krakatau, Sri Lanka, Papua New Guinea, Philippines.

unitus Parent, 1928: 193. (*Sciapus*) (ZMUB, lost), Kalimantan (syn. Bickel & Dyte, 1989).

The *K. rectus* wing is distinctive with M_1 straight, male cell R_5 closed and a brown apical spot.

Additional records. Philippines: Luzon, Mount Makiling (USNM); Papua New Guinea: north of Madang (AMS).

A related undescribed species common in

Micronesia (BPBM) has M_1 almost straight and cell R_5 closed before the apex, but lacks the apical spot (see Bickel, in press).

sericea de Meijere, 1913a: 57. (*Psilopus*) (ZMUA, examined), Maluku (Saonek, Key Island).

I have seen an additional male from Tual, Key Islands (ZMUC). A related if not conspecific species occurs on Vanuatu (BPBM).

tabulina Becker, 1922: 197. (*Sciapus*) (TMB, lost), Papua New Guinea.

Becker's description and figures should enable accurate identification of this species.

Krakatauia obversicornis n.sp.

Type material. HOLOTYPE male, PARATYPES 4 males, Queensland, Eidsvold, 20 Apr. 1924, K. Bancroft (AMS); PARATYPES male, 20 km west of Ravenshoe, Mount Garnet Road, 2 May 1967 (ANIC); male, Kholo, 13 Jan. 1973 (CNC).

Description – male. Length 5.0; wing: 4.0 x 1.3.

Head. Vertex, frons, face and clypeus shining metallic blue-green with little pruinosity; vertex and frons broad and flat with many fine black hairs present on lateral slope; clypeus free from eye margin; eyes with pale setae between facets; palp black; proboscis brownish; scape and pedicel black, strongly contrasting with yellow first flagellomere (Fig. 43b); arista dorsal, as long as head height, and with white, slightly curved apex (MSSC); postcranium with abundant pale setae.

Thorax. Metallic blue-green; setae black; pleura with dusting of grey pruinosity; 3 pairs long ac present; lateral scutellars about two-thirds length of medians.

Legs. Coxae, FI to three-fifths, FII to three-quarters, and all FIII black; remainder of legs yellow with only distal tarsomeres infuscated; CI with pale anterior hairs; CIII with tuft of long pale hairs; FI-III with pale ventral hairs only; I: 7.0; 7.5; 5.5/0.3/2.5/0.5/0.5; TI with dorsal at one-fifth; It_1 relatively long, with subapical comb of 3 black spine-like setae; It_2 very short; II: 7.5; 9.0; 4.0/2.0/1.5/1.0/0.5; TII with 4 strong anteriors; III: 9.0; 13.0; 5.0/2.5/2.0/1.0/1.0.

Wing. Relatively broad and with faint smokey wash and similar to Figure 122f; M_1 approaching R_{4+5} in broad arc, making cell R_5 hatchet shaped; m-cu slightly sinuous; CuAx ratio: 2.2; lower calypter brown with black setae; haltere dark brown.

Abdomen. Membranous area tergum 1 dark brown; metallic blue-violet with wide matt brown bands around areas of tergal overlap; hypopygium dark brown with yellowish cerci (Fig. 43a); epandrium subrectangular; aedeagus elongate and wide, extending beyond apex of surstylus; 2 epandrial setae present; surstylus lobate with short digitiform projection which bears apical seta, and with ventral lobe and dorsal curved digitiform projection; cercus with short distal setose projection which bears long curved apical setae, and narrow ventral arm with median lobate projection and setae as figured.

Female. Unknown.

Remarks. *Krakatauia obversicornis* is found from the Cairns district to south-eastern Queensland. This species is distinctive in having a 'reverse coloured' antenna, with the scape and pedicel black and the first flagellomere yellow. The more common pattern in sciapodines is scape and pedicel yellow and first flagellomere black. Possibly this antennal colouration is a MSSC.

Krakatauia macalpinei n.sp.

Type material. HOLOTYPE male, PARATYPES 8 females, New South Wales, Iluka, Clarence River, littoral rainforest, 19 Jan. 1971, D.K. McAlpine & A. Hughes (AMS).

Additional material. New South Wales – Iluka, Clarence River, littoral rainforest, 24 Nov. 1970, 22 Feb. 1965; Mooni, near Coffs Harbour; Smith's Lake, near Forster, 8 Dec. 1966; north-east of Harrington, 2 Oct. 1985, 27 Dec. 1984, 21-29 Oct., 28 Nov. 1988, 11 Jan. 1993, littoral rainforest; Bundjalung National Park, near Evans Head, 15 Oct. 1993; Broadwater National Park, 19 Mar. 1981; Angourie, 26 Jan. 1980; Brunswick Heads, 10 Mar. 1981; Corindi Creek, Red Rocks, 7 Nov. 1981, on trunk *Eucalyptus propinqua*; North Creek, near Ballina, 1 Mar. 1965; Bellingen River, North Beach, dunes, 30 Nov. 1960; Hawks Nest, paperbark-sedge swamp, 24 Nov. 1987. Queensland – Caloundra, no date; Bribie Island, 12 Sept. 1912; Coolool, 22 Oct. 1956; Eurong, Fraser Island, 17 Aug. 1969; Mudjima Beach, east of Nambour, 29 Nov. 1985; Surfers Paradise, 5 Apr. 1950; south-east of Amity, North Stradbroke Island, 22 Oct. 1990; Bilinga, Mar. 1949; Brisbane, 13 June 1931; Buderim Mountain, Dec. 1889; south of Sand, Morton Island; Pine Creek, 19 km south of Bundaberg, 15 Sept. 1975; Tugun, 6 Feb. 1948; Noosa, 27 Aug. 1959; Coolool National Park, 6-8 Mar. 1984; Oct. 1978; Fraser Island, Central Station, 28 Nov. 1993; Eurimbula, 30 Mar. 1975 (79 male, 68 female specimens examined: AMS, ANIC, NSWAG, QDPI, QMB, UQIC).

Description – male. Length 5.0-5.1; wing: 3.4 x 1.7.

Head. Frons metallic blue-green with abundant black hairs on lateral slope (Fig. 43d,e,f); vertex flat at base of slope, with ridge separating it from base of antennae, and with ocellar tubercle arising sharply from surface (MSSC); face and clypeus metallic green-bronze; eyes with dense long yellowish setae between facets (MSSC); palp and proboscis black; antenna black; scape with distinctive lateral flange (MSSC) which blocks view of pedicel; pedicel with long ventral seta; first flagellomere subtriangular with dorsal arista which is about as long as head width; ventral postcranium with abundant black setae (MSSC).

Thorax. Metallic green with bronze reflections; matt chocolate stripe present dorsal to notopleuron; setae black, and relatively fine and elongate (MSSC); pleura with dusting of grey pruinosity; 3 pairs long ac present; 1 pa, 2 sa, 2 sr, 2 npl, 1 pm, 1 weak hm present; median scutellars strong, laterals about two-thirds length of medians.

Legs. Coxae, basal three-quarters FI, basal two-thirds FII and most of FIII black; distal femora, tibiae, It_1 and IIt_1 yellow; remaining tarsomeres and all $IIIIt$ brown; CI and CII with abundant black anterior hairs (MSSC); CIII with 3-4 black lateral setae; FI-III with long black av and pv setae; I: 8.0; 8.0; 5.0/0.5/1.5/0.6/0.6; TI with dorsal at one-eighth, otherwise bare; It_1 with ventral pale pile, It_{2-5} very short, and $IIIIt_{3-5}$ each flattened and ventrally padlike (MSSC); II: 8.0; 9.0; 6.0/1.5/1.0/0.6/0.5; TII with dorsals at one-eighth and one-third, and av at one-fifth, half and three-quarters; III: 10.0; 12.0; 6.0/2.5/1.5/1.0/1.0; TIII swollen at one-eighth with abundant black hairs on posterior surface (MSSC).

Wing. Relatively broad, smokey brown colour with only posterior margin of membrane hyaline (Fig. 122f); M_1 approaching R_{4+5} in broad arc, making cell R_5

hatchet-shaped (MSSC); M_2 as short curved stub to margin; m-cu only slightly sinuous; CuAx ratio: 2.3; lower calypter brown with black setae; haltere dark brown.

Abdomen. Metallic blue-violet with wide matt brown bands around areas of tergal overlap; strong black marginal setae and pale lateral hairs present; hypopygium black with brown cerci (Fig. 43c); epandrium subrectangular; hypandrial arm elongate; aedeagus elongate, extending beyond apex of surstylus; 2 epandrial setae present; epandrial lobe with long apical and subapical bristles; surstylus with faint line marking join with epandrium; surstylus lobate with dorsal digitiform projection and apical peduncle which bears strong seta; cercus with short distal arm and longer bilobate ventral arm with setae as figured.

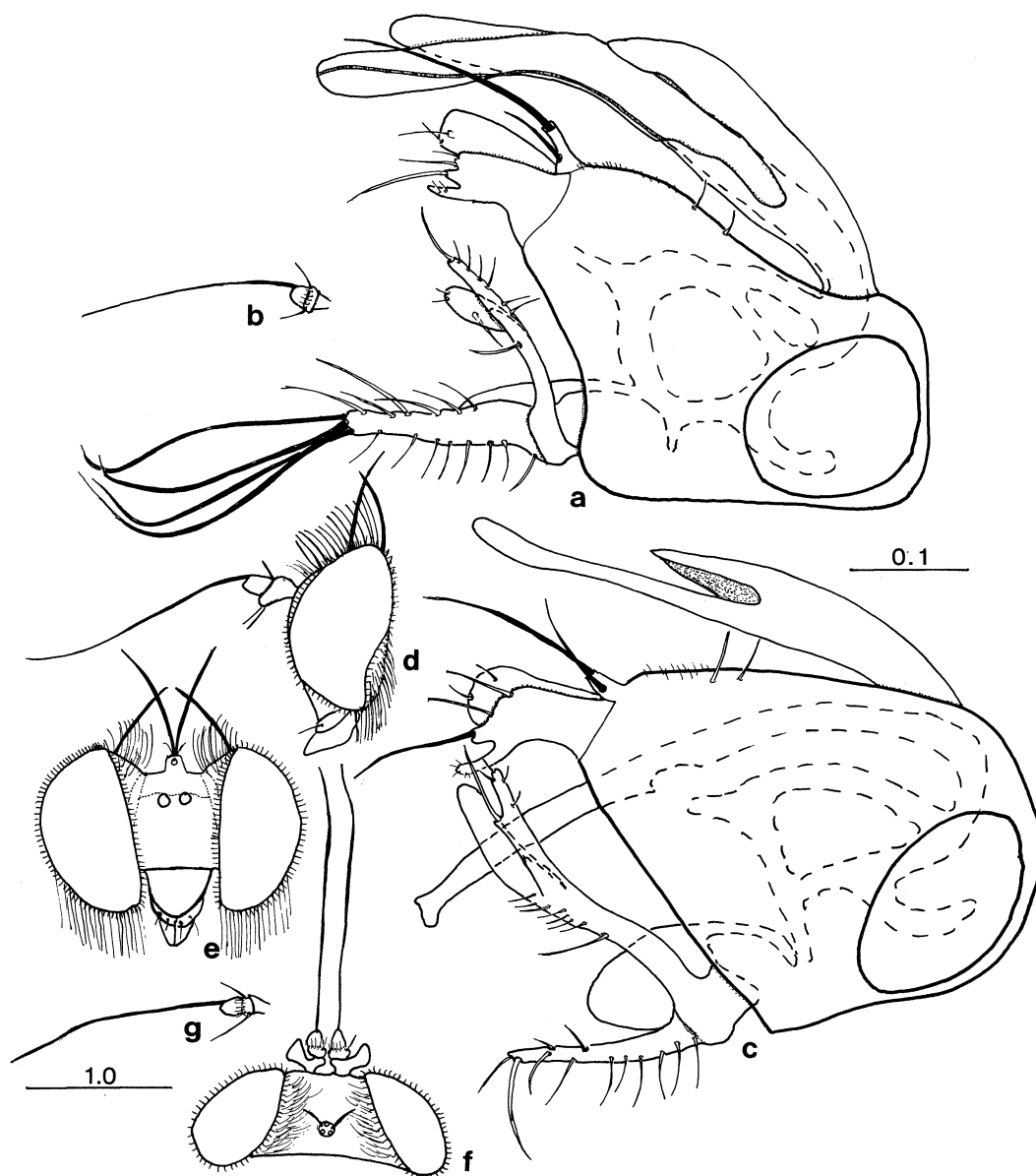


Fig. 43. *Krakatauia obversicornis* Ravenshoe, Qld: a – hypopygium, left lateral; b – male antenna, left lateral. *K. macalpini*, Brisbane, Qld: c – hypopygium, left lateral; d – male head, left lateral; e – male head, anterior; f – male head, dorsal; g – female antenna, left lateral.

Female. Similar to male except lack MSSC and as noted: smaller, wing 3.0 x 1.3; lateral slope vertex bare of black hairs but with strong black vertical seta; vertex also flattened; face not bulging; eyes with shorter pale setae between facets; proboscis black; ventral postcranium with abundant pale setae; scape without lateral flange (Fig. 43g); thoracic setae stouter; 4 strong dc present; coxae I and II with abundant pale anterior hairs, not black; It_{3-5} not flattened; TIII not swollen; wing not as strongly clouded; M_1 not so strongly curved (Fig. 122g); haltere also black.

Remarks. *Krakatauia macalpinei* is a coastal species and occurs from the Myall Lakes, New South Wales, to the Fraser Island and Cooloola in the "Big Sandy" region of south-eastern Queensland. Most specimens were taken in littoral rainforest, backdune vegetation, coastal riverine rainforest remnants, and estuaries. It is often abundant in littoral rainforest and is a characteristic species of this vegetation type.

Krakatauia macalpinei is of great interest for its wide array of MSSC. It has more distinct secondary sexual characters than any other sciapodine species considered in this revision.

The *funeralis* Group

Diagnosis. *Head.* Vertex strongly excavated, but not flattened; male lateral frons with dense black hairs but no distinct vertical seta (MSSC); female frons with strong vertical seta, otherwise bare; face and base of antenna strongly bulging in male (Fig. 44b) (MSSC); male scape sometimes modified (MSSC); first flagellomere triangular with dorsoapical to apical arista in both sexes (Fig. 44b,c); arista sometimes with lanceolate or spatulate apical flag (MSSC).

Thorax. Lateral scutellar setae strong, about two-thirds length of medians.

Legs. CI with some black distolateral setae; male FI with row of strong pv setae (MSSC); It_1 long, almost as long as TI, and sometimes dorsoventrally flattened with ventral pile (MSSC); It_{3-5} laterally flattened and padlike in some species (MSSC); male $IIIIt_{3-5}$ sometimes very slightly flattened (MSSC).

Wing. Broad and usually with smokey brown membrane; M_1 and R_{4+5} strongly converging at wing apex; R_{2+3} and R_{4+5} in both sexes with distinctive subapical bend (Fig. 122h); crossvein m-cu distinctly sinuous; haltere black in both sexes.

Abdomen. Epandrium subtriangular with lobate surstylus; cercus with setose distal arm and short basoventral arm.

Remarks. Members of the *Krakatauia funeralis* Group have a characteristic habitus: stout dark metallic green sciapodines, usually with broad smokey wings, black halteres, black setae on the male frons, FI with strong setae, pedicel without long dorsal and ventral setae, It_{3-5} often flattened, and M_1 and R_{4+5} converging at wing apex. The arista position varies from dorsoapical

to apical.

Of particular interest is an diverse assemblage of mostly undescribed montane New Guinea species near *Krakatauia digitula*. Here all males have a swollen antennal scape (not unlike that found in the *Plagiozopelma flavipodex* Group) and a thickened strap-like arista similar to the arista of the Afrotropical *P. bequaerti*.

The *funeralis* and *alanae* Groups are very close and isolated females sometimes cannot be reliably separated. The two groups show similar development of MSSC such as apical arista flags. As well, the Sundaland *Krakatauia anthracoides* Group (q.v.) is strongly similar to the *funeralis* Group, especially in the darkened wings and often elongate cerci.

The *funeralis* Group is confined to New Guinea, the Solomons and eastern Australia (Fig. 45). The three Australian species are found in rainforest from central New South Wales to Iron Range, Cape York Peninsula, and one of these, *K. claudiensis*, is known from both eastern Papua New Guinea and the Cape York Peninsula.

An undescribed montane species from above 1700 m on Guadalcanal, Solomon Islands, has an elongate male cercus like that of *Krakatauia marginalis*, and male with maculated wings but without fine hairs on the frons.

The *funeralis* Group includes the following species. *claudiensis* n.sp. Australia (Qld), Papua New Guinea. *compressipes* Parent, 1939a: 157. (*Chrysosoma*) (ANIC, examined), Papua New Guinea, **n.comb.**

Krakatauia compressipes is represented by a teneral male (a second male mentioned by Parent is at MNHP) and has mostly hyaline wings with brownish clouding around veins. A darker wing clouding is possibly more characteristic of the species. Each tarsomere It_{2-5} is laterally flattened. A related undescribed species from the Sepik River (ANIC) also has It_{2-5} laterally flattened, but the cercus is different.

digitula Becker, 1922a: 190. (*Chrysosoma*) (TMB, lost), Papua New Guinea, **n.comb.**

Additional records. Wau (CNC) and Bulolo (AMS).

As well, there are at least seven related undescribed New Guinea species, all with an enlarged scape and thickened spatulate arista (BMNH, SAM, ANIC, AMS, BPBM), and some are present in montane Papua New Guinea *Lithocarpus* and *Castanopsis* tree canopy insecticide fogging samples (BPBM). Some have strongly distorted male venation (MSSC). One of these undescribed species has a prolonged hypopygial peduncle (segment 7), longer than that of *K. digitula*. Also see *K. purpurascens*, below.

funeralis Parent, 1933a: 173. (*Chrysosoma*) (BMNH, examined), Australia (Qld, NSW), **n.comb.**

inflata Becker, 1922a: 221. (*Condyllostylus*) (TMB, lost), Papua New Guinea, **n.comb.**

This species is not a *Condyllostylus*. The description and wing figure place it clearly in the *funeralis* Group.

latemaculata Parent, 1939a: 160. (*Chrysosoma*) (ANIC, examined, female only), Papua New Guinea, **n.comb.**

The female holotype is missing its head and is possibly a female of *Krakatauia compressipes*, also described from Vanimo, Papua New Guinea.

marginalis Walker, 1861: 283. (*Psilopus*) (BMNH, examined, female only), Maluku (Batchian), Papua New Guinea, **n.comb.**

obscuripennis de Meijere, 1913a: 54. (*Psilopus*) (ZMUA, examined), Maluku (Waigeu) (syn. Bickel & Dyte, 1989).

anthracinum Becker, 1922a: 191. (*Chrysosoma*) (TMB, lost; DEI, examined, female only), Papua New Guinea (syn. Bickel & Dyte, 1989).

The female holotype of *Psilopus marginalis* and the two somewhat damaged female syntypes of *Krakatauia anthracinum* are identical. Male *Psilopus obscuripennis* are common in New Guinea collections, and associated females are identical to what I consider *Psilopus marginalis*. The description and hypopygium figure in de Meijere accurately portray the species. [*Psilopus obscuripennis* had been overlooked in Becker's 1922a monograph].

Additional records. Papua New Guinea: Kokoda (BMNH), Orokolo (AMS), and Koitaki (ANIC).

Krakatauia marginalis is very close to *K. claudiensis* (q.v.).

Lectotype here designated for *Chrysosoma anthracinum*: female with label, "Kaiser Wilhelmisland/Minjenfluss/R. Schlechter" (DEI).

nigrolimbata de Meijere, 1913b: 340. (*Psilopus*) (ZMUA, female only, examined), Irian Jaya, **n.comb.**

De Meijere (1915: 188) described the male and figured the postabdomen. This species has an elongate cercus.

Bezzi's (1928: 66) Fiji record of this species is a misidentification of a male *Chrysosoma feriferum* (BMNH, examined). Also, a Philippines record based on a female specimen (Frey, 1928) is regarded as unsubstantiated.

pseudofuneralis n.sp. Australia (Qld).

purpurascens de Meijere, 1915: 117. (*Psilopus*) (n.name for *purpuratum* de Meijere), Irian Jaya, Papua New Guinea, **n.comb.**

purpuratum de Meijere, 1906: 84. (*Agonosoma*) (ZMUA, examined, female only) [preoccupied by Aldrich, 1901].

Agonosoma purpuratum was described from a female only. De Meijere (1915: 117) figured the distinctive male hypopygium. The male scape is swollen and the arista thickened (MSSC), similar to an assemblage of species near *K. digitula*.

Additional records. Papua New Guinea: near Maprik (AMS, ANIC); Pagel, Sepik River (ANIC).

Krakatauia funeralis (Parent), **n.comb.**

Chrysosoma funerale Parent 1933a: 173.

Type material. Parent described *Chrysosoma funerale* from a male taken at Kuranda, Queensland (BMNH, examined).

Additional material. New South Wales – Dorrig National Park, on leaves of groundcover, *Hydrocotyle pedicellosa*, subtropical closed forest, 8 Jan. 1988; Victoria Park, near Lismore, 27 Dec. 1985; Wingham Brush, Manning River, riverine rainforest, 5 Mar. 1988; 3 km north-east of Harrington, 1 Mar. 1993, littoral rainforest; Wilson River, near Bellangry, 3 Dec. 1988. Queensland – Herberton Range, west of Atherton, 1100 m, 25 Nov. 1985; The Crater, near Herberton, 14 Dec. 1961; Kuranda, 11 Jan. 1967; Thornton Range, Daintree River, 7 Jan. 1967; Shiptons Flat, 15°47'S 145°14'E, 18 May 1984; Mount Lewis Road, off Mossman-Mount Mulloy Road, 27 Apr. 1967; Danbulla Forest Reserve, north-east of Yungaburra, 17 Nov. 1981; Yungaburra Forest Reserve 452, 29 Apr. 1967; Baldy Mountain, via Atherton, Apr. 1981; Wongabel State Forest, 10 Nov.-1 Dec. 1983; Mount Haig, 21 km north-east of Atherton, 18 Nov. 1981; Lamington National Park, 3 Feb.-2 Mar. 1980; Natural Bridge, near Numinbah, 10 May 1983; Mount Glorious, 26 Nov.-10 Dec. 1981, 10 Jan.-2 Mar. 1982, 25 Apr. 1930; Brisbane, 15 Apr. 1943; Mount Tennyson-Woods, 7 Jan. 1977; Mount Tamborine, 7 Dec. 1925 (30 males, 42 females examined: AMS, ANIC, QDPI, UQIC)

Description – male. Length 6.1-6.3; wing: 4.7 x 2.0.

Head. Vertex, frons violet with dense black hairs on lateral slope; upper face shining metallic green; lower face and clypeus covered with dense silvery pruinosity; clypeus free from eye margin; eyes with pale setae between facets; palp dark brown; proboscis yellow-brown; antenna black (Fig. 44b); scape somewhat globular; first flagellomere tapering; dorsoapical arista shorter than body length; arista with white lanceolate apical flag (MSSC); ventral postcranium with abundant pale setae.

Thorax. Metallic blue-violet with green reflections; matt chocolate stripe present dorsad of notopleuron; setae black; pleura with only dusting of grey pruinosity; 3 pairs long ac present; 1 pa, 2 sa, 2 sr, 2 npl, 1 pm, 1 weak hm present; lateral scutellars about two-thirds length of medians.

Legs. Coxae and legs black although tibiae may appear reddish in some specimens; CI with pale anterior hairs and 4-5 strong black distolateral setae; CII with mixture of pale anterior hairs and black setae; CIII with single black lateral seta and tuft of long pale hairs; FI-III with pale ventral short setae; I: 11.0; 9.0; 6.5/2.5/1.5/1.0/1.0; FI with 4 long strong black basal setae which continues as pv row of distally decreasing setae (MSSC); TI with 2-3 dorsal in basal quarter; It₁ slightly flattened with whitish ventral pile (MSSC); II: 12.0; 15.0; 10.5/3.5/2.0/1.5/1.0; TII with 2 dorsal and 3 anterior setae; III: 13.0; 21.0; 9.0/4.0/3.0/1.5/1.0; TIII with 5 dorsals; IIIIt₃₋₅ very slightly flattened and padlike.

Wing. Relatively broad and smokey brown with only posterior margin of membrane hyaline (Fig. 122h); CuAx ratio: 2.5; lower calypter brown with fan of either pale, black, or mixed setae (see Remarks).

Abdomen. Metallic blue-violet with wide matt brown bands around areas of tergal overlap; margins of terga 2-5 each with 2-3 ovoid dot-like depressions; strong black marginal setae and pale lateral hairs present; hypopygium dark brown with brown cerci (Fig. 44a); hypandrial hood short; aedeagus extending beyond apex of surstylus; epandrial lobe with long apical and shorter subapical bristles; surstylus with faint line marking join with

epandrium; surstylus lobate with short digitiform projection which bears apical seta; cercus with subtriangular distal projection with dorsal setae and long apical seta, and with long basolateral projection with curved hook-like apical setae, and shorter distomedial

projection with apical blade-like seta.

Female. Similar to male except lack MSSC and as noted: smaller, length 6.0; face not bulging (Fig. 44c); lateral slope of vertex bare except for strong vertical seta;

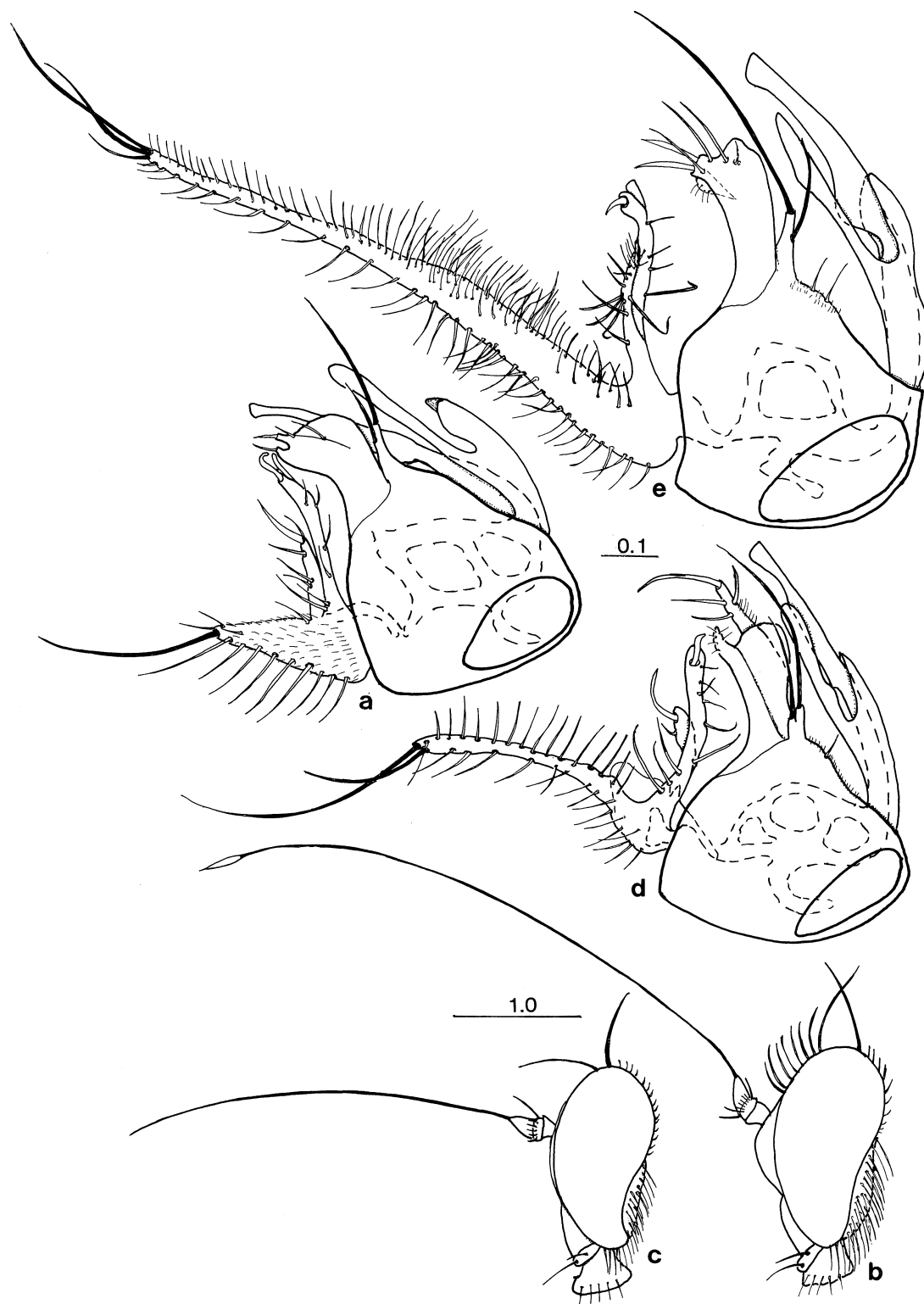


Fig.44. *Krakatauia funeralis*, Daintree River, Qld: a – male hypopygium, left lateral; b – male head, left lateral; c – female head, left lateral. *K. pseudofuneralis*, Mission Beach, Qld: d – hypopygium, left lateral. *K. claudiensis*, Iron Range, Qld: e – hypopygium, left lateral.

arista without flattened white tip; 5 strong dc present; femora with only short pale hairs and FI without pv bristles; TII with ad-pd pair at one-fifth; TIII with ad at one-fifth; wing membrane not as dark, with area posterior to CuA clear (Fig. 122i).

Remarks. *Krakatauia funeralis* is found in rainforests from the Cooktown area, Cape York Peninsula to the Manning River, New South Wales (Fig. 45). The New South Wales specimens were taken in both montane subtropical rainforest and lowland riverine rainforest remnants. It also occurs in littoral rainforest.

Specimens (both sexes) from New South Wales and southern Queensland have a fan of pale setae on the lower calypter, while specimens from northern Queensland have a fan of black setae. One female from Mount Haig (near Atherton, Queensland) has mixed black and pale setae on the lower calypter. It is not known if the setal colour varies clinally or if a sharp break between the colour forms exists in central coastal Queensland. However in all other respects, males from northern and southern Queensland are similar and considered conspecific.

***Krakatauia pseudofuneralis* n.sp.**

Type material. HOLOTYPE male, Queensland, 15 km east of El Arish, 7 Mar. 1964, I.F.B. Common & M.S. Upton (ANIC); PARATYPES male, North Mission Beach, north-east of Tully, 24 Apr. 1961 (ANIC); male, female, Kuranda, no date (BMNH).

Description – male. Length 6.1-6.3; wing: 4.7 x 2.0; similar to *K. funeralis* except as noted.

Head. Arista also with white lanceolate apical flag (MSSC).

Wing. Lower calypter brown with fan of black setae.

Abdomen. Hypopygium dark brown (Fig. 44d); surstylus lobate with stout elongate digitiform projection which bears 4 strong distal setae; cercus more elongate, narrow, with 2 strong apical setae; with 2 distinctive basoventral projections: longer projection with curved hook-like apical setae, and shorter projection arising mediad and bearing long curved subapical blade-like seta.

Female. Similar to female *K. funeralis*.

Remarks. *Krakatauia pseudofuneralis* is known only from a few specimens from the Innisfail – Tully district and Kuranda, Queensland. Except for the structure of the hypopygium, *K. pseudofuneralis* is identical to *K. funeralis*, with the same MSSC, and the two species occur sympatrically, at least at Kuranda. The two species possibly speciated only recently, such that distinctive MSSC have not yet developed. However, if MSSC are important to insure separation of closely related sympatric species during courtship, their absence here perhaps provides grounds for regarding the two species as conspecific.

***Krakatauia claudiensis* n.sp.**

Type material. HOLOTYPE male, Queensland, Iron Range, Middle Claudie River, near Mount Lamond, 11 Oct. 1974, G. Daniels (AMS); PARATYPES male, 3 females, same data but 5 Oct.-1 Nov. 1974; 2 males, 3 females, Claudie River, near Mount. Lamond, 25-30 May 1966, 21 Dec. 1971 (AMS);

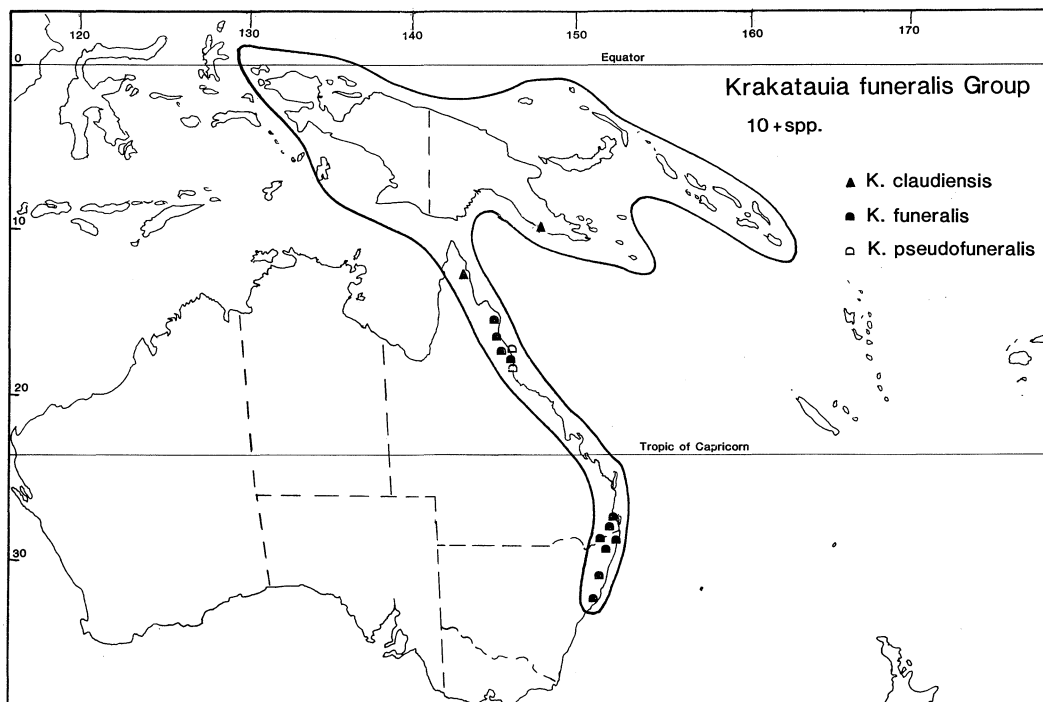


Fig.45. Distribution, *Krakatauia funeralis* Group.

female, Gordon Creek, Claudie River, 2-4 July 1983 (UQIC).

Additional material. Queensland – male, 5 females, 3 km east-north-east of Mount Tozer, Iron Range, 28 June-4 July 1986 (ANIC); male, female, West Claudie River, 12°44'S 143°15'E, 10 Dec. 1986 (UQIC). Papua New Guinea – male, Central Province, near Eilago, 17 May 1981 (AMS).

Description – male. Length 5.4-6.5; wing: 4-5 x 2.0; a dark species; similar to *K. funeralis* except as noted.

Head. Face and clypeus blue-green and covered with grey pruinosity; eyes with short pale setae between facets; arista dorsoapical (but almost dorsal) and about twice head height, and simple.

Thorax. Metallic blue-green with violet reflections and brownish pruinosity.

Legs. Coxae and legs entirely dark red brown; CI with black anterior hairs and 3 strong black distolateral setae; CII with black anterior hairs; CIII with single black lateral seta and other black hairs; femora with black ventral setae; FI also with pv row of 4 long black basal bristles which continues as decreasing setae distad (MSSC); $It_{3.5}$ slightly flattened, ventrally padlike, and with pale ventral pile (MSSC); TIII with 5 dorsals and strong anterior at two-thirds.

Wing. Solid smoky brown colour with only posterior margin of membrane hyaline; R_{4+5} distinctly downcurved towards M_1 ; M_1 arches up towards R_{4+5} ; m-cu strongly sinuous; CuAx ratio: 2.5; lower calypter brown with black setae.

Abdomen. Hypopygium dark brown with black cerci (Fig. 44e); surstylus lobate with 2 strong projecting bladelike apical setae and other setae as figured; cercus long, setose, and with long black apical setae; cercus with ventral projections, longer basolateral projection with curved hook-like apical setae.

Female. Similar to male except lack MSSC and as noted: face not bulging; lateral slope of vertex bare; 5 strong dc present; femora with only black ventral hairs and FI without pv bristles; It_1 not flattened.

Remarks. *Krakatauia claudiensis* is known from Iron Range, Cape York Peninsula and the Port Moresby district, Papua New Guinea (Fig. 45). It is close to the New Guinea *K. marginalis*. However, the cercus of *K. claudiensis* is less than twice the length of the hypandrium, whereas in *K. marginalis*, the cercus is more than three times the hypandrial length. There are also differences in the shape of the ventral cercal projection of the two species.

The *alanae* Group

Diagnosis. **Head.** Vertex strongly excavated, but not flattened in male; lateral frons in male with dense black hairs but no distinct vertical seta (MSSC); female frons bare except for strong vertical seta; face strongly bulging in male (MSSC); first flagellomere triangular

with dorsoapical to apical arista in both sexes; male arista sometimes with lanceolate apical flag or white apex (MSSC).

Thorax. Lateral scutellar setae strong, about two-thirds length of medians.

Legs. CI with some black distolateral setae; It_1 sometimes dorsoventrally flattened with pale ventral pile (MSSC); male $III_{3.5}$ not flattened.

Wing. Broad and usually with smokey brown membrane; M_1 and R_{4+5} strongly converging at wing apex; R_{2+3} and R_{4+5} in both sexes with distinctive subapical bend (Fig. 122h); crossvein m-cu distinctly sinuous; haltere black in both sexes.

Abdomen. Epandrium prolonged and tapering, with fused surstylus and relatively straight dorsal margin; cercus flattened, blade-like and elongate, bearing only scattered setulae and with pair of apical bean-shaped setae.

Remarks. The *Krakatauia alanae* Group is known only from Australia and Fiji but probably occurs throughout the Melanesian archipelago. It is very close to the *funeralis* Group but is distinguished in having the epandrium prolonged and tapering, with a flattened and blade-like cercus bearing apical flattened bean-shaped setae. This distinctive epandrium and cercus is convergent to that of *Plagiozopelma terminiferum* (see Fig. 72a), but other characters are not concordant, and the two taxa are not considered to be closely related. Isolated females of the *alanae* and *funeralis* groups cannot be reliably separated.

The two Australian species occur in rainforest in along the northern coast of New South Wales to south-eastern Queensland, and the Cairns district, respectively.

The *alanae* Group includes the following species.

alanae n.sp. Australia (NSW, Qld).

luctuosa Parent, 1928: 195. (*Chrysosoma*) (ZMUH, female only, lost), Fiji, **n.comb.**

An additional female identified by Parent and bearing a "Museum Geoffroy" label (MLUH, examined) is not the type designated by Parent. Males associated with the females have identical wings and colouration. The male cercus is long and blade-like and the dorsal epandrial margin bears a distinctive prominence.

Additional records. Fiji: Viti Levu, pairs from Sigatoka (AMS) and Nadarivatu (SAM).

Neotype here designated for *Krakatauia luctosum* Parent: male, with label "Sigatoka Fiji, 27 Dec. 1976, R. Eastwood" (AMS).

malanda n.sp. Australia (Qld).

Krakatauia alanae n.sp.

Type material. HOLOTYPE male, PARATYPE female, New South Wales, Wilson River Reserve, 15 km north-west of Bellangry, yellow pan traps, subtropical rainforest, 7 Dec. 1986, D.J. Bickel; PARATYPES 2 males, female, same except 5 Dec. 1988 (AMS).

Additional material. New South Wales – Brunswick Heads, 28 Jan.–1 Feb. 1983, on *Alocasia* sp.; Mount Warning, 25 Dec. 1975, 4 Apr. 1987; Woody Head, near Iluka, 29 Dec. 1978; Stotts Island, Tweed River, near Tumbulgum, 31 Jan. 1980; Upper Allyn, 14 Feb. 1968; Williams River, Barrington Tops National Park, 20 Jan. 1987; “Lorien” near Lansdowne, 19–25 Jan. 1987; Dorrigo National Park, Glades Area, on leaf *Hydrocotyle pedicellosa*, 8 Jan. 1988, 12 Feb. 1968; Tooloom Plateau, 14 km west of Urbenville, 15–21 Feb. 1984, on leaf *Hydrocotyle pedicellosa*, 10 Jan. 1988. Queensland – Mount Tambourine, 2 Nov. 1959, 6 Nov. 1959 (16 males, 29 females examined, AMS, ANIC, UQIC).

Description – male. Length 5.3; wing: 5.0 x 1.6.

Head. Vertex and frons shining dark metallic green; lower face from base of antenna and clypeus with silvery pruinosity; palp, proboscis brownish; antenna black; scape slightly swollen and extended medially; pedicel with some strong dorsal setae; first flagellomere triangular; arista dorsoapical, black, length almost twice head width, and with white tip (MSSC).

Thorax. Metallic blue-green with bronze reflections; scutellum metallic blue; matt chocolate stripe present dorsal to notopleuron; pleura with grey pruinosity; setae black.

Legs. Coxae and legs entirely dark brown; CI with pale anterior hairs and some black distolateral setae; CII with pale anterior hairs; CIII with black lateral seta and tuft of pale hairs; FI with pale ventral hairs; I: 10.0; 9.0; 5.0/2.0/1.5/1.0/1.0; FI with pv row of distally decreasing setae (MSSC), and with erect black hairs on posterior face (MSSC); It_1 dorsoventrally flattened with row of dense modified setae along anterior margin and with white pile ventrally (Fig. 46b) (MSSC); II: 10.5; 13.0; 9.5/3.0/2.0/1.0/1.0; TII with 4–5 anterior setae; III: 12.0; 18.0; 9.0/3.0/2.0/1.0/1.0; TIII with some dorsal setae.

Wing. With brownish clouding; m-cu sinuate; lower calypter brown with fan of pale setae in which are mixed 2–3 black setae.

Abdomen. Tergum 1 with dark brown dorsal membrane; terga 2–6 deep metallic green with bronze reflections and with matt brown band in around areas of tergal overlap; hypopygium dark brown with yellow cerci (Fig. 46a); epandrium elongate subtriangular; hypandrial arm elongate, reaching almost to apex of aedeagus; 2 epandrial setae near base of epandrial lobe; epandrial lobe with 2 long apical bristles; surstylus with faint suture line marking join with epandrium; surstylus hatchet shaped with distal tapering digitiform projection which bears curved apical setae; cercus distinctive with elongate, flattened arms bearing only scattered setulae and pair of apical flattened bean-shaped setae.

Female. Similar to male except lack MSSC and as noted: face not bulging; lateral slope of frons bare except for strong vertical seta; arista entirely black; 5 strong dc present; femora with only short pale ventral hairs; It normal; setae of lower calypter entirely pale.

Remarks. *Krakatauia alanae* is found in subtropical and lowland riverine rainforest from south-eastern

Queensland to the Barrington Tops drainage, New South Wales.

Males have mixed pale and black setae on the lower calypter, while females have entirely pale lower calypter setae. (Also see Remarks under *K. funeralis*.)

This species is named in honour of Mrs Alana Thomas, who typed a portion of this manuscript.

Krakatauia malanda n.sp.

Type material. HOLOTYPE male, Queensland, Malanda, 20–22 Sept. 1906, collector unknown (AMS).

Description – male. Length 5.6; wing: 5.3 x 1.4; similar to *K. alanae* except as noted.

Head. Palp black, proboscis yellow; antenna black; scape somewhat swollen; arista dorsoapical, almost twice head width in length, and with apex flattened into white ovate flag (MSSC).

Legs. Coxae and legs reddish brown; CI with silvery pruinosity and pale anterior hairs and 3 black distolateral setae; CII with pale anterior hairs; CIII with black lateral seta and tuft of pale hairs; FI–III with pale ventral hairs; FI with pv row of 4 long black basal bristles which continues as decreasing setae distad; FI with erect black hairs on posterior face; It_1 slightly flattened with white pile ventrally (MSSC).

Wing. Hyaline with faint brownish wash; M_1 almost joins R_{4+5} at apex; m-cu slightly sinuous; lower calypter brown with fan of pale setae.

Abdomen. Hypopygium black with broad flat yellow cerci (Fig. 46c); epandrium subtriangular; epandrial lobe densely pubescent with 2 long apical bristles; surstylus elongate with dorsal digitiform projection, median flange and apical decumbent seta; cercus large and flat, bearing only scattered setulae and pair of apical flattened curved setae.

Female. Unknown.

Remarks. *Krakatauia malanda* is known only from the holotype taken on the Atherton Tablelands, Queensland. It is closely related to *K. alanae*.

The *trustorum* Group

Diagnosis (based on male characters only). **Head.** Frons with abundant black hairs (MSSC); male face strongly bulging (MSSC) (Fig. 46f); antenna black; pedicel with long dorsal and ventral setae; first flagellomere triangular, tapering; arista apical.

Thorax. Metallic blue-green with bronze reflections; scutellum blue; setae black; 4 somewhat irregular pairs long ac present; male with 2 strong posterior dc and 4 weak hair-like dc anteriad (MSSC); lateral scutellars about three-quarters length of medians.

Legs. Femora with only pale ventral hairs, without

strong ventral setae; CIII with group of lateral setae; TII with short dorsal setae at one-third and half, curved pv setae at one-third and two-thirds and subapically; It_5 with enlarged claws, stronger and about longer than those of other tarsi (MSSC); FII with some black curved av setae in distal fifth; TII with ad, pd and ventral setae; III_{3-5} flattened and padlike (MSSC).

Wing. Hyaline; M_2 extends to margin as fold; m-cu slightly sinuous; lower calypter black with fan of pale

setae; haltere strongly infuscated to black (MSSC?).

Abdomen. Terga 2-6 metallic green with bronze reflections and matt brown bands around tergal overlap; segment 7 with well-developed tergum and sternum; hypandrial arm elongate, arising at mid-length of hypandrium and extending to apex of aedeagus; 2 epandrial setae and epandrial lobe with 2 strong bristles present; surstylus rounded and digitiform, without projections; cercus with ventral projections.

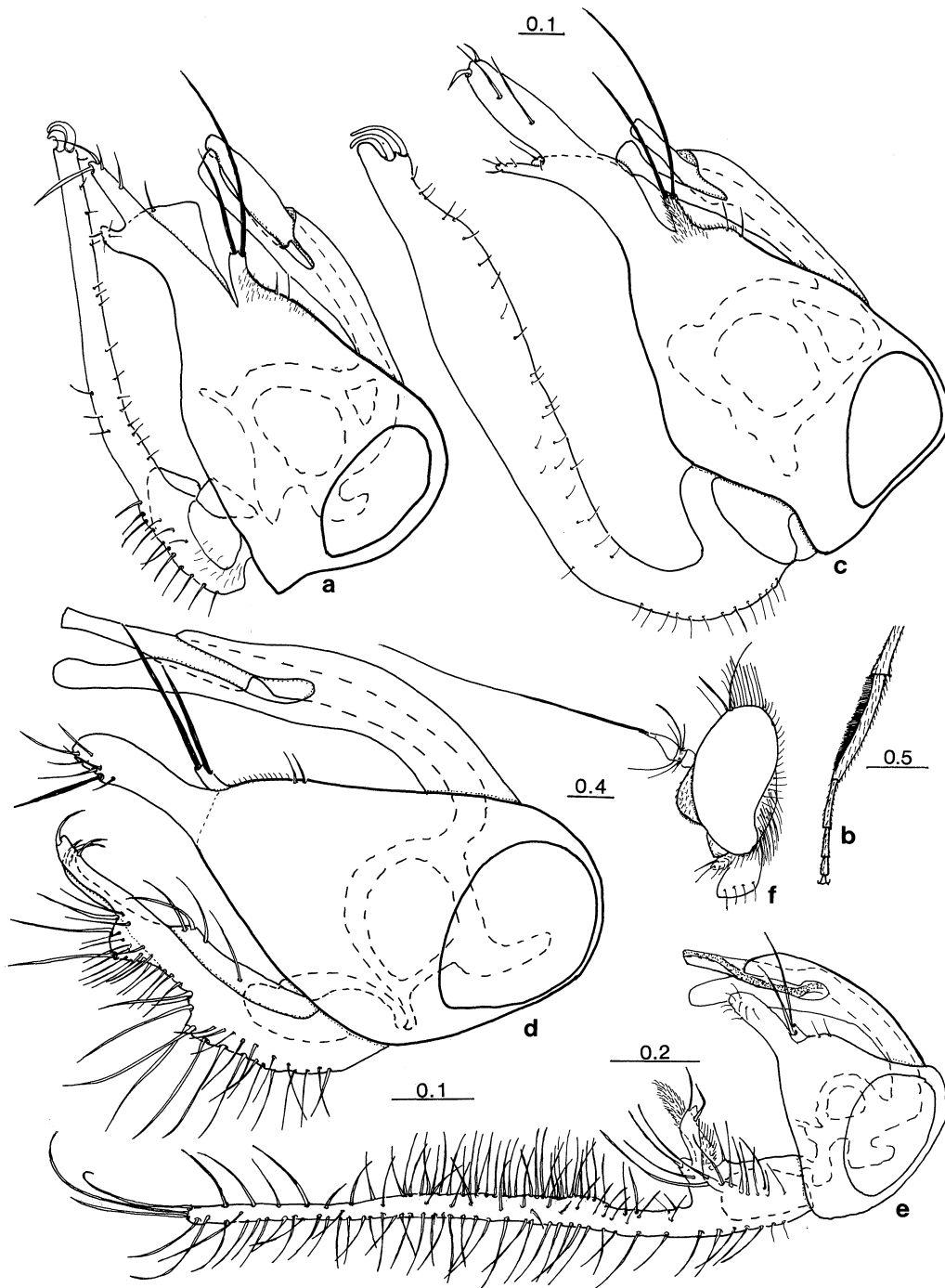


Fig.46. *Karakatauia alanae*, Mount Tamborine, Qld: a – hypopygium, left lateral; b – male left foretarsus. *K. malanda*, Malanda, Qld: c – hypopygium, left lateral. *K. trustorum*, Mooney Mooney Creek, NSW: d – hypopygium, left lateral; *K. remota*, Mount Lewis, Qld: e – hypopygium, left lateral; f – male head, left lateral.

Remarks. The *Krakatauia trustorum* Group comprises two species which share many characters of colouration, setation, habitus and MSSC. However, they have strikingly different cerci. Only males are known and females have not been associated. Important shared characters which define the Group include: pedicel with long dorsal and ventral setae, femora without strong ventral setae, It_5 with enlarged claws (MSSC), $III t_{3,5}$ flattened and padlike (MSSC), haltere black (MSSC?) and surstylus rounded and digitiform, without projections. Members of this Group have long dorsal and ventral setae on the pedicel, not unlike many *Chrysosoma* species.

The *trustorum* Group is entirely Australian and includes two widely separated species, from rainforest on the Windsor Tablelands, northern Queensland and mangroves/wet sclerophyll forest on the New South Wales central coast.

remota n.sp. Australia (Qld).

trustorum n.sp. Australia (NSW).

Krakatauia trustorum n.sp.

Type material. HOLOTYPE male, New South Wales, Mooney Mooney Creek, west of Gosford, 0.5 m, mangrove/wet sclerophyll forest, yellow pan, 23 Nov. 1986, D.J. Bickel (AMS).

Description – male. Length 5.0; wing: 4.7 x 1.6.

Head. Frons metallic blue-green; face and clypeus metallic green and covered with grey pruinosity; palp dark brown; proboscis yellow; antenna black.

Legs. Coxae, FI and FII to knees, FIII and TIII black; femoral knees I and II, TI, TII, and It_1 yellow; remaining tarsomeres dark brown; CI with pale anterior hairs; CIII with group of pale lateral setae; I: 10.0; 10.0; 6.5/2.5/1.5/1.0/1.0; TI with short dorsals at one-third and half, and with long pv setae at one-third, two-thirds and subapically; II: 10.5; 12.5; 8.0/2.5/2.0/1.0/1.0; TII with ad at one-tenth, one-third and two-thirds, pd at two-fifths and half, and 3-4 short ventrals; III: 12.5; 17.0; 6.0; 3.0/1.0/1.0/1.0/1.0; TIII with 2 ad setae and some short dorsal setae.

Wing. CuAx ratio: 1.6; lower calypter black with fan of pale setae; haltere black.

Abdomen. Hypopygium and cerci brown (Fig. 46d); epandrium triangular; hypandrial arm elongate, arising at mid-length of hypandrium and extending to apex of aedeagus; 2 epandrial setae present, with some short setae between them and epandrial lobe; epandrial lobe with 2 strong apical bristles; surstylus rounded with subapical setae as figured; elongate outer cercal arm with strong basal setae and apical curved seta, and stouter inner cercal arm with strong setae and distal curved digitiform projection.

Female. Unknown.

Remarks. *Krakatauia trustorum* was collected in wet sclerophyll forest near mangroves on the New South

Wales central coast.

Krakatauia trustorum is named for the members of the Australian Museum Trust who so generously supported this research.

Krakatauia remota n.sp.

Type material. HOLOTYPE male, Queensland, 7 km north of Mount Lewis, 16°31'S 145°16'E, 12 Feb. 1988, D. Rentz (ANIC).

Description – male. Length 5.1; wing: 4.6 x 1.6; similar to *K. trustorum*, except as noted.

Head. Vertex and frons shining metallic blue-green, with little pruinosity; palp yellow with strong black setae; proboscis yellow.

Legs. Colouration similar: coxae, FI and FII to knees, FIII and TIII black; femoral knees I and II, TI, TII, It_1 and $II t_1$ yellow; remaining tarsomeres dark brown; relative podomere ratios similar; TI with short dorsal setae at one-third and half, some curved pd setae in basal half (MSSC), and long curved pv setae at one-third, half and two-thirds; It_5 with enlarged claws, about twice as long as those of $II t_5$ and $III t_5$ (MSSC); FII with some black curved av setae in distal fifth; TII with ad setae at one-tenth, one-third and two-thirds, pd setae at one-tenth, two-fifths and half, and with ventral setae at one-quarter, half and two-fifths; TIII with strong ad seta at one-fifth, with anterior setae at one-quarter, two-fifths and two-thirds, and with pv row of curved setae along entire length (MSSC); $III t_1$ also with pv row of short curved setae.

Wing. CuAx ratio: 1.5; haltere with brownish stalk and black club.

Abdomen. Hypopygium and cerci brown (Fig. 46e); epandrium triangular; hypandrial arm elongate, arising beyond mid-length of hypandrium and extending to apex of aedeagus; 2 epandrial setae present; epandrial lobe with 2 strong bristles; surstylus rounded, lobate, with setae as figured; cercus very long, with, with strong lateral and apical setae, and with basoventral spatulate outer arm which bears setae as figured, with adjacent median setose projection.

Female. Unknown.

Remarks. *Krakatauia remota* is known from tropical rainforest near Mount Lewis, northern Queensland. It is very close to *K. trustorum* from New South Wales, but the two species have strikingly different male cerci.

The *anthracoides* Group

Diagnosis. **Head.** Male vertex and frons not deeply excavated, and with 1-8 black setae on lateral frons (MSSC); face bulging in male (MSSC); pedicel with relatively short dorsal and ventral setae; arisal position variable: from distinctly dorsal to dorsoapical among species, and sometimes sexually dimorphic; male arista

sometimes with apical flag (MSSC).

Thorax. Lateral scutellars reduced to weak hairs or absent.

Legs. CI with 3 black distolateral setae; FI with only weak ventral hairs; It_1 relatively long, only slightly shorter than TI (MSSC).

Wing. In both sexes usually with solid brown maculation and with only posterior margin of membrane hyaline; veins M_1 and R_{4+5} strongly converging at wing apex; crossvein m-cu weakly sinuous or externally bulging near its centre; haltere usually black.

Abdomen. Cercus with strong basoventral clavate projection.

Remarks. The *anthracoides* Group comprises rather small species from Sundaland and southern China. Many species have a large dark brown wing maculation. The arisal position varies from dorsal to dorsoapical, accounting for the variable placement of species by previous workers. For example, Becker (1922a) referred *Psilopus anthracoides* to *Chrysosoma*, while Parent (1934c) independently described the same species as *Sciapus carboneus*. Another closely related species, *K. cinctiseta*, has a distinctly apical arista. The two species are almost identical in size, genitalia and wing maculation.

The *anthracoides* Group shows similarities with the *evulgata* Group (similar setose frons, FI with only weak ventral hairs, It_1 relatively long, and M_1 and R_{4+5} strongly converging at wing apex).

Included species:

anthracoides Wulp, 1896: 102. (*Psilopus*) (ZMUA, examined), Java, Sumatra, **n.comb.**

carboneus Parent, 1934c: 235. (*Sciapus*) (MLUH, examined), Java, **n.syn.**

The holotype of *Sciapus carboneus* and male syntype of *Psilopus anthracoides* are identical in all respects. The *P. anthracoides* syntypes are 5.0 mm in length, not 3.0-3.5 mm as stated in Wulp's description.

cinctiseta Parent, 1935a: 197. (*Chrysosoma*) (BMNH, examined), West Malaysia, **n.comb.**

The arista has a white band at six-tenths and a narrow white apical flag (MSSC). I have seen an additional male from Selangor (BMNH).

A male of a possibly undescribed species from China: Hainan Island, Ta Hian (USNM) is similar to *K. cinctiseta* except the wings have dark grey maculation rather than dark brown, and the arista lacks a white band at six-tenths.

maculata Parent, 1934c: 234. (*Condyllostylus*) (Dresden, not seen, female only), Java, **n.comb.**

This species is possibly a teneral female *C. anthracoides*. Parent notes that the female has yellow halteres whereas most *anthracoides* Group species have black halteres in both sexes.

paracarborea Hollis, 1964a: 246. (*Sciapus*) (ZMUA, examined), Sumatra, **n.comb.**

The male has a distinctive apical arisal flag (MSSC).

Heteropsilopus Bigot

Heteropsilopus Bigot, 1859: 215. Type species *Psilopus grandis* Macquart 1849, by original designation [= *Psilopus cingulipes* Walker, 1835]

Chrysosoma, authors, not Guérin-Meneville.

Sciapus, authors, not Zeller.

Condyllostylus, authors, not Bigot.

Diagnosis. **Head.** Male face bulging, female face flat; male clypeus separate from eye margin, narrow (Fig. 52a); female clypeus wide, adjacent to eye margin (Fig. 52b); ocellar tubercle more pronounced in male than female; 1 or 2 strong postvertical setae present, positioned last in postocular series, and often more strongly developed in female than in male; female with strong black vertical seta, which in males is represented only by weak hair on lateral frons; arista usually dorsal in both sexes, but tendency for male to develop apical arista, in which case female may have dorsal or dorsoapical arista.

Thorax. Usually with 2-3 pairs strong ac; male usually with 2 strong posterior dc and 4-5 weak anterior hair-like dc, and sometimes with additional anterior strong dc (MSSC); female with 5-6 strong dc, decreasing in size anteriorly; male thorax often with supernumerary hairs, in addition to normal chaetotaxy; lateral scutellar setae almost always reduced to weak hairs, or absent (strong lateral scutellars present in *H. cingulipes* only).

Legs. FI without major ventral setae; TI sometimes with short dorsal seta in basal fifth; TII with offset paired ad and pd setae, usually more strongly developed in females.

Wing. Crossvein m-cu usually strongly sinuate, almost S-shaped, and more strongly sinuate in males than females, and sometimes bearing external and/or rarely an internal adventitious stub vein, either as intraspecific variation, but often as a specific character (*H. intermedius* with crossvein m-cu straight); wing sometimes with brown transverse maculations.

Abdomen. Tergum 1 with well-developed membranous tergal window; female terga 2-5 each with 3-4 ovate dot-like abdominal plaques, which are reduced in size on male; cercus simple, elongate and digitiform.

Remarks. Bigot (1859) based *Heteropsilopus* on the Australian *Psilopus grandis* Macquart (= *Heteropsilopus cingulipes*) to include sciapodines with a strongly sinuate m-cu crossvein. Hardy's (1935) use of the genus for Australian species was not accepted by all authors and *Heteropsilopus* has been considered a synonym of *Chrysosoma*. Its status as a distinct genus is here re-established. *Heteropsilopus* is restricted to southern Australia and south-western India and Sri Lanka (Fig. 47). The genus comprises large-sized sciapodines mostly with a strongly sinuate m-cu and simple digitiform cercus. The strongly sinuate m-cu is considered to be a distinctive group autapomorphy.

Heteropsilopus species have been described as both *Chrysosoma* and *Sciapus* on account of the variable position of the arista, evident between species and

even between the sexes (eg, see synonymic list of *H. cingulipes* where males were placed in *Chrysosoma* and conspecific females in *Sciapus*). The difficulty of interpreting arisal position is further demonstrated by synonyms of *H. brevicornis*, where the male was described by Becker as *Chrysosoma* while Parent considered it *Sciapus*. (The development of the apical arista among species of *Heteropsilopus*, first as a MSSC and secondarily in the females is discussed further under Morphology.) Further modifications of the antenna which are convergent with *Chrysosoma* are the development of an elongate arista in *H. tweedensis* (similar to that of *C. crinicornis*) and the apical flag of male *H. caelicus* (similar to some males in the *Chrysosoma leucopogon* Group).

Heteropsilopus is divided into three Groups, the *triligatus* Group of southern India and Sri Lanka, and the *cingulipes* and *brevicornis* Groups of southern Australia and Tasmania. Both Indian and Australian species are similar and I would not have hesitated to place any of the Indian species in *Heteropsilopus* had it occurred in Australia. Development of similar characters on some species, such as the stub-vein on m-cu, further unites the two disjunct groups. Indeed, the separation of *Heteropsilopus* into Australian and Indian groups more a matter of geographical convenience than sharp morphological difference.

Although often locally abundant, *Heteropsilopus* is somewhat confined in distribution and appear to

represent relicts of a once widespread Gondwanan taxon (see Remarks under *triligatus* Group and Historical Biogeography for further discussion).

Heteropsilopus displays many similarities to the Australian *Austrosciapus*, in development of MSSC on IIt, banded wings, and similar basic genitalic structure (eg, compare Fig. 49a, *H. sugdeni* with Fig. 75a, *A. fraudulentus*). I regard *Heteropsilopus* and *Austrosciapus* as sister taxa. The strong sinuate crossvein m-cu of *Heteropsilopus* is a defining autapomorphy of *Heteropsilopus*, while *Austrosciapus* retains the primitive straight m-cu.

Indian *Heteropsilopus* possibly gave rise to the genus *Plagiozopelma*, and species in the two genera show some similarities (see further discussion under *Plagiozopelma*).

The *triligatus* Group

The following characters occur variously among species of the *Heteropsilopus triligatus* Group.

a) Face and clypeus prolonged in both sexes (where known): *H. adhaerans*, *H. sigmatinerve*, *H. dilutus*; b) some species with strong CI spine-like setae; c) It_1 sometimes flattened in distal half; d) TI with long posterior setae (MSSC); e) TII with 2 apical setae (MSSC); f) male TII and IIt sometimes with erect setae

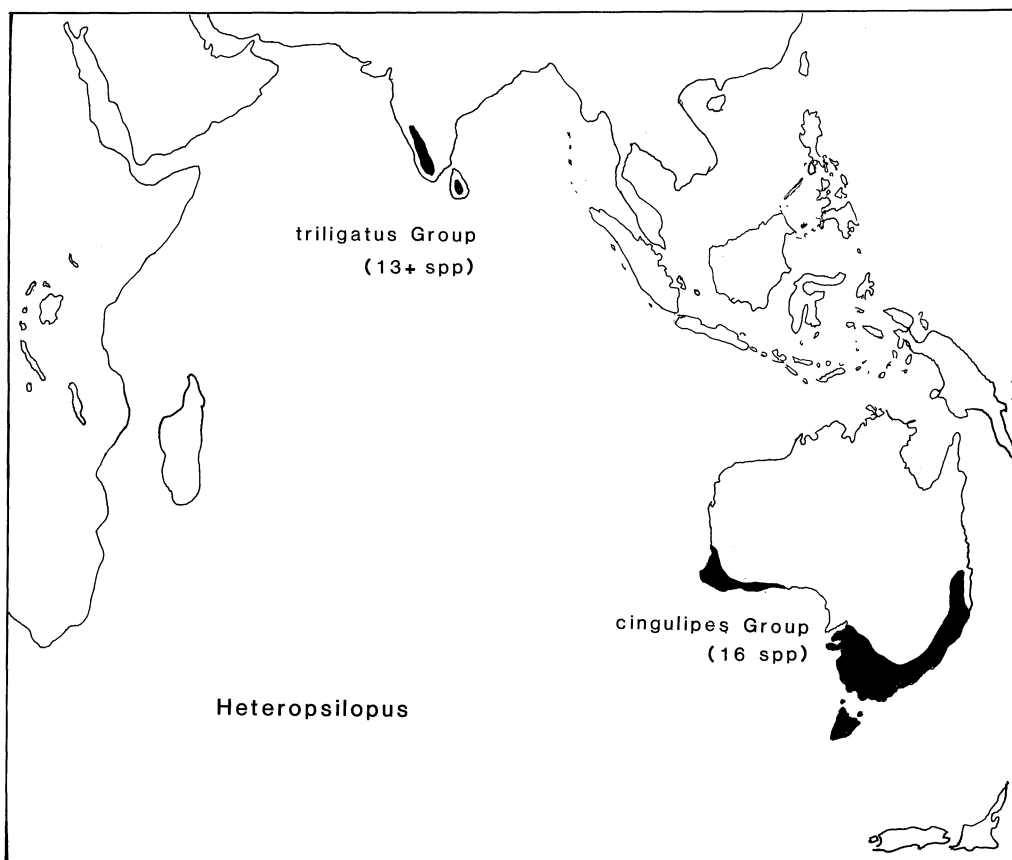


Fig.47. Distribution, *Heteropsilopus* Groups.

(MSSC); g) some species with modified crocheted costal cilia (MSSC); h) wing sometimes prolonged and basally narrowed, with loss of anal angle (in both sexes); i) wings usually with brown maculations, either banded or spotted pattern usually have similar pattern in both sexes (*H. triligatus*, *H. dilutus*, *H. perturbans*, *H. protarsatus*), or males have large dark brown maculation, not banded or spotted, and females have hyaline wings (*H. stragulus*, *H. vanus*, *H. pulcherrimus*, *H. hilaris*, *H. protervus*).

Remarks. The geographical distribution of the *triligatus* Group in India is restricted. Outside of the somewhat derived *H. pulcherrimus* in Sri Lanka, all known specimens were taken above 900 m in the elevated physiographic region of the "Southern Blocks" (Fig. 47). Common label localities include Nilgiri Hills, Anamali Hills, Cinchona, Andipatti Hills, Palni Hills, Coorg and Kodaikanal [many foreign collections (BMNH, CNC, AMNH) have large holdings of Indian *Heteropsilopus*, suggesting that species are often abundant].

Heteropsilopus is unknown from lowland India and the remaining Oriental region. Mani (1974), in his excellent summary of the biogeography of India, notes that Peninsular India has numerous phylogenetic relicts and Gondwana derivatives. The confinement of the *triligatus* Group to high elevations in the Southern Blocks of India and its inability to spread across the Gangeatic Plain strongly support a cool Gondwanan origin for the Group. Habitat associations of species are unknown.

The *triligatus* Group possibly gave rise to the genus *Plagiozopelma*, with species such as *H. pulcherrimus* representing a species intermediate between the two genera (see *Plagiozopelma* for further discussion).

The extent of intraspecific variation in many species is unclear. For example, a series of *Heteropsilopus* from the Tinnevely District (BMNH) has three apparent species which are possibly variants of *H. triligatus* and *H. protarsatus*. As well, significant variation in cercal length is evident in long series *H. triligatus* from the same locality (AMNH). Similar variation in cercal length is evident in the Australian *H. ingenuus*.

The *triligatus* Group includes the following species.

adhaerens Becker, 1922a: 207. (*Sciopus*) (DEI, examined), India, **n.comb.**

This species is small and has a pair of distinctive capitate setae on TII (MSSC).

Lectotype here designated: male, bearing label "Inde Meridionale, Trichnopoly F. Caius 1911" (DEI).

dilutus Parent, 1937a: 134. (*Chrysosoma*) (BMNH, examined), India, **n.comb.**

Both sexes have a very long clypeus (similar to some Afrotropical Sciapodinae).

hilaris Parent, 1941: 198. (*Chrysosoma*) (BMNH, examined), India, **n.comb.**

Additional records. India: Nandi Hills, 1200-1500 m (ZMUC) and Nilgiri Hills, Nadvatau (AMNH).

indicus Parent, 1934b: 283. (*Chrysosoma*) (BMNH, examined, missing postabdomen), India, **n.comb.**

The basal third of the male arista is undulating and

the distal third is distinctly pubescent (MSSC?).

perturbans Becker, 1922a: 192. (*Chrysosoma*) (ZMHB, examined), India, **n.comb.**

The lower calypter setae are black, not yellow.

Lectotype here designated: male, "Inde Meridionale, Trichnopoly F. Caius 1911" (ZMHB).

poecilus Becker, 1922a: 221. (*Condyllostylus*) (TMB, lost), India, **n.comb.**

Becker did not describe legs I and II from the single male holotype.

protarsatus Parent, 1937a: 139. (*Chrysosoma*) (BMNH, examined), India, **n.comb.**

protervus Parent, 1941: 205. (*Chrysosoma*) (BMNH, examined), India, **n.comb.**

pulcherrimus Becker, 1922a: 145. (*Chrysosoma*) (NHMV, examined), Sri Lanka, ?India, **n.comb.**

This striking species is common in collections from Sri Lanka and I have seen numerous specimens, mostly from the Kandy District (ie, about 500 m). However, it also occurs up to higher elevations of 1000 m or more.

An Indian record from the Nilgiri Hills (cited in Becker, 1922a but incorrectly ascribed to Ceylon) is possibly based on a closely related undescribed species which has the same wing pattern but a distinctly different cercus (see Key).

As suggested by Hollis (1964b), females commonly associated with the distinctive males have hyaline wings and yellow TIII.

The wing pattern of male *H. pulcherrimus* is similar to that of the unrelated male *Chrysosoma lucigena* from New Guinea.

Lectotype here designated for *Chrysosoma pulcherrimum*: male, bearing label "Ceylon, Peraderriya, 26/II 02, Dr. Uzel" (NHMV).

sigmatinervis Parent, 1937a: 140. (*Chrysosoma*) (BMNH, examined), India, **n.comb.**

Although the arista is distinctly dorsal, Parent placed this species in *Chrysosoma*.

stragulus Becker, 1922a: 150. (*Chrysosoma*) (ZSI, not seen), India, **n.comb.**

See discussion under the related *H. vanus*, below.

triligatus Becker, 1922a: 177. (*Chrysosoma*) (ZMHB, examined), India, **n.comb.**

trisignatum Parent, 1941: 205. (*Chrysosoma*) (BMNH, examined), India, **n.syn.**

These two species are similar in all respects, and the long ventral setae on the cercus are identical. Haltere colour varies from yellowish to brown, and as noted by Parent (1937a: 142), and the pattern of wing maculation is also somewhat variable. This species is common in south-western India, and I have seen long series from the Anamali Hills, Cinchona (AMNH) and Kodaikanal (CNC).

Lectotype here designated: male, bearing label "Inde Meridionale, Perumal Mai 1913" (ZMHB).

vanus Parent, 1941: 209. (*Chrysosoma*) (BMNH, examined), India, **n.comb.**

The descriptions of *Chrysosoma vanum* and *C. stragulum* are identical except Becker did not note

any flattening on It_1 on male *H. stragulum*. This may have been an omission. The holotype and long paratype series of *C. vanum* have wings identical to Becker's figure. Also, specimens identified by

van Emden as *C. stragulum* (BMNH) are identical to *C. vanum*. If the types of *H. stragulus* have a distally flattened It_1 , then the two species are probable synonyms. Females have clear wings.

Key to Males of the *Heteropsilopus triligatus* Group

This key is based on published descriptions and identified material, all from south-western India except where noted. See original descriptions and figures for confirmation.

1. CI with yellow setae only; antenna red-yellow; wings hyaline or with large dark brown maculation; costa never with flattened crocheted cilia; males often with white TIII 2
- CI with 3 black apical setae; antenna black; wing hyaline or with irregular banded pattern, spots, etc.; costa often with distinct flattened crocheted cilia; TIII yellow or black 7
2. Male It_1 distinctly flattened 3
- Male It_1 not flattened 5
3. Surstylus with long apical setae; lower calypter with black setae; haltere with brown club; wing with solid brown maculation; TIII white *H. vanus*
- Surstylus with short apical setae; lower calypter with yellow setae; haltere yellow; TIII yellow 4
4. Wing hyaline *H. hilaris*
- Wing with brown transverse maculation which has a basal subcostal extension *H. protervus*
5. Wing with dark brown transverse maculation, and wing apex hyaline; cercus relatively short *H. stragulus*
- Wing with solid dark brown maculation arising from base, and with white opaque apex 6
6. Cercus narrow elongate and appearing annulated (Sri Lanka) *H. pulcherrimus*
- Cercus elongate and broad, clavate (southern India) undescribed species
7. FI black 8
- FI yellow 9
8. Body length 3.0-3.5; costal cilia short but present *H. perturbans*
- Body longer than 6.0; costal cilia distinct *H. poecilus*
9. Anal angle of wing absent 10
- Anal angle present 12

10. Clypeus not extending much beyond base of eyes; small, body length less than 4.0; wing with strong costal setae; arista distinctly dorsal; TII with dorsal pair long, narrowly spatulate apical setae (MSSC) *H. adhaerens*
- Face and clypeus long and narrow, extending beyond base of eyes; larger, body longer than 5.0 11
11. Wing patterned; haltere yellow; costal cilia weak; arista apical *H. dilutus*
- Wing hyaline; haltere yellow with brown club; costal cilia strong; arista distinctly dorsal; II_{t1} with series of long ventral setae in distal two-thirds *H. sigmatinervis*
12. Arista apical, basally undulating and distally pubescent *H. indicus*
- Arista straight and bare (these species are not clearly defined and the extent of intraspecific variation is uncertain; several related undescribed species exist) 13
13. Haltere black; costal setae absent; II_{t1} as long as TII, and somewhat flattened *H. protarsatus*
- Haltere yellowish to infuscated; costal setae present; II_{t1} not flattened *H. triligatus*

Key to Males of Australian *Heteropsilopus*

1. II_{t2} with basal comb of black setae and strong dorsoapical beak (Fig. 53b,i) (*brevicornis* Group) 2
- II_{t2} not so modified (*cingulipes* Group) 3
2. Large, wing length greater than 7.0; wing with some faint clouding and cross-vein m-cu sinuous (Fig. 123h); antenna entirely red-yellow; 6 long, irregularly paired ac present; FI with some long pale ventral setae; epandrium yellow (Fig. 53a) (NSW, Vic., SA, Tas., WA) *H. brevicornis*
- Small, wing length less than 4.0; wing hyaline and cross-vein m-cu straight (Fig. 53j); antenna with yellow scape and pedicel and dark brown first flagellomere; 3 pairs short ac present; FI ventrally bare; epandrium dark brown (SA) *H. intermedius*
3. Wings with distinct transverse brown maculations or bands (in teneral specimens incipient maculations faint but present) 4
- Wings hyaline or at most with indistinct clouding around and anterior of m-cu and basal M₁ 10
4. Thorax with distinct matt brown maculations over ac and dc bands, humerus, and anterior of scutellum (Fig. 49c); 4 strong dc present; first flagellomere subtriangular with apical arista (Fig. 49b); II_{t4} and II_{t5} excavated with setae curled over excavation; hypopygium, Fig. 49a (NSW) *H. sugdeni*
- Thorax unicolourous green, with at most bronze stripe over ac band; male with anterior dc hairlike; arista dorsal to dorsoapical 5

5. $\text{IIt}_{3,5}$ strongly modified with IIt_4 bearing apical blade-like seta and strong transverse black seta (Fig. 48d); arista always dorsal (Fig. 48f)..... 6
 - IIt unmodified or with crocheted hairs only; arista sometimes apical 7
6. Wing with 3 transverse bands, with 2 distal bands joined between costa and R_{2+3} (Fig. 124a); first flagellomere often yellowish; surstylus with external row of 4-5 setae; cercus elongate (Fig. 48a) (south-eastern Australia, Tas.) *H. ingenuus*
 - Wing with 4 transverse bands, with 2 distal bands not joined; first flagellomere dark brown; surstylus deeply forked with ventral arm bearing apical spatulate seta; cercus short with stout ventral setae (Fig. 48i) (south-eastern Australia, Tas., WA) *H. trifasciatus*
7. IIt and part of TII with distinct row of pale crocheted ad setae; TIII slightly flattened with darkened and slightly indented posterior slit from one-third to half 8
 - IIt and TII lacking crocheted setae; TIII unmodified 9
8. CII and CIII black; IIt with row of stalked blade-like setae in addition to crocheted setae; arista half body length; thorax metallic coloured; cercus elongate and recurved, with basoventral digitiform projection (Fig. 50a) (NSW) *H. squamifer*
 - CII and CIII yellow, with some lateral infuscation; IIt with only crocheted setae; arista longer than body; thoracic pleura yellow ventrally; cercus not recurved (Fig. 50b) (NSW, Qld) *H. tweedensis*
9. Arista dorsal; wing bands joined between costa and R_{2+3} ; abdominal terga 2 and 3 metallic green; body length less than 6.0; cercus with abundant yellow hairs, and long black undulating setae (Fig. 49d) (NSW, Qld) *H. plumifer*
 - Arista apical; wing bands joined between costa and R_{4+5} ; abdominal terga 2 and 3 with lateral translucent yellow areas; body longer than 7.0; cercus very long, without yellow hairs or undulating black setae (Fig. 50c) (NSW, Qld) *H. khooi*
10. Distal TII and IIt_1 with long curved, overlapping black dorsal setae; $\text{IIt}_{3,5}$ dorsally excavated with distinctive curved setae 11
 - TII and IIt_1 lacking long dorsal setae 12
11. Arista with narrow white apical flag (Fig. 52h); scape and pedicel black, first flagellomere yellow; IIt_4 longer than IIt_{2+3} and with elongate curved setae (Fig. 52i); cercus elongate (Fig. 52g) (Qld) *H. caelicus*
 - Arista with apex white but simple; antenna entirely reddish yellow; IIt_4 not longer than IIt_{2+3} , and with curved setae as figured (Fig. 52j) (Qld) *H. meensis*
12. TIII with polished swollen callus at one-quarter; antenna black; IIt and TII with anterior row of delicate crocheted setae 13
 - TIII without callus; at least scape and pedicel yellowish; IIt and TII otherwise 15

13. CI black; lower calypter yellow; surstylus with long projecting cuticular spine; cercus without ventral projection (Fig. 53c) (NSW, ACT, Vic., Tas., SA).....*H. cingulipes*
- CI yellow or brownish; lower calypter yellow with dark brown rim; surstylus without projecting spine; cercus with ventral projection at two-thirds 14
14. CI and all femora yellow; 3 irregular pairs ac present; surstylus with dorsal and ventral arms subequal; ventral cercal projection black (Fig. 55b) (NSW, Vic.).....*H. brindabellensis*
- CI and basal two-thirds of all femora dark brown; 6 irregular pairs ac present; surstylus with dorsal projection; ventral cercal projection pale (Fig. 55d) (Vic.).....*H. calabyi*
15. Tarsus I, TII and II_t covered with short erect setae; TII without ad or pd setae (SA)*H. tantanoola*
- Tarsus I and II_t with pale ventral pile; TII with at least some ad and pd setae 16
16. First flagellomere black; FI only with black ventral spine-like setae (NSW, ACT).....*H. araluensis*
- First flagellomere yellow; FI and FII with black basoventral setae; hypopygium (Fig. 55a) (SA, Vic.).....*H. savicensis*

The *cingulipes* Group

Diagnosis. *Legs.* Male II_t usually ornamented with special hairs, setae, or cuticular projections (MSSC); male TIII in basal quarter sometimes with swollen callus which is posteriorly slit (MSSC), similar to those in the *Chrysosoma leucopogon* Group and *Parentia*.

Wing. Some species with brown wing maculations (similar in both sexes); male costa never ciliate; anal angle always developed.

Remarks. The *Heteropsilopus cingulipes* Group displays a classical Bassian distribution and is confined to south-eastern Australia, Tasmania and south-western Australia (Figs 9, 47, 54). Species are found in wet and dry sclerophyll forest, heath and coastal habitats, ie, the more xeric vegetation characteristic of much of modern Australia. Only rarely are species found in subtropical closed forest along the eastern Australian coast, the preferred habitat for sciapodine taxa of northern origin to the continent.

The *cingulipes* Group is regarded as an old endemic Australian element of Gondwanan origin. No species are known from the Cairns district or tropical monsoonal Australia. However, undescribed species with strongly sinuate m-cu and digitiform cerci from montane New Guinea (BPBM), are apparently near *Heteropsilopus* but have some features of *Chrysosoma*. These are possible relicts of the Tertiary fauna of the Australian Plate (see discussions of biogeography elsewhere in this revision).

Several species have strong spatulate setae on the oviscapt (Fig. 4b,c). These include *Heteropsilopus ingenuus*, *H. trifasciatus*, *H. sugdeni* and *H. plumifer*. Other known females have spine-like setae (Fig. 4a). The five species are not necessarily most closely related, but as discussed under Morphology, spatulate setae on the oviscapt probably represent an adaptation to oviposition in sandy habitats, and most of these species are found predominately in coastal or sandy heath/dry sclerophyll habitats.

The male arista of *Heteropsilopus caelicus* has an apical arisal flag (MSSC), and *H. cingulipes* shows strong sexual dimorphism in leg colour.

Hardy (1935, 1952, 1958) presented a confused set of synonymies involving the Australian species. These are resolved here. Fifteen species are included in the *cingulipes* Group.

araluensis n.sp. Australia (NSW, ACT).

brindabellensis n.sp. Australia (ACT, NSW, Vic.).

caelicus Parent, 1932a: 167. (*Chrysosoma*) (ANIC, examined), Australia (Qld).

calabyi n.sp. Australia (Vic.).

cingulipes Walker, 1835: 471. (*Psilopus*) (types lost), "New Holland", Australia (Tas., Vic., ACT, NSW, Qld, SA).

sidneyensis Macquart, 1847: 55. (*Psilopus*) (MHNP, examined), Australia (NSW).

grandis Macquart, 1850: 126. (*Psilopus*) (UMO, not seen), Australia (NSW).

eximius Walker, 1852: 209. (*Psilopus*) (BMNH, examined, female only), Australia.

- chrysurgus* Schiner, 1865: 214. (*Psilopus*) (NHMW, examined, female only), Australia (NSW), **n.syn.**
- angulosus* Bigot, 1890: 285. (*Psilopus*) (UMO, examined), "Australia".
- chalceus* White, 1916: 250. (*Sciapus*) (BMNH, examined, female only), Australia (Tas.).
- alatum* Becker, 1922a: 188. (*Chrysosoma*) (NHMW, examined), Australia (NSW).
- micans* Parent, 1932a: 109. (*Chrysosoma*) (ANIC, examined), Australia (ACT).
- metallicum* Parent, 1932a: 113. (*Chrysosoma*) (ANIC, examined, female only), Australia (NSW).
- jacquelineae* Parent, 1932a: 169. (*Sciopis*) (ANIC, examined), Australia (ACT).
- ingenuus** Erichson, 1842: 273. (*Psilopus*) (ZMHB, examined), Australia (Tas., Vic., ACT, NSW, Qld, SA).
- gloriosus* Parent, 1932a: 119. (*Sciapus*) (ANIC, examined), Australia (Tas.).
- khooi** n.sp. Australia (NSW, Qld).
- meensis** n.sp. Australia (Qld).
- plumifer** Becker, 1922a: 206. (*Sciopis*) (TMB, lost), Australia (NSW, Qld).
- savicensis** n.sp. Australia (SA, Vic.).
- squamifer** Hardy, 1958: 29. (AMS, examined), Australia (NSW).
- sugdeni** n.sp. Australia (NSW).
- tantanoola** n.sp. Australia (SA).
- trifasciatus** Macquart, 1850: 126. (*Psilopus*) (MHNP, examined), Australia (Tas., NSW, SA, Vic., WA).
- tweedensis** n.sp. Australia (Qld, NSW).

Heteropsilopus ingenuus (Erichson)

Psilopus ingenuus Erichson, 1842: 273.
Sciapus gloriosus Parent, 1932a: 119.

Type material. Erichson based *Psilopus ingenuus* on a syntypic pair from Tasmania (ZMHB, examined). Parent's *Sciapus gloriosus*, based on a single male from Tasmania (ANIC, examined), is clearly a synonym of *S. ingenuus*, as suggested by Hardy (1958). However, Hardy (1952, 1958) incorrectly placed the following species in synonymy with *Heteropsilopus ingenuus*: *Sciapus chalceus* White, *Sciopis plumifer* Becker and *Psilopus trifasciatus* Macquart.

Lectotype here designated: male, bearing a large grey label with the data "ingenuus Erichs. Vandiem Thayer" (ZMHB).

Additional material. Australian Capital Territory – Black Mountain; Wombat Creek; Mount Gingera; Mount Coree; Blundell's; Bendora; Cotter River; Tidbinbilla. New South Wales – metropolitan Sydney; Putty Road and Darkey Creek; Shoalhaven River, west of Nowra; Budawang Range, Castle Flats; Kosciusko National Park, Sawpit Creek; Jindabyne; Katoomba; Mount Tomah; Tubrabucca, Barrington Tops; Gloucester Tops, Redhead; Berowra; Robertson; Ku-ring-gai Chase National Park; Royal National Park; Bruces Creek, Nadgee State Forest; Nadgee Nature Reserve; Wallaga Lake, Bermagui; Bathurst; Bago; Tumut; Bowral; Macquarie Pass; Armidale; Araluen; Mapra Creek, Warrumbungles National Park; Bark Hut (1200 m), Waa Gorge, and Bullowa Creek,

Mount Kaputar National Park; Styx River, near Jeogla; Braidwood; Dromedary Creek, near Tilba Tilba; Bega; Eden; Merimbula; Charleyong; Nimmitabel; Jenolan Caves; Cooma; Geehi River; Tenterfield; Legume Road near Urbenville; Smiths Lake, near Forster (northern coastal limit). Queensland – Girraween National Park, Bald Rock Creek. South Australia – metropolitan Adelaide; Mount Lofty; Aldgate; Lobethal; Mount Gambier; Robe. Tasmania – Hobart; Launceston; Chain of Lagoons near Saint Marys; Asbestos Range, 41°09'S 146°35'E; Mount William National Park, 40°52'S 148°10'E; Ben Lomond National Park; Saint Patrick River; Wilmont; Cradle Mountain-Lake St Clair National Park; Sister Creek, Rocky Creek National Park; Tyenna River near Maydena; Cherry Tree Hill near Cranbrook; Forth River near Lemonthyne; Bronte Park; Kheban; Franklin River; Forth Falls; Broadmarsh; Bichen; Flinders Island; Huon-Picton Rivers junction; Mount Barrow; Deloraine. Victoria – metropolitan Melbourne; Upper Buckland River; Dandenong Range; Thomson River; Nunawading; Fern Tree Gully; Sale; Nariel; Gisborne; Tyers River; Aberfeld; Cape Otway; Macalister-Caledonian Rivers junction; Glenelg River; Mitta Mitta River; Bogong, via Beauty; Hall's Gap, Grampian Mountains; Tarra Valley; Warburton; Tallangatta; Bemm River; Martins Creek and Bonang Highway; Cabbage Tree Creek near Orbost; Little River, Snowy River National Park; Princess Margaret Rose Caves, near Nelson (more than 600 specimens examined: ANIC, AMS, SAM, MVM, UQIC, BPBM). Collection dates for 127 specimens, various years at Black Mountain, ACT: 15 Nov.-14 Apr., with most specimens taken from December through February; collection dates for other locales fall within this range, but with some late October dates from northern interior NSW.

Description – male. Length: 5.3-5.9; wing: 4.8-5.5 x 1.7-2.0.

Head. Vertex, frons metallic violet-green; 2 post-vertical setae present, continuation of postocular series; lateral frons with dark hairs and with weak proclinate vertical; face and clypeus covered with silvery pruinosity; clypeus separated from margin of eye and projecting anteriorly (Fig. 48e); palp and proboscis yellowish; abundant pale hairs present on ventral postcranium; scape and pedicel red-yellow; first flagellomere yellow to brownish; arista dorsal, its length about one and one-half times head width (Fig. 48f); ocellar tubercle strongly developed, with pair strong ocellar setae.

Thorax. Dorsum bright metallic green with bronze reflections over ac band and laterally; metepimeron yellow; scutellum metallic blue; pleura covered with dense grey-silvery pruinosity; 3-4 slightly offset pairs long ac present; 2 strong posterior dc, with 3-4 weak hair-like anterior dc; 1 pa, 2 sa, 2 sr, 2 npl, 1 short hm, and 1 pm present; lateral scutellars present as weak hairs or absent.

Legs. CI, femora, tibiae and basal tarsomeres yellow; CII and CIII basally brown and distally yellow, with variable degrees of infuscation; distal tarsomeres dark brown; CI with pale hairs and 3 strong pale anterolateral setae in distal third; CIII with pale lateral seta; I: 9.0; 10.0; 7.0/3.0/2.0/1.5/1.0; TI with short dorsal seta at one-sixth; II: 9.5; 12.0; 9.0/2.0/1.5/1.0/1.0; TII with short offset ad-pd pairs at one-fifths, half, two-thirds and with apical ring of setae; IIt₃₋₅ highly modified, incurved with strong setae as figured (Fig. 48d) (MSSC); III: 12.0; 16.0;

8.0/4.0/3.0/1.5/1.0; TIII with ad setae at one-quarter, half and two-thirds, and with 4-5 ventral setae.

Wing (Fig. 124a,b). With 2 brown transverse bands joined anteriorly to R_{2+3} ; brown infuscation also present along lower CuA; m-cu sinuous, and with distinct external stub-vein; lower calypter yellow with black edge and with fan of pale setae; haltere yellow with somewhat infuscated club.

Abdomen. Metallic green with violet reflections; on segments 2-6, basal half of each tergum and narrow band on preceding adjacent tergum matt brown; tergum 1 dorsally translucent yellow with cuticular band posteriorly; lateral margin tergum 2 with yellow translucent triangular area; posterior margins terga 1-6 with long black setae; sterna with pale hairs;

hypopygium dark brown with yellow cercus (Fig. 48a); hypandrial arm extending beyond hypandrial hood (Fig. 48b,c); aedeagus with flat apex; epandrial lobe with long and short bristle; surstylus with ventral lobe bearing median projection and with external row of 4-5 setae; cercus elongate and digitiform, with yellow setae and long black undulating lateral and apical setae.

Female. Similar to male except lacking MSSC; otherwise as noted; somewhat smaller; single strong vertical seta present; clypeus and face adjacent to eye margin; ocellar tubercle not as prominent; 2-3 irregular pairs long ac and 4-5 strong dc present; abdominal terga 2-5 each with 3-4 lateral ovate depressions, absent in

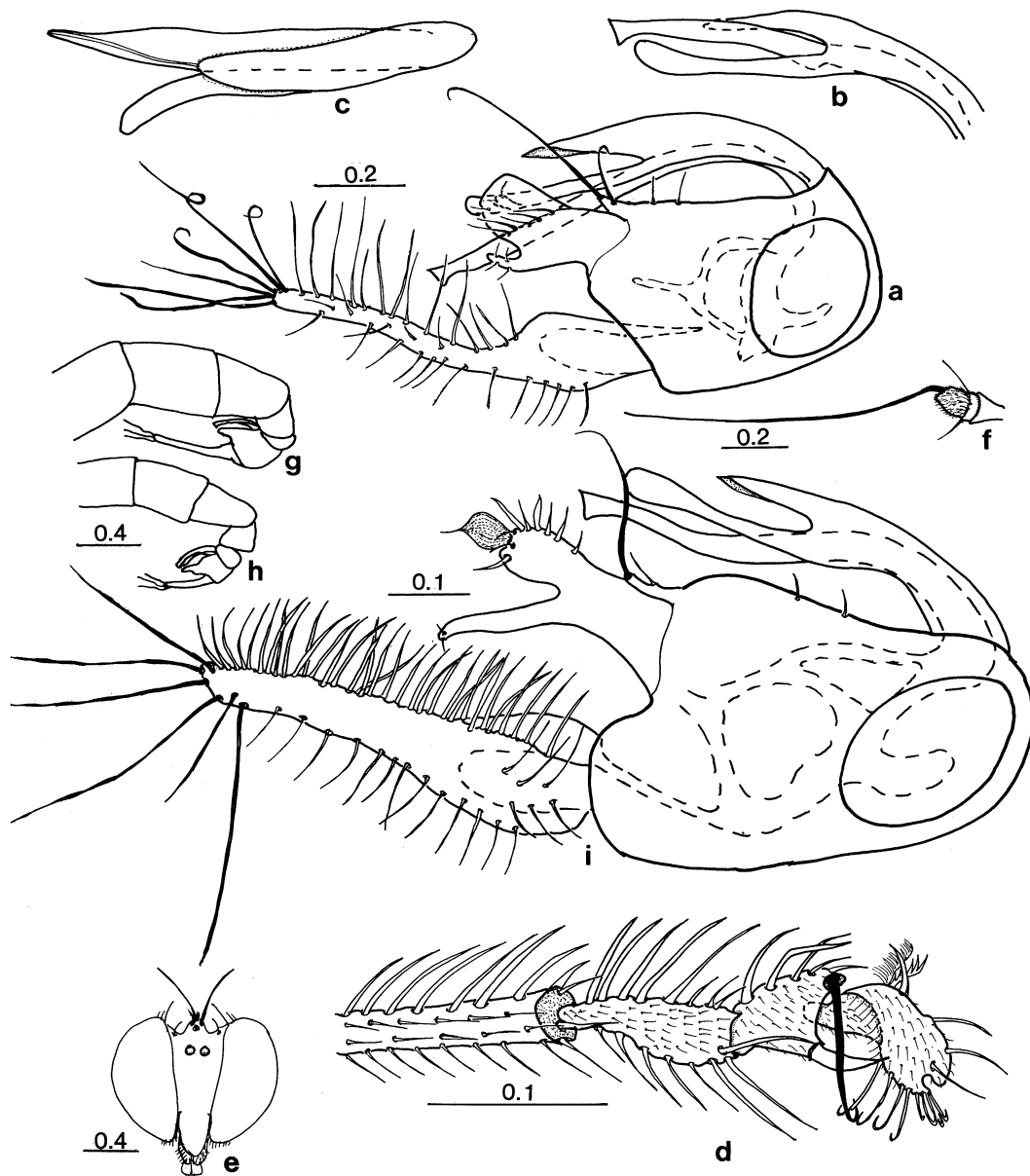


Fig.48. *Heteropsilopus ingenuus*, Hobart, Tas.: a – hypopygium, left lateral; b – aedeagus and hypandrium, left lateral; c – aedeagus and hypandrium, ventral; d – left Ilt_{2.5}, male, dorsal; e – male head, anterior; f – male antenna, left lateral; g – male postabdomen, left lateral, Sydney NSW; h – male postabdomen, left lateral, Hobart, Tas. *H. trifasciatus*, Stawell, Vic.: i – hypopygium, left lateral.

male; tergum 2 yellow laterally; oviscapt with 4 spatulate spines (Fig. 4b).

Remarks. *Heteropsilopus ingenuus* has a classical Bassian distribution which includes southern South Australia, Victoria, Tasmania and New South Wales, (only as far north as Myall Lakes on the coast) and the New England Plateau in southernmost Queensland. It also occurs on the western slopes of New South Wales, and possibly flies during the late winter or early spring in the Murray – Darling drainage. *Heteropsilopus ingenuus* is common in both wet and dry sclerophyll eucalypt forests, but also occurs in subalpine woodland associations in Tasmania and south-eastern Australia. It is not known from rainforest. The species is readily taken in yellow pan traps and is also known from stream emergence traps.

When examining large samples of male *H. ingenuus*, a distinct variation in cercus length is evident with a ‘short’ form about 0.55 in length and a ‘long’ form about 0.70–0.85 in length (Fig. 48g,h), with no intermediate lengths present. These two forms occur sympatrically, often in the same collection series. Although the ‘short’ form is more abundant in the southern part of the range (Tas., Vic.), it has been found in the Black Mountain, ACT material and at Barrington Tops, NSW. Thus, for example, in material from Hobart, Adelaide or Melbourne, the short form predominates, with only occasional long cercus specimens, while in Sydney and the Blue Mountains material, the long form is common. In all other respects, the two forms are identical and I regard them as conspecific.

Heteropsilopus ingenuus and *H. trifasciatus* are a closely related species pair, and both have the same complex male IIt (MSSC) and similar maculated wings.

Heteropsilopus trifasciatus (Macquart)

Psilopus trifasciatus Macquart, 1850: 126.

Type material. Macquart described *Psilopus trifasciatus* from males and females taken in Tasmania (MNHP, examined). Becker (1922a) regarded the species as a *Chrysosoma*. Parent (1932e) redescribed Macquart’s type material and transferred the species to *Sciapus*. Parent figured the ornamented male tarsus II, wing and genitalia. Parent’s wing figure shows 3 transverse bands, but the fourth basal band is not indicated. The spiny male cercus is diagnostic for this species. Hardy (1935: 253) thought that Parent had misinterpreted Macquart’s specimens and considered *H. trifasciatus* a synonym of *H. ingenuus*, since both species have similar IIt MSSC. Hardy (1952) later considered *S. trifasciatus* a distinct species, but incorrectly regarded *Chrysosoma metallicum* Parent as a synonym.

Additional material. New South Wales – 44 km north-west of Narrandera, 2 Apr. 1975. South Australia – Croydon, Apr. 1980; Yorke Peninsula, Maitland, 13 Mar. 1966; Eyre Peninsula, False Bay, 25 Mar. 1963. Victoria – south-west of Stawell, 10 Apr. 1979. Western Australia – Dryandra State Forest, Narrogin, malaise trap, 24–30 Mar. 1983; Yarragil, via Dwellingup, 15–20 Apr. 1981 (7 males, 10 females examined;

QDPI, AMS, SAM, MVM)

Description – male. Length: 5.7–6.0; wing: 4.2 x 1.6; similar to *H. ingenuus* except as noted.

Head. Palp and proboscis brownish; first flagellomere always dark brown.

Thorax. Two offset pairs of strong ac present.

Legs. Colour and podomere ratios similar; IIt identical to that of *H. ingenuus* (as in Fig. 48d) (MSSC).

Wing (Fig. 123a). With 4 brown transverse bands: irregular basal band, second band which is only faintly coloured anteriorly and 2 distal bands, not joined anteriorly but sometimes joined posteriorly over m-cu crossvein; m-cu sinuous, and with external stub vein; lower calypter yellow with fan of pale setae; halter stem yellow, with infuscated club.

Abdomen. Hypopygium (Fig. 48i) dark brown with yellow cerci; surstylus distally forked, with rounded ventral arm bearing apical spatulate seta and spine-like setae, and elongate dorsal arm; cercus stout and long, with ventral row of thick stout setae and apical group of long black undulating setae.

Female. Similar to male except lacking MSSC and as noted; with 5 strong dc; abdominal tergum 2 entirely metallic green; oviscapt with 4 spatulate spines.

Remarks. *Heteropsilopus trifasciatus* is distributed along the southern margin of Australia, from New South Wales to Western Australia. I have not seen any Tasmanian specimens except the Macquart types purportedly from that island. Since many of Macquart’s “Tasmanian” species are thought to be of Sydney origin (Hardy, 1929), possibly *H. trifasciatus* is restricted to the Australian mainland. All collection dates are from the autumn months of March and April, relatively late in the season.

Heteropsilopus trifasciatus is closely related to *H. ingenuus*, and both species have identical complex male IIt (MSSC) (Fig. 48d).

Heteropsilopus sugdeni n.sp.

Type material. HOLOTYPE male, PARATYPES 12 males, 3 females, New South Wales, Nadgee Nature Reserve, south-east of Eden, Merrika Lodge, 13 Jan. 1987, E. Sugden; PARATYPES 9 males, same but near Merrika River, 16–19 Jan. 1987 (AMS).

Description – male. Length: 4.7–4.8; wing: 4.0 x 1.8; similar to *H. ingenuus* except as noted.

Head. Antenna entirely red-yellow; first flagellomere subtriangular with apical arista (Fig. 49b).

Thorax. Metallic blue-green, with distinct brown maculations: central brown stripe over ac, flanked laterally by elongate brown maculation split by mesonotal suture; dark chocolate brown matt areas over humerus, posterior mesonotum and as large circular spot anterior to scutellum (Fig. 49c); scutellum bluish; 1 pair strong anterior ac present; 4 strong dc present; 1 pa, only 1 sa, 1 sr, 2 npl, 1 short hm, and 1 pm present;

lateral scutellars absent.

Legs. All coxae, femora, tibiae and t_1 yellow; distal tarsomeres black; CI and CII with black anterior setae; CIII with black lateral seta; IIt_{3-5} modified (MSSC): IIt_3 with black dorsal setae; IIt_4 dorsally excavated with some lateral setae; IIt_5 also excavated apical section curled over excavation.

Wing (Fig. 123b). Relatively broad; with 2 brown transverse bands not joined anteriorly and with brown spot near junction of CuA and m-cu and near anal angle; yellow cloud present at fork of R_{2+3} and R_{4+5} ; m-cu externally convex, with distinct external stub-vein; lower calypter yellow with fan of pale setae; haltere yellow.

Abdomen. Almost entirely translucent yellow with metallic blue-green band on each tergum 2-6; sternum 8 yellow; hypopygium mostly yellow, except surstylus and hypandrium black (Fig. 49a); hypandrial arm extending beyond hypandrial hood; aedeagus with flat apex; epandrial lobe with 1 long and 1 shorter bristle; surstylus with ventral lobe bearing median projection and

with external row of 3 setae; cercus elongate and digitiform, with yellow setae.

Female. Similar to male except lacking MSSC; otherwise as noted: strong vertical seta present; 4 strong dc also present; IIt normal; abdomen mostly yellow with metallic green bands; oviscapt with 4 spatulate spines.

Remarks. *Heteropsilopus sugdeni* is known only from the Nadgee area on the far southern coast of New South Wales. All specimens were collected from dry sclerophyll eucalypt forest.

Heteropsilopus sugdeni is close to *H. ingenuus* and the two species were collected together at Nadgee. The two species have almost identical genitalia but differ primarily in body colouration, dc chaetotaxy, antennal structure, and the modification of male IIt . The arista of *H. sugdeni* is distinctly apical while that of *H. ingenuus* is dorsal.

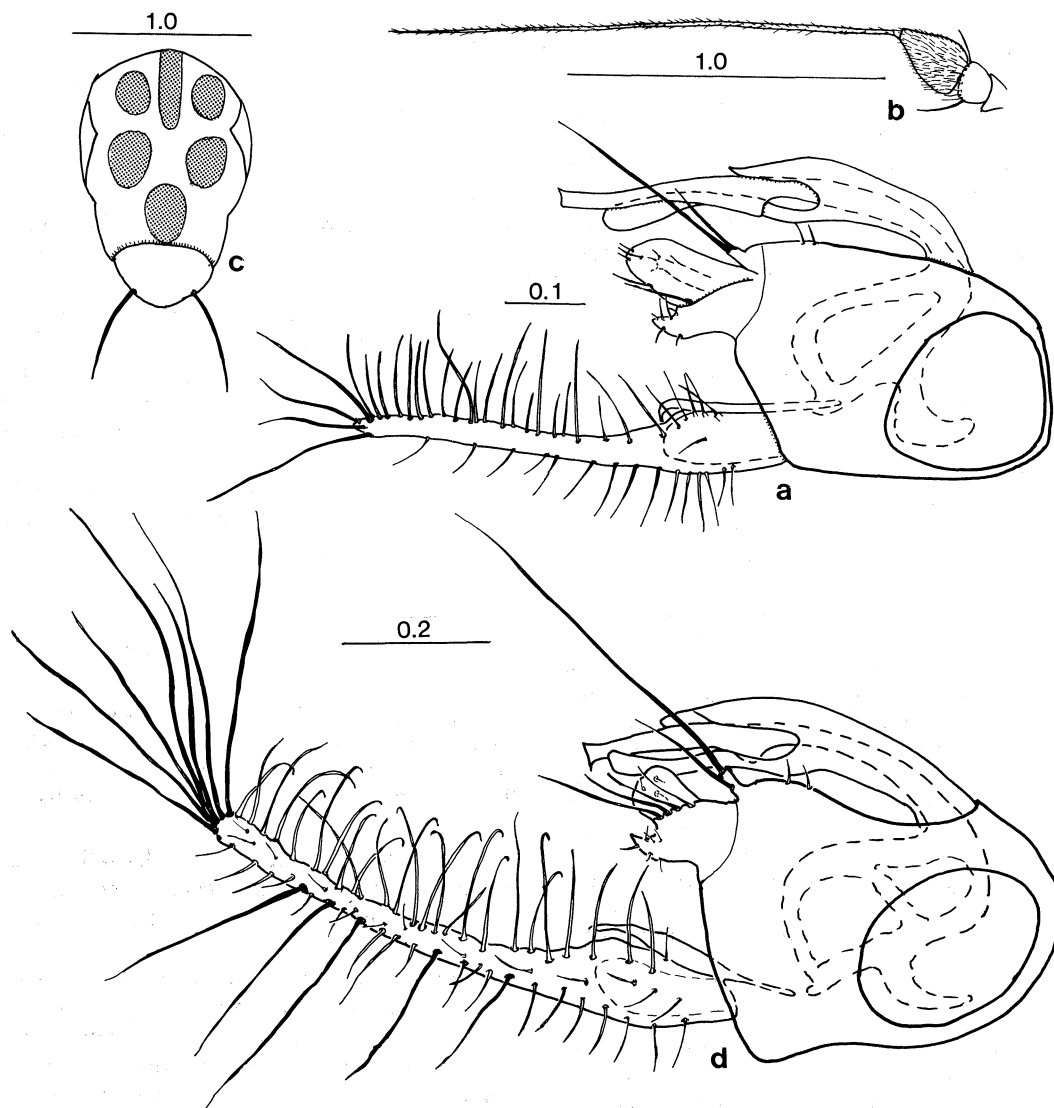


Fig. 49. *Heteropsilopus sugdeni*, Nadgee, NSW: a – hypopygium, left lateral; b – male antenna, left lateral; c – male thorax, dorsal. *H. plumifer*, Otford, NSW: d – hypopygium, left lateral.

The four strong dc on both sexes is unusual. In *Heteropsilopus*, males usually have weak hair-like anterior dc (MSSC).

***Heteropsilopus plumifer* (Becker)**

Sciopus plumifer Becker, 1922a: 206.

Type material. Becker described *Sciopus plumifer* from a series of 5 males and 2 females collected at Springwood, NSW (TMB, lost). Hardy (1951, 1958) incorrectly placed this species in synonymy with *Heteropsilopus cingulipes* and *H. squamifer*.

Neotype here designated from the same locality, male with the label "Springwood, Blue Mountains, NSW, 10-i-1956, D.K. McAlpine" (AMS).

Additional material. New South Wales – Otford, 1 Dec. 1962 and 31 Dec. 1962; Royal National Park, 27 Nov. 1965; Hornsby, 17 Nov. 1967; west of Nelligen, 12 Jan. 1961; Mount Gibraltar, Comboyne Plateau, 810 m, wet sclerophyll forest, 27 Jan. 1988; Blue Mountains, Burrallow Swamp, 9 Dec. 1986; Jenolan Caves, no date; Washpool Creek at Mount Lindsay Highway, 28 Nov. 1981; Werrikimbe National Park: Cobcroft Creek, 1110 m, and Upper Hastings River, 910 m, 6-7 Dec. 1986; Mount Dromedary, near Central Tilba, 210 m, 4 Feb. 1969; Broulee, 2 Dec. 1973; Colo Vale, 17 Jan. 1957. Queensland – Girraween National Park, 27 Nov. 1981; Amiens, 14 Dec. 1969 (25 males, 12 females examined: AMS, ANIC, UQIC, BMNH, USNM).

Description – male. Length: 4.3-5.9; wing: 4.3-5.2 x 2.0; similar to *H. ingenuus* except as noted.

Head. Lateral frons with short black hairs; scape and pedicel red-yellow; first flagellomere yellowish basally, becoming brown distad; arista dorsal.

Thorax. Dorsum metallic green with bronze band over ac band and laterally over humeral and supraalar areas, and with dark brown violet area posteriad of notopleuron; scutellum metallic blue; metepimeron yellow.

Legs. CI and CIII yellow, CII yellowish with varying degrees of infuscation; legs yellow with only distal tarsomeres darkened; TI with single dorsal seta at one-fifth; It₁ ventrally with whitish pile (MSSC); IIt without distinctive MSSC; TIII with ad at one-fifth and three-quarters.

Wing (Fig. 123c). Wings with 2 brown bands joined between costa and R₂₊₃; brown colouration also around distal CuA and near join of R₁ and costa; m-cu sinuate with external stub vein.

Abdomen. Hypopygium dark brown with yellow cerci (Fig. 49d); similar to *H. ingenuus* except as noted: row of external setae on surstylus long, extending well beyond surstylar margin; cercus elongate with abundant yellow setae and long black undulating setae apically and laterally.

Female. Similar to male except lacking MSSC; often with first flagellomere completely dark brown; otherwise similar to female *H. ingenuus*, and oviscapt also with 4 spatulate spines.

Remarks. *Heteropsilopus plumifer* is found along the central and southern New South Wales coast and the mountains from southern New South Wales into the New England district of south-eastern Queensland. The Queensland specimens are somewhat smaller than specimens from southern New South Wales. A series collected at Jenolan Caves, NSW have very faint wing maculations and females have the first flagellomere entirely dark brown. The male tarsus II of *H. plumifer* is unmodified.

***Heteropsilopus khooi* n.sp.**

Type material. HOLOTYPE male, New South Wales, Brunswick Heads, 16 Feb. 1983, D.K. McAlpine & K.C. Khoo; PARATYPES 2 females, Brunswick Heads, on *Alocasia macrorrhiza*, 9 Mar. 1981 (AMS).

Additional material. New South Wales – 2 males, Esk River, near Iluka, rainforest, 24 Nov. 1985 (AMS). Queensland – male, Caloundra, 23 Aug. 1933 (UQIC); 2 females: Cooloola National Park, yellow pan trap, 6-8 Mar. 1984; Cooloola Forestry Area, open forest, Apr. 1978; 4 males, 5 females, Beerwah, 28 Sept.-29 Oct. 1986 (QDPI); 3 males, Lamington National Park, O'Reillys, canopy fogging in subtropical rainforest, Dec. 1989 (AMS).

Description – male. Length: 7.2-7.4; wing: 6.1 x 2.0; similar to *H. plumifer* except as noted.

Head. Some pale hairs on lateral frons; antenna entirely red-yellow except dorsal first flagellomere somewhat darkened; first flagellomere subrounded with apical arista, as in *H. squamifer* (MSSC); arista about one and one-half times width of head.

Thorax. Dorsum metallic blue-green with dusting of grey pruinosity.

Legs. All coxae yellow although CII with some brown infuscation; remainder of legs yellow with only distal tarsomeres darkened; TI with dorsal setae at one-third and two-thirds; entire tarsus I with ventral pale pile; TII unmodified, and with strong offset ad-pd setal pair at one-fifth and three-fifths; TIII unmodified.

Wing (Fig. 123f). With 2 transverse apical bands joined anteriorly to R₄₊₅ and additional brown maculation around distal CuA.

Abdomen. Tergum 1 dorsally translucent yellow with metallic cuticular band posteriorly; terga 2 and 3 laterally with yellow translucent triangular area; hypopygium dark brown with yellow cercus (Fig. 50c); surstylus with 2 dorsal setae; cercus elongate, with pale setae and group of black undulating apical setae; cercus not recurved.

Female. Similar to male except lacking MSSC; otherwise as noted: somewhat smaller, wing length 4.7; antenna with dorsal arista.

Remarks. *Heteropsilopus khooi* is found in north-eastern New South Wales and south-eastern Queensland, and has been taken in littoral rainforest on *Alocasia*

macrorrhiza leaves, in coastal dry sclerophyll forest, and from the canopy of montane subtropical rainforest. This species lacks the obvious leg II and leg III MSSC and appears to be close to *H. plumifer*.

***Heteropsilopus squamifer* Hardy**

Heteropsilopus squamifer Hardy, 1958: 29.

Type material. Hardy described *Heteropsilopus squamifer* from a type series containing a male holotype, female allotype and 59 male and 42 female paratypes, all collected at Katoomba, NSW between dates 10 Dec.-1 Mar., 1955-1961 (AMS, examined). Some paratype labels were added to specimens collected after publication of the species description. Hardy somewhat confusedly synonymised the wing figure in Becker's description of *Sciopus plumifer* and part of his own 1952 concept of *Heteropsilopus cingulipes* with his newly described *H. squamifer*.

Additional material. New South Wales – Thunderbolt's Hideout, 10 km north of Tenterfield, 9 Jan. 1988, on trunk *Eucalyptus deanei*; Royal National Park, near Waterfall, on *Angophora costata*, 12 Feb. 1985, 21 Dec. 1986, 6 Apr. 1986; Tahmoor, 18 Feb. 1981; Mooney Mooney Creek, near Gosford, 23 Nov. 1986, on *Eucalyptus* sp.; Ku-ring-gai Chase National Park, 23 Nov. 1967, 15 Dec. 1984; Ashton Park, Mosman, 18 Oct.-12 Nov. 1980, on *Angophora costata*; Kangaroo Valley, Jan. 1986; Blue Mountains localities: Hazelbrook, 17 Nov.

1985, Leura Falls, 3 Jan. 1973, Mount York, 7 Mar. 1982, Mount Wilson, 27 Oct. 1984, Wentworth Falls, 6 Dec. 1986, and Mount Banks 26 Nov. 1984, on trunk *Eucalyptus* sp. (34 males, 20 females examined: AMS, ANIC, SAM).

Description – male (Fig. 51). Length: 6.9-7.3; wing: 6.2 x 1.8; similar to *H. ingenuus* except as noted.

Head. Slope of frons with pale hairs; scape and pedicel yellow, first flagellomere black; first flagellomere short subtriangular; arista apical and about half body length (MSSC) (Fig. 52a,c).

Thorax. Dorsum diffuse bronze band over humeral area; ac band metallic green.

Legs. CI yellowish to somewhat infuscated; CII and CIII black; legs yellow, only distalmost tarsomeres darkened; I: 9.0; 11.0; 7.0/2.0/1.5/1.0; TI bare of major setae; It₁ with whitish pile ventrally; II: 9.0; 12.0; 7.0/3.0/1.5/1.0/1.0; row of pale crocheted ad setae extend along leg II from TII at one-quarter to include all of II_t, and all of II_t with additional pd row of stalked blade-like setae (MSSC); III: 13.0; 18.0; 7.0/3.5/2.0/1.0/1.0; TIII slightly flattened with darkened and slightly indented posterior slit from one-third to half (MSSC).

Wing (Fig. 123d). With banding similar to *H. ingenuus*, but maculations somewhat fainter, and basal clouding absent.

Abdomen. Tergum window with dark brown membrane; lateral margin tergum 2 with lateral dark brown triangular areas; hypopygium dark brown and cercus yellow with

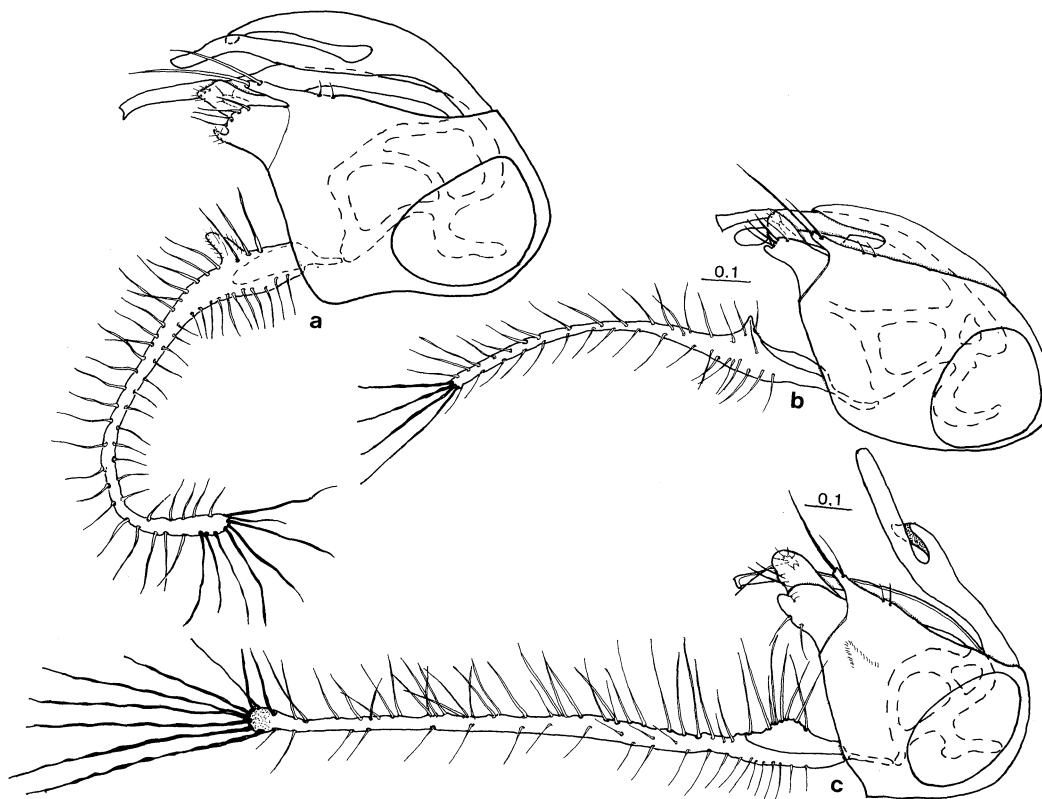


Fig. 50. *Heteropsilopus squamifer*, Katoomba, NSW: a – hypopygium, left lateral. *H. tweedensis*, near Mullumbimby, NSW: b – hypopygium, left lateral. *H. khooi*, Caloundra, Qld: c – hypopygium, left lateral.

black apex (Fig. 50a); cercus elongate, narrow, and apically recurved, with distinctive basoventral digitiform protuberance; cercus with pale setae along entire length with apical group of undulating black setae.

Female. Lacking MSSC; arista dorsoapical (Fig. 52b,d); otherwise similar to and probably indistinguishable from female *H. ingenuus*.

Remarks. *Heteropsilopus squamifer* is common in the sandstone areas of the Blue Mountains and Sydney district, but is also found on the New England Plateau (Tenterfield district) of northern New South Wales.

In the Sydney district, the species often occurs in

great numbers on the trunks of *Angophora costata* and smooth-barked *Eucalyptus* species during the early summer months. The flies rest with their bodies parallel to the surface and wings held out at angle, and move in short flights laterally or vertically up the trunks (these short flights are unlike those of the *Austrosiapus dendrohalma* group, whose members typically bound up tree trunks in a series of rapid leaping flights. These trunk congregations serve as leks, and in mating attempts males approach females from behind. Specimens display varying intensity of wing maculation, probably a function of age, as noted by Hardy (1952).

The Tenterfield specimens are slightly different from the Sydney and Blue Mountains specimens in that the setae of the second row on III are not bladelike



Fig.51. Habitus, male *Heteropsilopus squamifer*.

but simply curved (MSSC). However, the hypopygia and all other details are identical and I consider these two disjunct populations conspecific.

Males have a slight posterior indentation on TIII which is probably homologous to the TIII callus found on some *Heteropsilopus* species.

***Heteropsilopus tweedensis* n.sp.**

Type material. HOLOTYPE male, PARATYPE female, Queensland, Lamington National Park, Dec. 1921, H. Hacker (QMB); PARATYPES 2 females, Warrie National Park, via Springbrook, ex. *Drymophile* sp. (Liliaceae), 24 Nov. 1982 (UQIC).

Additional material. New South Wales – 3 females, Border Ranges National Park, The Pinnacle, on vegetation, 5 Jan. 1988; male, Huonbrook, near Mullumbimby, 4 Dec. 1961; female, Mount Warning near Murwillumbah, 26 Dec. 1975; 3 females, Nightcap National Park, Terania Creek, 16 Nov. 1988 (AMS).

Description – male. Length: 6.0-6.5; wing: 6.2 x 2.4; similar to *H. squamifer* except as noted.

Head. Lateral frons with pale hairs; frons, face and

clypeus covered with dense silvery pruinosity; vertical seta very weak; clypeus separated from margin of eye and projecting anteriorly; antenna red-yellow with some dorsal infuscation; first flagellomere conical with apical arista (MSSC); arista slightly longer than body length and slightly flattened dorsobasally (Fig. 52e) (MSSC).

Thorax. Dorsum bright metallic green with scutellum metallic blue; pleura not strongly melanised and becoming yellow ventrally; 3-4 slightly offset pairs long ac.

Legs. All coxae and legs yellow, with only distal tarsomeres infuscated; It, ventrally with white pile; distal fifth TII and entire IIt with ad row of outstanding crocheted setae (MSSC), but lacking the row of stalked spatulate setae of *H. squamifer*; TIII also slightly flattened with darkened and slightly indented posterior slit from one-third to half (MSSC).

Wing (Fig. 123e). With 2 brown transverse bands joined faintly anteriorly to R_{2+3} ; brown infuscation also present along lower CuA; m-cu with or without external stub-vein.

Abdomen. Hypopygium dark brown with yellow cerci (Fig. 50b); distinguished from *H. squamifer* in that cercus not recurved.

Female. Similar to male except lacking MSSC;

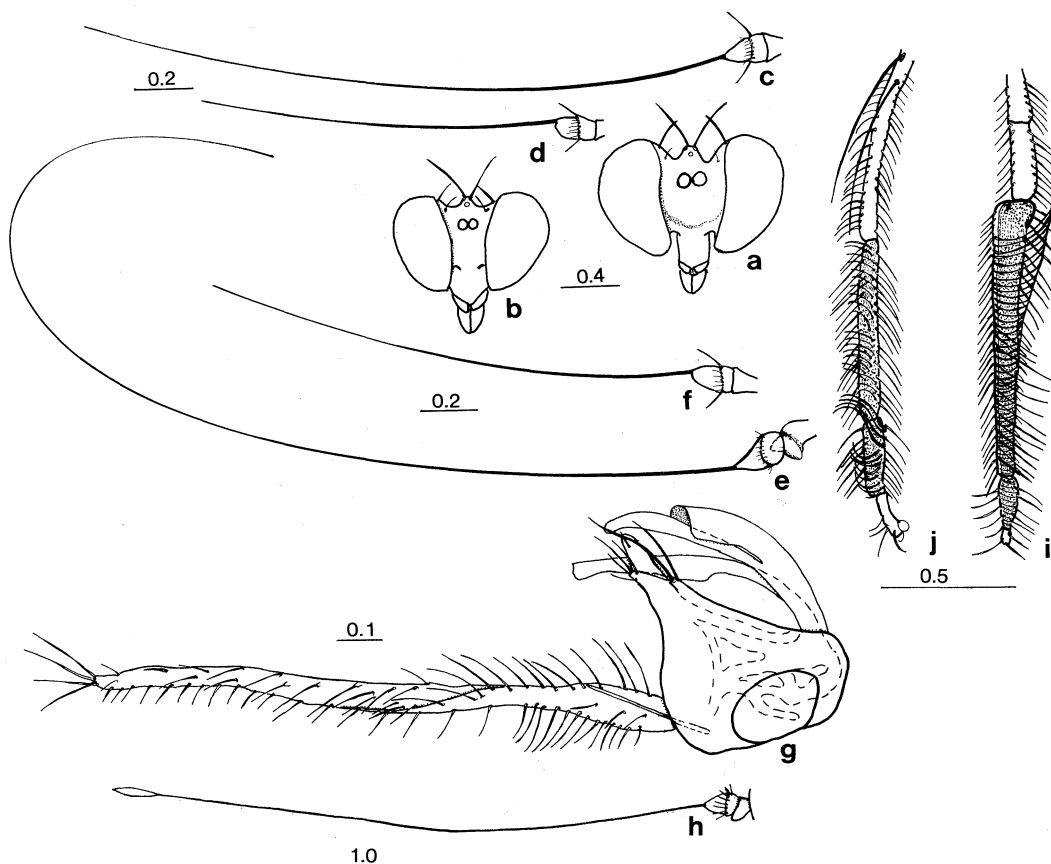


Fig. 52. *Heteropsilopus squamifer*, Katoomba, NSW: a – male head, anterior; b – female head, anterior; c – male antenna, left lateral; d – female antenna, left lateral. *H. tweedensis*, Mullumbimby, NSW: e – male antenna, left lateral; f – female antenna, left lateral. *H. caelicus*, Eidsvold, Qld: g – hypopygium, left lateral; h – male head, left lateral; i – male left tarsus II, dorsal. *H. meensis*, Mount Mee, Qld: j – male left tarsus II, dorsal.

otherwise as noted: vertical seta strong; first flagellomere subrounded, arista dorsoapical, and about one and one-half times head width in length (Fig. 52f); thoracic pleura mostly yellow.

Remarks. *Heteropsilopus tweedensis* is found in the wet forests surrounding the extinct Tweed Volcano in north-eastern New South Wales and south-eastern Queensland. Male *H. tweedensis* display a remarkable development of the first flagellomere and arista (Fig. 52e), not unlike that of *Chrysosoma crinicornis*.

Heteropsilopus tweedensis, *H. khooi* and *H. squamifer* have similar hypopygia and are closely related.

Heteropsilopus caelicus (Parent)

Chrysosoma caelicum Parent, 1932a: 167.

Type material. Parent described *Chrysosoma caelicum* from a male taken at Eidsvold, Queensland, 8 Sept. 1929 (ANIC, examined). It was referred to *Heteropsilopus* in Bickel & Dyte, 1989.

Description – male. Length: 6.7; wing: 5.3 x 1.5; similar to *S. squamifer* except as noted.

Head. Lateral frons with pale hairs; scape and pedicel reddish brown; scape with median extension; first flagellomere yellow, subrounded; arista apical, thick basally and tapering, long, about equal to body length and with elongate spear-shaped apical flag (MSSC) (Fig. 52h).

Thorax. Metallic green with grey pruinosity; lateral scutellar setae absent.

Legs. CI yellow; CII and CIII brown; remainder of legs yellow, except III_t dark brown; CI and CII with pale anterior hairs; I: 9.0; 11.0; 6.5/3.5/1.5/1.5/1.0; TI and It₁ with some pale curled posterior hairs; It₁ with whitish pile ventrally; II: 14.5; 18.0; 9.0/2.5/1.5/5.0/1.5; dorsal row of long black setae present from TII at half to II_t₁₋₂ (MSSC); II_t₃₋₅ modified with long black hairs covering dorsal boat-like excavation and with II_t₄₋₅ guarded with anterior and posterior rows of long black setae (Fig. 52i) (MSSC); III: 15.0; 20.0; 8.5/4.0/2.5/2.0/0.7; TIII with some dorsal setae; TIII at half with distinct posterior callus consisting of inflated mound with pale pile and subtended by black setae (MSSC).

Wing. Hyaline, somewhat elongate; m-cu sinuate with posterior curved marked by interior stub-vein.

Abdomen. Elongate, metallic green with matt brown bands near areas of tergal overlap; tergal window dark brown; hypopygium dark brown, cercus yellow with black apex (Fig. 52g), similar to *H. squamifer* except: epandrium somewhat subtriangular; hypandrial hood broader; cercus long and narrow, almost 3 times length of epandrium, with pale setae along length and with some short black apical setae.

Female. Unknown.

Remarks. *Heteropsilopus caelicus* is known only from the type locality in central Queensland. It is the only member of the genus with an apical arisal flag.

Heteropsilopus meensis n.sp.

Type material. HOLOTYPE male, Queensland, Mount Mee, 10 Nov. 1928, H. Harker (QMB).

Description – male. Length: 6.9; wing: 6.2 x 1.6; holotype missing hypopygium but is described on basis of MSSC; similar to *H. caelicus* except as noted.

Head. Antenna reddish yellow; scape with median extension; first flagellomere yellow, subrounded; arista apical, long, and tapering, black basally and with distal one-fifth white but not flattened.

Legs. CI yellow; CII and CIII brown; remainder of legs yellow, except III_t₂₋₅ dark brown; I: 12.0; 11.0; 9.0/3.5/2.0/1.5/1.0; TI and It₁ with some pale curled posterior hairs; II: 15.0; 21.0; 13.0/3.0/2.0/3.0/0.5; TII from half length through II_t with long curved black overlapping setae (MSSC); II_t₃₋₅ with dorsal excavation guarded by pale crocheted setae (Fig. 52j) (MSSC); III: 18.0; 24.0; 10.0; 4.0/2.0/1.5/1.0; TIII at one-third with slight swelling or callus, concolourous with leg (yellow) (MSSC).

Abdomen. Elongate, metallic green with matt brown bands near areas of tergal overlap; tergum 1 with dark brown dorsal membrane; hypopygium missing from holotype.

Female. Unknown.

Remarks. *Heteropsilopus meensis* is known only from the type locality in south-eastern Queensland. It is closely related to *H. caelicus*, having a somewhat similar male leg II modification. The distal fifth of the arista is white but not flattened into a flag.

Although the unique male holotype is missing its postabdomen, I regard it as a distinct species based on the leg II MSSC.

Heteropsilopus cingulipes (Walker)

Psilopus cingulipes Walker, 1835: 471.

Psilopus sidneyensis Macquart, 1847: 55.

Psilopus grandis Macquart, 1850: 126.

Psilopus eximius Walker, 1852: 209.

Psilopus chrysurgus Schiner, 1865: 214, n.syn.

Psilopus angulosus Bigot, 1890: 285 (syn. Bickel & Dyte, 1989).

Sciapus chalceus White, 1916: 250 (syn. Bickel & Dyte, 1989).

Chrysosoma alatum Becker, 1922a: 188.

Chrysosoma micans Parent, 1932a: 109.

Chrysosoma metallicum Parent, 1932a: 113 (syn. Bickel & Dyte, 1989).

Sciapus jacquelineae (as *jacquelinei*) Parent, 1932a: 169 (syn. Bickel & Dyte, 1989).

Type material. Walker described *Psilopus cingulipes* from specimens taken in Australia. The type material is lost (Parent, 1934 and K.G.V. Smith, personal communication). Walker's description fits the species considered below, although he overlooked the distinctive crocheted setae on male III. The types of *Psilopus sidneyensis* (MHNP, examined), *Psilopus grandis* (UMO, not seen), and *Psilopus eximius* (BMNH, examined) were seen by Parent. He considered these three species along with his own *Chrysosoma micans* to be synonyms (Parent, 1932c). *Psilopus chrysurgus* from New South Wales was considered a synonym of *Heteropsilopus bevicornis* in Bickel & Dyte (1989), but has since been examined (NHMW, female only) and is now regarded as a synonym of *H. cingulipes*. Bigot's *Psilopus angulosus*, a badly damaged female from "Australia" (UMO, examined) and White's *Sciapus chalceus*, based on 2 females taken in Tasmania (BMNH, examined), are both *Heteropsilopus cingulipes*. Becker's description and figure of *Chrysosoma alatum* (NMHW, examined) accurately portray this species. Parent's *C. micans*, male holotype and male and female paratypes from Blundell's, ACT (ANIC, examined) and *C. metallicum*, single female from Killara, NSW (ANIC, examined) are junior synonyms of *H. cingulipes*.

Parent's *Sciopus jacquelineae* is known only from the holotype, taken at Blundell's, ACT (ANIC, examined). The hypopygium is identical to that of *Heteropsilopus cingulipes* but the body lacks that species' MSSC (ie, lacking crocheted setae on II, callus on TIII, supernumary hairs on thorax, black CI and femora). In fact, the specimen might be described as having female head, thorax and legs and a male abdomen. The specimen itself is broken with the abdomen being to the label. Although the break on the abdomen appears to match that of the body, there is a strong possibility that a male abdomen was incorrectly associated with a broken female specimen. The label suggests that the specimen was part of a long series collected at Blundell's, ACT most of which form the paratype series of *Chrysosoma micans* (= *H. cingulipes*). Thus two possibilities exist: (1) Parent described a broken specimen which consisted of an incorrectly associated female body and male abdomen, or (2) the specimen is an aberrant *H. cingulipes* which failed to develop male secondary sexual characters even though it has the distinctive hypopygium of the species. In either case, *Sciopus jacquelineae* is regarded as a synonym of *H. cingulipes*.

Hardy (1930, 1935, 1952, 1958) variously and inconsistently placed many of the above species in synonymy with *H. cingulipes*. I have been able to confirm these synonymies by examination of type material.

Neotype here designated for *Psilopus cingulipes* Walker: male, bearing the label "Elanora Hts, NSW, 4 Oct 1986, T. Robinson" (AMS).

Additional material. Australian Capital Territory – Canberra: Black Mountain; Cotter-Murrumbidgee Rivers junction; Mount Majura; Paddy's River; Brindabella Range. New South Wales – metropolitan Sydney; Scheyville, Oct. 1987, pyrethrin knockdown of grey box, *Eucalyptus mollucana*;

Turrabucca; Blue Mountains: Mount York, Katoomba, Blackheath; Corunna Lake, near Narooma; Bombala; Heathcote; Royal National Park; Ku-ring-gai Chase National Park; Armidale; Boolijah Creek, near Sassafrass; Dorrigo National Park; "Lorien", near Lansdowne; Nowra; Lismore; Tilba-Tilba; Lowther; Bathurst; Freshwater; Gibraltar Range National Park; Tahmoor; Cooma; Kurrajong; Wombat, near Young; Congo, near Moruya; Brown Mountain, near Bega; Lake George; Point Lookout, New England National Park; Wombeyan Caves; Snowy-Thredbo junction; The Creel, Kosciuszko National Park; Wangi Point, Lake Macquarie; Braidwood; Cowra; Warrell Creek; Forbes; Monga; Eugoura; Batemans Bay; Kangaroo Valley; Back Yama, near Forbes; Hartwell; The Entrance; Bark Hut, Mount Kaputar; Cathedral Rocks, near Ebor; Shoalhaven River, west of Nowra; Dead Cow Creek, Warrumbungle Mountains. Queensland – metropolitan Brisbane; Girraween National Park; Amosfield; Cougal Creek, Upper Talbeadgera; Nambour; Cainbale; Springbrook; Tibrogarga Creek; Mount Tambourine; Cairncross National Park, near Maleny; Woombye, near Nambour. South Australia – Mount Lofty Ranges (female only). Tasmania – Hobart; Port Huon; Waldheim Chalet; Avoca; Hamilton; Devonport; Dunally; 3 km west of Lawrence. Victoria – metropolitan Melbourne; north of Orbost; Mount Beauty; Omeo; Boolarra; west of Koetung, near Tallangatta; Ferntree Gully; Taralgon; Nunawading; north-west of Glenmaggie; Frankston; Bairnsdale; Macalister-Wellington Rivers junction; Aire River, near Gleneareire; Latrobe River; Noorinbee; Dartmouth River, Mitta Mitta Creek; Howqua River, south-east of Merrijig.

Collection dates, various years: Black Mountain, ACT: 25 Oct.-18 Jan., with most specimens in November and December; for New South Wales and Queensland localities, most specimens taken from early October to late November; for all localities, only a few specimens recorded from February and March. Specimens taken by continuous malaise trapping at "Lorien" near Lansdowne, NSW occur from October to December, and April, possibly reflecting a bimodal flight period with a midsummer "lull" (more than 600 specimens: AMS, ANIC, MVM, QDPI, UQIC, USNM, CNC).

Description – male. Length: 5.6-7.5; wing: 6.0-6.8 x 2.5.

Head. Frons and face metallic blue-green and with some silvery pruinosity; lateral frons with 4-5 black (sometimes pale) hairs (MSSC); clypeus metallic green with silvery pruinosity and separated from margin of eyes (Fig. 53e); palp, proboscis yellowish; eyes with fine pubescence; antenna black; first flagellomere subtriangular, with dorsoapical arista (Fig. 53g); arista black, about as long as head width; ocellar tubercle with pairs strong ocellars, weak postocellars; ventral postcranium with abundant pale hairs.

Thorax. Metallic blue-green with irregular longitudinal bronze markings; scutellum metallic blue; pleura covered with dense grey-silvery pruinosity; setae black; 6-7 irregularly paired long ac; dc with 1 strong anterior seta and 2 strong posterior seta between which are 5-6 weak hair-like setae (MSSC); supernumerary hairs present (MSSC); 1 pa, 2 sa, 2 sr, 2 npl, 1 hm and 1 pm present; lateral scutellars about three-quarters length of medians.

Legs. Coxae and femora mostly dark brown; femoral 'knees', TI and TII yellowish; TIII yellow to brownish; tarsi infuscated to dark brown; CI and CII with pale anterior hairs; CIII with tuft of pale lateral

setae; I: 11.0; 12.0; 11.0/4.0/3.0/2.0/1.0; FI with pale ventral and posterior hairs; TI with short dorsal seta at one-fifth; It_{1-4} ventrally with whitish pile (MSSC); II: 14.0; 18.0; 15.0/5.0/3.0/1.0/1.0; TII with ad seta at one-third, and pd setae at one-quarter and two-thirds; III_{2-5} with anterior row of delicate crocheted setae extending from (MSSC); III: 20.0; 25.0; 13.0/6.0/4.0/2.0/1.0; TIII at one-third with polished brown callus which

bears longitudinal furrow posteriorly (MSSC).

Wing (Fig. 123g). Hyaline with at most faint clouding around m-cu and M_1 ; M_1 joins M_2 at right angle; m-cu sinuate, often with external stub vein; lower calypter yellow with fan of yellow setae; haltere yellow with brownish club.

Abdomen. Metallic green with bronze reflections; on segments 2-6, basal half of each tergum and narrow

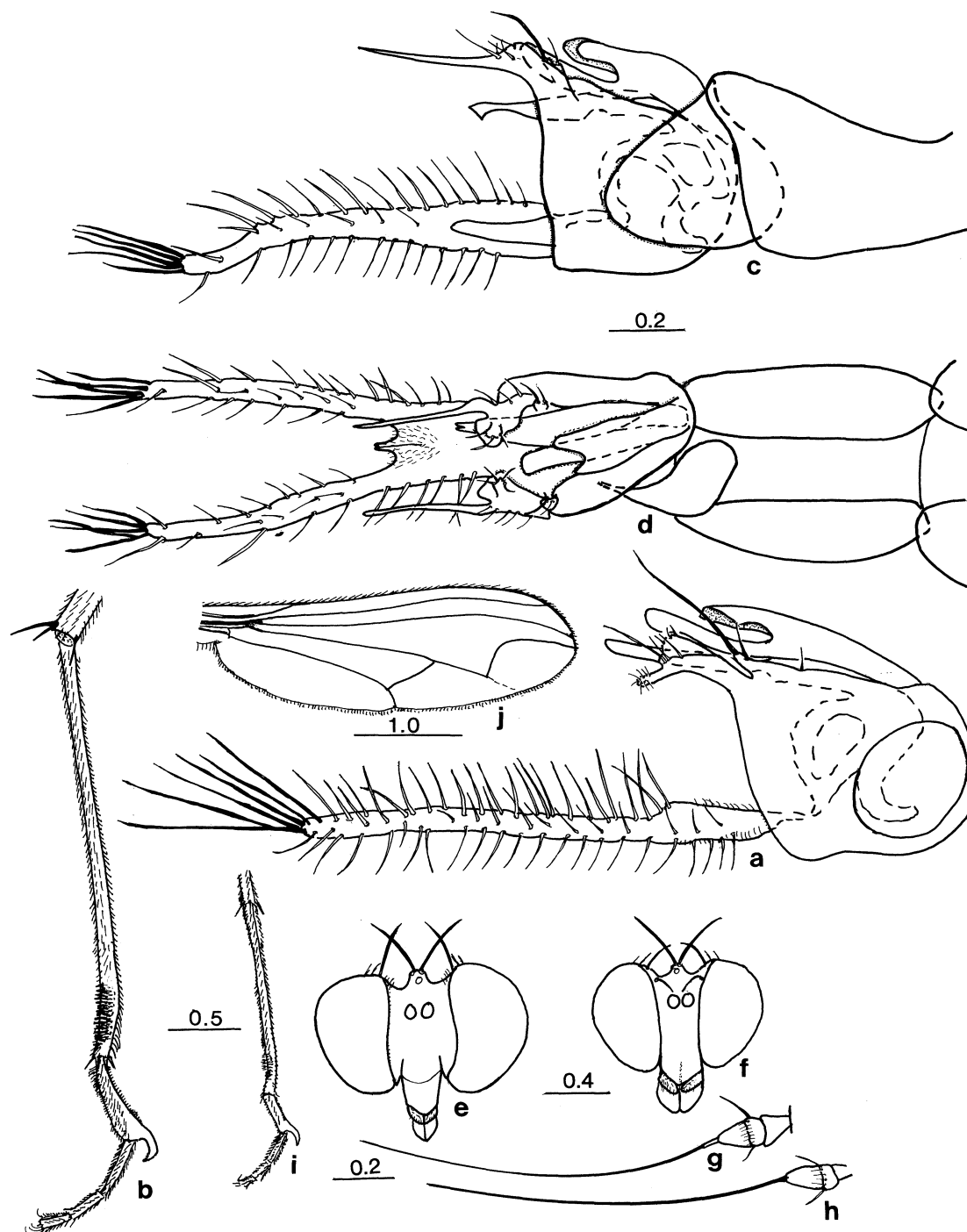


Fig. 53. *Heteropsilopus brevicornis*, Hobart, Tas.: a – hypopygium, left lateral; b – male left tarsus, anterior. *H. cingulipes*, Sydney, NSW: c – male postabdomen, left lateral; d – male postabdomen, ventral; e – male head, anterior; f – female head, anterior; g – antenna, male, left lateral; h – antenna, female, left lateral. *H. intermedius*, Brookfield Park, SA: i – male left tarsus II, anterodorsal view; j – male wing, dorsal.

band on preceding adjacent matt brown; terga posteriorly with long black marginal setae and laterally and ventrally with pale setae; terga without ovate depressions; hypopygium dark brown with yellowish cerci (Fig. 53c,d); hypandrium hoodlike with hypandrial arm to left of aedeagus; epandrial lobe with short pedicel and bearing long and short bristles; surstylus fused to epandrium, and bearing distinctive elongate needle-like projection; cercus elongate, red-yellow with fine pale setae and some strong black ventral setae; tip of cercus narrowed with apical group of black undulating setae.

Female. Similar to male except lacking MSSC; otherwise as noted: smaller, length 4.9-5.4; ocellar tubercle not as prominent; face wider than in male (Fig. 53f); single strong vertical seta present; antenna (Fig. 53h); lateral slope of frons bare except for vertical seta; clypeus extending to margin of eyes; 5-6 regular pairs of strong ac present; 5 strong dc present; CI yellow; femora and tibiae yellow; FI without pale hairs; TI with short dorsal setae at one-fifth, one-third and two-thirds; TII with ad setae at one-eighth, one-quarter, half and subapically, and with pd setae at one-quarter and two-thirds; TIII without callus, but with offset ad-pd setal pairs at one-quarter, half and two-thirds; abdominal terga 2-5 each with 3-4 ovate depressions along lateral margins; oviscapt with each hemitergite bearing 2 strong spine-like setae (Fig. 4a,b).

Remarks. *Heteropsilopus cingulipes* is very common throughout south-eastern Australia and Tasmania (Fig. 54), and occurs primarily in wet and dry sclerophyll forest habitats. Although often found resting on leaves and taken by sweeping, it is sometimes found on the trunks of smooth-barked trees. Hughes (1972) recorded it (as *Chrysosoma micans*) as an important aphid predator.

This species displays a strong sexual dimorphism, not only in the usual secondary characters, but also in leg colouration. As well, I have seen individual males which are much darker than normal, with most yellow cuticle strong infuscated.

Heteropsilopus araluensis n.sp.

Type material. HOLOTYPE male, New South Wales, Sheepstation Creek, Araluen, 24 Nov. 1973, L. Kelsey & Z. Liepa; PARATYPES male, 3 females, east of Nimmitabel, 8 Mar. 1963 (ANIC).

Additional material. Australian Capital Territory – Wombat Creek, north-east of Piccadilly Circus, 750 m, Feb. 1984; Blundell's Creek, Feb. 1987 (ANIC). New South Wales – Kosciusko National Park, Creel-Sawpit Creek, 15 Feb. 1963, 21 Jan. 1987; near Thredbo, 21 Jan. 1987 (AMS); Jindabyne, 22 Feb. 1969 (MVM) (8 males, 9 females examined).

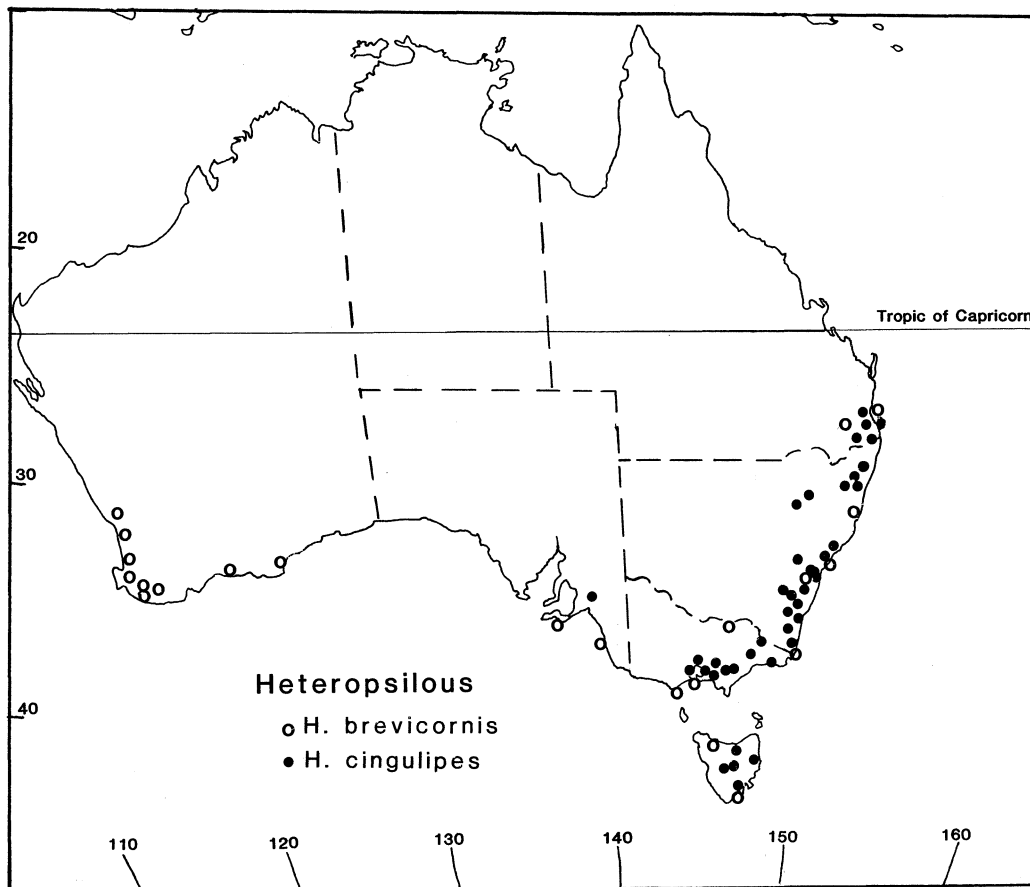


Fig. 54. Distribution, *Heteropsilopus cingulipes*, *H. brevicornis*.

Description – male. Length: 6.2; wing: 5.6 x 1.4; similar to *H. cingulipes* except as noted.

Head. Face and clypeus with dense grey pruinosity; scape and pedicel yellow; first flagellomere black; arista dorsal.

Thorax. Metallic blue-green with dusting of brownish pruinosity; 4-5 irregularly paired ac; 2 strong posterior dc with 4 somewhat shorter anterior dc; lateral scutellars reduced to weak hairs.

Legs. CI, distal CII and CIII, femora, tibiae and basal tarsomeres yellow; basal CII and CIII brownish; It_5 , IIt_5 and $IIIIt_{2-5}$ dark brown; FI only with row of 4-7 short black ventral spine-like setae in basal half; FII bare ventrally; It_{2-5} and IIt_{2-5} with pale ventral pile (MSSC); TIII without callus.

Wing. Hyaline (Fig. 123j), with at most faint clouding around m-cu and M_1 ; m-cu sinuate with external stub-vein; haltere yellow.

Abdomen. Metallic green with bronze reflections; on segments 2-6, basal half of each tergum and narrow band on preceding adjacent matt brown; yellow translucent patches present laterally and dorsally on tergum 1; hypopygium dark brown with yellow cerci (similar to that of *H. savicensis*, Fig. 55a); epandrium subrectangular; hypandrial arm extending to apex of aedeagus; 2 epandrial setae present; epandrial lobe with long and short bristle; surstylus with digitiform dorsal extension, medial projection bearing 2 strong setae, and ventral lobe with setae as figured; cercus

elongate with pale lateral setae and long black undulating apical setae.

Female. Similar to male except lacking MSSC, and FI also with black ventral spine-like setae.

Remarks. *Heteropsilopus araluensis* is found on the southern tablelands of New South Wales and the Australian Capital Territory, and subalpine habitats in the Snowy Mountains. It is closely related to the following species, *H. savicensis* and *H. tantanoola*. Both species bear a strong similarity to *H. plumifer* in hypopygial structure and general morphology.

Heteropsilopus savicensis n.sp.

Type material. HOLOTYPE male, PARATYPE male, South Australia, Naracoote Cave Reserve, sweeping *Eucalyptus obliqua*, dry sclerophyll forest, 25 Oct. 1958, G.F. Gross (SAM); PARATYPE male, Victoria, Glenelg River, 4 miles north-north-east of Nelson, 25 Nov. 1966 (MVM).

Description – male. Length: 6.7; wing: 5.1 x 1.8; similar to *H. araluensis* except as noted.

Head. Scape and pedicel yellow; first flagellomere yellow to brownish, not black as in *H. araluensis*.

Thorax. Dorsum metallic green with dense grey-brown

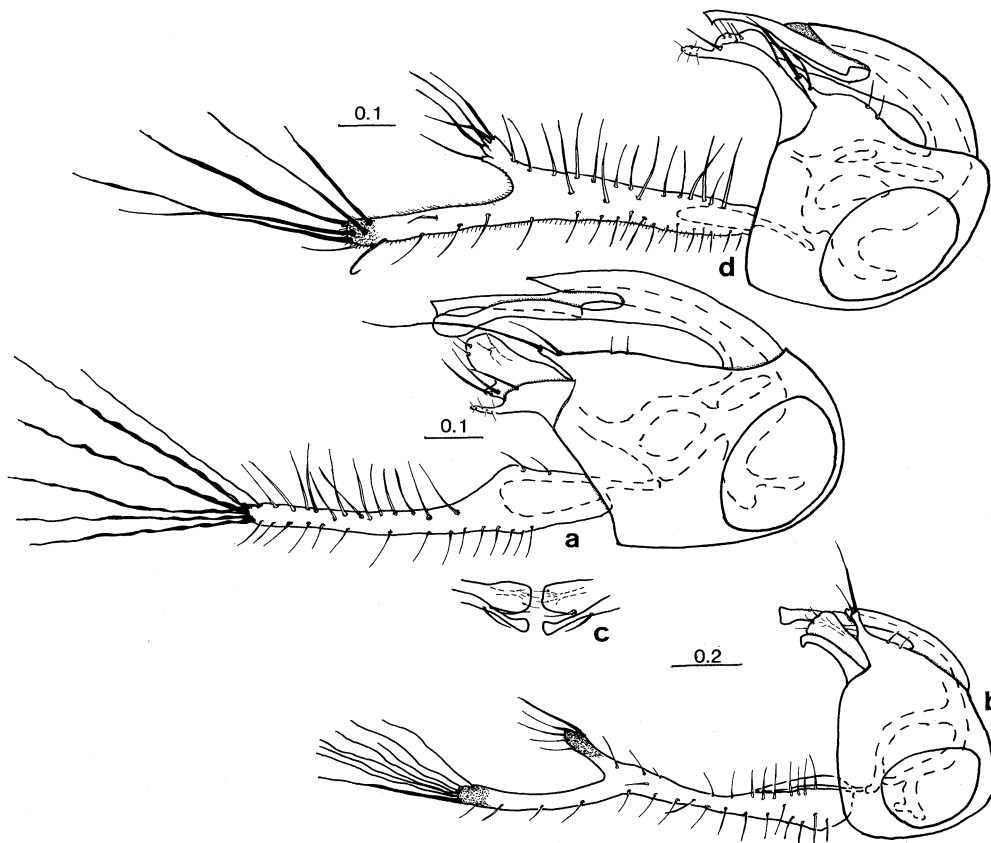


Fig. 55. *Heteropsilopus savicensis*, Naracoote, SA: a – hypopygium, left lateral. *H. brindebellensis*, Brindabella Range, ACT: b – hypopygium, left lateral; c – surstylar tips, anterior. *H. calabyi*, Rutherglen, Vic: d – hypopygium, left lateral.

pruinosity.

Legs. Colouration similar; both FI and FII with short black setae, not as strong as in *H. araluensis*, and present along entire ventral surface; ventral spine-like setae; It_{2-5} and IIt_{2-5} with pale ventral pile (MSSC); TIII without evidence of callus.

Abdomen. Hypopygium (Fig. 55a) as described for *H. araluensis*.

Female. Unknown.

Remarks. *Heteropsilopus savicensis* is found along the southern section of the South Australia-Victoria border. This species is possibly conspecific with *H. araluensis*, and the differences separating them (ie, antennal colour and presence of ventral black spines on femur II) may reflect intraspecific variation. The two species are geographically isolated and no specimens are available from the intervening area in Victoria.

Heteropsilopus tantanoola n.sp.

Type material. HOLOTYPE male, South Australia, Tantanoola, 10 Nov. 1988, dry sclerophyll forest remnant, D.K. McAlpine & B.J. Day (AMS).

Description – male. Length: 6.1; wing: 5.0 x 1.7; similar to *H. cinglipes* except as noted.

Head. Vertex with brownish pruinosity; frons, face and clypeus covered with dense silvery pruinosity; lateral frons with single short black vertical seta; eyes bare; antenna reddish yellow with first flagellomere slightly infuscated; arista dorsal.

Thorax. Mesonotum metallic blue-green and covered with dense brown pruinosity; scutellum metallic blue-green; metepimeron yellow; 4 irregularly paired long ac; dc with 2 strong anterior seta and 2 strong posterior seta between which are 2 short weak setae (MSSC); supernumerary hairs absent; lateral scutellars about one-quarter length of medians.

Legs. CI, anterior CIII, femora, tibiae and basal tarsomeres yellow; CII and lateral CIII brownish; It_5 , IIt_5 and III_{2-5} dark brown; femora ventrally bare with only short black vestiture; It covered with short erect hairs (MSSC); It_{1-4} without pale ventral pile; TII without major setae, but TII and IIt covered with short erect hairs (MSSC); TIII without callus.

Wing. Hyaline with at most faint clouding around m-cu and M_1 ; M_1 joins M_2 at right angle; m-cu sinuate, with external stub vein; lower calypter yellow with fan of yellow setae; haltere yellow with brownish club.

Abdomen. Metallic green with bronze reflections; on segments 2-6, basal half of each tergum and narrow band on preceding adjacent matt brown; yellow translucent patches present laterally and ventrally on tergum 1; hypopygium dark brown with yellow cerci (similar to that of *H. savicensis*, Fig. 55a); cercus elongate with pale lateral setae and long black undulating apical setae.

Female. Unknown.

Remarks. *Heteropsilopus tantanoola* is known only from a remnant patch of dry sclerophyll forest surrounded by cleared agricultural land near Tantanoola, South Australia, north-west of Mount Gambier. It is related to the probably sympatric *H. savicensis*, as well as to *H. araluensis*, but differs from males of both species in the presence of short erect hairs on It and IIt (MSSC) and the corresponding absence of pale ventral pile on these podomeres.

Heteropsilopus brindabellensis n.sp.

Type material. HOLOTYPE male, PARATYPES 4 males, female, Australian Capital Territory, Snowy Flats, Brindabella Mountains, 30 Dec. 1974, G. Daniels (AMS).

Additional material. Australian Capital Territory – Mount Gingera, 4 Feb. 1965 (ANIC); Brindabella Range, 26 Feb. 1972 (AMS). New South Wales – Wilsons Valley, Snowy Mountains, 16 Feb. 1963; Yaouk, via Adaminiby, no date; 14 km west of Thredbo, 14 Jan. 1987; Kosciusko National Park, Pipers Creek, Guthega Road, 1320 m, 1 Jan. 1991; Devil's Hole, Barrington Tops State Forest, 28 Dec. 1984; Cathedral Rocks National Park, near Ebor, Barokee Swamp, 21 Nov. 1990 (AMS). Victoria – Beech Forest, via Colac, 6 Jan. 1962 (QDPI); Delegate River, 5 km south-west of Bendoc, 880 m, 19 Jan. 1991; Errinundra Plateau, Goonmirk Road, 980 m, on trunk *Eucalyptus delegatensis*, 18 Jan. 1991 (AMS) (28 males, 13 females examined).

Description – male. Length: 6.7-6.8; wing: 5.8 x 2.0.

Head. Vertex, frons dark metallic blue-green with violet reflections; lateral slope of frons with 3 black hairs, one of which probably representing the vertical seta; face and clypeus metallic blue-green silvery pruinosity; clypeus free from margin of eyes; palp brownish; proboscis yellow, glabrous; abundant pale hairs on ventral postcranium; antenna black; arista subapical.

Thorax. Dorsum dark metallic green with blue-violet reflections, and scutellum metallic blue; matt chocolate brown stripe over notopleura; pleura covered with dense grey pruinosity; 3 strong, irregularly paired ac; 7 dc, 1 strong anterior and 2 strong posterior dc, between which are 4 weak hair-like dc (MSSC); 1 pa, 2 sa, 2 sr, 2 npl, 1 hm and 1 pm present; lateral scutellar setae about one-third length of medians.

Legs. CI yellow with whitish pruinosity and pale anterior hairs; CII and CIII black; CIII with group of pale lateral setae; TI and TII yellow to infuscated; TIII yellow at base, remainder dark brown; distal tarsomeres darkened; I: 10.0; 12.0; 9.0/4.0/2.0/1.5/1.0; II: 12.0; 17.0; 13.0/5.0/3.5/2.0/1.0; TII with 1 ad and 3 pd; TII from one-third with ad row of pale setae, continuing along entire IIt where setae become distinctly crocheted (MSSC); III: 16.0; 22.0; 11.0/6.0/4.0/2.0/1.0; TIII with distinct brown swollen callus at one-quarter, smooth posteriorly (MSSC).

Wing. Hyaline, with at most only faint clouding around m-cu and M_1 (Fig. 123i); m-cu sinuous, without stub-vein; lower calypter yellow with black rim, and with fan of pale setae; haltere yellow with brown club.

Abdomen. Metallic green with bronze reflections; pale hairs present on sterna and lateral margins of terga; tergum 1 with membrane dark brown; hypopygium dark brown with yellow cerci (Fig. 55b); epandrium ovate,

higher than wide; 2 epandrial setae present; epandrial lobe with 2 bristles; surstylus with broad ventral arm bearing median projection, and with narrow capitate dorsal arm (Fig. 55c); cercus elongate, yellow with infuscated ventral digitiform projection bearing group of pale setae, and apex black with group of undulating black setae; cercus otherwise with dark lateral setae and weaker pale setae.

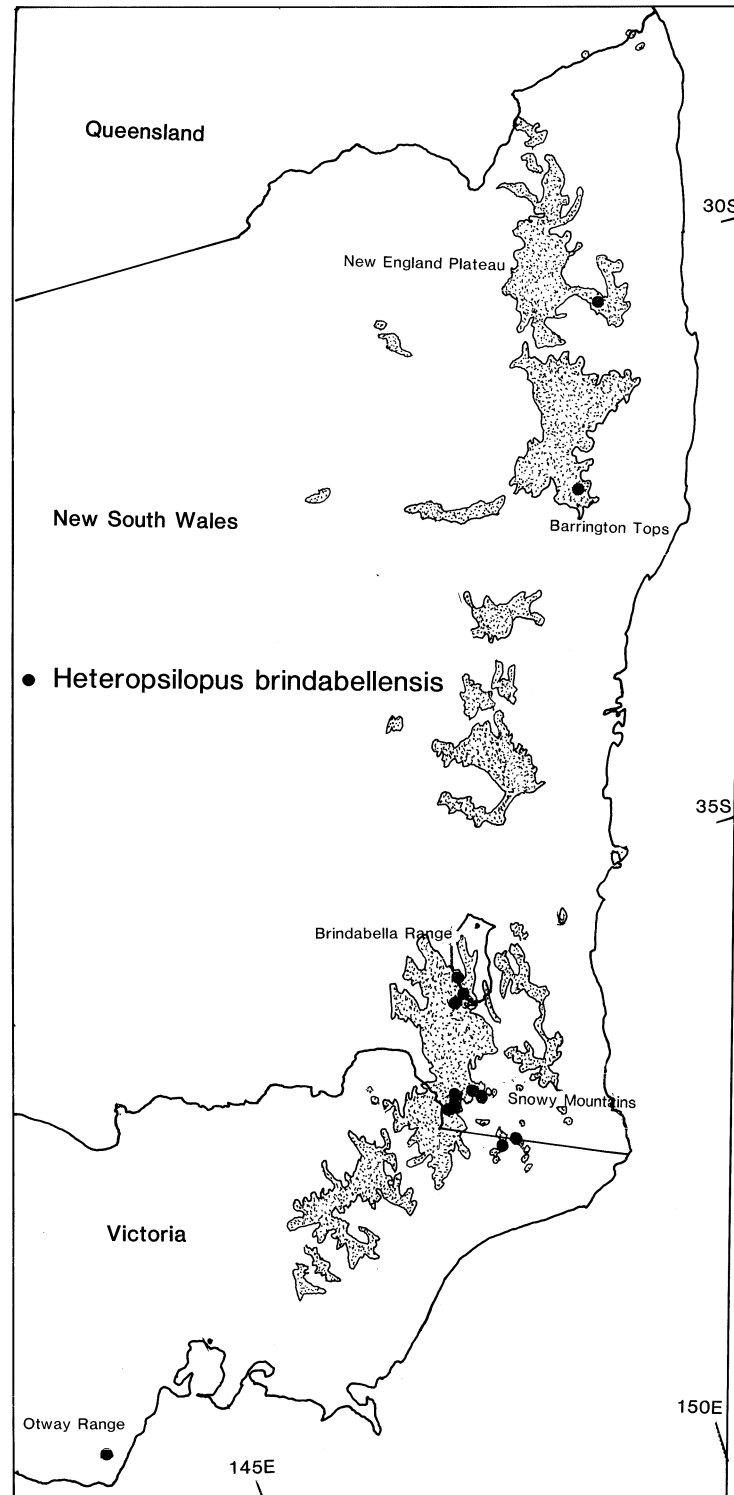


Fig.56. Distribution, *Heteropsilopus brindabellensis*. Stippled area indicates land above 1000 m.

Female. Similar to male except lacking MSSC and as noted: single strong black vertical seta present; 4 pairs ac and 5 strong dc present; TII with 3 ad and 3 pd; TIII with 2 ad and 4 pd.

Remarks. *Heteropsilopus brindabellensis* is known from cold montane and subalpine habitats (mostly above 1000 m) in the Brindabella Range and Snowy Mountains of the ACT and New South Wales, the Errinundra Plateau and Otway Ranges of Victoria, and in northern populations on the Barrington Tops and the Ebor district of the New England Plateau (Fig. 56). It probably is found in montane habitats in the intervening area.

Heteropsilopus calabyi n.sp.

Type material. HOLOTYPE male, PARATYPE male, Victoria, Rutherglen, 1 Nov. 1950, J.H. Calaby (ANIC).

Description – male. Length: 8.3; wing: 7.3 x 2.2; similar to *H. brindabellensis* except as noted.

Head. Face bulging beneath eyes.

Thorax. Six irregular pairs of long ac present, posterior pair strong, with anterior ac variously strong or weak, not symmetrical; 8 dc, 1 strong anterior, 2 strong posteriors between which are 5 weak hairs; median scutellars strong, laterals about two-thirds length of medians.

Legs. Coxae brown; CI with silvery pruinosity and abundant pale hairs; basal two-thirds of femora dark brown; distal third of femora, TI, TII and basal third of TIII yellow; distal two-thirds of TIII and tarsomeres brownish; It₁ with whitish pile ventrally; IIt_{1,5} with ad row of pale crocheted hairs (MSSC); TIII with swollen brown callus at one-quarter, posteriorly with median longitudinal strip of fine hairs (MSSC).

Abdomen. Hypopygium dark brown with yellow cerci (Fig. 55d); epandrium rounded, not elongate; surstylus with digitiform dorsal projection, and with long seta and other setae as figured; cercus elongate with pale ventral digitiform projection just beyond half and bearing pale setae, and with apex darkened and bearing group of black undulating setae; cercus also with scattered pale setae and some dark lateral setae.

Female. Unknown.

Remarks. *Heteropsilopus calabyi* is known only from the Murray River in northern Victoria. It is closely related to the montane *H. brindabellensis* but differs principally in body size, leg and cercus colouration, and in the shape of the epandrium and surstylus.

The *brevicornis* Group

Diagnosis. **Legs.** Male IIt₂ basally flattened with posterior comb of dark setae and produced into a dorsal

curved beak which overhangs the succeeding tarsomeres (Fig. 53b,i) (MSSC).

Wing. Crossvein m-cu either strongly sinuate or straight.

Remarks. The *Heteropsilopus brevicornis* Group comprises two species from southern Australia, which share the same distinctive IIt MSSC. Most *Heteropsilopus* species have a distinctive sinuate m-cu crossvein which is considered a synapomorphy. Yet *H. intermedius* from South Australia has an identical male tarsus II (MSSC) to the much larger sinuate crossvein species *H. brevicornis* (compare Fig. 53i and 53b), but it has a straight m-cu crossvein. These two sympatric species must be considered sister taxa based on their unique shared MSSC, but their distinctly different venation is a problem. The straight crossvein of *H. intermedius* is probably a reversal, but by placing it in *Heteropsilopus*, the generic definition is weakened. Indeed, if it weren't for the existence of *H. brevicornis*, I would have placed *H. intermedius* in the closely related straight crossvein genus *Austrosclerophyllus* (the two genera have similar genitalia and other suites of characters).

Heteropsilopus brevicornis has strong spatulate setae on the oviscapt (similar to Fig. 4c). This probably represents an adaptation for oviposition in sandy habitats, and this species is found predominately in coastal or sandy heath/dry sclerophyll habitats.

Included species:

brevicornis Macquart, 1850: 124. (*Psilopus*) (MHNP, examined), Australia (Tas., Vic., NSW, Qld, SA, WA).

venustus Walker, 1852: 209. (*Psilopus*) (BMNH, examined), Australia (WA).

volucre Becker, 1922a: 142. (*Chrysosoma*) (NHMV, examined), "New Holland".

bimaculatus Parent 1932a: 117. (*Sciapus*) (ANIC, examined), Australia (Tas.).

intermedius n.sp. Australia (SA).

Heteropsilopus brevicornis (Macquart)

Psilopus brevicornis Macquart, 1850: 124.

Psilopus venustus Walker, 1852: 209.

Chrysosoma volucre Becker, 1922a: 142.

Sciopus bimaculatus Parent, 1932a: 117.

Type material. The male type of *Psilopus brevicornis* is from the eastern coast of Australia (MNHP, examined). It was redescribed by Parent (1926), and although missing its postabdomen and distinctive mid-tarsi, its size and colouration are characteristic of only this Australian species. Walker described *Psilopus venustus* from a Western Australian female of this species (BMNH, examined). Becker described *Chrysosoma volucre* from two male and one female syntypes from "New Holland" (NHMV, examined) and figured the wing, hypopygium and distinctive male IIt. Parent described *Sciapus bimaculatus* (ANIC, examined) based on a male from

Advent Bay, Tasmania and a female from Narara, NSW and again figured the wing, hypopygium and distinctive male Ilt. Since Parent regarded the species as *Sciapus*, he must have overlooked Becker's same figures of this species considered as *Chrysosoma*. Hardy (1935) placed all these species in synonymy with *Heteropsilopus brevicornis*. (*Psilopus chrysurgus*, previously considered a junior synonym of *H. brevicornis*, and so listed in Bickel & Dyte, 1989, has since been examined and is now regarded as a synonym of *H. cingulipes*.)

Lectotype here designated for *Chrysosoma volucre*, male with the labels "N. Holl. 878 IV"/"Chr volucre det Becker"/"Type" [red label] (NHMV).

Additional material. New South Wales – Blackheath, Oct. 1930; Lake Cathie, near Port Macquarie, 26 Sept. 1981; Nadgee Nature Reserve, 29 Dec. 1985; Sydney, no date. South Australia – Seal Bay, Kangaroo Island, sand dunes, 4 Dec. 1977; 11 km north-west of Robe, litter under *Leucopogon* sp., no date; Robe, pitfall trap on dune, 14–18 Dec. 1978. Queensland – North Stradbroke Island, 7 km east of Dunwich, 22–24 Oct. 1990; Lake Broadwater, near Dalby, 25–26 Oct. 1986 (females only); Tasmania – Burnie, no date; Hobart, 25 Nov.–24 Dec. 1916; Asbestos Range National Park, 41°09'S 146°35'E, sand dunes behind Bakers Beach, 15 Jan. 1992. Victoria – Melbourne, no date; Cape Otway, 29 Nov. 1966; Cobram, 24 Dec. 1966. Western Australia – Frankland River, Circular Pool, 7 Nov. 1991; north-west of Dunsborough, 15 Nov. 1968; Nornalup, 17 Nov. 1958; Margaret River, 10 Nov. 1958, 24 Dec. 1970; Crawley, 26 Jan. 1935; Denmark, 25 Jan. 1935; Fremantle, 4 Dec. 1934; west of Watheroo, 4 Nov. 1958; Porongurups, 10 Dec. 1970; Cape LeGrande National Park, 11 Jan. 1987; Israelite Bay, 27 Dec. 1990 (34 males, 23 females examined, AMS, ANIC, MVM, SAM, BPBM, UQIC).

Description – male. Length: 7.5–8.5; wing: 7.5 x 3.0.

Head. Vertex, frons, face, clypeus metallic green and covered with dense silvery pruinosity; ocellar tubercle strong and projecting above dorsal eye surface; strong and weak postvertical setae present; lateral frons with some pale hairs (MSSC) but vertical seta absent; face with distinct mid-longitudinal ridge; palp and proboscis red-yellow; abundant pale hairs on ventral postcranium; antenna entirely red-yellow; pedicel with black dorsal and ventral apical setae; first flagellomere subtriangular; arista dorsoapical and one and one-half head height in length.

Thorax. Dorsum metallic green with bronze reflections, scutellum metallic blue, and both covered with brownish pruinosity; pleura with dense grey pruinosity; metepimeron yellow; setae black; 6 long, irregularly paired ac present; 7 dc present: 2 strong anterior and 2 strong posterior, between which are 3 weak hairs (MSSC); surface of dorsum also with additional non-paired supernumerary setae and hairs (MSSC); posteriormost pair dc offset laterally; 1 pa, 2 sa, 2 sr, 2 npl, 1 hm and 1 pm present; lateral scutellars reduced to weak hairs.

Legs. Coxae and legs yellow although CII infuscated and with grey pruinosity, and distal tarsomeres brown; CI and CII with pale anterior hairs, and CIII with pale lateral setae; I: 12.0; 14.5; 12.0/4.0/3.0/1.5/1.5; FI with

some long pale ventral setae; TI with ad-pd pair at one-eighth; II: 16.0; 18.0; 17.0/3.0/3.0/1.5/1.0; TII with ad-pd pair at one-eighth and 3 additional pd setae; Ilt₂ basally flattened with posterior comb of dark setae and produced into a dorsal curved beak (Fig. 53b) (MSSC); III: 20.0; 28.0; 13.0/5.0/4.0/2.0/1.0; TIII with 6–7 pd setae, ad seta at one-fifth, and 4 anterior setae; TIII without callus.

Wing (Fig. 123h). Hyaline with faint brown clouding around m-cu and M₁; M₁ somewhat converging with R₄₊₅; m-cu sinuate, with short external stub vein present or absent; lower calypter yellow with black rim and fan of pale setae; haltere yellow.

Abdomen. Metallic blue-green with grey pruinosity, and without matt brown bands on segments 2–6; terga 1–6 yellow ventrally and laterally; tergum 1 with yellow membrane; epandrium and cercus both yellow (Fig. 53a); epandrium subrectangular; hypandrial arm arising in distal half and extending to tip of surstylus; epandrial lobe with two bristles; surstylus with digitiform dorsal projection and pedicel bearing long seta; cercus elongate with yellow setae and apical group of black undulating setae.

Female. Similar to male except lacking MSSC and as noted: ocellar tubercle not as prominent and frons wider; strong black vertical seta present; face parallel sided, not expanded below eyes; 5–6 pairs ac and 5 pairs strong dc present; supernumerary thoracic setae absent; CI with 3 pale apical bristles; FI with 4 pale ventral setae; TII with 2 ad, 3 pv, and 2 pd; Ilt unmodified; wings sometimes without faint clouding; oviscapt with 4 spatulate setae.

Remarks. *Heteropsilopus brevicornis* is found in both inland and coastal habitats along the southern margin of the continent, from Stradbroke Island, Queensland, to Perth, Western Australia, including Tasmania (Fig. 54). The dense grey-brown pruinosity of this species is characteristic of many beach and dune flies, and many specimens were collected at such coastal sites. The females collected from the inland freshwater Lake Broadwater, Queensland, have the first flagellomere dark brown instead of the usual yellow.

Heteropsilopus brevicornis shares the distinctive beak-like projection of male Ilt₂ (MSSC) with *H. intermedius*.

Heteropsilopus intermedius n.sp.

Type material. HOLOTYPE male, PARATYPE female, South Australia, 34°21'S 139°31'E, Brookfield Conservation Park, 2 Dec. 1991–2 Jan. 1993, malaise trap 2, mallee, S. Stelman & S. Williams (ANIC).

Description – male. Length: 3.9; wing: 3.4 x 0.9; similar to *H. brevicornis* except as noted.

Head. Ocellar tubercle also strong; frons with single pale hair; (MSSC); palp and proboscis red-yellow; scape and pedicel yellow, first flagellomere dark brown; first

flagellomere subtriangular; arista dorsoapical.

Thorax. Dorsum metallic blue-green with bronze reflections, scutellum metallic blue, and both covered with grey pruinosity; pleura with dense grey pruinosity; metepimeron yellow; setae black; 3 pairs of short ac present; 5 dc present: 2 strong posterior and strong anterior setae, between which are 2 shorter setae (MSSC); thorax without supernumerary seta lateral scutellars reduced to weak pale hairs.

Legs. CI yellow; CII and CIII dark brown/green but CIII becoming yellow distally; remainder of legs yellow; femora ventrally bare; TI with short ad seta only at one-eighth; TII with ad-pd pair at one-eighth and short pd at half; IIt₁ is subapically bent, IIt₂ basally flattened with posterior comb of dark setae and produced into a dorsal curved beak which overhangs the succeeding tarsomeres (Fig. 53i) (MSSC); TIII with ad seta at one-fifth, and without callus.

Wing (Fig. 53j). Hyaline; m-cu straight; lower calypter yellow with black rim and fan of pale setae; haltere yellow.

Abdomen. Metallic blue-green with grey pruinosity, and with matt brown bands on segments 2-6; terga 1-2 mostly pale yellow except for mid-dorsal metallic green band; tergum 1 with yellow tergal window; epandrium and hypandrium dark brown, cercus yellow (not figured); cercus also elongate with black lateral setae and apical black undulating setae.

Female. Similar to male except lacking MSSC and as noted: ocellar tubercle not as prominent and frons wider; strong black vertical seta present; 4 strong dc present; CI with 3 pale apical bristles; IIt unmodified.

Remarks. *Heteropsilopus intermedius* is known only from the type locality in mallee habitat near the lower reaches of the Murray River, South Australia.

Chrysosoma Guérin-Ménéville

Chrysosoma Guérin-Ménéville, 1831: pl. 20 fig. 6. Type species *Chrysosoma fasciata* Guérin-Ménéville, 1831, by subsequent designation by Enderlein, 1912: 373.

Agonosoma Guérin-Ménéville, 1838: 293 ([unnecessary] replacement name for *Chrysosoma* Guérin-Ménéville), preoccupied by Laporte, 1832.

Margaritostylus Bigot, 1859: 215. Type species *Psilopus globifer* Wiedemann, 1830, by original designation.

Megistostylus Bigot, 1859: 215. Type species *Dolichopus crinicornis* Wiedemann (as *Psilopus crinicornis*), by original designation (syn. Bickel & Dyte, 1989).

Mesoblepharius Bigot, 1859: 215. Type species *Psilopus senegalensis* Macquart, 1834, by original designation.

Oariostylus Bigot, 1859: 215. Type species *Psilopus tuberculicornis* Macquart, 1855, by original designation.

Eudasyus Bigot, 1889: xxiv. Type species *Psilopus senegalensis* Macquart, 1834, by original designation.

Oariopherus Bigot, 1889: xxiv. Type species *Psilopus tuberculicornis* Macquart, 1855, by original designation.

Spathipsilopus Bigot, 1889: xxiv. Type species *Psilopus globifer* Wiedemann, 1830, by original designation.

Variostylus Bigot, 1890: 264 (*lapsus* for *Oariostylus* Bigot). *Spathipsilopus* Bigot, 1890: 268. Type species *Psilopus globifer* Wiedemann, 1830, by subsequent designation of Dyte, 1975: 213.

Kalocheta Becker, 1923: 41. Type species *Kalocheta passiva* Becker, 1923, by monotypy, **n.syn.**

Gnamptopsilopus, authors, not Aldrich.

Psilopus, authors, not Meigen.

Psilopodinus, authors, not Bigot.

Condyllostylus, authors, not Bigot.

Diagnosis. General. Often with relatively stout bodies and bristly legs; includes some of the largest Sciapodinae.

Head. Vertex strongly excavated in both sexes; strong postvertical seta present, in line with postocular series; male frons usually with group of fine setae (MSSC) (Fig. 62i) or with weak vertical seta (MSSC); female frons with strong vertical seta (Fig. 62j); face usually bulging in males (MSSC), flat in females; clypeus usually distinctly free from margin of eyes in male; adjacent or near eyes in female; male pedicel usually with long ventral and dorsal setae (Fig. 62g); first flagellomere of both sexes usually elongate isosceles triangular, symmetrical with distinctly apical arista; females occasionally with distinctly dorsal arista (eg. Fig. 62f,h); arista usually long, about two-thirds body length or longer in males (Fig. 59b), about half body length in females; male antenna often variously modified (MSSC): lanceolate apical arisal flag; arista and first flagellomere fused and basally flattened; and first flagellomere allantoid or sausage shaped, more than 3 times as long as wide.

Thorax. Mesoscutum often with matt brown or bronze stripes over ac band and laterally above notopleuron; ac developed as 3-5 strong pairs; male usually with 2 strong posterior dc and only weak hair-like dc anteriad (MSSC); female usually with 5 strong dc; male mesoscutum sometimes with unpaired supernumerary setae, often in main setal rows (MSSC); lateral scutellar setae vary in size from about two-thirds length of medians to weak hairs, or sometimes even lost; propleural seta absent.

Legs. CI sometimes with 3 strong black distolateral setae; FI usually with strong ventral setae in both sexes; TI usually with strong dorsal chaetotaxy, often species specific and sometimes sexually dimorphic; various modifications of male legs (MSSC): male It often somewhat swollen with pale ventral pile; male IIt₁₋₅ sometimes ornamented with crocheted hairs, banded or flattened tarsomeres, and male TIII sometimes with swollen callus which bears posterior slit-like excavation.

Wing. Usually hyaline but sometimes with brown maculations; male sometimes with costa bearing rows of modified short black curled av setae (MSSC); vein M₁ usually in long gentle curve to apex, and sometimes slightly convex or straight; never as sharply elbowed as in *Austrosapius* or *Condyllostylus*; crossvein m-cu usually sinuate, and varies from moderately sinuate (Fig. 124i) to weakly sinuate (Fig. 124e), but sometimes externally convex or bowed; if crossvein m-cu straight, it makes an acute angle with M (eg. Fig. 124h).

Abdomen. Male tergum and sternum 7 both well developed; epandrium subrectangular to subtriangular; hypandrium with narrow left lateral arm, arising beyond hypandrium midlength and extending just beyond apex of hypandrial hood; aedeagus with dorsal angle; epandrial lobe with 2 strong apical bristles; surstylus usually with large ventral lobe and digitiform dorsal projection, although variously modified; male cercus usually cleft or forked.

Remarks. The presence of an apical arista is the traditional key character used to separate *Chrysosoma* from other Sciapodinae. However, examination of the large heterogeneous assemblage under “*Chrysosoma*”, reveals that the apical arista alone is not a reliable character for generic placement. At least some species in all other major sciapodine genera (including typically “dorsal arista” genera) have independently evolved an apical arista, and had been incorrectly placed in *Chrysosoma* (see Morphology for extensive discussion of antennal structure).

As previously treated, *Chrysosoma* represented a evolutionary grade rather than a monophyletic taxon. In order to more clearly delimit *Chrysosoma*, species have been removed from the genus and referred variously to *Amblypsilopus*, *Condyllostylus*, *Heteropsilopus*, *Krakatauia*, *Parentia* and *Plagiozopelma*.

Chrysosoma in the restricted sense is confined to the humid Old World tropics, although *C. globiferum* occurs in what is regarded as Palearctic China. Apart from the possible historical introduction of *C. crinicornis* into Brazil, the genus is absent from the New World. *Chrysosoma* is well defined with respect to the Oriental and Australasian regions, which include the New Guinea type locality. However, the Afrotropical fauna is also rich, and although some groups are clearly related to the Oriental fauna, distinctive endemic groups and perhaps new genera remain to be delimited in what is now considered Afrotropical *Chrysosoma* (see Notes on Afrotropical *Chrysosoma* below).

The genus *Megistostylus* is regarded as a synonym of *Chrysosoma*. The genus was originally erected by Bigot for *Dolichopus crinicornis* (incorrectly regarded by Becker as a junior synonym of *Musca longicornis* Fabricius, thus the common usage *Megistostylus longicornis*), which has a remarkable male antenna, with the scape swollen and the first flagellomere fused with the arista, forming a flattened base from which the long curved arista arches back across the body (Fig. 62e). *Chrysosoma crinicornis* is very close to *C. proliciens*, and males have almost identical genitalia, wing structure and habitus. However, the male of *C. proliciens* has a characteristic *Chrysosoma* antenna with unmodified arista (Fig. 62g). Females of both species, in strong contrast to their males, have a similar distinctly dorsal arista (Fig. 62f,h), and are so close that they can only be distinguished by species-specific leg I chaetotaxy. Therefore, the modified antenna of *C. crinicornis* should be regarded as a MSSC only, and not grounds upon which to base a genus. Other members of the *proliciens* Group, such as *C. duplociliatum* and *C. lucare*, also

show a tendency towards flattening of the arista base and fusion with the first flagellomere.

Parent (1929a) broadened the concept of *Megistostylus* to include species with the first flagellomere and arista fused to form an apical style, globular scape, and only two scutellars. He included his new Oriental species *Megistostylus monilicornis* (= *Plagiozopelma nemocerum*) and referred some Afrotropical species to the genus. However, in later works, Parent described new Afrotropical species as *Chrysosoma* but noted the presence of a “*Megistostylus*-type antenna”. Additional Afrotropical species were described as *Megistostylus* by Vanschuytbroeck. These species bear no close relationship with *Chrysosoma crinicornis*. Although they were all referred to *Chrysosoma* by Dyte & Smith (1980), most are here newly placed in combination with *Plagiozopelma* (see Notes on Afrotropical *Plagiozopelma* and Notes on Afrotropical *Chrysosoma*).

The genus *Kalocheta*, with five species from central Africa, has a distinctive flattened and strap-like arista on both sexes. In all other characters, however, the genus is closely allied to *Chrysosoma*, in particular the *vittatum* Group, with which it shares a convex M_1 , similar wing maculation and comparable hypopygial form. *Kalocheta* is derived from *Chrysosoma* and provides another case of what originally was a MSSC (the strap-like arista) becoming incorporated into the female phenotype. I do not believe the group deserves separate generic status and here have placed *Kalocheta* in synonymy with *Chrysosoma*. The five included species constitute the *passiva* Group (see Notes on Afrotropical *Chrysosoma* for new combinations).

Chrysosoma is possibly derived from *Parentia*, an Australian Gondwanan genus which includes species having similar hypopygial structure, strong ventral femoral setae and MSSC (modified costal setae, TIII callus and IIt modification). The *Chrysosoma proliciens* Group (q.v.) has the closest ties with *Parentia*. However, *Chrysosoma* even still could be polyphyletic.

The Australian *Chrysosoma* fauna is essentially tropical (Fig. 12).

The Oriental and Australasian *Chrysosoma* Groups form the following associations, which are possibly monophyletic.

A. The *leucopogon*, *proliciens*, *arrogans* and *noumeanum* Groups are characterised by male lateral frons usually with abundant pale or sometimes black setae (MSSC), pedicel with single strong dorsal and ventral setae, first flagellomere elongate triangular in shape, and with apical arista almost equal to body length, FI with strong ventral setae, TI usually with strong dorsal chaetotaxy (usually species specific), It_1 often flattened (MSSC), and m-cu usually sinuate. The *leucopogon* and *proliciens* Groups are widely distributed across the Orient and Australasia, but major diversity centers on Sundaland and the Papuan subregion. The *arrogans* and *noumeanum* Groups are Melanesian.

B. The *lucigena*, *vittatum*, *aeneum* and *antennatum* Groups are characterised by rather large sized (body length greater than 5.0 mm), first flagellomere usually

relatively short and triangular with dorsoapical arista (at least in females), mesoscutum with matt bronze stripes, weak lateral scutellars, CI usually with three strong black distolateral setae, and wing with brown maculations. The *vittatum* Group is found in both the Oriental and Afrotropical regions but has not crossed Weber's Line. The Afrotropical *passiva* Group (= *Kalocheta*, see above) is undoubtedly derived from this

Group. The *lucigena*, *antennatum* and *aeneum* Groups are essentially Papuan.

C. The *lacteimicans* Group is characterised by lateral scutellars absent, CI with 3 black distolateral setae, femora bare, tibiae usually without major setae, TII and IIt often with short erect setae (MSSC), wing sometimes with sexually dimorphic maculation. The Group is confined to the central Pacific.

Key to Oriental and Australasian *Chrysosoma* Groups

The following key separates the major Oriental and Australasian *Chrysosoma* Groups. However, due to uncertain group limits and the diversity of the fauna, some species may not be accurately placed. [Also see Key to Australian *Chrysosoma* and Key to *Plagiozopelma* Groups; for a key to *Chrysosoma* species found in Micronesia, Polynesia, and Melanesia east of New Guinea, see Bickel (in press)].

1. Lateral scutellar setae reduced to weak hairs or lost; FI with only weak ventral setae 2
- Lateral scutellars strong, at least one-third length of median scutellars or, if weak, FI with strong ventral setae; TI often with strong dorsal and ventral setae; male TIII often with swollen callus and posterior slit in basal quarter 6
2. Small, body length less than 5.0; lateral scutellars usually absent; tibiae without major setae; TII and IIt sometimes with short erect setae (MSSC); male wing only sometimes with brown maculations, female wing always hyaline; cercus usually short and digitiform with ventrobasal projection (central Pacific) *lacteimicans* Group
- Body longer than 5 mm; lateral scutellars present as short hairs; tibiae usually with strong setae; male face usually strongly bulging; mesoscutum with matt bronze stripes over ac band and above notopleuron, It_{2-5} each relatively short; if wing maculated, then on both sexes 3
3. Male first flagellomere allantoid, more than 3 times as long as wide (Fig. 64b); FI without long ventral setae; It_{2-5} each relatively short, often appearing curled or swollen with ventral setae (MSSC) (Melanesia, Australia) *aeneum* Group
- Male first flagellomere usually short and triangular with dorsoapical arista; other characters variable 4
4. M_1 convex or straight; wing with dark brown maculation, continuous along anterior margin, with excavations from posterior margin; FI sometimes with long ventral setae; TI often with 2-3 long dorsal setae; cercus deeply cleft, arms often narrow and bandlike (Orient, Afrotropics) *vittatum* Group
- M_1 always concave (eg, Fig. 124d); wing maculations not as above 5
5. Both sexes with long black ventral and often anterior FI setae, and also with long black dorsal and ventral setae on TI and usually TII; wing maculations sexually dimorphic; male cercus short distal digitiform projection, and a ventral projection which bears a pointed median branch (western Melanesia) *lucigena* Group
- Legs without unusually long setae; wing maculation patterns similar on both sexes; male cercus usually forked (New Guinea) *antennatum* Group

6. Wing usually with subapical spot or clouding near costa; male costa usually with 1 or 2 rows of short black flattened setae; arista often distinctly dorsal in females; male It_1 never with pale ventral pile; male arista usually simple but sometimes fused with first flagellomere; cercus with short dorsal digitiform projection and large bilobed clavate ventral arm (Orient, Australasia)..... *proliciens* Group
- Wing hyaline or uniformly smokey; male costa never with flattened setae; arista usually apical in both sexes; male It_1 often with pale ventral pile; male arista sometimes with apical flag 7
7. Male TI without strong subapical ventral setae on TI; male It_1 not strongly flattened and without posterior row of curved setae; TIII often with swollen black swollen callus at one-fifth; TI usually with strong dorsal setae in both sexes (Orient, Australasia, Afrotropics)..... *leucopogon* Group
- Male TI with strong subapical ventral setae on TI; male It_1 strongly flattened with posterior row of curved setae; TIII sometimes with callus; TI often without strong dorsal setae 8
8. Male lateral frons with strong black vertical seta; wing hyaline (New Caledonia) *noumeanum* Group
- Male lateral frons with 1-2 pale setae; male wing sometimes with brown maculations (Melanesia)..... *arrogans* Group

Key to Male Australian *Chrysosoma*

1. FI yellow, FII and FIII black (Qld)
..... *C. diversicolor* (unrecognised, see *leucopogon* Group)
- Femora either mostly all yellow or mostly all black 2
2. Male first flagellomere allantoid (Fig. 64b); mesoscutum with bronze stripes over ac band and above notopleuron; CI with 3 strong black distolateral setae; wing with brown clouding along anterior margin between costa and R_{4+5} and over veins M_1 , M_2 and m-cu (Fig. 124i); (NT) *C. interruptum* (*aeneum* Group)
- Male first flagellomere triangular (Fig. 58b)..... 3
3. Male costa unmodified; TIII always with smooth black swollen callus at one-fifth, with posterior slit-like excavation; arista often with lanceolate apical flag; FI usually with 3-5 long pale ventral setae (northern Australia) *leucopogon* Group
- Male costa with 1 or 2 rows of short curled, somewhat flattened setae; TIII sometimes with posterior callus; wing in both sexes with subapical spot or clouding; arista apical in males, but often distinctly dorsal arista in females; male arista and first flagellomere sometimes fused and flattened (northern Australia) *proliciens* Group

The *leucopogon* Group

Diagnosis. *Head.* Lateral frons in males with pale hairs (MSSC), frons in female bare except for strong vertical seta; pedicel with single strong dorsal and ventral setae; first flagellomere elongate triangular in shape, and

with apical arista about two-thirds of body length (Fig. 59b); male arista often with flattened lanceolate apical flag (Fig. 59c) (MSSC).

Thorax. Three strong ac present; male with 2 strong posterior dc and 4 weak hair-like anterior dc (MSSC), female with 5-6 strong dc; lateral scutellar setae vary from strong to reduced and hairlike.

Legs. FI usually with 3-5 long pale ventral setae; TI usually with diagnostic strong dorsal and ventral setae, which are sometimes sexually dimorphic; male tarsus I often somewhat swollen with pale ventral pile (MSSC); male II_{1-5} sometimes ornamented with crocheted hairs, banded or flattened tarsomeres (MSSC); male TIII often with smooth black swollen callus at one-fifth, with posterior slit-like excavation (MSSC).

Wing. Crossvein m-cu slightly sinuate (Fig. 124d).

Abdomen. Hypandrial arm arising beyond midlength of hypandrium and extending almost to apex of aedeagus; surstylus usually with dorsoapical digitiform projection; male cercus usually forked.

Remarks. The large and complex *leucopogon* Group is found across the Old World tropics, but is particularly diverse in Australasia. The Group contains both common tramp species and derived insular endemics. Many distinct species await description, especially from the high islands of the western Pacific.

For convenience of identification, the Group has been divided into a number of assemblages. However, since the suites of characters defining these assemblages overlap, their limits are not always distinct. Indeed, sister taxa may have been placed in different assemblages owing to the lack of expression of a distinctive MSSC. For example, the distinctive male TIII callus is a strong apomorphy within the *leucopogon* Group. *Chrysosoma callosum* from Australia and *C. pacificum* from French Polynesia are almost identical except *C. pacificum* lacks the male TIII callus. The absence of this character could easily lead to the two species being considered phylogenetically distant. However, *C. pacificum* is probably derived from *C. callosum*, even though the TIII callus is not expressed in the phenotype. Thus the assemblages below may not be monophyletic since the mosaic pattern of character expression, especially MSSC, allows for various associations of species.

The *leucopogon* Group is very close to the *proliciens* Group (also most diverse in the western Pacific, especially the Papuan area) and such species as *C. leucopygum* and *C. pexum* could justifiably be placed in either group. As well, the *arrogans* Group (q.v.), separated here mainly on distinctive leg I chaetotaxy, is also close and not always distinct.

In Australia, the *leucopogon* Group occurs across the monsoonal North and along coastal Queensland, almost as far south as Brisbane. All four Australian species have a TIII callus (MSSC) and therefore belong to assemblage I. Of these, *C. leucopogon* is a widespread paleotropical species, while the other three are confined to Australia and New Guinea.

The *Chrysosoma leucopogon* Group includes the following species assemblages.

I. The following species have a posteriorly excavated swollen TIII callus at approximately one-fifth (MSSC) (also see the *arrogans* Group). A number of Micronesian species are described by Bickel (in press).

armillatum Bigot, 1890: 285. (*Psilopus*) (UMO, examined), Sri Lanka.

When Becker (1922a: 184) redescribed this species, he omitted mention of the very narrow white arisal flag (MSSC). The distinctive hypopygium is figured by Becker. I have seen an additional male from Colombo District: Negumbo (BMNH).

bearni Parent, 1935a: 364. (BMNH, examined) Sabah, Java, Sumatra, Thailand, Singapore.

Some specimens of *Chrysosoma bearni* in collections had been misidentified as *C. patelliferum*. *Chrysosoma bearni* is close to *C. globiferum* but has FI entirely black, and TI with three dorsal and two ventral setae (*C. globiferum* has FI distally yellow and TI with 3 dorsal setae only).

Additional records. Singapore (ZMUC), Thailand: River Kwai, Doi Suthep Pai, and Java: Bogor (ZMUC).

callosum Parent, 1929: 199. (MLUH, examined), Australia (Qld, NT).

complicatum Becker, 1922a: 159. (ZMHB, examined), Marshall Islands, Caroline Islands, Gilbert Islands, Wake Island, Ocean Island, Western Samoa, Tonga, Tuvalu, Fiji, Palmyra Island.

leucochirus Bezzi, 1928: 64. (BMNH, examined), Fiji (syn. Bickel & Dyte, 1989).

The description and genitalia of *C. complicatum* agree exactly with Bezzi's *C. leucochirus*. The white arisal apex is distinctively bent and digitiform, as figured in Bezzi. The white II_4 (MSSC) is similar to that developed on *C. leucopogon*. This species is characteristic of the Micronesian – western Polynesian fauna and is found on many isolated atolls (see Bickel, in press for records). Lectotype here designated: male, with labels "4.1, 94; Jaluit Steinbach S.G.; complicatum Beck. det Becker" (ZMHB).

compressum Becker, 1922a: 178. (ZSI, not seen), India, Nepal.

I have seen specimens of this distinctive and relatively small species from Nepal: Lothar, near Birganj, 140 m (CNC).

cordieri Parent, 1934b: 279. (*Chrysosoma*) (MHNP, examined, female only), Java.

Although only known from a badly damaged female, this species appears close to female *C. leucopogon*. FI has four long pale ventral setae, TI with two short dorsal in basal half followed by strong dorsal at half and strong ventral at two-thirds, and It_1 with short dorsal seta at half.

disparitarse Parent, 1935b: 66. (BMNH, examined), Solomon Islands.

nigricinctum Parent, 1941: 203. (BMNH, examined), Solomon Islands (syn. Bickel & Dyte, 1989).

The male holotypes of these species were examined together and are identical. TI has two to three short basal and two longer distal dorsal setae and two ventrals, It_1 has pale ventral pile and a strong dorsal seta at half, and the elongate II_4 is yellow with curved anterior setae (MSSC).

feriferum Lamb, 1929: 126. (BMNH, examined), Western Samoa, American Samoa, Tonga, Fiji.

liber Parent, 1932b: 293. (*Condylostylus*) (BMNH,

examined), Fiji (syn. Bickel & Dyte, 1989).

Chrysosoma ferriferum and *Condylostylus liber* are identical. Both have long pale setae on abdominal segments 7 and 8 (MSSC) and short erect setae on TII and It_1 , with a dorsal seta at base of TII (all MSSC).

Chrysosoma ferriferum is common in material from Fiji and Tonga (USNM, ZMUC, BPBM, BMNH). Some specimens in collections were mistakenly identified as *C. patelliferum*.

globiferum Wiedemann, 1830: 222. (*Psilopus*) (ZMUC?; types lost), China (Oriental and Palearctic), Hong Kong, Taiwan, Ryukyu Islands, Hawaiian Islands, Midway, Laysan and Kure Islands.

patellifer Grimshaw, 1901: 11. (*Gnamptopsilopus*), misidentified.

figuratum Becker, 1922a: 184. (NHMW, examined), Hong Kong, Taiwan (syn. Bickel & Dyte, 1989).

fraternum Van Duzee, 1933: 310. (USNM, examined), Hawaiian Islands, Midway, Laysan and Kure Islands (syn. Bickel & Dyte, 1989).

Wiedemann's account of *Psilopus globifer* from China consists of a comparison with *P. leucopogon*, and lacks the formal Latin description given to other species in the same work. The specimens he examined belonged to Dr von Trentepohl and should have been deposited at Copenhagen. However, they are not at ZMUC and are considered lost.

Schiner (1868: 215) redescribed what he thought was *P. globifer* based on specimens from Tahiti. Becker (1922a: 180) also considered these specimens to represent the species. Schiner's Tahiti specimens (NHMW, examined) are in fact *Chrysosoma pacificum*, an endemic Polynesian species which, nevertheless, is similar to *C. globiferum*.

Becker's *C. figuratum*, based on a syntype series of three males from Hong Kong (NHMW) and two males from Taiwan (TMB, lost), fits Wiedemann's description of *P. globifer*. There is only one specimen in the Hong Kong series with its arista apex intact, and it has the arista stuck to the body so that the flag is not readily apparent. Thus Becker's description of *C. figuratum* omits mention of the species' black apical flag which has a whitish tip and distinctive striated appearance. In all respects, the syntypes of *C. figuratum* are identical to the common Hawaiian *C. fraternum* and I regard both as synonyms of *C. globiferum*. The description and figures for *C. fraternum* in Hardy (1964: 232) accurately portray *C. globiferum*. The species has FI distally yellow and TI with 3 dorsal setae only. Additional records. Okinawa: Chizuka (USNM); Taiwan (MCZ). [Becker's (1922a: 178) description and figures for *C. patellifer*, which he misidentified from Taiwan specimens (TMB, lost), is probably that of *C. globiferum*.]

Neotype here designated for *Psilopus globifer* Wiedemann: male, bearing label "Chengtzu, China, Crampton" (USNM). (this locality is just Palearctic in terms of the arbitrary 30°N boundary set by the "Catalogue of Palaearctic Diptera").

Lectotype here designated for *Chrysosoma figuratum* Becker: male, with labels "frfld HonKong 1864"; Chr. figuratum Beck, det Becker" (NHMW).

leucopogon Wiedemann, 1824: 40. (*Dolichopus*) (NHMW, examined), widespread, including eastern coast of Africa, Madagascar, India, Sri Lanka, south-eastern Asia, Taiwan, Indonesia, the Indian Ocean islands of Aldabra, Reunion, Mauritius, Rodriguez, Seychelles and Cocos-Keeling, New Guinea, Belau, Australia (Qld, NT), New Caledonia (including Loyalty Islands), Samoan Islands and Tahiti.

apicalis Wiedemann, 1830: 227. (*Psilopus*) (NHMW, examined), Sumatra.

conicornis Macquart, 1846: 120. (*Psilopus*) (MHNP, examined), India.

curviseta Thomson, 1869: 508. (*Psilopus*) (NRS, examined, female only), Tahiti (syn. Bickel & Dyte, 1989).

loewi Enderlein, 1912: 378. (Warsaw, not seen), Taiwan.

snelli Curran, 1927: 5. (BMNH, examined), Zanzibar. Additional records. Western Samoa: Apia. Loyalty Islands: Ouvea. Thailand: Loey Province, Dan Sal (ZMUC). Viet Nam: Trang Bom, north-west of Saigon.

For discussion, see species section below.

nobile Parent, 1933a: 175. (BMNH, examined), Australia (NT, WA, Qld).

obscuripes Parent, 1934c: 117. (BMNH, examined), Solomon Islands, Papua New Guinea (Bougainville Island).

It_1 has a dorsal row of eight to ten evenly spaced capitate setae (MSSC). This species is confined to the Solomon Islands in the geographical sense. Additional records. Papua New Guinea: Bougainville. Solomon Islands: Guadalcanal (USNM), Santa Isabel and Kolombangarra (BMNH).

parvicucullatum Lamb, 1929: 129. (BMNH, examined), Western Samoa.

patelliferum Thomson, 1869: 507. (*Psilopus*) (NRS, examined), Guam.

macropus Thomson, 1869: 508. (*Psilopus*) (NRS, examined, female only), Guam (syn. Bickel & Dyte, 1989).

The male holotype of *Psilopus patellifer* and two female syntypes of *P. macropus* are from Guam. I have compared these types with additional specimens from Guam (BPBM) and they are male and female of the same local endemic species. I have not seen specimens from other Micronesian localities (BPBM) or elsewhere in the Pacific.

However, *C. patelliferum* has been widely misinterpreted and made the senior synonym of the following species: *Psilopus villipes* Rondani (now regarded as *nomen dubium*, q.v.), *P. patellatum* Wulp (q.v.) and *P. pilosulus*. As well, *P. noumeanum* (q.v.) was incorrectly placed in synonymy with *P. macropus*.

Additional confusion concerning *Chrysosoma patelliferum* arose from Becker's (1922a) inaccurate description and figures. He portrayed *C.*

patelliferum as having a black and white arisal flag whereas the flag is entirely white, as noted in Thomson's original description. As a result, there have been many misidentifications. The species was also misinterpreted by Wulp, de Meijere, Grimshaw, Bezzi and Parent. All published records of *C. patelliferum* outside of Guam should be disregarded.

Chrysosoma patelliferum is one of a number of species from the Orient and Western Pacific which have a white arisal flag. *Chrysosoma patelliferum* has the following features: male femora all black, female femora all yellow; arisal flag white, lanceolate; TI with two dorsal only; It_1 bare; TII_1 and III_1 covered with short erect setae (MSSC), and III_1 also with black ventral comb (MSSC).

provocans Parent, 1934b: 289. (BMNH, examined), Vanuatu.

This species is a common and distinctive element of the Vanuatu fauna. I have seen specimens from the following islands: Malekula, Espiritu Santo, Efate, Aore, Epi, Tanna, Erromango and Ambrym (USNM, BPBM, BMNH, AMS, ZMUC).

pseudocallosum n.sp. Australia (Qld, WA, NT), Papua New Guinea.

tuberculicorne Macquart, 1855: 104. (*Psilopus*) (UMO, examined), Marquesas Islands, Society Islands, Niue Island.

candidum Parent, 1932e: 872. (MHNP, examined), Tahiti (syn. Bickel & Dyte, 1989).

Parent described *C. candidum* based on a single male from Tahiti. He noted the black and white arisal flag and the striking white flattened annuli at the bases and apex of III_1 (MSSC) (leg III was missing from Parent's type). Also TI has a very long pv subapical seta (MSSC). I have seen males from Tahiti identified by Parent (BMNH), additional Tahiti specimens (ZMUC), and males from Niue Island (BPBM).

Macquart described *P. tuberculicornis* from a male taken in the Marquesas. His description agrees precisely with that of Parent's except that he claims that both legs II and III have large white annuli at the bases of the first and second tarsomeres. The holotype of *P. tuberculicornis* is badly moulded, soiled and damaged, missing its head, abdomen and all legs except right leg I. I doubt that leg III has these rings. I know of no other instance in the Group where tarsus III is ornamented in the male, whereas tarsus II is often modified. I believe that Macquart mistook one of the legs II for leg III and consider the two species identical.

II. The following species lack a male TIII callus. This assemblage is divided into eight sub-assemblages, labelled A-H.

A. These species are similar in most characters (hypopygial structure, apical arisal flags, leg chaetotaxy, etc.) to species in assemblage I (above). In some cases, the most closely related species to a callus-bearer is a species lacking a callus (eg, *C. callosum* and *C.*

pacificum).

ceramense de Meijere, 1913a: 55. (*Psilopus*) (ZMUA, examined), Maluku (Seram).

This species is possibly conspecific with *C. meijeri*. Their hypopygia are almost identical, but they differ at least in the colour of setae on the lower calypter.

Lectotype here designated: male, with label "Ceram, 22-II/Merv. de Beaufort, leg 1910".

leucopygum de Meijere, 1906: 82. (*Agonosoma*) (ZMUA, examined), Irian Jaya, Papua New Guinea.

See *C. maculiventris*, below.

ludens Parent, 1935b: 70. (BMNH, examined), Solomon Islands, Papua New Guinea, Marshall Islands.

The cercus of male *C. ludens* consists of two parallel setose arms and veins M_1 and R_{4+5} are almost joined at the wing apex. The male arista is simple and male TI has three dorsal setae and a strong ventral subapical seta.

Additional records. Solomon Islands: Guadalcanal (USNM). Marshall Islands (USNM, BPBM). Papua New Guinea: Loloata Island, Central Province (PNGK); Laing Island, Madang Province (ISRN). Torricelli Mountains (SAM); New Britain, Fullern Harbour, mangroves (AMS).

maculiventris Parent, 1935b: 71. (BMNH, examined), Solomon Islands.

leucopygum sensu Parent, 1934b: 286 [nec. de Meijere, 1906: 82] (BMNH, examined), Solomon Islands (syn. Bickel & Dyte, 1989).

The single male holotype of *Chrysosoma maculiventris* is badly damaged, missing its antennae and abdomen. It is however identical to a Solomon Islands specimen regarded as *C. leucopygum* by Parent. I am unable to determine if the Solomon Island specimens are conspecific with New Guinea *C. leucopygum* and prefer to regard them as separate species.

meijeri Parent, 1932f: 349. (ZMUA, examined), Maluku (Buru), Sabah.

See discussion under *C. ceramense*.

mutilatum Parent, 1935b: 72. (BMNH, examined), Solomon Islands, Caroline Islands.

The single male holotype lacks its postabdomen but is identifiable through the totally black legs and other features of Parent's description: arisal flag black, palp and proboscis black, TII_1 and III_1 with short porrect setae. I have seen additional males from Guadalcanal (USNM) and the Caroline Islands (BPBM).

nigrohalteratum Parent, 1939a: 161. (ANIC, examined), Papua New Guinea.

Additional records. Papua New Guinea: Maprik (ANIC).

nudifrons de Meijere, 1910: 96. (*Agonosoma*) (ZMUA, examined), Indonesia (Krakatau).

The arista has a very narrow white apical flag. Lectotype here designated: male, with label "E. Jacobson, Krakatau, Mei 1909".

pacificum Parent, 1930a: 113; (figures) Parent, 1932a: 166, (MHNP, examined), Society Islands.

globifer Schiner, 1868: 215, misidentified.

This species is almost identical to *C. callosum*

(Assemblage I), except it lacks the TIII callus.

patellatum Wulp, 1881: 27. (*Psilopus*) (ZMUA?, RMNL?, not found and possibly lost), Sumatra, Java, **n.status**.

pilosulus Wulp, 1884: 226. (*Psilopus*) (ZMUA, examined), Java.

I was unable to locate any types of *Psilopus patellatum*. De Meijere (1910: 88) regarded *P. patellatum* as a variety of *Psilopus patellifer* Thomson and also placed Wulp's *P. pilosulus* in synonymy. He also redescribed and figured a male syntype of *P. pilosulus* (at ZMUA and apparently the only surviving syntype; the remaining syntypes, supposedly at RMNL, could not be located).

I have not seen additional specimens of *Chrysosoma patellatum*.

Lectotype here designated for *Psilopus pilosulus*: male, with the label "Java" (ZMUA).

pexum Becker, 1922a: 173. (TMB, lost), Papua New Guinea.

pexoides Parent, 1939a: 161. (ANIC, examined), Papua New Guinea (syn. Bickel & Dyte, 1989).

When Parent described *Chrysosoma pexoides* from a male taken at Wau, Papua New Guinea, he realised it was close to *C. pexum*. I have seen long series of what must be regarded as *C. pexum* from Wau, Chimbu River and Baiyer River (AMS, ANIC) and it is a common New Guinea species. I regard the two species as conspecific.

Regarding Parent's points distinguishing *C. pexoides* from *C. pexum*: i) the description of arisal length varies among authors, and in comparing with body length, an arista which is "as long as the entire body" would only reach beyond the thorax when curving back over the body from the antenna; ii) colour of TIII is variable among specimens, from yellow to brownish; Parent's single male *C. pexoides* has yellowish TIII, but incipient infuscation is evident; iii) Becker's hypopygium figure is somewhat rough, but it represents Parent's *C. pexoides*; iv) Becker's description of the distinctive male FI ventral setae fits the *C. pexoides* holotype. This diagnostic FI setation consists of a strong black basal av-pv pair from which av and pv rows of shorter setae continue to half.

Chrysosoma pexum has a black and white apical arisal flag. It is close to *C. leucopygum* in genitalic structure and presence of weak costal cilia.

Neotype here designated for *Chrysosoma pexum*: male, with label "New Guinea, Chimbu River, Kundiawa, 27-iii-1964, D.H. Colless" (ANIC).

piriforme Becker, 1922a: 161. (ZMHB, examined), Taiwan.

TI has two strong dorsal setae in the basal half, which are much stouter in the female than male. Lectotype here designated for *Chrysosoma piriforme*: male, with label "Formosa Sauter/Kankau 1908 x" (ZMHB).

B. The following six species have a narrow lanceolate arisal flag, M1 and R₄₊₅ joined at the wing apex, and

usually an unbranched cercus with a shallow apical fork. They are confined to Sundaland, the Philippines and New Guinea.

annuliferum Frey, 1924: 119. (ZMH, examined), Philippines, Sabah.

Parent (1935a: 359) accurately redescribed this species. *Chrysosoma annuliferum* and the following species, *C. annulitarse* are close, and have a similar white-banded IIt (MSSC). *Chrysosoma annuliferum* has an elongate tapering cercus, in contrast to other members of the assemblage.

annulitarse Parent, 1935a: 360. (BMNH, examined), Sabah, Sarawak.

I have seen a male of this distinctive species from Sarawak: First Division, Santubong (BMNH).

cautum Parent, 1935a: 366. (BMNH, examined), Sabah.

fissum Becker, 1922a: 180. (TMB, lost), Singapore.

saonekense de Meijere, 1913a: 56. (*Psilopus*) (ZMUA, examined). Irian Jaya (Saonek Island), Maluku; Papua New Guinea.

atripes Parent, 1934b: 278. (ZMUH, lost), Maluku (Key Islands) (syn. Bickel & Dyte, 1989).

The descriptions of these two species agree in every detail (de Meijere's 1913b paper had been overlooked by Parent). The legs are entirely black, TII is covered with short erect hairs (MSSC), and It₁ is slightly flattened with a posterior row of setae (MSSC).

Additional records. Papua New Guinea: Gusap, Madang Province. (PNGK); Maprik (ANIC).

schistellum Frey, 1924: 123. (ZMH, examined), Philippines, Borneo.

This species has a very narrow arisal flag.

Additional records. Philippines specimens: Manilla (MCZ) and Los Banos, Luzon (USNM).

C. The following species have similar truncated cerci, TI with dorsal setae, and It₁ slightly flattened. They are confined to the Philippines and Sundaland and are possibly related to assemblage IIB (above).

biseriatum Parent, 1932b: 104. (MLUH, examined), Indonesia (Flores, Lombok, Sumbawa).

The wing figure in Parent's description is inaccurate. The wings on the holotype are crumpled and folded, but clearly m-cu is sinuous. It₁ is flattened in basal half and TI has two strong dorsals and a strong ventral preapical. As noted by Parent, this species is close to *C. setosum*.

chrysoleucum Frey, 1924: 119. (ZMH, examined), Philippines.

Chrysosoma chrysoleucum is very close to *C. fusiforme*, both have similar truncated clavate cerci and a black and white lanceolate arisal flag. However, the femora of *C. chrysoleucum* are yellow, while those of *C. fusiforme* are black.

fstulatum Frey, 1924: 120. (ZMH, examined), Philippines.

This species is close to *C. chrysoleucum* but has a more deeply cleft cercus. The distal half of It₁ is flattened.

fusiforme Frey, 1924: 122. (ZMH, examined), Philippines.

See discussion under *C. chrysoleucum*.

marki Hollis, 1964a: 241. (ZMUA, examined), Sumatra.

philippinense Frey, 1924: 122. (ZMH, examined), Philippines.

Chrysosoma philippinense has black legs and lacks an arisal flag.

setosum Wulp, 1891: 202. (*Psilopus*) (ZMUA, examined), Java.

This species was originally described from a female. De Meijere (1914: 81) described the male. All femora are yellow.

Additional records. Male, Java: Djakarta (USNM).

simalurense de Meijere, 1916: 25. (*Psilopus*) (ZMUA, examined), Indonesia (Simalue Island).

This species has an apical arisal flag.

This specific name takes priority over the subspecific name *simularensis* used by de Meijere on the same page for a subspecies of *Psilopus vittatus* (= *Chrysosoma vittatum*, q.v.).

D. The following two Sundaland species have bright orientated silvery pruinosity on the abdomen (MSSC), especially evident in anterior view. Both species have somewhat elongate setae on ventral FI, dorsal TI and dorsal TII, and therefore are close to Assemblage IIF.

argenteomicans Parent, 1935a: 194. (BMNH, examined), West Malaysia.

Only the lower face and clypeus are densely pruinose. A series from Fraser's Hill (BMNH) is similar in all respects and possibly conspecific, except the coxae and femora are distinctly brown.

argentinoides Hollis, 1964a: 240. (ZMUA, examined), Sumatra.

The frons, face and clypeus are completely covered in dense silvery pruinosity.

E. The species of this assemblage have smokey or infuscated wings, and some males have lanceolate arisal flags. The white contrasting tarsomeres on leg II of *C. cinctitarse* (MSSC) are similar to species close to *C. leucopogon* (Assemblage I). Both sexes have long setae ventrally on FI, sometimes on FII, and dorsally on TI and TII. These long leg setae are similar to those of Assemblage IIE (above) and to those of the Papuan *lucigena* Group. The two species are found in Sundaland and the Philippines.

cinctitarse de Meijere, 1913a: 84. (*Psilopus*) (ZMUA, examined), Java, Sumatra.

This species is close to *C. spiniferum* but has white hair on IIt_{3-4} which contrasts with the remaining black tarsomeres (MSSC), it and lacks an arisal flag. Specimens from Sumatra: Gunung Singgalung (ZMUA) identified by Hollis (1964a: 239) as *C. persplendidum* are in fact *C. cinctitarse*.

A closely related undescribed species from Thailand: Talum (BMNH) has similar IIt but a different cercus.

An additional undescribed species from West Malaysia: Laurat Hills (BMNH) has similar IIt but also a white arisal flag.

Lectotype here designated for *Psilopus cinctitarsis*: male, with label "E. Jacobson, Nongkodjadjar, Java, Jan., 1911".

spiniferum Wulp, 1896: 101. (*Psilopus*) (ZMUA?, not

seen), Java, Sumatra.

persplendidum Frey, 1934: 321. (Basel, not seen; syntype ZMH examined), Java, **n.syn.**

I have not been able to locate the types of *Psilopus spinifer* but have examined the specimens (ZMUA) redescribed by de Meijere (1910: 98). Although Frey's description of *Chrysosoma persplendidum* omits any mention of an arisal flag, a male syntype from Tjisaroea (1 of 2 males mentioned in Frey's description) has a white lanceolate apical flag and is identical in all respects to *C. spinifer* as redescribed and figured by de Meijere.

Additional records. Java: Tjibodas (USNM, ZMUC) and Mount Gede (BMNH); Sumatra: Brastagi (USNM).

F. The following species have dense cream-coloured modified setae along the venter of abdominal segments 1 to 5 (MSSC). As well, all have black halteres and lower calypters and two to four long black basoventral setae on FI.

floccosum Becker, 1922a: 184. (ZMHB, examined), Taiwan, Sabah, Sarawak, West Malaysia.

interrogatum Becker, 1924: 129. (DEI, examined), Taiwan, **n.syn.**

pseudofloccosum Parent, 1935a: 434. (BMNH, examined), Sabah, **n.syn.**

The types of *C. floccosum* and *C. interrogatum* were examined together and they are identical. The abdominal venter of the single *C. interrogatum* type was eaten away by pests such that the distinctive cream-coloured setae were absent. The description of *C. pseudofloccosum* is identical in all respects to the types of *C. floccosum*, and Parent's figures more accurately represent the species. FI has two long pale basoventral setae, and TI has three dorsal setae in the basal half, the third being very long. Also, abdominal segments 1 to 6, especially segments 5 and 6, have silvery pruinosity.

Additional records. Sarawak: First Division, Santubong and West Malaysia: Kuala Lumpur (BMNH).

A related undescribed species, but with a distinctly different cercus is from the Philippines: Mindanao (USNM).

Lectotype here designated for *Chrysosoma floccosum*: male, with label "Formosa Sauter/Kankau 1908 vii" (ZMHB).

hirtiventris de Meijere, 1924: 16. (*Psilopus*) (ZMUA, examined), Sumatra.

This species has totally black legs and TI with three dorsal setae.

I have seen a related undescribed species, which is possibly conspecific, with only two dorsals, from the Philippines: Sibuyan, San Fernando (BMNH).

seticorne Walker, 1864: 29. (*Psilopus*) (BMNH, examined), Maluku (Seram).

Parent (1934a: 29) redescribed this species.

An undescribed species from Sulawesi (BMNH) is very close but lacks the pale ventral abdominal modified hairs.

G. The following two dark coloured species have a similar lobate distal cercus with a basoventral projection.

excitatum Frey, 1924: 120. (ZMH, examined), Philippines (Luzon and Sibuyan).

The male TI has three long dorsals in basal half while the female also has an additional long ventral.

Additional records. Luzon: Mount Malindang, Misamis Occidental (1000 m); Cabadbaran, Augustan del Norte; Mount Makling (USNM). Sibuyan: San Fernando (BMNH);

A closely related undescribed species with entirely black femora and long black setae on the cercus occurs on Mindanao: Mount Apo (MCZ) and Puerto Galero (CNC).

Another related undescribed species is from

“East Borneo” (BMNH).

lofokiana Hollis, 1964a: 244. (ZMUA, examined), Sumatra, West Malaysia.

This species is close to *C. excitatum* but distinctive. Both have a similar dark colour and lobate distal cercus.

Additional records. West Malaysia: Bentong Pass; Genting Highlands (AMS). Selangor: Bukit Kutu. Sabah: Mount Kinabalu (BMNH).

H. Unrecognised species.

diversicolor Parent 1928: 197. (ZMHB, lost), Australia (Qld).

See species discussion, below.

Key to Australian Males of the *Chrysosoma leucopogon* Group

1. FI yellow, FII and FIII black (Qld) *C. diversicolor*
 — All femora mostly black 2
2. Arista simple, without apical flag; $\text{II}t_{1-3}$ with curved av setae 3
 — Arista with lanceolate apical flag; $\text{II}t_{1-5}$ without curved av setae 4
3. $\text{II}t_{4-5}$ with flattened white setae; tergum 7 without distinctive seta; cercus with 2 short thick subequal arms (Fig. 58e) (Old World tropics, Qld, NT) *C. leucopogon*
 — $\text{II}t_{4-5}$ normal; tergum 7 with long curved subapical setae; cercus with 2 narrow arms, the ventral arm bearing distinctive pedunculate blade-like seta (Fig. 58c) (NT, WA) *C. nobile*
4. TI with long pv at two-thirds, and short weak pv at four-fifths; cercus with bulging, densely setose base and elongate ventral arm with setae as figured (Fig. 59a) (Qld, NT) *C. callosum*
 — TI single strong pv at four-fifths; cercus not bulging basally, and with distinctive blunt subapical blade-like seta (Fig. 59d) (NT, Qld, WA, Papua New Guinea) *C. pseudocallosum*

Chrysosoma nobile Parent

Chrysosoma nobile Parent, 1933a: 175.

Type material. Parent described *Chrysosoma nobile* from specimens collected from the Crocodile Islands, NT (BMNH, examined).

Additional material. Northern Territory – Wessel Islands, Rimbija Island, 11°01'S 136°45'E, 15 Jan.-14 Feb. 1967; Darwin, Casurina Point Reserve, coastal monsoon forest, 22 Oct. 1972, 14 Jan. 1992 (AMS). Queensland – (female only) Torres Strait, Prince of Wales Island, 20-30 May 1969 (MVM). Western Australia – Millstream, 22-25 Oct. 1970, 8 Apr. 1970 (21 males, 26 females, ANIC except where noted).

Description – male. Length: 5.0; wing: 4.3 x 1.4. **Head.** Frons and clypeus metallic blue-green with

dusting of pruinosity; lateral frons with 4-5 pale hairs (MSSC); face bulging with flexion at frontoclypeal suture (MSSC) (Fig. 58a); palp yellow with black setae; proboscis yellowish; antenna black (Fig. 58b); first flagellomere tapering; arista black, simple, and about two-thirds body length.

Thorax. Dorsum metallic blue-green with some pruinosity; 1 pa, 2 sa (anterior seta weak), 2 sr, 2 npl, 1 weak hm, 1 strong pm present; lateral scutellars about one-third length of medians.

Legs. Coxae, femora, It_{2-5} , $\text{II}t_{2-5}$ and $\text{III}t$ black; femoral ‘knees’ I and II, tibiae, It_1 and $\text{II}t_2$ yellow; CI and CII with pale anterior setae; CIII with tuft of pale lateral setae; I: 8.5; 8.0; 5.0/2.0/1.2/1.0/1.0; FI with 2 long pale basal and 5 black distal ventral setae; TI with dorsal setae at one-eighth, one-quarter and half, and strong ventral at two-thirds; It_1 with whitish ventral pile (MSSC); II: 9.5; 12.0; 13.0/3.0/2.0/1.0/1.0; TII with

strong ad setae at one-sixth, half and with ventrals at one-fifth (long) and three-quarters (short); IIt_1 long, with 13-15 long curved av setae, continuing along $IIt_{2.5}$ as dense short crocheted hairs (MSSC); III : 12.0; 15.0; 8.0/4.0/2.5/1.2/1.0; $TIIt$ with black callus at one-fifth, smooth but excavated on posterior surface (MSSC); $IIIt_1$ basoventrally with tuft of 5-6 pale curled setae (MSSC).

Wing. Hyaline (similar to Fig. 124d): M_1 gradually arching to apex; M_2 reaching margin as fold; lower calypter yellow with dark brown rim, and with fan of pale setae; haltere pale yellow.

Abdomen. Metallic blue-green with matt brown bands at tergal overlap and with silvery pruinosity laterally; margin of tergum with long black setae; short black and pale setae present laterally and ventrally; peduncle with well-developed tergum 7 bearing strong curved subapical bristle and with reduced sternum 7 (Fig. 58d); hypopygium entirely dark brown (Fig. 58c); 1 or 2 strong epandrial setae present; epandrial lobe with strong apical bristle and shorter subapical bristle; surstylus with dorsoapical hook subtended ventrally by strong apical setae; cercus forked with shorter dorsal arm bearing 2 strong apical setae and longer ventral arm with long external seta at one-third, blade-like seta on long peduncle at half, seta on short peduncle at two-thirds and strong apical seta.

Female. Similar to male but lacking MSSC; strong vertical seta present; with 2 strong posterior dc and 3-4 strong but shorter dc anteriorly; femora mostly black, although FI yellow in distal third; TI with 3 long, strong dorsals and 2 strong ventrals (not 1 as in male); IIt_1 without curved setae but with 2 dorsals; $TIIt$ with offset ad-pd pair at one-fifth and 1 dorsal at two-thirds.

Remarks. *Chrysosoma nobile* is found in tropical northern Australia, from the Fortescue River, Western Australia to Arnhem Land, Northern Territory, and possibly the Torres Strait Islands.

Female *C. nobile* have mostly black femora, while in

all other Australian *leucopogon* Group species, female femora are yellow.

Chrysosoma leucopogon (Wiedemann)

Dolichopus leucopogon Wiedemann, 1824: 40.

Psilopus apicalis Wiedemann, 1830: 227.

Psilopus conicornis Macquart, 1846: 120.

Psilopus curviseta Thomson, 1869: 508 (syn. Bickel & Dyte, 1989).

Chrysosoma loewi Enderlein, 1912: 378.

Chrysosoma snelli Curran, 1927: 5.

Type material. Wiedemann described *Dolichopus leucopogon* from two male syntypes taken in "India orient" (ZMUC and NHMW, examined). The synonymies of *Psilopus apicalis* from Sumatra, (NHMW, examined), *Psilopus conicornis* from India (MHNP, examined) and *Chrysosoma lowei* from Taiwan (Warsaw, not seen) with *Chrysosoma leucopogon* are discussed in Becker, 1922a. *Psilopus curviseta*, based on a single female from Tahiti (NRS, examined), has the colouration and leg I chaetotaxy characteristic of *C. leucopogon* females. *Chrysosoma snelli* from Zanzibar (BMNH, examined) was placed in synonymy by Dyte (1975).

Lectotype here designated for *Dolichopus leucopogon* Wiedemann: male, bearing label "Dolichopus leucopogon West, Ind. or." (NHMW).

Additional material. Northern Territory – Boroalba Creek Springs, north-east of Mount Cahill, 17 Nov. 1972 (ANIC); Kakadu National Park, Ubir Rock, 9 May 1987, monsoonal forest (AMS). Queensland – Atherton, CSIRO, 15 Jan. 1988; Big Mitchell Creek, Mareeba-Molloy Road, 6 May 1967; Ayr, 4 Sept. 1950; Watalgan, via Rosedale, dense vine scrub, 21 May 1974 (all ANIC); Townsville, Cairns, Heron Island, Capricorn Island, Kuranda (BMNH); Brisbane, 25 Oct. 1953 (CNC); Waterpark Creek, near Byfield, 2 Dec. 1992 (AMS); Buderim Mountains, near Wooloolah, Dec. 1889 (NSWA); Hoskyn Island, 23°47'S 152°18'E, 23-30 Aug. 1980 (UQIC). Cocos-Keeling Islands – West Island, South Island, Horsburgh Islands, 26-29 May 1952, 19-23 Nov. 1964 (ANIC). Christmas Island – various locales, Apr. 1989 (ANIC).

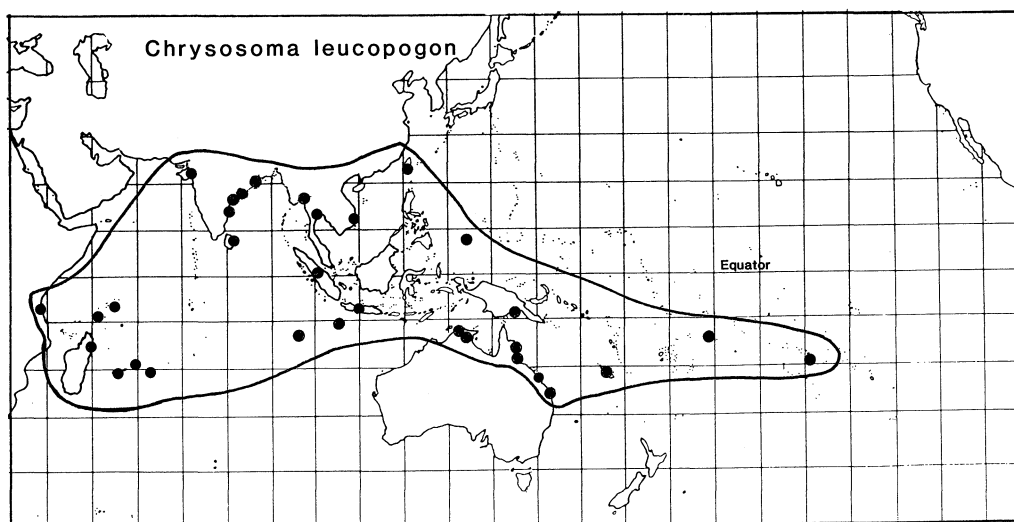


Fig. 57. Distribution, *Chrysosoma leucopogon*.

Description – male. Length: 5.9-6.1; wing: 6.0 x 2.0; similar to *C. nobile* except as noted.

Leg. Coxae, femora, It_{2-5} , IIt_{2-5} , III black; 'knees' I and II, tibiae, It_1 and IIt_2 yellow; podomere ratios similar except It_1 almost as long as TI ; TI with 3-4 black dorsals of somewhat variable development but lacking ventral setae; It_1 dorsally bare, and without whitish ventral pile; IIt_1 mostly yellow but white in distal fifth, and with row of curved av setae; IIt_{2-3} black, with crocheted setae (MSSC); IIt_{4-5} distinctive, with

flattened white hairs forming distinct dorsal crest (MSSC); TI with black callus (MSSC); III basoventrally with tuft of pale curled hairs.

Abdomen. Tergum 7 without strong curved subapical seta; hypopygium (Fig. 58e); surstylus without strong apical seta; cercus with long base and subequal dorsal and ventral arms; dorsal arm with 2 long apical setae and with dense whitish pubescence; ventral arm with 3 strong apical setae subtended by stout curved apical seta, external seta-bearing prominence,

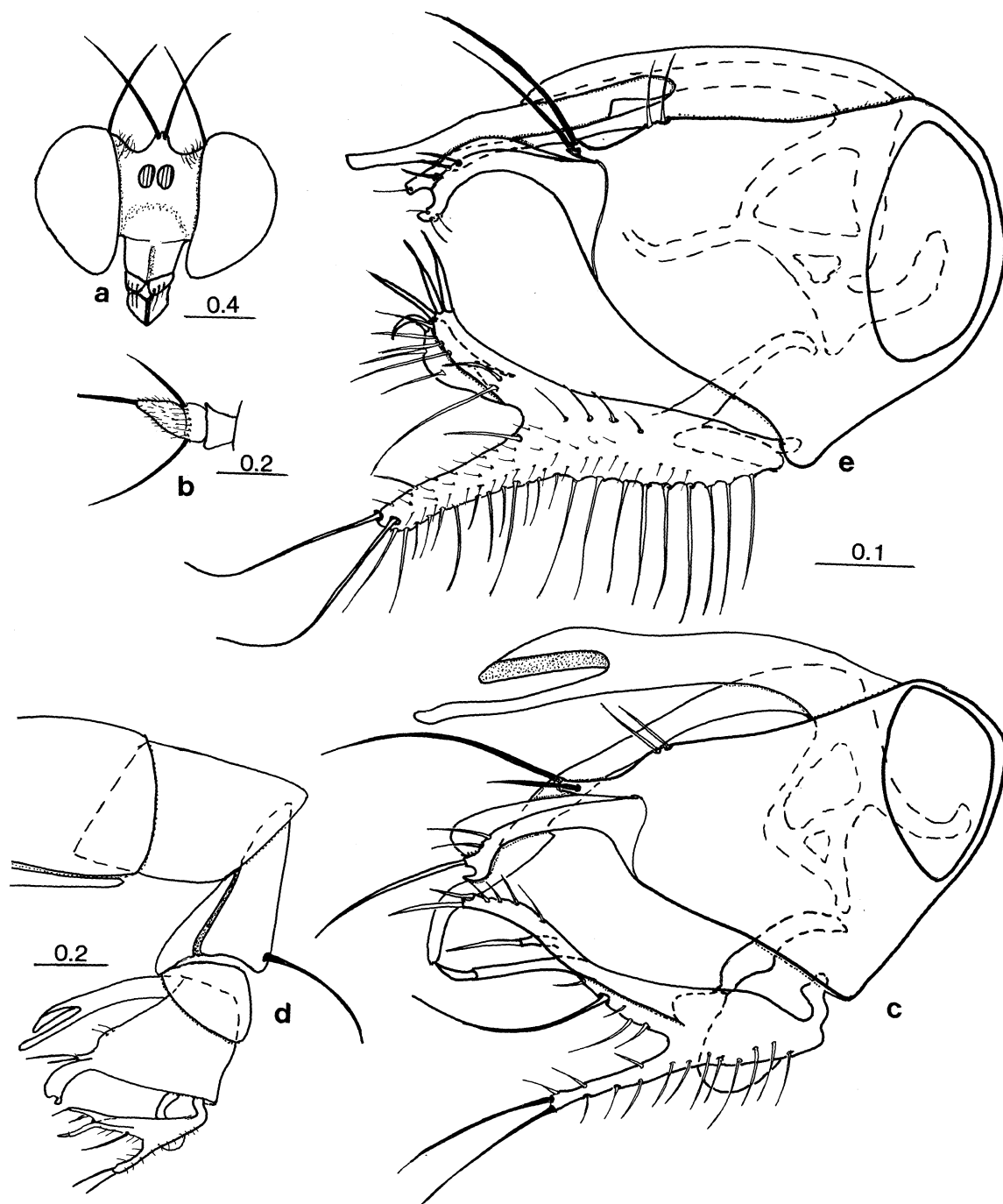


Fig. 58. *Chrysosoma nobile*, Wessel Islands, NT: a – male head, anterior; b – male antenna, left lateral; c – hypopygium, left lateral; d – male postabdomen, left lateral. *C. leucopogon*, Watalgan, Qld: e – hypopygium, left lateral.

and median projection.

Female. Similar to male except lacking MSSC and as noted: CI sometimes yellow anterodistally; all femora yellow; TI with 3 strong dorsal and 2 strong ventral setae; It_1 with 2 strong dorsal setae; TII with 2 strong av and 3 strong ventrals; TIII with offset ad-pd pair at one-fifth and strong dorsal at two-thirds.

Remarks. *Chrysosoma leucopogon* is a widespread paleotropical species whose distribution includes the eastern African coast, Madagascar, India, Sri Lanka, south-eastern Asia, Taiwan, Indonesia, various Indian Ocean islands (Aldabra, Reunion, Mauritius, Rodriguez, Seychelles, Cocos-Keeling and Christmas), New Guinea, Belau, Australia, New Caledonia, Samoa and Tahiti (Fig. 57). In Australia, it is found in Arnhem Land and along the Queensland coast as far south as Brisbane. This species is often extraordinarily abundant, and thousands of specimens were taken in malaise traps set on Christmas Island in April, 1989.

Chrysosoma leucopogon is distinctive and fairly constant in morphology across its entire range. Some intraspecific variation is evident in body length, density of pubescence on the cercus, and length and development of male Ilt crocheted hairs. The leg I chaetotaxy is also somewhat variable, with the male TI and It_1 setae varying somewhat in number and strength. Queensland males have slightly longer Ilt crocheted hairs than Oriental specimens. However, none of this variation is sufficient to warrant designation of additional species since such variation may be present within a local series or even between the right and left legs of the same individual.

Chrysosoma callosum Parent

Chrysosoma callosum Parent, 1929: 199.

Type material. Parent described *Chrysosoma callosum* from a male taken in Queensland (MLUH, examined).

Additional material. Northern Territory – Darwin, 2 Mar. 1954, 22 Oct. 1973; Brock's Creek, Burnside Station, 25 Apr. 1952; East Alligator River, 7 June 1973; East Point, 1-31 May 1976. Queensland – Torres Strait, Yorke Island, 22 Mar. 1984; Claudie River, Iron Range, 28-30 May 1960; 10 Sept.-1 Nov. 1974; Lake Placid, near Cairns, 24 May 1958; north-north-east of Coen, 4 Nov. 1979; Mount Webb National Park, 28 Apr. 1981, 28 Sept.-3 Oct. 1980; Mount Cook National Park, 10 May 1981; Shipton's Flat, 15°47'S 145°14'E, 18 May 1981, 19 Oct. 1981; Babinda, no date; Bingil Bay, 17°50'S 146°06'E, 29 Aug. 1977; Upper Mulgrave River, Goldsborough River, 9 May 1967; Little Fork, Annan River, 15°49'S 149°14'E, 19 Oct. 1980; near Mount Finnigan, 15 Oct. 1980; Hope Vale Mission, 15°16'S 144°59'E, 9 Oct. 1980; Bamboo Creek, north of Mossman, 25 Apr. 1967; Palm Island, no date; Townsville, 29 Apr. 1968, 22 May 1988; Dunk Island, 25 July 1927; Samford, 2 June 1960; Kuranda; Redlynch 10-17 Aug. 1938; Heathlands, 11°45'S 142°35'E, Heathlands, 18-20 July 1992; Batavia Downs, 12°41'S 142°41'E, 22 June-23 July 1992 (53 males, 48 females examined, AMS, ANIC, BMNH, UQIC, QDPI).

Description – male. Length: 5.4-5.6; wing: 4.7 x 1.6 (Fig. 59b); similar to *C. nobile* except as noted.

Head. Vertex, frons bright metallic blue-green; lateral frons with pale hairs (MSSC); first flagellomere elongate, tapering; arista long, about two-thirds body length, with apical lanceolate flag, black with white tip (Fig. 59c) (MSSC).

Legs. Coxae, FI and FII to 'knees' and all of FIII

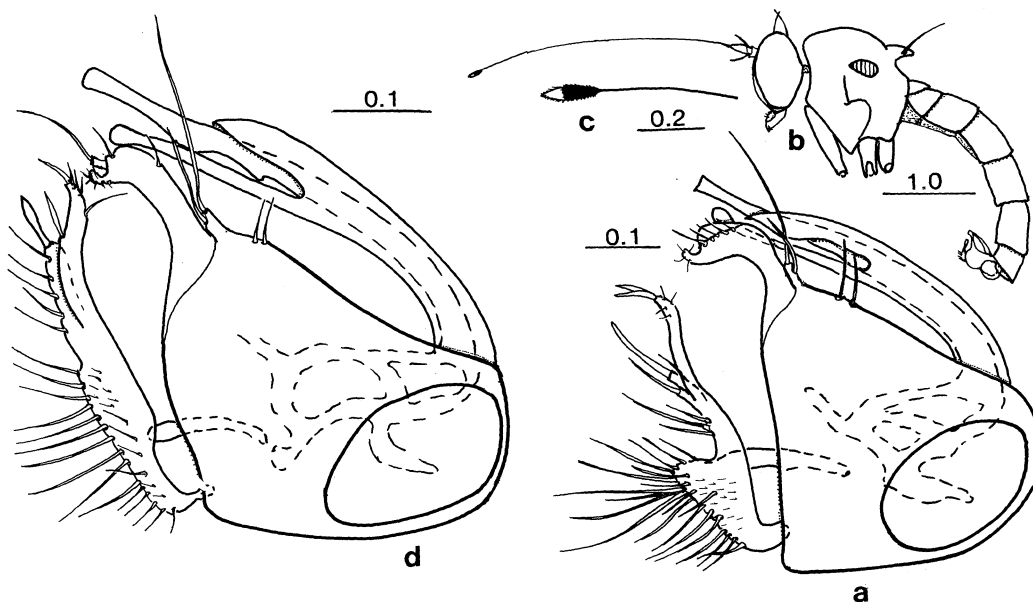


Fig. 59. *Chrysosoma callosum*, Mount Webb, Qld: a – hypopygium, left lateral; b – male habitus, left lateral; c – apex of male arista. *C. pseudocallosum*, Borroloola, NT: d – hypopygium, left lateral.

black; femoral 'knees' I and II, tibiae, and basal tarsomeres yellow; distal tarsomeres darkened; CI and CII with pale anterior hairs; CI with distolateral row of 3-4 pale bristles; CIII with tuft of pale lateral hairs; femora with pale ventral hairs; I: 9.0; 9.0; 7.0/1.0/1.0/0.5/0.5; FI with long pale ventral setae; TI with 3 black dorsal setae, and strong long pv at two-thirds, and short weak pv at four-fifths (MSSC); It_1 relatively long, and swollen with white ventral pile (MSSC); II: 9.0; 13.0; 12.0/3.0/2.0/1.0/0.5; TII with long dorsals at one-sixth and half, and strong ventral at one-fifth; III 13.0; 19.0 12.0/3.0/2.0/1.0/1.0; TIII with strong dorsal at two-thirds; TIII with callus (MSSC).

Wing. Figure 124d.

Abdomen. Tergum 7 without elongate subapical bristle; hypopygium (Fig. 59a); epandrial lobe short with long apical and shorter subapical bristle; surstylus with dorsal finger-like projection and with row of 5 setae; cercus with distinctive bulging densely setose base, and with elongate ventral arm bearing setae and modified blade-like setae as figured.

Female. Similar to male but lacking MSSC; CI and all femora yellow (FIII is darkened apically); FI with 5 long, distally decreasing pale ventrals; TI with 3 dorsals and 2 long ventrals; It_1 with 2 dorsal setae; TII with dorsals at two-thirds, ad at one-fifth, half and apex, and ventrals at one-third and two-thirds; TIII with ad at one-fifth and dorsal at three-quarters.

Remarks. *Chrysosoma callosum* is found in the Northern Territory and coastal Queensland, from the Torres Strait to Townsville. Parent (1933: 172) recorded the species as being present in both Queensland and the Society Islands. The Society Island male (BMNH, examined) is almost identical except it lacks the distinctive setose cercal base of *C. callosum* and it represents an undescribed species. Also, Parent's (1934: 114) record of this species from the Solomon Islands is based on females only and needs confirmation by males. The closely related *C. pacificum* from French Polynesia lacks the TIII callus, but has a similar male cercus. *Chrysosoma callosum* is also very close to *C. pseudocallosum* (q.v.).

The setation of both male and female TI is somewhat variable: usually two ventral setae are present but variously one or three ventral setae also occur.

Chrysosoma pseudocallosum n.sp.

Type material. HOLOTYPE male, PARATYPE male, Northern Territory, Jabiru, 5-9 June 1984, ex. pantraps, I.D. Naumann (ANIC).

Additional material. Northern Territory – Darwin, Mar.-Apr. 1909; 22 km west-south-west of Borroloola, malaise trap, 17 Apr. 1976; near Borroloola, 17-20 Apr. 1976; south-west of Dorisvale, 14°48'S 131°02'E, 9 Aug. 1968; East Jabiru, monsoon woodland, 24 May 1988, 29 Jan. 1989, yellow pans;

East Point, 1-31 May 1976; Berry Springs, monsoonal vine forest, malaise trap, 26 June-29 Aug. 1988. Queensland – Ayr, 23 Apr. 1982; 20 Aug. 1959; Torres Strait Islands: Duan Island, Sue Island, Bamaga Island, Stephen Island, Boigu Island, Yam Island, Moa Island, Darnley Island, Yorke Island, Badu Island, Murray Island, all between 21 Mar.-8 Apr. 1984, 15 May-3 June 1985; Heathlands, 11°45'S 142°35'E, 18-20 July 1992, 3 Apr.-23 May 1993; Noosaville, 26°24'S 153°04'E, 30 Jan. 1988; Woody Point, Fraser Island, 5 July 1987; Stradbroke Island, 27°30'S 153°24'E, 27 Mar. 1993; Burnett River, Bundaberg, in wallum (*Banksia* heath), 12 May 1972; Gordonvale, 16 May 1980; Mount Coolum, 27 Sept. 1986; Indooroopilly, 14-24 Apr. 1986; Townsville, 5 Nov. 1945, 22 May 1988; Kuranda, 18 July 1984; Maroochy, near Nambour, 22 Mar.-3 Apr. 1985. Western Australia – Sandblock, near Kununurra, 22-27 Apr. 1990. Papua New Guinea – Kila Kila, Mar. 1962; Laloki, 30 June 1981; Saranga, 23 Feb. 1981; north of Madang, May 1989 (44 males, 27 females examined, AMS, ANIC, BMNH, UQIC, QDPI, USNM, NTMD).

Description – male. Length: 5.3; wing: 4.1 x 1.6; identical to *C. callosum* except as noted.

Legs. TI with single long subapical pv seta (MSSC).

Abdomen. Hypopygium (Fig. 59d); surstylus with long apical pedunculate seta; cercus lacking protruding densely setose base, but parallel sided with distinctive subapical blunt blade-like seta, and other setae as figured.

Female. Similar to female *C. callosum*.

Remarks. *Chrysosoma pseudocallosum* is found in monsoonal northern Australia, from Western Australia to the Torres Strait, and from Cape York Peninsula and along coastal Queensland as far south as Brisbane. It also occurs in lowland New Guinea.

Chrysosoma pseudocallosum is almost indistinguishable from *C. callosum* except for the male cercal structure, which is a constant and reliable diagnostic character. The two species are widely sympatric in Australia, and have even been taken together in the same yellow pan and malaise traps.

Chrysosoma diversicolor Parent

Chrysosoma diversicolor Parent, 1928: 197.

Remarks. Parent described *Chrysosoma diversicolor* from specimens collected in Queensland (ZMUH, lost) and gave a detailed description with figures of the wing and male leg I. Based on his description and figure showing leg I chaetotaxy, there is little doubt that this species belongs in the *leucopogon* Group. Of note is the distinctive leg colouration, with FI entirely yellow and FII and FIII black with yellow knees. I have not seen any Australian *Chrysosoma* with such a colour pattern and regard this species as unrecognised.

The *arrogans* Group

Diagnosis. *Head.* Male lateral frons with 1 or 2 hairs (MSSC); female frons with strong vertical seta; pedicel with single strong dorsal and weaker ventral seta; first flagellomere elongate triangular in shape; male arista sometimes with lanceolate apical flag. (MSSC).

Thorax. Three pairs long ac present; male with 2 strong posterior dc and 4 weak hair-like anterior dc (MSSC); female with 5 strong dc; lateral scutellar setae reduced to weak hairs or absent.

Legs. FI usually with some long pale basoventral setae; TI sometimes with strong dorsal setae, but often mostly bare of major setae except for MSSC; TI with strong ventral or pv subapical curved seta, usually followed distad by 1 or 2 shorter ventral setae (MSSC); It₁ flattened with pale ventral pile and posterior row of curved black setae (MSSC); males of some species with weak TIII callus at one-fifth (MSSC).

Wing. Crossvein m-cu variable, from slightly sinuous to straight; male wing sometimes with brown maculation and opaque white apex (MSSC?); female wing of known species hyaline.

Abdomen. Cercus usually short and forked.

Remarks. The *arrogans* Group is defined primarily by distinctive MSSC, shared by all members: TI with 2-3 subapical ventral or pv setae and It₁ flattened with pale ventral pile and a posterior row of black curved setae (MSSC). Most species have been described from Melanesia, especially the Solomons, but undescribed species are known from as far west as Timor (ANIC), and an additional species from the Philippines and Guam is described by Bickel (in press).

The *arrogans* Group is not clearly separated from the *leucopogon* Group (Assemblage IA), and species such as *C. pagdeni* and *C. salomonis*, both with a TIII callus (MSSC) could be considered intermediate between the two Groups. As well, many *leucopogon* Group species have a weakly flattened It₁ flattened with pale ventral pile.

The *arrogans* Group is closely related to the *noumeanum* Group (a large radiation in New Caledonia).

Two Solomon Islands species, *C. eminens* and *C. excellens* lack strong ventral setae on FI. More importantly, males of both species have large dark brown wing maculations (their females are unknown), possibly associating them with the *lacteimicans* Group, where many males have strongly maculated wings while female wings are hyaline. Some undescribed western Pacific maculated-wing males have m-cu distinctly bowed and the hyaline-winged females have m-cu straight (similar to wing figure for *C. solitarium*). I have isolated three undescribed species from the Solomons and New Guinea (USNM, BMNH, ZMUC), including a high elevation endemic from Guadalcanal (BMNH).

The *arrogans* Group includes the following species.

arrogans Parent, 1934c: 113. (BMNH, examined), Solomon Islands, Papua New Guinea (Bougainville). *Chrysosoma arrogans* has m-cu almost straight and

an apical arista flag (MSSC) is present. Both sexes have three strong dorsals on TI and two long pale basoventral setae on FI.

Additional records. Solomon Islands: Guadalcanal (USNM); Banika, Russel Group (AMNH). Papua New Guinea: Bougainville (USNM).

crypticum Becker, 1922a: 193. (ZMHB, examined), Bismarck Archipelago.

Crossvein m-cu is distinctly sinuous, and the male arista is bare.

confusum Parent, 1932d: 226. (n.name for *Chrysosoma papuasinum* sensu Becker, 1922a: 179, nec. Bigot) (TMB, lost), Papua New Guinea.

This species is very close to *C. papuasinum*, and according to Parent, has only fine ventral setae on FI. I have not seen additional specimens. (Also see under *C. papuasinum*, below.)

eminens Parent, 1935b: 68. (BMNH, examined), Solomon Islands, Papua New Guinea.

Chrysosoma eminens and *C. excellens* are very close. The cerci differ as shown in Parent's figures, and FI of *C. eminens* has pale basoventral setae while that of *C. excellens* is bare.

Additional records. Males, Papua New Guinea: Finschhafen (SAM); Solomon Islands: Guadalcanal (CUIC).

excellens Parent, 1934c: 114. (BMNH, examined), Solomon Islands.

leverii Parent, 1934c: 115. (BMNH, examined), Solomon Islands.

festivum Parent, 1935b: 69. (BMNH, examined, female only), Solomon Islands (syn. Bickel & Dyte, 1989). The types of both species were examined together. *Chrysosoma festivum* was described from a single female which agrees in all aspects of colouration, venation, and size with the male holotype of *C. leverii*, and the two are considered conspecific.

pagdeni Parent, 1937a: 138. (BMNH, examined), Solomon Islands (Guadalcanal).

The cercus and arista flag are distinctive. I have seen additional specimens, but only from Guadalcanal (BPBM, MCZ, USNM, BMNH).

papuasinum Bigot, 1890: 283. (*Spathiopsilopus*) (UMO, examined), "New Guinea", Papua New Guinea, New Britain.

Parent regarded Becker's redescription of *Chrysosoma papuasinum* (based on TMB specimens, lost) as representing a different species and gave it a new name, *C. confusum*, q.v.

Contrary to Parent's redescription and figures (1932d: 226) of the *Spathiopsilopus papuasinus* types, the male arista flag is symmetrical, and is not unlike that figured by Becker (it is asymmetrical only if viewed laterally). Parent used what he considered the asymmetrical apical flag, the presence of strong FI ventral bristles, and TII chaetotaxy of Bigot's *C. papuasinum*, to separate it from Becker's concept (= *C. confusum*). Becker's descriptions are generally briefer than Parent's, and often when he fails to mention a feature, it cannot be interpreted as not being present. However, Becker described the femora as "Schenkel alle

unterseits zart weiss behart" which Parent interpreted as "Femur I, face ventrale, a delicate pilosité blanche". Becker may have omitted description of strong ventral femoral setae. Also Becker's description of the TII chaetotaxy is not strictly comparable with Parent's. However, I keep the species separate, although they are possibly conspecific.

Males have a very weak TIII swelling which is perhaps a callus. The wing has costal cilia, a MSSC characteristic of many *proliciens* Group species. However, the very narrow arisal flag and cercus are similar to *C. arrogans*. The hypopygium figure in Parent's redescription should have a slightly thinner cercus which bears some strong erect basoventral setae.

I have examined the specimens identified by Parent (1939) as *Chrysosoma papuasium* from Rabaul and Vainimo, Papua New Guinea (ANIC), and both have symmetrical arisal flags.

Additional records. Males, Irian Jaya: Sargi Island (ANIC). Papua New Guinea: Laing Island, Madang Province (ISRN).

Lectotype here designated from three males and two females of the syntype series: male, with label "N-Guin" (UMO).

salomonis Parent, 1929: 205. (MLUH, examined), Solomon Islands.

Parent's description and figures clearly define this species. The coxae and femora are black, and It_1 of both sexes has two dorsal setae. The male TIII has a weak callus (MSSC).

Additional records. Solomon Islands: Guadalcanal (USNM, BMNH); Treasury Islands (USNM).

solitarium Parent, 1935b: 74. (BMNH, examined, female only), Solomon Islands.

This species is potentially identifiable. The female is unusual in having dc_3 weak (most female *Chrysosoma* have 5 strong dc). The m-cu crossvein is straight (unusual for *Chrysosoma* species) but FI and TI have strongly developed setae characteristic of many species of the genus. The wing is similar to females of undescribed *arrogans* Group species from the western Pacific.

The *noumeanum* Group

Diagnosis. *Head.* Lateral frons in both sexes with strong vertical seta; male clypeus free from eye margin; male face often bulging in lateral view (MSSC); pedicel with relatively short dorsal and ventral setae; first flagellomere triangular, with apical arista about twice head height; male arista never with apical flag.

Thorax. Male with 2 strong posterior dc and 4 weak hair-like anterior dc (MSSC); female with 5-6 strong dc ; lateral scutellar setae usually absent but sometimes as tiny weak hairs.

Legs. Females of some species with strongly developed coxal and ventral femoral setae (FSSC); FI usually with only short ventral setae; TI without strong

dorsal setae; TI with strong ventral or pv subapical curved seta (MSSC); It_1 flattened with pale ventral pile and posterior row of curved black setae (MSSC); males of some species with weak TIII callus (MSSC) near half rather than at one-fifth as in many *leucopogon* Group species; male $III_{t,3,5}$ often flattened and padlike (MSSC).

Wing. Crossvein m-cu slightly sinuous.

Remarks. The *noumeanum* Group represents a New Caledonian radiation which contains a single described species, *C. noumeanum*. A large number of undescribed species will be treated in a future monograph. The *noumeanum* Group shows a close relationship with the *arrogans* Group centered in the Solomons and New Guinea. Some species have a TIII callus (MSSC), but at half rather than one-fifth as in many *leucopogon* Group species.

noumeanum Bigot, 1890: 288. (*Psilopus*) (UMO, examined), New Caledonia.

bigoti Parent, 1932d: 223. (UMO, examined), New Caledonia (syn. Bickel & Dyte, 1989).

Bigot described *Psilopus noumeanus* from three syntypes, two females and a male, mounted together on a cork block. His original description noted "haunches noires", which applies only to CII and CIII of both sexes. The male CI is brownish, while the two females having distinctly yellow CI. On this basis, Parent regarded the male as a different species, and described it as *Chrysosoma bigoti*, leaving the two female syntypes to represent *C. noumeanum*, which he redescribed. He then placed *C. noumeanum* in synonymy with *C. macropum*. Apart from the following considerations, such a synonymy is unjustified, since it involves species based only on females from the distant type localities of New Caledonia and Guam, respectively.

When Parent described *C. bigoti*, the type was already missing its head and postabdomen. The specimen would be almost unidentifiable except for the presence of a TIII callosity at half, crocheted cilia on II_t and pad-like It_1 . I have examined a large BPBM collection of New Caledonian Sciapodinae and isolated a common endemic species which matches this species exactly. Males have CI infuscated while associated females have CI entirely yellow. Similar coxal colouration dimorphism occurs in other *Chrysosoma* species. *Chrysosoma noumeanum* is therefore regarded as the senior synonym of *C. bigoti* and the species is endemic to New Caledonia. A male in good condition from Noumea (ex. BPBM) is placed in association with the *Psilopus noumeanus* types. The male of the three *Psilopus noumeanus* syntypes is here designated as lectotype.

The *proliciens* Group

Diagnosis. *Head.* Vertex strongly excavated; male with tuft of hairs on lateral slope of frons (MSSC); female

with frons bare except for strong vertical seta; male face bulging (MSSC) (Fig. 62g); pedicel sometimes with long ventral and dorsal setae; first flagellomere elongate subtriangular, with apical arista in males, but often distinctly dorsal arista in females (Fig. 62f); male arista long, equal to or greater than body length, and always simple; female arista usually about half the body length; males sometimes with arista and first flagellomere fused, and with basal flattening of arista (MSSC).

Thorax. Ac present as 3-5 strong pairs; male mesoscutum usually with unpaired supernumerary setae, either in main setal rows or elsewhere on dorsum (MSSC); male with 2 strong dc posteriorly, and anterior dc as 4-5 weak hairs (MSSC); female with 5 strong setae; lateral scutellar setae strong, about two-thirds length of medians.

Legs. TI usually with strong species specific chaetotaxy in both sexes; males of some species with distinct callus and posterior slit on basal quarter of TIII (MSSC).

Wing. Male costa to R_1 usually with av row (sometimes with an additional ad row) of black curled, somewhat flattened setae (MSSC); female costa unmodified; wing in both sexes often with subapical spot or clouding posterior to costa; M_1 often forming wide hatchet-shaped arc to wing apex; crossvein m-cu slightly sinuous.

Abdomen. Cercus often with short dorsal digitiform projection and large bilobed clavate ventral arm.

Remarks. The *proliciens* Group is most diverse in the Australasian tropics, especially the Papuan subregion where many species await description. However the group is also occurs in the Orient. *Chrysosoma proliciens* and *C. crinicornis* are widespread species, and although *C. crinicornis* is recorded from Brazil, it could either be a limited accidental introduction or mislabelling. The morphological limits of the *proliciens* Group are not always distinct from the closely related *leucopogon* Group, and some species could arguably belong in either Group.

The group shares many characters (strong ventral setae on FI, modified coastal av setae, TIII callus, similar hypopygial structure) with the predominately southern Australian *Parentia dispar* Group. Possibly *Chrysosoma* arose in the northern edge of the Australian Plate from *Parentia*, and the *proliciens* Group is basal in *Chrysosoma*. Indeed, species such as *Chrysosoma duplociliatum* and *C. lucare* might be considered intermediate between *Parentia* and *Chrysosoma*.

The *proliciens* Group is complex. Significant intraspecific variation in size, leg colouration, chaetotaxy and intensity of wing maculation is evident in some species.

Females often have a dorsal arista, in strong contrast to the apical arista of the males (eg, Fig. 62f,h). If the *Chrysosoma proliciens* Group is basal to the genus, then the female dorsal arista represents the retention of a primitive character which has become modified in males as an apical arista. Derived taxa such as the *leucopogon* Group have apical arista in both sexes. A similar transition from dorsal to apical arista through the

expression of a MSSC in the female phenotype is evident in *Heteropsilopus* (also see discussions under Morphology, and Male Secondary Sexual Characters and the Female Phenotype).

Five species are known northern Australia, *C. crinicornis* and *C. proliciens*, both widespread Oriental-Australasian species, *C. inerme* also known from New Guinea, *C. duplociliatum* known only from islands off Arnhem Land, and *C. lucare* which probably occurs on the New Guinea coast since its Australian range includes the Torres Straits islands. I have seen females only of a sixth species from Mount Tozer, Iron Range (ANIC), possibly a described New Guinea species.

The following species are included.

aldrichi de Meijere, 1913b: 342. (*Psilopus*) (ZMUA, examined), Irian Jaya.

collini Parent, 1932d: 217. (UMO, examined), "New Guinea" (syn. Bickel & Dyte, 1989).

Parent described *Chrysosoma collini* from the single male in the syntypic series of *Psilopus chromatipes* Bigot (*P. chromatipes*, now represented by the remaining two female syntypes, is a species of uncertain placement). *Chrysosoma collini* is identical to *C. aldrichi*. Both species have similar colouration and hypopygia, and males have three strong dorsal bristles on the basal half of TI.

For consideration of *C. aldrichi* var. *frontale* Becker, see *Krakatauia evulgata*.

Lectotype here designated for *Psilopus aldrichi* de Meijere: male, bearing label: "Z Nieu Guinea, Lorenz, 1909-10, Riverkamp, 10 Feb. 10" (ZMUA).

austeni Parent, 1934a: 14. (n.name for *lilacinus* var. *flavitibiale* sensu Becker, 1922a: 182, [nec. de Meijere, 1915: 119], misidentified) (DEI, not seen), Maluku, Irian Jaya, Papua New Guinea.

Parent proposed the name *C. austeni* for Becker's concept of *C. lilacinus* var. *flavitibiale* which was based on material from the Key Islands. These are here regarded as comprising three closely related species, all with straight m-cu, black halteres and four dorsal setae on TI, which are separated as follows:

i) *C. lilacinus*: lower calypter with black setae; legs black;

ii) *C. flavitibiale*: lower calypter with black setae; TI yellow; long ventral cercal arm present, the length almost twice that of *C. lilacinus* (ie, much longer than that illustrated in Becker 1922a, fig. 152);

iii) *C. austeni*: lower calypter with pale setae; TI and TII yellow (hypopygium as in Becker 1922a, fig. 152, the figure for his concept of *C. lilacinus* var. *flavitibiale*).

Additional records (*C. austeni*). Irian Jaya: Jayapura (USNM); Papua New Guinea: Wau (ANIC, BMNH).

crinicornis Wiedemann, 1824: 39. (*Dolichopus*) (ZMUC, examined), Java, widespread Oriental tropics, from Sri Lanka, India and lowland Nepal to the Philippines, Taiwan, Ryukyu Islands, Indonesia, New Guinea, Solomon Islands, Australia (Qld); Brazil (?).

- filifer* Walker, 1859b: 114. (*Psilopus*) (BMNH, examined), Sulawesi.
- longisetosus* Wulp, 1882: 120. (*Psilopus*) (IRSN, not seen), Brazil.
- aeterus* Bigot, 1890: 283. (*Psilopus*) (UMO, not seen), Maluku.
- imparile* Parent, 1933a: 174. (BMNH, examined), Qld (syn. Bickel & Dyte, 1989).
- longicornis*, Becker and authors, nec. Fabricius 1775. For discussion, see full species account, below.
- derisor* Parent, 1934b: 280. (BMNH, examined), Sri Lanka.
- The legs and CI are mostly yellow.
- duplociliatum* Parent, 1933a: 172. (BMNH, examined), Australia (NT).
- egens* Walker, 1858: 92. (*Psilopus*) (BMNH, examined), Maluku (Aru Islands), Papua New Guinea.
- The male holotype was redescribed by Parent (1934a: 12), although its abdomen is missing. The male wing is totally hyaline with a strong av row of costal cilia which gradually decrease in size distally extending to R_{2+3} and a weaker ad row of cilia which end at R_1 (MSSC). The male abdomen has abundant black setae on terga 5-8. The male TI has 5 dorsal setae to two-thirds, increasing in size distally, some shorter dorsal setae, and a long ventral seta at half and two-thirds. The male It_1 is bare of major setae and not flattened, and is almost as long as TI. The male pedicel has a short dorsal seta and a very long ventral seta which extends almost to the eye base (MSSC).
- Additional records. Papua New Guinea: Bunapas (Madang Province), swamp forest (ISRN).
- flavitibiale* de Meijere, 1915: 119 (as *Psilopus lilacinus* subspecies *flavitibiale*) (ZMUA, examined), Irian Jaya.
- This species has a long ventral cercal arm, almost twice the length of *Psilopus lilacinus* s.s., and warrants separate status (see discussion under *C. austini*, above).
- Additional records. Papua New Guinea: Trobriand Islands, Kiriwina (USNM).
- ignavum* Becker, 1922a: 174. (TMB, lost), Papua New Guinea.
- I have not seen additional specimens of this species. However, from the description and wing figure, I regard this species as belonging to the *proliciens* Group. The yellow CI, femora and tibiae, and the presence of three dorsals on TI and one to two dorsals on It_1 should distinguish *C. ignavum* from other yellow-legged members of the Group.
- impressum* Becker, 1922a: 173. (TMB, lost), Papua New Guinea, Irian Jaya.
- The three males from Wewak (ANIC) identified by Parent (1939a: 159) fit Becker's description exactly. This species is common in collections.
- Additional records. Papua New Guinea: Musgrove River, near Port Moresby; Bainyik (AMS), Maprik (ANIC, BMNH); Irian Jaya: Jutefa Bay (BMNH).
- Neotype here designated: male, bearing label "Wewak, N. Guinea, F.H. Taylor" (ANIC).
- impudens* Parent, 1941: 200. (ZMHB, not seen), Sumatra.

This rather large species has black legs and two dorsal setae on It_1 .

Additional records. Sumatra: Brastagi (USNM).

A related undescribed species from West Malaysia: Genting Highlands (AMS) is even larger and has three strong dorsal setae on It_1 .

inerme de Meijere, 1913b: 343 (as *Psilopus albopilosus* subspecies *inerme*) (ZMUA, examined), Irian Jaya, Papua New Guinea, Australia (Qld).

For discussion, see species account, below.

lilacinum de Meijere, 1913b: 341. (*Psilopus*) (ZMUA, examined), Irian Jaya.

See discussion under *C. austini*, above.

lucare n.sp. Australia (NT, Qld, WA).

proliciens Walker, 1856: 120. (*Psilopus*) (BMNH, examined, female only). Sarawak; West Malaysia, Indonesia, Singapore, Philippines, India, Australia (Qld, NT), Papua New Guinea.

delectans Walker, 1856: 120. (*Psilopus*) (BMNH, examined), Sarawak.

perficiens Walker, 1860b: 150. (*Psilopus*) (BMNH, examined), Maluku (syn. Bickel & Dyte, 1989).

albopilosus albopilosus Wulp, 1895: 46. (*Psilopus*) (ZMUA, examined), Java.

divisum Becker, 1922a: 182. (Syntypes TMB, lost; ZSI, DEI, ZMHB, not seen), Singapore, Philippines, India and Papua New Guinea (syn. Bickel & Dyte, 1989).

For discussion, see species account, below.

waigeense de Meijere, 1913a: 57. (*Psilopus*) (ZMUA, examined), Maluku (Waigeu), Irian Jaya, Papua New Guinea.

geniculatus de Meijere, 1913b: 347. (*Psilopus*) (ZMUA, examined), Irian Jaya (syn. Bickel & Dyte, 1989).

geniculatus subspecies *mutabile* Becker, 1922a: 173 (n.name for *Psilopus geniculatus* subspecies *appendiculatus* de Meijere, 1915: 120) (ZMUA ?, not seen), Irian Jaya (syn. Bickel & Dyte, 1989).

futile Parent, 1939a: 158. (ANIC, examined, female only), Papua New Guinea (syn. Bickel & Dyte, 1989).

Male syntypes of *Psilopus waigeensis* from Maluku and *P. geniculatus* from Irian Jaya were examined together and they are identical. Parent described *C. futile* from a single female and it is identical to a female syntype of *P. geniculatus*.

De Meijere erected the subspecies *P. geniculatus appendiculatus* (= *mutabile*) for specimens from Hollandia which varied slightly from *P. geniculatus* s.s. He considered that these specimens represented a local form or race of *P. geniculatus*. I was unable to locate the types at either ZMUA or RNHL and they are probably lost. Subspecies *mutabile* is regarded as part of intraspecific variation and placed in synonymy with *C. waigeense*.

Additional records (*C. waigeense*). Papua New Guinea: Pagei, Sepik River (ANIC).

Lectotype here designated for *Psilopus geniculatus* de Meijere: male, bearing label: "Z. Niew Guinea, Lorenz, 1909-10, Alkmaar, 2 Feb. 10".

Key to Australian Males of the *proliciens* Group

1. Scape vase-shaped and pedicel reduced to narrow ring; first flagellomere and arista fused, broad at base, and projecting back over entire body (Fig. 62e); costa without curled setae; hypopygium (Fig. 60d) (Qld) *C. crinicornis*
- Antenna not so modified; costa with short black, somewhat flattened and curled setae extending to R_1 2
2. Costa with 2 rows of modified setae (Fig. 124h); wing without brown subcostal maculation; It_1 with pale ventral pile; abdominal segments 5-8 with long black setae; hypopygium (Fig. 62a) 3
- Costa with single row of curved flattened setae; wing with dark spot just posterior to join of R_1 and costa (eg, Fig. 124e); It_1 without pale ventral pile 4
3. Haltere black; TIII entirely black, without callus or posterior slit; FII and FIII with only apex yellow (NT, Qld) *C. duplociliatum*
- Haltere yellow; TIII with basal quarter yellow, with callus and posterior slit at one-fifth; FII and FIII with distal eighth yellow (WA, NT, Qld) *C. lucare*
4. It_1 with 2-3 strong dorsals (Fig. 60b); haltere yellow; thorax with bronze stripe between ac rows; TIII unmodified; pedicel with long ventral and dorsal setae (Fig. 62g); cercus with short dorsal digitiform projection and large bilobed clavate ventral arm which bears apical pedunculate seta (Fig. 60a) (WA, Qld, NT) *C. proliciens*
- It_1 dorsally bare; haltere black; thorax metallic green; TIII with distinct callus at one-quarter; pedicel with short ventral and dorsal setae; abdominal segments 6, 7 and 8 with long black setae; cercus with short dorsal digitiform projection bearing only dorsal setae, and with larger ventral arm (Fig. 60c) (Qld, New Guinea) *C. inerme*

Chrysosoma proliciens (Walker)

Psilopus proliciens Walker, 1856: 120.

Psilopus delectans Walker, 1856: 120.

Psilopus perficiens Walker, 1860b: 150 (syn. Bickel & Dyte, 1989).

Psilopus albopilosus albopilosus Wulp, 1895: 46.

Chrysosoma divisum Becker, 1922a: 182 (syn. Bickel & Dyte, 1989).

Type material. Walker described a single female from Sarawak as *Psilopus proliciens* (BMNH, examined), and on the same page he described a male, also from Sarawak, as *P. delectans* (BMNH, examined). I regard the two species as conspecific. The only significant difference between them is a fainter wing maculation on *P. delectans*, which is within the range of intraspecific variation. Since the name *proliciens* has had wider usage, it is retained as the senior synonym even though the holotype is female. Parent (1934a: 24,27) regarded Walker's *P. perficiens* from Amboina (BMNH, examined) as a synonym of *Chrysosoma delectans* and Wulp's *Psilopus albopilosus* from Java

(single male and female syntypes, ZMUA, examined) as a junior synonym of *C. proliciens* (However, *Psilopus albopilosus inerme* is regarded as a separate species, see below). Becker described *C. divisum* from a scattered syntype series Singapore (TMB, lost), Philippines (DEI, not seen), India (ZSI, female only, not seen) and Papua New Guinea (ZMHB, female only, not seen). Frey (1924: 122) considered *C. divisum* might be a synonym of *C. albopilosum*. In all respects, including geographical distribution, the description of *C. divisum* agrees with the present concept of *C. proliciens*.

Additional material. Northern Territory – Boroalba Creek Springs, north-east of Mount Cahill, 17 Nov. 1972; Burnside Station, Broaks Creek, 25 Apr. 1932; Koongarra, near Mount Cahill, 10 Mar. 1973; Berry Springs, 26 June-29 Aug. 1991, 27 Sept.-30 Oct. 1991, 9 Jan.-28 Feb. 1992, monsoonal vine forest. Queensland – 16 km north-east of Heathlands, 11°41'S 142°42'E, 13 Mar. 1992, Iron Range, Claudie River, 22 Oct. 1974; east-north-east of Mount Tozer, 28 June-10 July 1986; Mount Webb National Park, 29 Sept. 1980; Mount Cook National Park, 12 Oct. 1980; Shipton's Flat, 15°47'S 145°14'E, 18 May 1981; west of

Kuranda, 28 Dec. 1986; Mulgrave River, south-south-west of Gordonvale, 16 Nov. 1981; Moses Creek, north by east of Mount Finnigan, 15 Oct. 1980; Danbulla Forest Reserve, north-east of Yungaburra, 17 Nov. 1981; Daintree River, 29 Apr. 1955; Glenella, near Mackay, 13 May 1959; Bamboo Creek, near Mossman, 25 Apr. 1967. Western Australia – Carson Escarpment, Drysdale River, 14°49'S 126°49'E, 9-15 Aug. 1975; Wyndham Research Station, 17 Dec. 1953, 10 Jan. 1961 (28 males, 33 females examined, AMS, ANIC, WADP, UQIC, NTMD).

Non-Australian records. Indonesia – Bali (ANIC); Irian Jaya: Fak-Fak (BMNH). West Malaysia – Kuala Lumpur (BMNH). Sabah – Mount Kinabalu, Komokuk, 1000 m. Sarawak – 4th Division, Niah (BMNH). Papua New Guinea – Oriono River; Maprik; Madiri (ANIC).

Description – male. Length 5.7-6.0; wing: 5.0 x 1.8.

Head. Vertex, frons shining metallic blue with tuft of pale hairs on lateral slope (Fig. 62i); face and clypeus metallic green and covered with orientated silvery pruinosity, evident when viewed at acute angle; clypeus free from eye margin; palp black; proboscis yellow-brown; antenna black; pedicel with very long ventral and dorsal setae (Fig. 62g); first flagellomere tapering triangular with long curved dorsoapical arista which equals body length; ventral postcranium with abundant pale setae.

Thorax. Metallic blue-green with dusting of pruinosity; pleura with grey pruinosity; bronze stripe present between ac rows; setae black; 5 pairs strong ac present; supernumerary setae and hairs present (MSSC); 1 pa,

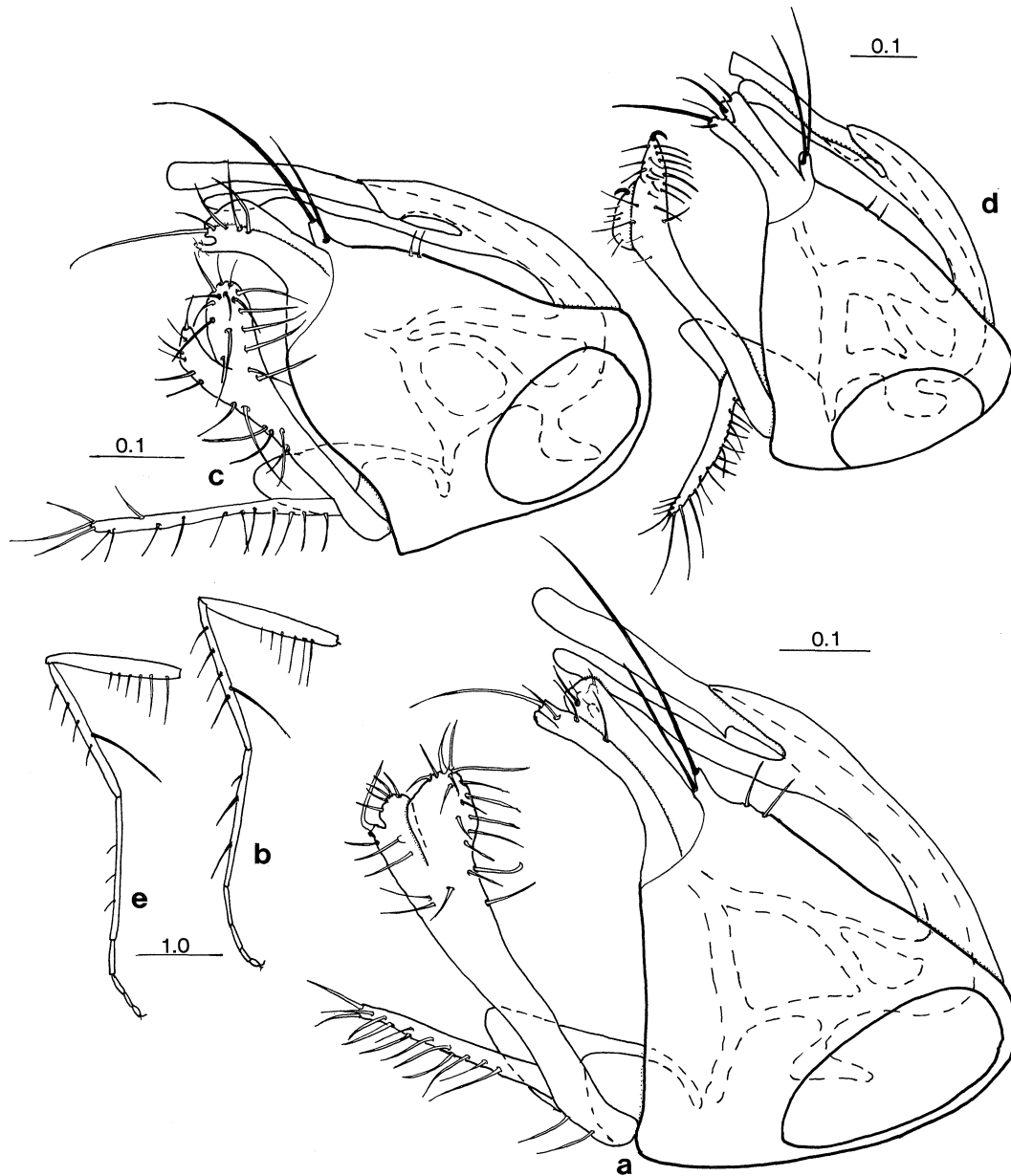


Fig. 60. *Chrysosoma proliciens*, Mount Finnigan, Qld: a – hypopygium, left lateral; b – male left leg I, lateral. *C. inerme*, Innisfail, Qld: c – hypopygium, left lateral. *C. crinicornis*, Iron Range, Qld: d – hypopygium, left lateral; e – male left leg I, lateral.

2 sa (anterior short), 2 sr, 2 npl, 1 pm, 1 weak hm present; lateral scutellar setae about two-thirds length of medians.

Legs. Coxae, FI and FII to knees and all of leg III black; femoral knees, TI and TII yellow; It and Ilt yellowish to infuscated; CI and CII with pale anterior hairs; CIII with tuft of long pale hairs; FI-III with pale ventral hairs; I: 10.0; 11.0; 8.5/2.5/1.5/1.0/1.0; FI with 4-5 long pale basoventral bristles; TI with 4 (sometimes 3) dorsal setae in basal two-thirds and 1 strong ventral at two-thirds; It₁ with 2 strong dorsals (sometimes with additional shorter dorsal basad) (Fig. 60b); II: 11.0; 14.5; 11.0/3.0/2.0/1.0/1.0; TII with strong dorsals at one-fifth, one-third and two-thirds and ventrals at one-fifth, half and three-quarters; III: 13.0; 19.0; 9.0/4.0/2.5/1.0/1.0; TIII with ad at one-fifth and strong dorsal at three-quarters.

Wing. Hyaline but with dark spot just posterior to join of R₁ and costa and extending to R₄₊₅ (Fig. 124e); costa with short black, somewhat flattened and curled setae extending to R₁ (MSSC); M₂ as weak fold to margin; CuAx ratio: 2.5; CuA not reaching margin; lower calypter yellow with brown rim and fan of pale yellow setae; haltere yellow.

Abdomen. Metallic green with matt brown bands around areas of tergal overlap; hypopygium black with yellowish cerci (Fig. 60a); epandrium subtriangular; hypandrial arm elongate, almost reaching tip of aedeagus; 2 epandrial setae present; epandrial lobe with long apical and shorter subapical bristles; surstylus with faint epandrial join mark; surstylus lobate, with dorsal digitiform projection which bears apical seta, and with median bilobate projection; cercus with short dorsal digitiform projection and large bilobed clavate ventral arm which bears apical pedunculate seta as figured.

Female. Similar to male except lacking MSSC and as noted: slightly smaller; lateral slope of frons with strong vertical seta, otherwise bare (Fig. 62j); arista slightly dorsal (Fig. 62h); 4 strong ac present; 2 strong posterior dc and 3 shorter anterior dc, but not hairlike; without supernumerary thoracic setae; bronze band also present between ac; FI with 2 long pale ventral bristles; It₁ also with 2 strong dorsal setae; costa without flattened curled setae; subcostal spot often faint (Fig. 124f).

Remarks. *Chrysosoma proliciens* is a widespread species known from India, Indonesia, Malaysia, Singapore, the Philippines and New Guinea. In Australia, it is found across the tropical monsoonal North, from the Kimberley Range, Western Australia, to coastal Queensland as far south as the Cairns district. This species is closely related to *C. inerme* and *C. crinicornis*.

Intraspecific variation includes the intensity of wing spot infuscation, the number of dorsal setae on TI, and the colour of the tibiae and tarsi on legs I and II, which ranges from yellowish to brown.

Chrysosoma inerme (de Meijere)

Psilopus albopilosus subspecies *inerme* de Meijere, 1913b: 343.

Chrysosoma inerme (de Meijere) (n.status, Bickel & Dyte, 1989).

Type material. All 25 male and 19 female syntypes of *Psilopus albopilosus inerme* from Irian Jaya (ZMUA, examined) lack bristles on It₁, which thereby distinguish it from *P. albopilosus* s.s. (= *Chrysosoma proliciens*). Also, the cerci of *C. inerme* and *C. proliciens* are distinctly different. *Chrysosoma inerme* has been taken elsewhere in New Guinea as well as Queensland warrants separate specific status.

Lectotype here designated: male, with label "Z. Nieu Guinea, Lorentz, 1908-10, Bivak Eiland, II.10" (ZMUA).

Additional material. Queensland – male, Mossman, on cane, no date; male, Innisfail, no date; male, female, Bamboo Creek, near Miallo, 25 Apr. 1967 (ANIC); male, "Cairns Distr." (BMNH).

Non-Australian records. Irian Jaya – Hollandia; Humboldt Bay, Feb. 1936 (BMNH). Papua New Guinea – Buba, Morobe District, resting on cacao leaves, 7 Sept. 1955 (Papua New Guinea); Laloki, Central Province, 2 Aug. 1984 (AMS); Sapoka, Western Province, 4 Mar. 1981 (AMS); Bainyik, 18 Dec. 1963 (AMS); Brown River, near Port Moresby, 9 Oct. 1963 (AMS); Vailala River, Nov. 1923 (ANIC); Torrecelli Mountains, Jan. 1939; Maprik (BMNH) (14 males, 9 females examined).

Description – male. Length 4.8-5.0; wing: 5.0 x 1.8; similar to *C. proliciens* except as noted.

Head. Pedicel with short ventral and dorsal setae.

Thorax. Bronze stripe absent or only faint.

Legs. Coxae and femora dark brown; TI yellowish in basal half; remainder of legs dark brown; podomere ratios similar; FI with 4-5 long pale basoventral bristles; TI with 3 dorsal setae in basal two-thirds and 1 weak ventral at two-thirds; It₁ bare; TIII with weak callus and posterior slit at one-quarter (MSSC).

Wing. Subcostal spot more diffuse; haltere black.

Abdomen. Segments 6, 7 and 8 covered with abundant long black setae; hypopygium black with yellowish cerci (Fig. 60c); surstylus with faint epandrial join mark; surstylus subrectangular with short dorsal projection which bears strong apical seta, and with other setae as figured; cercus with short dorsal digitiform projection bearing only dorsal setae, and with larger ventral arm, which appears bilobed in posterior view, each lobe bearing curved apical seta.

Female. Similar to male except lacking MSSC and as noted: face not bulging; lateral slope of vertex bare; arista more apical than that of female *C. proliciens*; 4 strong ac present; FI with 2 long pale ventral bristles; It₁ also bare; costa without flattened curled setae; subcostal spot faint; haltere yellow.

Remarks. *Chrysosoma inerme* is relatively common in New Guinea, but is also known from the Cairns

district, Queensland. The bare basitarsus of leg I separates it from *C. proliciens*.

***Chrysosoma crinicornis* (Wiedemann)**

Dolichopus crinicornis Wiedemann, 1824: 39.

Megistostylus crinicornis.—Bigot, 1859: 215, as type of new genus, *Megistostylus* Bigot.

Psilopus filifer Walker, 1859b: 114.

Psilopus longisetosus Wulp, 1882: 120.

Psilopus aeterus Bigot, 1890: 283.

Chrysosoma imparile Parent, 1933a: 174 (syn. Bickel & Dyte, 1989).

Megistostylus longicornis, Becker and authors, misidentified, nec. *Musca longicornis* Fabricius, 1775.

Chrysosoma crinicornis.—Bickel & Dyte, 1989 (n.status).

Type material. *Dolichopus crinicornis* Wiedemann was based on a male from Java (ZMUC, examined). Since Becker's work (1922a, 1922b), this common Indo-Australian species has been regarded as a junior synonym of *Musca longicornis* Fabricius, in the combination *Megistostylus longicornis* (Fabricius). However, examination of the Fabrician types (ZMUC) revealed *Musca longicornis* to be a senior synonym of the widespread New World *Condyllostylus chrysoprasi* (Walker) (see *Condyllostylus* for formal synonymy and discussion). The Wiedemann name is reinstated.

Psilopus filifer Walker (BMNH, examined), *Psilopus longisetosus* Wulp (IRSN, not seen) and *Psilopus aeterus* Bigot (UMO, not seen) are previously established junior synonyms of *Dolichopus crinicornis*. *Chrysosoma imparile*, from Kuranda, Qld (BMNH, examined), is a female *C. crinicornis*.

Additional material. Queensland – Townsville, no date; Cairns, 28 June 1959; Kuranda, 4–13 Nov. 1972; Iron Range, 29 May–6 June 1966, 28 June–10 July 1980; 4 Oct. 1974; Upper Mulgrave River, Goldsborough River, 9 May 1967; east of Cardstone, 14 Jan. 1967; Mulgrave River, west of Gordonvale, 21 May 1966; Cape Tribulation, 21–28 Mar. 1984; Fisher Creek, Palmerston National Park, 30 Apr. 1967; McIlwraith Range, 13°43'S 143°19'E, June–July 1989; Babinda, 17 June 1945; Mourilyan Harbour, 18–31 Aug. 1971; Mossman Gorge,

24 Apr. 1967; Torres Strait: Bodu Island, 6 May 1986; Darnley Island, 30 Jan. 1986 (39 males, 27 females examined, AMS, ANIC, BMNH, QDPI, UQIC).

Non-Australian records. Japan – Ryukyu Islands – Ishigaki Island, Yonabara, 21 May 1964 (BPBM).

Description – male. Length 6.0–6.3; wing: 6.1 x 2.1; similar to *C. proliciens* except as noted.

Head. Antenna (Fig. 62e); scape elongate, vase-shaped; pedicel reduced to narrow ring with corona of short setae; first flagellomere and arista fused, broad and shining at base and curving back over entire body (MSSC).

Thorax. Metallic blue-green; without bronze stripe; only 3 pairs strong ac present; supernumerary setae few or absent.

Legs. I: 10.5; 11.5; 10.0/2.5/1.5/1.0/1.0 (Fig. 60e); FI with 2 long pale basoventral bristles; TI with 4 dorsals in basal two-thirds and 1 strong ventral at two-thirds; It₁ with only 3 short dorsals; II: 11.0; 16.0; 12.5/4.0/2.5/1.0/1.0; TII with ad at one-fifth, dorsals at two-fifths and three-fifths, and ventrals at one-third and three-fifths; III: 15.0; 23.5; 11.0/4.5/3.0/1.5/1.0.

Wing. Costa without curled, setae (Fig. 124g); CuAx ratio: 2.0; haltere dark brown.

Abdomen. Metallic green with matt brown bands around areas of tergal overlap; hypopygium black with brownish cerci (Fig. 60d); surstylus lobate with short digitiform dorsal projection and with long apical seta arising; cercus with dorsal digitiform projection subequal in length to large bilobed clavate ventral arm; ventral arm with setae as figured.

Female. Similar to male except lacking MSSC and as noted: slightly smaller, length 8.0–9.0; arista distinctly dorsal (Fig. 62f); 4 strong ac and 5 strong dc present; wing spot often faint; haltere red-yellow.

Remarks. *Chrysosoma crinicornis* has a wide distribution in the Oriental and Australasian tropics, from

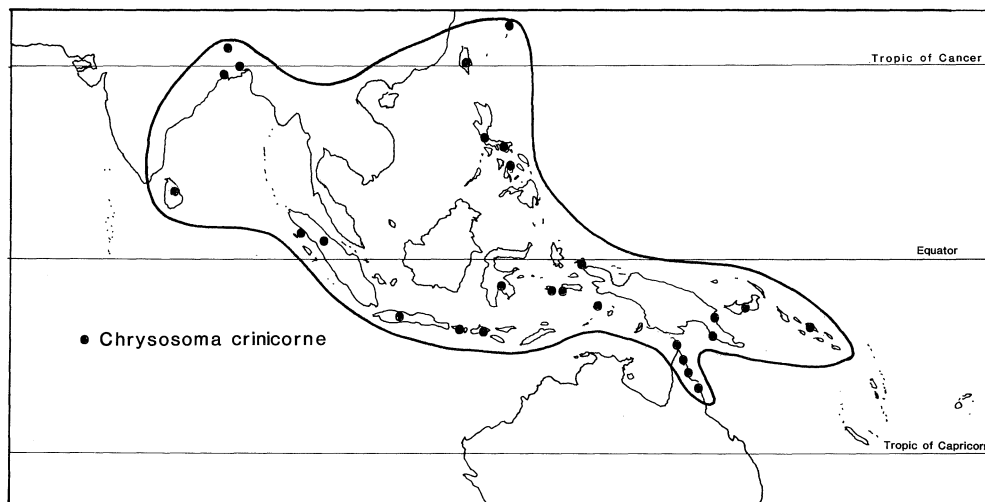


Fig.61. Distribution, *Chrysosoma crinicornis*.

the Indian subcontinent to the Philippines, Solomons and Queensland, where it occurs on the Cape York Peninsula as far south as the Cairns district (Fig. 61).

This species is also recorded from Brazil, the provenance of the junior synonym *Psilopus longisetosus* Wulp, and an additional male (NHMW). I have scanned large neotropical holdings (MCZ, AMNH, USNM, CNC, BMNH) and have found no additional specimens. Yet *Chrysosoma crinicornis* is common and widespread throughout the Oriental and Australasian

tropics, and shares its range with related species in the *proliciens* Group. Apart from the Brazilian occurrence of *C. crinicornis*, true *Chrysosoma* does not occur in the Neotropical Region (a number of species ascribed to *Chrysosoma* are transferred to *Condylotylus*, see *Condylotylus*). *Chrysosoma crinicornis* is possibly an accidental introduction to Brazil from the Orient. The absence of this species from most neotropical collections suggests that it is localised in distribution, possibly near a port city.

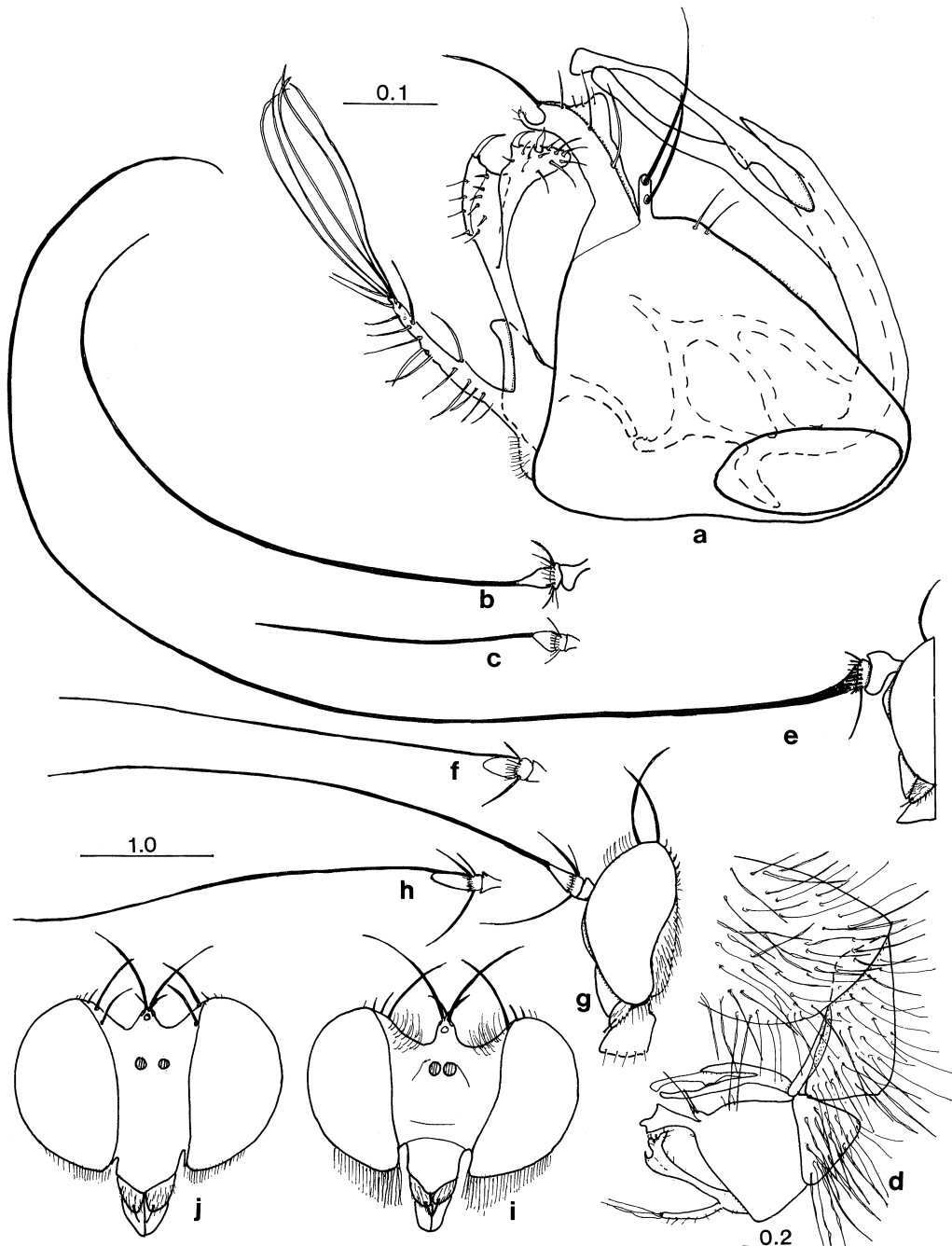


Fig. 62. *Chrysosoma lucare*, Darwin, NT: a – hypopygium, left lateral; b – male antenna, left lateral; c – female antenna, left lateral; d – male postabdomen, left lateral. *C. crinicornis*, Iron Range, Qld: e – male antenna, left lateral; f – female antenna, left lateral. *C. proliciens*, Mount Finnigan, Qld: g – male head, left lateral; h – female antenna, left lateral; i – male head, anterior; j – female head, anterior.

However, it is possible that *C. crinicornе* never occurred in the New World, and that the records are the result of misinterpretation or mislabelling. To begin with, its record from the West Indies (eg, Robinson, 1970) is undoubtedly that of true *Musca longicornis* which is a *Condylostylus*. And it should be noted that the type locality "Brazil" cited by Robinson 1970 is incorrect, since Fabricius gave the locality as "America". This leaves only two old specimens purportedly from Brazil to substantiate this occurrence: the male holotype of *Psilopus longisetosus* Wulp and a male specimen in NHMW. I have not seen the Wulp holotype, although C.E. Dyte (personal communication) claimed that D. Hollis examined it and regarded it as what was then called "*Megistostylus longicornis*" (= *C. crinicornе*). I have examined the NHMW male, and it is *C. crinicornе*, with the labels: "Brasilien"/"longicornis"/"Alte Sammlung". If these were both part of the same series, and both mislabelled, then the Brazilian occurrence could not be supported.

Chrysosoma crinicornе is a distinctive species showing little intraspecific variation. It is closely related to *C. proliciens* and the two species have similar hypopygia and female antennae. Female *C. crinicornе* are distinguished from female *C. proliciens* by the absence of a bronze ac band, and presence of only short dorsals on It_1 .

The distinctive long fused arista-first flagellomere of male *Chrysosoma crinicornе* (Fig. 62e) is an extreme development of a MSSC trend evident in other species of the *proliciens* Group (eg, in *C. duplociliatum*, the arista also has a relatively broad base, but is not fused with first flagellomere). The female arista is distinctly dorsal (Fig. 62f).

Chrysosoma duplociliatum Parent

Chrysosoma duplociliatum Parent, 1933a: 172.

Type material. Parent described *Chrysosoma duplociliatum* from a single male taken in the Crocodile Islands, Arnhem Land, Northern Territory (BMNH, examined).

Additional material. Northern Territory – 7 males, 8 females, Rimbija Island, Wessel Group, 11°01'S 136°45'E, 15 Jan.-14 Feb. 1977 (ANIC). Queensland – male, south-east of Chillagoe, 17°12'S 144°33'E, 27 Nov. 1981; 2 males, 7 females, Heathlands, 11°45'S 142°35'E, 15-26 Jan. 1992, yellow pans (ANIC).

Description – male. Length 5.5-6.0; wing: 5.3 x 1.8; similar to *C. proliciens* except as noted.

Head. Antenna (as in Fig. 62b); pedicel with ring of setae; first flagellomere symmetrical and conical; apical arista only slightly shorter than body length, curved and tapering from relatively broad base, not unlike arista of *C. crinicornе*; however, arista not fused with first flagellomere and distinct suture marks join.

Thorax. Metallic blue-green with dusting of pruinosity; bronze stripe absent; 3 pairs strong ac present.

Legs. Coxae and femora to knees black; leg III entirely black; femoral knees, tibiae and basal tarsomeres of legs I and II yellow, with distal tarsomeres black; podomere ratios similar; T_I with 3 short dorsal setae and pv seta at three-fifths; It_1 with pale ventral pile (MSSC); T_{II} with strong ad at one-eighth and half and apex, and ventral at half; T_{III} covered with short black erect setae (MSSC), and with strong anterior setae at one-fifth, half and three-quarters.

Wing (Fig. 124h). Costa with 2 rows of modified setae (MSSC), a closely spaced av row of slightly flattened setae which continues to R_{2+3} , and a more widely spaced ad row of hair-like and slightly crocheted setae which ends at R_1 ; faint brown 'pseudovein' present anterior to M_1 ; M_2 present as fold; m-cu making acute angle with M_1 ; CuAx ratio: 1.8; lower calypter brownish with fan of pale yellow setae; haltere club brown, stalk somewhat yellowish.

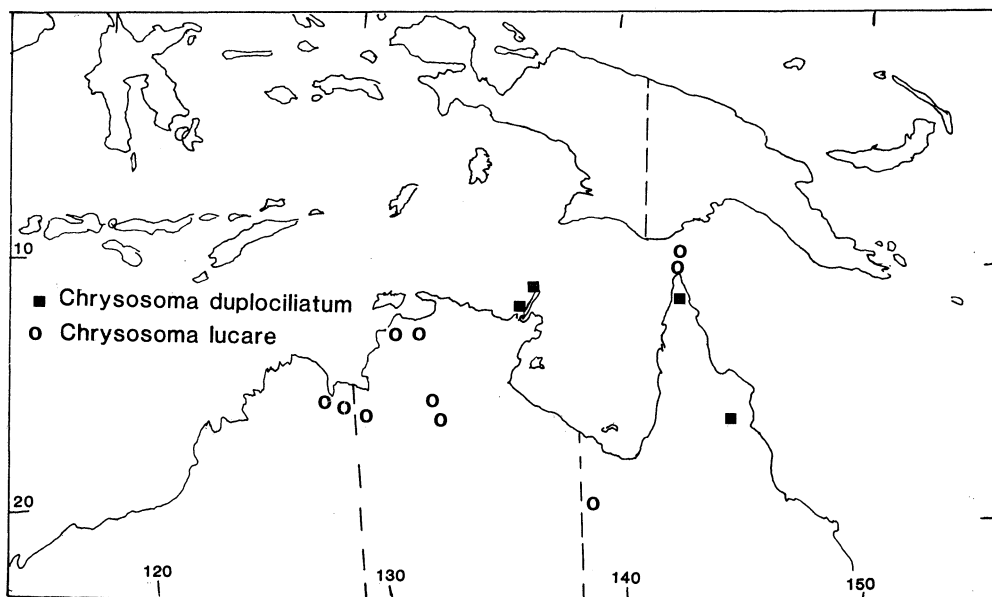


Fig.63. Distribution, *Chrysosoma duplociliatum* and *C. lucare*.

Abdomen. Segments 5, 6, 7 and 8 with long fine and somewhat distally curled black hairs (MSSC) (as in Fig. 62d); hypopygium black with black cerci (as in Fig. 62a); surstylus lobate, with short apical digitiform projection which bears long seta, ventral subtriangular projection, and curved dorsal digitiform projection; cercus with dorsal digitiform projection bearing long pale apical setae, and with large bilobed ventral arm with outer apical tooth-like seta and 2 smaller inner tooth-like setae.

Female. Similar to male except lacking MSSC and as noted: slightly smaller; arista dorsoapical (as in Fig. 62c); 4 strong ac present; 4 strong dc present; leg colouration similar but basal quarter of TIII somewhat yellowish; TI with dorsal setae at one-sixth, half and subapically, and strong pv at half; It_1 unmodified; TII with strong ad at one-eighth, half, three-quarters and apex, dorsal at half and ventral at three-fifths; TIII unmodified; costa unmodified; m-cu making larger angle with M; haltere entirely yellow.

Remarks. *Chrysosoma duplociliatum* is known only from islands offshore Arnhem Land, Northern Territory, the Wessel and Crocodile Groups, the tip of Cape York Peninsula, and a male (with yellow halteres) from Chillagoe, Qld (Fig. 63). This species is discussed further under the Remarks for its sister species, *C. lucare*.

Chrysosoma lucare n.sp.

Type material. HOLOTYPE male, PARATYPES 6 males, 3 females, Queensland, Adel's Grove, near Lawn Hill Gorge, 18°41'S 138°32'E, 18 Dec. 1991, M.S. & B.J. Moulds (AMS).

Additional material. Northern Territory – 2 males, Darwin, no date (SAM); female, Dingo Creek crossing, Victoria Highway, 14°09'S 129°05'E, 1 Jan. 1992 (AMS); 2 females, 11–22 km south-west of Katherine, on *Eucalyptus tectifica*, 21 Nov. 1974; female, 26 km north of Mataranka, on *E. tectifica*, 19 Nov. 1974 (UQIC). Queensland – male, Torres Strait: Sue Island, 9 Dec. 1978 (UQIC); male, female, Torres Strait: Campbell Island, 26 Dec. 1978 (AMS). Western Australia – male, female, 7 km east of Kununurra, 13–15 Dec. 1975, on *Eucalyptus* sp. (UQIC); 4 males, Wyndham, Kimberley Research Station, 11–17 Dec. 1953 (ANIC).

Description – male. Length 5.5–6.0; wing: 5.3 x 1.8; similar to *C. duplociliatum* except as noted.

Head. Antenna (Fig. 62b).

Legs. Femora I and II mostly black with yellow knees on distal eighth; FIII entirely black; TIII yellow in basal quarter, but black distally; tibiae and basal tarsomeres of legs I and II yellow, with distal tarsomeres black; chaetotaxy of legs I and II similar; TIII with swollen callus at one-quarter marked posteriorly by longitudinal slit (MSSC) and also with anterior setae at one-fifth, half and three-quarters.

Wing (as in Fig. 124h). Costa also with 2 rows of modified setae (MSSC), but the ad row is slightly longer than in *C. duplociliatum*; CuAx ratio: 1.9; haltere

entirely yellow.

Abdomen. Segments 5, 6, 7 and 8 also with long fine and somewhat distally curled black hairs (MSSC) (Fig. 62d); hypopygium black with black cerci (Fig. 62a); surstylus lobate, with short apical digitiform projection which bears long seta, ventral subtriangular projection, and curved dorsal digitiform projection; cercus with dorsal digitiform projection bearing long pale apical setae, and with large bilobed ventral arm with outer apical tooth-like seta and 2 smaller inner tooth-like setae.

Female. Similar to female *C. duplociliatum* except as noted: antenna (Fig. 62c); distal third of FI and FII and distal eighth of FIII yellow; TIII almost entirely yellow except distal quarter somewhat infuscated.

Remarks. *Chrysosoma lucare* is found across monsoonal Australia from northern Cape York Peninsula and the Torres Strait Islands, around the Gulf of Carpentaria, and through Arnhem Land to the Kimberley Ranges, Western Australia (Fig. 63). Some specimens were collected off *Eucalyptus* trunks.

Chrysosoma lucare and *C. duplociliatum* are sister species, sharing two rows of costal setae (MSSC) and almost identical hypopygia. However, they are readily separated in both sexes, with female *C. lucare* having the distal third of FI and FII and most of TIII yellow, unlike *C. duplociliatum*. (For separation of males, see the text key).

However, some specimens are intermediate in character expression, with a single male from Chillagoe, Qld, appears like *Chrysosoma duplociliatum* except it has yellow halteres, and a male *C. lucare* from Sue Island, Torres Strait, has only a weakly developed TIII callus and posterior slit, and a slightly infuscated haltere. Thus the two species are not always distinctly separated in parts of their ranges and possibly can form hybrids. However, I don't believe they are conspecific. *Chrysosoma lucare* is found across much of monsoonal Australia while *C. duplociliatum* in the strict sense is confined to north-eastern Arnhem Land and the tip of Cape York Peninsula.

The *aeneum* Group

Diagnosis. **Head.** Male with black hairs on lateral frons (MSSC); female frons bare except for strong vertical seta; face strongly bulging in males (Fig. 64b); first flagellomere of male allantoid (sausage-shaped), more than 3 times as long as wide (MSSC), with long apical seta; first flagellomere of female usually subtriangular, not more than twice as long as wide (Fig. 64b,c).

Thorax. Mesoscutum with matt brown or bronze stripes over ac band and laterally above notopleuron; 3–4 pairs strong ac present; male with 2 strong posterior dc and only weak hair-like dc anteriorly (MSSC); female with 5 strong dc, or with some anterior dc reduced or missing; lateral scutellar setae reduced to short setae.

Legs. CI with 3 strong black distolateral setae; FI

without long ventral setae although females of some species with group of 3-4 short black basoventral setae; It_1 long, only slightly shorter than TI ; $It_{2,5}$ each relatively short, often appearing curled or swollen with ventral setae (MSSC).

Wing. Usually with similar dark brown maculation in both sexes; veins M_1 and R_{4+5} strongly converging at wing apex and sometimes joined subapically; crossvein m-cu sinuous, sometimes strongly as in Figure 124i.

Abdomen. Male tergum and sternum 7 both well developed; hypopygium relatively small compared to size of abdomen; epandrial lobe sometimes strongly developed, with bristles modified as blade-like setae; male cercus broad with ventral teeth and sometimes branched.

Remarks. The *Chrysosoma aeneum* Group is most diverse in New Guinea, but also occurs in the Northern Territory and Solomon Islands. The single Australian species, *C. interruptum*, is found in Arnhem Land.

The group is distinguished by the allantoid male first flagellomere (MSSC), maculated wings, thoracic vittae, and similar hypopygia. All species have three strong black distolateral CI setae except for the Solomon Island *C. bicolor*.

The *aeneum* Group is related to the *lucigena* and *vittatum* groups. (Species in the Oriental *Plagiozopelma alliciens* Group (q.v.) also have a allantoid first flagellomere (MSSC), but this is regarded as convergence.)

An undescribed species from Wau, Papua New Guinea (ANIC) has the swollen allantoid first flagellomere in both male and female, an example of a MSSC becoming secondarily fixed into the female phenotype.

Included species:

aeneum Fabricius, 1805: 268. (*Dolichopus*) (ZMUC, lost), "Java", Maluku, Irian Jaya, Papua New Guinea.

variipennis Walker, 1861: 238. (*Psilopus*) (BMNH, examined), Irian Jaya.

Chrysosoma aeneum is a common New Guinea species. I have not seen specimens from west of Weber's Line and the "Java" type locality is probably incorrect. The figures in Becker, 1922a accurately portray this species. Also see discussion under *C. fasciatum*, below.

Parent (1934a: 36) placed *Psilopus variipennis* in synonymy with *C. aeneum*.

Neotype here designated for *Dolichopus aeneus* Fabricius: male, with label "Wewak, New Guinea, F.H. Taylor" (ANIC).

bicolor Parent, 1937: 133. (BMNH, examined), Solomon Islands.

fasciatum Guérin-Ménéville, 1831: pl. 20, 1838: 293. (MHNP, examined, female only). "New Guinea", Irian Jaya (Waigeo Island), Maluku (Aru Islands).

cognatum Parent, 1929: 200. (MLUH, examined), Maluku (Aru Islands).

Chrysosoma fasciatum is the type species of the genus. Parent (1926: 24) redescribed the female holotype and later placed his *C. cognatum*, described from the Aru Islands, in synonymy. The figure of

the male hypopygium in Parent's description of *C. cognatum* should therefore be regarded as representing the species.

Both de Meijere and Becker had placed *Chrysosoma fasciatum* in synonymy with *C. aeneum*, but Parent regarded the two species as distinct. They are very close, with almost identical colouration and wing maculation. However, the cercus of *C. fasciatum* has a distinct mid-dorsal projection and is distally narrowed, while that of *C. aeneum* is broadly tapering. *C. fasciatum* is uncommon in collections (unlike *C. aeneum* and *C. maculipenne*) and I have only seen one other male, also from the Aru Islands (USNM).

The series of nine males and 15 females from Wewak and Aitape, Papua New Guinea (ANIC, examined) identified by Parent (1939: 158) as *Chrysosoma fasciatum* is definitely *C. aeneum* as figured in Becker, 1922a. Therefore, *C. fasciatum* as defined by Parent (ie, sensu *C. cognatum*) is known only from the Aru Islands and the type locality of Irian Jaya: Offack, Waigeo (the only New Guinea stop on Duperry's 1823 *La Coquille* voyage).

interruptum Becker, 1922a: 177. (ZSI, not seen), Australia (NT).

leopoldi Parent, 1932g: 23. (IRSN, not seen), Irian Jaya.

maculipenne Guérin-Ménéville 1831: pl. 20, 1838: 294. (MHNP, female only, examined), "Sumatra", Maluku, Irian Jaya, Papua New Guinea.

benedictus Walker, 1859: 91. (*Psilopus*) (BMNH, examined), Maluku.

persuadens Walker, 1861: 149. (*Psilopus*) (BMNH, examined), Maluku.

diversifrons de Meijere, 1913a: 345. (*Psilopus*) (ZMUA, examined), Irian Jaya, **n.syn.**

Parent (1926: 23) redescribed the female type of *C. maculipenne*. The male cercus is bifurcate and the narrow apex is ventrally serrate, as shown in de Meijere's figure for *Psilopus diversifrons* (the hypopygium figure in Becker, 1922a does not portray the cercus accurately). Also, the very short It_3 (MSSC) is distinctive for the species. The Ossak, Sumatra type locality for *C. maculipenne* is probably incorrect since I know of no other records from west of Weber's Line. Parent (1934a: 5, 24) placed both *Psilopus benedictus* and *P. persuadens* in synonymy with *Chrysosoma maculipenne*.

The two male syntypes of *Psilopus diversifrons* have genitalia and leg I identical to those of *Chrysosoma maculipenne* (cercus with distinctive serrations). The only difference between *C. diversifrons* and 48 specimens of *C. maculipenne* (identified as *Psilopus benedictus*), all collected together at Alkmarr, Irian Jaya (ZMUA), is that the *P. diversifrons* specimens lack the apical wing maculation. However, the *C. maculipenne* series from the same site show wing maculation intensity varying from faint to dark. Therefore, the two syntypic specimens of *P. diversifrons* are regarded as teneral *C. maculipenne* and the name placed in synonymy.

Additional records. Indonesia – Waluku – Aru Islands (USNM). Papua New Guinea – Lower Sepik; Pagai, Sepik River; Kundiwa, Chinbu River; Baiyer River; Orokolo; Wanagalese, south-west of Popondetta, 750–1100 m; Mori River, Cape Rodney; Rigo District, south-east of Port Moresby; Vailala River; Kiriwina, Trobriand Islands (ANIC); Sivipi, near Sasembata, Popondetta subdistrict; Aroana Estate, Aroa River (AMS); Musgrave River; Brown River; Vanapa River (BMNH). Lectotype here designated for *Psilopus diversifrons* de Meijere: male, with label “Z Niew Guinea, Lorenz, 1909-10, Alkmaar, 2-ii-10”.

Chrysosoma interruptum Becker

Chrysosoma interruptum Becker, 1922a: 177.

Type material. Becker described *Chrysosoma interruptum* from a male and two female syntypes collected at Palmerston, North Australia (= Darwin, Northern Territory). Although I have not examined the types (ZSI), this species can be identified with confidence from Becker's description and wing figure.

Additional material. Northern Territory – Kakadu National Park, near Cooida, monsoonal woodland, 17 Jan. 1992 (AMS); Humpty Doo, 28 Nov. 1974; East Point, Darwin, 1–31 May 1976; Edith Falls, Katherine Gorge, 6 Dec. 1980; Melville Island, Snake Bay, 15 Nov. 1983 (NTMD); Baroalba Creek Springs, 19 km north-east of Mount Cahill, 16 Nov. 1972; Koongarra, 15 km east of Mount Cahill, 6–9 Mar. 1973; Coburg Peninsula, Smiths Point, 11°09'S 132°08'E, 26 Jan. 1977; Cobourgh Peninsula, Black Point, 11°09'S 132°09'E, 15–23 Jan.

1977 (ANIC); Arnhem Highway, Wildman River crossing, 27 Nov. 1988 (WADA); Groote Eylandt, no date (SAM); south of Hayes Creek, 13°37'S 131°33'E, 200 m, 8 Jan. 1993 (UQIC); Arnhem Land, no date (BPBM) (49 males, 30 females examined).

Description – male. Length 7.9–8.0; 7.3 x 2.7.

Head (Fig. 64b). Vertex metallic blue-green with grey pruinosity and with tuft of pale hairs on lateral frons; frons shining metallic blue-green; upper face strongly bulging and metallic green with bronze reflections; lower face and clypeus covered with dense silvery pruinosity; clypeus free from eye margin; lower eyes with long pale hairs between facets; palp and proboscis yellowish; antenna black; first flagellomere elongate, allantoid (MSSC); arista apical, length about one and one-half head height.

Thorax. Metallic green with bronze vittae over ac band and laterally above notopleura; scutellum blue-green; 3 pairs strong ac present; 1 pa, 2 sa; 2sr, 2 npl, 1 pm, 1 weak hm present; lateral scutellars reduced to weak hairs.

Legs. CI, all femora, TI, TII and basal TIII yellow; CII and CIII black; rest of legs brownish to black; CI with 3 strong black distolateral spines; CII with black anterior hairs; CIII with strong black lateral seta and pale hairs; I: 13.0; 13.5; 10.0/2.5/2.0/1.0/1.0; TI with 5–6 strong black dorsals and 3 ventrals; II: 15.0; 22.0; 17.0/4.0/2.5/1.0/0.8; TII with strong ad and pd; III: 18.0; 25.0; 14.0/5.0/4.0/1.5/1.0; TIII rows strong dorsals and anteriors; IIIIt with dense short setae.

Wing (Fig. 124i). Elongate; hyaline with brown clouding along anterior margin between costa and R₄₊₅

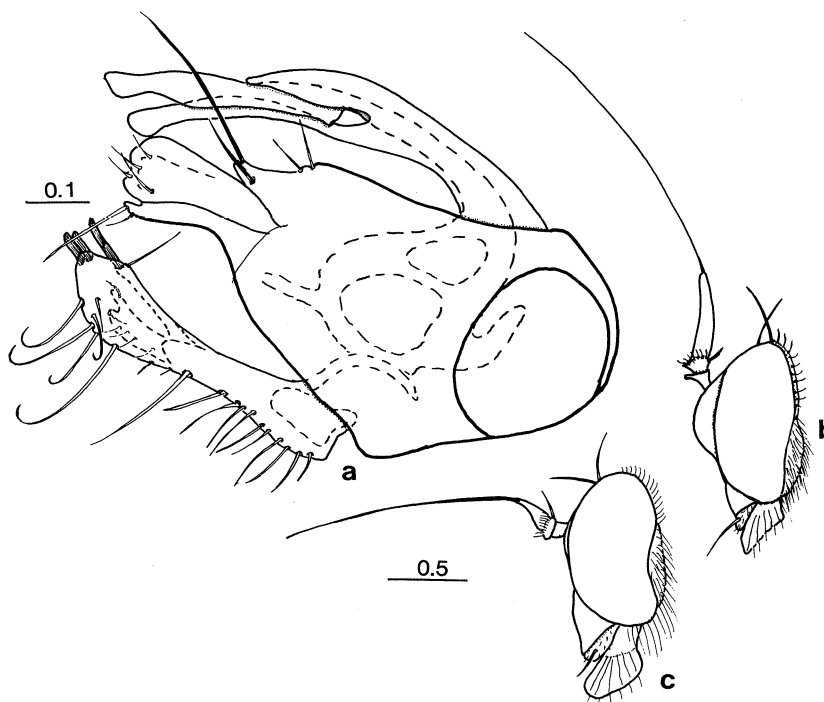


Fig. 64. *Chrysosoma interruptum*, Mount Cahill, NT: a – hypopygium, left lateral; b – male head, left lateral; c – female head, left lateral.

and over veins M_1 , M_2 and m-cu; M_1 making wide arc to wing apex; M_2 as weak fold to margin; m-cu slightly sinuous; lower calypter yellow with brown rim and fan of pale yellow setae; haltere yellow.

Abdomen. Metallic green with matt brown bands around areas of tergal overlap; hypopygium black with yellowish cerci (Fig. 64a); epandrium subrectangular; hypandrial arm elongate and almost reaching apex of aedeagus; 2 epandrial setae present; epandrial lobe with long apical and shorter subapical bristles; surstylus with faint line marking join with epandrium; surstylus lobate and divided longitudinally with short dorsal projection which bears long apical seta; cercus as single clavate arm which bears long dorsal setae 2 blunt apical tooth-like setae and with long internal projection also with tooth-like seta.

Female. Similar to male except lacks MSSC and as noted: face not bulging; lateral frons with strong vertical seta; clypeus adjacent to eyes; first flagellomere not greatly prolonged, but triangular (Fig. 64c); 3 dc present, 2 strong posterior dc, then gap with 1 strong dc just anterior to suture.

Remarks. *Chrysosoma interruptum* appears confined to northern Arnhem Land and islands in the Gulf of Carpentaria. It has been collected in vine forest and monsoonal woodland.

Females are unusual in having only three dc, two posterior dc and one near the mesonotal suture. In almost all other *Chrysosoma*, females have 5 strong dc.

The *vittatum* Group

Diagnosis. Head. Male with pale hairs on lateral slope of frons (MSSC); female frons with strong vertical seta; face bulging in males; first flagellomere relatively short, triangular, and with dorsoapical arista.

Thorax. Mesoscutum often with matt brown or bronze vittae over ac band and laterally above notopleuron; ac developed as 3-4 strong pairs; male usually with 2 strong posterior dc and only weak hair-like dc anterior (MSSC); female with 5 strong dc; lateral scutellars present as to short setae.

Legs. CI usually with 3 strong black distolateral setae; FI sometimes with long ventral setae; TI often with 2-3 long dorsal setae; It_1 long, usually only slightly shorter than TI; It_{2-5} each relatively short (MSSC).

Wing. In both sexes with similar dark brown maculations, continuous along anterior margin, with excavations from posterior margin (the maculations are often faint in teneral specimens); vein M_1 in long gentle bowed convex curve to apex or at least almost straight; not concave (eg, see Becker, 1922a: figs 73, 82, 85, 87); crossvein m-cu relatively straight or slightly bowed.

Abdomen. Hypopygium relatively small compared to size of abdomen; cercus deeply cleft, arms often narrow and bandlike.

Remarks. The *vittatum* Group is distinguished by a

convex or straight vein M_1 . The Group is found in both the Oriental and Afrotropical regions, and although some species are apparently common in Sundaland, none have crossed Weber's Line. Becker (1922a) treats the commonly encountered Oriental species. I have seen additional undescribed species from Sulawesi (MCZ), Java (ANIC), and the Philippines (MCZ).

The *vittatum* Group is close to the Papuan *aeneum* and *lucigena* Groups (q.v.), and species show similar wing maculation, bronze thoracic vittae, black distolateral CI setae and cerci.

A number of Afrotropical species belong in the *vittatum* Group, and the central African *passiva* Group (= genus *Kalocheta*) appears to be derived from the *vittatum* Group (see Notes on Afrotropical *Chrysosoma*).

Included Oriental species:

chinese Becker, 1922a: 175. (ZSI, not seen), China (Yunnan).

cupido Walker, 1849: 643. (*Psilopus*) (BMNH, examined), East Indies, Sri Lanka, India, China (Hainan Island), Indonesia, Nepal.

limpidipenne Becker, 1922a: 147. (ZMHB, examined), Taiwan and China.

limpidipenne subspecies *ornatum* Becker, 1922a: 148. (NHMW, not seen), Vietnam, **n.syn.**

Parent (1934b: 280) placed *Chrysosoma limpidipenne* in synonymy with *C. cupido*.

The subspecies *Chrysosoma limpidipenne ornatum* was based on a variant wing maculation. In a long series of *C. cupido* from Hainan Island (USNM), a range of variation in wing maculation is present, including the *ornatum* form. Therefore, the subspecies is placed in synonymy with *C. cupido*. I have also seen specimens from Nepal: Kathmandu, 1600 m (CNC) with relatively faint wing maculation. Lectotype here designated for *Chrysosoma limpidipenne*: male, bearing labels, "Formosa Sauter"/"Kagi 907.viii.10" (ZMHB).

graphicum Parent, 1935a: 428. (BMNH, examined), Sabah.

lugubre Parent, 1935a: 429. (BMNH, examined). Sabah; Kalimantan.

Chrysosoma lugubre Parent is close to *C. obscuratus*. Both species have similar colouration and setal combs on It (MSSC), but wing maculations differ. *Chrysosoma lugubre* has black antennae and a single white window on the dark wing.

Additional records. Kalimantan: Loa Tebuch (BMNH).

obscuratum Wulp, 1884: 226. (*Psilopus*) (type repository unknown; not at ZMUA or RMNL), Sumatra.

I have not seen specimens of this species.

placens Parent, 1935a: 433. (BMNH, examined), Sabah, Sarawak, Kalimantan, Sumatra, West Malaysia.

Additional records. Kalimantan: Loa Tebuch. Sumatra: Lenokoelen. West Malaysia: Kuala Lumpur and Penang. Sarawak: Kuching and Niah (all BMNH).

terminatum Becker, 1922a: 141. (DEI, examined), Philippines.

Chrysosoma terminatum is separated from *C. cupido* by the grey CI, black TIII and distinctive cercus. I have seen additional specimens from Manilla

(USNM).

Lectotype here designated: male, bearing label, "Philippines coll O-S".

undulatum Becker, 1922a: 165. (ZSI, not seen), Assam, Indochina.

vittatum Wiedemann, 1819: 3. (*Psilopus*) (NHMW, not seen), Sri Lanka, India, Indochina, Java, Sumatra, Sulawesi, Vietnam, Philippines.

spectabilis Walker, 1859: 114. (*Psilopus*) (BMNH, examined), Sulawesi.

gemma Bigot, 1890: 290. (*Psilopus*) (UMO, not seen), Java.

simalurensis de Meijere, 1915: 25 (as subspecies). (*Psilopus*) (ZMUA, examined), Indonesia (Simeulue Island), **n.syn.**

See Becker 1922a for diagnostic figures and notes. Parent (1932d: 220) and (1934a: 31), respectively, placed both *Psilopus gemma* and *Psilopus spectabilis* in synonymy with *Chrysosoma vittatum*. The subspecies *simalurensis* is within the range of intraspecific variation for *C. vittatum* and placed in synonymy. [This subspecific name is preoccupied by the specific name *Chrysosoma simulurensis* (de Meijere)].

Additional records. Vietnam: Bienhoa Province, TrangBom, (USNM). Sabah: Mount Kinabalu; West Malaysia: Kuala Lumpur (BMNH). Philippines: Leyte Island (USNM).

The *lucigena* Group

Diagnosis. *Head.* Male with weak vertical on lateral slope of frons; female with strong vertical seta; face flat to only slightly bulging in males; pedicel with long dorsal and ventral setae; first flagellomere short and triangular with dorsoapical arista.

Thorax. Mesoscutum often with matt brown or bronze stripes over ac band and laterally above notopleuron; 4 pairs strong ac present; male with 2 strong posterior dc and only weak hair-like dc anterior (MSSC); female with 5 strong dc, or with some anterior dc reduced or missing; lateral scutellars present as short setae.

Legs. CI with 3 strong black distolateral setae, and often with additional strong lateral setae; both sexes have FI with long black ventral and often anterior setae, and TI and usually TII also with long black dorsal and ventral setae; It_1 long, only slightly shorter than TI, and It_{2-5} each relatively short.

Wing. With dark brown maculations, and the patterns are usually sexually dimorphic; crossvein m-cu sinuous.

Abdomen. Hypopygium relatively small compared to size of abdomen; male cercus with short distal digitiform projection, and a ventral projection which bears a pointed median branch.

Remarks. The rather large-sized species of the *Chrysosoma lucigena* Group have long setae adorning the legs and strongly maculated wings, making them among the most striking flies in New Guinea. Other

Chrysosoma groups have developed similar leg setae: the *leucopogon* Group (Assemblage IIE) from Sundaland and the Philippines, and a group of Afrotropical species near *Chrysosoma senegalense*.

This Group is confined to the Papuan subregion and I have isolated four undescribed species (ANIC, AMS, BMNH) in addition to the two named species.

The maculated wings of the *lucigena* Group are usually sexually dimorphic in pattern. The two related and commonly collected New Guinea species, *Chrysosoma lucigena* and *C. splendidum*, have striking black and white male wing maculation (not unlike that of male *Heteropsilopus pulcherrimus* from Sri Lanka), similar female wing maculation, and long black ventral FI and dorsal TI setae. Females of the two species have the m-cu maculation variously joined or separated from the anterior marginal maculation (eg, Becker, 1922a: fig. 78, Parent, 1941: fig. 11).

Chrysosoma lucigena and *C. splendidum* have been confused in the taxonomic literature as discussed below. They are widely sympatric and show intraspecific variation in size, development of mesonotal coppery bands, cercal structure and intensity of wing maculation. Even specimens collected at a single site show intraspecific variation. Possibly they comprise a single variable species complex, but further study is required, with special attention to their distribution in the rugged topography of New Guinea.

Chrysosoma lucigena, *C. splendidum*, and a third undescribed species are tentatively separated as follows

A. *Chrysosoma lucigena*. Male: wing clouded or infuscated posteriorly, without solid dark brown maculation extending to margin; anal angle hyaline; distal cercal projection short (as in de Meijere, 1910, figs 12, 13). FI yellow with only distal third infuscated or brown. Female: with coppery colouration along ac band and laterally above notopleuron.

B. *Chrysosoma splendidum*. Male: with strong dark brown wing maculation extending to posterior margin between anal angle and apical white maculation (Becker, 1922a, fig. 77) [also, anal angle milky opaque, not solid dark brown as in de Meijere, 1906, fig. 6]; distal cercal projection distinctly longer (Becker, 1922a, fig. 79). FI mostly brown except for yellowish apex (may appear yellowish in teneral specimens. Female: without coppery mesonotal bands, thorax entirely metallic green.

C. Undescribed species [Papua New Guinea: Woitape (AMS). West Papua, Rouku (ANIC)]. Male: TI without long dorsal setae (present in other 2 species); opaque white wing apex relatively small in extent compared with other two species; wing posteriorly infuscated or clouded, without solid black maculation extending to margin; distal cercal projection long, subequal with ventral arm and bearing long ventral and apical setae. Female: with coppery colouration above notopleuron but not along ac band.

Included species:

lucigena Walker, 1858: 91. (*Psilopus*) (BMNH, examined), Maluku (Aru Islands), Irian Jaya, Papua New Guinea.

extendens Walker, 1865: 111. (*Psilopus*) (BMNH,

examined, female only), Irian Jaya (syn. Bickel & Dyte, 1989).

Walker described *Psilopus lucigena* from an Aru Islands male and *Psilopus extendens* from an Irian Jaya female. In his description of *P. extendens*, Walker noted the presence of coppery bands on the mesonotum. De Meijere (1910) accurately illustrated the hypopygium of *P. lucigena* (as *Agonosoma*). Parent (1934a) somewhat confusedly made *Chrysosoma splendidum* a junior synonym of both *P. extendens* and *P. lucigena* at different places in the same paper. This would in effect make *P. extendens* a junior synonym of *P. lucigena* although not explicitly stated. Since I follow de Meijere in regarding *Chrysosoma lucigena* and *C. splendidum* as separate species, *P. extendens* is placed in synonymy with *C. lucigena*. The two Walker species represent male and female of the same species, and I have seen similar associated specimens in collections. However, Parent (1941) described what he regarded as a female of *Chrysosoma lucigena* from a New Guinea specimen (BMNH, not seen). His description omits mention of the coppery bands present on the Walker type, and I suspect his specimen is a female *C. splendidum*.

Additional records. Papua New Guinea – Bulolo, Upper Marki logging area, 1500 m; Koitaki; Buri, near Sasambata, Popondetta subdistrict (AMS); Eilago, near Port Moresby; Uberi, Kokoda Trail; 85 km west of Port Moresby; Salamaua; Kundiwa, Chimbu River (ANIC). Finisterre Mountains, Budemu, 1100 m (BMNH, ANIC). Irian Jaya – Cyclops Mountains; Hollandia (USNM). Maluku – Mysol (BMNH).

splendidum Wulp, 1868: 111. (*Psilopus*) (RMNL, examined), Irian Jaya, Papua New Guinea.

signatipenne de Meijere 1906: 83. (*Agonosoma*) (ZMUA, examined, female only), Irian Jaya.

Wulp (1868) described *Psilopus splendidus* from a New Guinea male. De Meijere (1906) distinguished it from the closely related *P. lucigena*, and in the same paper described *Agonosoma signatipenne* from a female, noting its similarity to Walker's *P. extendens* except for absence of coppery mesosomal bands. De Meijere (1913) placed his *A. signatipenne* in synonymy with *Psilopus splendidus*. As noted above, Parent incorrectly placed *Chrysosoma splendidum* in synonymy with *C. lucigena*.

Additional records. Papua New Guinea – Imbia, near Maprik; Bainyik; Kuminihus, near Maprik; Awala, Popondetta subdistrict; 50 km north of Mount Hagen (AMS); Kandep Forest, West Highlands; Sepik River, Pagwi; Yamil, near Maprik (ANIC). Vesilog, near Songeri; Torricelli Mountains, 650 m; 22 km south of Paup; Akimbo River (BMNH).

The *antennatum* Group

Diagnosis. *Head.* Male with black hairs on lateral slope of frons (MSSC). Female frons bare except for strong vertical seta; face flat to slightly bulging in males; pedicel with long dorsal and ventral setae; first

flagellomere short and triangular with dorsoapical arista.

Thorax. Mesoscutum with matt bronze stripes over ac band and laterally above notopleuron; 4 pairs strong ac present; male usually with 2 strong posterior dc and only weak hair-like dc anteriad (MSSC); female with 5 strong dc; lateral scutellars present as short hairs.

Legs. CI usually with 3 strong black distolateral setae; male It_1 long, only slightly shorter than Tl_1 ; It_{2-5} each relatively short.

Wing. With dark brown maculations, the patterns being similar on both sexes; crossvein m-cu sinuous.

Abdomen. Male cercus usually forked.

Remarks. The *Chrysosoma antennatum* Group is not characterised by any strong apomorphy but represents a residual grouping from the more strongly defined *lucigena*, *vittatum* and *aeneum* Groups.

The three included *antennatum* Group species are all from the Papuan subregion.

antennatum Becker, 1922a: 149. (ZMHB, examined),

Bismarck Archipelago: New Britain, New Ireland. **trichromatum** Parent, 1939: 163. (ANIC, examined), New Britain (syn. Bickel & Dyte, 1989).

The types of *Chrysosoma antennatum* and *C. trichromatum* were examined together and are identical. The distinctive wing maculation, especially noting the basal yellowish subcostal maculation and the brown maculation in cell R_5 , is similar on both sexes. The hypopygium is figured more accurately in Parent's description than in Becker's. I have seen additional material from New Britain and New Ireland (AMS, ANIC, BMNH) and the species is characteristic of the Bismarck Archipelago.

Lectotype here designated for *Chrysosoma antennatum* Becker, male, with label "Bismark Arch, 3-vii-96 Dahl S, 1896-97 (ZMHB)."

fissilamellatum Parent, 1939a: 158. (ANIC, examined), Papua New Guinea.

Chrysosoma fissilamellatum is closely related to *C. antennatum*, and both have similar hypopygia. The type series comprises two males (ANIC) and a female (MNHP).

quadratum Wulp, 1884: 222. (*Psilopus*) (RMNL, female only, examined), Maluku (Halmaheira).

The type series consists of three females. I have seen a possible male with identical wings from Maluku: Bucan Island (USNM). This specimen appears close to the *aeneum* Group but it lacks the allantoid first flagellomere.

Lectotype here designated for *Psilopus quadratus* Wulp: female, bearing label "Bernstein, Morotai".

The *lacteimicans* Group

Diagnosis. *General.* Body length usually less than 5 mm.

Head. Male with weak vertical seta, female vertical strong; face slightly bulging in males; first flagellomere

triangular with apical arista.

Thorax. Ac developed as 3-4 strong pairs; lateral scutellars reduced to weak hairs or lost.

Legs. CI sometimes with black distolateral setae; femora bare ventrally, without long setae; tibiae usually without major setae in males, but with stronger tibial setation present in females; TII and IIt usually covered in short erect setae (MSSC).

Wing. Male usually with large dark brown maculation and sometimes with opaque white apex (MSSC); female wing always hyaline; crossvein m-cu externally bowed in the center or slightly sinuate, almost straight.

Abdomen. Hypopygium relatively small; cercus usually short and digitiform with ventrobasal projection.

Remarks. The central Pacific *lacteimicans* Group is known the Samoan and Cook Islands, Micronesia, Fiji and Vanuatu. All species have similar male genitalia, TII and IIt usually covered in short erect setae (MSSC), and a distinctive m-cu crossvein, which is externally convex at the center or almost straight, not sinuous as in many other *Chrysosoma*.

Males of some Samoan species have strongly maculated wings while female wings are hyaline. This explains why the maculated wing species were described only from males and females were not associated. Lamb (1929), for example, noted a large number of clear-winged *Chrysosoma* females which he was unable to place with any male from his Samoan material. (The western Pacific *arrogans* Group species, *C. emiens* and *C. excellens*, have maculated-wing males with m-cu also bowed and possibly hyaline-winged females.)

Apart from the erect hairs on leg II and maculated wings, the four Samoan species lack other major MSSC. However, *C. molestum* and its undescribed Cook Islands sister species have hyaline wings in both sexes, and male erect hairs on leg II and long setae on IIt₂.

The *lacteimicans* Group species display some similarities with New World *Amblypsilopus* (eg, *A. scintillans*), especially noting the short digitiform cercus, lack of major leg setation, and erect hairs on leg II (MSSC). Some New World *Amblypsilopus* (eg, *A. dimidiatus* and *A. maculatus*) even show similar wing maculation as in male Samoan species, but in both sexes. However, antennal structure, the bowed m-cu, and male genitalia suggest that the *lacteimicans* Group probably originated in the western Pacific, and possibly near such species as *C. emiens* and *C. excellens* of the *Chrysosoma arrogans* Group.

Included species:

consimile Lamb, 1929: 133. Western Samoa, American Samoa.

Chrysosoma consimile has yellow halteres and femora, unlike those of the darker *C. lacteimicans*.

lacteimicans Becker, 1924: 28. (NHMW, examined), Samoan Islands.

decorum Lamb, 1929: 132. (BMNH, examined), Western Samoa (syn. Bickel & Dyte, 1989).

latefuscatum Parent, 1929a: 204. (MLUH, examined), Samoan Islands (syn. Bickel & Dyte, 1989).

The syntypes of *Chrysosoma lacteimicans* were compared directly with the holotype of *C. latefuscatum* and a paratype of *C. decorum*. They are identical in all respects, especially noting the leg colour, strong ventral seta at one-third on TII, erect cilia on TII and IIt, and the distinctive spatulate projection from the base of the cercus. Becker's *C. lacteimicans* syntypes are somewhat teneral with the brown wing maculation present only as a dark grey wash, but the opaque white apex is distinct.

Females are not associated but probably have hyaline wings. Males have black halteres.

Lectotype here designated for *Chrysosoma lacteimicans*: male, bearing the label "Samoa, Schultz".

innatum Lamb, 1929: 134. (BMNH, examined), Western Samoa.

molestum Parent, 1934b: 288. (BMNH, examined), Vanuatu (Banks Group), Gilbert Islands, Tuvalu. *Chrysosoma molestum* has hyaline wings and male IIt₂ with a distinctive long apical seta (MSSC). I have seen additional specimens from the Gilbert Islands (BPBM) and Tuvalu (ANIC, BMNH). The tibiae are mostly bare of major setae, and TII and IIt are covered in short erect hairs (MSSC). This species is redescribed and figured in Bickel (in press).

A closely related undescribed species from the Cook Islands (BPBM, AMNH, BMNH, ZMUC) has two long apical setae on IIt₂.

viduum Lamb, 1929: 135. (BMNH, examined), Western Samoa.

Unplaced Oriental and Australasian *Chrysosoma*

The following Oriental and Australasian species have been placed in *Chrysosoma*, but are not readily associated with established species groups. However, since their types exist and/or accurate descriptions are available, these species are identifiable. Some may be ascribed to groups or perhaps referred to *Plagiozopelma* upon future revisionary work.

aestimatum Walker, 1860: 114. (*Psilopus*) (BMNH, examined), Sulawesi, **n.comb.**

Parent (1934a: 1) listed this species as an unrecognisable female. However, Walker's description was based on a male and the BMNH has single male and female specimens. The male is missing its head but based on the hypopygial structure, the species is transferred to *Chrysosoma*.

bifiguratum Becker, 1922a: 140. (ZSI, not seen, female only), Assam.

The strong setae on CI possibly associate this species with the *Plagiozopelma flavipodex*

Group, although the distinctive wing maculation is unusual.

exilipes Parent, 1935a: 426. (BMNH, examined), Sabah.
herbereri Parent, 1932b: 103. (MLUH, examined), Indonesia (Sumbawa).

The holotype is badly damaged, missing its head and most legs. The male TI has a short dorsal at one-eighth, a stronger dorsal at half, and a strong preapical ventral. Parent's figures and description should enable accurate identification.

loriseta Parent, 1934b: 287. (BMNH, examined), Andaman Islands.

medium Becker, 1922a: 139. (TMB, lost), Papua New Guinea.

The distinctive wing maculation enables potential identification of this species.

palapes Hardy & Kohn, 1964: 234. (BPBM, examined), Hawaiian Islands (Oahu), Sri Lanka.

The hypopygium and flattened $\text{III}_{t_{3-5}}$ are distinctive and accurately figured in the original description. Crossvein m-cu is almost straight. I have seen a male and two females, identical in all respects to Hawaiian specimens, from Sri Lanka: Gilimale (USNM). Such a disjunct distribution is remarkable and suggests accidental introduction to Hawaii from Sri Lanka.

I have seen a related undescribed species from Sri Lanka: Trincomale (USNM).

planitarse Becker, 1922a: 168. (TMB, lost), Papua New Guinea.

The description and flattened It_{1-2} should enable identification of this species.

sagax Becker, 1922a: 152. (NHMW, not seen), India.

sumatranum Enderlein, 1912: 380. (Warsaw, not seen), Sumatra.

Enderlein's description, "Vordercoxen mit 1 Langsreihe gelber Haare" could be interpreted to indicate strong CI setae, placing this species in the *Plagiozopelma flavipodex* Group.

Notes on Afrotropical *Chrysosoma*

Prior to this revision, more than 100 species of Afrotropical Sciapodinae had been referred to *Chrysosoma* (Dyte & Smith, 1980). Some of these are now regarded as *Plagiozopelma* (see Notes on Afrotropical *Plagiozopelma*), while others are referred to *Amblypsilopus* (see Notes on Afrotropical *Amblypsilopus*, and the *Amblypsilopus abruptus* Group) and the new genus *Ethiosciapus*.

The Vanschuytbroeck 1959 key to Afrotropical Sciapodinae has many problems, especially his interpretation of established species. Parent's 1933d key to Afrotropical *Chrysosoma* (s.l.), although dated, is better.

The Afrotropical *Chrysosoma* s.s. is closely related to the Oriental fauna. The following notes are based

on original descriptions and examination of types and other material. Tentative groups are proposed for the major associations of Afrotropical species, but species lacking distinctive characters or whose descriptions are inadequate are left as undifferentiated *Chrysosoma*.

A. The *vittatum* Group. The Afrotropical and Oriental species in this group have similar hypopygia, straight or convex M_1 , brown wing maculations, leg II sometimes with modified short setae (MSSC), and usually bronze thoracic vittae (see discussion of *vittatum* Group elsewhere). This Group possibly grades into the *senegalense* Group.

The Group includes: *Chrysosoma aequatoriale* Parent (MNHP, examined), *C. aequilobatum* Parent (TII is described as having long setae, a possible link with the *senegalense* Group), *C. alboguttatum* Parent (MNHP, female only, examined), *C. bacchi* Dyte (BMNH, examined), *C. bredoi* Parent, *C. carum* Walker, *C. continuum* Curran (specimen identified by Curran, AMNH), *C. fortunatum* Parent, *C. hirsutulum* Parent, *C. norma* Curran, *C. praecipuum* Parent, *C. repertum* Becker, *C. speciosum* Parent, *C. triumphator* Parent and *C. zephyrum* Bigot (MNHP, examined).

B. The *senegalense* Group. A large Afrotropical group in which males have very long posterior and pd setae on II_{t_1} and usually TII (MSSC), is centered around *C. senegalense* Macquart. This group has a hypopygial structure close to that of the *leucopogon* Group (eg, see Curran, 1925, figs 3, 5, 12). [Other *Chrysosoma* groups also have very long leg setae but in both sexes, and on different legs (on FI, TI and usually TII). These include the Sundaland *leucopogon* Group Assemblages IIF and IIE, and the Papuan *lucigena* Group.]

Wings often have dark maculations and M_1 is almost straight in some species, linking the *senegalense* and *vittatum* Groups. Intermediates between the two groups are evident (eg, *C. tricrinitum* and *C. albocrinitatum* have relatively short TII setae, and note *C. aequilobatum* from the *vittatum* Group, above).

The *senegalense* Group includes: *Chrysosoma albilimbatum* Bigot (MNHP, examined), *C. albocrinitatum* Curran, *C. angolense* Parent (MNHP, examined), *C. gemmeum* Walker (BMNH, examined), *C. hargreavesi* Curran (BMNH, examined), *C. katangense* Curran (AMNH paratype, examined), *C. lavinia* Curran (AMNH paratype, examined), *C. liberia* Curran (AMNH, examined), *C. mixtum* Curran (BMNH, examined), *C. schoutedeni* Curran (AMNH paratype, examined), *Chrysosoma senegalense* Macquart, *C. tarsiciliatum* Parent (MNHP, examined; males have $\text{II}_{t_{1-4}}$ with somewhat shorter setae than other group members), *C. tricrinitum* Parent (MNHP, examined) and *C. varivittatum* Curran.

Chrysosoma mixtum from Nigeria is possibly a synonym of the common West African *C. senegalense*. The male holotype of *C. mixtum* was compared directly with identified specimens of *C. senegalensis* at the BMNH and they were identical. However,

Curran's key (1927) indicates differences in colour of the lower calypter setae. Parent's discussion (1933c) suggests that *C. senegalense* displays significant intraspecific variation and perhaps additional species are variants of a polytypic *C. senegalense*.

C. The *passiva* Group (= *Kalocheta*, for further discussion, see *Chrysosoma* Remarks). All species have a distinctive flattened and strap-like arista in both sexes. The extent of arisal flattening is variable among species. The male legs are relatively unmodified. The following five of the *passiva* Group are here newly referred to *Chrysosoma*.

collarti Parent, 1933d: 35. (*Kalocheta*), **n.comb.** [nec. *Chrysosoma collarti* Curran, 1927: 249 (= *Plagiozoplema collarti*)].

cucana Negrobov & Kulibali, 1983: 1121. (*Kalochaeta*), **n.comb.**

neoliberia, **n.nom.**

liberia Curran, 1929: 5. (*Kalocheta*) (AMNH, examined) [preoccupied Curran, 1929: 4].

passiva Becker, 1923: 42. (*Kalocheta*), **n.comb.**

villersi Vanschuytbroeck, 1970: 267. (*Kalocheta*) (MNHP, examined), **n.comb.**

D. The *gemmarium* Group. Species in this group are large sized, greater than 8 mm in length, have long legs and aristae, and mostly yellowish thorax, legs and abdomen. The head is high and narrow, frons polished metallic coloured, very long first flagellomere which tapers into the long apical arista, CI with 3 black apical setae, male TI thickened (MSSC), It_1 prolonged, with each segment It_{2-5} usually swollen and deformed (MSSC), male IIt_1 with modified hairs (MSSC), M_1 slightly concave and originating close to wing apex, m-c only slightly sinuate, abdomen elongate (especially in males), and cercus lobate.

An undescribed species from Zaire (CNC) has a strap-like arista in both sexes, a convergence with the *passiva* Group.

The *gemmarium* Group shows some similarities with *Plagiozoplema* and perhaps it should be referred there (see Notes on Afrotropical *Plagiozoplema*) or made a separate genus.

The Group includes: *Chrysosoma africanum* Parent, *C. anomalipes* Parent, *C. decellei* (Vanschuytbroeck), *C. gemmarium* Walker (BMNH, examined), *C. inversum* Curran (BMNH, examined), *C. kamerunense* Becker, *C. meyeri* (Vanschuytbroeck), *C. pseudogemmarium* Parent, *C. saegeri* (Vanschuytbroeck) and *C. tuberculatum* Curran (BMNH, examined).

E. Although the widespread *Chrysosoma leucopogon* occurs on the east African coast, no additional *leucopogon* Group species are recognised, although perhaps *C. woodi* Parent (BMNH, examined) belongs here.

Abbemyia n.gen.

Etymology. *Abbemyia* is named in honour of Abbé Octave Parent, the foremost student of the family

Dolichopodidae. The gender is feminine.

Type species. *Psilopus nigrofasciatus* Macquart, 1850, here designated.

Diagnosis. *Head.* Frons with usually with strong vertical seta in both sexes, and sometimes male with additional long black hairs (MSSC); male face bulging (MSSC); clypeus adjacent to margin of eye; pedicel with relatively long dorsal and ventral setae, longer in male than female; first flagellomere rounded equilateral triangular; arista apical, length about equal to head width.

Thorax. Dorsum metallic green with bronze reflections; 3 pairs strong ac present; 2 strong posterior and 3 weaker anterior dc present; female with 5 strong dc; lateral scutellar setae absent.

Legs. At least CI, all femora and tibiae of females and sometimes males yellow; FI with 2 strong pale basoventral setae; male FI and TI sometimes with rows of spine-like setae (MSSC); It_1 often slightly swollen with pale ventral pile at base (MSSC); TII with strong ad and pd setae.

Wing. Hyaline with faint brown wash; M_1 with gentle curve to apex; m-cu straight.

Abdomen. Hypopygium dark brown; epandrium subrectangular; hypopygial foramen left lateral; hypandrial arm extending almost to apex of aedeagus; 2 strong epandrial setae present; epandrial lobe greatly modified, prolonged and downcurved, and bearing strong modified apical seta; surstylus short and reduced; cercus short with strong lateral setae.

Remarks. Although bearing a superficial resemblance to *Chrysosoma*, species in the genus *Abbemyia* are distinguished by the following features: male usually with strong vertical seta, male clypeus almost adjacent to margin of eyes, lateral scutellar setae absent and crossvein m-cu straight. As well, features of the hypopygium, such as the greatly prolonged and downcurved epandrial lobe with its strong modified apical setae, and the simple cercus also distinguish the genus. In antennal shape and overall body habitus, *Abbemyia* shows some similarity to *Narrabeenia*.

Abbemyia is known from two eastern Australian species, *A. nigrofasciata* and *A. taree*, and three undescribed species, two from Fiji (NZAC), and one widely distributed across the central Pacific: the Society, Marquesas and Tuamotu groups, Vanuatu and New Caledonia (BMNH, BPBM, AMS). All have the strongly modified epandrial lobe. Most specimens have been collected in low-lying coastal vegetation.

Included species:

nigrofasciata Macquart, 1850: 126. (*Psilopus*) (MNHP, examined), Australia (NSW, Qld), **n.comb.**

regale Parent, 1932a: 111. (ANIC, examined), Australia (NSW).

chetiscutatum Parent, 1932a: 113. (ANIC, examined, female only), Australia (NSW).

taree n.sp. Australia (NSW).

Key to Males of *Abbemyia*

1. All coxae and femora dark metallic green; haltere brown; frons with abundant black lateral hairs posteriad of vertical seta; pedicel with several long dorsal and ventral setae; scutellum with irregular setae on disc; TII with ad setae at one-sixth, one-quarter and subapically; cercus relatively short, without long apical setae (Fig. 65a) (NSW, Qld).....*A. nigrofasciata*
- Coxa I and all femora yellow; haltere yellow; frons with strong vertical seta only; pedicel with single long dorsal and ventral setae; scutellar disc bare; TII with ad setae at one-quarter and subapically; cercus elongate, with intertwined apical setae as long as hypopygium (Fig. 65d) (NSW)*A. taree*

Abbemyia nigrofasciata (Macquart), n.comb.

Psilopus nigrofasciatus Macquart, 1850: 126.

Chrysosoma regale Parent, 1932a: 111.

Chrysosoma chetiscutatum Parent, 1932a: 113 (syn. Bickel & Dyte, 1989).

Type material. Macquart described *Psilopus nigrofasciatus* from a male collected on the eastern coast of Australia (MNHP, examined). After seeing the Macquart holotype, Parent (1932e: 876) placed his *Chrysosoma regale*, based on a male from Woy Woy, NSW (ANIC, examined), in synonymy. Although *Chrysosoma chetiscutatum*, a female also taken at Woy Woy (ANIC, examined), has distinctly different leg colouration, the association of the sexes is supported by specimens collected elsewhere, and the species is regarded as a synonym.

Additional material. New South Wales – male, Nelson Bay, 12 Nov. 1960 (ANIC); 2 females, Newport, near Sydney, 2-6 Nov. 1972; 3 Jan. 1973 (BMNH); male, The Entrance, 18 Dec. 1986; male, female, Harrington, 4-11 Nov. 1988, littoral rainforest (AMS). Queensland – male, female, Rockhampton, no date (AMS); female, Cooloola National Park, Oct. 1978; female, Dunwich, Stradbroke Island, 25 Sept. 1985. (QDPI).

Description – male. Length: 5.0; wing: 4.0 x 1.6.

Head (Fig. 65b). Frons dark shining metallic blue-green; lateral frons with abundant black lateral hairs (MSSC) posteriad of vertical seta; face and clypeus metallic blue-green, with fine silvery pruinosity, evident at oblique angle; upper face bulging; clypeus close to lateral margin of eye; palps brown with black setae; proboscis yellow; ventral postcranium with abundant pale hairs; antenna black; pedicel with 2-3 long dorsal and 6-7 long ventral setae, almost forming corona (MSSC); first flagellomere as equilateral triangle; arista apical, length about equal to head width.

Thorax. Dorsum metallic green with bronze reflections; scutellum metallic blue; pleura metallic green with dense grey pruinosity; 3 pairs strong ac present; 2 strong posterior and 3 weaker anterior dc present; 1 pa, 2 sa, 2 weak sr, 2 np, 1 hm, and 1 pm present; lateral scutellar setae absent; scutellum with irregular weak black setae on disc (MSSC).

Legs. Coxae, femora, distal tarsomeres I and II, and all tarsus III black; tibiae and basal tarsomeres I and III yellow; CI and CII with pale anterior hairs and CIII with pale lateral setae; I: 9.0; 7.0; 5.0/2.0/1.5/1.0/1.0; FI with pale basoventral setae and row of black posteroventral spine-like setae distad (MSSC); TI with ventral row of short porrect black setae along entire length (MSSC); It₁ slightly swollen with pale ventral pile in basal eighth (MSSC); II: 9.0; 10.0; 7.0/2.5/2.0/1.0/1.0; TII with ad setae at one-sixth, one-quarter and subapically, and pd setae at one-quarter and subapically; III: 11.0; 14.0; 6.0/3.5/2.0/1.0/1.0.

Wing. Hyaline with faint brown wash; M₁ with gentle curve to apex; m-cu straight; CuAx ratio: 2.7; lower calypter yellow with black setae; haltere brown.

Abdomen. Metallic green with bronze reflections; on segments 2-6, basal half of each tergum and narrow band on preceding adjacent tergum matt brown; hypopygium dark brown, with massive yellow cerci (Fig. 65a); epandrium subrectangular; hypopygial foramen left lateral; hypandrial arm arising beyond midlength and extending almost to apex of aedeagus; 2 strong epandrial setae present; epandrial lobe greatly prolonged and downcurved, and bearing strong apical blade-like seta and long external bristle; surstylus reduced in size, fused to epandrium and bearing short setae; cercus stout, subtriangular and tapering with strong black undulating lateral setae and row of strong ventral spine-like setae.

Female. Similar to male except lacking MSSC and as noted: head (Fig. 65c); frons bare except for strong black vertical seta; 5 strong dc present; scutellar disc bare; CI, femora, tibiae and basal tarsomeres yellow; CII, CIII and distal tarsomeres black; CI with 3 pale distolateral bristles; CIII with pale lateral setae; FI with 2 pale basoventral setae; TI without short ventral setae; TII setation similar; haltere yellow.

Remarks. *Abbemyia nigrofasciata* occurs in coastal habitats from Rockhampton, Queensland to the Sydney district, New South Wales. This species shows strong leg colour dimorphism, with all coxae and femora black in males, but CI and all femora yellow in females. As well, the haltere is black in males and yellow in females. Male FI and TI have short ventral spine-like

setae (MSSC).

Sexes of *Abbemyia nigrofasciata* have been associated based on occurrences together, accounting for the leg colour dimorphism and the synonymy of the female *Chrysosoma chetiscutatum*. Males of the yellow femur *Abbemyia taree* are known only from the mouth of the Manning River, NSW, while black femur males of *Abbemyia nigrofasciata* and a yellow legged female occur over a wide range. Although one might associate male *A. taree* with all females, I feel that yellow legged females outside of the Manning River are best regarded as *A. nigrofasciata*, especially if males are also present. Possibly females of both species cannot be accurately separated, even though their males are distinct.

***Abbemyia taree* n.sp.**

Type material. HOLOTYPE male, PARATYPES 2 males, New South Wales, Harrington, 11 Jan. 1993, *Juncus* reed swamp, G. Williams (AMS).

Description – male. Length: 4.5; wing: 4.0 x 1.5; similar to *A. nigrofasciata* except as noted.

Head. Lateral frons with strong black vertical seta only, without additional setae; palp yellow with black setae; proboscis yellow; antenna black; pedicel with only single long dorsal and ventral setae.

Thorax. Scutellum without setae on disc.

Legs. CI yellow; CII and CIII dark brown; all trochanters, femora, tibiae and basitarsi yellow; distal tarsomeres dark brown; CI and CII with pale anterior hairs and CIII with pale lateral setae; relative podomere ratios similar; FI with 4-5 very long ventral setae in basal third (MSSC), and with some short pale av and pv setae distally; TI with pv row of black setae along entire length, becoming slightly longer and somewhat crocheted distally (MSSC); It_1 slightly swollen with pale ventral pile in basal sixth (MSSC); TII with ad setae at one-quarter and subapically, and with weak pd setae at one-quarter and subapically.

Wing. Hyaline; CuAx ratio: 2.6; lower calypter with pale setae; haltere yellow.

Abdomen. Metallic green with bronze reflections; on segments 2-6, basal half of each tergum and narrow band on preceding adjacent tergum matt brown; hypopygium (Fig. 65d) dark brown, with yellow cerci; hypandrial arm curved and extending almost to apex of aedeagus; 2 strong adjacent epandrial setae present; epandrial lobe greatly prolonged and

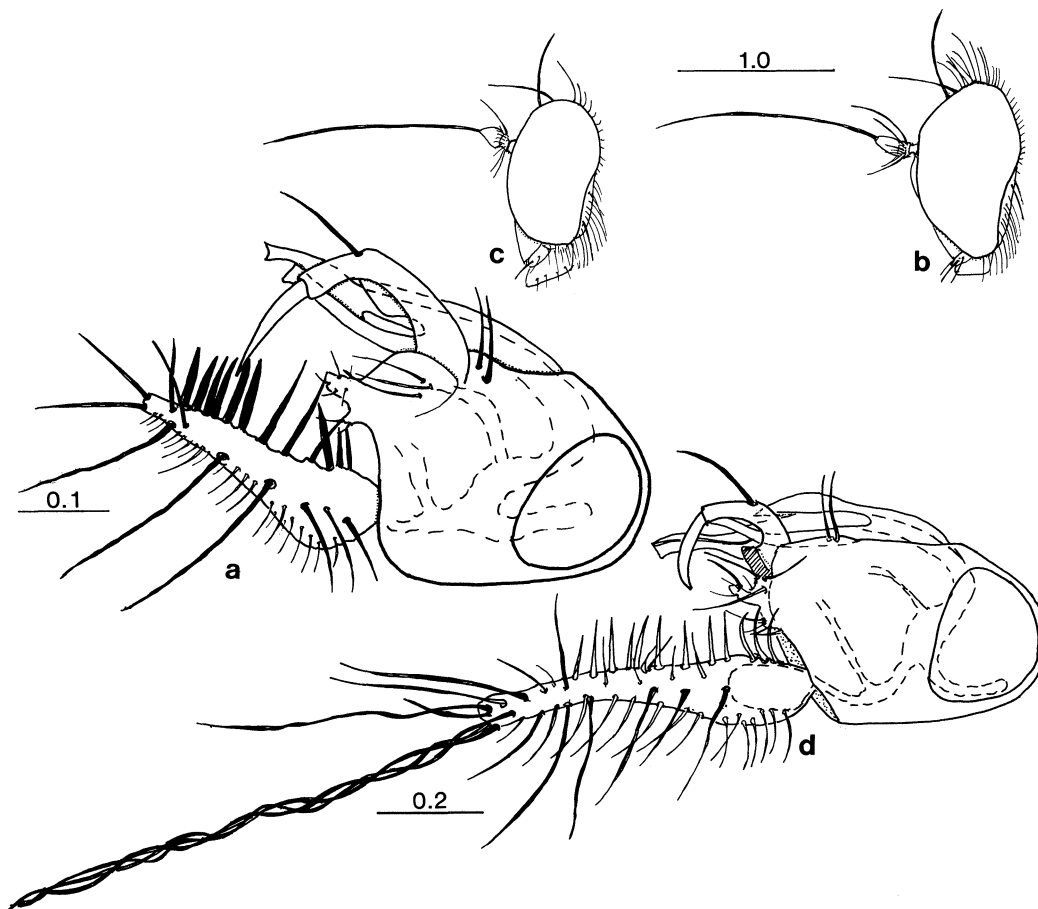


Fig. 65. *Abbemyia nigrofasciata*, Woy Woy, NSW: a – hypopygium, left lateral; b – male head, left lateral; c – female head, left lateral. *A. taree*, Harrington, NSW: d – hypopygium.

downcurved, and bearing very strong modified apical blade-like bristle and long external seta; surstylus reduced in size, with 3 mounds being setal fields as figured; cercus elongate, with strong black undulating lateral and intertwined apical setae and row of ventral spine-like setae.

Female. Unknown (also see Remarks for *A. nigrofasciata*).

Remarks. *Abbemyia taree* is known only from *Juncus* swamps at the mouth of the Manning River, near Taree, New South Wales. It occurs sympatrically there with *A. nigrofasciata*. In pedicel setation, lack of hairs on the frons, and leg colouration, male *A. taree* are similar to female *A. nigrofasciata*. Females have not been directly associated with *Abbemyia taree*, but see Remarks for *A. nigrofasciata*.

Plagiozopelma Enderlein

Plagiozopelma Enderlein, 1912: 367. Type species *Plagiozopelma spengeli* Enderlein, 1912, by original designation [= *Psilopus appendiculatus* Bigot, 1890].

Psilopus, authors, not Meigen.

Chrysosoma, authors, not Guérin-Meneville.

Margaritostylus, authors, not Bigot.

Megistostylus, authors, not Bigot.

Diagnosis. *Head.* Frons usually shining, highly polished, although sometimes with dusting of pruinosity; strong postvertical setae present as continuation of postocular series; vertical seta strongly developed in female, but absent or as weak hair in males; face usually bulging in males (MSSC), but conforming with curvature of eyes in females; male clypeus usually narrowed and separated from margins of eyes (Fig. 67h); male scape often swollen and vasselike (MSSC); pedicel with only weak dorsal and ventral setae; male first flagellomere conical with apical arista; female first flagellomere subrectangular with arista dorsoapical to dorsal; male first flagellomere sometimes elongate and allantoid, more than three times as long as wide (MSSC); male arista often modified, either with apical flag (eg, Fig. 67d), or thickened and ornamented (MSSC).

Thorax. Usually 2-4 pairs of strong ac present; male usually with 2 strong posterior dc, and 3-4 weak anterior hairs (MSSC); female with 5-6 strong dc, decreasing in size anteriorly; lateral scutellar setae reduced to weak hairs or absent.

Legs. CI usually with 3-7 strong lateral spine-like setae, more strongly developed in females than males (Fig. 67b); CI sometimes with 3 strong black distolateral setae; FI and TI in both sexes usually without major setae.

Wing. Crossvein m-cu slightly sinuous to straight.

Abdomen. Without strong bristles; hypopygial

peduncle (segment 7) with tergum and sternum both well developed (Fig. 67j); aedeagus with dorsal angle; cercus usually deeply forked.

Remarks. Enderlein erected the genus *Plagiozopelma* for the single species, *Plagiozopelma spengeli*. The only significant diagnostic feature he gave was the presence of an external stub vein on crossvein m-cu. Because of its apical arista, Becker (1922a) placed the genus in synonymy with *Chrysosoma*. However, a large number of species which share distinctive characters, and including *P. spengeli*, are here separated from *Chrysosoma* and given generic status. The name *Plagiozopelma* was raised from synonymy by Bickel & Dyte (1989).

Plagiozopelma centers around the diverse *flavipodex* Group, and most species in the genus have at least some of the following characters: frons usually shining, highly polished; male with vertical seta as weak hair or absent; male first flagellomere conical with apical arista; tibiae and femora without strong setae (unlike most *Chrysosoma*); crossvein m-cu slightly sinuous to straight; abdomen without strong bristles.

Of particular interest is the development of distinctive female secondary sexual chaetotaxy (FSSC), not found on the male. In most sciapodines, males develop the more distinctive chaetotaxy (modified leg setae, anterior dc reduced to hairs, supernumerary setae, etc.) while females carry a conservative and more predictable chaetotaxy. However, in *Plagiozopelma*, especially the *flavipodex* Group, females have strongly developed lateral CI spines and sometimes anteromedian setal fields, which are only weakly developed in males. In addition, females of the *angustifacies* Group have strong projecting spines on the ventral postcranium.

Plagiozopelma occurs widely across the Oriental, Afrotropical and Australasian tropics but is most diverse in the Orient. The genus is especially diverse on the Indian subcontinent, and perhaps it was derived there from a taxon near the *Heteropsilopus triligatum* Group. The Indian *H. hilare* and *H. vanum* have CI with strong spine-like setae, a shining vertex, apical arista, and a flattened It₁ (MSSC), not unlike species in Assemblage IV of the *Plagiozopelma flavipodex* Group. However, crossvein m-cu of *Plagiozopelma* is almost straight, in strong contrast to the strongly sinuate m-cu of *Heteropsilopus*. In other characters, *Plagiozopelma* shows similarities to *Amblypsilopus* with its often delicate habitus, absence of strong leg setae and straight m-cu.

Of the five Oriental and Australasian Groups considered in detail, the *flavipodex* Group is found across the Orient and Australasia, the *alliciens*, and *annotatum* Groups are Oriental, and the *terminiferum* and *angustifacies* Groups are Papuan. The *bequaerti* Group is Afrotropical (see Notes on Afrotropical *Plagiozopelma*). There are also some unplaced *Plagiozopelma*, and many species await description.

Key to Old World *Plagiozopelma* Groups

The following key enables separation of the *Plagiozopelma* groups. However, due to uncertain limits in some groups some species may not be accurately placed. As well, some species listed under Unplaced *Chrysosoma* may belong in *Plagiozopelma*.

1. Five strong dc present in both sexes; head circular in anterior view; face and clypeus elongate; pleura with silvery pruinosity; CI with 3-5 strong black distolateral spine-like setae; III_t₃₋₅ each slightly flattened (MSSC); m-cu straight; epandrium with flat dorsal surface; cercus lobate, distinctive (Fig. 70a) (Melanesia, Australia) *angustifacies* Group
- Male usually with 2 strong posterior dc and 3-4 weak hair-like dc anteriorly; vertex strongly excavated and head wider than high; other features various 2
2. CI with 3 strong black distolateral setae; vertex and frons usually with dusting of pruinosity; wing hyaline; m-cu straight; first flagellomere elongate tapering, with relatively thick apical arista; male arista sometimes with apical flag; cercus short and simple, and with additional arm-like projection ventrad of cercus (India, Sri Lanka) *annotatum* Group
- CI usually with 3-8 strong lateral spine-like setae, more strongly developed in females than males; vertex and frons usually polished metallic green-blue; male wing sometimes with anteroapical maculation 3
3. Male scape distinctly swollen and vasselike; male arista thickened, expanded, or with apical flag; male It₁ often flattened 4
- Male scape not strongly swollen; arista always simple 5
4. Male arista, if modified, with ovate apical flag; male arista about as long as body; surstylus often curved and deflexed; male distal It tarsomeres usually unmodified; cercus usually with ventral arm arising near base (Orient, Australasia) *flavipodex* Group
- Male arista thickened and flattened and expanded, with fringes, etc., and its length usually less than half body length; male leg I distal tarsomeres usually modified with protuberances, setal brushes, etc.; cercus usually large and lobate (Afrotropics) *bequaerti* Group
5. Male first flagellomere normal; male III_t₃₋₅ dorsoventrally flattened, padlike; male It₁ with 4 long posterior crocheted hairs on distally; epandrium elongate subtriangular; cercus with elongate blade-like arms (Fig. 72a,b) (New Guinea, Qld) *terminiferum* Group
- Male first flagellomere elongate and allantoid, more than 3 times as long as wide; male III_t₃₋₅ not flattened; hypopygium otherwise (Orient) *alliciens* Group

The *flavipodex* Group

Diagnosis. *Head.* Frons shining and highly polished metallic blue-green; male scape swollen and vasselike (Fig. 67f) (MSSC) (group autapomorphy); male arista often with apical flag which is usually ovate or cordate (MSSC); male arista about as long as body (MSSC) (Fig. 67k), whereas female arista about half body length.

Legs. CI with 3-7 strong lateral spine-like setae, more strongly developed in females than males (Fig. 67b) (FSSC) (group autapomorphy); on larger specimens, female CI also sometimes have anteromedian setal fields (FSSC); male It₁ often ovate and flattened with pale ventral pile (MSSC).

Abdomen. Surstylus often curved and deflexed; cercus usually with ventral arm arising from cercal base, and sometimes with additional arm.

Remarks. The *flavipodex* Group is found throughout the Orient and western Australasian tropics (Fig. 66), but is particularly diverse on the Indian subcontinent. Species extend as far east as Fiji and the Marianas Group. For the closely related Afrotropical *bequaerti* Group, see Notes on Afrotropical *Plagiozopelma*.

With existing literature, most Oriental species can be identified with confidence. Females are readily assigned to the Group on the basis of strong CI spines (FSSC). Males of many species have arisal flags (MSSC), but these are easily broken off the long arista. Consequently specimens which appear complete may in fact be damaged, and some published descriptions omit mention of these characteristic flags.

Of particular interest is an undescribed species from Malaysia: Kuala Lumpur and Thailand: Biserat (both BMNH) in which the male has a distinctive binodate arista (MSSC). Here the apical arisal flag, which is basally black and distally white, is precisely repeated at two-thirds along the arista. The hypopygium is close to that of *P. punctinerve* (Assemblage I, below), but the venation is unmodified.

Of the four species occurring in Australia, *Plagiozopelma ashbyi*, *P. aurifrons* and *P. placidum* are endemic, while *P. flavipodex* is widely distributed throughout the Orient and Australasia. Most are associated with rainforest and other moist habitats.

Plagiozopelma aurifrons does not have sexually dimorphic dc setae, and its female has spine-like lower postorbitals (FSSC), characters diagnostic for the *angustifacies* Group. *Plagiozopelma aurifrons* therefore may represent the *flavipodex* Group ancestor of the *angustifacies* Group.

I have seen specimens (CNC, BMNH, BPBM, MCZ, AMNH, USNM, AMS) of undescribed species from Sri Lanka, India, Nepal, Malaysia, Philippines, Thailand, New Guinea, Fiji and Vanuatu (but not New Caledonia). For convenience, species of the *Plagiozopelma flavipodex* Group are divided into the following nine assemblages. Species within the assemblages usually share certain characters and are probably most closely related.

I. The following species have both a boil-like swelling on vein M, basad of crossvein m-cu crossvein (MSSC) and an arisal flag (MSSC). Also see discussion in Remarks, above.

albipatellatum Parent, 1935a: 358. (*Chrysosoma*) (BMNH, examined; paratype AMNH), Sabah, **n.comb.**

parapunctinerve Hollis, 1964a: 242. (*Chrysosoma*) (ZMUA, examined), Sumatra, West Malaysia, **n.comb.**

Additional record. West Malaysia: Fraser's Hill (BMNH).

punctinerve Parent, 1935a: 198. (*Chrysosoma*) (BMNH, examined), West Malaysia, **n.comb.**

II. The following species have the male arista with distinct black and white banding and an apical flag (MSSC).

anuliseta Enderlein, 1912: 372. (*Margaritostylus*) (Warsaw, not seen), Sumatra, West Malaysia,

n.comb.

This species is very close to *P. nemocerum*, except for the presence of an expanded apical flag (see Becker 1922a, fig. 107).

Additional record. Male, West Malaysia: Kuala Lumpur (BMNH).

caeleste Walker, 1849: 462. (*Psilopus*) (BMNH, examined), East Indies, **n.comb.**

This species was redescribed by Parent (1934a: 6).

nemocerum Wulp, 1895: 42. (*Psilopus*) (ZMUA, examined), Java, **n.comb.**

monilicornis Parent, 1929: 197. (*Megistostylus*) (MLUH, examined, specimen lost), Java, **n.syn.**

The holotype of *Megistostylus monilicornis* is represented only by a pinned label. However, Parent's description exactly matches that of the single remaining male *Psilopus nemocerum* syntype. The almost nodate banding on the distal arista is distinctive (see Parent's figures).

III. The following species are close to *Plagiozopelma flavipodex* and have an elongate ventral cercal arm and usually a round black apical arisal flag.

cordatum de Meijere, 1914: 89. (*Psilopus*) (ZMUA, examined), Java, **n.comb.**

This species is close to *P. negotiosum*.

Lectotype here designated: male, with label "E. Jacobson, Wonosobo Java, April, 1909".

flavipodex Becker, 1922a: 156. (*Chrysosoma*) (TMB, lost; neotype ANIC). Papua New Guinea, Maluku, Australia (Qld, NT), Christmas Island, Sarawak, Philippines, Nepal, Guam, Marianas Islands.

See discussion in species section.

grandiseta Parent, 1932b: 112. (*Megistostylus*) (MLUH, examined), Lombok, Sumbawa, **n.comb.**

This species is close to *P. flavipodex* and *P. rhopaloceras*, but the ventral cercal arm has black setae along its entire length.

negotiosum Parent, 1935a: 430. (*Chrysosoma*) (BMNH, examined, paratype AMNH), Sabah, **n.comb.**

I have seen a related undescribed species with a longer cercus from Thailand: Buisit Besar (BMNH).

rhopaloceras de Meijere, 1914: 82. (*Psilopus*) (ZMUA, examined), Java, Lombok, **n.comb.**

Plagiozopelma rhopaloceras is very close to *P. flavipodex* in colouration, genitalia and MSSC, but is almost twice its length.

Additional record. Indonesia: Lombok (ANIC).

IV. The following Sri Lanka and southern India species are large (body longer than 5.0) and striking. Almost all have a strongly flattened and ovate male It, and/or a large arisal flag. *P. duplicatum*, *P. excisum*, *P. kandyense* and *P. shentorea* have digitiform ventral cercal arms, *P. extractum*, *P. ovale* and *P. petulans*, have anvil-shaped ventral arms, and *P. brunnipenne* has a large lobate cercus. *Plagiozopelma shentorea* has a distinctly dorsal arista. I have seen additional undescribed species from Sri Lanka and southern India.

brunnipenne Becker, 1922a: 165. (*Chrysosoma*) (DEI, examined), India, **n.comb.**

A related undescribed species occurs in Sri Lanka (USNM).

Lectotype here designated: male (damaged and glued to a card), bearing the label "Inde Meridionale Trichinopoly F. Caius 1911".

duplicatum Becker, 1922a: 162. (*Chrysosoma*) (ZSI, not seen), Sri Lanka, India, **n.comb.**

Additional records. Sri Lanka: Kandy District; Okkampitiya (CNC); Ekgal Aru; Wilpatta National Park; Silarathurai Kondachchi (USNM). India: Nedungadu (AMNH).

excisum Becker, 1922a: 162. (*Chrysosoma*) (ZSI, not seen), Sri Lanka, **n.comb.**

I have seen additional specimens from the Kandy and Katugastota districts (USNM, CNC).

extractum Becker, 1922a: 161. (*Chrysosoma*) (ZSI, not seen), Sri Lanka, **n.comb.**

Becker's description omitted mention of the colour of legs I and II and possibly these legs were missing from his single male type. Specimens listed below with the hypopygium and arista identical to Becker's figures have male It₁ strongly flattened and ovate, as in other related Sri Lanka species.

Additional records. Sri Lanka: Padukka W.P. (CNC); Udawattakele and Gilemale (USNM); Matale, Perideniya (BMNH).

kandyense Hollis, 1964b: 221. (*Chrysosoma*) (Basel, not seen), Sri Lanka, **n.comb.**

Additional records. Sri Lanka: Emelina (BMNH); Udawattakele, Kandy District (USNM).

ovale Becker, 1922a: 155. (*Chrysosoma*) (syntypes in ZMHB, examined; other syntypes, in NHMV, DEI, ZSI, not seen), Sri Lanka, India, **n.comb.**

Plagiozopelma ovale presents a problem. In his species description, Becker noted that the aristal flag was either black and white (as in his fig. 99) or entirely white. I have seen only one male syntype (ZMHB), and that has the white aristal flag (not unlike that shown for *P. foliatum* in Becker, fig. 120). As well, the hypopygium appears to be different from that figured for *P. ovale* (Becker, fig. 100) in that the cercus has a third, partially hidden anvil-shaped appendage similar to that of the related *P. extractum* (Becker, fig. 112). Since I have not seen black and white flag *P. ovale* syntypes, it is unknown if they also have an anvil-shaped appendage. The syntype series of *P. ovale* probably represents two species, one with a black and white aristal flag, the other with an entirely white flag. I prefer not to make a decision concerning this species until the other syntypes can be examined.

petulans Becker, 1922a: 154. (*Chrysosoma*) (NHMW, examined), Sri Lanka, **n.comb.**

The epandrium has a yellow translucent extension which partially covers the cercus. The male type has the aristal apices broken off and Becker's original description did not mention the presence of an aristal flag. However, a specimen from Adam's Peak (USNM), identical in all respects to the lectotype, has a large black ovate apical flag which contains a whitish basal window.

Lectotype here designated: male, with label "Ceylon Fischer" (NHMW).

shentorea Hollis, 1964b: 222. (*Chrysosoma*) (Basel, not seen; male paratype BMNH, examined), Sri Lanka, **n.comb.**

The male arista is simple and distinctly dorsal. Additional records. Sri Lanka: Kahalla, Katugastota C.P., 1,000 m (CNC).

V. The following species have an external stub vein on m-cu and elongate cercal arms.

appendiculatum Bigot, 1890: 286. (*Psilopus*) (UMO, not seen), Burma, Sumatra, West Malaysia, **n.comb.**

spengeli Enderlein, 1912: 368. (*Plagiozopelma*) (Warsaw, not seen), Sumatra.

strigatum Enderlein, 1912: 376. (*Chrysosoma*) (Warsaw, female only, not seen), Sumatra.

Plagiozopelma spengeli was designated by Enderlein as the type species of the genus. Becker (1922a: 158) referred it to *Chrysosoma* and regarded Enderlein's *C. strigatum* as a female of the same species. Parent (1932d: 216) placed *P. spengeli* in synonymy with *P. appendiculatum*.

A related (possibly conspecific) undescribed species from India: Calcutta (BMNH), also with a m-cu stub vein, has a very narrow white apical aristal flag subtended by a white band at nine-tenths on the black arista. It₁ bears a black basoventral seta and is distinctly shorter than TI. Another undescribed species from Thailand: Biserat (BMNH) is similar to *P. appendiculatum*, but has the setae of the lower calypter strongly developed and appearing like a 10-pronged pitchfork (MSSC). Since there are undescribed related species with a m-cu stub vein, records of *P. appendiculatum* based only on females from both southern India (Becker, 1922a) and Sri Lanka (Hollis, 1964b) are regarded as unsubstantiated.

VI. The following species have a short lobate cercus.

grossum Becker, 1922a: 186. (*Chrysosoma*) (ZSI, not seen), Assam, **n.comb.**

oculatum Becker, 1922a: 167. (*Chrysosoma*) (ZSI, not seen), India, Nepal, **n.comb.**

The black aristal flag with included white window figured in Becker is distinctive. Unlike most members of the Group, the female lacks a row of strong CI bristles, and both sexes have abundant pale hairs and a few weak bristles on CI.

Additional record. Nepal: Katmandu (CNC).

VII. The following species all have a white aristal flag (MSSC), but are not necessarily most closely related.

albidum Becker, 1922a: 164. (*Chrysosoma*) (ZSI, not seen), Sikkim, India, Nepal, **n.comb.**

This species is close to *P. foliatum*.

allectans Walker, 1856: 119. (*Psilopus*) (BMNH, examined), Sarawak, Philippines, **n.comb.**

This species was redescribed by Parent (1934a: 2) who referred it to *Chrysosoma*.

alutiferum Parent, 1934a: 37. (*Chrysosoma*) (BMNH,

examined), Singapore, West Malaysia, **n.comb.**

Additional records. Singapore (BMNH) and West Malaysia: Kuantan Trigganu (AMS).

apicatum Becker, 1922a: 151. (*Chrysosoma*) (ZMHB, examined), Taiwan, **n.comb.**

This species is very close to *P. flavipodex* in size and cercal structure but has a white apical flag. Lectotype here designated: male, bearing label "Kankau (Form.) H. Sauter ix-12".

foliatum Becker, 1922a: 164. (*Chrysosoma*) (ZSI, not seen), India, Nepal, Burma, **n.comb.**

This species is close to *P. albidum*.

Additional records. Nepal: Birganj, 100 m (CNC) and Burma: Rangoon (BMNH).

mirandum Becker, 1922a: 157. (*Chrysosoma*) (ZSI, not seen), India, **n.comb.**

niveoapicale Frey, 1924: 118. (*Chrysosoma*) (ZMH, examined), Philippines, **n.comb.**

This species is close to *P. apicatum* but has a long ventral cercal arm.

punctiforme Becker, 1922a: 156. (*Chrysosoma*) (ZSI, not seen), India, **n.comb.**

subpatellatum Wulp, 1895: 44. (*Psilopus*) (ZMUA, examined), Java, **n.comb.**

subrectum Walker, 1864: 209. (*Psilopus*) (BMNH, examined), Maluku, Irian Jaya, West Malaysia.

pallidipes de Meijere, 1913b: 344. (*Psilopus*) (ZMUA, examined), Irian Jaya.

breve Becker, 1922a: 193. (*Chrysosoma*) (ZMHB, examined, female only), "New Guinea" (syn. Bickel & Dyte, 1989).

The arisal apices are broken off the male types of *Psilopus subrectus* and *P. pallidipes* and possibly an apical flag is present. A male from Papua New Guinea: Morobe District (BMNH) agrees in all respects but has a narrow white arisal flag. The female holotype of *Chrysosoma breve* has strong CI bristles and agrees in all respects with de Meijere's description of *Psilopus pallidipes*.

VIII. The following species well defined by males but are not necessarily closely related.

ashbyi n.sp. Australia (Qld).

aurifrons n.sp. Australia (Qld).

discophorum Frey, 1924: 117. (*Chrysosoma*) (ZMH, examined), Philippines, **n.comb.**

The cercus has a long black apical seta.

elongatum Becker, 1922a: 153. (*Chrysosoma*) (ZMHB, examined), Taiwan, **n.comb.**

prolongatum Parent, 1928: 196. (*Chrysosoma*) (ZMUB, lost), Taiwan, **n.syn.**

The male *C. elongatum* syntype is identical in all respects to Parent's description of *C. prolongatum*. Parent's description more accurately portrays the species. The basally flattened It_4 is symmetrical, not asymmetrical as figured in Becker, and the distally narrowed It_4 is prolonged as in Parent's figure.

A related undescribed species from China: Hong San, Kiangsi (USNM) has It_2 flattened and a different cercus.

Becker's record of this species from northern India was based on females only and is regarded as unsubstantiated.

Lectotype here designated for *Chrysosoma elongatum*: male, with label "Formosa Toyenmongai" (ZMHB).

impunctatum Parent, 1934b: 284. (*Chrysosoma*) (BMNH, examined, male holotype missing abdomen), West Malaysia, **n.comb.**

indentatum Parent, 1934b: 282. (*Chrysosoma*) (BMNH, examined), Cambodia, **n.comb.**

inscriptum Becker, 1922a: 157. (*Chrysosoma*) (ZSI, not seen), India, Bangladesh, **n.comb.**

placidum n.sp. Australia (Qld).

IX. These species are based on females only. All have a row of strong lateral CI bristles.

argentifrons Parent, 1935a: 196. (*Chrysosoma*) (BMNH, examined, female only), West Malaysia, **n.comb.** This species is known only from females which have silvery pruinosity on the frons, face, clypeus and thorax. Possibly *Plagiozopelma argentifrons* is the female of *P. alutiferum* (Assemblage VII). Apart from the distinctive female pruinosity, they are similar and both species were collected together at West Malaysia: Trigganu (AMS).

flavicorne Wiedemann, 1830: 227. (*Chrysosoma*) (ZMUC, examined, female only), Sumatra, **n.comb.**

This species may be the female of another described species.

latemarginatum Parent, 1934b: 285. (*Chrysosoma*) (ZMUB, lost, female only), Burma, **n.comb.**

mimans Parent, 1934b: 288. (*Chrysosoma*) (ZMUB, lost, female only), Burma, **n.comb.**

nigricoxatum Enderlein, 1912: 375. (*Chrysosoma*) (Warsaw, not seen, female only), Sumatra, **n.comb.**

nonnitens Parent, 1937a: 137. (*Chrysosoma*) (BMNH, examined, female only), India, **n.comb.**

xanthocyaneum Parent, 1934b: 292. (*Chrysosoma*) (BMNH, examined, female only), India, **n.comb.**

Key to Australian Males of the *Plagiozopelma flavipodex* Group

1. Scape dark brown 2
- Antenna entirely yellow or red-yellow 3

2. Wing hyaline; lateral scutellars absent; (arista missing in type); It_{3-4} with av and pv rows of short spine-like setulae; cercus with tapering setose dorsal arm and distinctive ventral bilobate projection (Fig. 68a) (Qld) *P. placidum*
- Wing with smoky band along anterior margin (Fig. 124j); lateral scutellars as short hairs; apical arista flag black (Fig. 67c); It_1 crooked with posterior setae along entire length; dorsal cercal arm elongate with only dorsal setae (Fig. 67a) (Qld) *P. ashbyi*
3. Wing with dark brown subapical cloud; CII and CIII dark brown; ac absent; face and clypeus with dense golden pruinosity; arista thick, and with enlarged spear-like apical flag (Fig. 68d); surstylus lobate; cercus stout, elongate, with short curved ventral digitiform projection and strong black ventroapical setae (Fig. 68b) (Qld) *P. aurifrons*
- Wing hyaline (Fig. 125a); all coxae yellow; 2 pairs ac present; face and clypeus with silvery pruinosity; arista with much smaller apical flag (Fig. 67k); surstylus tapering; ventral cercal arm with ventral subapical tuft of hairs (Fig. 67d) (Qld, NT, Christmas Island) *P. flavipodex*

***Plagiozopelma flavipodex* (Becker)**

Chrysosoma flavipodex Becker 1922a: 156.

Type material. Becker described *Chrysosoma flavipodex* from two males and a female taken on Insel Deslacs (= Garove Island, Vitu Group, Papua New Guinea) (TMB, lost). This species was referred to *Plagiozopelma* in Bickel & Dyte, 1989.

Neotype here designated: male, with the label "New Guinea, Maprik, 21-iii-1964, D.H. Colless" (ANIC).

Additional material. Northern Territory – Berry Springs, monsoonal vine forest, malaise trap, 2 July–25 Aug. 1991, 30 Oct. 1991–8 Jan. 1992 (NTMD); Litchfield Park: Penderick's, monsoonal vine forest, 13 Jan. 1992, and Ada Creek at jumpup, 25 June 1992 (AMS); Baroalba Creek Springs, 19 km north-east of Mount Cahill, 17 Nov. 1972; Koongarra, 16 km east by north of Mount Cahill, 10 Mar. 1973. (ANIC). Queensland – Captain Billy track, 11°37'S 142°49'E, 11 Mar. 1992; Bellenden Ker Range, Cableway Base Station, 17 Oct.–9 Nov. 1981; east-north-east of Mount Tozer, Iron Range, 28 June–16 July 1986; Mount Webb National Park, 15°03'S 145°09'E, malaise trap, 3 Oct. 1980, 27 Apr.–2 May 1981; 1 km south-east of Mount Cook, 15°30'S 145°16'E, 14 Oct. 1980; near Rounded Hill, 15°17'S 145°10'E, 8 Oct. 1980; The Boulders, near Babinda, 10 May 1967; west of Tully, 23 Apr. 1955; 12°41'S 142°41'E, Batavia Downs, 22 June–23 July 1992 (ANIC); Tully Falls, 4 June 1961 (BPBM); Townsville, 21–26 May 1988; Mulgrave River, west of Gordonvale, 21 May 1966 (AMS). Mulgrave River Crossing, Goldsborough Road, 2 Apr. 1978, rainforest; Torres Strait, Darnley Island, 18 Mar. 1985 (QDPI) (84 male, 93 female Australian specimens examined). Christmas Island – 1 Apr. 1933 (misidentified as *Chrysosoma subpatellatum*) (BMNH); various locales, Apr. 1989, numerous specimens (ANIC).

Extralimital material. Indonesia – Maluku, Halmaheira, 1–14 June 1981 (USNM). Nepal – Lothar, near Birganj, 100 m, 17 Sept. 1967; Katmandu, near Simra, 27 Aug. 1967 (CNC). Papua New Guinea – Wau, no date; Sepik River, Pagwi, 5

Mar. 1964 (ANIC); Laing Island and Bunapas, swamp forest, both Madang Province (ISRN). Philippines – Manila (USNM). Sarawak – 4th Division, Niah, 9–17 Oct. 1975 (BMNH). Thailand – Bulsit Besar, 17 Oct. 1901 (BMNH). Northern Marianas – Saipan (USNM).

Description – male. Length 4.0–4.5; wing: 4.0 x 1.5.

Head. Vertex, frons and face bright shining metallic gold-green; vertical seta as weak pale hair on frons; face slightly bulging, with some grey pruinosity ventrally and laterally (Fig. 67h); clypeus tapering and covered with grey pruinosity; palp and proboscis yellow; antenna yellow; first flagellomere conical (Fig. 67f); arista almost two-thirds body length (Fig. 67k), and arista flag spatulate, basally white and distally black (MSSC) (Fig. 67e); ventral postcranium with abundant pale setae.

Thorax. Shining metallic green with bronze reflections; scutellum blue; setae black; pleura with some grey pruinosity; 2 pairs strong ac present; dc with 2 strong posterior setae and 3–4 weak anterior hairs (MSSC); 1 pa, 2 sa, 2 sr, 2 npl, 1 pm, 1 weak hm present; lateral scutellar setae absent.

Legs. All coxae and remainder of legs entirely yellow; CI with 6 strong spine-like setae; I: 7.0; 7.5; 9.0/3.5/2.5/1.0/0.5; TI bare; II: 8.0; 13.5; 11.0/3.0/2.5/1.0/1.0; TII either bare or variously with short ad or pd setae in basal quarter; III: 11.0; 19.0; 8.0/4.0/2.5/1.5/0.5; TIII with row of short dorsal setae.

Wing. Hyaline (Fig. 125a); crossvein m-cu straight; CuAx ratio: 1.2; lower calypter pale with dark brown rim and pale setae; haltere yellow with infuscated club.

Abdomen. Elongate; metallic bronze-green with some silvery pruinosity; sparsely haired with only 2 strong dorsals on each tergum; hypopygial peduncle (segment 7) often retracted under segment 6 such that hypopygium appears to arise from base of segment 6 (as

in Fig. 67k); sternum 7 well developed (Fig. 67j); sternum 8 with only short weak hairs; epandrium yellow with brown cercus, surstylus and hypandrium (Fig. 67d); hypandrial arm elongate, reaching to apex of aedeagus; epandrial lobe with long and short bristles; surstylus fused to epandrium, curved and digitiform with ventral subapical setae; cercus with 2 subequal arms arising from base, dorsal arm setose and often infuscated, and ventral arm bare except for group of pale subapical hairs.

Female. Similar to male except lacking MSSC and as noted: strong black vertical seta present; arista about half body length; face wider (Fig. 67i); frontoclypeal suture not strongly marked; first flagellomere not so strongly conical (Fig. 67g); CI with strong pale lateral setae (FSSC); TII usually with offset with ad-pd setal pair in basal quarter.

Remarks. *Plagiozopelma flavipodex* is a distinctive species which is widespread throughout the Indo-Pacific region, from lowland Nepal to New Guinea and north-eastern Australia, including the Philippines, Guam, Northern Marianas, Sundaland and Christmas Island (Fig. 66). In Queensland, New Guinea and Nepal, it occurs in montane as well as lowland and coastal locales. It is often quite common and has been taken in large numbers in yellow pans at Townsville, Qld and Christmas Island. Its wide distribution may be the result of both natural dispersal and accidental human introduction.

Several related sympatric species, including *Plagiozopelma subpatellatum* and *P. rhopaloceras*, appear similar to *P. flavipodex*. However, size, cercal structure and colour of the aristal flag should separate these species.

In Australia, *Plagiozopelma flavipodex* is found from the Torres Strait Islands to Townsville, Queensland, and in the Arnhem Land, Northern Territory (Fig. 66). It is associated with tropical rainforests, monsoonal vine

forests, and disturbed coastal habitats such as gardens and parks.

Plagiozopelma ashbyi n.sp.

Type material. HOLOTYPE male, PARATYPES 3 males, 2 females, Queensland, Mount Tamborine, 21 Dec. 1964, P.F. Ashby (ANIC). PARATYPES 11 males, 14 females, same locale, dates from Dec.-Feb. inclusive, various years (ANIC, QDPI, UQIC, AMS); female, Lamington National Park, 11-17 Feb. 1983 (UQIC).

Description – male. Length 7.8; wing 6.0 x 2.1; similar to *P. flavipodex* except as noted.

Head. Vertex, frons, face shining metallic blue-green; frons with lateral tuft of pale hairs; scape dark brown, enlarged and vaselike (MSSC); pedicel and first flagellomere yellow; arista with rounded black apical flag with silvery pruinosity at centre and base of flag (Fig. 67c) (MSSC).

Thorax. Metallic blue-green with bronze reflections; brown-bronze matt stripes present over ac band and above notopleuron; scutellum deep metallic blue; 2-3 offset pairs of strong ac present; lateral scutellar setae short and hairlike.

Legs. CI yellow; CII and CIII dark brown basally, yellowish distad; remaining legs yellow although II_{2-5} and III_{1-5} black; I: 10.0; 12.0; 6.0/2.0/2.5/1.0/1.0; I_1 crooked and with posterior setae along entire length and I_{1-5} with ventral short pale hair pile (MSSC). II: 13.0; 17.0; 11.0/4.5/2.5/1.5/1.0; TII with adjacent short ad and long ad seta in basal fifth; III: 16.0; 22.0; 8.0/5.0/3.0/2.0/1.0; TIII with row of strong dorsal setae; III_{3-5} padlike, ventrally pale (MSSC).

Wing (Fig. 124j). With smokey band across anterior margin of wing; posterior portion of wing hyaline; CuAx ratio: 2.0; lower calypter dark brown with long black

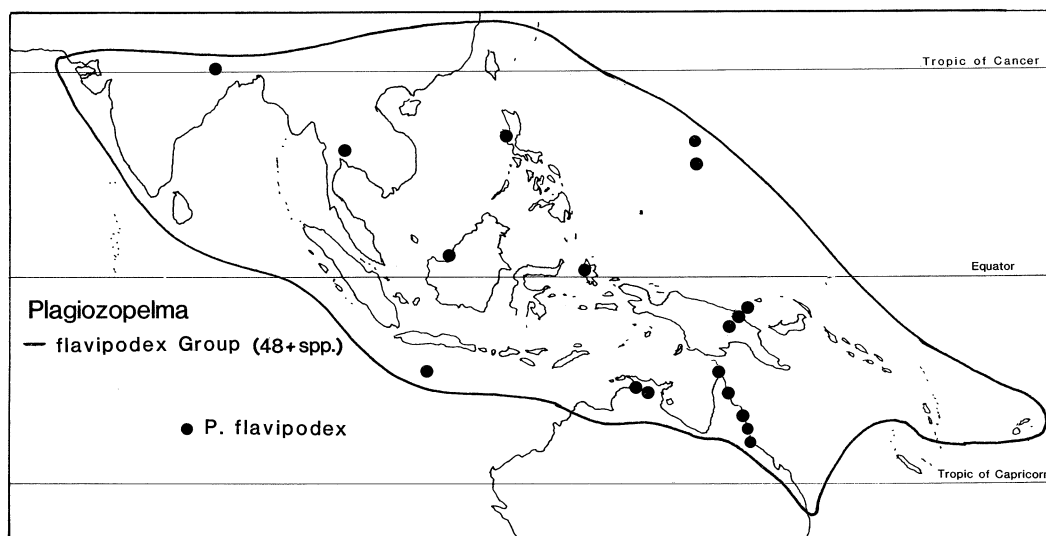


Fig. 66. Distribution, *Plagiozopelma flavipodex* and the *flavipodex* Group.

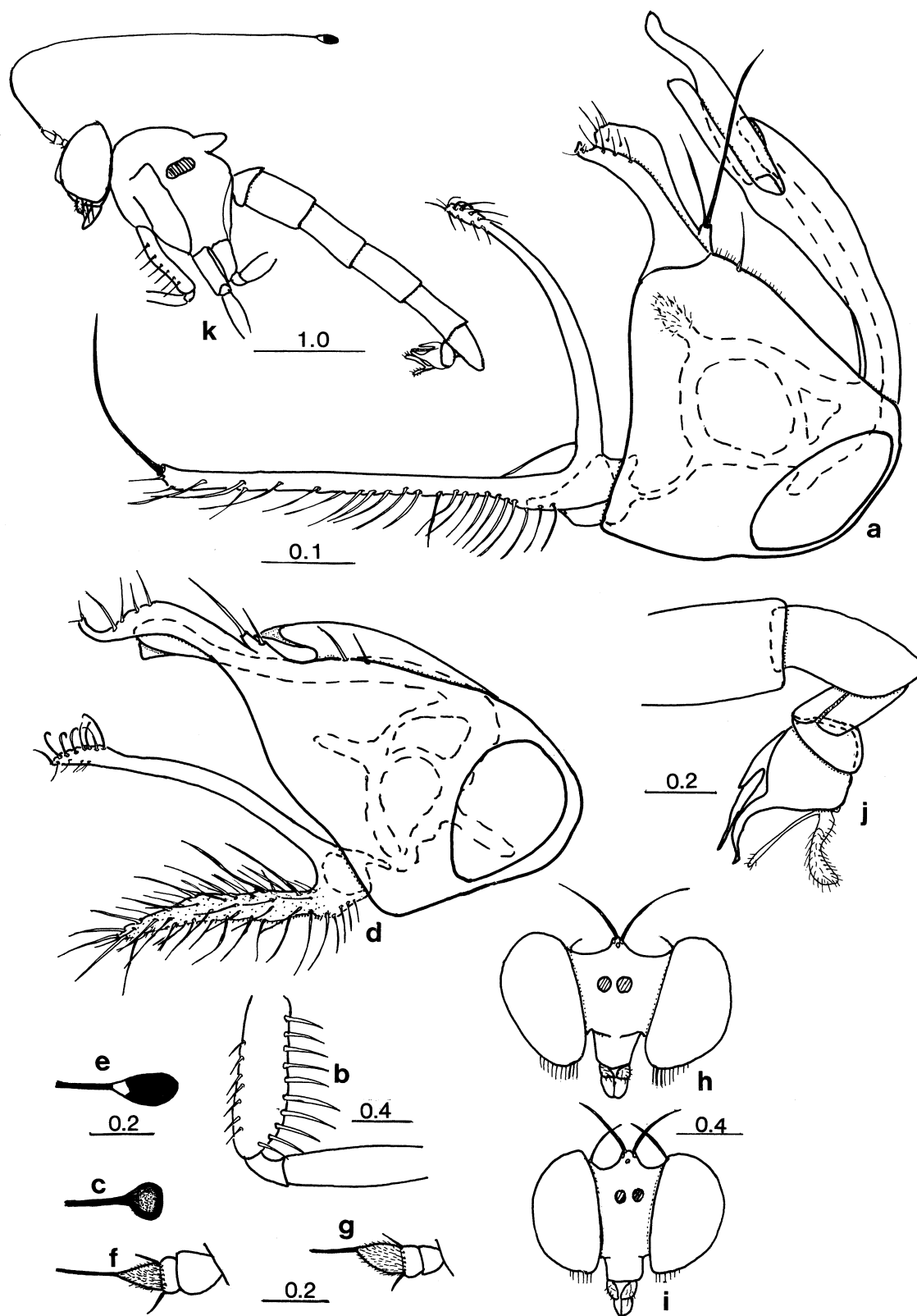


Fig.67. *Plagiozopelma ashbyi*, Mount Tamborine, Qld: a – hypopygium, left lateral; b – female left coxa I, anterior; c – apex male arista. *P. flavipodex*, The Boulders, Qld: d – hypopygium, left lateral; e – apex male arista; f – base male antenna, left lateral; g – base female antenna, left lateral; h – male head, anterior; i – female head, anterior; j – male postabdomen, left lateral; k – male habitus, left lateral.

setae; haltere brown.

Abdomen. Metallic blue-green with silvery pruinosity and matt brown bands around tergal overlap; hypopygium dark brown with yellowish surstyli and cerci (Fig. 67a); hypandrial arm not reaching apex of aedeagus; surstylus with distinct suture at attachment with epandrium, and bearing distal setae as figured; dorsal cercal arm elongate, with only dorsal setae along entire length and an apical curved bristle; ventral cercal arm long and curved, with distal setae only.

Female. Similar to male except lacking MSSC and as noted: frons with strong black vertical seta; face and clypeus covered with dense silvery pruinosity; ventral postcranium beneath eyes with pale spine-like setae; antenna red-yellow; CI with lateral spines (Fig. 67b); TI with dorsal setae at one-sixth and half; TII with 3 ad setae in basal quarter and dorsal setae at one-sixth and two-fifths; TIII with 5 strong dorsal setae and 2-3 ad setae.

Remarks. *Plagiozopelma ashbyi* is known from wet forested montane habitats in south-eastern Queensland. It is the most southern occurring *Plagiozopelma* species in Australia.

***Plagiozopelma placidum* n.sp.**

Type material. HOLOTYPE male, Queensland, Lake Placid, near Cairns, 24 May 1958, D.K. McAlpine (AMS). PARATYPE female, 13 km up Davies Creek Road, via Mareeba, 6 Nov.-2 Dec. 1984 (QDPI).

Description – male. Length 5.0; wing: 3.8 x 1.5; similar to *P. flavipodex* except as noted.

Head. Vertex and frons bright metallic green and covered with pruinosity which appears silvery only when viewed from acute angle; fine pale hairs present on lateral slope of frons; face and clypeus covered with dense silvery pruinosity; scape dark brown; pedicel and first flagellomere yellow; arista missing from specimen.

Thorax. Bright metallic green with bronze reflections and with matt brown-bronze stripe above notopleuron; 3 pairs strong ac present; lateral scutellar setae totally absent.

Legs. CI yellow, CII and CIII dark brown and remainder of legs yellow; CI with pale anterior hairs and 2 strong pale distal setae; CIII with single pale lateral seta; I: 9.0; 10.0; 5.5/2.0/1.5/1.5/1.0; It_{3-4} each with av and pv rows of short dark spine-like setulae (MSSC). II: 9.0; remainder of leg missing; III: 12.0; 18.0; 4.0/

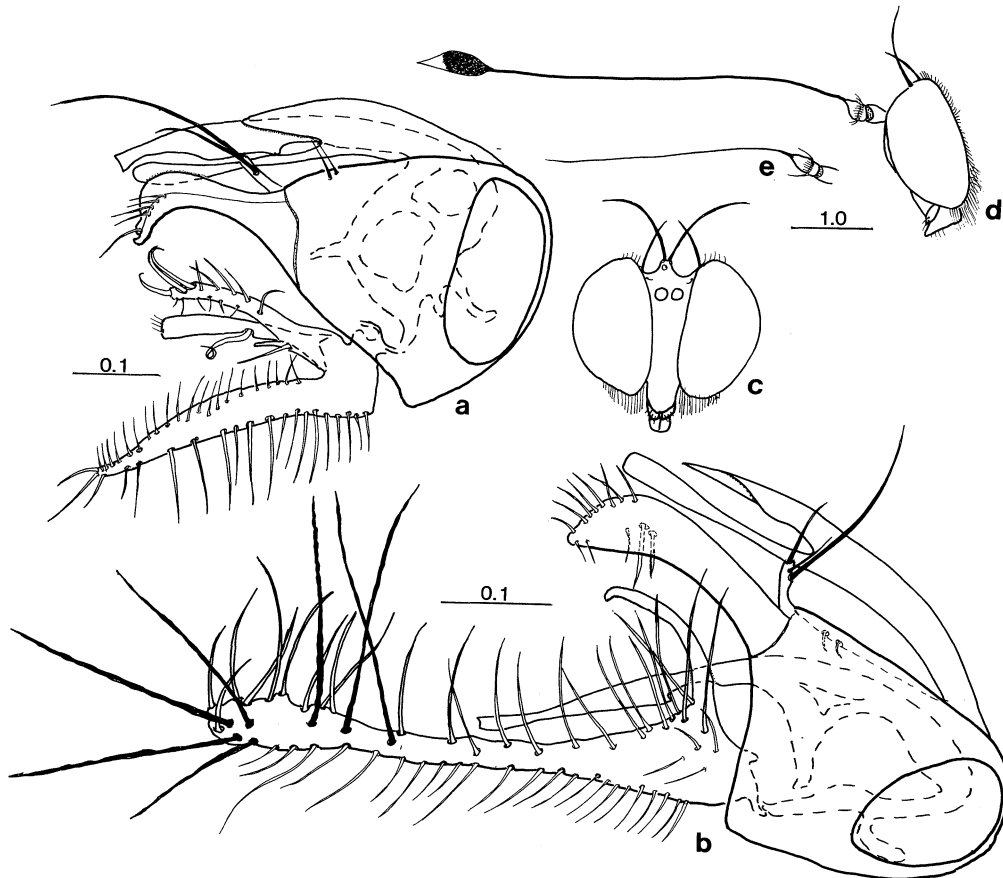


Fig. 68. *Plagiozopelma placidum*, Lake Placid, Qld: a – hypopygium, left lateral. *P. aurifrons*, The Crater, Qld: b – hypopygium, left lateral; c – male head, anterior; d – male head, left lateral; e – female antenna, left lateral.

8.5/remainder missing; TIII with some dorsal setae.

Wing. Hyaline; M_1 gradually arches towards R_{4+5} ; m-cu slightly sinuous; CuAx ratio: 2.5; lower calypter brown with fan of pale setae; haltere yellow.

Abdomen. Metallic green with brown bands around tergal overlap; epandrium and cerci brown (Fig. 68a); epandrium subrectangular; hypandrial arm elongate and almost reaching apex of aedeagus; surstylus with faint line marking join with epandrium; surstylus lobate and recurved, with setae along outer margin; cercus with tapering setose dorsal arm and distinctive ventral bilobate projection bearing setae as figured.

Female. Similar to male except lacking MSSC and as noted: frons with strong black vertical seta; 2 strong posterior and 2 strong anterior dc present, separated by gap; hair-like lateral scutellars present; It unmodified.

Remarks. *Plagiozopelma placidum* is known only from the Cairns district. The male holotype is missing its arista and possibly an apical flag is present.

Plagiozopelma aurifrons n.sp.

Type material. HOLOTYPE male, PARATYPE female, Queensland, The Crater, near Herberton, 4 Jan. 1976, D.K. McAlpine & G. Holloway (AMS). PARATYPES male, 18 km west of Ravenshoe, near The Crater, 29 Nov. 1981 (ANIC).

Additional material. Queensland – 3 females, Bellenden Ker Range, Cableway Base, rainforest, 17 Oct.-9 Nov. 1981 (ANIC).

Description – male. Length 7.3; wing: 5.3 x 2.0; similar to *P. flavipodex* except as noted.

Head. Vertex, frons shining deep metallic blue-violet; face, clypeus and occiput covered with dense golden pruinosity (MSSC). frons with short weak vertical seta; face rather narrow and not strongly bulging; clypeus projecting below ventral margin of eyes (Fig. 68c); antenna red-yellow (Fig. 68d); first flagellomere large, vaselike; pedicel with distal rim of black setae; first flagellomere rounded conical with dorsal arista; arista thick, black, about two thirds body length; apical flag broad and spear-shaped, basally black and apical third white (MSSC).

Thorax. Shining deep metallic blue-green with bronze reflections; matt chocolate stripe present dorsal to notopleuron; pleura with silvery pruinosity; ac absent; 5 strong dc present, with tiny setulae anteriormost; lateral scutellars absent.

Legs. CI yellow; CII and CIII dark brown; trochanters and remainder of legs entirely yellow, with only distalmost tarsomeres darkened; CI with row of 7-8 anterior spine-like setae along entire length; CII with pale anterior hairs, CIII with group of pale laterals; major leg setae black; I: 13.0; 14.0; 11.5/6.0/3.5/1.5/1.0; TI with ad at one-eighth; It₁ with 1 basoventral; II: 14.0;

21.5; 15.0/6.0/4.0/1.5/1.0; TII ad-pd pairs at one-eighth, one-third and with ad only at two-thirds; III: 18.0; 25.0; 10.0/7.0/3.5/2.0/1.5; TIII with ad-pd pair at one-eighth and with some dorsals; III₄₋₅ slightly flattened, padlike (MSSC).

Wing. With distinctive dark brown cloud from C to mid m-cu and almost to apex; M_1 converging towards R_{4+5} ; m-cu slightly sinuate; CuAx ratio: 2.5; lower calypter pale yellow with dark brown rim and fan of pale setae; haltere red-yellow.

Abdomen. Metallic green with silvery pruinosity laterally and with brown bands at tergal overlap; epandrium yellow, with surstyli, distal cercus and hypandrium dark brown (Fig. 68b); epandrium subrectangular; hypandrial arm elongate but not reaching aedeagal apex; 2 incurved epandrial setae present; epandrial lobe with 3 bristles; surstylus with faint line marking join with epandrium; surstylus lobate with setae along outer margin and with group of 3 medianly projecting setae; cercus elongate, setose, with distinctive curved ventral digitiform projection and strong black undulating setae ventroapically.

Female. Similar to male except lacking MSSC and as noted: strong vertical seta present; face and clypeus wider and covered with silvery pruinosity with only trace of gold colour; proboscis not projecting; arista not so thick and without flag (Fig. 68e); lower postorbitals developed as 6-7 strong yellow spines flanking the eye margin (FSSC); wings entirely smokey brown.

Remarks. *Plagiozopelma aurifrons* is a large species known only from rainforests in the Cairns district, Queensland.

The male apical arisal flag and golden head pruinosity are distinctive. Both sexes of *Plagiozopelma aurifrons* have all dc strong and females have spine-like lower postorbitals (FSSC). These two characters also occur in the *angustifacies* Group, and *P. aurifrons* is probably similar to the ancestor of that group.

The *angustifacies* Group

Diagnosis. General. Body and legs dark metallic green, often with striking silvery pruinosity on pleura of both sexes; setae black.

Head. Almost circular in anterior view, making the head appear high in comparison with other sciapodines (Fig. 70c); vertex shining metallic blue-violet; face and clypeus parallel sided and narrow, especially in males; male clypeus adjacent to lateral margin of eyes; male face not bulging but conforming with eye contour; pedicel with short dorsal and ventral setae; first flagellomere tapering triangular; arista apical, about equal in length to head height; postcranium, face and clypeus with silvery pruinosity; female ventral postcranium often with 3-4 black projecting spine-like setae in addition to the usual pale setae (FSSC) (Fig. 70d).

Thorax. Three pairs of long ac present; 5 strong dc present in both sexes, decreasing in size anteriorly, without sexual dimorphism; lateral scutellar setae absent.

Legs. CI with 3-5 strong black distolateral spine-like setae, more strongly developed in females (similar to females in *flavipodex* Group); female CI also with anteromedian field of short setae; male It_1 often with black ventral setae (MSSC); III_{t_3} on distal half and $III_{t_{4,5}}$ slightly flattened and ventrally padlike in male (MSSC).

Wing. Often with faint brown clouding; crossvein m-cu straight (Fig. 125b); haltere yellow.

Abdomen. Epandrium tapering subtriangular, with straight dorsal surface (similar to that of the *terminiferum* Group and the *Krakatauia alanae* Group); cercus massive, developed into dorsal lobe with long setae and longer ventral lobe with various setae, hair fields, etc.

Remarks. The *angustifacies* Group has distinctive dark body colouration with silvery pruinosity, head almost circular head, male clypeus adjacent to lateral margin of eyes, male $III_{t_{4,5}}$ slightly flattened and ventrally padlike in male (MSSC), and characteristic hypopygium. Females have strongly developed distolateral CI spines with additional setal fields (FSSC), and strong postcranial spines (FSSC), both absent on males. The group is unusual in showing no sexual dimorphism in dc chaetotaxy.

The *angustifacies* Group shows some similarities with the *flavipodex* Group from which it was probably derived, especially noting the shining vertex and the strongly developed CI spines in the female. (The *flavipodex* Group species *Plagiozopelma aurifrons*, which also has unmodified male dc and females with spine-like lower postorbitals (FSSC), is close to *angustifacies* Group.)

All species have a similar basic hypopygial structure. Some intraspecific variation in position and development of cercal setae is evident in *Plagiozopelma*

angustifacies and *P. mouldsorum*.

The *angustifacies* Group occurs in rainforest in the Papuan subregion, from New Guinea to Vanuatu, and northernmost Cape York Peninsula (Fig. 69). I have isolated five undescribed species from New Guinea (AMS, ANIC, BPBM) and Vanuatu (AMS).

Included species:

angustifacies Becker, 1922a: 186. (*Chrysosoma*) (ZMHB, examined), Bismarck Archipelago.

Lectotype here designated, male with label "Bismarck-Arch, Ralum, 29 May 1896, Dahl S 1896-97".

artificacies Parent, 1935b: 65. (*Chrysosoma*) (BMNH, examined), Solomon Islands.

sigma Parent, 1935b: 73. (*Chrysosoma*) (BMNH, female only, examined), Solomon Islands, **n.syn.** Parent described *Chrysosoma sigma* from a damaged and somewhat teneral female specimen. The holotype agrees in all respects with other female *Plagiozopelma artificacies* except certain features of the teneral holotype (proboscis, tibiae, etc.) are paler than those found on fully mature specimens. I have seen additional specimens from Guadalcanal (CUIC, BMNH).

atropurpureum Parent, 1939: 156. (*Chrysosoma*) (ANIC, examined, female only), Papua New Guinea (Wewak, holotype) and New Britain.

Since this species is represented by females from different localities, the type series possibly comprises two species.

mouldsorum n.sp. Australia (Qld), Papua New Guinea.

Plagiozopelma mouldsorum n.sp.

Type material. HOLOTYPE male, Queensland, Iron Range, Claudie River, near Mount Lamond, 31 May 1966, D.K. McAlpine; PARATYPES male, same but 29 May 1966; female, Lockerbie Scrub, Cape York, no date, (AMS). female, Coen area, 6 Dec. 1975 (QDPI).

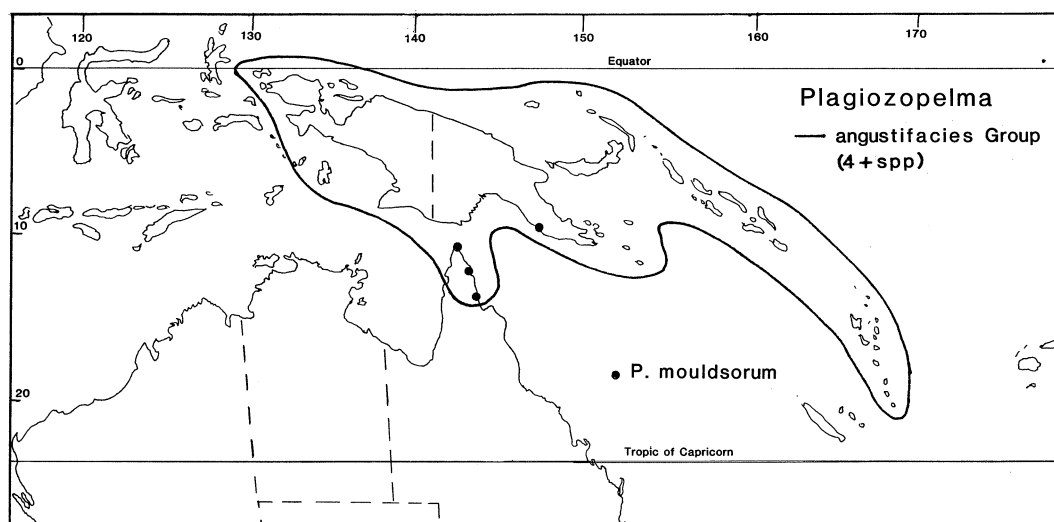


Fig. 69. Distribution, *Plagiozopelma angustifacies* Group.

Additional material. Papua New Guinea – 2 males, female, Central Province, Laloki, 2 Aug. 1984 (PNGK, deposited AMS).

Description – male. Length 5.3; wing: 3.4 x 1.4.

Head. Subcircular in anterior view (Fig. 70c); frons shining metallic dark blue-green with some black hairs laterally, and distinct vertical seta not evident; single strong postvertical present, continuation of postocular series; face and clypeus with silvery pruinosity; palp and proboscis yellowish; antenna brownish with base of first flagellomere yellowish; first flagellomere tapering (Fig. 70b); ventral postcranium with pale setae.

Thorax. Shining metallic green-blue with bronze vitta over ac band; pleura with silvery pruinosity; 1 pa, 2 sa, 2 sr, 2 npl, 1 pm, 1 weak hm present.

Legs. Coxae dark brown with silvery pruinosity; femora reddish brown; TI, TII, and It yellow; TIII basally reddish brown, distally yellowish; IIIt and IIIIt brown; CI with pale hairs and 4 strong black distolateral setae; CIII with strong black lateral seta; FII and FIII with long pale ventral setae; I: 9.0; 8.0; 5.0/2.0/1.5/1.0/1.0; TI with dorsal at one-fifth; It₁ with 2 black pv setae (MSSC) II:

10.0; 12.0; 8.0/4.0/2.0/1.0/1.0; TII with ad at one-eighth, half, and pd at one-third; III: 12.0; 17.0; 6.0/4.0/2.0/1.5/1.0; TIII with 4 strong dorsals; IIIIt₃ on distal half and IIIIt₄₋₅ slightly flattened and ventrally padlike in male (MSSC).

Wing. Relatively broad with faint yellowish clouding (Fig. 125b); M₁ branching sharply and converging towards R₄₊₅; M₂ slightly curved; m-cu straight; CuAx ratio: 1.2; lower calypter brown with fan of pale setae; haltere pale yellow.

Abdomen. Dark metallic violet, except posterior portion of tergum 2 metallic green; setae black; hypopygium black (Fig. 70a); epandrium tapering elongate subtriangular, with flat dorsal surface; hypandrial arm arising at midlength and almost reaching aedeagal apex; 2 epandrial setae present; epandrial lobe with strong apical and subapical bristles; surstylus lobate with strong setae as figured; cercus massive, developed into dorsal lobe with either 1 or 3 long setae and longer ventral lobe with pedunculate seta bearing projection, field of short spine-like setae, and subapical spatulate seta.

Female. Similar to male except lacking MSSC, and

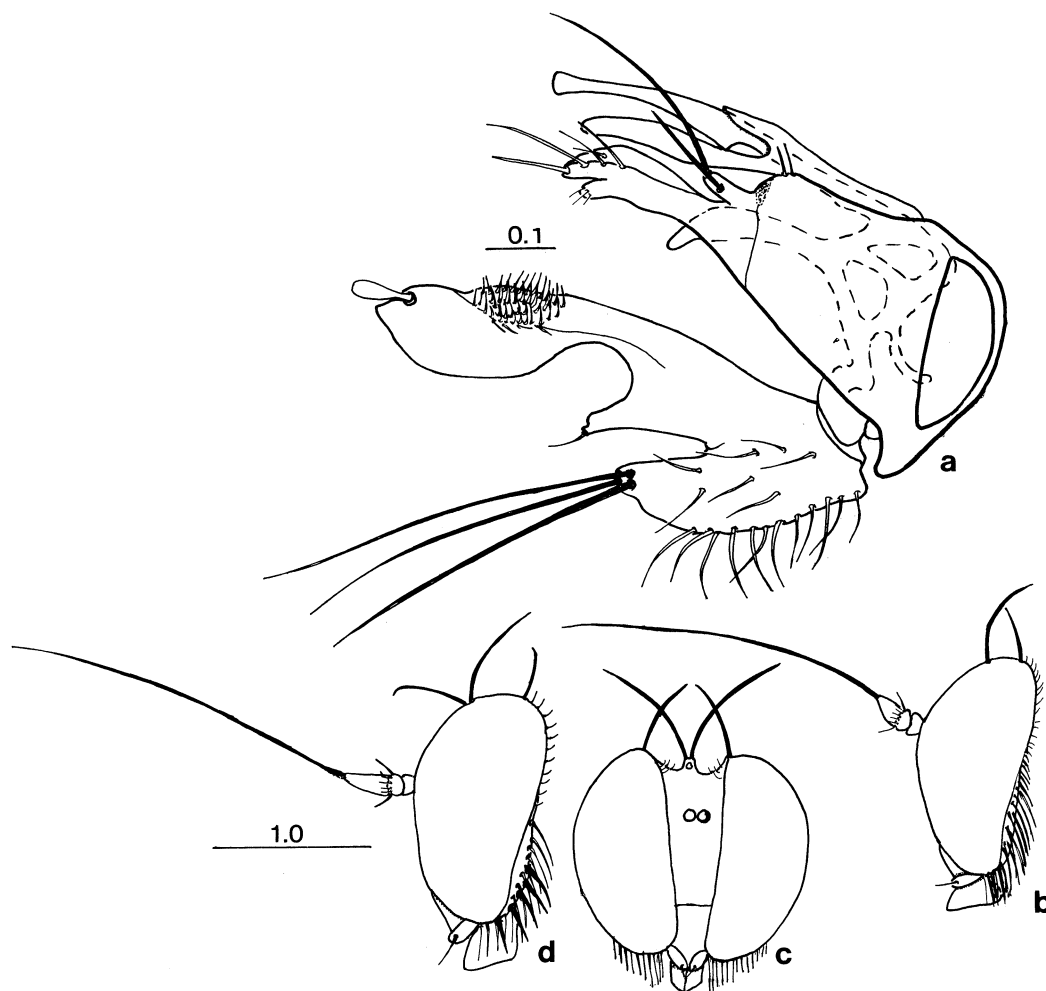


Fig. 70. *Plagiozopelma mouldsorum*, Iron Range, Qld: a – hypopygium, left lateral; b – male head, left lateral; c – male head, anterior; d – female head, left lateral.

as noted: head (Fig. 70d); face wider; strong black vertical present; ventral postcranium behind eye with 3-4 black projecting spine-like setae in addition to usual pale setae; CI with black distolateral spine-like setae strongly developed and anteromedian setal field; It_1 without pv setae; FII and FIII without long ventral setae; $III_{t_{3-5}}$ not flattened.

Remarks. *Plagiozopelma mouldsorum* occurs in northern Cape York Peninsula and Papua New Guinea (Fig. 69). The species is named for Max and Barbara Moulds who collected the Lockerbie Scrub specimen.

Some intraspecific variation is present on the cercus. The Papua New Guinea male and the Claudie River holotype had only one long seta on the dorsal cercal lobe, while the other Claudie River male had 3 long setae (as shown in Fig. 70a). In other respects they are identical and I regard them as conspecific.

The *alliciens* Group

Diagnosis. *Head.* Male scape not swollen; male first flagellomere allantoid or sausage shaped, more than three times as long as wide (MSSC); first flagellomere of female subtriangular, not more than twice as long as wide; arista apical and simple.

Legs. CI usually with 6-8 strong lateral spine-like setae, more strongly developed in females than in males.

Wing. Female wing sometimes with apical maculation.

Remarks. The *alliciens* Group is defined by the allantoid male first flagellomere (MSSC). Other characters, such as the strong CI setae, shining frons, general habitus, and hypopygial structure link it with the *flavipodex* Group (only the absence of a male swollen scape excludes it from the *flavipodex* Group s.s.). A similar allantoid male first flagellomere has also been convergently derived in the *Chrysosoma aeneum* Group, q.v.

The *alliciens* Group is found from India to Sundaland. I have seen additional undescribed species from upper Burma and Sarawak (BMNH). In the undescribed species from Sarawak: Kuching (BMNH), represented by seven females, the only specimen with intact antennae has an allantoid first flagellomere. This is possibly an example of a MSSC becoming secondarily fixed into the female phenotype (also see the *Chrysosoma aeneum* Group).

Included species:

alliciens Walker, 1856: 119. (*Psilopus*) (BMNH, examined), Sarawak, West Malaysia, **n.comb.**

Parent (1934a: 4) redescribed this species. *Plagiozopelma alliciens* is very close to *P. lichtwardti* but has a shining metallic green frons, hyaline wings and a distinctive cercus.

Additional records. West Malaysia: Bentong Pass (AMS).

amplipenne Parent, 1941: 197. (*Chrysosoma*) (BMNH, examined), India, **n.comb.**

Additional records. India: Anamalai Hills, 1,100 m

(CNC, AMNH) and Karnataka (ZMUC).

lichtwardti Enderlein, 1912: 374. (*Chrysosoma*) (Warsaw, female only, not seen), Sumatra, Sabah, West Malaysia, Sarawak, ?New Guinea, **n.comb.**

dilectum Parent 1935a: 368. (*Chrysosoma*) (BMNH, examined). Sabah. **n.syn.**

Chrysosoma lichtwardti was described from females taken in Sumatra and had not been associated with males. Both sexes have a distinctive subapical wing maculation (Becker, 1922, fig. 70). Females have silvery pruinosity on the frons, and a subtriangular first flagellomere. Males in a series of *P. lichtwardti* from Sarawak: Kuching (BMNH) are identical to a male paratype of *Chrysosoma dilectum* (AMNH). Males have less pruinosity on the frons and an allantoid first flagellomere. Both sexes have rows of strong pale spines on CI.

Additional records. West Malaysia: Bentong Pass (AMS); Pahang; Genting Senbah. Singapore. Sarawak: near Mount Dulit (all BMNH). Parent (1941: 198) recorded *C. dilectum* from New Guinea but I haven't been able to confirm this record.

limbatifrons de Meijere, 1914: 85. (*Psilopus*) (ZMUA, examined), Java, Sabah, **n.comb.**

The female has a band of silvery pruinosity between the ocellar tubercle and base of the antenna, and bordered laterally by bright metallic green cuticle.

Additional records. Java: Tjibodas (USNM). Sabah: Mount Kinabalu (BMNH).

The *annotatum* Group

Diagnosis. *Head.* Vertex and frons usually pruinose; first flagellomere elongate tapering, with relatively thick apical arista; male arista sometimes with apical flag (MSSC).

Thorax. Lateral scutellar setae absent.

Legs. CI with 3 strong black or pale distolateral setae; It_1 flattened in some species.

Wing. Crossvein m-cu straight.

Abdomen. Cercus short and simple, and with additional arm-like projection ventrad of cercus; this projection is possibly of cercal origin, and arises inside the epandrium.

Remarks. The *annotatum* Group is restricted to Sri Lanka and the Indian subcontinent. I have seen three undescribed Sri Lanka species (USNM, CNC), and additional undescribed species from southern India: Anamali Hills (CNC), and Nepal: Birganj (CNC). The rather thick arista and characteristic hypopygium (see Becker, 1922a, figs 92, 108, 118) distinguish the group.

The *annotatum* Group includes the following species.

annotatum Becker, 1922a: 160. (*Chrysosoma*) (ZMHB, examined), Sri Lanka, **n.comb.**

The black spatulate apical flag arista flag is distinctive.

Additional records. Niwara Eliya (USNM, BMNH) and Hakgala Nature Reserve (USNM).

congruens Becker, 1922a: 163. (*Chrysosoma*) (DEI, ?lost), Sri Lanka, **n.comb.**

Becker's description and figure accurately portray this species. A narrow white arisal flag is present. Additional records. Sri Lanka: Kanneliyn, Colombo District, Nugegoda W.P. and Rangala (USNM, CNC, BMNH).

The male holotype is not at DEI or ZMHB and is possibly lost.

faciatum Becker, 1922a: 166. (*Chrysosoma*) (TMB, lost), Sri Lanka, **n.comb.**

infirmum Becker, 1922a: 152. (*Chrysosoma*) (NHMW, examined), Sri Lanka, **n.comb.**

This species is close to *P. annotatum* but lacks an arisal flag.

Additional records. Kurunegala, Piliyandala and Perideniya (USNM, CNC, BMNH).

The *terminiferum* Group

Diagnosis. *Thorax.* Lateral scutellars present as weak hairs.

Legs. Relatively long; female FI with 2 strong pale basoventral setae; male It₁ with 4 long slightly crocheted posterior hairs on distal half (MSSC); male III_{t3-5} dorsoventrally flattened, padlike (MSSC).

Abdomen. Epandrium elongate subtriangular; surstylus with tapering digitiform lateral projection; cercus with elongate blade-like arms and basally with shorter pairs of basomedial arms (Fig. 72a,b).

Remarks. *Psilopus terminifer* had been referred to *Chrysosoma* because of its male apical arista. However, with the restriction of *Chrysosoma* proposed in this work, it is placed in *Plagiozopelma* because of such its highly polished frons, somewhat swollen male scape, lateral scutellars reduced to weak hairs, and female CI with 3 strong pale lateral setae.

It also has strong hypopygial similarities with the *Krakatauia alanae* Group in the elongate blade-like

cerci, triangular epandrium, and surstyler structure (see Fig. 46a,c). However, this is regarded as convergence and not evidence for a close relationship with *Krakatauia*.

The *terminiferum* Group occurs in the Aru Islands, New Guinea and northern Queensland (Fig. 71), and includes two species, *P. terminiferum*, and a related undescribed species from Papua New Guinea: Kokoda (BMNH) which lacks the male apical wing spot, and has narrower cerci and only slightly flattened III_{t3-5}.

Included species:

terminiferum Walker, 1858: 92. (*Psilopus*) (BMNH, examined), Maluku (Aru Islands), Irian Jaya, Papua New Guinea, Australia (Qld).

Plagiozopelma terminiferum (Walker)

Psilopus terminifer Walker, 1858: 92.

Type material. Walker described *Psilopus terminifer* from a male collected in the Aru Islands (BMNH, examined). Becker (1922a) referred it to *Chrysosoma*. Parent (1934a) redescribed and illustrated the type. This species was referred to *Plagiozopelma* in Bickel & Dyte, 1989.

Additional material. Queensland – Torres Strait, Darnley Island, 30 Jan. 1986, Murray Island, 29 May–3 June 1985; Iron Range: Claudie River, Gordon Creek, and near Mount Lamond, 31 May–6 June 1966; 25 June–4 July 1982; 10 Nov. 1985; 2–9 May 1971; 3 km north-east of Mount Webb, malaise trap, 28 Apr.–2 May 1981, 30 Sept.–3 Oct. 1980; 16 km north-east of Heathlands, 11°41'S 142°42'E, malaise trap, 15–17 Mar. 1992; Dividing Range, 15 km west of Captain Billy's Creek (24 males, 18 females examined, AMS, ANIC, QDPI, UQIC).

Extralimital records. Irian Jaya – Lake Sentani; Jetufa Bay (BMNH). Papua New Guinea – Koitaki (AMS). Laloki, and Brown River, near Port Moresby (PNGK).

Description – male. Length 5.7; wing: 4.6 x 1.3.

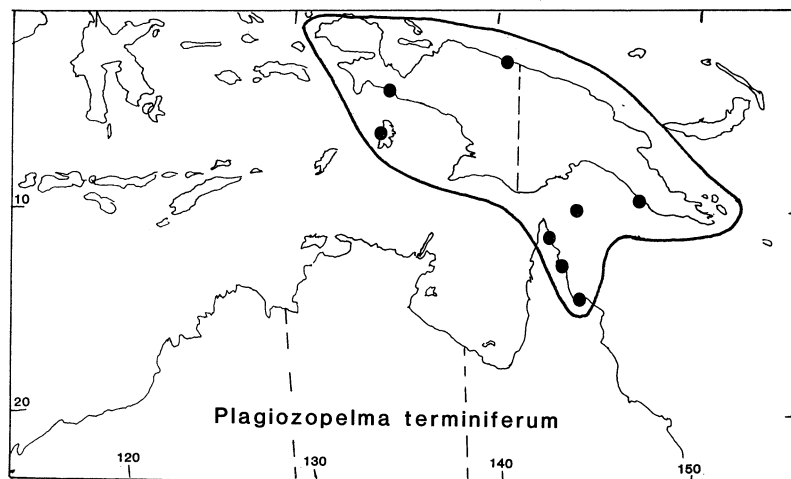


Fig. 71. Distribution, *Plagiozopelma terminiferum*.

Head. Vertex and frons highly polished and deep metallic blue; vertex deeply excavated; lateral sides of vertex with pale hairs; lower face and clypeus covered in grey pruinosity such that in anterior view appears frosted green; ocellar setae black, postverticals pale yellow; face bulging, with distinct frontoclypeal suture (Fig. 72c,e); clypeus free from margin of eyes; palp, proboscis yellow; antenna bright red-yellow (Fig. 72c); scape slightly swollen; first flagellomere short and conical; arista apical and relatively short, less than half body length; ventral postcranium with abundant pale setae.

Thorax. Shining metallic green with bronze reflections; matt chocolate stripe present dorsal to notopleuron; setae black; pleura with only dusting of grey pruinosity.

Legs. Relatively long; CI yellow; CII and CIII dark brown; trochanters and legs yellow, except III₃₋₅ dark brown; I: 10.0; 10.5; 5.5/1.5/1.0/1.0/1.0; FI with 3-4 pale ventral setae; II: 11.0; 15.0; 11.5/3.0/2.0/1.0/0.5; TII with 4-5 anterior setae; III₁ very long, longer than FII; III: 16.0; 21.0; 10.5/4.0/1.5/1.0/1.0; TIII with short anterior and dorsal setae.

Wing. Elongate, relatively narrow, and with distinctive dark brown apical spot (MSSC) (Fig. 125c); m-cu slightly

sinuate; lower calypter pale yellow with dark brown rim and fan of pale setae; haltere yellow with infuscated club.

Abdomen. Terga sparsely haired with only 2 strong dorsals on each segment; terga 1-3 metallic green with some grey pruinosity; terga 4-5 matt brown in basal two-thirds and white pruinose in distal third, and tergum 6 shining metallic blue-violet (MSSC); segment 7 with well-developed tergum and sternum, and dark brown; hypopygium dark brown with yellow cerci (Fig. 72a); hypandrial hood arising beyond midlength of hypandrium; hypandrial arm reaching almost to apex of aedeagus; 2 epandrial setae present; epandrial lobe with 2 long bristles; surstylus with faint line marking join with epandrium; surstylus lobate with median projection and distinctive tapering digitiform lateral projection which bears strong curved apical seta; cercus distinctive with bare elongate lateral arms and pair of apical flattened fan-like setae, and basally with shorter pairs of median arms with spike-like apical setae and subtended by median pedunculate seta and cuticular projection (Fig. 72b).

Female. Similar to male except lacking MSSC and as noted: smaller, length 4.7, wing 3.8 x 1.4; face wider; strong curved vertical seta present; first flagellomere

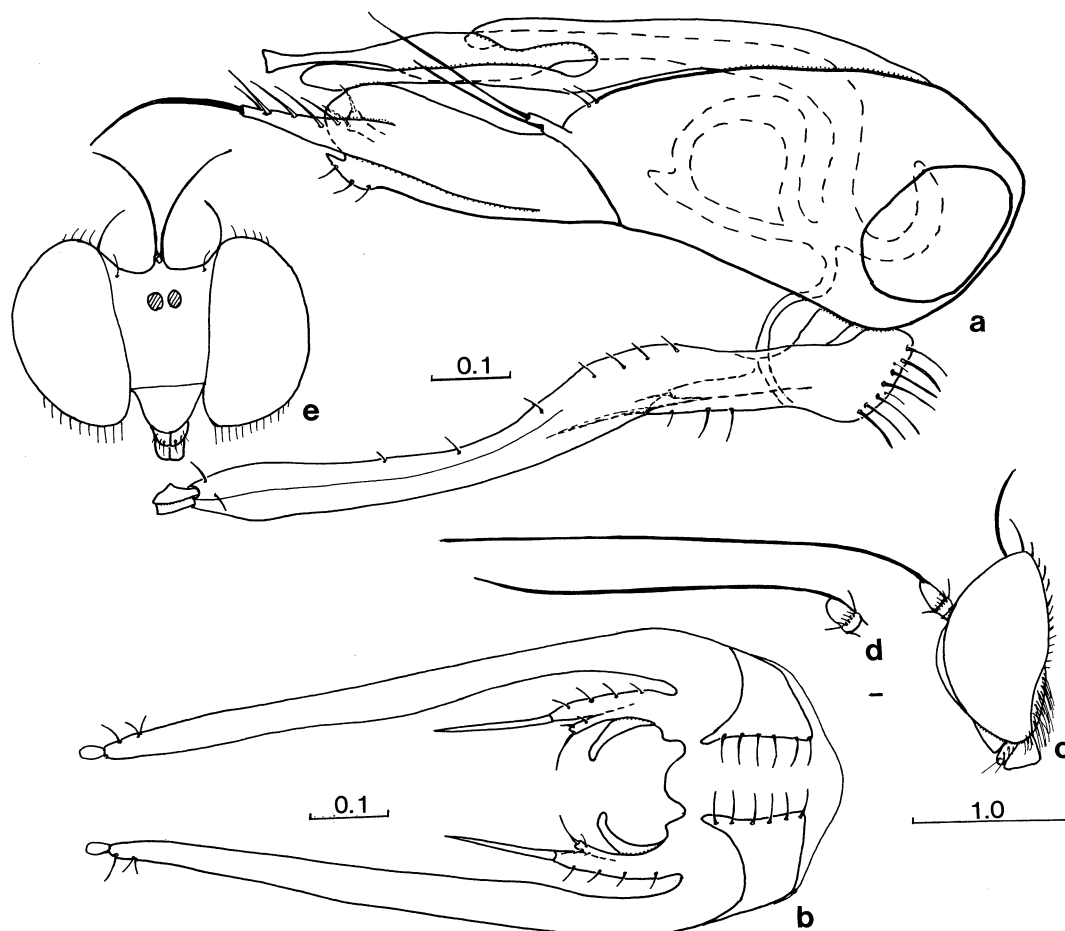


Fig. 72. *Plagiozopelma terminiferum*, Iron Range, Qld: a - hypopygium, left lateral; b - male cercus, dorsal; c - male head, left lateral; d - female antenna, left lateral; e - male head, anterior.

with dorsal arista (Fig. 72d); 4 strong dc present; CI with 3 strong pale lateral setae; FI with 2 pale basoventral setae, stronger than in male; TII with single strong dorsals in addition to anterior setae; wing shorter, without apical maculation (Fig. 125d); abdomen bronze with green reflections.

Remarks. *Plagiozopelma terminiferum* is known from the Aru Islands, New Guinea, the Torres Strait islands and northern Cape York Peninsula (Fig. 71). The shining frons, male apical wing spot, and blade-like cerci are distinctive.

Unplaced Oriental *Plagiozopelma*

The following Oriental species are referred to *Plagiozopelma*. They are similar to the *flavipodex* Group except males lack the characteristic swollen scape.

cynicum Parent, 1935a: 367. (*Chrysosoma*) (BMNH, examined), Sabah, Sarawak, **n.comb.**

The frons in the female is polished metallic green, but dulled in the male. The male scape is weakly swollen and the female CI has strong lateral spines. Additional records. Sarawak: Mount Dulit (BMNH).

principale Becker, 1922a: 160. (*Chrysosoma*) (ZMHB, examined), Borneo; Kalimantan, Sabah, Sarawak, West Malaysia, **n.comb.**

siderum Parent, 1934b: 290. (*Chrysosoma*) (ZMUH, lost), Kalimantan, **n.syn.**

nitidifrons Parent, 1935a: 432. (*Chrysosoma*) (BMNH, examined), Sabah, **n.syn.**

I have compared the male holotype of *C. principale* directly with a male paratype of *C. nitidifrons* (AMNH) and they are identical. Of particular note is the strong ventral seta on It_1 (MSSC), the strong ventral pile on It_2 and It_3 (MSSC), CI with strong lateral spines (similar to the *flavipodex* Group), the brown anterior clouding on the wings, and the distinctive hypopygium. Becker's description of *C. principale* gives the body length as 5 mm and the wing as 6 mm. The specimen is somewhat shrunken with the abdomen curved back on itself, and the true length is closer to 7.0 (the *C. nitidifrons* paratype has body length 7.8 and wing 6.7). These measurements are within the range of intraspecific variation. The description of *C. siderum* matches that of *C. principale* and the two species are regarded as synonyms.

Additional records. Sarawak: Semongoh Forest Reserve (BMNH). West Malaysia: Fraser's Hill (AMS, BMNH); Selangor, Ulm Klang; Kuala Lumpur; Genting Sembah (BMNH).

strenuum Parent, 1935a: 437. (*Chrysosoma*) (BMNH, examined), Sabah, **n.comb.**

Notes on Afrotropical *Plagiozopelma*

Although *Megistostylus* in the original sense does not

occur in the Afrotropical region (see Remarks under its formal synonymy with *Chrysosoma*), Parent (1929a) broadened the concept of *Megistostylus* and described the Afrotropical *M. tritiseta* in the genus. However, he subsequently (1935c, 1936) described related species as *Chrysosoma*, and merely noted that they had a "*Megistostylus* type antenna". Vanschuytbroeck later used the name *Megistostylus* for several of his species, and referred earlier species to that genus. The "*Megistostylus* type antenna" to which Parent referred is characteristic of most male *Plagiozopelma*, especially in the *flavipodex* Group, where the male scape is swollen and the arista sometimes appears fused with the first flagellomere. Examination of these Afrotropical "*Megistostylus*" species reveals them to be very close to the *flavipodex* Group, but because of the ornamented aristae are placed separately in the *bequaerti* Group.

The *Chrysosoma gemmarium* Group (see Notes on Afrotropical *Chrysosoma*) should possibly be transferred to *Plagiozopelma*. The group has the frons polished metallic coloured, cercus lobate, male It_1 prolonged with each segment swollen and deformed. CI in both sexes have 3 black apical setae, similar to *Plagiozopelma* [interestingly, Vanschuytbroeck (1959) regarded some members of the *gemmarium* Group as having a "*Megistostylus* type antenna"].

Parent's (1933d) key to Afrotropical *Chrysosoma* and Vanschuytbroeck's (1959) key to Afrotropical "*Megistostylus*" treat most species listed below, although reference to the original descriptions and figures is often necessary.

The *bequaerti* Group. This group has males with thickened and ornamented aristae (MSSC) (spectacularly modified in some species, eg, *P. ramiseta*, see Parent, 1939c: fig. 18), inflated vase-like male scape (MSSC), flattened and ovate male It_1 (MSSC), distal tarsus I with ventral serrations and protuberances (MSSC), and a large lobate cercus. Females (and sometimes males) have strong lateral spine-like setae on CI (FSSC). Crossvein m-cu is weakly sinuate and sometimes has an external stub-vein, and the frons is polished and metallic.

The Group is very close to the *flavipodex* Group, sharing the male swollen male scape (MSSC), male It_1 often flattened and ovate, polished frons, and female CI spines (FSSC). Assemblage IV of the *flavipodex* Group, mostly from the Indian subcontinent, shows the greatest similarity to the *bequaerti* Group, and one Indian species, *Plagiozopelma brunnipenne*, has a lobate cercus similar to that of most *bequaerti* Group members.

Plagiozopelma capilliferum and *P. nalensis* both lack the male ornamented arista, but are included in the *bequaerti* Group based on the modified It_1 and cercal structure.

The following *bequaerti* Group species are newly referred to *Plagiozopelma* from their previous combination with *Chrysosoma* (Dyte & Smith, 1980). Species which possibly belong here but whose descriptions are inadequate to confirm placement are left in their current combination with *Chrysosoma*.

angulitarse Parent, 1933d: 18. (*Chrysosoma*), **n.comb.**
bequaerti Curran, 1926: 2. (*Chrysosoma*), **n.comb.**
capilliferum Parent, 1933d: 22. (*Chrysosoma*), **n.comb.**
collarti Curran, 1927: 249. (*Chrysosoma*), **n.comb.**
conjectum Parent, 1934d: 116. (*Chrysosoma*), (BMNH, examined), **n.comb.**
daveyi Parent, 1939c: 261. (*Chrysosoma*) (BMNH, examined), **n.comb.**
du Curran, 1929: 2. (*Chrysosoma*) (AMNH, examined), **n.comb.**
flavum Vanschuytbroeck, 1962: 353. (*Megistostylus*) (MNHP, examined), **n.comb.**
ghesquieri Parent, 1936c: 2. (*Chrysosoma*), **n.comb.**
grahami Parent, 1939c: 264. (*Chrysosoma*) (BMNH, examined), **n.comb.**
inops Parent, 1929a: 202. (*Chrysosoma*), **n.comb.**
nalense Curran, 1926: 6. (*Chrysosoma*), **n.comb.**
njalense Parent, 1934d: 118. (*Chrysosoma*) (BMNH, examined, female only), **n.comb.**
piliseta Parent, 1936c: 4. (*Chrysosoma*), **n.comb.**
ramiseta Parent, 1939c: 266. (*Chrysosoma*) (BMNH, examined), **n.comb.**
tritisetata Parent, 1929a: 171. (*Megistostylus*) (MNHP, examined), **n.comb.**

Austrosciapus n.gen.

Etymology. *Austrosciapus* is formed by adding the prefix “austro”, referring to the Australian provenance of included species, to the existing generic name *Sciapus*. The gender is masculine.

Type species. *Sciapus proximus* Parent, 1928.

Diagnosis. *Head.* Vertical seta usually strong in both sexes (in the *proximus* and *tumidus* groups the male vertical is slightly weaker than that of the female); male face not bulging beyond anterior eye margin; clypeus adjacent to margin of eyes in both sexes (Fig. 82d); pedicel with only short dorsal and ventral setae; first flagellomere usually subrectangular to subtriangular, but reniform in *dendrohalma* Group; arista distinctly dorsal, arising from base of first flagellomere, relatively short and always simple.

Thorax. Ac setae usually developed either as 2-4 pairs of long setae or 5-8 pairs short setae, however, totally absent in the *hollowayi* Group; male dc various: either with 2 strong posterior setae and the anterior 3-5 dc reduced and hairlike (MSSC), or with dc₃ only reduced to weak hair (MSSC), or male with 5 strong unmodified dc; female with 5 strong dc; median scutellar setae strong, laterals always reduced to weak hairs or absent.

Legs. Femora almost always without strong ventral setae; major TII ad-pd setae usually present in females but absent in males; diagnostic leg MSSC include: a) tarsomeres II usually modified, with short erect or crocheted setae, distinctive bristles and/or swollen or

flattened tarsomeres, b) III_t sometimes flattened and padlike, and c) male TIII sometimes with brown band at one-fifth, but not developed as excavated callus.

Wing. Either hyaline or with transverse brown maculations; vein M1 with elbow-shaped bend, but not strongly recurved (as in most *Condyllostylus*); M₂ always present; crossvein m-cu straight or slightly bowed, and making almost right angle with vein M.

Abdomen. Abdominal plaques reduced in size in males; hypandrial arm arising beyond midlength of hypandrium; aedeagus with dorsal angle; epandrial lobe with 2 strong apical and subapical bristles; surstylus usually with large ventral lobe and digitiform dorsal projection, although variously modified; cercus usually simple and digitiform, although sometimes modified.

Remarks. Most previously described *Austrosciapus* species were included in the original concept of *Sciapus* (s.l.). Although subsequently referred to *Amblypsilopus* in Bickel & Dyte (1989), they are now regarded as part of a distinct genus. *Austrosciapus* is separated from superficially similar *Amblypsilopus* by having the vertical seta usually strong in both sexes, the clypeus adjacent to margin of eyes in both sexes, wing sometimes with transverse maculations, and cercus usually simple and unbranched.

Austrosciapus comprises 39 species in seven groups with one unplaced species. The genus is entirely Australian, although two species, *A. connexus* and *A. proximus*, are found on various Pacific islands and New Zealand, respectively, undoubtedly the result of accidental introduction. Within Australia, the genus predominates on the eastern tropical and subtropical rainforest as well as wet and dry sclerophyll eucalypt forests (Fig. 14), and has an Eastern Forest distribution (Fig. 16). Three species occur in northern Cape York Peninsula, one of which is found across the monsoonal tropics to Western Australia. However, the genus is unknown from Tasmania and New Guinea. The Western Australia *hollowayi* Group is found in coastal open sclerophyll forest and shrubby headland vegetation.

Austrosciapus is probably an old element of the Australian fauna and possibly of Gondwanan origin. The *tumidus*, *dendrohalma* and *hollowayi* Groups and part of the *proximus* Group are strongly associated with Australian eucalypt forests, suggesting these taxa radiated with the spread of sclerophyllous vegetation from mid-Tertiary time. In marked contrast, genera of Oriental-Papuan affinities, such as *Plagiozopelma* and *Amblypsilopus*, are usually associated with rainforests.

Austrosciapus has many similarities to the Gondwanan genus *Heteropsilopus*, the development of MSSC on IIt, similar wing maculations, and similar basic genitalic structure (eg, compare Fig. 49a, *H. sugdeni* with Fig. 75a, *A. fraudulosus*).

Heteropsilopus and *Austrosciapus* are regarded as sister taxa.

The *Austrosciapus* Groups form the following monophyletic associations:

I. The *proximus*, *tumidus*, *muelleri* and *sarinensis*

Groups. All four groups have modified male dc, long ac and usually with leg II MSSC. The *proximus* + *tumidus* clade shares similar leg II MSSC, and wing maculations are present on some species. Both occur in eastern Australia, although some *proximus* Group species have become accidentally established on Pacific islands. The *sarinensis* + *muelleri* clade have similar hypopygia but the *muelleri* Group has MSSC

on leg I while the *sarinensis* Group has MSSC on tarsus II.

II. The *storyi* + *dendrohalma* Groups. Both have unmodified male dc, short ac, often strongly modified cerci, and are confined to eastern Australia.

III. The *hollowayi* Group totally lacks ac setae and has unmodified dc setae in both sexes. It is confined to south-western Australia.

Key to Males of Australian *Austrosciapus* Groups

1. Male III_t₃₋₅ flattened with ventral pad-like surfaces 2
 — Male III_t₂₋₅ unmodified 4
2. At least antennal scape yellow; all coxae and legs mostly yellow; male TI and IIt unmodified (eastern Australia) *storeyi* Group
 — Antenna black; CII and CIII black; either male TI or IIt modified 3
3. IIt unmodified; TI with strong ventral setae and It₁ somewhat swollen with ventral pale pile (eastern Australia) *muelleri* Group
 — IIt with distinctive vestiture; IIt₁ yellow, posteriorly slightly concave with silvery pile; other IIt₁ surfaces with black setae; IIt₂₋₅ black with erect black setulae and IIt₂₋₃ also with silvery posterior pile; TI without strong ventral setae; frons often deep metallic blue (eastern Australia) *sarinensis* Group
4. Ac absent; thorax with dense brown pruinosity; wing in both sexes narrowed at base and expanded distad; cercus elongate (WA) *hollowayi* Group
 — Ac always present; thorax usually dark metallic green with only dusting of pruinosity; anal angle usually present 5
5. Male IIt unmodified; wings never banded; 5 strong dc present in both sexes; cercus short with ventral projections; first flagellomere reniform; male TI sometimes with subapical ventral excavation with group of short ventral setae on adjacent It₁; adults on tree trunks (eastern Australia) *dendrohalma* Group
 — Male IIt₁₋₄ with modified erect hairs and strong setae; wings sometimes with brown transverse bands; males with some anterior dc reduced to hairs 6
6. Male IIt₂₋₅ black, glabrous, and with rows of short erect crocheted black hairs; male TIII sometimes with brown band at one-fifth; wing sometimes with transverse brown maculations (Australia, Pacific islands) *proximus* Group
 — Male IIt₁ with 2 strong dorsoapical bristles, IIt₂ with long apical ad setae; IIt₄ basally swollen, bulbous and yellow; IIt₂₋₅ with short porrect setae; TIII never with brown band; male wing hyaline, although female often with 2 faint brown bands; male abdomen appearing annulated (eastern Australia) *tumidus* Group

The *proximus* Group

Diagnosis. *Head.* Vertical seta as either weak in male and stronger in female, or strong in both sexes; antenna usually black; first flagellomere subtriangular (Fig. 74c).

Thorax. Three pairs strong ac present; male with 5 dc present and dc_3 reduced to weak hair, or with 2 strong posterior dc and the 2-3 anterior dc weak and hairlike (MSSC); female with 5 strong dc, except in *A. crater* and *A. ravenshoensis*, where only 2 posterior dc present (FSSC).

Legs. Some males (*A. doddi*, *A. triangulifer*) with bowed It_1 (MSSC); male $IIt_{2,5}$ black, glabrous, and with rows of erect crocheted black hairs (MSSC) (synapomorphy); IIt_1 and IIt_2 with variable specific development of apical seta (MSSC); male TIII sometimes with brown band at one-fifth (MSSC), but not developed as callosity or posteriorly excavated.

Wing. Hyaline or with dark brown maculations in both sexes; crossvein m-cu straight or very slightly bowed.

Remarks. The *Austrosciapus proximus* Group is defined by the distinctively modified male IIt (MSSC) (group autapomorphy), which links even such species as *A. connexus* and *A. magus* with their remarkable hypopygial modifications.

The closely related Australian *tumidus* Group, which has a somewhat differently modified IIt , weak wing maculations, strong vertical and apical ad-pd IIt_1 , and a more modified hypopygium, is probably derived from the *proximus* Group, from an ancestor similar to *A. discretifasciatus*.

Many *proximus* Group species have brown wing maculations which often vary in intensity. A local series might contain some specimens with dark brown markings and others with only a faint grey wash marking the limits of maculation. The faintly maculated specimens often don't appear teneral, but perhaps maculation does increase with age, as was noted by Hardy (1961) for the sciapodine *Heteropsilopus squamifer* (q.v.). In *A. triangulifer*, the extent of maculation is intraspecifically variable (see Fig. 125f-h).

Some males of the *proximus* Group have a brown band at one-fifth on TIII (MSSC). Although this band is similarly positioned to the excavated callosities found on males of *Parentia*, some *Chrysosoma leucopogon* Group species, and some *Heteropsilopus*, there is no evidence of swelling or posterior excavation on *proximus* Group males.

The *proximus* Group is mostly endemic to eastern Australia, although two common species have extralimital distributions which suggest accidental introduction. In addition to their primary eastern Australian distribution, *Austrosciapus connexus* occurs in Perth, WA, Norfolk Island, Hawaii and French Polynesia (Fig. 76) and *A. proximus* has been found in Auckland, New Zealand (Fig. 73). The Group is not known from Tasmania, although such south-east Australian species as *A. proximus* and *A. discretifasciatus* might be expected

to occur there. *Austrosciapus bifarius* is found across northern monsoonal Australia from Cape York Peninsula almost to the Western Australian border (Fig. 73).

The 19 species of the *proximus* Group can be divided into four monophyletic assemblages as distinguished in the key.

I. Wing with distinct brown markings and male dc_3 reduced to weak hair. The relatively wide arid gap between south-eastern and tropical north-eastern Queensland has divided this assemblage geographically, and only *A. connexus* occurs along the entire coast:

A. Austrosciapus connexus (eastern coastal Australia).

B. *Austrosciapus bifarius*, *A. capricornis*, *A. collessi*, *A. doddi*, *A. fraudulentus* and *A. triangulifer* (north-eastern Queensland, northern Australia).

C. *Austrosciapus cassisi*, *A. discretifasciatus*, *A. frauci*, *A. proximus*, *A. quadrimaculatus* and *A. zentae* (central Queensland to Victoria).

II. Wing with distinct brown markings and with 4 male dc setae, dc_3 and dc_4 reduced to weak hairs: *Austrosciapus ascitus* (central Queensland).

III. Wing hyaline and male with 2 strong posterior dc and 2-3 weak hair-like anterior dc, frons with only dusting of pruinosity, thorax and abdomen mostly metallic coloured: *Austrosciapus riparius*, *A. magus* and *A. minnamurra* (eastern Australia).

IV. Wing hyaline and male with 2 strong posterior dc and 2-3 weak hair-like anterior dc, female with anterior dc absent (FSSC), frons with dense silvery pruinosity, thorax and abdomen yellowish: *Austrosciapus crater* and *A. ravenshoensis* (north-eastern Queensland).

Included species:

ascitus n.sp. Australia (Qld).

bifarius Becker, 1922a: 208. (*Sciapus*) (ZSI, not seen), Australia (Qld, NT), **n.comb.**

capricornis n.sp. Australia (Qld).

cassisi n.sp. Australia (NSW).

collessi n.sp. Australia (Qld).

connexus Walker, 1835: 471. (*Psilopus*) (types lost), Australia (NSW, Qld, WA), Norfolk Island, French Polynesia (Tahiti), Hawaiian Islands, **n.comb.**

pachigyna Macquart, 1848: 37. (*Psilopus*) (MNHP, examined), "New Holland."

pachigyna, misspelling of *pachigyna*.

crater n.sp. Australia (Qld).

discretifasciatus Macquart, 1849: 127. (*Psilopus*) (MNHP, examined), Australia (NSW, ACT, Vic., Qld), **n.comb.**

depinctus Becker, 1922a: 210. (*Sciapus*) (TMB, lost), Australia (NSW).

genevieveae, as *genevievei* Parent, 1932a: 168. (*Sciapus*) (ANIC, examined), Australia (Qld).

doddi n.sp. Australia (Qld).

frauci n.sp. Australia (Qld).

fraudulentus n.sp. Australia (Qld).

magus n.sp. Australia (NSW, Qld).

minnamurra n.sp. Australia (NSW).

proximus Parent, 1928: 191. (*Sciapus*) (ZMUH, lost), Australia (NSW, Qld, Vic.), New Zealand, **n.comb.**

- quadrimaculatus* Parent, 1932a: 121. (*Sciapus*) (ANIC, seen), Australia (Qld), **n.comb.**
 examined), Australia (NSW), **n.comb.**
ravenshoensis n.sp. Australia (Qld). *insecans* Becker, 1922a: 208. (*Sciapus*) (ZSI, not
 seen), Australia (Qld) (syn. Bickel & Dyte,
riparius n.sp. Australia (NSW). 1989).
triangulifer Becker, 1922a: 211. (*Sciapus*) (ZSI, not *zentae* n.sp. Australia (NSW, Qld).

Key to Males of the *Austrosciapus proximus* Group

1. Wing with distinct transverse brown markings or indications of such;
 with 5 dc present and dc₃ reduced to weak hair or with only 4 dc,
 the 2 anterior dc weaker 2
 — Wing hyaline, or at most with faint brown wash; dc either all strong,
 or with 2 strong posterior dc and 2-3 weak hair-like anterior dc 15
2. Brown wing markings distinctly joined together across anterior margin
 of wing (eg, Fig. 126b-d) 3
 — Wing markings as 2 separate bands, not joined anteriorly, or as 4
 separate markings 11
3. Anterior join of wing bands extending only to R₂₊₃ (eg, Fig. 126d);
 cercus elongate, extending beyond apex of surstylus 4
 — Anterior join of wing bands extending to R₄₊₅ (eg, Fig. 125h); cercus
 usually short and not extending much beyond apex of surstylus 7
4. Scape and pedicel yellow; metepimeron and tergum 1, and base of
 tergum 2 yellow; epandrial lobe relatively short (Fig. 75b) (Qld) *A. ascitus*
 — Antenna black; metepimeron metallic green 5
5. Cercus very long, and often held curled under abdomen; distal cercus
 with few setae; TIII usually entirely yellow; dorsal lobe of surstylus
 with marginal row of 6 pale setae (Fig. 78c) (Qld) *A. collessi*
 — Cercus much shorter, not curled but digitiform, and with setae along
 entire length 6
6. II_t₁ with strong apical pd seta; It₁ straight; vertical seta very weak;
 surstylus with distinctive pedicel which bears 3 strong setae; TIII
 with distinct dark brown band at one-fifth (Fig. 77b) (NSW, Qld) *A. zentae*
 — II_t₁ with weak apical setae; It₁ distinctly bowed; vertical seta strong;
 surstylus lobate with large subrectangular dorsal lobe which bears 5
 strong distal setae; TIII with very faint brown band at one-fifth (Fig.
 74g) (north-east Qld) *A. doddi*
7. Surstylus with black lobate dorsal extension which covers cercus (Fig.
 77c) (Qld, NSW, WA, Norfolk Island, Polynesia) *A. connexus*
 — Surstylus not extending over cercus 8
8. It₁ distinctly bowed; surstylus short and broad with distinctive black
 subapical bristle and short blunt ventral blade-like seta; hypandrial
 hood serrated; TIII entirely yellow (Fig. 74d) (Qld) *A. triangulifer*
 — It₁ straight; surstylus narrower; hypandrial hood smooth; TIII
 sometimes with faint brown sub-basal ring at one-fifth 9

9. Cercus digitiform and extending well beyond apex of surstylus; surstylus with some strong apical setae (Fig. 75a); dark brown infuscation covering much of wing (similar to Fig. 125h) (Qld) *A. fraudulosus*
- Cercus not extending much beyond apex of surstylus; wing not so heavily infuscated 10
10. Cercus short, triangular; surstylus with ventral lobe distally bent (Fig. 74a) (south-eastern Australia) *A. proximus*
- Cercus elongate, triangular; surstylus with ventral club-shaped arm and dorsal arm which bears short modified apical seta (Fig. 74e) (monsoonal Australia) *A. bifarius*
11. Cercus, short, not extending much beyond tip of surstylus and without black undulating apical bristles 12
- Cercus distinctly longer than surstylus, and with group of long black undulating apical bristles 13
12. TIII with distinct brown band at one-fifth; surstylus broad and subtriangular; epandrial lobe elongate lying adjacent to surstylus (Fig. 74f) (south-eastern Australia) *A. discretifasciatus*
- TIII entirely yellow; surstylus expanded distally, clavate; epandrial lobe elongate and projecting (Fig. 77a) (Qld) *A. frauci*
13. Haltere dark brown; TIII with distinct brown band at one-fifth; surstylus expanded distally, and with dorsobasal setose projection (Fig. 77b) (NSW) *A. cassis*
- Haltere yellow; TIII entirely yellow or with only faint brown band 14
14. Wing with 2 distinct brown bands (Fig. 126c); dorsal surstylar arm with group of 5-6 curved distal setae (Fig. 78a) (Qld) *A. capricornis*
- Wing with 4 separate maculations, only weakly joined into 2 bands on some specimens; dorsal surstylar arm with 2 long curved apical setae (Fig. 77d) (NSW) *A. quadrimaculatus*
15. Thorax mostly red-yellow with some dorsal metallic green reflections; CII and CIII mostly yellow; frons covered with dense silvery pruinosity 16
- Thorax entirely metallic green or blue-green; CII and CIII black; vertex and frons shining, with little pruinosity 17
16. Antenna entirely black; anal angle absent (Fig. 126g); surstylus with dorsal pointed thumb-like projection, and with row of 3 strong lateral setae (Fig. 80c); body length less than 5.0 (Qld) *A. ravenshoensis*
- Antenna yellow; anal angle weak but present (Fig. 126f); surstylus with lobate dorsal projection, and with 1 strong lateral seta (Fig. 80b); body longer than 5.0 (Qld) *A. crater*
17. Abdominal sternum 4 with distinctive posterior U-shaped projection (Fig. 79c); cercus straight and elongate; surstylus short and massive (Fig. 79b) (NSW) *A. riparius*
- Abdominal sternum 4 without projections; cercus curved or with ventral projection 18

18. Cercus with massive ventral projection, bearing very long marginal setae, and with dorsal arm thin and elongate; surstylus lobate (Fig. 79a) (north-east Qld to NSW) *A. magus*
- Cercus curved, somewhat expanded distally, and highly setose; surstylus with hatched-shaped ventral projection and with dorsoapical projection bearing strong apical seta (Fig. 80a) (NSW) *A. minnamurra*

***Austrosciapus proximus* (Parent), n.comb.**

Sciapus proximus Parent, 1928: 191.

Amblypsilopus proximus.—Bickel & Dye 1989: 395.

Type material. Parent described *Sciapus proximus* based on male and female syntypes from "N.S.W." (ZMUH, lost).

Neotype here designated from a male identified by Parent, bearing the label "N.S.W., Woy Woy, Nov. 1921, A. Tonnoir" (ANIC).

Additional material. New South Wales – Dorrig National Park; Narara; Woy Woy; Eccleston; Chevoit Hills; Cabbage Tree Creek, Clyde Mountain; Yabbor State Forest, Budawang Range, Castle Flats; Palm Creek, Royal National Park; Woronora River, Heathcote; metropolitan Sydney; Brown Mountain, near Nimmitabel; Upper Allyn River, Tumut; Scotts Head, near Warrell Creek; Terrigal; Katoomba; The Island, Bellingen; Wilson River, near Bellangry; Beechmont; near Bargo; Bawley Point, near Bateman's Bay; Merrika River, Nadgee Nature Reserve, on blossoms of *Eucalyptus sieberi*; Bruces Creek, Nadgee State Forest; Woko National Park, near Gloucester, dry rainforest; Terania Creek, Nightcap National Park; "Lorien", near Landsdowne; Werrikimbe National Park, Upper Hastings River, 910 m; Wingham Brush, riverine rainforest, yellow pans; Tooloom Scrub, near Urbenville, yellow pans and on leaves *Hydrocotyle pedicellosa*, subtropical rainforest; Mount Warning. Queensland – Highvale; Mount Tambourine; Lamington National Park; Woombye, near Nambour; Mount Nebo; Waterpark Creek, near Byfield, rainforest; Carnarvon National Park, Violet Gorge. Victoria – Cabbage Tree Creek, near Orbost, warm temperate rainforest. All Australian collection dates from Nov. to May inclusive; Sydney district: 3 Nov.-6 Mar (more than 400 specimens examined: AMS, ANIC, USNM, UQIC, NSW, CNC).

Description – male. Length: 5.1-5.4; wing: 4.2 x 1.7.

Head. Vertex and frons metallic blue-green; short black vertical seta present; face and clypeus covered with dense silvery pruinosity; palp and proboscis yellow; antenna black; pedicel with strong dorsal and weaker ventral setae; first flagellomere subtriangular (Fig. 74c); arista dorsal, as long as head height; ventral postcranium with abundant pale setae.

Thorax. Shining metallic green with bronze reflections; with bronze-brown area along lateral edge of mesonotum; scutellum blue-green; pleura with dense silvery pruinosity; setae black; 3 pairs long ac present; 5 dc, with dc₃ reduced to weak hair (MSSC); 1 pa, 2 sa, 2 npl, 2 sr, 1 hm and 1 pm present; lateral scutellar seta reduced to tiny weak hair or absent.

Legs. CI and trochanter I yellow; CII, CIII and their trochanters black; remainder of legs yellow with only

'knee' of FIII and distal tarsomeres darkened; CI and CII with pale anterior hairs, and CIII with pale lateral setae; CI with 3 black anteroapical setae; femora with pale weak ventral hairs; I: 9.0; 8.0; 6.0/2.0/1.5/1.0/1.0; TI with ad-pd pair at one-eighth and strong dorsal seta at half; It₁ straight; II: 9.0; 10.5; 7.0/2.0/2.0/1.5/1.0; TII with offset ad-pd pairs at one-fifth and one-third, strong ad at half, and 4 strong apicals; IIt₂₋₅ without normal vestiture but black, glabrous with rows of erect, crocheted black hairs (MSSC); III: 11.0; 15.0; 6.0/4.0/2.5/1.5/1.0; TIII with only faint brownish subbasal band (MSSC), and covered with black setae, with 4-5 strong dorsal setae, and with strong anterior seta at half (MSSC).

Wing. Broad; hyaline with 2 brown transverse bands joined anteriorly to R₄₊₅ and brown infuscation not extending basally (Fig. 125e); m-cu straight; CuAx ratio: 2.0; lower calypter pale with black rim and fan of pale setae; haltere yellow.

Abdomen. Metallic green with matt brown rings around base of each tergum and overlapping preceding tergum; tergum 1 with dark tergal window; hypopygium black (Fig. 74a,b); hypandrium with left arm arising in distal half; epandrial lobe with long and short apical bristles; surstylus elongate with distinctive ventral club-like projection, and with setae as figured; cercus subtriangular.

Female. Similar to male but lack MSSC; also with weak vertical seta; with 5 strong dc; TIII with shorter black vestiture.

Remarks. *Austrosciapus proximus* occurs along the coast and ranges from East Gippsland, Victoria to central Queensland (Fig. 73), and is found in a variety of habitats, from dry and wet sclerophyll forest to subtropical, riverine and warm temperate rainforest. [Specimens from Kuranda, Qld (BMNH, examined) misidentified by Parent (1933a) as *A. proximus* are *A. bifarius*.]

The New Zealand specimens were collected in Auckland gardens (B.A. Holloway, personal communication) and I have not seen any specimens from natural habitats in New Zealand. This suggests accidental introduction of the species from Australia, probably in soil (see Bickel, 1992).

Austrosciapus proximus is often found on vegetation, especially along creeks, and it has been collected on the common subtropical rainforest groundcover plant *Hydrocotyle pedicellosa* (Apiaceae).

Some specimens fail to develop the characteristic dark

brown wing markings and show only a grey wash to mark the extent of maculation. Collections from the same locality often contain both faint and dark marked individuals.

Female *A. proximus* cannot be reliably separated from sympatrically occurring female *A. connexus*.

***Austrosciapus triangulifer* (Becker), n.comb.**

Sciapus triangulifer Becker, 1922a: 211.

Sciapus insecans Becker 1922a: 208, syn. Bickel & Dyte, 1989.

Amblypsilopus triangulifer.—Bickel & Dyte 1989: 395.

Type material. Becker described *Sciapus triangulifer* from two males taken at Kuranda "India" (= Queensland) (ZSI, not seen). This common northern Queensland species can be identified with confidence from Becker's description and figures. *Sciapus insecans*, also described from Kuranda, "India" (= Queensland) (ZSI, not seen), and is similar to *S. triangulifer* except it has a greater extent of wing clouding. This variation in wing maculation as intraspecific (see Wing and Remarks, below) and *S. insecans* is regarded as a synonym.

Additional material. Queensland – Mulgrave River, 4 Oct. 1925; 3 Dec. 1966–2 Jan. 1967; 15 Dec. 1961; Claudie River, Mount Lamond, 28 May–2 June 1966; Clohsey River, near Cairns, 3 June 1968; North Maria Creek, near Silkwood, 14 Dec. 1961; Kuranda, 22 May 1958; Cape Tribulation, 4 Jan. 1982; Hutchinson Creek, near Daintree River, 8 Jan. 1971; Cairns, and Milla Milla, no date; Malanda Falls, 6 Feb. 1975; Barron River, near Kuranda, 14 Aug. 1955; The Boulders, Babinda, 10 May 1967; Bamboo Creek, near Miallo, north of Mossman, 25 Apr. 1967; Gillies Highway, south-west of

Gordonvale, 11 July 1971; Mount Webb, 2 Oct. 1980; north-east of Mount Finnigan, 10 Oct. 1980; Innisfail, no date; Crediton Creek, Eungella National Park, 30 Nov. 1992, 920 m (87 males, 69 females examined; AMS, ANIC, BMNH, QDPI, SAM, CNC, USNM).

Description – male. Length: 4.5–5.0; wing: 4.5 x 1.6; similar to *A. proximus* except as noted.

Head. Vertical seta strong.

Legs. TI with offset ad-pd pair at one-eighth, and dorsal seta at two-fifths; It_1 distinctly bowed (MSSC); TII with short ad-pd pair at one-tenth, strong ad at one-eighth, offset ad-pd pair at half and strong apical setae; $It_{2,5}$ black, glabrous with rows of erect, crocheted black hairs (MSSC); FIII with black dorsal setae, especially strongly developed in distal third (MSSC); TIII entirely yellow without brown band.

Wing (Fig. 125f,g,h, all from Kuranda). Normally with 2 dark brown transverse bands fused anteriorly to R_{4+5} , and extending between costa and R_{4+5} to wing base; however wing maculation intraspecifically variable, ranging from very faint in some specimens (Fig. 125g), to extensive maculation in others such that the gap between transverse bands is almost completely filled (Fig. 125f); CuAx ratio: 1.9; m-cu slightly sinuous.

Abdomen. Hypopygium (Fig. 74d); hypandrial hood with serrations; surstylus broad, short, and with membranous attachments to epandrium; surstylus with distinctive short, blunt blade-like seta ventrally and median strong black seta; cercus triangular, setose with long apical seta.

Female. Similar to male except lack MSSC and as noted: vertical seta also strong; It_1 straight; TII with

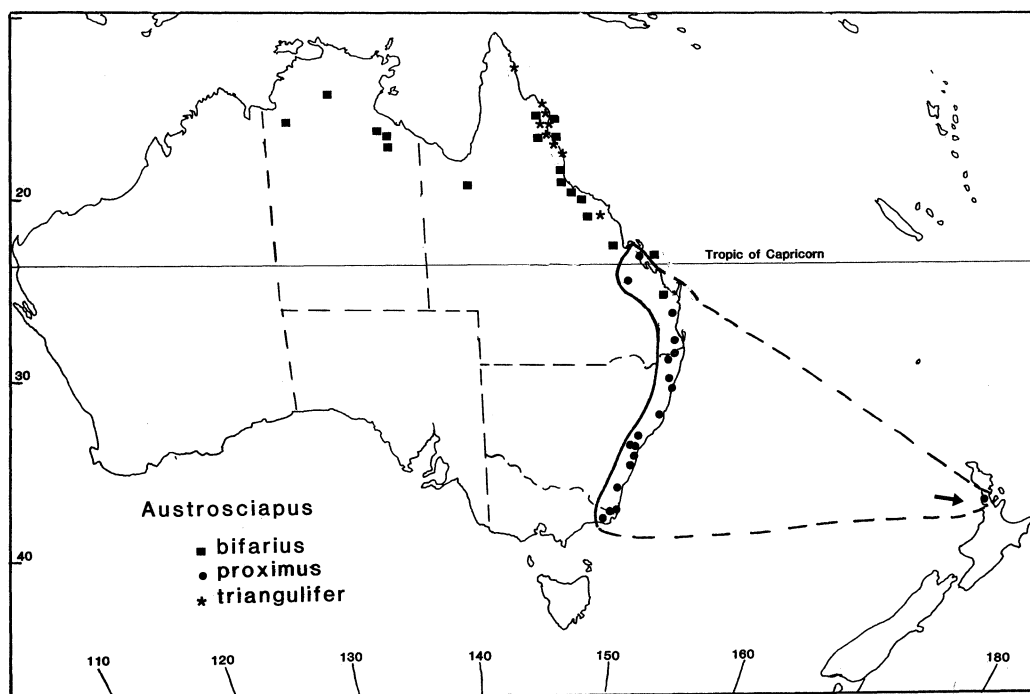


Fig.73. Distribution, *Austrosciapus bifarius*, *A. proximus*, *A. triangulifer*.

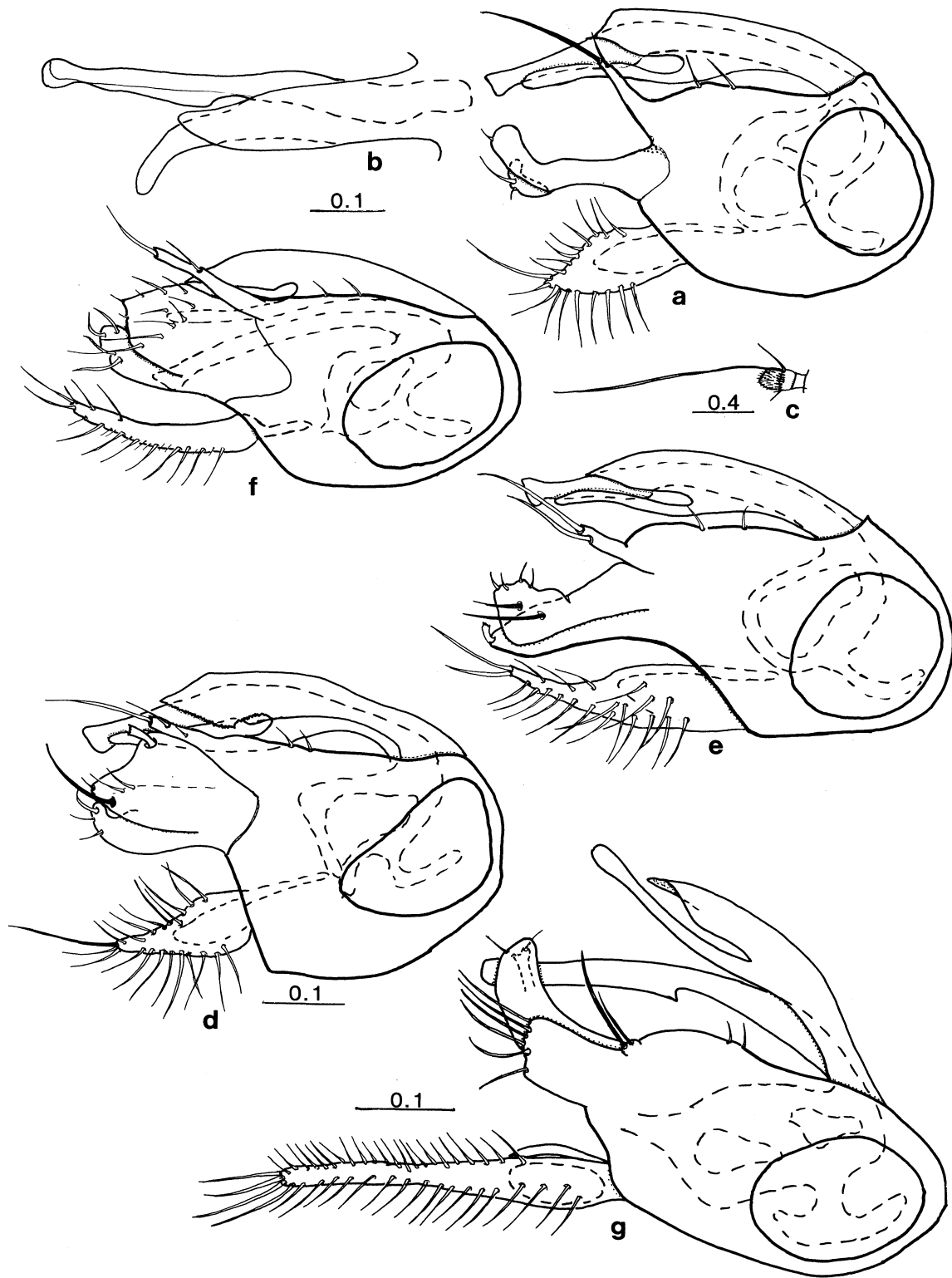


Fig.74. *Austrosciapus proximus*, Bellingen, NSW: a – hypopygium, left lateral; b – hypandrium and aedeagus, ventral; c – male antenna, left lateral. *A. triangulifer*, Mulgrave River, Qld: d – hypopygium, left lateral. *A. bifarius*, Ingham, Qld: e – hypopygium, left lateral. *A. discretifasciatus*, Newcastle, NSW: f – hypopygium, left lateral. *A. doddi*, Cairns district, Qld: g – hypopygium, left lateral.

offset ad-pd pairs at one-eighth and one-third; FIII with short normal vestiture.

Remarks. *Austrosciapus triangulifer* occurs in northern Queensland rainforest from Iron Range to Eungella National Park, near Mackay (Fig. 73).

The variation in wing maculation is intraspecific and found on both sexes. A complete range of wing infuscation is present among males of representative samples from the Barron River, Mulgrave River, Claudie River, Kuranda, and Crediton Creek. All males have identical hypopygia and are therefore conspecific.

***Austrosciapus doddi* n.sp.**

Type material. HOLOTYPE male, PARATYPES 3 males, female, Queensland, Cairns district, no date, F.P. Dodd; PARATYPES male, female, Kuranda, no date (AMS).

Additional material. Queensland – 11 males, 23 females, Kuranda, Sept.-Oct. 1910 (BMNH); 3 males, 3 females, Russet Park, Kuranda, 14 Oct.-20 Dec. 1987, flight trap (CAS).

Description – male. Length 4.0; wing: 4.0 x 1.4; similar to *A. proximus* except as noted.

Head. Vertical seta strong.

Legs. It₁ distinctly bowed (MSSC); TII with only weak ad-pd pair at one-quarter, and with strong apical setae; IIt₁ and IIt₂ with only weak apical setae; IIt_{2.5} with erect crocheted hairs (MSSC); TIII with only very weak brown band at one-fifth (MSSC).

Wing. With 2 broad brown bands fused anteriorly to R₂₊₃ (similar to Fig. 126a); CuAx ratio: 2.0.

Abdomen. Hypopygium black (Fig. 74g); hypandrial hood wide with weakly serrated margin; hypandrial arm curved to right of aedeagus; epandrial lobe very short and with 2 strong bristles; surstylus lobate with large subrectangular dorsal lobe which bears 5 strong distal setae; cercus setose and digitiform, and extending beyond apex of surstylus.

Female. Similar to male except lacking MSSC.

Remarks. *Austrosciapus doddi* is known only from the Cairns district, Queensland. It is superficially similar to the southern *A. zentae*, having similar wing maculation and surstylus, but is probably closer to the northern Queensland *A. triangulifer*, since both species have a bowed male It₁ (MSSC).

***Austrosciapus fraudulosus* n.sp.**

Type material. HOLOTYPE male, Queensland, junction, 16 km north-east of Heathlands, 11°41'S, 142°42'E, 22 Mar. 1992, at light, M. Schneider & G. Daniels (McEvey No. 10154) (AMS).

Description – male. Length: 4.3; wing: 3.9 x 1.5; similar to *A. proximus* except as noted.

Head. Short black vertical seta present; antenna yellowish, but infuscated dorsally.

Thorax. Lateral scutellar setae one-fifth the length of medians.

Legs. CI with 3 black anteroapical setae; relative podomere ratios similar; TII with ad setae one-fifth and subapically, and pd setae at one-eighth, half and subapically; IIt_{3.5} black and glabrous with erect black hairs (MSSC), but not as strongly developed as in other *proximus* Group species; TIII with very faint brownish subbasal band (MSSC); TIII covered with black setae, with 4-5 stronger dorsal setae.

Wing. With 2 brown transverse bands fused anteriorly to R₄₊₅ and covering much of the wing (similar to Fig. 125h); m-cu straight; CuAx ratio: 2.4; lower calypter pale with black rim and fan of pale setae; haltere yellow.

Abdomen. Metallic green with matt brown rings around base of each tergum and overlapping preceding tergum; hypopygium (Fig. 75a); hypandrial arm reaching almost to apex of aedeagus; epandrial lobe with long and short apical bristles; surstylus lobate with 3 apical setae; cercus digitiform.

Female. Unknown.

Remarks. *Austrosciapus fraudulosus* occurs in northern Cape York Peninsula, Queensland, from the Jardine River drainage to the Cape. Most specimens were taken along creeks in monsoonal vine forest.

The wing maculation of this species is close to that of *A. triangulifer*, while the hypopygial structure is of a generalised type for the *proximus* Group.

***Austrosciapus bifarius* (Becker), n.comb.**

Sciapus bifarius Becker, 1922a: 208.

Amblypsilopus bifarius.—Bickel & Dyte, 1989: 394.

Type material. Becker described *S. bifarius* from 2 males and 1 female taken at "Indien, Cairuna, Kuranda (N.O. Aust), India" (= Kuranda, near Cairns, Queensland) (ZSI, not seen). From Becker's description and figures this species can be identified with confidence.

Additional material. Northern Territory – McArthur River and Caranbirini Water Hole, both south-west of Boorooloola, 3 Nov. 1975, 22 Apr. 1976, 14 Apr. 1976; Katherine River, 19 Jan. 1973; Bukalara Plateau, 46 km south-west of Boorooloola, 23 Apr. 1976; Boorooloola, 23 Dec. 1991; Dingo Creek crossing of Victoria River, 16°04'S 129°05'E, yellow pans, 1 Jan. 1992. Queensland – Dugatt River, 46 km north of Cloncurry, 17 Nov. 1991; Escot Station, west of Burketown, 19 Dec. 1991; Broken River, Eungella, 9 Dec. 1961; Townsville, 7 Jan. 1955; Fig Tree Creek, 39 km south of Ingham, 14 Apr. 1980; Ingham, 17 May 1960, 28 Mar. 1961; Lake Barrine, 530 m, 30 Jan. 1964; Ayr, Swan Lagoon, 16 Mar. 1986; Heron Island, 30 Apr. 1964; Pine Creek, south of Bundaberg, 14 Dec.

1975; Herbert River, Ingham, in grass, 7 Nov. 1975; Marlborough Creek, Marlborough, 29 Jan. 1975; Stannary Hills, 930 m; north-west of Mount Carbine, Windsor Tablelands, 23 Jan. 1988; Atherton, 25 Jan. 1988; Kuranda, no date; Big Mitchell Creek, Mareeba-Molloy Road, 4 May 1967; Curtain Fig, 17°17'S 145°34'E, 28 Jan. 1988; Atherton Laboratory, CSIRO, 17°17'S 145°29'E, 25 Jan. 1988 (110 males, 84 females examined, AMS, ANIC, BMNH, QDPI, MVM, SAM, USNM, BPBM).

Description – male. Length 3.9–4.2; wing: 3.5 x 1.4; similar to *A. proximus* except as noted.

Head. Vertical seta weak.

Legs. TI with short dorsal seta at one-eighth; TII with short ad-pd pair at one-eighth, pd at one-quarter, and strong ad at half, and with 3 strong apical setae; IIt₁ with short apical ad-pd pair; IIt_{2,5} with erect, crocheted setae; TIII with brown band at one-fifth (MSSC).

Wing (Fig. 125i). With 2 dark brown bands fused anteriorly to R₄₊₅ and with a brown clouding extending basally anterior to R₄₊₅; CuAx ratio: 1.6.

Abdomen. Hypopygium (Fig. 74e) black with dark appendages; surstylus divided into ventral club-shaped

arm and dorsal arm which bears distinctive apical short modified seta; cercus elongate, subtriangular, setose.

Female. Similar but lacks MSSC; also with weak vertical seta; TIII entirely yellow.

Remarks. *Austrosciapus bifarius* is found along the Queensland coast and offshore islands from the Cairns district to Bundaberg, and across the monsoonal north, including the Gulf of Carpentaria, Arnhem Land, and probably the Kimberley Ranges, Western Australia (Fig. 73). In the more arid regions, *A. bifarius* is associated with rivers and creeks.

Austrosciapus discretifasciatus (Macquart), n.comb.

Psilopus discretifasciatus Macquart, 1849: 127.

Sciapus depinctus Becker, 1922a: 210.

Sciapus genevieveae, as *genevievei* Parent 1932a: 168.

Amblypsilopus discretifasciatus.—Bickel & Dyte, 1989: 394.

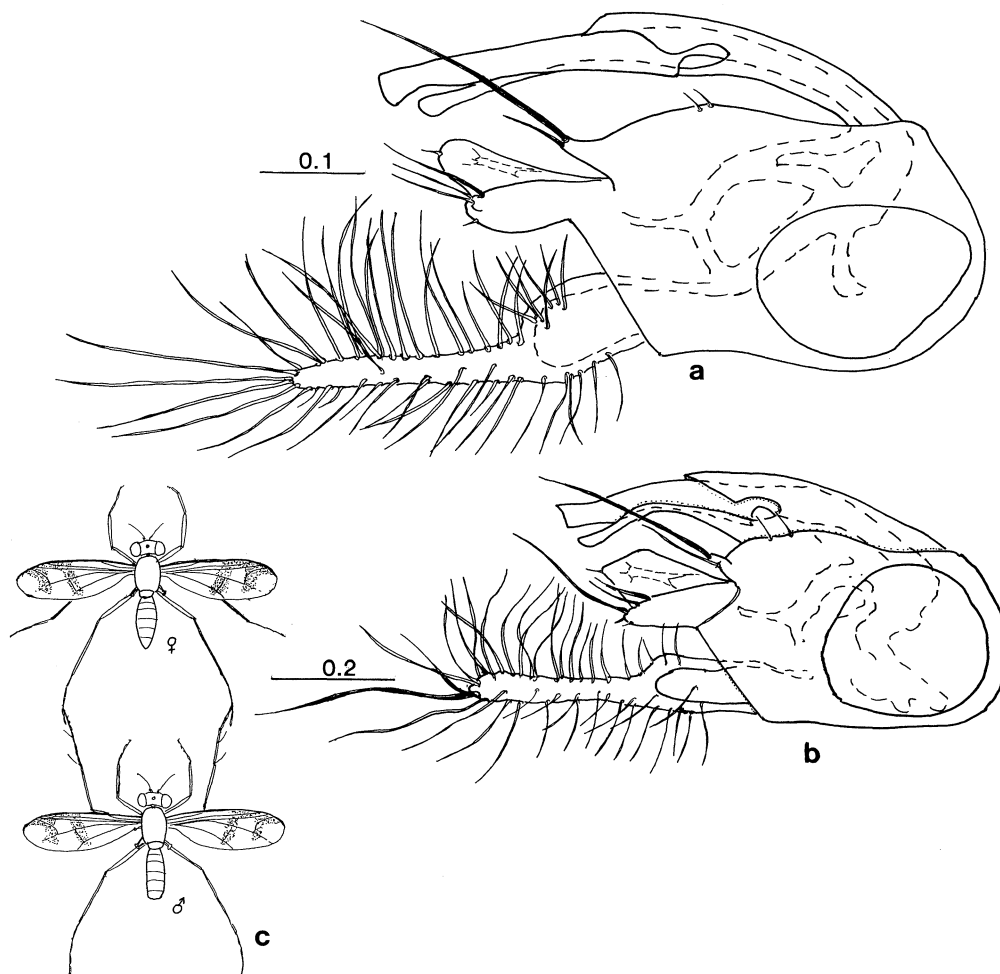


Fig.75. *Austrosciapus fraudulentus*, Heathlands, Qld: a – hypopygium, left lateral. *A. ascitus*, Blackdown Tableland, Qld: b – hypopygium, left lateral. *A. connexus*: c – diagrammatic view of male tarsus II holding female tarsus III during mate guarding.

Type material. Macquart's *Psilopus discretifasciatus* was described from a pair taken in "Tasmania" (MNHP, examined). I haven't seen Tasmanian specimens of this species and the probable type locality is Sydney, where it is common (see Hardy, 1929 for discussion of the Sydney origin for many of Macquart's Tasmanian species). Both Hardy (1930) and Parent (1932a) regarded Becker's *Sciapus depinctus*, a syntypic pair from Parramatta and Botany Bay, NSW (TMB, lost), as a junior synonym. Parent (1932e) examined the types of *P. discretifasciatus* and placed his *Sciapus genevieveae*, described from a male, Eidsvold, Queensland (ANIC, examined) in synonymy. Although Parent described this species as *genevievei*, it was amended to *genevieveae* in Bickel & Dyte (1989).

Additional material. Australian Capital Territory – Cotter-Murrumbidgee Rivers junction, 8 Oct. 1960. New South Wales – Allyn River near Allynbrook, 21 Mar. 1973; Jindabyne, 21 Feb. 1969; Katoomba 8 Nov.-22 Dec. 1955; Curricabark Road, near Gloucester, 25 Mar. 1985; near Taree, 28 Mar. 1992; Newcastle, 4 Oct. 1925; metropolitan Sydney, Mar. and Nov., various years; Mapra Creek, Warrumbungle National Park, 16 Nov. 1990, yellow pans; Bullawa Creek, near Narrabri, 11 Nov. 1964; Dorrigo National Park, 30 Mar. 1960; Mendooran, 19 Nov. 1971; Tumut, 31 Mar. 1961; Singleton, 24 Nov. 1967; Ulladulla, no date; Windsor, no date; Tamworth, no date; Tubrabucca, 16 Nov. 1953; Tarro, Hunter River, 18 Oct. 1922; Armidale, 5 Oct. 1959; Wingabutta Creek, north of Mendooran, 26 Mar. 1971; Bay's Hill, Taree, 28 Mar. 1993. Queensland – Eidsvold, Oct. 1929, Apr. 1930; Dead Horse Gully Creek, Bunya Mounstns National Park, 6 Dec. 1985; Gatton, yellow pans and D-Vac of potato crops, 7 Oct.-11 Nov. 1981; 30 Mar.-13 Apr. 1981; Mount Tambourine, 6-17 Mar. 1981; Palen Creek, south of Rathdowney, 24 Feb. 1974; Goomburra, 14 Oct. 1973; Kholo, 9 Mar. 1973; Loganlea, 22 May 1968; Carnarvon Creek, 16 km north-east of Park, creekbed, 28 Nov. 1992; Girraween National Park, Bald Rock Creek, 900m, 25 Nov. 1992. Victoria – Grampian Mountains, Oct. 1928; Nunawading, 9 Jan. 1965; Upper Buckland, 28 Nov. 1984; Mitta Mitta River, Dartmouth Survey, 4 Mar. 1973 (more than 200 specimens examined AMS, ANIC, MVM, NSW, QDPI, CNC).

Description – male. Length 3.5-4.0; wing: 3.3-3.8 x 1.3; similar to *A. proximus* except as noted.

Head. Strong vertical seta present.

Legs. TI with dorsal seta at one-fifth; TII with ad setae at one-fifth, half and subapically, and pd setae at one-fifth, one-third and subapically; IIt₁ with strong apical ad-pd pair and IIt₂ with strong ad (MSSC); IIt_{2,5} with short erect crocheted hairs (MSSC); TIII with distinct brown band at one-fifth (MSSC).

Wing (Fig. 125j). With 2 distinct bands, not joined anteriorly and without infuscation extending basally; CuAx ratio: 2.3.

Abdomen. Hypopygium (Fig. 74f); surstylus broad, with large subtriangular ventral arm and smaller dorsal arm, and with setae as figured; cercus narrow, elongate.

Female. Similar to male except lack MSSC; TIII without brown band.

Remarks. *Austrosciapus discretifasciatus* is broadly distributed along the eastern Australian coast and

ranges and western slopes from the Grampian Mountains, Victoria to central Queensland. It is found in undisturbed habitats as well as gardens and agricultural field.

Intensity of wing maculation is variable among specimens, but the bands are never joined anteriorly. This species, with its strong verticals and strong apical ad-pd setae on IIt₁, is possibly similar to the ancestor of the *tumidus* Group.

Austrosciapus frauci n.sp.

Type material. HOLOTYPE male, Queensland, Pine Creek, 19 km south of Bundaberg, 14 Dec. 1975, H. Frauca (ANIC); PARATYPE male, Croftby, 13 Oct. 1973 (MVM).

Additional material. Queensland – 2 males, Carnarvon National Park, Carnarvon Creek camp, riverine forest, pans, 28 Nov. 1992 (AMS); female, Mapleton, 23 Oct. 1980 (MVM).

Description – male. Length 4.3; wing: 5.0 x 1.8; similar to *A. proximus* except as noted.

Head. Strong vertical seta present.

Legs. IIt₁ and IIt₂ each with strong apical anterior-posterior setae, and IIt₃ with apical av-pv pair (MSSC); IIt_{2,5} with short erect crocheted hairs (MSSC); TIII entirely yellow and without dense black setae.

Wing. Hyaline with 2 dark brown transverse bands, not fused along anterior margin or with faint infuscation linking bands (similar to Fig. 125j).

Abdomen. Hypopygium black with yellow cerci (Fig. 77a); ventral margin of epandrium straight with 2 short epandrial setae and some short hairs basad; elongate epandrial lobe, projecting apicad from epandrium, and with long apical and subapical bristles; surstylus free from epandrial lobe, clavate and ventrally subtriangular; cercus short, subtriangular and setose.

Female. Similar to male but lack MSSC.

Remarks. *Austrosciapus frauci* occurs from south-eastern to central Queensland and is closely related to *A. discretifasciatus*.

Austrosciapus zentae n.sp.

Type material. HOLOTYPE male, PARATYPES 2 males, New South Wales, Porter's Dam Road, 16 km north-west, 9 Feb. 1974, Z. Liepa (ANIC).

Additional material. New South Wales – 20 km south of Grafton, 19 Mar. 1981; Iluka, littoral rainforest, 23 Feb. 1965; Woodburn, south-west of Ballina, 2 May 1970; Gleneareagh, 2 Feb. 1923; "Lorien", near Lansdowne, 16 Nov. 1987, Jan., Feb., Mar. 1988, malaise trap, and 5 Mar. 1988, on leaves in garden; Shoalhaven River, 30 km west of Nowra, 25 Dec. 1988. Queensland – Brisbane, 25 Sept. 1938,

21 Apr. 1914; Maryborough, 27 Jan. 1975; Currumbin, 17 Dec. 1970; Buderim, 18 Nov. to 2 Dec. 1982; Maroochy, near Nambour, 15-22 Mar. 1985 (24 males, 39 females, examined: AMS, ANIC, QDPI, NSW, UQIC).

Description – male. Length 4.0; wing: 4.0 x 1.4; similar to *A. proximus* except as noted.

Head. With very weak vertical seta.

Legs. TI bare; TII with only offset ad-pd pairs at one-fifth and one-third, and strong apical setae; IIt₁ with strong apical pd seta (MSSC); IIt_{2,3} with erect crocheted hairs, with additional fine whitish pile dorsally (MSSC); IIt_{4,5} black, glabrous with erect black setae (MSSC); TIII with distinct dark brown band at one-fifth (MSSC).

Wing (Fig. 126a). With 2 broad brown bands fused anteriorly to R₂₊₃ and with brown clouding extending basally along R₂₊₃; basal band extends almost to wing margin beyond m-cu; CuAx ratio: 2.0.

Abdomen. Hypopygium (Fig. 77b); hypandrial hood wide with serrated margin; hypandrial arm curved to right of aedeagus; epandrial lobe with 2 strong bristles; surstylus lobate with small dorsal lobe; pedicel with 3 long apical setae arising near surstylus-epandrium join and positioned laterad of surstylus; cercus elongate, setose, and extending beyond tip of surstylus.

Female. Similar to male except lacking MSSC; also with weak vertical seta.

Remarks. *Austrosciapus zentae* occurs along the eastern Australian coast from southern New South Wales to the Maryborough district, Queensland. The distinctive surstylar pedicel bears three apical setae.

***Austrosciapus connexus* (Walker), n.comb.**

Psilopus connexus Walker, 1835: 471.

Psilopus pachygyna Macquart, 1848: 37.

Psilopus pachygyna Macquart, 1850: 127 (misspelling of *pachygyna*).

Amblypsilopus connexus.—Bickel & Dyte, 1989: 394.

Type material. Walker described *Psilopus connexus* based on a female from “New Holland”. The type is not in the BMNH (K.G.V. Smith, personal communication), and apparently all Diptera types described in Walker’s 1835 paper are lost. Walker’s description fits females of the species under consideration and the name should be conserved instead of regarding it as a *nomen dubium*. A male, bearing the label “Guildford, New South Wales, 27. 10. 1970, E. Williams” is here designated as neotype (AMS). *Psilopus pachygyna*, described from males collected in “New Holland” (MHNP, examined), is regarded as a junior synonym of *Psilopus connexus*.

Additional material. New South Wales – metropolitan Sydney; Guildford; Gosford; Corryong; Glenorie; Dorrig; Mullumbimby; Upper Allyn River; Brunswick Heads; Woolgoolga; Nelligen; Engadine; “Lorien”, near Lansdowne; Harrington; Woronora River. Queensland – metropolitan Brisbane (including St Lucia, resting on *Eucalyptus curtissi*, 27 Oct. 1987); Blackall Range; Burleigh; Kuranda; Woodburn; Nambour; Montville; Lake Placid, near Cairns; Bundaberg; Woombye; Samford; Biggenden; Wynnum; Mount Glorious; Toowoomba; Dunwich; Stradbroke Island; Townsville; Miallo, north of Mossman; Eidsvold; Wreck Island, Great Barrier Reef; Mareeba; Caloundra; Tin Can Bay; Gatton, Mount Tambourine; Emerald; Ingham; Byfield. Western Australia – Perth; Mandurah; Crawley; Fremantle; Mullaloo. Norfolk Island – Kingston. Summary of collection dates: metropolitan Sydney: Nov.-Apr.; north-eastern Queensland: Sept.-May; metropolitan Perth: Dec.-Apr. (more than 700 specimens

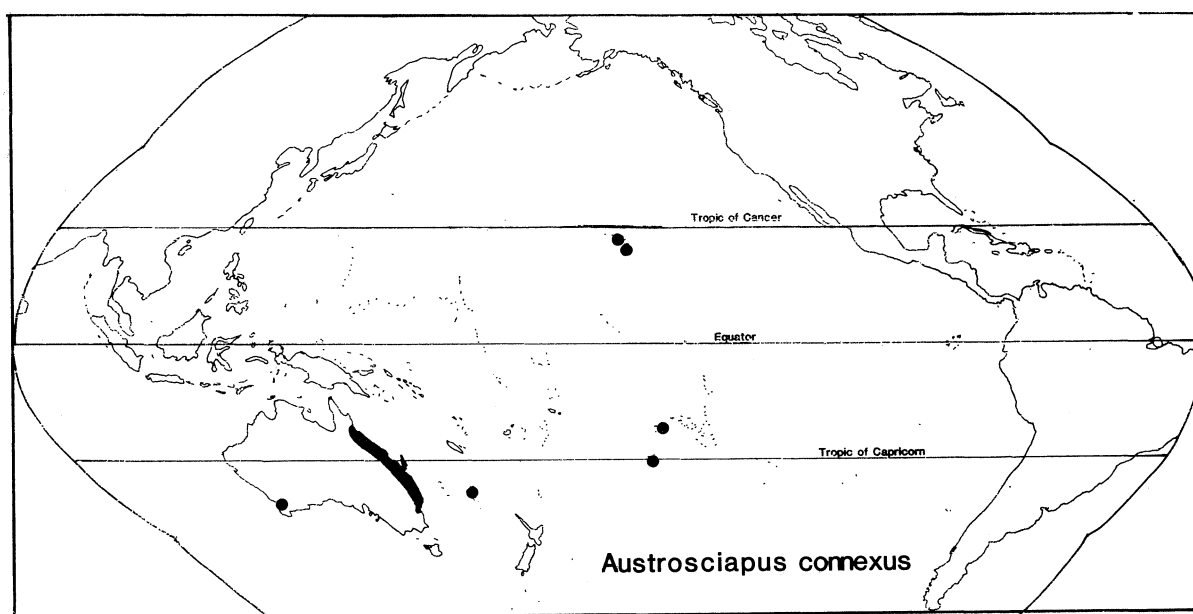


Fig.76. Distribution, *Austrosciapus connexus*.

examined, AMS, ANIC, MVM, QDPI, QMB, UQIC, SAM, WAM, WADA, BMNH, USNM, CNC).

Additional exotic material. French Polynesia – Austral Islands, Tubai (BPBM); Rurutu (ZMUC). Society Islands, Tahiti; Bora Bora (BPBM).

Description – male. Length 4.4–4.8; wing: 4.0 x 1.4; similar to *A. proximus* except as noted.

Head. Weak vertical seta present.

Legs. TI with strong dorsal at one-eighth; TII with ad setae at one-eighth, two-fifths and subapically, and pd setae at one-eighth, one-quarter and subapically; II₁ at apex with strong pd and weaker ad (MSSC); II₂ with strong apical ad-pd pair (MSSC); II₂₋₅ with erect crocheted hairs (MSSC); TIII with broad brownish band at one-fifth, contrasting with yellow leg (MSSC).

Wing (Fig. 126b). With 2 broad brown bands fused anteriorly to R₄₊₅, and without basal infuscation; CuAx ratio: 1.5.

Abdomen. Hypopygium (Fig. 77c); hypandrial hood short and broad; epandrial lobe with long and short apical bristles; surstylus with knob-like ventral section and distinctive broad lobate dorsal extension which completely covers cercus; cercus with row of dorsal setae and strong apical seta.

Female. Similar to male but without MSSC; also with

weak vertical seta; TIII entirely yellow.

Remarks. *Austrosciapus connexus* is very common along the eastern Australian coast, from the Cairns district, Queensland to south of Sydney, NSW. The species has not been taken from the Blue Mountains west of Sydney, whereas it is abundant on the coastal plain around Sydney, suggesting it possibly is limited by hard frosts.

Austrosciapus connexus is also found in Perth, WA, Norfolk Island, the Hawaiian Islands, Tahiti and the Austral Islands (Fig. 76). The occurrence in Perth and the Pacific islands probably represents accidental introduction through human transport. The species is frequently found in parks, gardens and disturbed waste areas of eastern Australian cities, and might easily be transported in soil or on potted plants. It is a successful coloniser in the Pacific, and Williams (1931) noted it was common in Hawaiian sugar cane fields. (Also see discussion elsewhere under Accidental Introductions.)

The black lobate surstylus allows male *A. connexus* to be recognised instantly, but females are indistinguishable from female *A. proximus*. The development of the distinctive male hypopygium represents a major morphological jump from an ancestor similar to *A. proximus*. There are no species with an intermediate form, and if one were to rely on the

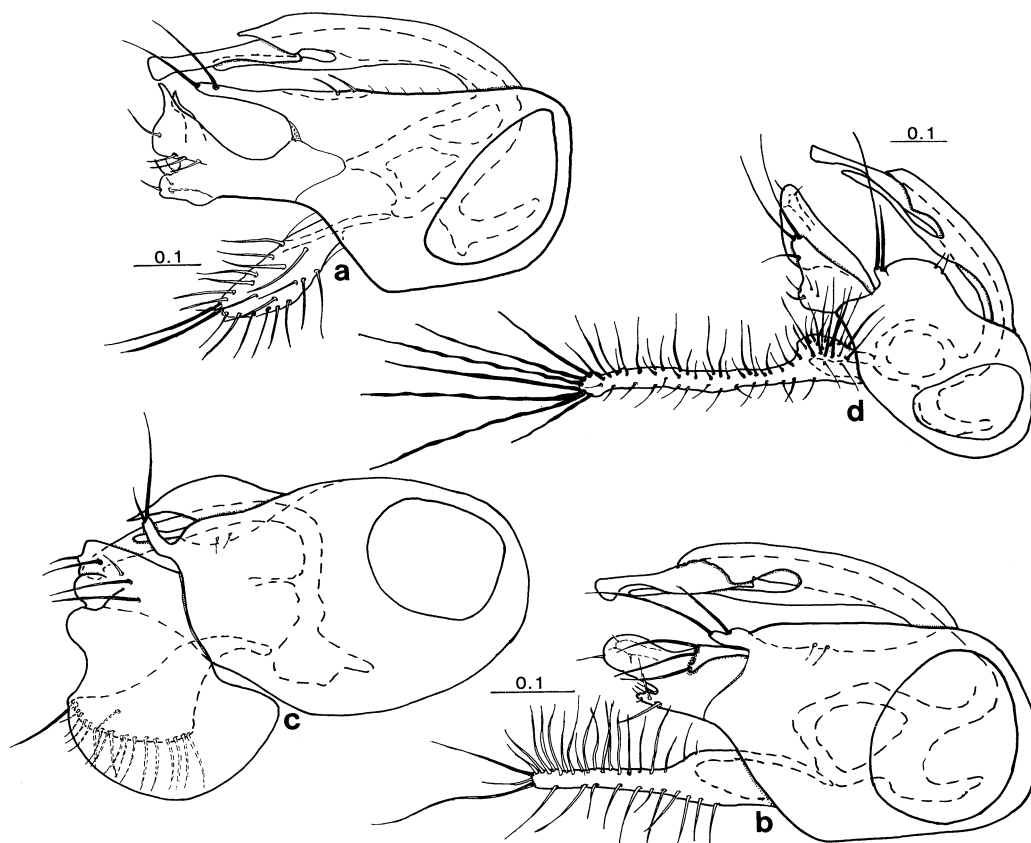


Fig. 77. *Austrosciapus frauci*, Bundaberg, Qld: a – hypopygium, left lateral. *A. zentae*, Milton, NSW: b – hypopygium, left lateral. *A. connexus*, Guildford, NSW: c – hypopygium, left lateral. *A. quadrimaculatus*, Sussex Inlet, NSW: d – hypopygium, left lateral.

hypopygium alone, *A. connexus* would not be readily associated with the *proximus* Group. However, similarities of wing maculation, leg II MSSC and general habitus confirm its placement in the Group.

The courtship behaviour of *Austrosciapus connexus* is discussed under Mating Behaviour and illustrated in Figure 75c.

***Austrosciapus quadrimaculatus* (Parent), n.comb.**

Sciapus quadrimaculatus Parent, 1932a: 121.

Amblypsilopus quadrimaculatus.—Bickel & Dyte, 1989: 395.

Type material. Parent described *Sciapus quadrimaculatus* from a single male taken at Narara, NSW (ANIC, examined).

Additional material. New South Wales — Cudmirah, near Sussex Inlet, 20 Dec. 1974; Narara, 14 Apr. 1950; Dorrigo National Park, 13 Feb. 1984; Bawley Point, near Bateman's Bay, 30 Nov. 1992 (ANIC); Nadgee Nature Reserve, near Eden, 15 Jan. 1987; "Lorien", near Lansdowne, 7-28 Feb. 1987, 4 Oct.-6 Dec. 1987; 0.5 km south-east of Lansdowne, riverine rainforest, 19 Dec. 1992; Sydney, 8 Nov. 1967; Copeland Tops, near Gloucester, wet sclerophyll forest, 10 Mar. 1989 (AMS) (19 males, 24 females, examined).

Description — male. Length 4.0; wing: 3.6 x 0.7; similar to *A. proximus* except as noted.

Head. Strong vertical seta present.

Legs. TI with short dorsals at one-eighth and two-fifths; TII with short dorsal at two-fifths, otherwise bare; II₁ and II₂ each with strong apical ad-pd pair (MSSC); II_{2,5} with erect crocheted hairs (MSSC); TIII entirely yellow, without evidence of brown band, but ventrally at one-fifth with denser vestiture than present distad (MSSC).

Wing. Wing with 2 transverse bands, not joined anteriorly; some specimens with faint or incompletely joined brown bands, giving effect of 4 separated spots.

Abdomen. Hypopygium (Fig. 77d); shining dark brown with long black cercus; hypandrial hood broad with irregular margin; epandrial lobe short with long and short apical bristles; surstylus with broad trapezoidal overlapping dorsal and ventral lobes, dorsal lobe bearing 2 strong apical bristles; cercus elongate, with group of long black undulating apical bristles.

Female. Similar to male except lack MSSC; also with strong vertical seta; TII with ad-pd pair at one-eighth, offset ad-pd pair at one-third, av-pv pairs at two-thirds, and strong apical setae; TIII unmodified.

Remarks. *Austrosciapus quadrimaculatus* is found along the New South Wales coast and ranges from Dorrigo to the Victorian border. The name "quadrimaculatus" is somewhat a misnomer, since

Parent described the species from a specimen which had two incomplete brown bands, giving the effect of four separated spots. Most specimens have two complete bands, although not as strongly coloured as in other *proximus* Group species. Despite variation in wing maculation, the hypopygium is identical in all males.

***Austrosciapus capricornis* n.sp.**

Type material. HOLOTYPE male, Queensland, 3 km north-east of Mount Webb, 15°03'S 145°09'E, at light, 30 Apr. 1981, D.H. Colless; PARATYPES 7 males, 10 females, same data but 30 Apr.-2 May 1981, 2-3 Oct. 1980, malaise trap and at light (ANIC).

Additional material. Queensland — 14 km west by north of Hope Vale Mission, 15°16'S 144°59'E, 7-9 May 1981; Goomeri, 12 May 1955; Kuranda Range State Forest, 20 Apr. 1967; 3 km west of Paluma, 900 m, 16 Jan. 1970; Iron Range, Claudie River, 14 Oct. 1974; Iron Range, 9 km north-east of Mount Tozer, 28 June-10 July 1986; Bertie Creek, 1 km south-east of Heathlands, 11°49'S 142°30'E, 15-26 Jan., 12 Feb., 16 Mar. 1992; Bamaga, 10°53'S 142°42'E, 5-12 Dec. 1986 (5 males, 14 females, ANIC, AMS, QDPI).

Description — male. Length 3.8; wing: 3.0 x 1.0; similar to *A. proximus* except as noted.

Head. Vertical seta present but not strongly developed.

Legs. TI bare; FI with a few weak pale ventral setae; TII with ad setae at one-eighth, two-fifths and subapically, and pd setae at one-quarter and subapically; II_{2,5} with erect crocheted hairs (MSSC); TIII with faint brown band at one-fifth, very pale to obscure in some specimens.

Wing (Fig. 126c). M₁ almost perpendicular to M₂, and arching anteriorly then curving distally; 2 brown bands present, not connected anteriorly; CuAx ratio: 1.7; lower calypter pale yellow with pale setae.

Abdomen. Hypopygium (Fig. 78a); hypandrial arm curving to right of hypopygium; hypandrial hood with irregular serrations on margin; epandrial lobe short, with strong apical and subapical bristles; surstylus with overlapping dorsal and ventral lobes; ventral lobe with median trifid appendage; dorsal lobe with group of curved distolateral setae (not marginal, as in *A. collessi*); cercus elongate with distinctive ventrobasal group of strong curved setae; entire length of cercus setose, with apex slightly expanded and bearing group of long black undulating setae.

Female. Similar to male but without MSSC; vertical seta stronger; TIII entirely yellow.

Remarks. *Austrosciapus capricornis* occurs from the tip of Cape York Peninsula to the Cairns district, Queensland. In genitalic structure, *A. capricornis* is very close to *A. quadrimaculatus*.

Austrosciapus cassisi n.sp.

Type material. HOLOTYPE male, PARATYPE male, New South Wales, Lennox Head, wet coastal heath, 24 Nov. 1985, D. Bickel & G. Cassis (AMS).

Additional material. New South Wales – male, Mungo Brush, Myall Lakes National Park, littoral rainforest, yellow pans, 24 Nov. 1987 (AMS).

Description – male. Length 4.7; wing: 4.0 x 1.3; similar to *A. proximus* except as noted.

Head. Strong vertical seta present.

Legs. TI with dorsal setae at one-eighth and two-fifths; TII with offset ad-pd pairs at one-fifth and one-third, and with strong subapical setae; III₁ with short apical ad-pd pair (MSSC); III₂₋₅ with erect crocheted hairs (MSSC); TIII with distinct brown band at one-fifth (MSSC).

Wing (similar to Fig. 126a). With 2 separate broad brown bands, not fused anteriorly; distal CuA present as short stub vein beyond base of m-cu or absent or absent; lower calypter pale with black rim and fan of pale setae; haltere dark brown.

Abdomen. Hypopygium black with yellow cerci (Fig. 78b); 2 short epandrial setae present; epandrial lobe with

long and short apical bristles; surstylus expanded distally, with 2 strong apical setae and distinctive dorsobasal setose projection; cercus elongate, extending beyond apex of surstylus, and with group of strong black apical setae.

Female. Unknown.

Remarks. *Austrosciapus cassisi* occurs along the northern New South Wales coast and is associated with littoral rainforest and wet coastal heath. It is morphologically close to *A. collessi* from northern Queensland.

Austrosciapus collessi n.sp.

Type material. HOLOTYPE male, PARATYPES male, 2 females, Queensland, 10 km east-north-east of Ravenshoe, 13 Nov. 1981, D.H. Colless (ANIC).

Additional material. Queensland – Mount Lewis, 14-25 Nov. 1980; Mount Baldy, near Atherton, 16-29 Oct. 1981; Kuranda State Forest, 20 Apr.-7 May 1967; Wongabel State Forest, near Atherton, 19-20 May 1980; 9 Jan.-10 Feb. 1984; Davies Creek, near Mareeba, 20 Nov. 1981; Bamboo Creek, near Miallo, 25 Apr. 1967; Mount Carbine, Windsor Tableland,

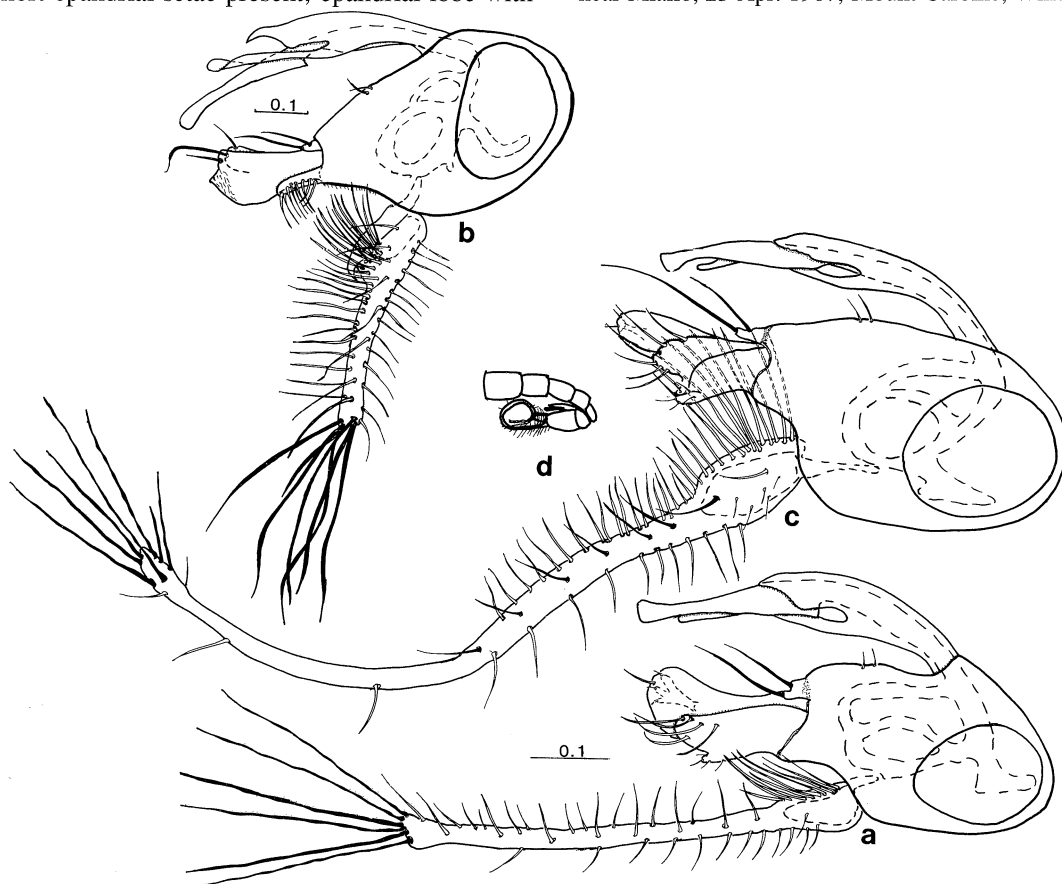


Fig. 78. *Austrosciapus capricornis*, Mount Webb, Qld: a – hypopygium, left lateral. *A. cassisi*, Lennox Head, NSW: b – hypopygium, left lateral. *A. collessi*, Ravenshoe, Qld: c – hypopygium, left lateral; d – male postabdomen, left lateral.

10 Nov.-26 Dec. 1983; Tolga Scrub, Atherton Tableland, 18 Feb. 1984; Bellenden-Ker Range; The Boulders, near Babinda, 10 May 1967; Lake Barrine, 530 m, 30 Jan. 1964 (13 males, 27 females examined; ANIC, QDPI, BPBM).

Description – male. Length 3.3-3.5; wing: 2.9 x 0.9; similar to *A. proximus* except as noted.

Head. Weak vertical seta present.

Legs. TI with short dorsal at one-eighth; TII with ad setae at one-eighth and two-fifths and pd setae at one-eighth and one-quarter; IIt₁ with short apical ad-pd pair, and IIt₂₋₅ with erect crocheted hairs (MSSC); TIII usually without brown band, but present at one-fifth in male from Paluma.

Wing (Fig. 126d). With brown maculations joined anteriorly in distinct band between costa and R₂₊₃; lower calypter pale with pale setae.

Abdomen. Hypopygium (Fig. 78c); hypandrial arm curving to right of aedeagus; surstylus with overlapping dorsal and ventral lobes; ventral lobe with bifid median appendage; dorsal surstylar lobe with marginal row of 6 strong pale setae; base of cercus with group of long strong projecting pale setae; cercus black and very long, more than twice length of epandrium, and at rest held rolled up under abdomen (Fig. 78d); distal portion of cercus with only few dorsal setae and ventral margin base; apex of cercus with long black undulating setae.

Female. Similar to male, but without MSSC; vertical seta also weak.

Remarks. *Austrosciapus collessi* is found in the Atherton Tablelands, Windsor Tablelands and Bellenden-Ker Range of the Cairns district, Queensland. The single male specimen from Lake Barrine is aberrant in that IIt is unmodified and lacks the characteristic *proximus* Group IIt MSSC.

Austrosciapus ascitus n.sp.

Type material. HOLOTYPE male, Queensland, North Mimosa Creek, Blackdown Tableland, south-east of Dingo, 800 m, 29 Nov. 1992, yellow pans, D.J. Bickel (AMS).

Description – male. Length 4.5; wing: 4.3 x 1.5; similar to *A. proximus* except as noted.

Head. Frons, face and clypeus covered with dense silvery pruinosity; palp and proboscis yellowish; scape and pedicel yellow, first flagellomere brown; first rounded; arista dorsal, as long as head height.

Thorax. Metallic blue-green with dusting of grey pruinosity; pleura metallic blue-green with dense silvery pruinosity, except metepimeron yellow; 3 pairs long ac present; 5 dc, with dc₃ reduced to weak hair (MSSC); lateral scutellar seta reduced to weak hair.

Legs. CI, apical CII, most of CIII, all femora and basal tarsomeres entirely yellow; distal tarsomeres darkened; CI with 3 pale anteroapical setae; CIII with pale lateral

setae; femora ventrally bare; relative podomere ratios similar; TI bare of major setae; TII with strong ad at one-fifth, and weaker pd setae at one-tenth and half; IIt₁ elongate, two-thirds length of TII; IIt₂₋₅ without normal vestiture but black, glabrous with erect black hairs (MSSC); TIII without basal band, but with distinct longitudinal posterior excavation at one-fifth (MSSC), and covered with black setae, with 4-5 strong dorsal setae, but without strong anterior.

Wing. Hyaline with 2 brown transverse bands fused anteriorly only faintly to R₂₊₃; CuAx ratio: 3.0; lower calypter pale with black rim and fan of pale setae; haltere yellow.

Abdomen. Tergum 1, base of tergum 2 and ventral tergum 2 and 3 yellow; distal abdomen metallic green; hypopygium black (Fig. 75b); hypandrium with left arm arising in distal half and extending almost to apex of aedeagus; epandrial lobe with long and short apical bristles; surstylus relatively short with short apical seta and 3 long distal setae; cercus digitiform.

Female. Unknown.

Remarks. *Austrosciapus ascitus* is known from the Blackdown Tableland, central Queensland. It was collected in yellow pans along a creek in dry sclerophyll eucalypt forest.

Austrosciapus magus n.sp.

Type material. HOLOTYPE male, PARATYPE female, New South Wales, Upper Kangaroo Valley, 23 Nov. 1960, D.H. Colless (ANIC). PARATYPES male, female, Queensland, Kuranda, Oct. 1910 (BMNH); male, Brisbane, 25 Oct. 1953 (CNC).

Additional material. New South Wales – 4 males, female, Wingham Brush, Manning River, riverine rainforest, 5 Mar. 1988, 19 Dec. 1992, 14 Jan. 1993; Putty Road and Darkey Creek, 19 Nov. 1990; Shoalhaven River, 30 km west of Nowra, 25 Dec. 1986; 2 males, Royal National Park, 12 Feb. 1985; 3 males, 4 females, Yabboro State Forest, Budawang Range, Castle Flats, 21 Jan. 1994, yellow pans (AMS). Queensland – many specimens, Carnarvon Gorge National Park, 8-10 Dec. 1979 (UQIC), 28 Nov. 1992 (AMS); 2 males, Teddington Weir, near Maryborough, 27 Jan. 1975 (QDPI).

Description – male. Length 3.7; wing: 3.3 x 0.7; similar to *A. proximus* except as noted.

Head. Vertical seta very weak to absent.

Thorax. Two strong posterior and 4 much weaker anterior dc (MSSC).

Legs. TI bare; FII with row of black ventral setae in distal two-thirds; TII with ad setae variously at one-third and two-fifths or half; IIt₁ with only weak ad and pd bristles; IIt₂₋₅ glabrous brown with erect crocheted hairs (MSSC); TIII with distinct broad brown band at one-fifth (MSSC), and with abundant black hairs, somewhat longer than normal vestiture (MSSC).

Wing. Hyaline; CuAx ratio: 2.0.

Abdomen. Relatively long, the preabdomen being twice the length of thorax; hypopygium (Fig. 79a); surstylus lobate, with 3 strong setae along margin of dorsal lobe; cercus unusual and distinctive with long thin dorsal arm with scattered long setae, and greatly expanded yellow lobate ventral projection, longer than epandrium, bearing row of very long thick brown setae externally, and some long pedunculate setae along inner margin.

Female. Similar to male but lack MSSC; strong vertical seta present; femora, tibiae, and tarsi yellow, without brown knee on FIII; TII with offset ad-pd setal pair at one-quarter and pd at two-fifths; TIII with normal vestiture.

Remarks. *Austrosciapus magus* has a strikingly large

and unusual male cercus. This species has a wide distribution, from the Cairns district, Queensland, to southern New South Wales. It is particularly abundant at Carnarvon Gorge, Qld.

Austrosciapus riparius n.sp.

Type material. HOLOTYPE male, PARATYPES, 9 males, 9 females, New South Wales, Fal Brook, 30 km north-east of Singleton, 17 Nov. 1985; D.J. Bickel (AMS).

Additional material. New South Wales – 2 males, 4 females, Clyde Mountain, Cabbage Tree Creek, 9 Jan. 1968 (ANIC); male, Minnamurra Falls, 10 Feb. 1962 (NSWA); 4 males, 3 females, Kanangra-Boyd National Park, Kowmung River at Gingra Creek, 2 Jan. 1993, yellow pans (AMS).

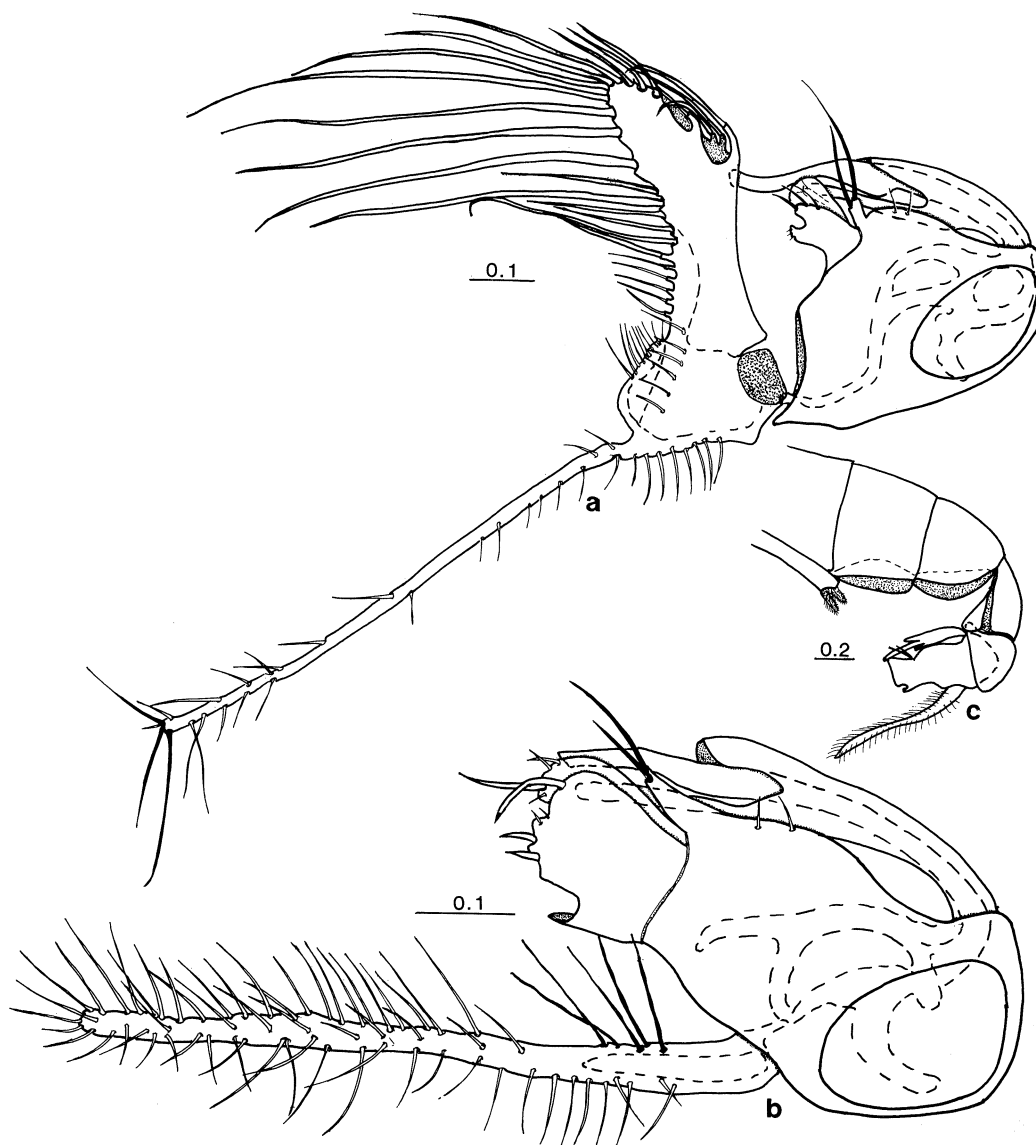


Fig. 79. *Austrosciapus magus*, Carnarvon Gorge, Qld: a – hypopygium, left lateral. *A. riparius*, Clyde Mountain, NSW: b – hypopygium, left lateral; c – male postabdomen, left lateral.

Description – male. Length 3.8; wing: 3.3 x 1.4; similar to *A. proximus* except as noted.

Head. Vertex with dusting of grey pruinosity; not shining; weak vertical seta present; proboscis brownish.

Thorax. Dark blue-violet with green reflections; 2 strong posterior dc and 3-4 weaker anterior dc (MSSC).

Legs. TI with 2 rows long brownish setae along entire posterior side and continuing on It₁ (MSSC); TII with row of 5-6 black dorsal setae on distal half (MSSC), and with strong apical setae, no other ad-pd setae present; IIt_{3,5} with 2 rows of black, erect, crocheted hairs (MSSC); TIII with dark brown band at one-fifth (MSSC).

Wing. Hyaline (Fig. 126e); CuAx ratio: 2.8.

Abdomen. Metallic blue-green with brown matt rings; sternum 4 modified with 2 yellow sclerotised projections united in fork-like structure and projecting distally (Fig. 79c) (MSSC); when the hypopygium is withdrawn into recessed sterna 5 and 6, the tip of the surstylus fits snugly between the projections and the cerci project anteriorly under the abdomen; hypopygium (Fig. 79b); epandrial lobe with short and long apical bristles; surstylus broad, massive with irregular distal margin bearing setae as figured; cercus elongate, straight and bearing basal group of black undulating setae and other setae as figured.

Female. Similar to male but lack MSSC, and as noted: vertical seta strong; 5 strong dc, anteriorly decreasing in size; TII with ad-pd pairs at one-fifth and one-third, and with strong apical setae; TIII entirely yellow; sternum 4 normal.

Remarks. *Austrosciapus riparius* is found from the Budawang Mountains to the Barrington Tops district, New South Wales. The type series was collected off large rocks along a creek where the flies would run about on the rocks and then fly a short distance to another site. No mating behaviour was observed but individuals would often disturb each other.

Males have a distinctive pair of projections on abdominal sternum 4.

Austrosciapus minnamurra n.sp.

Type material. HOLOTYPE male, New South Wales, Minnamurra Falls, near Kiama, 29 Jan. 1968, Z. Liepa (ANIC).

Additional material. New South Wales – male, Cheltenham (presumably Sydney suburb, no state given), 14 Feb. 1931; male, Wilson River, 15 km north-west of Bellangry, subtropical rainforest, 7 Dec. 1986 (AMS).

Description – male. Length 4.7; wing: 4.2 x 1.4; similar to *A. proximus* except as noted.

Head. Short weak vertical seta present.

Thorax. Metallic blue-green; 5 strong dc, of

approximately equal strength.

Legs. All trochanters yellow; TI bare; TII with very weak ad-pd pair at one-eighth; IIt₁ with strong black apical ad-pd pair of setae, and ventrally with 3 offset pairs of short diverging setae (MSSC); IIt_{2,3} yellow, each with ventral pair diverging setae and erect crocheted hairs (MSSC); IIt_{4,5} smooth dark brown, with erect crocheted hairs (MSSC); TIII entirely yellow.

Wing. Hyaline with slight brown clouding; m-cu slightly sinuate; CuAx ratio: 2.6.

Abdomen. Hypopygium (Fig. 80a); surstylus distinctive with ventroapical hatchet-shape projection and with 3 long setae and with dorsoapical digitiform projection with strong apical seta; cercus large, curved and clavate, with abundant long black undulating bristles.

Female. Unknown.

Remarks. *Austrosciapus minnamurra* occurs in eastern New South Wales from the Hastings drainage to the Illawarra district, mostly in subtropical rainforest.

Austrosciapus crater n.sp.

Type material. HOLOTYPE male, Queensland, Kuranda, 23 Dec. 1958, D.K. McAlpine; PARATYPES 4 males, 11 females, The Crater, near Herberton, 3-4 Jan. 1969, 16 Dec. 1961, 29 Jan. 1972 (AMS).

Additional material. Queensland – near Kuranda, 15 Jan.-20 Feb. 1985, 20 Dec. 1986; The Boulders, Babinda, 10 May 1967, 14 Nov. 1969; The Crater, 20 Jan. 1991; Mount Haig, 21 km east of Atherton, 18 Nov. 1981; Tolga, 5 Mar. 1961; Lake Eacham National Park, 15 Jan. 1969; Tully River, Cardstone-Ravenshoe Road, no date; Lake Barrine, Atherton Tableland, 28 Jan. 1972; Iron Range, Claudie River, 21 Nov. 1913 (20 males, 7 females examined; AMS, ANIC, MVM, QDPI)

Description – male. Length: 5.9-6.1; wing: 5.3 x 1.9.

Head. Vertex, frons, face and clypeus dark metallic green, and entirely covered with dense silvery pruinosity; weak vertical seta present; palp and proboscis yellow; palp with black setae; antenna yellow; first flagellomere rounded subtriangular; arista dorsal, black, and as long as head width.

Thorax. Entirely red-yellow and with silvery pruinosity on pleurae; dorsum dark red-yellow and with metallic green, either as narrow ac strip which expands posteriorly to width of dorsum, or covering entire dorsum with metallic blue-green; scutellum metallic blue; setae black; 3 pairs strong ac present; 2 strong posterior and 3 weaker anterior dc (MSSC).

Legs. All coxae and legs entirely yellow except for darkened distal tarsomeres; CI with pale hairs and 3 pale distolateral bristles; CII with pale anterior hairs; CIII with pale lateral bristle; I: 10.0; 12.0; 11.0/4.0/3.0/2.0/

1.0; TI with short dorsal seta at one-eighth; II: 12.0; 18.0; 13.0/4.0/2.5/1.5/1.0; TII with ad setae at one-eighth, one-sixth, three-fifths and subapically, and pd setae at one-eighth, half and subapically; $II_{2.5}$ with 2 dorsal rows of crocheted black hairs (MSSC); III: 15.0; 22.0; 8.0/5.0/3.0/1.5/1.0; TIII with strong anterior seta at one-fifth, and darkened and slightly flattened between one-sixth and one-third (MSSC).

Wing. Hyaline (Fig. 126f); M_1 arches anteriorly perpendicular to M_2 ; m-cu slightly sinuous and making acute angle with M; anal angle weak; lower calypter yellow with dark rim and fan of pale setae; CuAx ratio: 1.6; haltere yellow with brownish club.

Abdomen. Terga 1 and 2 yellow; terga 3-6 shining metallic green with bronze reflections; hypopygium dark brown with yellow cerci (Fig. 80b); surstylus with large ventral lobe bearing median projection and bearing strong lateral seta, and with short dorsal lobe; cercus elongate, setose, and with group of black undulating apical bristles.

Female. Similar to male except lacking MSSC, otherwise as noted: vertical seta also weak; only 2 strong posterior dc, anterior dc totally absent (FSSC); TIII unmodified; abdominal colouration varies from terga 1-

5 yellow with tergum 6 entirely metallic green, to only terga 1 and 2 yellowish with rest of abdomen metallic green.

Remarks. *Austrosciapus crater* occurs in rainforest at Iron Range and the Cairns district, Queensland. The pale thoracic colouration and absence of anterior dc in females (FSSC) is distinctive for this species and the closely related *A. ravenshoensis*.

Austrosciapus ravenshoensis n.sp.

Type material. HOLOTYPE male, PARATYPES 4 females, Queensland, Palmerston National Park, 24 km east by north of Ravenshoe, 14 Nov. 1981, D.H. Colless (ANIC); PARATYPES male, 3 females, Ravenshoe, near The Crater, 29 Nov. 1981 (ANIC); male, Lake Eacham National Park, Dec. 1974 (ANIC).

Additional material. Queensland – female, Lake Barrine, Atherton Tablelands, 28 Jan. 1972 (AMS); Bellenden Ker, Cable Tower 3, 17 Oct.-5 Nov. 1981 (AMS).

Description – male. Length: 4.2-4.7; wing: 3.5 x 1.4;

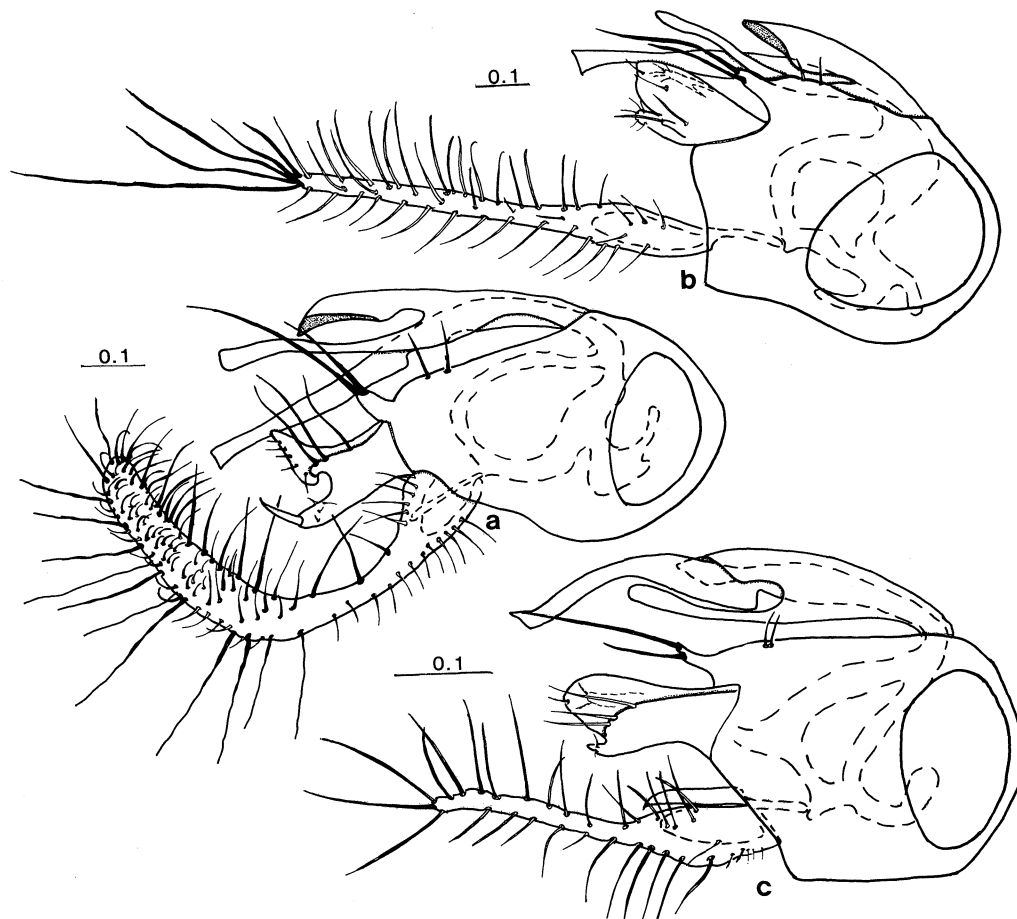


Fig. 80. *Austrosciapus minnamurra*, Cheltenham, NSW: a – hypopygium, left lateral. *A. crater*, The Crater, Qld: b – hypopygium, left lateral. *A. ravenshoensis*, Ravenshoe, Qld: c – hypopygium, left lateral.

similar to *A. crater* except as noted.

Head. Antenna entirely black.

Thorax. Ground colour yellow with varying amounts of metallic green colour on posterior dorsum; scutellum metallic blue-green.

Wing (Fig. 126g). Hyaline; anal angle absent; m-cu straight.

Abdomen. Terga 1 and 2 yellowish with varying amounts of metallic infuscation; remainder of abdomen metallic green; hypopygium dark brown with black hypandrium and yellow epandrium and cercus (Fig. 80c); surstylus with dorsal pointed thumb-like projection and with row of 3 strong lateral setae; cercus elongate, setose.

Female. Similar to male except lacking MSSC; otherwise as noted: with only 2 strong posterior dc, anterior dc absent (FSSC); TII with only pd at one-eighth and ad at one-quarter and strong apical seta; anal angle also absent; abdominal terga 1-5 with lateral and ventral areas of terga yellow and with dorsum metallic green.

Remarks. *Austrosciapus ravenshoensis* occurs in wet closed forest around the Cairns district, Queensland and is closely related to the sympatrically occurring *A. crater*. The two species are readily separated by antennal colour and size.

The *tumidus* Group

Diagnosis. **Head.** Frons of both sexes with strong vertical seta; face, clypeus and pleura of both sexes covered with dense orientated silvery pruinosity, especially evident in oblique view.

Thorax. Ac long, in 3-4 irregular pairs; male with 4 dc, dc₃ reduced to weak hair (MSSC); female with 4-5 strong dc; lateral scutellar setae reduced to weak hairs.

Legs. CI and all femora usually yellow (except male *A. tumidus*, where black); TI with short dorsal at one-fifth; male IIt distinctive (MSSC): IIt₁ yellow with black setae and 2 strong dorsoapical bristles, IIt₂ yellow with long apical ad seta, IIt₃ yellow with short setae, IIt₄ yellow and basally swollen, bulbous, IIt₅ black and IIt₂₋₅ with short black porrect setae (group autapomorphy).

Wing. Crossvein m-cu straight; female wing often with faint brown clouding in 2 vague bands, basal band over m-cu and distally over M₁ (Fig. 126i).

Abdomen. Male abdomen has slight constrictions around tergal overlap and thereby appears annulated; male segment 7 expanded distally (Fig. 82b); hypandrial hood with coarse serrations (group autapomorphy); hypandrial arm arising in distal half of hypandrium and often curving to right of aedeagus; epandrial lobe prolonged; cercus elongate, unbranched.

Remarks. The *Austrosciapus tumidus* Group occurs from northern Queensland to Victoria, and comprises four species, some of which occur in semiarid habitats. It is closely related to the *proximus* Group, and both have similar IIt modifications (MSSC).

Wing banding is only faintly present in females of some *tumidus* Group species. This possibly reflects the more conservative females retaining an ancestral maculation (as found in both sexes of many *proximus* Group species) which has been totally lost in males. It should be noted that female *A. pulvillus* of the *Austrosciapus hollowayi* Group also have stronger wing maculations than males.

The elongate epandrial lobe, serrated hypandrial hood, and unusual modifications of the surstylus are distinctive for the Group.

Included species:

aprilis n.sp. Australia (Qld).

broulensis n.sp. Australia (NSW, Qld).

pseudotumidus n.sp. Australia (Qld, NSW).

tumidus Hardy, 1958: 299. (*Sciapus*) (AMS, examined), Australia (NSW, ACT, Qld, Vic.), **n.comb.**

Key to Males of the *Austrosciapus tumidus* Group

1. CI and all femora black; surstylus with distinctive long ventral curved black seta and long dorsal white blade-like seta (Fig. 82a); cercus long, curved (south-eastern Australia) *A. tumidus*
 — CI and all femora yellow; hypopygium otherwise 2
2. Surstylus broad and massive with distinctive long ventral seta (Fig. 82f) (Qld) *A. aprilis*
 — Surstylus elongate with L-shaped bend 3
3. Epandrial lobe as long as surstylus; surstylus clavate, with 3 somewhat flattened setae, distalmost very long (Fig. 82e) (Qld, NSW) .. *A. pseudotumidus*
 — Epandrial lobe less than half length of surstylus; surstylus with flattened tip (Fig. 82g) (Qld, NSW) *A. broulensis*

***Austrosciapus tumidus* (Hardy), n.comb.**

Sciapus tumidus Hardy 1958: 299.

Amblypsilopus tumidus.—Bickel & Dyte, 1989: 395.

Type material. The male holotype of *Sciapus tumidus* is from Katoomba, NSW (AMS, examined).

Additional material. Australian Capital Territory – Black Mountain. New South Wales – Katoomba; Mount Tomah, Blue Mountains; metropolitan Sydney; Dorrig National Park; near Ebor; Wallangra; “Lorien”, near Lansdowne; Brown Mountain, near Nimmitabel; Cabbage Tree Creek, Clyde Mountain; Wilson Valley, Kosciusko National Park; Geehi River; Bonnet Bay; Monga, near Braidwood; Barrington Tops; Bawley Point, near Bateman’s Bay; Mount Dromedary, near Central Tilba;

Scheyville, in canopy of *Eucalyptus* sp. (ironbark), Jan. 1988. Queensland – Lamington National Park. Victoria – Nunawading. Collection dates of 70 males and 112 females from Black Mountain, ACT: 7 Nov.–9 Apr., various years, with most from Nov.–Jan.; continuous malaise trapping at the subtropical “Lorien” locality shows apparent bimodal phenology, Oct.–Dec., Feb.–Apr. (more than 300 specimens examined, AMS, ANIC, MVM, UQIC, QDPI, NSW).

Description – male (Fig. 81). Length 4.0–4.8; wing: 3.0–3.2 x 1.2–1.3.

Head. Vertex and frons metallic blue-green with bronze reflections and some silvery pruinosity; face and clypeus metallic green and covered with dense orientated silvery pruinosity, especially evident in oblique view (Fig. 82d); palp and proboscis yellow; palp

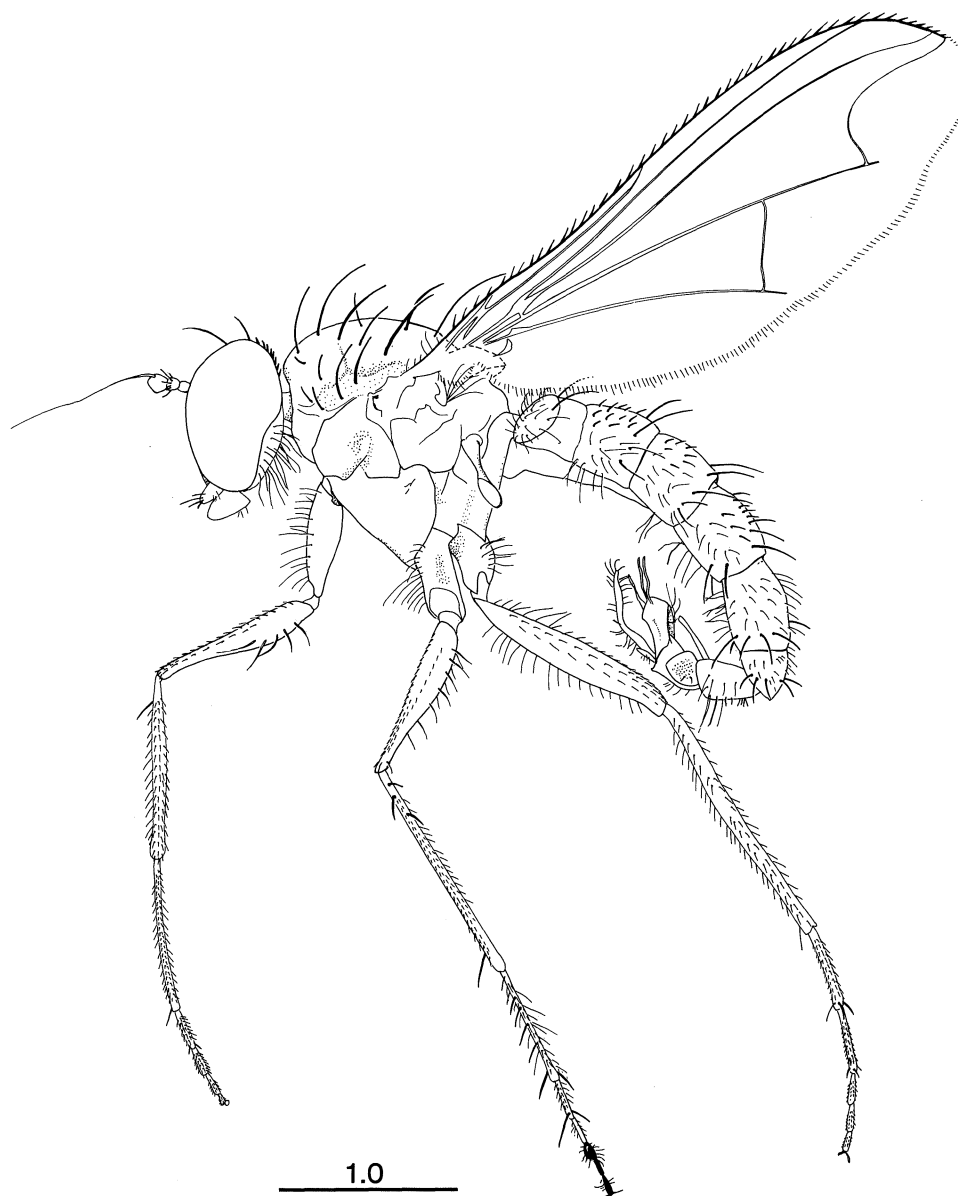


Fig.81. Habitus, male *Austrosciapus tumidus*.

with long black setae; antenna black (Fig. 82c); first flagellomere rounded; arista dorsal and relatively short, not much longer than head height; ventral postcranium with pale setae.

Thorax. Metallic green with bronze reflections; scutellum blue green; pleura with grey pruinosity; 1 pa, 2 sa, 1 sr, 1 hm, 1 pm and 2 npl present.

Legs. Coxae black with silvery pruinosity; femora mostly black; femoral knees, tibiae and basal tarsomeres yellow; distal tarsomeres black; CI and CII with pale anterior hairs, CIII with tuft of pale lateral hairs; I: 6.5; 7.0; 4.0/1.5/1.5/1.0/1.0; FI with pale ventrals; TI with dorsal at one-fifth; II: 8.0; 9.0; 4.5/2.0/1.0/1.5/1.0; TII with offset ad-pd setal pairs at one-eighth and one-third; III: 9.0; 13.0; 4.0/3.0/2.0/1.0/1.0; TIII bare of major setae.

Wing (Fig. 126h). Hyaline; veins dark brown; M_2 stublike, not reaching wing margin; M_1 arching sharply towards R_{4+5} ; m-cu straight; CuAx ratio: 2.5; lower calypter pale with black rim and fan of pale setae; haltere pale yellow.

Abdomen. Abdomen appears annulated; tergum 1 metallic blue and remainder of abdomen shining metallic blue-green; segment 7 narrow basally and expanded distally, with sternum 7 somewhat reduced basally (Fig. 82b); epandrium subrectangular (Fig. 82a); hypandrial hood with jagged teeth; hypandrial arm curved to right of aedeagus; epandrial lobe elongate, with 2 strong bristles, apical bristle somewhat flattened distally; surstylus clavate with distinctive long curved black ventral seta, long straight blade-like pale dorsal seta, and row of 6 setae; cercus elongate, curved, and with setae as figured.

Female. Similar to male except: CI and all femora yellow; TII also with av-pd setal pairs at half and three-quarters; TIII with 2 strong ad; vein M_2 not forming a stub, but ends where M_1 arches anteriorly; wing with faint brown clouding in 2 vague bands, basal band over m-cu and distally over M_1 (Fig. 126i).

Remarks. *Austrosciapus tumidus* is common and widely distributed along the coast and ranges from Victoria to south-eastern Queensland. It occurs primarily in dry and wet sclerophyll forest habitats, and it was taken in the canopy of a narrow leaved ironbark (*Eucalyptus* sp.) by insecticide fogging.

Austrosciapus tumidus is the only species in the *tumidus* Group with leg colour dimorphism, with male CI and all femora black, but yellow in females. All other species in the Group have yellow CI and femora on both sexes.

Austrosciapus pseudotumidus n.sp.

Type material. HOLOTYPE male, PARATYPES 6 females, Queensland, Emerald, 6-18 Sept. 1981, malaise trap, D.S.H. Murray (QDPI); PARATYPES male, female, Charleville, 12 Sept. 1920 (QMB). New South Wales, male, Narrabri, 22 Dec. 1951 (NSWA); male, Moree, 13 Nov. 1961 (CNC).

Additional material. Possible females of this species: Queensland – Toowoomba, 7 Jan. 1983 (ANIC); Dulacca, 26 Nov. 1979, on *Eucalyptus camaldulensis* (UQIC); Girraween National Park, 1 Dec. 1981 (UQIC).

Description – male. Length 3.7-4.0; wing 3.4 x 1.3. Similar to *A. tumidus* except as noted.

Legs. CI, trochanters, femora, tibiae and basal tarsomeres yellow; CII and CIII and distal tarsomeres black.

Abdomen. Hypopygium (Fig. 82e); hypandrial hood with jagged margin; hypandrial arm curved to right of aedeagus; epandrial lobe very long, with 2 short bristles, the basal bristle in a subapical position; surstylus with distinctive L-shape bend, bearing series of 3 prominent flattened pale setae, distalmost very long; cercus not as long and bearing strong setae as figured.

Female. Similar to *A. tumidus*, and with similar faint wing banding.

Remarks. *Austrosciapus pseudotumidus* and *A. tumidus* are closely related sister species. There appears to be a habitat separation between the two species, with *A. pseudotumidus* occurring in semi-arid and heath habitats along the western slopes of the Great Divide from central Queensland to Narrabri, NSW, while *A. tumidus* favors the moister coast and ranges.

Austrosciapus broulensis n.sp.

Type material. HOLOTYPE male, PARATYPES male, 2 females, New South Wales, Broulee, 7 miles north-east of Moruya, 12 Apr. 1956, M.S. Upton (ANIC).

Additional material. New South Wales – metropolitan Sydney, Feb.-Mar., Nov., various years; Burrallow Swamp, Blue Mountains National Park, 9 Dec. 1986; Kangaroo Valley, 23 Mar. 1961; Werrikimbe National Park, Upper Hastings River, 7 Dec. 1986; Shoalhaven River, 25 Dec. 1986; "Lorien", near Lansdowne, 13-19 Apr. 1987; Eugowra, 15 Nov. 1962; Bruxner Park, 16 Apr. 1970; Como West, 9 Nov. 1972; Heathcote, 24 Oct. 1970; Dorrigo National Park, no date; Mount Kaputar, Bullowa Creek, 30 Nov. 1984; Baker's Creek Falls, near Armidale, 6 Feb. 1987; "Tuglo", north-east of Singleton, 18 Nov. 1985. Queensland – Mount Tamborine, 14 Sept. 1973; Brisbane, 5 Mar. 1954; Maleny, 4 Jan. 1927; Bundaberg, 8 Mar. 1972; Beaudesert, 2 Feb. 1956; Evelyn, 7 Feb. 1981; Repulse Creek, 23 km north-east of Bauhinia Downs, 22 Apr. 1981; Carnarvon National Park, Carnarvon Creek, 28 Nov. 1992 (150 specimens examined, AMS, ANIC, QMB, QDPI, UQIC, NSW, BMNH).

Description – male. Length 3.8; wing 3.1 x 1.0; similar to *A. tumidus* except as noted.

Legs. CI, femora, tibiae and basal tarsomeres yellow; CII, CIII and distal tarsomeres black.

Abdomen. Hypopygium (Fig. 82g); hypandrium with some jagged teeth; epandrium elongate subrectangular; surstylus in distinctive L-shape with long distal

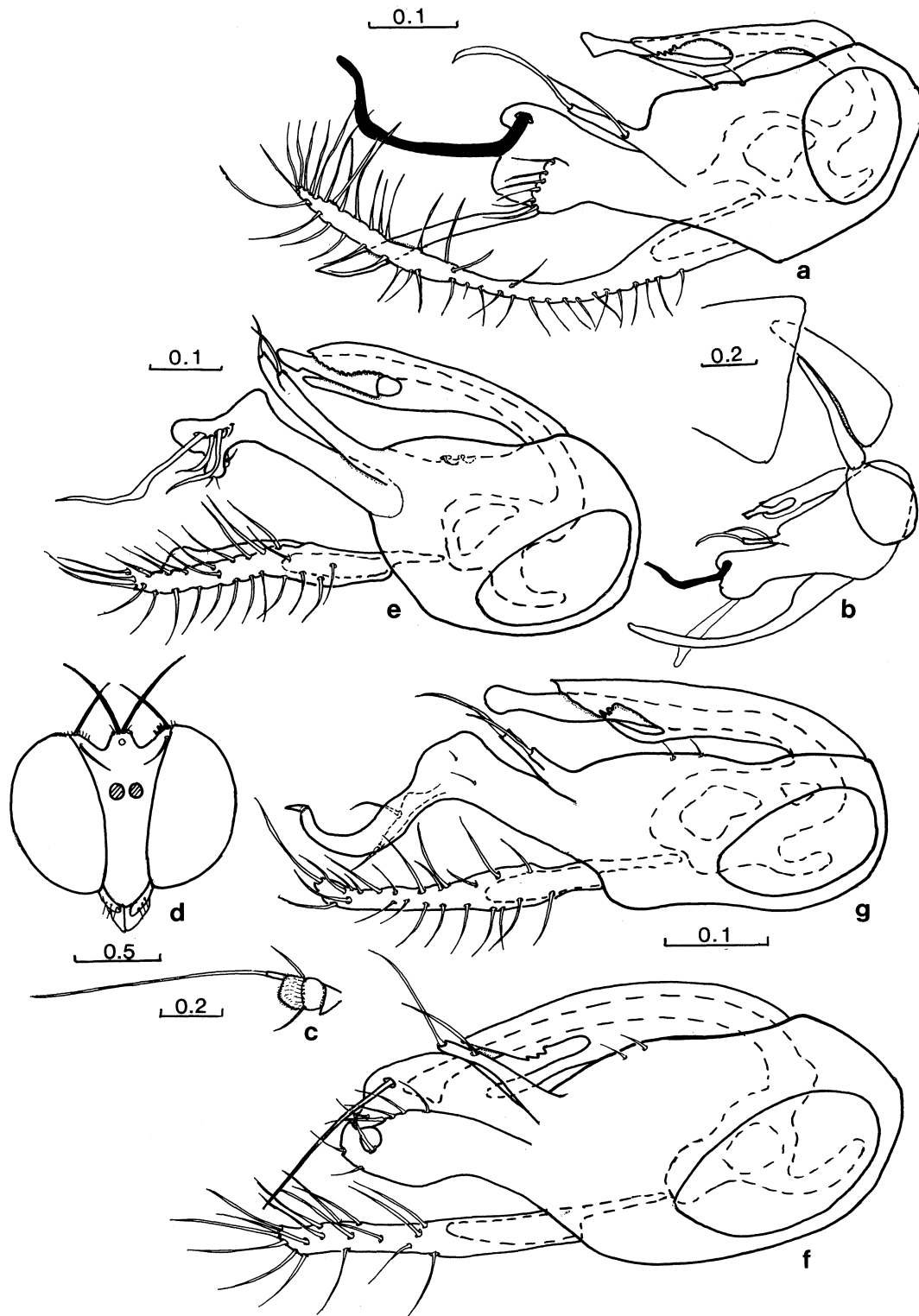


Fig.82. *Austrosciapus tumidus*, Black Mountain, ACT: a – hypopygium, left lateral; b – male postabdomen, left lateral; c – male antenna, left lateral; d – male head, anterior. *A. pseudotumidus*, Emerald, Qld: e – hypopygium, left lateral. *A. aprilis*, Bauhinia Downs, Qld: f – hypopygium, left lateral. *A. broulensis*, Broulee, NSW: g – hypopygium, left lateral.

extension and flattened tip, and with setae as figured; surstylus relatively short with setae as figured.

Female. Similar to female *A. tumidus* except banding on wing very faint, if evident.

Remarks. *Austrosciapus broulensis* is distributed along the coast, ranges and western slopes, from southern New South Wales to northern Queensland. It occurs sympatrically with *A. aprilis* at least in southern Queensland.

Austrosciapus aprilis n.sp.

Type material. HOLOTYPE male, PARATYPES 5 males, Queensland, Repulse Creek, 23 km north-east of Bauhinia Downs, 22 Apr. 1981, at light, D.H. Colless (ANIC).

Additional material. 5 females, same data as above (see Remarks).

Description – male. Length 3.7; wing 3.1 x 1.0; similar to *A. tumidus* except as noted.

Legs. CI, femora, tibiae and basal tarsomeres yellow; CII, CIII and distal tarsomeres black.

Abdomen. Hypopygium (Fig. 82f); epandrium somewhat rounded; hypandrial hood with only few jagged teeth; hypandrial arm short, straight, not curving to right of aedeagus; surstylus broad, massive and divided into dorsal and ventral lobes; ventral lobe with distinctive long black projecting setae, with other setae as figured; cercus straight.

Female. Similar to *A. tumidus*, but possibly with very faint wing clouding, sometimes present.

Remarks. *Austrosciapus aprilis* is known only from the type locality in southern Queensland, west of the Great Divide. It was collected together with specimens of *A. broulensis*, and females of the two species cannot be reliably separated.

The *sarinensis* Group

Diagnosis. *Head.* Vertex and frons deep metallic blue

or with only dusting of grey pruinosity; strong vertical seta present on both sexes; male face not bulging; first flagellomere subtriangular (Fig. 83b); arista dorsal, about as long as head width.

Thorax. Ac present as 2-3 strong pairs; male with 2 strong posterior dc and 4 weak anterior hair-like dc (MSSC); female with 6 strong dc present, but anterior 4 dc somewhat shorter than 2 posterior dc; lateral scutellar setae reduced to short hairs or absent.

Leg. TI bare of major setae; male III_t with distinctive vestiture: II_t₁ yellow, and posteriorly flattened and slightly concave with silvery pile (MSSC), other II_t₁ surfaces with normal black vestiture and II_t₂₋₅ black with erect black setulae on anterior, dorsal and ventral surfaces, but II_t₂₋₃ also with silvery posterior pile which appears bright when viewed from oblique angle (MSSC); III_t₂₋₄ (not III_t₃₋₅) flattened and appearing somewhat swollen, and fleshy with distal III_t₂ and III_t₃₋₄ only with ventral pad-like surface; III_t₅ only slightly flattened (MSSC).

Wing. Crossvein m-cu straight.

Abdomen. Segment 7 short, with sternum 7 well developed; hypopygium relatively small and epandrium subrectangular; hypandrial arm arising at midlength and long, extending to apex of aedeagus; hypandrial hood very short; surstylus with membranous attachment to epandrium and usually with ventral sections expanded and setose; cercus digitiform.

Remarks. The *Austrosciapus sarinensis* Group is found in coastal and montane moist forests from northern Queensland to the Sydney district, New South Wales.

Species tend to be relative large and dark blue-green in colour. Males have II_t swollen with flattened surfaces and distinctive vestiture and III_t₂₋₄ flattened with ventral pad-like surfaces (usually in the Sciapodinae, if the male hind tarsus is flattened, only III_t₃₋₅ is involved). All five species have elongate and relatively unmodified cerci. The *sarinensis* Group is very close to the *muelleri* Group in most characters, including hypopygial structure, but they differ in the expression of leg MSSC.

Included species:

flavicauda n.sp. Australia (NSW).

gwynnae n.sp. Australia (Qld, NSW).

sarinensis n.sp. Australia (Qld, NSW).

stevensi n.sp. Australia (NSW).

tooloomensis n.sp. Australia (NSW, Qld).

Key to Males of the *Austrosciapus sarinensis* Group

1. CI and all femora yellow; cercus with 3 strong black undulating apical setae 2
- All coxae and femora black 4

2. All coxae, metepimeron, first flagellomere, abdominal sternum 8, and epandrium yellow; vertical seta weak (NSW) *A. flavicauda*
- CII, CIII, metepimeron, first flagellomere, sternum 8 and epandrium dark metallic green to black; vertical seta strong 3
3. Cercus yellow, relatively short; surstylus divided into overlapping dorsal and ventral sections, dorsal section narrow with strong apical setae, and ventral section keel-shaped with 4-5 long lateral setae (Fig. 83a) (Qld, NSW) *A. sarinensis*
- Cercus black, elongate; surstylus lobate with dorsal digitiform projection (Fig. 84c) (NSW) *A. stevensi*
4. Haltere black; wing with faint brown wash (Fig. 126j); surstylus with dorsal digitiform and ventral lobate projections; ventral surstylar lobe with 2 strong setae projecting from curved crest, and with median digitiform projection; cercus elongate, digitiform (Fig. 83d) (Qld, NSW) *A. gwynnae*
- Haltere yellow; wing hyaline; surstylus apically forked and with 3 strong lateral setae; cercus elongate, setose, with group of apical setae (Fig. 83c) (NSW, Qld) *A. tooloomensis*

***Austrosciapus sarinensis* n.sp.**

Type material. HOLOTYPE male, Queensland, 14 miles south-west of Sarina, 8 May 1955, K. Norris & I. Common (ANIC); PARATYPES 2 males, Mount Lewis, malaise trap, 14-25 Nov. 1980 (QDPI).

Additional material. New South Wales – Boonoo Boonoo Falls, via Boonoo Boonoo, 24 Jan. 1966 (ANIC); Dorrigo National Park, no date (SAM); Mount Gibraltar, Comboyne Plateau, 21 Jan. 1985; Dingo Tops Forest Park, north-west of Wingham, 950 m, rainforest, 19 Feb. 1993; Wilson River, via Bellangry, 27 Nov. 1966; “Lorien”, near Lansdowne, edge rainforest, 12-18 Jan. 1987, 1-8 Feb. 1987; Dingo Tops, north of Mount George, 980 m, 19 Feb. 1993, rainforest edge; Mount Royal State Forest, north of Singleton, 15 Nov. 1986; Lindfield, 15 Feb. 1986, yellow pans; Putty Road and Darkey Creek, yellow pans, 18 Nov. 1990; Nightcap National Park, Terania Creek, 14 Nov. 1988, and Googarna Road, north-east of Nimbin, 15 Nov. 1988; Woko National Park, near Gloucester, 24 Nov. 1990 (AMS). Queensland – Mount Glorious, canopy of subtropical rainforest, 30 May-5 Nov. 1987; O’Reilly’s, Lamington National Park, canopy fogging, Dec. 1988 (AMS); probable female, Dalrymple Creek, Mistake Mountains, malaise trap, 28 Mar. 1983 (QDPI) (24 males, 14 females examined).

Description – male. Length: 4.8-5.0; wing: 4.0 x 1.3.

Head. Vertex and frons deep metallic blue; strong vertical seta present; face and clypeus covered with dense silvery pruinosity; clypeus adjacent to margins of eyes; palp brown; proboscis yellow; antenna black; first flagellomere subtriangular (Fig. 83b); arista dorsal, about as long as head width; ventral postcranium with abundant pale setae.

Thorax. Dorsum metallic blue-green with dusting of grey pruinosity; scutellum metallic blue; pleura metallic green and covered with silvery pruinosity; setae black;

3 pairs strong ac present; 1 pa, 2 sa, 2 sr, 2 npl, 1 hm and 1 pm present; lateral scutellars reduced to short hairs.

Legs. CI, trochanter I, all femora, tibiae and all t_1 yellow; CII and CIII, trochanters II and III, and all t_{2-5} dark brown, except where noted; tip of FIII infuscated; CI and CII with pale anterior hairs and CIII with group of pale lateral setae; leg vestiture black; I: 6.0; 8.0; 5.5/2.0/1.5/1.0/1.0; leg I without strong setae; II: 9.5; 10.5; 6.0/3.0/2.0/1.0/1.0; TII with ad-pd pair at one-fifth; IIt somewhat swollen with distinctive vestiture: IIt₁ yellow, posteriorly flattened and slightly concave with silvery pile, other IIt₁ surfaces with black setulae (MSSC); IIt₂₋₅ black with erect black setulae on anterior, dorsal and ventral surfaces, but IIt₂₋₃ also with silvery posterior pile (MSSC); III: 10.0; 15.0; 4.5/2.0/2.0/2.0/1.0; IIIt₂₋₄ swollen and flattened with ventral pad-like surface (MSSC); IIIt₅ only slightly flattened, not padlike.

Wing. Hyaline (similar to Fig. 126j); CuAx ratio: 2.7; lower calypter yellow with black rim and fan of pale setae; haltere stalk yellow and club infuscated.

Abdomen. Metallic green with bronze reflections; on segments 2-6, basal half of each tergum and narrow band on preceding tergum matt brown; setae black; segment 7 short, with sternum 7 developed along entire length; hypopygium relatively small compared to length of abdomen; hypopygium dark brown with yellow cerci (Fig. 83a); epandrium subrectangular; hypandrial arm arising at midlength of hypandrium and almost as long as aedeagus; 2 epandrial setae present; epandrial lobe with long apical bristle and shorter subapical bristle; surstylus divided into overlapping dorsal and ventral sections, dorsal section narrower with strong apical setae, and ventral section keel-shaped with 4-5 long lateral setae; cercus with 3 strong black undulating apical setae.

Female. Similar to male except lacking MSSC; otherwise as noted: 5 strong dc present; all trochanters yellow; TII setae stronger.

Remarks. *Austrosciapus sarinensis* is found in both montane and coastal rainforest from north-eastern Queensland to the Sydney district, New South Wales.

There is some intraspecific variation in this widespread species. The position of the strong lateral setae on the ventral surstylar section varies somewhat among specimens. As well, specimens from Terania Creek, northern New South Wales are slightly smaller (male wing = 3.7) and $II_{t_{2.5}}$ is not as dark as in other specimens. However, in all other respects the specimens are identical and regarded as conspecific.

***Austrosciapus stevensi* n.sp.**

Type material. HOLOTYPE male, New South Wales, Lindfield, near Sydney, 15-16 Feb. 1986, yellow pan trap, dry sclerophyll forest, M. Stevens (AMS).

Description – male. Length: 4.0; wing: 3.8 x 1.2; similar to *A. sarinensis* except as noted.

Legs. Colouration, podomere ratios similar; TII with ad seta at one-quarter.

Abdomen. Hypopygium dark brown with black cerci (Fig. 84c); surstylus lobate with dorsal digitiform projection; cercus elongate, almost twice the epandrial length, and with 3 strong black undulating apical setae.

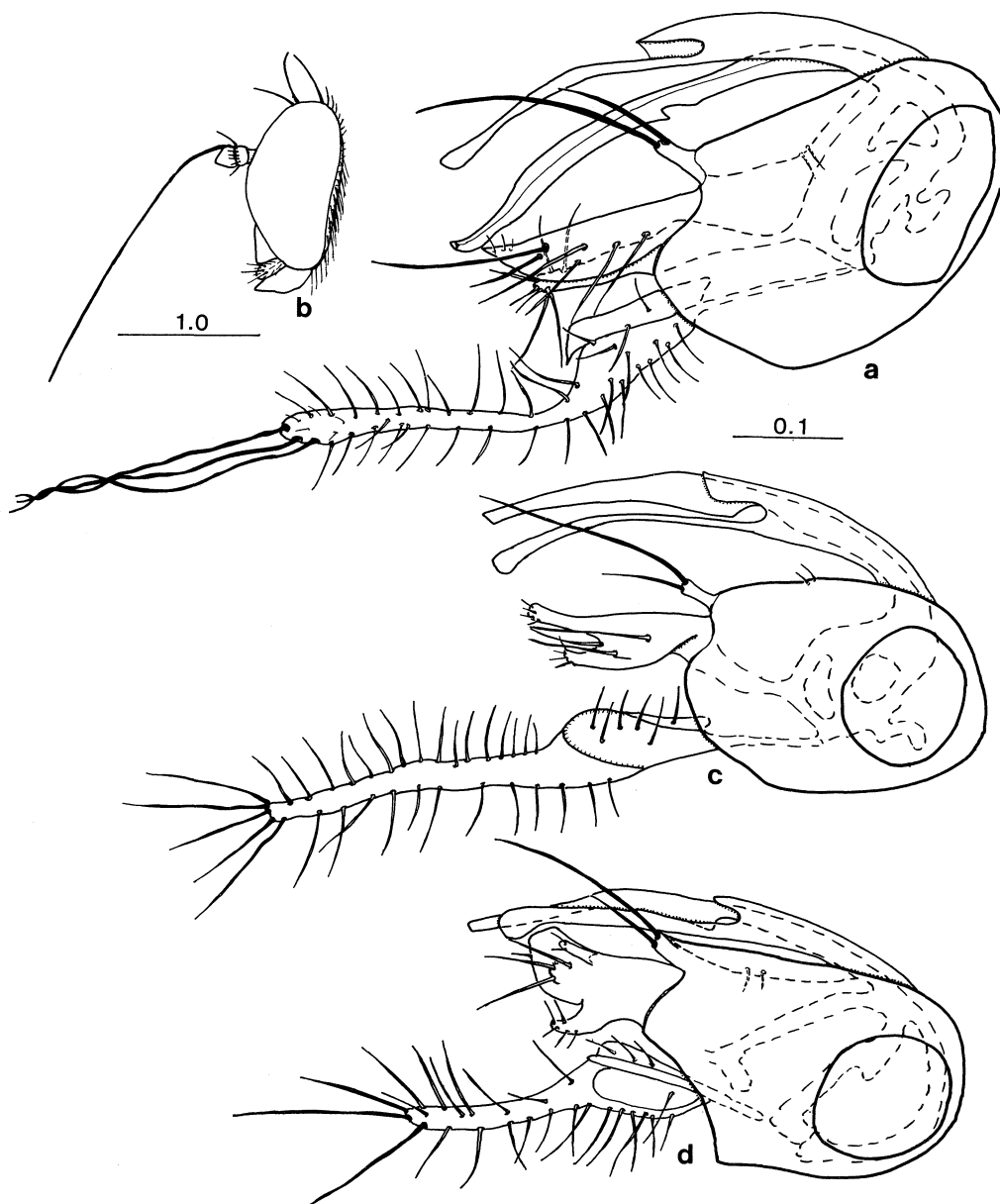


Fig.83. *Austrosciapus sarinensis*, Wilson River, NSW: a – hypopygium, left lateral; b – male head, left lateral. *A. toooloomensis*, Mount Tamborine, Qld: c – hypopygium, left lateral. *A. gwynnae*, near Atherton, Qld: d – hypopygium, left lateral.

Female. Unknown.

Remarks. *Austrosciapus stevensi* is known only from its metropolitan Sydney type locality. It occurs sympatrically with the closely related *A. sarinensis*, and specimens of both species were taken together in yellow pan traps.

Austrosciapus tooloomensis n.sp.

Type material. HOLOTYPE male, PARATYPES 2 males, 6 females, New South Wales, Tooloom Scrub, near Urbenville, subtropical closed forest, 10-11 Jan. 1988, D.J. Bickel (AMS).

Additional material. New South Wales – male, Woko National Park, north of Gloucester, 24 Nov. 1990, subtropical rainforest; male, Kiwarra State Forest, near Taree, Breakneck Lookout, dry rainforest, 14 Jan. 1993 (AMS). Queensland – Mount Tamborine, male, Nov. 1977 (QDPI), male, 6 Nov. 1959 (QMB).

Description – male. Length: 4.0; wing: 3.3 x 1.3; similar *A. sarinensis* except as noted.

Thorax. Dorsum metallic blue-green with dusting of brownish pruinosity.

Legs. Coxae and femora dark brown; tibiae and basal tarsomeres yellowish, with distal tarsomeres dark brown; I: 6.0; 7.0; 4.0/2.0/1.0/0.8/0.8; II: 8.0; 9.5; 5.0/2.0/1.5/1.0/0.5; III: MSSC similar; III: 9.0; 11.5; 4.0/1.5/1.0/1.0/0.5; IIIIt₂₋₄ flattened with ventral pad-like surface (MSSC).

Wing. CuAx ratio: 1.7; lower calypter brownish with black rim and with fan of black setae; haltere yellow.

Abdomen. Hypopygium dark brown with brown cerci (Fig. 83c); hypandrial arm extending to apex of aedeagus; surstylus with membranous attachment to epandrium; surstylus apically forked and with 3 strong lateral setae; cercus elongate, simple, setose, and with group of apical setae as figured.

Female. Similar to female *A. sarinensis*.

Remarks. *Austrosciapus tooloomensis* occurs along the New South Wales-Queensland border and in the Manning River drainage, New South Wales. It has been taken in both subtropical and dry rainforest. The type series was collected off leaves of the ground cover plant, *Hydrocotyle pedicellosa* (Apiaceae) and on the large-leaved *Alocasia macrorrhizos* (Araceae).

Austrosciapus gwynnae n.sp.

Type material. HOLOTYPE male, PARATYPES 3 males, 7 females, Queensland, Hugh Nelson Range, 2 km south of Atherton, malaise trap, 26 July-5 Sept. 1984, Storey & Brown (QDPI).

Additional material. New South Wales – male, Upper Allyn, near Ecclestone, 17 Nov. 1965 (AMS).

Description – male. Length: 4.3; wing: 3.8 x 1.4; similar to *A. sarinensis* except as noted.

Head. Palp and proboscis brown; first flagellomere subtriangular, arista subapical to apical.

Legs. Coxae, trochanters and femora black with metallic green reflections; tibiae yellow; tarsi infuscated to black; CI and CII with pale anterior hairs, and CI with 3 strong pale distolateral setae; CIII with group of pale lateral setae; legs somewhat thicker than normal; TII with ad-pd setal pair at one-quarter; IIIt₁₋₃ posteriorly flattened, slightly concave, yellow, devoid of black setulae and with whitish pile (MSSC); IIIt₁₋₄ with erect black setulae on shining black anterior, dorsal and ventral surfaces; IIIIt₂₋₄ flattened with ventral pad-like surface (MSSC).

Wing. Hyaline with faint brown wash (Fig. 126j); CuAx ratio: 2.0; lower calypter dark brown with black rim and with fan of black setae; haltere black.

Abdomen. Hypopygium brown with dark brown cerci (Fig. 83d); surstylus with dorsal digitiform projection and ventral lobate development; ventral surstylar lobe with 2 strong setae projecting from curved crest, with median digitiform projection, and with other setae as figured; cercus elongate, and with strong black apical setae.

Female. Similar to male except lacking MSSC and as noted: first flagellomere distinctly rounded; CI, all trochanters, femora, tibiae and t₁ yellow; CII, CIII and remaining tarsomeres black; TI with short dorsal seta at one-sixth; TII with strong ad-pd setal pairs at one-fifth and half; haltere club yellow; abdominal venter yellow, dorsum blue-green.

Remarks. *Austrosciapus gwynnae* is known from the Cairns district, Queensland and from the drainage of the Barrington Tops, New South Wales. It undoubtedly occurs in suitable habitat in the intervening area.

This species displays a strong sexual dimorphism, not only in the specialised features of the male tarsi, but also in leg colour and shape of the first flagellomere. This species is named in honour of Mrs Gwynn Knowles who has assisted with the preparation of many of these specimens at the Australian Museum.

Austrosciapus flavicauda n.sp.

Type material. HOLOTYPE male, New South Wales, Woko National Park, north of Gloucester, subtropical rainforest, 24 Nov. 1980, G. Williams (AMS).

Description – male. Length: 5.1; wing: 4.6 x 1.6; similar to *A. sarinensis* except as noted.

Head. Vertex and frons deep metallic blue with dusting of silvery pruinosity; weak vertical seta present; face and clypeus covered with dense silvery pruinosity;

palp and proboscis yellow; scape and pedicel black; first flagellomere yellow.

Thorax. Metepimeron yellow.

Legs. All coxae, trochanters, femora, tibiae, and t_1 yellow, except CII with brown median stripe and apex of FIII infuscated; $It_{2,5}$ and $III_{2,5}$ dark brown, $II_{2,5}$ noted below; I: 7.5; 9.0; 7.5/3.0/2.0/1.0/0.8; leg I without strong setae; II: 10.5; 14.5; 7.0/3.0/2.6/0.7/0.5; TII with ad only at one-sixth; II_t somewhat swollen with distinctive vestiture: II_t entirely yellow, posteriorly flattened and slightly concave with whitish pile, (MSSC); $II_{2,5}$ black with erect black setulae on anterior, dorsal and ventral surfaces, but $II_{2,3}$ also with pale posterior pile (MSSC); III: 12.0; 17.0; 7.0/2.0/1.5/1.5/0.6; $III_{2,4}$ flattened with ventral pad-like surface (MSSC); III_5 only slightly flattened.

Wing. CuAx ratio: 2.2; haltere yellow.

Abdomen. Metallic green with bronze reflections; tergum 2 anterodorsally and tergum 3 and 4 ventrally with some translucent yellow cuticle; hypopygium relatively small (not figured); sternum 8, epandrium, surstylus and cercus yellow; hypandrium and aedeagus dark brown; surstylus short; cercus tapering and digitiform, with some dark distal setae.

Female. Unknown.

Remarks. *Austrosciapus flavicauda* is known only from Woko National Park, in the upper reaches of the Manning drainage, New South Wales. It is distinctive in having all coxae and the epandrium yellow.

The *muelleri* Group

Diagnosis. *Head.* Vertex and frons deep metallic blue or with only dusting of grey pruinosity; strong vertical seta present on both sexes; male face not bulging; first flagellomere subtriangular (as in Fig. 83b); arista dorsal,

about as long as head width.

Thorax. Ac present as 2-3 strong pairs; male with 2 strong posterior dc and 4 weak anterior hair-like dc (MSSC); female with 6 strong dc present, but anterior 4 dc somewhat shorter than 2 posterior dc; lateral scutellar setae absent.

Leg. Male TI with strong pv and/or ventral setae and It_1 somewhat swollen, and with ventral pale pile (MSSC); distal III_t and $III_{3,4}$ flattened and somewhat swollen, with ventral pad-like surface (MSSC); III_5 slightly flattened (MSSC).

Wing. Crossvein m-cu straight.

Abdomen. Segment 7 short, with sternum 7 well developed; hypopygium relatively small and epandrium subrectangular; hypandrial arm arising at midlength and long, extending to apex of aedeagus; hypandrial hood very short; surstylus with membranous attachment to epandrium and usually with ventral sections expanded and setose; cercus digitiform.

Remarks. The *Austrosciapus muelleri* Group is found in coastal and montane moist forests in New South Wales. Males have TI with strong ventral setae and It_1 somewhat swollen with ventral pale pile. All have $III_{2,4}$ flattened with ventral pad-like surfaces (usually in the Sciapodinae, if the male hind tarsus is flattened, only $III_{3,5}$ is involved). This group is very close to the *sarinensis* Group and they have similarities in hypopygia. However, the *muelleri* Group has MSSC on leg I while the *sarinensis* Group has MSSC on tarsus II.

The isolated *Austrosciapus actensis* from Canberra, ACT has similar TI MSSC (with a straight pv setae at three-quarters) and $III_{3,4}$ fleshy and padlike (MSSC). However, it has reduced ac and all male dc strong and thus is best kept in Unplaced *Austrosciapus*.

Included species:

muelleri n.sp. Australia (NSW).

otfordensis n.sp. Australia (NSW).

Key to Males of the *Austrosciapus muelleri* Group

1. TI with strong pv at half and 2 strong ventrals on distal fifth; It_1 with strong posterior seta at seven-eighths; dorsal surstylus with 3 strong distal setae (Fig. 84a) (NSW) *A. muelleri*
- TI with strong ventral at four-fifths only; It_1 lacking strong posterior seta; dorsal surstylus with 4 strong setae, spaced from epandrial lobe distad (Fig. 84b) (NSW) *A. otfordensis*

Austrosciapus muelleri n.sp.

Type material. HOLOTYPE male, PARATYPES 3 males, New South Wales, Cockerawombeeba Creek, 23 km west-north-west of Bellangry, mixed cool temperate rainforest, 730 m, 8 Dec. 1986, D.J. Bickel (AMS).

Additional material. New South Wales – male, Upper

Hastings River, Werrikimbe National Park, wet sclerophyll forest, 7 Dec. 1986 (AMS).

Description – male. Length: 4.0-4.2; wing: 3.0 x 1.2.

Legs. CI, all trochanters, femora, tibiae and all t_1 yellow; CII and CIII dark brown; $It_{2,5}$ and $II_{2,5}$ yellowish, and $III_{2,5}$ black; CI without strong distolateral setae; CIII with pale lateral seta; I: 7.5; 7.0; 5.0/2.0/1.2/1.0/0.8; TI

with strong pv at half and 2 strong ventrals on distal fifth (MSSC); It_1 somewhat swollen, and with ventral pale pile and strong posterior seta at seven-eighths (MSSC); II: 8.0; 9.5; 6.5/2.5/1.8/1.0/0.8; TII with adpd pair at one-fifth; III_t unmodified; III: 9.0; 12.5.; 4.5/2.0/1.8/1.2/1.0; distal third of III_{t_2} and $III_{t_{3-4}}$ flattened with ventral pad-like surface (MSSC); III_{t_5} only slightly flattened, without ventral pad.

Wing (similar to Fig. 126j). CuAx ratio: 1.5; haltere entirely yellow.

Abdomen. Hypopygium dark brown with yellow cerci (Fig. 84a); epandrium subrectangular; hypandrial arm arising at midlength of hypandrium and extending well beyond hood apex; 2 epandrial setae present; epandrial lobe with long apical bristle and shorter subapical bristle; surstylus with membranous attachment to epandrium; dorsal section of surstylus with 3 strong distal setae and ventral section keel-shaped; cercus elongate digitiform with black undulating apical setae.

Female. Unknown.

Remarks. *Austrosciapus muelleri* was collected in yellow pans at two montane moist forest localities in the Hastings River drainage, New South Wales. This species is named in honour of Lennart Mueller, a member of the collecting trip.

***Austrosciapus offordensis* n.sp.**

Type material. HOLOTYPE male, New South Wales, Otford, 24 Nov. 1962, D.K. McAlpine (AMS).

Description – male. Length: 3.9; wing: 2.9 x 1.0; similar to *A. muelleri* except as noted.

Legs. Colouration and podomere ratios similar; TI with strong ventral seta at four-fifths (MSSC); It_1 somewhat swollen, and with ventral pale pile (MSSC),

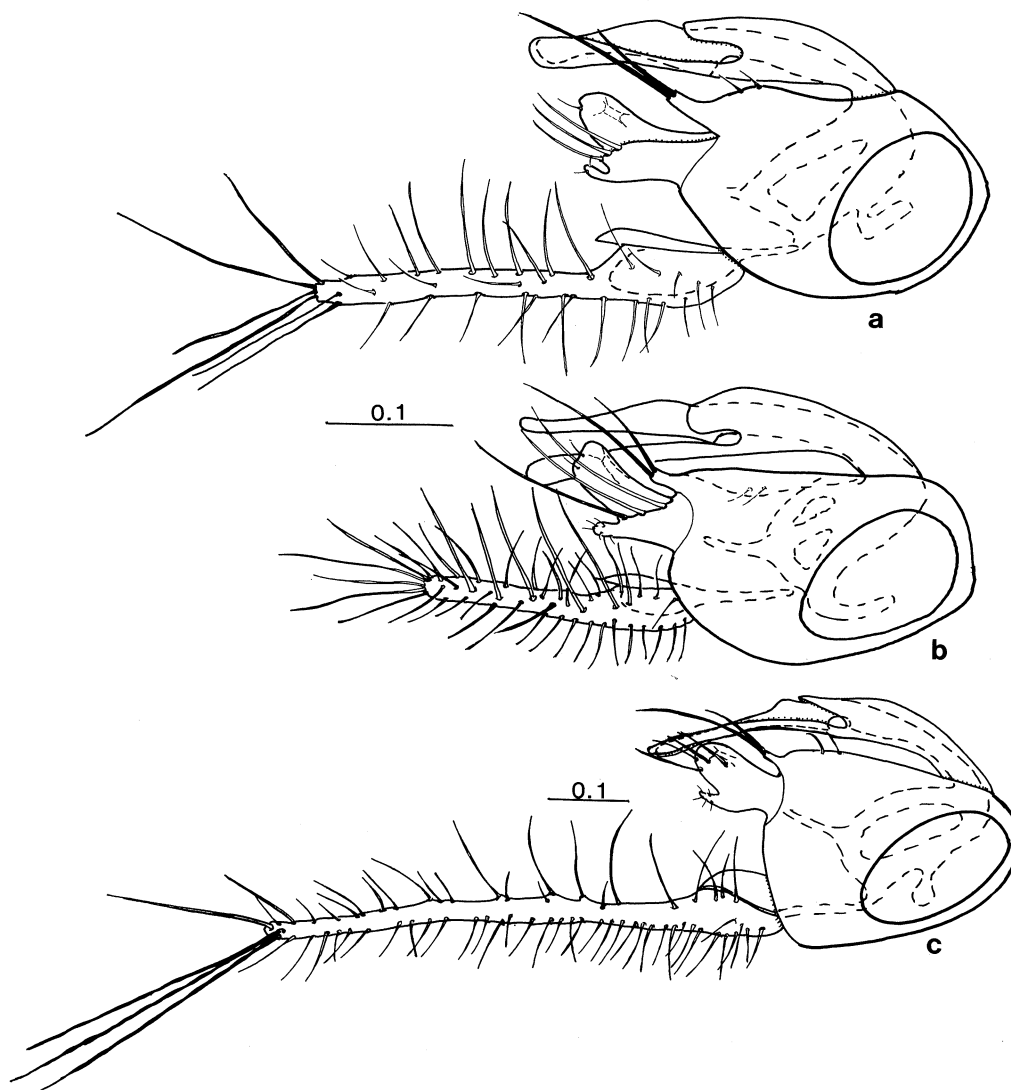


Fig.84. *Austrosciapus muelleri*, Cockerawombeeba Creek, NSW: a – hypopygium, left lateral. *A. offordensis*, Otford, NSW: b – hypopygium, left lateral. *A. stevensi*, Lindfield, NSW: c – hypopygium, left lateral.

but lacking strong posterior seta; TII with short ad seta at one-quarter; III missing on specimen.

Abdomen. Hypopygium dark brown with yellow cerci (Fig. 84b); dorsal section of surstylus with 4 strong setae, spaced from near epandrial lobe distad; cercus also digitiform but slightly shorter.

Female. Unknown.

Remarks. *Austrosciapus ofordensis* is known only from south of Sydney and is closely related to *A. muelleri*.

The *dendrohalma* Group

Diagnosis. General. Adults often found on tree trunks.

Head. Males with very weak vertical seta (Fig. 85d), female verticals strong; first flagellomere reniform with dorsal arista (Fig. 85e) (group autapomorphy).

Thorax. Ac present as 6-7 short pairs; 5 strong dc present in both sexes, without dimorphism; lateral scutellar setae reduced to tiny hairs or absent.

Legs. TI bare of major setae; male TI sometimes with subapical ventral excavation with group of short ventral setae on adjacent It_1 (Fig. 85b) (MSSC); TII with rather short ad and pd setae on male, stronger on female; TIII bare of major setae.

Abdomen. Hypandrial hood broad; hypandrial arm arising in distal quarter of hypandrium and not extending beyond apex of hood; only single epandrial seta present; hypandrial arm curved to right of aedeagus; aedeagus usually wide and bladelike in lateral view; surstylus short, broad, lobate; cercus short, often with ventral projections.

Remarks. I have collected four of the five

Austrosciapus dendrohalma Group species off trunks of smooth-barked *Eucalyptus* species and *Angophora costata* (both Myrtaceae). Adults of both sexes show a similar habit of resting with head orientated vertically upwards and body parallel to the trunk surface. Individuals bound rapidly up the trunk in a series of short jump-like flights, hence the specific name "dendrohalma" or "tree leaper". This behaviour contrasts with that of subfamily Medeterinae which often rest with the body leaning out from the surface and move up tree trunks in shorter and more irregular lateral and vertical flights. I have seen male *Austrosciapus dendrohalma* approaching females from behind, but no mating or courtship behaviour has been observed. Large congregations are rare and generally not more than two or three individuals are present on any given trunk. The rearing of *A. cantrelli* from soil in the core of a hollow tree supports the arboreal association of this group.

The *dendrohalma* Group is found along the coasts and ranges of eastern Australia from northern Queensland to Victoria. Four of the five Australian species are broadly sympatric, and often I have collected two or more species off the same trunks: *Austrosciapus janae* and *A. cantrelli* at Mooney Mooney Creek, *A. dendrohalma* and *A. janae* at Myall Lakes and near Lansdowne, and three species, *A. dendrohalma*, *A. janae* and *A. dayi* at Ku-ring-gai Chase, all in New South Wales, and *A. cantrelli* and *A. dendrohalma* at Carnarvon Creek, Qld.

Males of three species have a subapical ventral excavation on TI, with a group of short ventral setae on the adjacent It_1 (Fig. 85b) (MSSC).

Included species:

cantrelli n.sp. Australia (Qld, NSW).

dayi n.sp. Australia (NSW, Qld).

dendrohalma n.sp. Australia (NSW, Qld).

janae n.sp. Australia (NSW, Qld, Vic.).

nellae n.sp. Australia (NSW).

Key to Males of the *Austrosciapus dendrohalma* Group

1. CI yellow or yellowish; cercus elongate; TI without subapical excavation 2
- CI black; cercus otherwise; TI with subapical excavation (Fig. 85b) 3
2. CII, CIII and metepimeron dark metallic green; abdomen metallic green; cercus with ventral digitiform process (Fig. 86a) (Vic, NSW, Qld) *A. janae*
- All coxae and metepimeron yellow; abdominal segment 2 mostly yellow; cercus with simple (Fig. 86b) (NSW) *A. nellae*
3. TI with only weakly developed subapical excavation; cercus without ventral arm-like projection; (Figs 85f,g) (NSW, Qld) *A. dayi*
- TI with distinct subapical ventral excavation (Fig. 85b); cercus with ventral arm-like projection and abundant apical setae 4

4. Hypandrial hood not broad; epandrium with distal excavation to receive cercus; cercus with distinctive curved ventral arm (Fig. 85a) (NSW, Qld) *A. dendrohalma*
- Hypandrial hood broad; epandrium without distal excavation; cercus with straight ventral arms and long distal bristles (Fig. 85h) (Qld, NSW) *A. cantrelli*

***Austrosciapus dendrohalma* n.sp.**

Type material. HOLOTYPE male, PARATYPES 5 males, 9 females, Queensland, Cooloola National Park, 27-28 Nov. 1985, on trunks *Eucalyptus* sp., D.J. Bickel (AMS).

Additional material. New South Wales – Ku-ring-gai Chase National Park, on *Angophora costata*, 5-9 Jan. 1985, 21 Feb. 1970; Wingatta Creek, 30 km north of Mendooran, 16 Nov. 1974; Bendalong, near Milton, 26 Dec. 1969; Bruxner Park, north of Coffs Harbour, 22 Nov. 1985, on *E. grandis*; Myall Lakes National Park, on *A. costata*, 28 Nov. 1987; “Lorien”, near Lansdowne, on *Eucalyptus* sp., 26 Nov. 1987. Queensland – Eurimbula National Park, near Miriam Vale, 3 Dec. 1992, on tree trunks; Carnarvon Gorge, 28 Nov. 1992, on tree trunks (AMS); Indooroopilly, 14-21 Mar. 1963 (QDPI) (22 males, 19 females).

Description – male (Fig. 85c). Length: 4.0-4.1; wing: 3.6 x 1.3.

Head. Head wide (Fig. 85d); vertex strongly excavated; vertex, frons, face and clypeus dark metallic blue-green, and covered with dusting of grey pruinosity; lateral margins of clypeus adjacent to eyes; palp black; proboscis yellowish; ventral postcranium with pale hairs; antenna black (Fig. 85e); pedicel with apical ring of black setae; first flagellomere reniform; arista dorsal.

Thorax. Dark metallic blue-green with bronze reflections, and with some grey pruinosity; setae black; 6-7 pairs short ac; 5 equally strong dc; 1 pa, 2 sa, 2 sr, 1 hm, 1 pm, 2 npl present; lateral scutellar setae reduced to tiny weak hairs; metepimeron black.

Legs. Coxae, basal two-thirds of FI and FII and distal tarsomeres black; FIII yellowish with variable infuscation; distal third FI and FII, tibiae and basal tarsomeres yellowish; CI and CII with anterior pale setae; CIII with 3 pale lateral setae; I: 8.0; 7.0; 5.0/2.0/1.5/1.0/1.0; TI with subapical ventral excavation and It_1 with group of adjacent short dark ventral setae (Fig. 85b) (MSSC); II: 8.5; 9.0; 6.0/3.0/2.0/1.0/1.0; TII with 2 short offset ad-pd pairs; III: 10.0; 13.0; 5.0/5.0/2.5/1.5/1.0.

Wing (Fig. 127a). Hyaline; R_{4+5} with short anterior bend, then ending at wing apex; M continuing to margin as faint fold; CuAx ratio: 1.5; lower calypter with black rim and long pale setae; stalk of haltere brown, club yellow.

Abdomen. Dark metallic bronze green with some grey pruinosity; venter with abundant pale hairs; terga with black setae; hypopygium black (Fig. 85a);

hypandrial hood almost as long as aedeagus; hypandrial arm curves to right of aedeagus; epandrium distally excavated to receive cercus; surstylus arising ventrally, medial of 2 epandrial lobe bristles, (epandrial lobe absent); cercus distinctive with subrectangular dorsal section (with setae as figured) bearing a curved ventral arm which can be rotated backward into genital chamber.

Female. Similar to male but lacks MSSC; vertex not so strongly excavated; TII with stronger offset ad-pd pairs at one-quarter and half.

Remarks. *Austrosciapus dendrohalma* occurs from central Queensland to the Sydney district, New South Wales. Individuals are commonly found on the trunks of smooth-barked *Eucalyptus* species and *Angophora costata*.

The male cercus is unusual and appears to rotate on a basal pivot, so that the curved ventral arm can be hidden within the epandrium or produced forward.

***Austrosciapus dayi* n.sp.**

Type material. HOLOTYPE male, PARATYPE female, New South Wales, “Tuglo”, 48 km north of Singleton, 10 Dec. 1981, B.J. Day (AMS); PARATYPES 5 males, 7 females, Ku-ring-gai Chase National Park, on trunks of *Eucalyptus* sp. and *Angophora costata*, dry sclerophyll forest, 5 Jan. 1985 (AMS, ANIC); Queensland, male, Lamington National Park, open forest, 6-10 Mar. 1961 (UQIC).

Additional material. New South Wales – male, 5 females, Williams River, Barrington Tops National Park, on *Eucalyptus* sp., 26 Jan. 1987; male, Mount Royal, 12 Nov. 1983. Queensland – male, Girraween National Park, Bald Rock Creek, 900 m, 25 Nov. 1992, on tree trunks (AMS).

Description – male. Length: 4.0-4.1; wing: 3.7 x 1.2; similar to *A. dendrohalma* except as noted.

Legs. TI with weakly developed subapical excavation and black setae on It_1 (MSSC).

Abdomen. Hypopygium (Fig. 85f); hypandrial hood short, with ventral subapical hump; hypandrial arm curves to right of aedeagus; epandrial lobe short with long apical and subapical bristles; surstylus with membranous attachment to epandrium; surstylus short, wide with long seta arising from middle lobe; cercus short and with incurved projections (Fig. 85g, ventral view); cercal base with only short setae, but apex with

strong seta.

Female. Similar to male, vertex not so deeply excavated.

Remarks. *Austrosciapus dayi* occurs from the Sydney district, New South Wales to south-eastern Queensland.

***Austrosciapus cantrelli* n.sp.**

Type material. HOLOTYPE male, Queensland, Brisbane, from soil in core of tree, 19 Oct. 1977, B.K. Cantrell; PARATYPES 2 males, 6 females, same data, but 18 Oct.-11 Nov. 1977 (QDPI).

Additional material. New South Wales – male, 5 females,

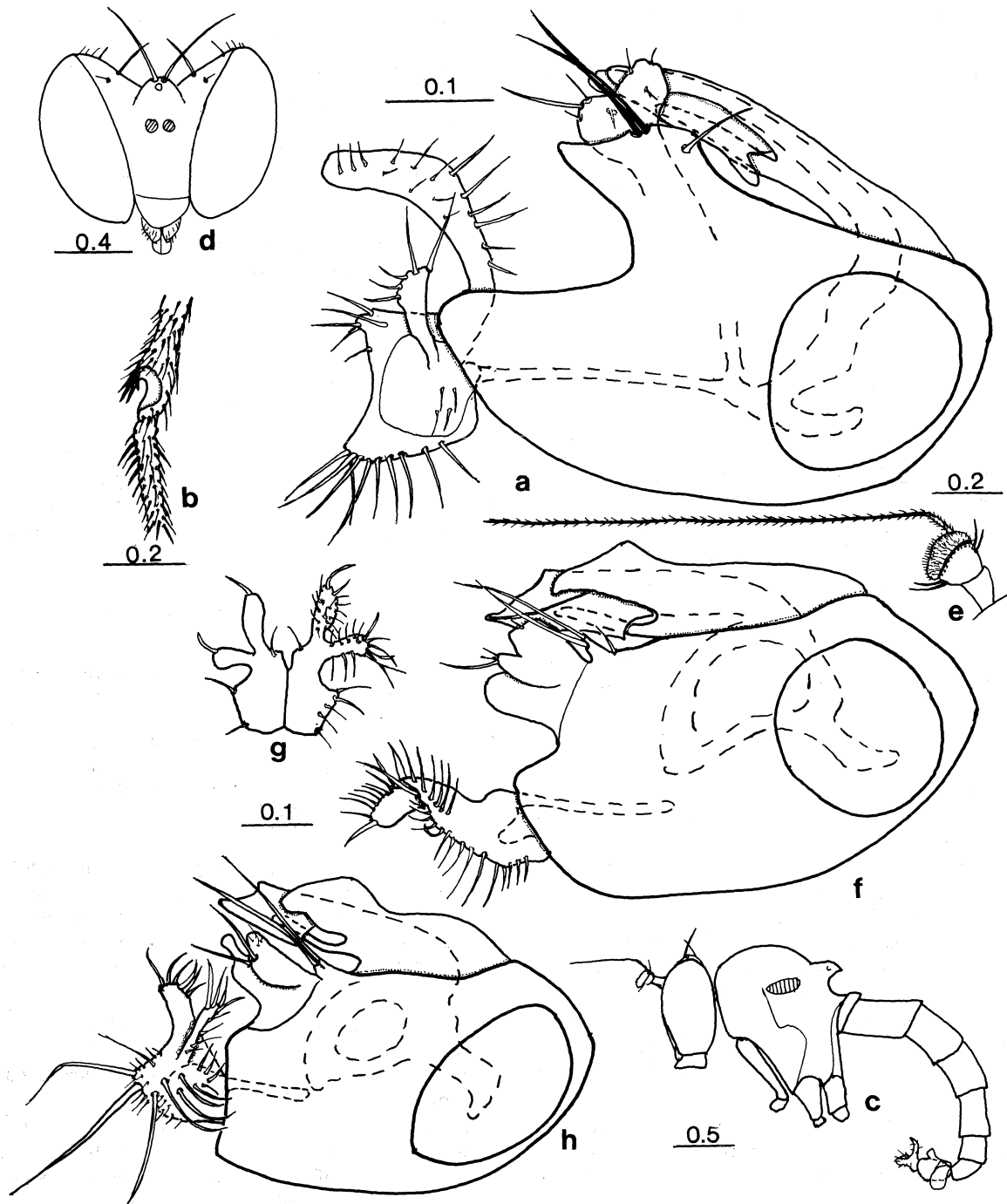


Fig.85. *Austrosciapus dendrohalma*, Mendooran, NSW: a – hypopygium, left lateral; b – male left leg I, anterior; c – male habitus, left lateral; d – male head, anterior; e – male antenna, left lateral. *A. dayi*, Singleton, NSW: f – hypopygium, left lateral; g – male cercus, ventral. *A. cantrelli*, Brisbane, Qld: h – hypopygium, left lateral.

Washpool State Forest, west of Baryugil, 10 Dec. 1985; male, Mooney Mooney Creek, near Gosford, wet sclerophyll forest, on trunk *Eucalyptus* sp., 23 Nov. 1986. Queensland – 5 males, 8 females, Carnarvon Gorge, 28 Nov. 1992, on tree trunks (AMS); male, Emerald, 6-18 Sept. 1981, malaise trap (QDPI).

Description – male. Length: 4.0; wing: 3.6 x 1.3; similar to *A. dendrohalma* except as noted.

Legs. Coxae dark brown; FI and FII in basal half brown to dark brown; remainder of legs yellow, although infuscated on some specimens; TI with apical excavation (MSSC).

Wing. CuAx ratio: 2.0.

Abdomen. Metallic bronze-green with matt bronze-brown bands on basal half of terga 2-5; hypopygium (Fig. 85h); hypandrial hood short and broad; hypandrial arm extending to right of aedeagus; epandrial lobe short with 2 long apical bristles; surstylus broad with 2 long distal setae and median lobate projection; cercus short, with long outer bristles and narrow lateral side arm as figured.

Female. Similar to male but lacks MSSC.

Remarks. *Austrosciapus cantrelli* occurs in the coast and ranges from central New South Wales to central Queensland. The Brisbane type series was reared from soil in the core of a hollow tree. It is not known if larvae of *A. cantrelli* live in soil generally or if they are directly associated with tree-hole debris, as are larvae of the

dolichopodid genus *Systemus* (see Bickel, 1986). The reared Brisbane series have yellow femora, while specimens from Washpool and Emerald have distinctly infuscated femora.

Austrosciapus janae n.sp.

Type material. HOLOTYPE male, New South Wales, Mooney Mooney Creek, near Gosford, wet sclerophyll forest, on trunk *Eucalyptus* sp., 3 Dec. 1984, D.J. Bickel (AMS); PARATYPES male, 4 females, Royal National Park, near Waterfall, on trunk *Angophora costata*, 12 Feb. 1985 (AMS); male, Ku-ring-gai Chase National Park, on *Eucalyptus* sp., 5 Jan. 1985 (ANIC).

Additional material. New South Wales – male, Barrington Tops National Park, Upper Williams River, 26 Jan. 1987; male, Myall Lakes National Park, on *A. costata*, 28 Nov. 1987; male, Mount Royal State Forest, 18 Nov. 1985; male, 3 females, “Lorien”, near Lansdowne, on *Eucalyptus* sp., 26 Nov. 1987; male, 2 females, Jenolan Caves, no date; male, Mount Lindsay Highway, north-east of Tenterfield, on *E. deanei*, 9 Jan. 1988 (AMS). Queensland – male, female, 13 km up Davies Creek Road, near Mareeba, malaise trap in *Casurina* forest, 2 Dec. 1984-7 Jan. 1985 (QDPI); females specimens probably representing this species: 10 km south-east of Mount Carbine, 16°37'S 145°12'E, 24 Nov. 1980; Bluewater Creek, 38 km north-west of Townsville, 25 Sept. 1980 (ANIC). Victoria – male, Healesville, 13 Dec. 1914 (BMNH).

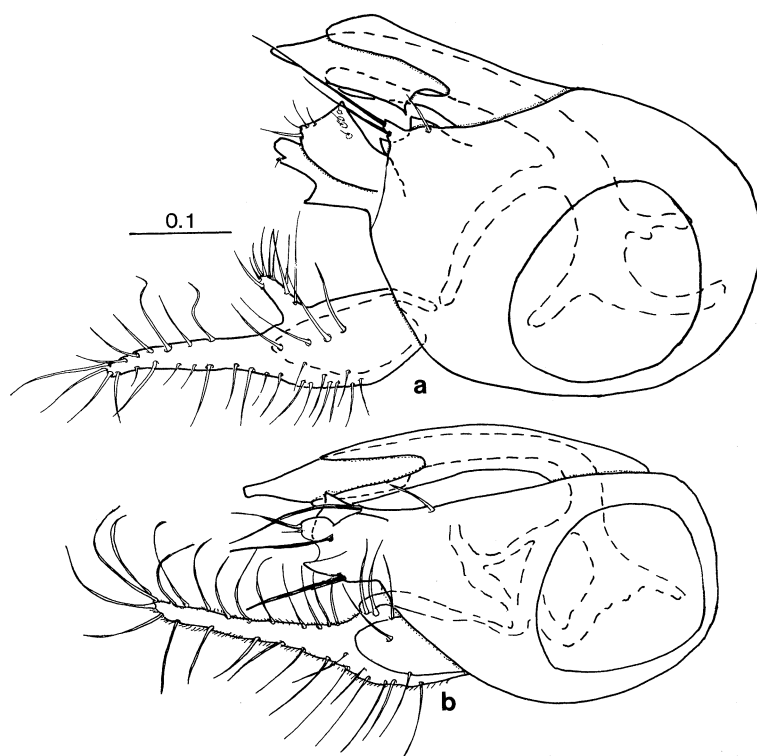


Fig. 86. *Austrosciapus janae*, Royal National Park, NSW: a – hypopygium, left lateral. *A. nellae*, Lansdowne, NSW: b – hypopygium, left lateral.

Description – male. Length: 3.7-4.0; wing: 3.4 x 1.4; similar to *A. dendrohalma* except as noted.

Head. Palp yellow.

Thorax. Metepimeron black.

Legs. CI yellow to infuscated; femora, tibiae, and basal tarsomeres yellow; CII and CIII dark brown; distal tarsomeres black; TI without subapical excavation and It_1 without distinctive ventral setae.

Abdomen. Entirely metallic green; hypopygium dark brown with yellow cerci (Fig. 86a); hypandrial arm curves to right of aedeagus; epandrial lobe pedicel relatively short, and bearing long and short bristle; epandrial lobe subtended medially by rectangular lamella; surstylus short, divided into dorsal and ventral sections, dorsal section with external tooth, and ventral section with row of short setae and some apical setae; cercus somewhat elongate and swollen, with ventral digitiform projection.

Female. Similar to male except lacks MSSC.

Remarks. *Austrosciapus janae* occurs in along the coast and ranges from the Cairns district, Queensland to near Melbourne, Victoria.

This species is named in honour of Mrs Jan Howarth, who assisted in typing this manuscript.

Austrosciapus nellae n.sp.

Type material. HOLOTYPE male, New South Wales, "Lorien", 3 km north of Lansdowne, edge of rainforest, malaise trap, 10-17 Jan. 1988, G. Williams. PARATYPE male, same but 30 Nov.-6 Dec. 1987 (AMS).

Description – male. Length: 3.4; wing: 3.3 x 1.2; similar to *A. dendrohalma* except as noted.

Head. Palp and proboscis yellow.

Thorax. Lateral scutellars absent; metepimeron yellow.

Legs. All coxae, femora, tibiae and basal tarsomeres yellow; distal tarsomeres becoming black; TI without subapical excavation and It_1 without distinctive ventral setae; TII with short pd setae only at one-quarter and two-thirds.

Wing. CuAx ratio: 1.4; haltere yellow.

Abdomen. Metallic bronze green with some grey pruinosity; but segment 2 mostly translucent yellow; hypopygium black with yellow cercus (Fig. 86b); hypandrial hood almost as long as aedeagus; only

single epandrial seta present; epandrial lobe pedicel relatively short, and bearing long bristle; epandrial lobe subtended medially by rectangular lamella; surstylus short, with strong projecting setae as figured; cercus elongate and simple.

Female. Unknown.

Remarks. *Austrosciapus nellae* is known only from the type locality on the northern coast of New South Wales. In hypopygial form and predominately yellow legs, it is most closely related to *A. janae*.

This species is named in honour of Nellie Williams of "Lorien".

The *storeyi* Group

Diagnosis. *Head.* Strong proclinate vertical seta present in both sexes; male face not bulging; scape and sometimes pedicel yellow.

Thorax. Ac present as 5-8 short pairs; 5-6 strong dc present in both sexes, without dimorphism.

Legs. All coxae and legs yellow; male tibiae bare of major setae; male III_{3-5} d-v flattened with ventral cushioned pad-like surface (MSSC).

Abdomen. Male abdominal terga 1-4 mostly yellow; epandrium subrectangular; hypandrial hood broad and sometimes with complex structure; hypandrial arm arising in distal quarter of hypandrium and not extending beyond apex of hood; aedeagus wide and bladelike in lateral view; usually only one epandrial seta present; cercus short, with ventral digitiform or palmate projection which bear strong setae.

Remarks. The *storeyi* Group is confined to eastern Australian forests and four species are known, from the Cairns district and Expedition Range in Queensland, and the Barrington Tops-Manning drainage in New South Wales. The lack of sexual dimorphism in the dc setae, the short ac, and similarities in hypopygial structure place it close to the *dendrohalma* Group, and the two groups form a clade in *Austrosciapus*.

Included species:

balli n.sp. Australia (Qld).

dekeyzeri n.sp. Australia (NSW).

solus n.sp. Australia (NSW).

storeyi n.sp. Australia (Qld).

Key to Males of the *Austrosciapus storeyi* Group

1. Metepimeron yellow 2
- Metepimeron metallic green 3

2. Lateral scutellars about two-thirds length of medians; hypandrium with complex hood and row of blade-like projections on right side; surstylus narrow and with peduncle bearing 2 apical bristles; cercus with palmate ventral projection bearing curved setae (Fig. 87a,b) (Qld) *A. storeyi*
- Lateral scutellars as weak hairs, less than one-quarter length of medians; hypandrium broad but not complex; surstylus lobate with apical seta; cercus distinctive digitiform projections (Fig. 87c) (NSW) *A. dekeyzeri*
3. CI with long pale seta at two-thirds, almost as long as the coxa itself; It_1 with short ventral seta at one-fifth; abdominal sternum 4 strongly sclerotised; surstylus truncate with some strong apical setae; cercus with elongate ventral arm with some blade-like setae (Fig. 87e,f) (Qld) *A. balli*
- CI with unmodified setae; It_1 without ventral seta; sternum 4 membranous; surstylus with hooked apex, and strong apical seta; cercus with digitiform ventral projection bearing group of apical setae (Fig. 87d) (NSW) *A. solus*

Austrosciapus storeyi n.sp.

Type material. HOLOTYPE male, PARATYPE female, Queensland, Mount Lewis, malaise trap, 14-25 Nov. 1980, R.I. Storey (QDPI).

Description – male. Length: 4.3; wing: 3.8 x 1.3; male specimen somewhat teneral.

Head. Vertex and frons metallic blue-green with dusting of grey pruinosity; face and clypeus metallic blue-green and covered with dense silvery pruinosity; palp and proboscis yellowish; scape and pedicel yellow, first flagellomere dark brown and subtriangular; arista dorsal.

Thorax. Metallic blue-green and with brownish pruinosity; pleura with grey pruinosity; metepimeron yellow; setae black; 5 pairs short ac present; lateral scutellars about two-thirds length of medians.

Legs. All coxae and remainder of legs yellow, with only distal tarsomeres infuscated; CI and CII with pale anterior setae; CIII with pale lateral seta; femora with pale ventral hairs; tibiae without major setae; I: 7.5; 8.0; 6.0/2.5/2.0/1.0/1.0; II: 8.0; 10.0; 9.0/3.0/2.0/1.5/1.0; III: 10.0; 13.5; 4.5/4.0/2.0/1.5/1.0; $III_{t_{3-5}}$ flattened with ventral pad-like surface (MSSC).

Wing. Hyaline; M_2 fading out towards margin; CuAx ratio: 1.8; lower calypter pale yellow with black rim and with fan of pale setae; haltere yellow.

Abdomen. Metallic green-brown; lateral terga 1-3 yellow; hypopygium dark brown with yellow cerci (Fig. 87a); epandrium subrectangular; hypandrium with complex, unusual structure: hood bearing row of blade-like projections on right side, evident also in ventral view (Fig. 87b); hypandrial arm truncate, dorsally projecting with serrate margin; aedeagus broad, with subapical ventral hook-like projection; 2 short epandrial setae present; epandrial lobe with 2 subequal bristles; surstylus short, with crooked apex, and with elongate peduncle bearing 2 apical bristles; cercus relatively short, with

digitiform distal projection, and with palmate ventral projection which bears rows of curved setae and other setae as figured.

Female. Similar to male except lacks MSSC and as noted: 4 pairs ac present, much stronger than on male.

Remarks. *Austrosciapus storeyi* is known only from the Cairns district, Queensland. The aedeagus and hypandrium show an unusually complex structure.

Austrosciapus dekeyzeri n.sp.

Type material. HOLOTYPE male, New South Wales, Barrington Tops National Park, Upper Williams River, 550 m, yellow pans, 26 Jan. 1987, D.J. Bickel & R. de Keyzer (AMS).

Description – male. Length: 3.8; wing: 2.8 x 1.2.

Head. Vertex and frons metallic blue-green with dusting of grey pruinosity; face and clypeus metallic blue-green and covered with dense silvery pruinosity; palp and proboscis yellowish; scape and pedicel yellowish, first flagellomere brown, rounded subtriangular; arista dorsal, about as long as head width.

Thorax. Metallic blue-green with bronze reflections; pleura with grey pruinosity; metepimeron yellow; setae black; 9-10 pairs short ac present; lateral scutellars reduced to tiny hairs.

Legs. Colouration, podomere ratios, and setation similar to *A. storeyi*, and $III_{t_{3-5}}$ also flattened with ventral pad-like surface (MSSC).

Wing. Hyaline; M_2 fading out towards margin; CuAx ratio: 1.2; lower calypter pale yellow with black rim and with fan of pale setae; haltere yellow.

Abdomen. Terga 1-4 yellow with mid-dorsal brown markings which spread laterally near tergal overlap; hypopygium dark brown with yellow cerci (Fig. 87c); epandrium subrectangular; hypandrium broad, with short

hyandrial arm arising beyond midhyandrial length; aedeagus broad, with subapical dorsal thorn-like projection; surstylus short, lobate, with apical seta; cercus

relatively short, subtriangular, with 2 distinctive ventral digitiform projections, the outer with 3 and the inner with 7 apical setae, respectively.

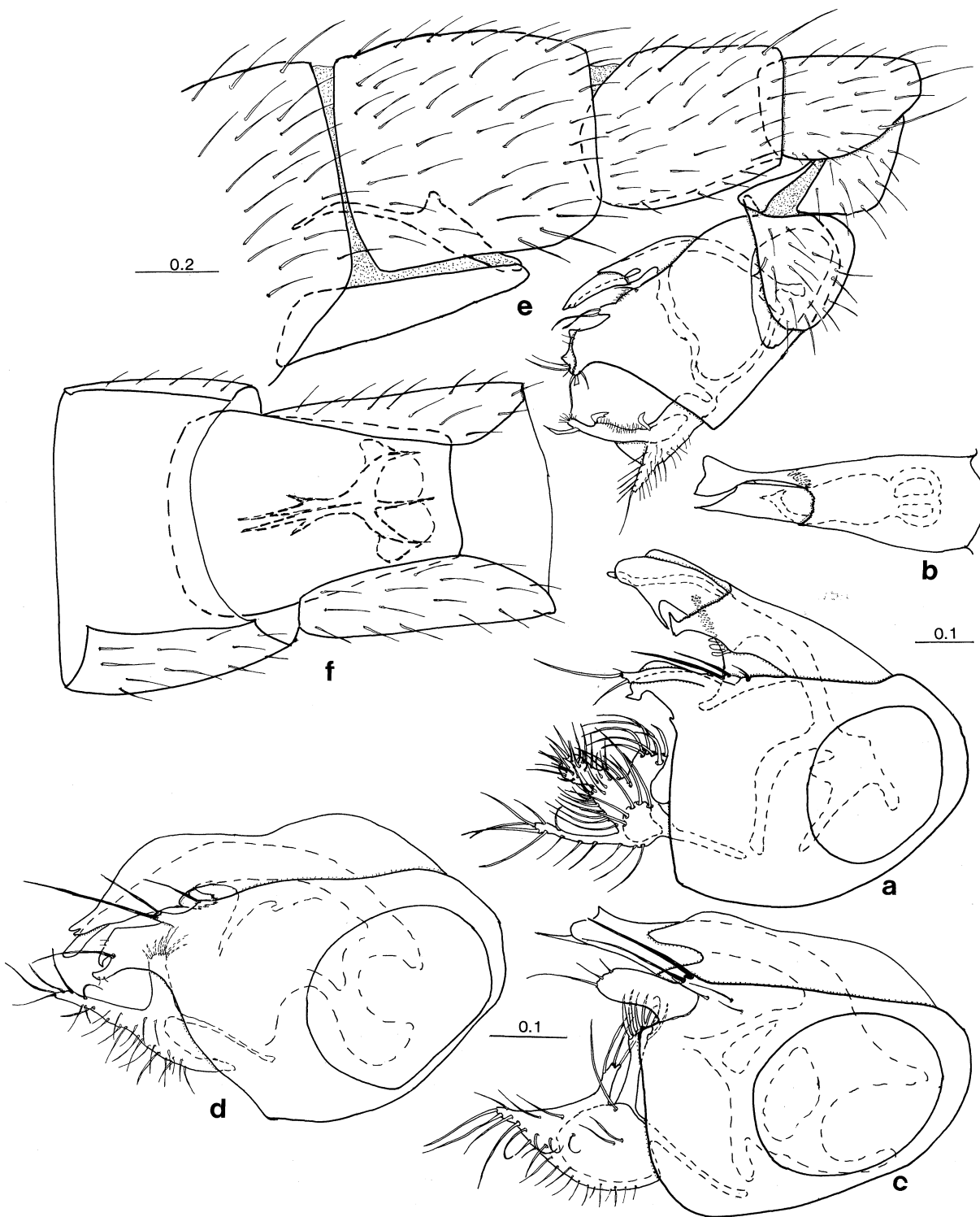


Fig.87. *Austrosciapus storyei*, Mount Lewis, Byfield, Qld: a – hypopygium, left lateral; b – hypandrium and aedeagus, ventral. *A. dekeyzeri*, Barrington Tops, NSW: c – hypopygium, left lateral. *A. solus*, Lansdowne, NSW: d – hypopygium, left lateral. *A. balli*, Blackdown Tableland, Qld: e – male postabdomen, left lateral; f – male abdominal segments 3 and 4, ventral.

Female. Unknown.

Remarks. *Austrosciapus dekeyzeri* is known only from subtropical rainforest in the Barrington Tops drainage, New South Wales.

***Austrosciapus solus* n.sp.**

Type material. HOLOTYPE male, New South Wales, "Lorien", 3 km north of Lansdowne, 4-11 Oct. 1987, malaise trap, edge of subtropical rainforest, G. Williams (AMS).

Description – male. Length: 2.9; wing: 2.6 x 0.9.

Head. Frons dark metallic blue-green with dusting of brown pruinosity; face and clypeus metallic blue-green and covered with dense silvery pruinosity; palp and proboscis yellowish; scape yellowish, pedicel and first flagellomere brown; first flagellomere short, rounded; arista dorsal, about as long as head height.

Thorax. Metallic blue-green with dusting of brownish pruinosity; pleura, including metepimeron dark brown with grey pruinosity; setae black; 5-6 pairs short ac present; lateral scutellars reduced to short weak hairs.

Legs. All coxae and remainder of legs yellow, with only distal tarsomeres infuscated; CI and CII with pale anterior setae; CIII with pale lateral seta; femora with pale ventral hairs; tibiae without major setae; I: 3.5; 3.5; 2.0/0.8/0.7/0.4/0.4; II: 3.7; 4.4; 2.5/1.2/1.0/0.6/0.4; III: 4.0; 5.0; 1.7/1.2/0.6/0.6/0.5; III₃₋₅ somewhat swollen but with ventral flattened pad-like surfaces (MSSC).

Wing. Hyaline; CuAx ratio: 1.2; lower calypter pale yellow with black rim and with fan of pale setae; haltere yellow.

Abdomen. Mostly shining metallic green-brown, except terga 2-3 mostly translucent yellow and each with dark brown dorsomedian band which extends laterally over posterior margin; hypopygium dark brown (Fig. 87d); epandrium subrectangular; hypandrium forming large hood with dorsal projection into genital chamber; aedeagus broad, with dorsal angle serrate; 1 epandrial seta present; epandrial lobe with 2 bristles; surstylus short, with hooked apex, and strong apical seta; cercus relatively short, with digitiform ventral projection which bears group of apical setae.

Female. Unknown.

Remarks. *Austrosciapus solus* is known only from mixed subtropical rainforest-wet sclerophyll forest on the New South Wales northern coast.

***Austrosciapus balli* n.sp.**

Type material. HOLOTYPE male, PARATYPES 4 males, female, Queensland, North Mimosa Creek, Blackdown Tableland, south-west of Dingo, 800 m, 29 Nov. 1992, yellow pans, D.J. Bickel (AMS).

Description – male. Length: 3.2; wing: 2.8 x 1.1.

Head. Vertex and frons metallic blue-green with dusting of grey pruinosity; face and clypeus metallic blue and covered with silvery pruinosity; palp and proboscis yellowish; scape yellow, pedicel and first flagellomere dark brown and subtriangular; arista dorsal.

Thorax. Metallic blue-green and with brownish pruinosity; pleura including metepimeron metallic green with grey pruinosity; setae black; 8-10 pairs short ac present; lateral scutellars about one-quarter length of medians.

Legs. All coxae and remainder of legs yellow, with only distal tarsomeres infuscated; CI and CII with pale anterior setae; CI with very long projecting pale anterior seta at two-thirds, about as long as coxa itself (MSSC); CIII with pale lateral seta; femora with pale ventral hairs; I: 4.0; 4.1; 2.4/1.5; 1.0; 0.6/0.4; It₁ with very short ventral seta at one-fifth (MSSC); II: 4.4; 6.0; 4.5/2.0/1.2/0.6/0.4; TII with short ad seta at one-sixth; III: 5.5; 7.0; 2.2/2.1/1.0/1.0/0.5; III₃₋₅ flattened with ventral pad-like surface (MSSC).

Wing. Hyaline; CuAx ratio: 1.5; lower calypter pale yellow with black rim and with fan of pale setae; haltere yellow.

Abdomen. Metallic green, with lateral tergum 2 yellow; segment 7 prolonged, forming distinct pedicel; sternum 4 forms a heavily sclerotised plate distally bearing a pair of elongate internal curved apodemes which project anteriorly into segment 3 (Fig. 87e,f); hypopygium brown; epandrium subrectangular; hypandrium hood short, with lateral arm to right of aedeagus; aedeagus with distinct dorsal angle; single epandrial setae present; epandrial lobe with 2 bristles; surstylus truncate with some strong apical setae; cercus Y-shaped, with elongate ventral arm which bears some blade-like setae as figured.

Female. Similar to male except lacks MSSC and as noted: female metepimeron yellow; CI with shorter projecting pale anterior seta at two-thirds, about half the length of the male; It₁ without distinct short ventral seta at one-fifth; TII with longer ad seta at one-sixth; III₁ unmodified; abdomen metallic green.

Remarks. *Austrosciapus balli* was taken from a creek in eucalypt forest on the Blackdown Tableland, an extension of the Expedition Range, central Queensland. It is named for Michael Ball who helped collect the specimens.

Male sternum 4 is broad, and forms a heavily sclerotised plate which bears a distal pair of internal curved blades projecting anteriorly into segment 3 (Fig. 87e,f). The function of this unusual structure is unknown. The long pale seta on coxa I (both sexes, although stronger in the male) is also unusual.

The *hollowayi* Group

Diagnosis. **Head.** Frons, face and clypeus covered with dense silvery pruinosity; strong vertical seta

present on both sexes; male face not bulging; sides of clypeus adjacent to eye margins and clypeus extending below base of eyes in both sexes (Fig. 88b); first flagellomere rounded, arista dorsal and about as long as head height.

Thorax. Ac absent; five strong dc present on both sexes, not sexually dimorphic; lateral scutellar setae absent.

Legs. Relatively long and mostly yellow; CI with 3 strong pale distolateral setae; femora ventrally bare; male tarsus I with modified hairs and/or enlarged pulvilli (MSSC); TII with offset ad-pd setal pairs.

Wing. Anal angle absent in both sexes (Fig. 127b-d); wing somewhat expanded distally.

Abdomen. Male abdomen elongate and partially yellowish; cercus elongate and unbranched.

Remarks. The *Austrosciapus hollowayi* Group is known only from south-western Australia, and comprises two closely related species found in coastal

plain forests, dune communities and headlands. Both geographically and morphologically the group is isolated from the main body of *Austrosciapus* in eastern Australia.

Both species have relatively long pale coloured legs, lack ac, have non-dimorphic dc, narrowed wing base in both sexes, and relatively long abdomens. Female *Austrosciapus pulvillus* have more darkly maculated wings than do males, in a manner similar to females of the *Austrosciapus tumidus* Group.

The antennal shape, non-dimorphic dc, and long cercus of the *hollowayi* Group are somewhat similar to *Narrabeenia*, but the hypopygium and wing (especially the curvature of vein M_1) relate it more strongly to *Austrosciapus*.

Male tarsus I of *Austrosciapus pulvillus* is distinctive with its enlarged pulvilli and associated setae (Fig. 88d).

Included species:

hollowayi n.sp. Australia (WA).

pulvillus n.sp. Australia (WA).

Key to Males of the *Austrosciapus hollowayi* Group

1. Mesonotum with dense golden-brown pruinosity and silvery pruinose ac stripe; $It_{2,5}$ slightly flattened ventrally with silvery hairs (MSSC); wing (Fig. 127b); hypopygium (Fig. 88a) (WA).....*A. hollowayi*
- Mesonotum with grey pruinosity; It_4 bearing long ad-pd setal pair, and It_5 with pair of curled apical setae subtended by enlarged pulvilli under claws (Fig. 88d); wing (Fig. 127d); hypopygium (Fig. 88c) (WA).....*A. pulvillus*

Austrosciapus hollowayi n.sp.

Type material. HOLOTYPE male, PARATYPES 5 males, 3 females, Western Australia, Coronation Beach, 8 Sept. 1981, G.A. Holloway (AMS).

Additional material. Western Australia – Crawley, 25 Nov. 1953; 2 miles south-south-west of Dongara, 15 Oct. 1970; Drummond's Cove, Geraldton, 3 Oct. 1972, 5 Oct. 1973 (4 females, ANIC, BMNH).

Description – male. Length: 6.3; wing: 4.0 x 1.4.

Head. Frons, face, and clypeus metallic green but covered with dense silvery pruinosity; face and clypeus with faint median longitudinal ridge; sides of clypeus adjacent to eye margins (Fig. 88b); palp brown; proboscis yellow; antenna yellow; first flagellomere rounded, infuscated dorsally; arista dorsal, about as long as head height.

Thorax. Dorsum with dense golden-brown pruinosity and silvery pruinose ac stripe; pleura metallic green and becoming yellowish ventrally, and with silvery pruinosity; metepimeron yellow; setae black; ac absent, although minute hairs sometimes present anteriorly; 1 pa, only 1 sa, 1 sr, 2 npl, 1 hm and 1 pm present; metapostnotum broad.

Legs. Coxae and legs yellow with tarsomeres darkened; CIII with strong pale lateral seta; femora ventrally bare; I: 10.0; 12.0; 7.0/2.0/1.0/1.0/1.0; $It_{2,5}$ slightly flattened ventrally with silvery hairs (MSSC); II: 11.5; 17.0; 13.0/4.0/2.5/1.5/1.0; TII with offset ad-pd pair at one-fifth and with ad at two-thirds; III: 15.0; 22.0; 9.5/5.0/3.0/2.0/1.0; TIII with ad at one-fifth.

Wing. Hyaline, narrowed at base and expanded apically (Fig. 127b); M_1 arches basally and then approaches apex subparallel with R_{4+5} ; m-cu straight; CuAx ratio: 1.3; lower calypter yellow with black rim and pale setae; haltere yellow but club slightly infuscated.

Abdomen. Elongate, almost 3 times length of thorax; terga yellowish; posterior margins of terga 1-6 dark brown; membrane of tergum 1 yellow; sternum 7 well developed; hypopygium yellow with yellow cerci (Fig. 88a); hypandrial arm arising beyond midlength of hypandrium and extending almost to apex of aedeagus; 2 epandrial setae present; epandrial lobe with long apical bristle and shorter basal bristle; surstylus with digitiform dorsal arm and lobate ventral arm separated by broad U-shaped excavation; ventral surstylar arm with median projection; cercus elongate with short yellow setae and long black ventral and apical setae as figured.

Female. Similar to male except lack MSSC and as noted: face wider; wing (Fig. 127c) also without anal angle; abdomen about twice as long as thorax; abdominal terga dark metallic green dorsally and laterally and covered with grey pruinosity; abdominal venter yellow; tergum 6 black, glabrous.

Remarks. *Austrosciapus hollowayi* is known from coastal Western Australia, from the Geraldton to the Perth district, and the type series was swept from low grassy vegetation along a beach. This species has the pale colouration and densely pruinose thorax often found on coastal flies. *Austrosciapus hollowayi* has only minor leg I MSSC.

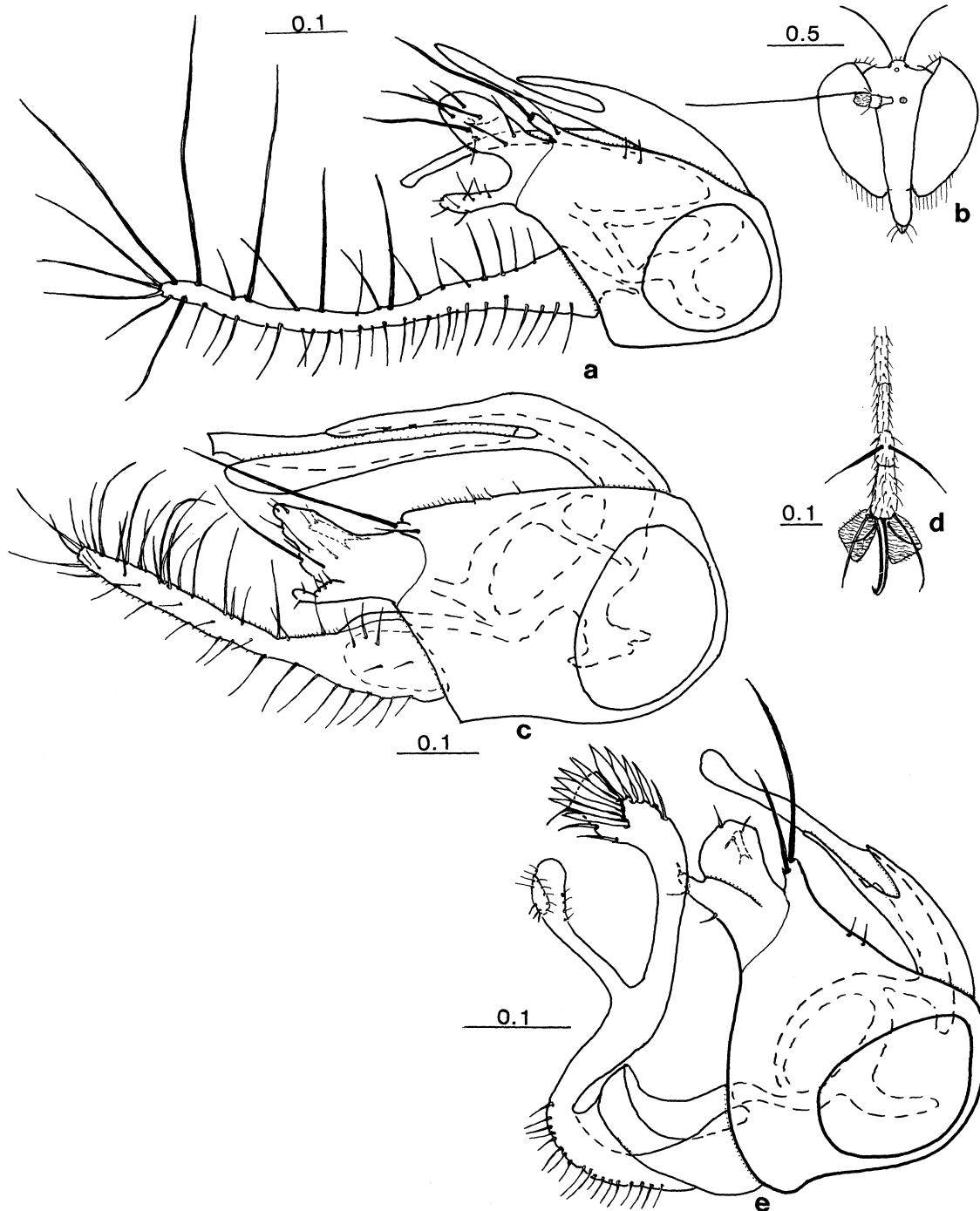


Fig.88. *Austrosciapus hollowayi*, Coronation Beach, WA: a – hypopygium, left lateral; b – male head, anterior. *A. pulvillus*, Cape Naturaliste, WA: c – hypopygium, left lateral; d – male tarsus I, dorsal. *A. actensis*, Black Mountain, ACT: e – hypopygium, left lateral.

Austrosciapus pulvillus n.sp.

Type material. HOLOTYPE male, PARATYPES 6 males, 13 females, Western Australia, Cape Naturaliste, Bunker Bay, 11 Nov. 1991, yellow pans, shrubs on headland, D.J. Bickel (AMS).

Additional material. Western Australia – 2 males, Yalgorup National Park, near Lake Hayward, 2 Nov. 1991, yellow pans, dry sclerophyll forest; 2 females, Tuart Forest Park, near Ludlow, 2 Nov. 1991, yellow pans, *Eucalyptus gomphocephala* forest (AMS); 2 males, females, Ludlow Forest, Nov. 1980, 9 Nov. 1981 (ANIC).

Description – male. Length: 3.0; wing: 2.8 x 1.2.

Head. Frons, face, and clypeus covered with dense silvery pruinosity; pair strong postvertical setae present; palp and proboscis yellow; scape and pedicel yellow, first flagellomere brown; first flagellomere rounded, arista dorsal, about as long as head height.

Thorax. Dorsum metallic blue-green with grey pruinosity; scutellum and median postpronotum metallic blue; pleura mostly yellow, with yellow colouration extending onto lateral postpronotum; setae black; 1 pa, only 1 sa, 1 sr, 2 npl, 1 hm and 1 pm present.

Legs. Coxae and legs yellow with distal tarsomeres darkened; CIII with strong pale lateral seta; femora ventrally bare; I: 6.5; 7.0; 4.2/0.8/0.5/0.5/0.8; TI with a few short ventral setae; $It_{2,4}$ shortened, with It_4 bearing long ad-pd setal pair, and It_5 with pair of curled apical setae subtended by enlarged pulvilli under claws (MSSC) (Fig. 88d); II: 7.0; 10.0; 6.5/2.5/1.5/1.0/0.8; TII with offset ad-pd pairs at one-fifth, two-thirds and subapically, each ad seta of pair longer than pd seta; III: 9.5; 12.0; 4.5/3.0/2.0/1.0/0.8; TIII with strong ad setae at one-quarter and two-thirds.

Wing. Narrowed at base and expanded apically, anal angle absent (Fig. 127d); faint, almost band-like infuscations present over basal M_1 before the bend, m-cu, and anterior of m-cu in cell r_5 ; anal angle absent; m-cu straight; CuAx ratio: 1.7; lower calypter yellow with pale setae; haltere yellow.

Abdomen. About twice as long as thorax; terga 1-5 yellow ventrally and laterally, with posterior margins metallic green-brown; hypopygium yellow with yellow cerci (Fig. 88c); 2 epandrial setae present; epandrial lobe with long apical bristle and shorter basal bristle; surstylus with digitiform dorsal arm and lobate ventral arm separated by broad U-shaped excavation; cercus digitiform with short yellow setae some black apical setae.

Female. Similar to male except lack MSSC and as noted: face wider; It unmodified; anal angle also absent; wing infuscations darker on female than male; abdomen mostly metallic blue-green with some pruinose bands, except tergum 1 and lateroventral margins of terga 2-6 yellow.

Remarks. *Austrosciapus pulvillus* has been collected

in coastal woodlands and shrubby headland habitats, from Cape Naturaliste to south of the Perth, Western Australia. The type series was collected over a three hour period in yellow pans placed under shrubs on a windswept headland. Tarsus I has unusual MSSC, comprising expanded pulvilli with long associated setae (Fig. 88d). The female has darker wing maculations than the male.

Unplaced Australian *Austrosciapus*

The following *Austrosciapus* species is not assigned to any group:

actensis n.sp. Australia (ACT).

Austrosciapus actensis n.sp.

Type material. HOLOTYPE male, Australian Capital Territory, Black Mountain, light trap, 23 Dec. 1965, I.B.F. Common (ANIC).

Description – male. Length: 3.0; wing: 2.1 x 0.8.

Head. Frons metallic green with dusting of grey pruinosity; vertical seta strong; face and clypeus metallic green with silvery pruinosity; clypeus adjacent to sides of eyes; palp and proboscis yellow; antenna black; first flagellomere subrectangular, arista short, about as long as head height.

Thorax. Four pairs very short ac present; 5 dc present, slightly decreasing in size anterior, but without hair-like dc; lateral scutellar setae absent.

Legs. CI, all femora, all tibiae and basal tarsomeres yellow; CII and CIII metallic green-brown; distalmost tarsomeres dark brown; I: 5.0; 4.5; 3.5/1.5/1.0/0.5/0.5; TI with straight pv seta at three-quarters (MSSC); II: 5.5; 5.5; 4.5/1.5/1.0/0.5/0.5; TII bare; III: 7.0; 8.0; 3.0/1.0/1.0/1.2/0.5; $III_{t_{3-5}}$ black (contrasting with the yellow basal tarsomeres), flattened, and $III_{t_{3-4}}$ fleshy and padlike (MSSC).

Wing. Hyaline; M_2 as weak extension to margin; CuAx ratio: 1.3; lower calypter pale yellow with yellow setae; haltere yellow.

Abdomen. Metallic green with bronze reflections and with pale setae; matt brown bands around tergal overlap; both tergum and sternum 7 well-developed; epandrium and cercus dark brown (Fig. 88e); epandrium subtriangular; hypandrial arm arising before midlength of hypandrium; hypandrial hood short; aedeagus with dorsal angle; epandrial lobe with long apical and shorter subapical bristles; surstylus short, with large ventral lobe which bears median setose projection, and digitiform dorsal lobe; cercus basally curved and deeply forked, outer arm with short setae and inner arm capitate with lateral row of strong blade-like setae.

Female. Unknown.

Remarks. *Austrosciapus actensis* is known only from montane woodland at Black Mountain, ACT and is somewhat isolated from other members of the genus. It has reduced ac, unmodified male dc and the clypeus adjacent to the sides of the eyes. The posteroventral TI seta (MSSC) is straight and not unlike that of species in the *muelleri* Group. The flattened tarsomeres of III_t₃₋₄ appear thick and fleshy (MSSC), similar to those in the *Austrosciapus sarinensis* and *muelleri* Groups.

Austrosciapus actensis is possibly close to the genus *Pseudoparentia*.

Amblypsilopus Bigot

Amblypsilopus Bigot, 1889: xxiv. Type species *Psilopus psittacinus* Loew, 1861 (as *psitacinus* Fabricius), by original designation.

Gnamptopsilopus Aldrich, 1893: 48. Type species *Psilopus scintillans* Loew, designated by Coquillett, 1910: 547 (syn. Bickel & Dyte, 1989).

Leptorhethum Aldrich, 1893: 50. Type species *Leptorhethum angustatum* Aldrich, 1893, by monotypy, **n.syn.**

Sciopolina Curran, 1924: 216. Type species *Sciopolina fasciata* Curran, 1924, by monotypy, **n.syn.**

Australiola Parent, 1932a: 127. Type species *Australiola tonnoiri* Parent, 1932, original designation (= *Sciapus zonatus* Parent, 1932) (syn. Bickel & Dyte, 1989).

Labeneura Parent, 1937a: 126 (as subgenus of *Sciapus*). Type species *Labeneura barbipalpis* Parent, 1937 (= *Sciapus* Curran, 1929), by monotypy, **n.syn.**

Agonosoma, authors, not Guérin-Méneville.

Chrysosoma, authors, not Guérin-Méneville.

Condylostylus, authors, not Bigot.

Sciapus, authors, not Zeller.

Diagnosis. Head. Vertex distinctly excavated in most species; head width almost always greater than height; male vertical seta usually weak and reduced; female vertical always strong; male face flat to only slightly bulging; male clypeus narrowed and distinctly free from eye margin in most species (MSSC); female clypeus almost always adjacent to sides of eyes; pedicel with short dorsal and ventral setae; first flagellomere usually subrectangular to subtriangular, sometimes modified in males; arista usually distinctly dorsal, rarely dorsoapical or apical, and arising from base of first flagellomere; arista usually short, not much longer than head width (except where arista has become secondarily apical, as in *A. pallidicornis*); arista usually simple, rarely with apical flags or other MSSC.

Thorax. Ac biseriate, usually with 3-6 long pairs, but modified: a) reduced to short setae; b) present only anterior of mesonotal suture; c) totally absent; ac chaetotaxy is never sexually dimorphic, and therefore is sometimes useful in defining groups for both sexes; 4-5 pairs dc present, almost always sexually dimorphic: in female always strong, only slightly decreasing in size anterior; in male the posterior 2 dc (dc₁ and dc₂) always strong, and the anterior dc variously reduced and

hairlike (MSSC): i) all anterior dc hairlike; ii) dc₃ only hairlike, with dc₄ and dc₅ strong; iii) dc₃ and dc₄ weak and hairlike, with dc₅ strong; with (dc₁ and dc₂); occasionally all male dc strong; median scutellar setae strong, laterals always reduced to weak hairs or absent.

Legs. Femora almost always without strong ventral setae; major TII ad-pd setae usually present in females but absent in males; diagnostic species or group MSSC variously developed on legs include: i) tibiae and/or tarsomeres greatly elongated or shortened, ii) tarsomeres I and II flattened, iii) III_t₃₋₅ flattened and padlike, iv) tibiae and tarsi I and II with short erect or crocheted setae, v) male TI or It₁ with pale curved posterior hairs.

Wing. Usually hyaline, but sometimes with apical maculations, either in males only or in both sexes. Vein M1 usually with elbow-shaped bend, neither gradually arching towards the apex as in *Chrysosoma* nor strongly recurved as in *Condylostylus*; male wing variously modified (MSSC): venation distorted; wing prolonged and narrowed; anal angle reduced/lost; with apical maculation; costa with crocheted hairs (New World species only); vein M₂ sometimes totally lost (eg, Fig. 128f); crossvein m-cu straight and usually forming right angle with vein M.

Abdomen. Abdominal plaques reduced in size on males; hypandrium asymmetrical, with narrow left lateral arm, arising near base of hypandrium; aedeagus with dorsal angle; epandrial lobe with 2 strong apical bristles; surstylus often with large ventral lobe and digitiform dorsal projection; cercus various.

Remarks. Most *Amblypsilopus* species were originally described in *Sciapus*, a heterogeneous assemblage which included sciapodines usually with a dorsal arista and pale hairs on the lower calypter. With the restricted definition of *Sciapus* presented in this work, much of the *Sciapus* residue had to be referred to other genera, with generic decisions and new combinations made for species from all zoogeographic regions.

The next available name that did not include a species referable to *Sciapus* s.s., *Chrysosoma*, or *Condylostylus*, was *Amblypsilopus*, with a New World type species, *A. psittacinus*. *Amblypsilopus* had been regarded as a junior synonym of *Sciapus*, but is given new status and receives most of the *Sciapus* residue, with the remainder placed variously in *Heteropsilopus*, *Krakatauia*, *Austrosciapus* and other genera. However, it is not enough to refer species to *Amblypsilopus* without defining the genus in its own right. Apart from abundant Australasian and Oriental material, I was able to refer to a good collection of identified New World Sciapodinae (USNM, AMNH), including the type species of both *Amblypsilopus* and *Gnamptopsilopus*, *Psilopus psittacinus* and *P. scintillans*, respectively. The New World species are not defined by any unique or distinctive character (the crocheted costal cilia of some Nearctic species are characteristic only of a North American Group; see Notes on New World *Amblypsilopus*).

The general habitus and range of MSSC in New

World species are similar to those of the Australasian and Oriental faunas, and I have referred these species also to *Amblypsilopus*. In addition, most Afrotropical "*Sciapus*" are also newly referred to *Amblypsilopus* (see Notes on Afrotropical *Amblypsilopus*). However, I have not seen all described species and original descriptions are often inadequate for making generic decisions. Thus for many species, *Amblypsilopus* will act as a 'holding genus' until they can be critically studied and their correct placement ascertained.

Amblypsilopus is not strongly defined, and it represents a large pan-tropical genus which is possibly polyphyletic. Although not satisfactory from a phylogenetic standpoint, I have not been able to spit the genus in any meaningful manner so that species or groups can be keyed without primary reference to geographical provenance. Indeed, New World species such as *A. variegatus*, *A. flavidus* and *A. scintillans* would not seem out of place if they occurred in the Australasian region. Until revisionary work is undertaken on the large New World and Afrotropical faunas, this somewhat amorphous genus must remain. However, *Amblypsilopus* has been made somewhat less paraphyletic by placing four obviously derived genera in synonymy with it.

Some New World species appear intermediate between *Condylostylus* and *Amblypsilopus*, such as *C. armiger* (see Remarks under *Condylostylus*) and a Dominican Republic amber specimen (AMNH, PB 297). The genus possibly arose from *Condylostylus*, but this requires much further investigation.

Generic Synonymies

The genera *Sciopolina*, *Australiola*, *Labeneura* and *Leptorhethum* are regarded as junior synonyms of *Amblypsilopus*. These genera were defined primarily on the basis of extremely modified male wings (MSSC) and represent small derived groups. However, intermediate stages of wing modification are sometimes evident in related species, and females cannot be separated from unmodified *Amblypsilopus*. To base such genera only on striking MSSC (and referring species with less spectacular MSSC to the main body of *Amblypsilopus*) only serves to make *Amblypsilopus* a more paraphyletic genus. These genera are not worthy of separate status but are treated here as species groups. The poorly defined genus *Leptorhethum* is also placed in synonymy.

A. *Sciopolina*. This taxon has six southern Afrotropical species, and is treated in Irwin's (1974) detailed revision. The group is defined primarily by male wing modification (MSSC). All other morphological details, including the hypopygium, are well within the range of variation found in *Amblypsilopus*. I have studied Irwin's descriptions and examined paratypes of *S. stuckenbergorum* and can find no distinctive feature common to both sexes which would distinguish *Sciopolina* from *Amblypsilopus*.

Irwin used the structure of the female terminalia to distinguish *Sciopolina* from other sciapodine genera. Female terminalia are discussed above under Morphology. They are rarely distinct enough to reliably separate genera. Irwin placed much emphasis on the setal arrangement of the female cercus in designating character states. The position and strength of setae on the cercus and paranal lobe are variable characters which are difficult to polarise. Also, the structure of the female oviscapt is strongly influenced by oviposition habits and function would probably channel morphology. This is evident in the Australian *Heteropsilopus cingulipes* Group, where some species have blade-like apical setae on tergite 9+10 (similar to the acanthophorites of Asilidae), probably as an adaptation for oviposition in sandy soil.

The six species once included in *Sciopolina* are now regarded as the *fasciatus* Group (see Notes on Afrotropical *Amblypsilopus*).

B. *Australiola*. Parent based *Australiola* on the distinctively modified male wings of *Australiola tonnoiri* (= *Amblypsilopus zonatus*). The male wings are elongate and parallel-sided, with M_2 lost, M_1 parallel with R_{4+5} and the apex covered by a large brown spot (all MSSC). The female was described from the same locality but in a different genus, as *Sciapus zonatus*. The female wing is unmodified, and since only the male wing of *Australiola* is modified, *Australiola* is placed in synonymy with *Amblypsilopus*. Other related species show male wings intermediate in modification (and even more extremely modified as in *A. liepae*) and all are placed in the *zonatus* Group.

C. *Labeneura*. Parent erected *Labeneura* as a subgenus of *Sciapus* (s.l.) to accommodate the single species *Labeneura barbipalpis*, which he described only from a male. He distinguished *Labeneura* by the distinctive male venation (strong curvature in vein M_1 and the absence of vein M_2) (MSSC), and setose palps. This species is identical in all respects to Curran's earlier species, *Sciapus lenga* and is regarded as a junior synonym (see Notes on Afrotropical *Amblypsilopus* for formal synonymy). Curran noted that both sexes had It_5 and Iit_5 flattened and setose palps, but that the female venation was normal for *Sciapus*. The presence of such unusual tarsal modifications in both sexes perhaps represents another case where a modification which arose as a MSSC became secondarily expressed in the female phenotype. The male venation is a MSSC, however. Separate generic status is not warranted for this West African species and *Labeneura* is placed in synonymy with *Amblypsilopus*. The single species, *A. lenga*, represents the *lenga* Group.

D. *Leptorhethum*. Aldrich proposed the genus *Leptorhethum* for his West Indian *L. angustatum*. The limits of this genus has always remained obscure even though Robinson (1975) proposed a redefinition, and Milward de Azevedo (1986) added an additional species.

Some species were placed in *Leptorhethum* because of a shallowly excavated vertex, a character emphasised in Aldrich's original generic diagnosis. However, this is

a weak character since many *Amblypsilopus*, especially females, also have shallowly excavated vertices. Although the vertex of the type species, *L. angustatum* (BMNH, examined) is not well excavated, the head is distorted by drying. However, *L. tenuipes* (BMNH, examined) has a distinctly excavated male vertex.

The genus is neither strongly defined nor reliably separated from *Amblypsilopus*. The four Neotropical and one Afrotropical species ascribed to *Leptorhethum* are newly referred to *Amblypsilopus* elsewhere in this paper. The New Zealand *Leptorhethum novum* Parent is in *Parentia* (Bickel, 1992).

Oriental and Australasian Faunas

Few tropical Oriental and Australasian *Amblypsilopus* species have been described, especially when compared to *Chrysosoma* and *Plagiozoplema*. This is surely a reflection of past collecting than lack of diversity. Many traditional collectors ignore small-sized specimens, and casual sweeping often captures more females than males. Female *Amblypsilopus* are difficult to identify and some previously described species based on females only are here regarded as *nomina dubia*. Considering the large number of newly described Australian *Amblypsilopus*, and the many undescribed extralimital species taken by mass-sampling methods, the Oriental and Australasian faunas are indeed rich.

In Australia, *Amblypsilopus* species occur mostly across the monsoonal north, and down the eastern coast and ranges to the southern limit of subtropical rainforest in New South Wales (eg, Figs 15, 89, 94). Of the 83 species in mainland Australia, only one occurs south of the subtropical rainforest limit, one occurs exclusively on the tablelands of New South Wales and the Australian Capital Territory, and two occur in the Alice Springs district of central Australia. Some Groups have disjunct species, such as *A. putealis* from northern Western Australia, a member of the essentially eastern coastal *zonatus* Group.

A long curved, almost crocheted posterior subapical seta is present on male TI (MSSC) of many Australasian

Amblypsilopus (eg, Fig. 93). Although characteristic of groups in Association A (below), this seta also occurs occasionally in species of other associations. Its expression is thus variable, either present or absent, and positioned variously on the distal TI (and even appearing on It_1 on *A. fustis*), and is probably part of the groundplan for most of the Australasian *Amblypsilopus* fauna. A similar seta is also present on TI of *Pseudoparentia centralis*, *P. tricola* and on an undescribed species from New Caledonia of uncertain affinity.

The Australasian *Amblypsilopus* Groups form the following associations.

A. The *triscuticatus*, *neoplatypus*, *pallidicornis* and *zonatus* Groups all share a curved posterior seta in the distal quarter of TI (MSSC). Except for the *zonatus* Group, all have five dc, with the anterior three dc of males reduced to weak hairs. These groups are rich in Australia, but large undescribed faunas are also present in the Oriental-Papuan area.

B. The *argyrodendron*, *anomalicornis*, *glaciunguis* and *trogon* Groups have only four dc (with male dc_3 reduced to a weak hair) and ac present only on the anterior mesonotum or absent. Although the *zonatus* Group of A (above) also has male dc_3 reduced to a weak hair, it has the curved posterior seta on TI of association A (above). As well, *A. kakaduensis* of the *glaciunguis* Group has a strong curved seta on male TI (MSSC) which links the *glaciunguis* Group with association A. Thus associations A and B are closely related, showing variable expression of MSSC. The groups of association B are richest in Australia.

C. The *flaviappendiculatus*, *rimbija*, *topendensis* and *cyplus* Groups have male TI with series of curved posterior setae, legs relatively short and often dark green or brown, $III_{t_{3.5}}$ flattened and padlike; hypandrial hood short and surstylus sometimes with a lobate projection. The Australian *topendensis* Group is derived from the *flaviappendiculatus* Group.

D. The *bertiensis* Group has a distinctive surstylus with a lateral cylindrical projection and includes two Queensland species.

E. The *abruptus* Group is somewhat isolated and richest in Old World tropics.

Key to Male Australian *Amblypsilopus*

1. III_{t_4} or It_5 with transverse silvery flag (eg, Fig. 105c); $III_{t_{4.5}}$ slightly flattened; 2 pairs short anterior and pair longer posterior ac present (Qld, NT, PNG) *glaciunguis* Group
- III_{t_4} or It_5 without silvery flag; other features various 2
2. TI distinctly swollen in distal third with pale ventral pile and crocheted setae, but without other outstanding setae; cercus digitiform, unbranched; $III_{t_{3.5}}$ flattened (Qld) *cyplus* Group
- TI not distally swollen; other features various 3

3. TI with outstanding curved posterior seta or setae4
- TI without curved posterior setae11
4. TI with single strong curved posterior seta on apical quarter (sometimes with additional shorter setae distad); male vertical seta usually reduced and weak; legs usually elongate and yellow; male leg I tarsomeres often modified; abdominal segments often translucent yellow5
- TI with series of 5-6 curved posterior setae; both sexes with strong vertical seta; legs relatively short; III_t₃₋₅ flattened and padlike; abdomen dark green; hypandrial hood short; surstylus sometimes with lobate projection8
5. Male III_t₃₋₅ flattened and padlike; male with 4 dc, dc₃ reduced to a weak hair; ac absent or reduced to 1 or 2 pairs anterior of mesonotal suture; male wing often strongly modified with M₂ reduced to lost and M₁ parallel to R₄₊₅, and with apical maculation even if faint (NSW, Qld, WA, Lord Howe and Norfolk Islands) *zonatus* Group
- Male III_t unmodified; 5 dc present, anterior 3 dc reduced to weak hairs; ac various; male wing unmodified (Australasia, Orient, Pacific)6
6. Arista apical or dorsoapical, with length greater than one and a half times head height (Fig. 100f); 2-3 long ac present; epandrial lobe not developed but setae arising together on a mound *pallidicornis* Group (part)
- Arista dorsal and length less than one and a half times head height; other features various7
7. Male abdominal segment 7 (hypopygial peduncle) prolonged, longer than segment 6; hypopygium reduced in size, often tiny; hypandrium with left lateral arm reduced or absent *neoplatypus* Group
- Abdominal segment 7 shorter than segment 6; hypopygium not greatly reduced in size; left lateral arm of hypandrium usually well developed *triscuticatus* Group
8. Vein M₂ totally absent (Fig. 128f); head and thoracic setae yellow; all dc strong; cercus elongate and filiform (NT, Qld) *topendensis* Group
- M₂ present, even if as fold; major setae usually black; male anterior dc usually hairlike; cercus various9
9. Cercus distally truncated and bearing curved apical seta; epandrial lobe with numerous setae (Fig. 119c); TI with distal pv row of 8-10 fine hairs and apex with ventral fine pile; epandrial lobe prolonged; CI, femora yellow; antenna black; (Qld, PNG) *A. sideroros*
- Hypopygium not as above10

10. TI usually with pale crocheted posterior hairs, confined either to distal half (eg, Fig. 112d) or present along entire tibia (Fig. 113e); surstylus with weakly sclerotised dorsal lobate projection which often extends laterally and covers cercal base; cercus usually elongate and whiplike (Australasia, Orient)..... *flaviappendiculatus* Group
- TI often with 3 long and widely separated pv setae in distal half, often at half, three-quarters and five-sixths (Fig. 115d), and/or with row of 8-12 shorter and evenly spaced posterior setae; It_1 slightly flattened with pale ventral pile and with 5-6 pale crocheted posterior setae; surstylus without sclerotised lobate projection; cercus usually short (Qld, NT)..... *rimbija* Group
11. Male with 5 strong dc..... 12
- Male with at least some anterior dc weak and hairlike or distinctly shorter..... 13
12. Antenna yellow; It_4 with long dorsal setae and It_5 with pair of long curled setae (Fig. 119b); TIII with apicoventral depression and base of IIIIt with strong ventral setae; cercus deflexed with strong black subapical setae (Fig. 119a) (Qld)..... *A. cincinnatus*
- Antenna black; $It_{4,5}$ unmodified; It_1 with pale ventral pile in basal half; wing membrane somewhat milky with dark brown veins; cercus elongate with 2 strong basoventral setae and with long undulating apical seta (Fig. 119d) (NT)..... *A. aliciensis*
13. Male with 4 dc, dc_3 reduced to a weak hair; female with 4 strong dc; ac setae absent or reduced to 1 or 2 pairs anterior of mesonotal suture..... 14
- Male with 5 dc and at least 2 or 3 anterior setae reduced to weak hairs, or all male dc strong; ac various..... 16
14. Male IIIIt unmodified; wing unmodified; ac absent; cercus either very long and bladelike or short and digitiform (northern Australia)..... *trogon* Group
- Male IIIIt_{3,5} flattened and padlike; wing often with apical maculation; ac and cercus various..... 15
15. Male first flagellomere enlarged, appearing fleshy and inflated; epandrial lobe sometimes with 4-8 setae; ac present (Australia, New Guinea)..... *anomalicornis* Group
- Male first flagellomere unmodified; 1 epandrial lobe bristle forked; ac absent (NSW, Qld)..... *argyrodendron* Group
16. Surstylus with lateral cylindrical projection which bears strong apical setae (Fig. 109a,c); lateral scutellar setae weak, about one-sixth length of medians or absent; TI unmodified; IIIIt_{4,5} flattened (Qld)..... *bertiensis* Group
- Surstylus without cylindrical projection; other features various..... 17
17. Antenna entirely yellow; TI without long curved posterior seta; 3 ac present; It_5 flattened into black apical flag; cercus (Fig. 100) elongate, and with strong curved ventral setae (NSW)..... *A. pseudexul* (*pallidicornis* Group, part)
- Without above combination of characters..... 18

18. Wing elongate and narrow, with black triangular apex subtended by white opaque spot (Fig. 118c); R_{2+3} and R_{4+5} parallel almost to apex; CI and legs mostly dark brown; hypopygial peduncle (segment 7) elongate; cercus elongate and with basal setose projections (Fig. 118a,b) (NT) *A. melasma*

— Wing not so modified; male TI without distinctive setae; arista dorsal to dorsoapical; male TII and III sometimes covered with short erect setae (Old World tropics, Qld) *abruptus* Group

The *neoplatypus* Group

Diagnosis. General. Rather delicate sciapodines with elongate yellow legs.

Head. Male with very weak short vertical seta; female verticals strong; male head wide and dumb-bell shaped, with clypeus narrow and distinctly free from margin of eyes (Fig. 90a); female clypeus adjacent to eyes (Fig. 90b); antenna often black; first flagellomere

short, subtriangular, with short dorsal arista, not much longer than head width in size (Fig. 90c).

Thorax. Ac with 3-4 short pairs, or totally absent; dc in male with 2 strong posterior dc and 3-4 weak hairs anteriorly (MSSC); females with 5-6 strong dc, decreasing in size anteriorly; lateral scutellar setae absent.

Legs. CI almost always yellow, with CII and CIII often yellow; tibiae devoid of major setae except female sometimes with some weak ad-pd setae on TII; male TI on distal quarter with long curved pale posterior seta

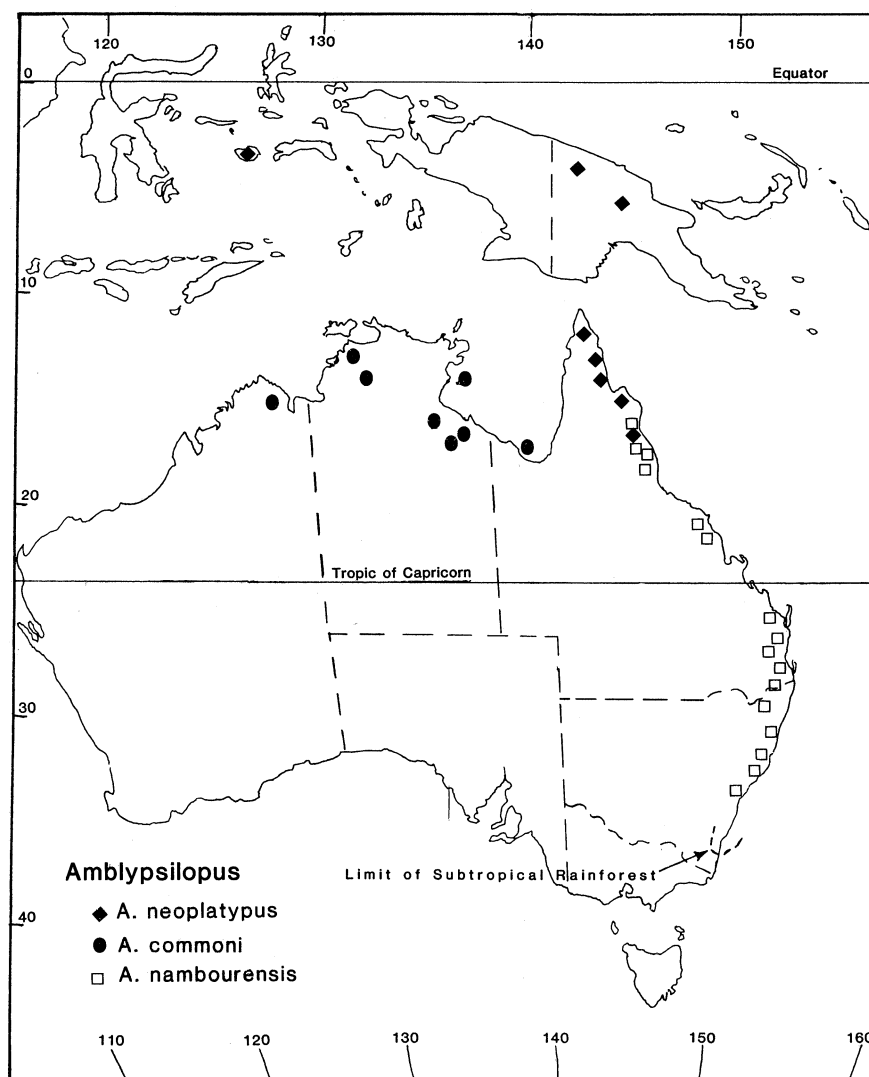


Fig.89. Distribution, some species of the *Amblypsilopus neoplatypus* Group.

(MSSC); male It_1 rarely longer than TI ; male It_{2-4} or It_5 variously modified in species (MSSC); male III_t and III_{ft} unmodified.

Wing. Hyaline.

Abdomen. Terga often translucent yellow; hypopygial peduncle (segment 7) often prolonged (Figs 90i, 91h, 92g); hypopygium often greatly reduced in size and appearing minute (Fig. 91e); hypandrium often simple and hoodlike, with strong reduction or absence of left lateral arm (Figs 91c,d,f, 92b); epandrial lobe usually reduced and incorporated into epandrial margin; aedeagus usually simple, without dorsal angle; cercus varies from short to elongate and often filiform.

Remarks. The *neoplatypus* Group is very close to the *triscuticatus* Group, with males of both groups sharing the same synapomorphy, a curved subapical posterior setae on TI (MSSC). However the *neoplatypus* Group has a modified male postabdomen, with strong size reduction in the hypopygium and accompanying loss of both the left hypandrial arm and dorsal angle of the aedeagus. Indeed, the tiny male genital capsules of some species appear almost aberrant (eg, Fig. 91e).

The Group is restricted to Sundaland, the Papuan subregion and Australia, and most species occur moist forests.

In Australia, the *neoplatypus* Group is found across the monsoonal North and along the moist eastern coast and ranges to the southern limit of subtropical rainforest in New South Wales (Fig. 89). The northern Queensland fauna has strong Papuan affinities, and species such as *A. neoplatypus*, *A. tozerensis* and *A. papilliferus* either occur on both landmasses or have sister species between Cape York Peninsula and New Guinea. The southward decrease in diversity strongly supports an Oriental-Papuan origin for the Australian fauna.

Many species await description from the Oriental and Australasian tropics. There are ten Australian species, divided into the following assemblages based on genitalic structure and MSSC.

I. *A. nambourensis*, *A. septentrionalis*, *A. papilliferus* and *A. malensis*: eastern coasts and ranges of Australia, and Northern Territory (with related undescribed New Guinea species).

II. *A. neoplatypus* and *A. tozerensis*: northern Queensland and New Guinea (with *A. ellisi* from Sumatra and undescribed New Guinea species).

III. *A. commoni*, *A. fortescuia*, *A. fonticolus* and *A. nimbuwah*: monsoonal northern Australia.

Included species:

albipes Becker, 1922a: 201. (*Sciapus*) (TMB, lost), Papua New Guinea.

Based on Becker's description and comparison with undescribed PNG species, both *A. albipes* and *A. alter* appear to belong in the *neoplatypus* Group.

alter Becker, 1922a: 202. (*Sciapus*) (TMB, lost), Papua New Guinea.

commoni n.sp. Australia (WA, NT, Qld).

ellisi Hollis, 1964a: 247. (*Sciapus*) (ZMUA, examined), Sumatra, **n.comb.**

Amblypsilopus ellisi is very close to *A. neoplatypus*, differing primarily in It MSSC.

fonticolus n.sp. Australia (NT, Qld).

fortescuia n.sp. Australia (WA).

malensis n.sp. Australia (Qld, NSW).

nambourensis n.sp. Australia (Qld, NSW).

neoplatypus Bickel [n.name for *Sciapus platypus* Parent]. (ZMUA, examined), Indonesia (Maluku), Papua New Guinea, Australia (Qld).

platypus Parent, 1932f: 350. (*Sciapus*) (preoccupied by Becker, 1922a, as var. of *Sciapus ignobilis*).

nimbuwah n.sp. Australia (NT).

papilliferus n.sp. Australia (Qld, NT).

septentrionalis n.sp. Australia (Qld).

tenuitarsis de Meijere, 1913a: 343. (*Psilopus*) (ZMUA, examined), Irian Jaya.

Bezzi's (1928: 66) Fiji record for this species is based on females and thus unsubstantiated.

tozerensis n.sp. Australia (Qld).

Key to Australian Males of the *Amblypsilopus neoplatypus* Group

1. Scape and pedicel black, first flagellomere yellow; It_{4-5} flattened, expanded and black; hypopygium entirely yellow; surstylus distally clavate with strong spine-like seta (Fig. 91g,h) (Qld, NSW) *A. malensis*
- Antenna entirely black 2
2. It_1 in basal quarter with 4 strong ventral setae, increasing in size distally (Fig. 90g); distal I tarsomeres not flattened; ac absent 3
- It_1 ventrally bare; distal I tarsomeres often flattened; ac present or absent 4

3. Surstylus deeply forked; epandrial lobe elongate, with 2 curved apical bristles; cercus with long curved subapical seta; body longer than 4.2 (Fig. 90d-g) (NSW, Qld) *A. nambourensis*
- Surstylus as twisted arm, bearing cuticular leaf-like projections covered with microtrichia, and with large curved blade-like seta; cercus with group of long apical setae; length less than 4.0 (Fig. 91a) (Qld) *A. septentrionalis*
4. It_{2-4} distinctly flattened and black 5
- It_{2-4} not flattened, or if appears only slightly flattened, It_4 silvery 7
5. Frons metallic blue-green; 2 pairs ac present; head setae black; hypopygium minute, with short spatulate cercus (Fig. 91c-f) (Qld, New Guinea) *A. neoplatypus*
- Frons with silvery pruinosity; ac absent; head setae yellow; hypopygium much longer than segment 7; cercus elongate; segment 7 with strong posterior seta (Fig. 92a) 6
6. It_{2-4} strongly flattened; dorsal surstylar arm with apical blade-like seta; epandrial lobe with short pedicel and 2 short curved bristles; cercus with swollen base (Fig. 92a-c) (NT, WA, Qld) *A. commoni*
- It_{2-4} only slightly flattened; epandrial lobe 2 stout curved internal bristles; surstylus with strong external pedunculate seta on dorsal margin; cercus with long curved basal seta (Fig. 92d) (WA) *A. fortescuei*
7. Pair of pilose papillae at apex of abdominal segment 7; It_5 slightly flattened with 3 black pinnate hairs on each side (Fig. 90h-j) (Qld, NT) *A. papilliferus*
- Abdominal segment 7 without papillae 8
8. Tergum 7 without strong distal setae; cercus not much longer than epandrium; epandrium ovate with strong dorsal seta near surstylus; surstylus distinctively shaped like a bird's head (Fig. 91b) (Qld) *A. tozerensis*
- Tergum 7 with strong distal seta or group of setae 9
9. Major head setae black; $IIIIt_{2-3}$ yellow; tergum 7 with group of strong distal setae; surstylus without dorsal blade-like seta; cercus elongate with widely spaced dorsal setae and closely spaced ventral setae (Fig. 92f-g) (Qld, NT) *A. fenticolus*
- Major head setae yellow; $IIIIt_{2-3}$ dark brown; tergum 7 with single strong distal seta; dorsal arm of surstylus with blade-like seta; surstylus with dorsal pedunculate seta (Fig. 92e) (NT) *A. nimbuwah*

***Amblysilopus nambourensis* n.sp.**

Type material. HOLOTYPE male, PARATYPES male, 3 females, Queensland, Woombye, near Nambour, 11-16 Oct. 1965, D.H. Colless (ANIC).

Additional material. New South Wales – Mooney Mooney Creek, near Gosford, 3-12 Dec. 1979; Bellingen, The Island, 8 Mar. 1981; Scotts Head, near Warrell Creek, 13 Feb. 1968;

O'Sullivan's Gap Flora Reserve, near Bulahdelah, 11 Dec. 1985; Wilson River, near Bellangry, 7 Dec. 1986; Lorient, near Lansdowne, 26 Nov. 1987, 6 Apr. 1988; 0.5 km south-east of Lansdowne, riverine rainforest-mangroves, 6 Jan. 1993; Wingham Brush, 2 Dec. 1992; Tooloom Scrub, near Urbenville, on leaves of groundcover, *Hydrocotyle pedicellosa*, 10 Jan. 1988, Queensland – Byfield State Forest, 5 Jan. 1968, 28 Jan. 1975; Waterpark Creek, near Byfield, 2 Dec. 1992; Maroochy, near Nambour, 15-22 Mar. 1985; Mount Tambourine, 2 Jan. 1962; Mount Nebo, 20 Dec. 1981; Indooroopilly, 7-21 Nov.

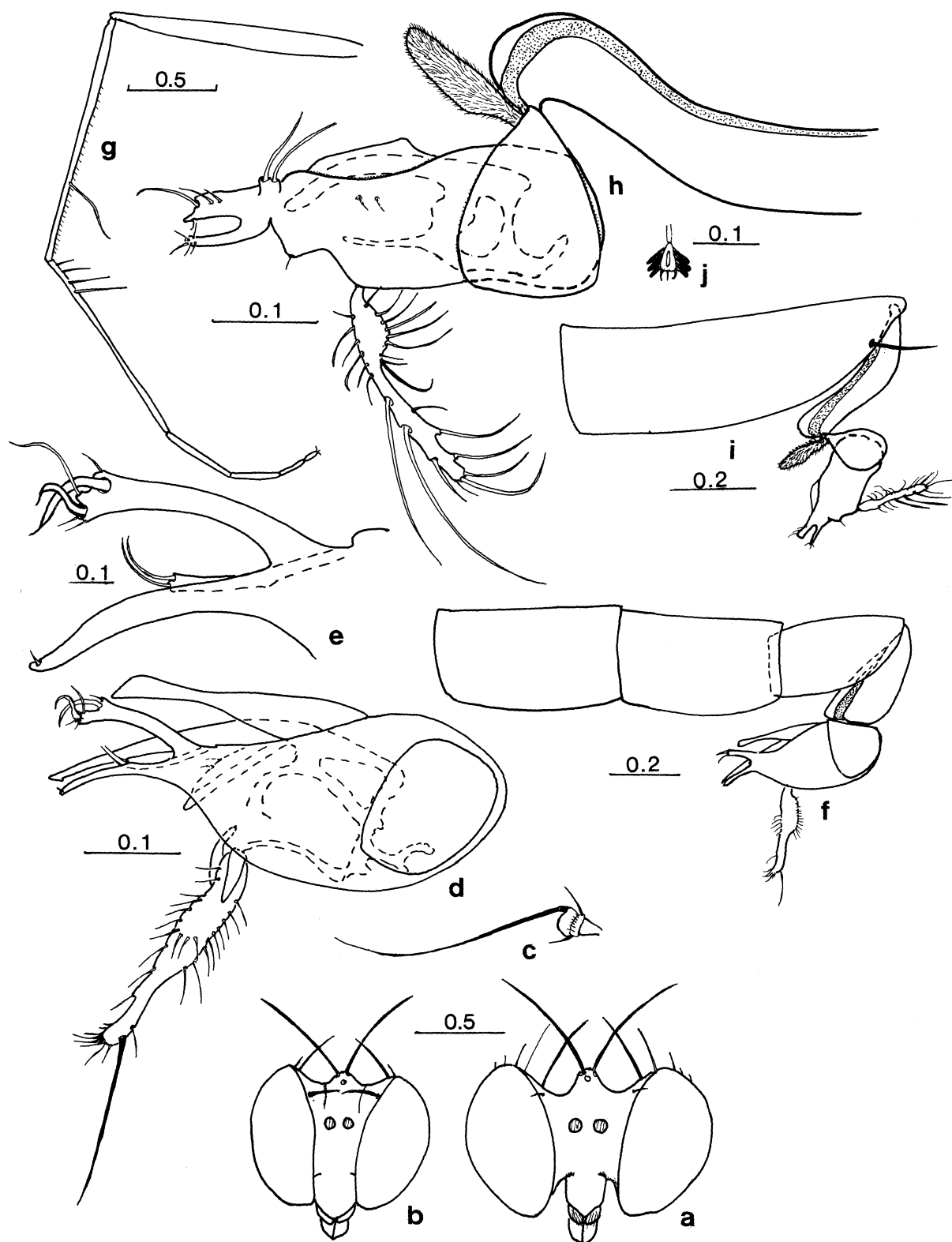


Fig.90. *Amblypsilopus nambourensis*, Byfield, Qld: a – male head, anterior; b – female head, anterior; c – male antenna, left lateral; d – hypopygium, left lateral; e – surstylus and epandrial lobe, left lateral; f – male postabdomen, left lateral; g – male left leg I, lateral. *A. papilliferus*, Bellenden Ker, Qld: h – hypopygium, left lateral; i – male postabdomen, left lateral; j – male It_3 , dorsal.

1986; Mount Glorious, 13 Mar. 1977; Mountain Creek, near Buderim, 18 Nov.-2 Dec. 1982; Isis River, 11 km south of Childers, 27 Jan. 1975; Davies Creek, near Mareeba, 21 Dec. 1984; Spewah Road, south of Kuranda, 12 Jan. 1967; Broken Range, Eungella, 10 Dec. 1961; Barron Falls, near Kuranda, 5 Feb. 1975; Miriam Vale District, 29 Mar. 1975. Possible females of this species: Fig Tree Creek, south of Ingham, 14 Apr. 1980; Shipton's Flat, 19 Oct. 1980; Big Mitchell Creek, Mareeba-Molloy Road, 4 May 1967; near Cooktown, 13 May 1981; Ellis Beach, north of Cairns, 21 Apr. 1967; Wongabel State Forest, near Atherton, 19 Nov. 1981; Sarina Range, south of Sarina, 29 Jan. 1975; Teddington Weir, near Maryborough, 27 Jan. 1975 (110 males, 75 females examined, AMS, ANIC, QDPI, USNM).

Description – male. Length: 4.3-4.4; wing: 3.3 x 1.0.

Head. Vertex, frons dark metallic green with bronze reflections; face and clypeus metallic blue-green with silvery pruinosity; face bulging; clypeus free from sides of eyes (Fig. 90a); setae black; palp and proboscis yellow; antenna black, pedicel with black dorsal and ventral setae (Fig. 90c); arista dorsal, about as long as head width.

Thorax. Dorsum dark metallic blue-green with little pruinosity; scutellum metallic blue; pleura covered with dusting of grey pruinosity; setae black; ac absent; dc_{1-2} strong, dc_{3-4} weak and hairlike, and dc_5 strong; 1 pa, only 1 sa, only 1 sr, 2 npl, 1 hm and 1 pm present; lateral scutellars absent.

Legs. CI, femora, tibiae and all t_1 yellow; CII and CIII and all t_{2-5} dark brown; coxa III with 1 pale lateral seta; I: 6.0; 6.5; 5.0/2.5/1.5/1.0/1.0; TI with long curved posterior pale seta at four-fifths (MSSC); It_1 in basal quarter with row of 4 straight ventral setae, increasing in size distally (MSSC) (Fig. 90g); It_5 slightly flattened (MSSC); II: 6.5; 8.0; 9.0/2.5/1.5/1.0/0.7; III: 9.0; 14.0; 7.5/3.0/1.5/1.0/0.7.

Wing. Hyaline (Fig. 127f); M_1 with strong knee-shaped bend; M_2 weak, marked only by fold to margin; CuAx ratio: 1.7; lower calypter yellow with dark brown rim and with fan of pale setae; haltere yellowish-brown.

Abdomen. Elongate; dark metallic green with bronze reflections; on segments 2-6, basal half of each tergum and narrow band on preceding adjacent matt bronze-brown; segment 7 dark brown, with sternum reduced to narrow strip almost along entire length of segment (Fig. 90f); hypopygium dark brown with yellowish surstyli and dark brown cerci (Fig. 90d); epandrium ovate; hypandrium simple, without left lateral arm; aedeagus simple; 2 epandrial setae present, lying internally; epandrial lobe with elongate pedicel, often lying along fork of surstylus, and with 2 subequal curved apical setae (Fig. 90e); surstylus deeply forked, dorsal arm of fork with short apical seta, and ventral arm with 2 strong curved blade-like setae and other setae as figured; cercus with distinctive long curved subapical seta.

Female. Similar to male except lacking MSSC; otherwise as noted: face not bulging; clypeus adjacent to eyes (Fig. 90b); dc similar to male with 2 strong

posteriors and 1 strong anterior, between which lie 2 shorter setae; I: 5.0; 5.5; 4.0/2.0/1.0/0.7/0.7; II: 5.5; 6.5; 6.5/2.0/1.5/1.0/0.7; III: 7.0; 10.0; 3.0/1.5/2.0/1.0/0.8.

Remarks. *Amblypsilopus nambourensis* is common along the eastern Australian coast and ranges from the Cairns district, Queensland to the central New South Wales coast (Fig. 89). It is often abundant near clearings in rainforests and wet sclerophyll forests, and is commonly seen on the leaves of ground cover, garden plants, and ornamentals.

The female shows reduced hair-like dc, normally only a MSSC.

Amblypsilopus septentrionalis n.sp.

Type material. HOLOTYPE male, Queensland, Mount Cook National Park, 15°29'S 145°16'E, malaise trap, 12 May 1981, D.H. Colless (ANIC).

Additional material. Queensland – 2 males, 2 females: Speewah Road, 8 km south of Kuranda, 12 Feb. 1967 (AMS); male, Iron Range, West Claudie River, 10 Dec. 1986 (UQIC); near Heathlands, 11°51'S 142°38'E, 15-26 Jan. 1992, at light (ANIC).

Description – male. Length: 3.7; wing: 2.8 x 1.0; similar to *A. nambourensis* except as noted.

Thorax. Ac usually absent, but Mount Cook specimen (holotype) with 2 short ac.

Legs. Similar, including MSSC on leg I.

Abdomen. Hypopygium dark brown with yellowish surstyli and cerci (Fig. 91a); epandrium subrectangular; 2 epandrial setae present, lying internally; epandrial lobe apparently fused with surstylus and developed into distinctive twisted arm-like projection which bears large and small thin cuticular leaf-like structures covered with microtrichia, large curved external blade-like seta, and other setae as figured; cercus relatively short with group of long apical setae as figured.

Female. Similar to male except lacking MSSC and smaller.

Remarks. *Amblypsilopus septentrionalis* occurs in the Cape York Peninsula from near the Cape to the Cairns district. Apart from marked differences in size and hypopygial structure, this species is close to *A. nambourensis*, and the two species bear identical leg MSSC, especially the row of four ventral setae on It_1 . They occur sympatrically and males of both species were taken together at Kuranda, Queensland.

Amblypsilopus papilliferus n.sp.

Type material. HOLOTYPE male, PARATYPE female, Queensland, Bamboo Creek, north of Mossman, 25 Apr. 1967, D.H. Colless (ANIC).

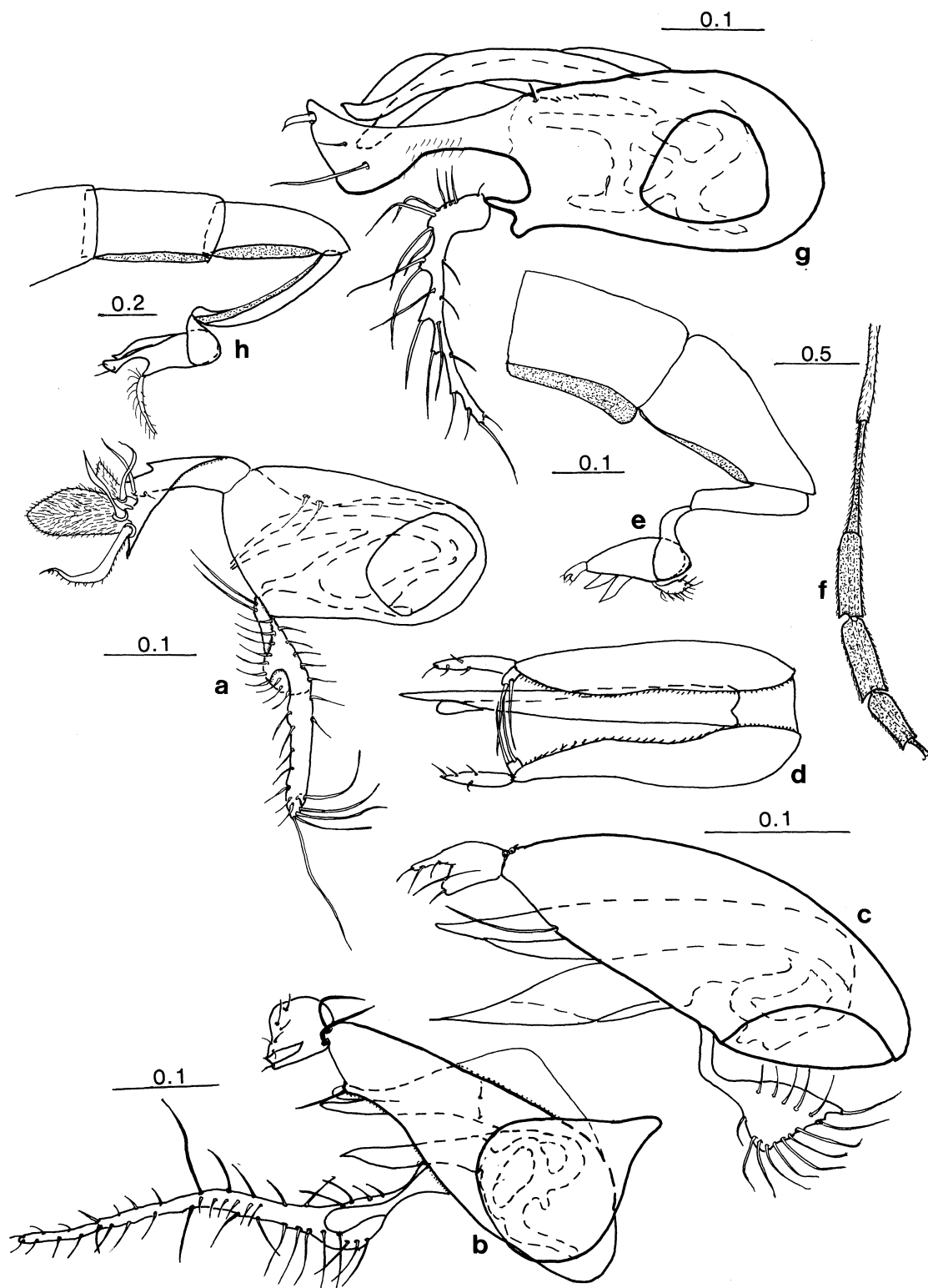


Fig.91. *Amblypsilopus septentrionalis*, Kuranda, Qld: a – hypopygium, left lateral. *A. tozerensis*, Iron Range, Qld: b – hypopygium, left lateral. *A. neoplatypus*, Iron Range, Qld: c – hypopygium, left lateral; d – hypopygium, ventral; e – male postabdomen, left lateral; f – male lt, left lateral. *A. malensis*, Maleny, Qld: g – hypopygium, left lateral; h – male postabdomen, left lateral.

Additional material. Northern Territory – male, 3 females, Berry Springs, monsoonal vine forest, malaise trap, 4 Dec. 1991–9 Jan. 1992, 6 females, 30 Oct.–4 Dec. 1991 (NTMD). Queensland – female, Thornton Range, near Daintree, 7 Jan. 1971 (AMS); male, 2 females, Bellenden Ker Range, Cableway Base, 100 m, malaise trap, rainforest, 17 Oct.–9 Nov. 1981 (ANIC); male, west of Gordonvale, 50 m, 10 Nov. 1962 (CAS).

Description – male. Length: 3.8; wing: 3.0 x 0.8; similar to *A. nambourensis* except as noted.

Head. Frons, face, and clypeus shining dark blue-green with dusting of silvery pruinosity on face and clypeus.

Thorax. Three pairs ac present; 2 strong posterior dc and 3–4 weak hair-like anterior dc present.

Legs. CI, femora, tibiae and tarsi yellow; CII and CIII dark brown; I: 6.0; 8.5; 10.5/3.0/2.0/1.5/0.5; TI with several long curved posterior pale setae (MSSC); It_1 very long, thin, and curved (MSSC); It_5 yellow with 3 dark pinnate hairs on each side (Fig. 90j) (MSSC); II: 6.0; 8.0; 11.0/2.5/2.0/1.5/1.0; III: 8.5; 15.0; 8.0/3.0/2.5/1.5/1.0.

Wing. CuAx ratio: 2.0.

Abdomen. Dark metallic green with bronze reflections; on segments 2–6, basal half of each tergum and narrow band on preceding tergum matt bronze-brown; tergum 6 with strong posterior seta; segment 7 elongate, dark brown, with sternum reduced to narrow distal strip; pair of distinctive papillae with abundant microtrichia arising from apex of segment 7 near join with sternum 8 (Fig. 90i); hypopygium dark brown with yellowish surstyli and dark brown cerci (Fig. 90h); epandrium subrectangular; hypandrium simple, without left lateral arm; aedeagus simple; 2 epandrial setae present, lying internally; epandrial lobe as short pedicel bearing 2 subequal curved apical setae; surstylus deeply forked, with apical setae as figured; cercus relatively short and with 2 long curved subapical setae.

Female. Similar to male except lacking MSSC; also with dark blue-green frons; with 4 strong dc.

Remarks. *Amblypsilopus papilliferus* is known from rainforest in the Cairns district, northern Queensland, and monsoonal vine forest in the Northern Territory. The dark metallic blue-green frons will help associate females.

An undescribed species from Wau, Papua New Guinea (AMS, BPBM) also has papillae arising from the apex of segment 7 and a similar hypopygium but lacks the ornamentation of male It_5 .

Amblypsilopus tozerensis n.sp.

Type material. HOLOTYPE male, PARATYPES 2 females, Queensland, Iron Range, 9 km east-north-east of Mount Tozer, 12°45'S 143°17'E, 5–10 July 1986, D.H. Colless; PARATYPES 3 males, female, same data but 28 June–4 July 1986 (ANIC); male, West Claudie River, malaise trap, 11 Dec. 1986 (UQIC).

Additional material. Queensland – 2 males, McIlwraith Range, 13°43'S 143°19'E, June–July 1989; male, Curtain Fig, 17°17'S 145°34'E, Mar. 1988 (ANIC).

Description – male. Length: 3.8; wing: 2.7 x 0.8; similar to *A. nambourensis* except as noted.

Thorax. Four to 5 pairs very short ac present on anterior slope; 2 strong posterior dc and 3–4 hair-like anterior dc present.

Legs. CI, all trochanters femora and tibiae yellow; CII, CIII and tarsi dark brown; I: 5.1; 5.5; 5.7/2.2/1.1/1.0/0.5; TI with long curved posterior pale seta at four-fifths (MSSC); It_1 slightly longer than TI; It_4 in lateral view slightly concave and dull silvery (MSSC); II: 5.0; 6.0; 7.0/2.0/1.5/1.0/1.0; III: 7.0; 10.5; 6.0/2.0/2.0/1.1/0.5.

Wing. CuAx ratio: 1.5; haltere yellowish.

Abdomen. Segment 7 brown, forming elongate peduncle with sternum 7 tapering basally; hypopygium brown with yellowish surstyli and brown cerci (Fig. 91b); epandrium ovate with strong dorsal seta near join with surstylus; hypopygial foramen left lateral in position; hypandrium simple, with only remnant of hypandrial arm, and arched basally; aedeagus simple and recessed within genital chamber; epandrial setae absent; 2 bristles of epandrial lobe arising along join of surstylus and directed medially; surstylus short, and distinctively shaped like a bird's head, and with setae as figured; cercus elongate, simple, with setae as figured.

Female. Similar to female *A. nambourensis*.

Remarks. *Amblypsilopus tozerensis* is known from the Iron and McIlwraith Ranges and the Cairns district, Queensland.

The hypopygium and its peduncle can be enclosed within segments 5 and 6 such that only the cerci are visible. This species is related to *A. neoplatypus* in hypandrial structure, but is not as derived. The two species occur sympatrically in the Cape York Peninsula.

A closely related undescribed species with a slightly different surstylus and cercus is known from Papua New Guinea: Port Moresby (AMS).

Amblypsilopus neoplatypus Bickel

Sciopus platypus Parent 1932f: 350 (preoccupied Becker, 1922a, as var. of *Sciapus ignobilis*).

Amblypsilopus platypus.—Bickel & Dyte, 1989: 395.

Type material. Parent described *Sciopus platypus* from a male collected on Buru Island, Maluku, Indonesia (ZMUA, examined). It is identical in all respects to Australian and New Guinea specimens. Because the name was used by Becker, 1922a as a variety of *Sciapus ignobilis*, the Parent species is here given a new name, *Amblypsilopus neoplatypus*.

Additional material. Queensland – 30 km north-east of Heathlands, Double-mouth Creek, 11°37'S 142°49'E, 19 Mar. 1992; Claudie River, near Mount Lamond, Iron Range, 29 May–

4 June 1966, 15-23 Dec. 1971 (AMS); Middle Claudie River, Iron Range, 14 Oct. 1974; Gordon Creek near Claudie River, 6-7 July 1982 (UQIC); 3 km east-north-east of Mount Tozer, 28 June-10 July 1986; Gilles Highway, 9.6 km south-west of Gordonvale, 11 July 1971; Kennedy River, 26 km west of "Fairview", 22 Apr. 1989; The Bend, 3 km north by west of Coen, 25 Apr. 1989 (ANIC). Papua New Guinea – Wau, 5-12 May 1972; Bainyik, 12-21 Dec. 1963 (AMS) (29 males, 26 females, examined).

Description – male. Length: 4.2; wing: 3.0 x 1.1; similar to *A. nambourensis* except as noted.

Head. Vertex, frons shining metallic blue-green; pruinosity of face and clypeus evident when viewed perpendicular to surface.

Thorax. Three pairs ac, posterior 2 pairs strong; 2 strong posterior dc and 3 weak hair-like anterior dc present.

Legs. CI, femora, tibiae and tarsi yellow except It which is dark brown; CII and CIII dark brown basally, yellowish distad; CIII with pale lateral seta; I: 6.5; 10.5; 3.0/2.5/2.5/1.5/0.7; TI with long curved posterior pale seta at four-fifths (MSSC); It_{2-4} each flattened, forming dark subrectangular tarsal flags (MSSC) (Fig. 91f); II: 6.0; 8.0; 8.0/2.0/1.5/1.0/0.7; III: 9.0; 14.0; 6.5/2.5/2.0/1.0/1.0.

Wing. CuAx ratio: 1.2; haltere yellow.

Abdomen. Segment 7 brown, forming elongate peduncle bearing minute hypopygium (Fig. 91e); hypopygium dark brown basally, yellowish distally (Fig. 91c,d); epandrium ovate with strong marginal dorsal seta; hypopygial foramen left dorsobasal in position; hypandrium simple, with only remnant of hypandrial arm; aedeagus simple, bladelike; both hypandrium and aedeagus recessed within genital chamber; epandrial setae absent, epandrial lobe short, with 2 bristles directed medially; surstylus short, distally forked, and with setae as figured; surstylus with membranous attachment to epandrium; cercus with narrow base but expanded and clavate with strong curved marginal setae.

Female. Similar to male except lacking MSSC; otherwise as noted: 2 strong posterior dc and 3 shorter dc anteriorly; podomere ratios similar; It entirely yellow and not flattened; abdomen entirely shining metallic blue-green.

Remarks. *Amblypsilopus neoplatypus* is known from Maluku, New Guinea, and Australia, where it is confined to the Cape York Peninsula, extending as far south as the Cairns district (Fig. 89). It is particularly abundant at Iron Range. Both *A. platypus* and the related *A. ellisi* from Sumatra have a tiny reduced hypopygium.

Amblypsilopus malensis n.sp.

Type material. HOLOTYPE male, PARATYPE female, Queensland, Maleny, May 1936, collector unnamed (UQIC);

PARATYPE female, Mary Cairncross Park, via Maleny, 27 Apr.-1 May 1985 (QDPI).

Additional material. New South Wales – male, Shoalhaven River, 30 km west of Nowra, 25 Dec. 1986; Queensland – 5 males, 4 females, Carnarvon National Park, Violet Gorge and Moss Garden, rainforest, 28 Nov. 1992 (AMS); female, Mount Glorious, 22 Jan. 1962 (ANIC).

Description – male. Length: 3.7; wing: 2.9 x 1.0; similar to *A. nambourensis* except as noted.

Head. Scape and pedicel black, first flagellomere yellow.

Legs. CI, femora, tibiae and tarsi yellow; CII and CIII and distal tarsomeres dark brown; I: 6.0; 9.5; 5.0/2.5/2.0/1.0/1.0; TI with long curved posterior pale seta at four-fifths (MSSC); It_{4-5} flattened into black apical flag (MSSC); II: 6.0; 9.5; 7.0/2.0/1.5/1.0/0.5; III: 6.5; 12.5; 5.0/2.5/2.0/1.0/1.0.

Wing. CuAx ratio: 1.5.

Abdomen. Metallic green with bronze reflections except as noted: tergum 1 metallic green laterally and posteriorly; terga 2-4 yellow, each with distal dark brown matt band; tergum 5 yellow basoventrally, otherwise metallic green; terga 5 and 6 metallic green; hypopygial peduncle (segment 7) very long, longer than segment 6 (Fig. 91h); hypopygium entirely yellow (Fig. 91g); epandrium subrectangular; hypandrial hood almost as long as hypandrial arm; aedeagus narrowed and tapering, and with basal serrations; epandrial lobe bristles not strongly developed separately; surstylus fused to epandrium and expanded distally, clavate, without major indentations or projections, and with spine-like setae; cercus short with setae as figured.

Female. Similar to male except lacking MSSC; otherwise similar to female *A. nambourensis*.

Remarks. *Amblypsilopus malensis* is known from three localities, extending from the Carnarvon Gorge, central Queensland to the Shoalhaven River, NSW.

Amblypsilopus commoni n.sp.

Type material. HOLOTYPE male, PARATYPES 21 males, 14 females, Western Australia, Drysdale River Survey, Carson Escarpment, 14°49'S 126°49'E, 9-15 Aug. 1975, I.B.F. Common & M.S. Upton (ANIC).

Additional material. Northern Territory – Bessie Spring, east-south-east of Cape Crawford, 16°40'S 135°51'E, 26 Oct. 1975, 12 Apr. 1976; Caranbirini Waterhole, south-west of Borrooloola, 22 Apr. 1976; west-south-west of Borrooloola, 16°08'S 136°06'E, 2 Nov. 1975; Darwin, Casurina Beach, 22 Oct. 1972; Howard Spring, June 1964; south-west of Dorisvale, 14°48'S 131°02'E, 9 Aug. 1968; Larrakeyah, 14 Aug. 1991 (ANIC); Groote Eylandt, no date (SAM). Queensland – Bentinck Island, 2 May 1963 (SAM). Western Australia – Drysdale River, 15°02'S 126°55'E, 3-8 Aug.

1975 (ANIC). (12 males, 13 females examined).

Description – male. Length: 3.0–3.3; wing: 2.4 x 0.8.

Head. Frons, face and clypeus metallic blue-green and covered with orientated silvery pruinosity which appears pruinose when viewed perpendicular-surface but appears metallic when viewed at oblique angle; major setae yellowish; palp and proboscis yellow; antenna black, pedicel with pale dorsal and ventral setae; arista dorsal, about as long as head width.

Thorax. Dorsum bright metallic blue-green with little pruinosity; setae yellow; ac absent; 2 strong posterior dc with 3 shorter anterior dc (MSSC).

Legs. CI yellow; CII and CIII mostly yellow although brown basally; legs yellow except $It_{2,5}$, IIt_5 and $IIIIt_5$ dark brown; CIII with pale lateral seta; male legs not greatly elongated; I: 5.0; 6.5; 5.5/2.0/1.5/0.7/0.7; TI with 2 pale curved posterior setae at four-fifths and with pale apical posterior seta (MSSC); $It_{2,4}$ dark brown and flattened (MSSC) (Fig. 92c); II: 5.0; 6.5; 7.0/2.0/1.0/0.7/0.7; III: 7.0; 11.0; 5.0/2.0/1.5/1.0/0.7.

Wing. Hyaline (Fig. 127e); M_2 marked only by fold to margin; CuAx ratio: 1.6; lower calypter yellow with dark brown rim and with fan of pale setae; haltere yellow.

Abdomen. Elongate; dark metallic green with bronze reflections; on segments 2–6, basal half of each tergum and narrow band on preceding adjacent matt bronze-brown; tergum 7 bearing distinctive apical seta; sternum 7 only developed distally; hypopygium dark brown with brown cerci and yellowish hypandrium and surstyli (Fig. 92a); epandrium subrectangular; hypandrium curved, apparently weakly sclerotised, and with left lateral hypandrial arm highly absent (Fig. 92b); 2 epandrial setae present; epandrial lobe with short pedicel bearing 2 medianly directed short curved bristles; surstylus with apical fork, with dorsal fork bearing distinctive apical blade-like seta; surstylus also with internal pedunculate seta; cercus basally swollen, elongate, setose.

Female. Similar to male except lacking MSSC; otherwise as noted: smaller, wing 2.0 x 0.8; leg colouration and podomere ratios similar; abdomen bright metallic green with bronze reflections and with short pale setulae.

Remarks. *Amblypsilopus commoni* is widespread across tropical monsoonal Australia, from the Kimberley Ranges, Western Australia to the Gulf of Carpentaria (Fig. 89). It forms an assemblage with the related *A. fortescui*, *A. nimbuwah* and *A. fonticolus*.

Amblypsilopus fortescui n.sp.

Type material. HOLOTYPE male, PARATYPES male, 6 females, Western Australia, Millstream, 8 Apr. 1971, D.H. Colless; PARATYPES 2 males, 11 females, same data but 25 Oct. 1976 (ANIC).

Additional material. Western Australia – male, Kimbolton, 26 Oct. 1982 (ANIC).

Description – male. Length: 4.3; wing: 2.8 x 1.0; similar to *A. commoni* in all respects except as noted.

Legs. TI with pale crooked posterior seta at four-fifths, but without apical seta; $It_{2,4}$ brown, not as strongly flattened as in *A. commoni*.

Abdomen. tergum 7 elongate, with strong apical seta as in *A. commoni*; sternum 7 only developed in distal half; hypopygium (Fig. 92d); epandrial setae not evident; epandrial lobe with short pedicel bearing 2 internally directed short stout curved bristles; surstylus with apical fork, with dorsal fork bearing some setae and ventral fork broad with setae as figured, and with strong external pedunculate seta along dorsal margin; cercus elongate, with long curved basal seta and other setae as figured.

Female. Similar to male except lacking MSSC.

Remarks. *Amblypsilopus fortescui* is known from the Fortescue River and King Sound, northern Western Australia. This species is very close to *A. commoni* and may represent the ancestor from which the more derived *A. commoni* developed (with its strongly flattened male tarsus I).

Amblypsilopus nimbuwah n.sp.

Type material. HOLOTYPE male, PARATYPE female, Northern Territory, Cooper Creek, 11 km south by west of Nimbuwah Rock, 3 May 1973, D.H. Colless; PARATYPES 2 females, Biraduk Creek, west-south-west of Nimbuwah Rock, 5 May 1973 (ANIC).

Description – male. Length: 3.3; wing: 2.3 x 0.8; similar to *A. commoni* except as noted.

Legs. CI yellow; CII and CIII mostly yellow although slightly infuscated; legs yellow except where noted and distalmost tarsomeres darkened; I: 4.5; 6.0; 6.0/2.0/1.0/1.4/0.5; TI with pale curved posterior seta at four-fifths (MSSC); $It_{2,3}$ dark brown and only slightly flattened and It_4 silvery (MSSC); It_5 dark brown; II: 5.0; 6.0; 7.0/2.0/1.5/0.8/0.8; III: 7.5; 12.0; 6.0/2.0/1.5/1.0/0.8.

Abdomen. Hypopygium identical to that of *A. commoni* except for details of surstylus (Fig. 92e); surstylus with apical fork, with dorsal fork bearing apical blade-like seta and ventral fork bearing strong apical seta; surstylus with external pedunculate seta developed along dorsal margin.

Female. Similar to male except lacking MSSC and abdomen is bright metallic green with bronze reflections.

Remarks. *Amblypsilopus nimbuwah* is known only

from western Arnhem Land, Northern Territory. It is almost identical to *A. commoni* except it lacks that species' distinctive black flattened male foretarsus.

However, the male foretarsus of *A. nimbuwah* is very close to that of *A. fonticolus*, although the hypopygia of the two species are markedly different.

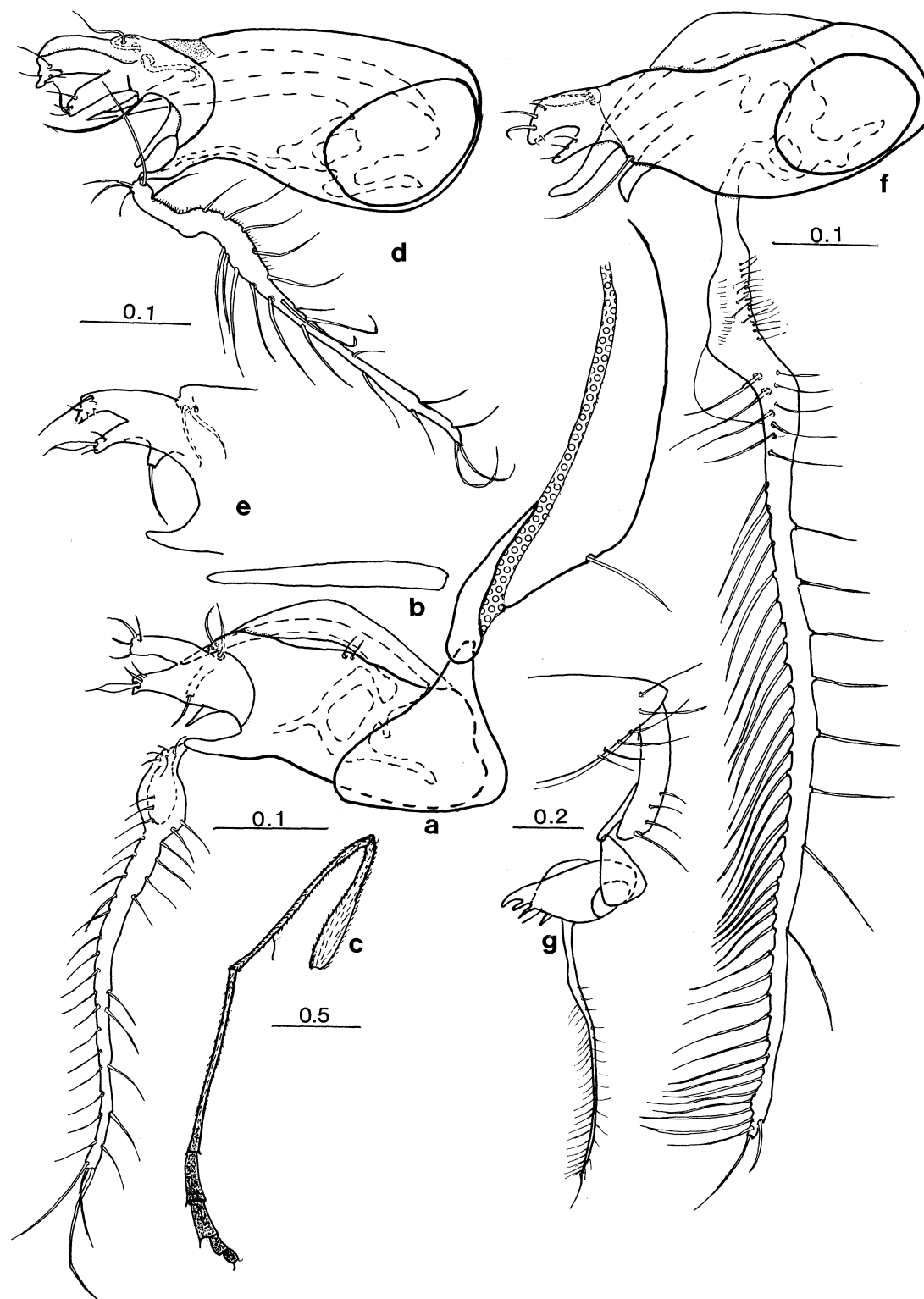


Fig.92. *Amblypsilopus commoni*, Carson Escarpment, WA: a – hypopygium, left lateral; b – hypandrium, ventral; c – male left leg I, lateral. *A. fortescuei*, Millstream, WA: d – hypopygium, left lateral. *A. nimbuwah*, Nimbuwah Rock, NT: e – surstylus, left lateral. *A. fonticolus*, Baroalba Creek, NT: f – hypopygium, left lateral; g – male postabdomen, left lateral.

Amblypsilopus fonticolus n.sp.

Type material. HOLOTYPE male, Northern Territory, Baroalba Creek Springs, 19 km north-east by east of Mount Cahill, 16 Nov. 1972, D.H. Colless; PARATYPE female, same data but 17 Nov. 1972 (ANIC).

Additional material. Northern Territory – male, Berry Springs, monsoonal vine forest, malaise trap, 27 Sept.-30 Oct. 1991 (NTMD). Queensland – male, junction of Goldmine and Davies Creeks, Kuranda-Mareeba Road, 3 May 1967 (ANIC); male, Torres Strait, Badu Island, 6 May 1986, at light (QDPI); 2 males, Heathlands, 11°45'S 142°34'E, 15-26 Jan. 1992, 5-25 July, 1992, malaise trap (ANIC).

Description – male. Length: 3.0-3.5; wing: 2.3-2.7 x 0.8; similar to *A. commoni* except as noted.

Head. Setae black.

Thorax. Setae black, sometimes yellowish; 2 strong posterior dc with 2 shorter anterior dc.

Legs. CI yellow; CII and CIII mostly yellow although slightly infuscated; remainder of legs yellow except distalmost tarsomeres darkened; I: 4.5; 6.0; 5.0/2.0/1.0/1.4/0.5; TI with pale curved posterior seta at four-fifths (MSSC); It pale yellow but It₄ slightly flattened and silvery (MSSC); II: 5.0; 6.0; 7.0/2.0/1.5/0.8/0.8; III: 7.5; 12.0; 6.0/2.0/1.5/1.0/0.8.

Wing. CuAx ratio: 1.7.

Abdomen. Segment 7 elongate, with tergum 7 bearing strong apical seta and with sternum 7 strongly developed only in distal half (Fig. 92g); hypopygium (Fig. 92f); epandrium subrectangular with strong curved dorsal seta; hypandrium curved, apparently weakly sclerotised, with left hypandrial arm absent; epandrial setae absent; epandrial lobe with short pedicel bearing 2 medianly directed short curved bristles; surstylus with apical fork, and with setae as figured; cercus narrow, elongate, with widely spaced dorsal setae and more closely spaced row of ventral setae.

Female. Similar to male except lacking MSSC and as noted: podomere ratios similar; abdomen bright metallic green.

Remarks. *Amblypsilopus fonticolus* is known from Arnhem Land, Northern Territory, and the Cape York Peninsula, from Torres Strait to the Cairns district.

Some intraspecific variation is evident. The Heathlands, Qld male is somewhat smaller than other specimens (body length 3.0, wing length 2.3). The Kuranda-Mareeba Road male has yellowish thoracic setae but is identical in all other respects to the black setae specimens from Torres Strait and Arnhem Land.

The *triscuticatus* Group

Diagnosis. *General.* Delicate sciapodines with elongate yellow legs.

Head. Males usually with short weak vertical seta; female vertical seta strong; male head dumb-bell shaped in anterior view, and clypeus narrow and distinctly free from margin of eye; female clypeus adjacent to eyes; first flagellomere short, subtriangular, with dorsal arista usually short, and length less than one and a half head height (Fig. 98c).

Thorax. Ac variously developed, 2-3 long pairs, or strongly reduced to totally absent; dc in male: either dc_{1,2} strong, dc_{3,4} weak and hairlike, and dc₅ strong, or 2 strong posterior dc with 3-4 weak hairs anteriorly (MSSC); females with 5-6 strong dc, decreasing in size anteriorly; lateral scutellar setae absent.

Legs. CI, femora and tibiae usually yellow; tibiae usually bare of major setae except female sometimes with weak ad or pd setae on TII; male TI on distal quarter with long curved pale posterior seta (MSSC); male It₁ often thin and elongate, sometimes longer than TI (MSSC); in females, It₁ always shorter than TI, except in *A. brevitibia*; male It_{2,4} or It₅ variously flattened or modified in some species; It₅ sometimes modified as black or silvery flag (MSSC); male IIt and IIIt usually unmodified.

Wing. Usually hyaline although faint anteroapical clouding is evident in some species; crossvein m-cu straight.

Abdomen. Relatively long in male; terga sometimes translucent yellow; hypopygial peduncle (segment 7) not greatly prolonged; epandrial lobe usually strongly reduced and epandrial lobe bristles appear to arise from epandrial margin; hypandrium usually with left lateral arm; aedeagus usually dorsally serrate with dorsal angle; surstylus usually rounded and lobate, without dorsal and ventral divisions; cercus usually elongate and often filiform.

Remarks. Almost all males of the *Amblypsilopus triscuticatus* Group have a curved subapical posterior setae on TI (MSSC). This is a synapomorphy, which unites the *triscuticatus* Group with the *neoplatypus*, *pallidpseudicornis* and *zonatus* Groups. These latter groups are defined further by additional apomorphies, and indeed, each may have arisen independently from a *triscuticatus* Group ancestor. Therefore, *triscuticatus* Group as here defined is probably paraphyletic.

Males have particularly long legs and consequently appear delicate (Fig. 93). Leg I often bears species diagnostic MSSC, including flattened or prolonged tarsomeres. Male *Amblypsilopus brevitibia* have a very long It₁, with compensatory abbreviation of TI (both MSSC).

Some non-Australian species based on females only possibly belong here, but most are regarded as Unplaced *Amblypsilopus* or *nomina dubia*.

Most *triscuticatus* Group species are found in moist forests. The Group is widespread throughout the Oriental and Australasian regions (as far east as Vanuatu and New Caledonia) and is much more diverse than the listing suggests. Collections from the tropical western Pacific reveal numerous undescribed species.

Considering the size increase in the Australian fauna alone (23 species, 22 of them new), and with undoubtedly many undescribed species awaiting collection from the ranges of northern and eastern Australia, this Group will prove to be very diverse.

In Australia, the *triscuticatus* Group is found across the monsoonal North and along the moist eastern coasts and ranges to southern New South Wales (Fig. 94). In the southern part of its range, most species are associated with pockets of subtropical rainforest, although *A.*

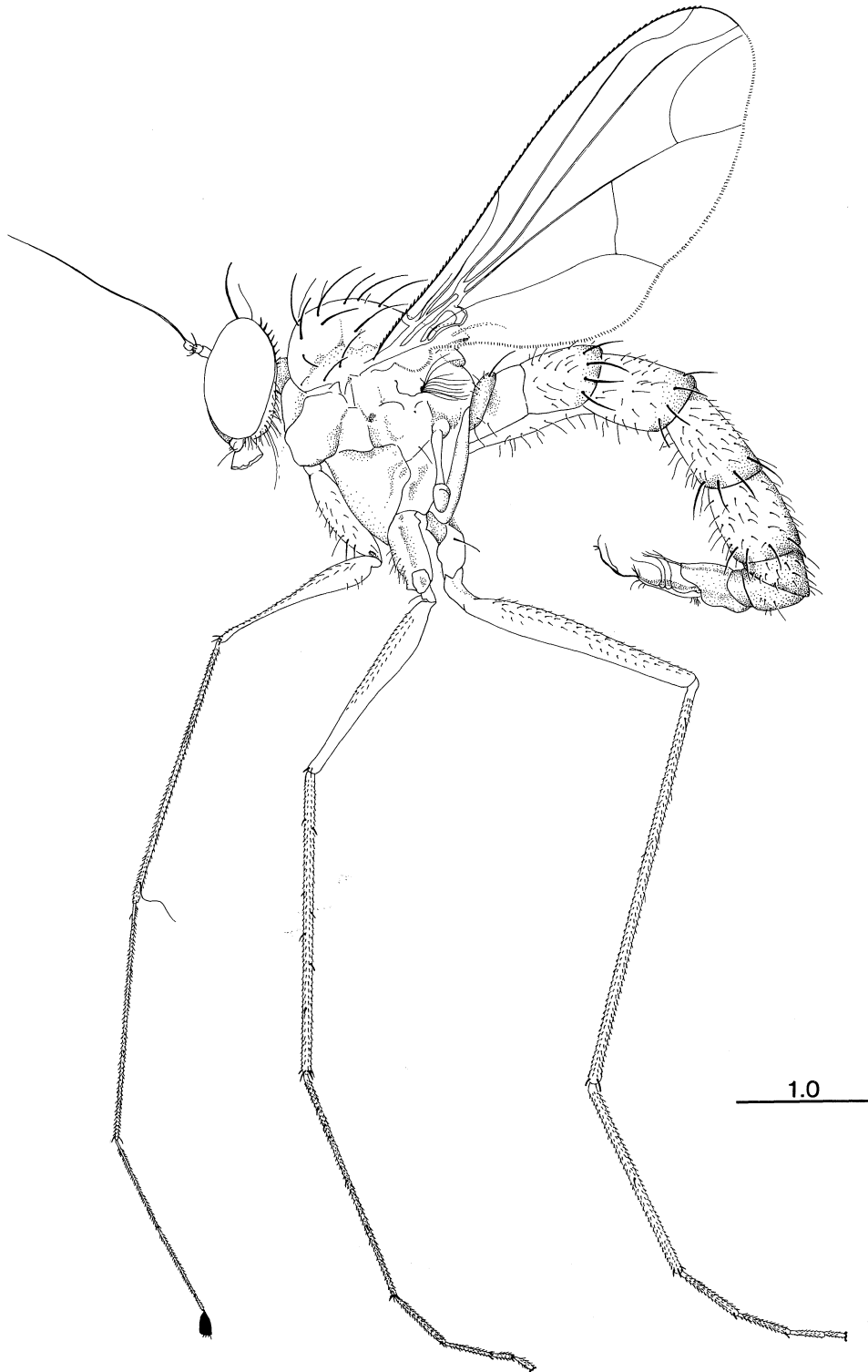


Fig.93. Habitus, male *Amblypsilopus triscuticatus*.

montanorum occurs in montane woodland, and the widespread coastal *A. triscuticatus* is also known from the Blue Mountains and Canberra, ACT. The southward decrease in diversity strongly supports an Oriental-Papuan origin for the Australian fauna.

The 23 Australian species can be divided into six assemblages based on similar hypopygial structure and MSSC.

I. *A. annanensis*, *A. bimestris*, *A. byrnei* and *A. graciliventr*is – eastern coasts and ranges from northern Queensland to central New South Wales and across monsoonal northern Australia.

II. *A. canungra* and *A. uneorum* – north-east New South Wales to south-east Queensland; both with scape and pedicel black and first flagellomere yellow, and It_1 shorter than TI, and basally flattened with some ventral pale pile.

III. *A. albisignatus*, *A. bimus*, *A. lismorensis*, *A. loriensis*, *A. trudis*, *A. walkeri* and *A. wokovens*is – eastern coast and ranges from northern Queensland to central New South Wales; similar to Assemblage I but with spatulate cercus bearing a median pedunculate seta.

IV. *A. arboreus*, *A. basseti*, *A. brevitibia*, *A. kaputar*, *A. moggillensis*, *A. rentzi*, *A. tortus* and *A. triscuticatus* – eastern coasts and ranges from northern Queensland to central New South Wales, and across monsoonal northern Australia; mostly with elongate cerci.

V. *A. montanorum* – mountains of NSW and ACT.

VI. *A. natalis* – Christmas Island. [*A. renschi*, *A. flavipes*, Indonesia]; these three species have long vertical seta in males and at least some femora with long pale ventral setae (MSSC).

Included species:

albisignatus n.sp. Australia (NSW, Qld).

annanensis n.sp. Australia (Qld).

arboreus n.sp. Australia (NT).

basseti n.sp. Australia (Qld, NSW).

bimestris n.sp. Australia (Qld).

bimus n.sp. Australia (Qld).

brevitibia n.sp. Australia (NSW).

byrnei n.sp. Australia (NT, Qld).

canungra n.sp. Australia (Qld, NSW).

flagellaris Frey, 1925: 17. (*Psilopus*) (ZMH, examined), Philippines (Luzon), **n.comb.**

The cercus is very long and It_5 is elongate and white (MSSC).

flavipes de Meijere, 1910: 102. (*Psilopus*) (ZMUA, examined), Java, Flores, **n.comb.**

gracilipes Parent, 1932b: 108. (*Sciapus*) (preoccupied by Loew, 1871), (MLUH, specimen lost, pinned label only), Flores.

badjavensis Dyte, 1975: 227. (*Sciapus*) (n.name for

gracilipes Parent), **n.syn.**

The holotype of *Sciapus gracilipes* is lost and represented only by a pinned label. However, the syntype series of *Psilopus flavipes* agrees in all aspects with the description and figures of *Sciapus gracilipes*, especially noting the long pale ventral setae on the femora and the distinctive cercus. This species is near *A. renschi* and *A. natalis*. The curved posterior TI seta (MSSC) diagnostic of the *triscuticatus* Group, is present but very weak.

Lectotype here designated for *Psilopus flavipes* de Meijere: male, bearing the label: "Java, I-06, Semarang, Jacobson".

*graciliventr*is Parent, 1933a: 178. (*Sciapus*) (BMNH, examined), Australia (Qld, NT, WA).

grallator Frey, 1924: 118. (*Chrysosoma*) (ZMH, examined), Philippines, **n.comb.**

The male has a long clavate cercus, and the body length is 3.5, not 5.0 as given in the original description. Male It_1 is one and a half times as long as TI (MSSC).

kaputar n.sp. Australia (NSW).

lismorensis n.sp. Australia (NSW).

loriensis n.sp. Australia (NSW).

moggillensis n.sp. Australia (Qld).

montanorum n.sp. Australia (ACT, NSW).

natalis n.sp. Christmas Island.

neoparvus Dyte, 1975: 229 [n. name for *Sciapus parvus* Parent], (BMNH, examined), Vietnam, **n.comb.**
parvus Parent, 1934b: 296. (*Sciapus*) (preoccupied by Van Duzee, 1933).

pulverulentus Parent, 1939a: 162. (*Chrysosoma*) (ANIC, examined), Papua New Guinea.

The holotype is badly damaged, missing the head, wings and both legs I. However, Parent's description notes the curved subapical ventral seta on TI (MSSC) which places it in the *triscuticatus* Group. The hypopygium is distinctive and is figured in the description. The male wing is unusual in having a transverse infuscation near the apex.

*rensch*i Parent, 1932b: 109. (*Sciapus*) (MLUH, examined), Indonesia: Lombok, **n.comb.**

rentzi n.sp. Australia (NSW).

tortus n.sp. Australia (Qld).

triscuticatus Hardy, 1930: 129. (*Sciapus*) (lost; neotype AMS), Australia (Qld, NSW, ACT).

trudis n.sp. Australia (Qld).

uneorum n.sp. Australia (Qld).

walkeri n.sp. Australia (Qld).

wokoensis n.sp. Australia (NSW).

Key to Australian Males of the *Amblypsilopus triscuticatus* Group

1. Scape and pedicel black, first flagellomere yellow 2

— Antenna either entirely black or entirely yellow (first flagellomere may be infuscated) 5

2. Head and thorax covered with dense orientated silvery pruinosity; It_1 distinctly longer than TI ; $It_{3,5}$ each very short and flattened; cercus forked, ventral arm with distal blade-like seta and dorsal arm with long apical seta (Fig. 97b) (Qld, NSW) *A. basseti*
- Head and thorax with only dusting of pruinosity; It_1 shorter than TI ; It_1 basally flattened with some ventral pale pile 3
3. $IIIIt_{3,5}$ slightly flattened with ventral pad-like surface; cercus short and apically forked (Fig. 99a) (Qld) *A. uneorum*
- $IIIIt_{3,5}$ unmodified 4
4. $It_{3,5}$ flattened (Fig. 98h), with It_4 bearing posterior row of black pinnate setae, with It_5 strongly flattened into wide apical flag which is dorsally black, and $It_{4,5}$ ventrally covered with shining silvery pruinosity, evident when viewed at an acute angle; 4 pairs ac present; hypopygium with very long cercus (NSW) *A. rentzi*
- $It_{3,5}$ unmodified; 3 pairs ac present; cercus wide basally and elongate (Fig. 99b) (NSW, Qld) *A. canungra*
5. Antenna entirely yellow or at most with first flagellomere brownish 6
- Antenna entirely black 13
6. It_1 distinctly longer than TI 7
- It_1 shorter than or subequal to TI 10
7. Cercus elongate and narrow, almost twice length of epandrium (Fig. 98e); CII and CIII dark brown; It_1 more than twice as long as TI (Fig. 98f); $It_{3,4}$ silvery; It_5 black and flattened (NSW) *A. brevitibia*
- Cercus subrectangular or tapering, and short, not much longer than epandrium; CII and CIII yellow distally 8
8. Major head and thoracic setae black; It_5 with flattened black setae (Fig. 95e); cercus with apical blade-like seta subtended by 2 curved setae (Fig. 95d) (Qld) *A. bimestris*
- Major head and thoracic setae yellow; It_5 unornamented 9
9. TI and It_1 each with pale curved posterior seta; wing hyaline; cercus tapering with branched apical seta subtended by curved subapical seta (Fig. 95f) (Qld) *A. annanensis*
- TI only with pale curved posterior seta; wing with faint brown clouding posterior to costa and along basal M; cercus subrectangular with apical spatulate and forked setae (Fig. 95a) (WA, NT, Qld) *A. graciliventris*
10. CII and CIII mostly yellow; It_4 white and contrasting with flattened and pinnate black It_5 ; cercus subrectangular with 2 apical projections (Fig. 95b,c) (NT, Qld) *A. byrnei*
- CII and CIII mostly brown; other features various 11

11. Pedicel with black setae only; It_1 very thin; cercus with 2 long curved blade-like setae midventrally on basal section; It_5 flattened into black flag (Fig. 98a,b) (Qld, NSW, ACT) *A. triscuticatus*
- Pedicel with yellowish dorsal and ventral setae; cercus elongated and curved, setae not bladelike (Fig. 98d); It_5 various 12
12. It_5 as black apical flag; basal abdominal segments mostly translucent yellow (Qld) *A. moggillensis*
- It_5 as white apical flag; basal abdominal segments mostly metallic blue-green (NSW) *A. kaputar*
13. It_1 distinctly longer than TI 14
- It_1 shorter than or subequal to TI 21
14. Cercus elongate and narrow, more than twice length of epandrium, and with scattered long dorsal setae and more closely spaced ventral setae; CII and CIII dark brown; surstylus with various modified blade-like setae 15
- Cercus subrectangular or tapering, and relatively short; CII and CIII often yellow distally 16
15. It_5 flattened and white; surstylus with various modified setae (Fig. 99c) (NT) *A. arboreus*
- It_{3-4} laterally flattened; It_5 dorsoventrally flattened and black; surstylus with various modified setae (Fig. 99h) (Qld) *A. tortus*
16. Cercus lobate with distinctive cuticular peduncle which bears strong spike-like seta or setae (eg, Fig. 97a) 17
- Cercus clavate, without pedunculate spike-like seta 20
17. It_5 flattened; CII mostly dark brown 18
- It_5 unmodified; CII mostly yellow 19
18. All coxae, basal FI and FII and all FIII dark brown; haltere brown; It_5 flattened and black (NSW) *A. loriensis*
- CI and femora mostly yellow; haltere yellow; It_5 flattened, dark brown in basal third and white distally; cercus (Fig. 97d) with ventral peduncle which bears 2 apical blade-like setae (Qld) *A. bimus*
19. CIII with black lateral seta; lower calypter with pale setae; surstylus flattened (Fig. 97a) (Qld) *A. trudis*
- CIII with pale lateral seta; lower calypter with black setae; surstylus broad with strong apical seta (Fig. 97c) (NSW) *A. lismorensis*
20. Surstylus with distal margin entire; cercus with 4 long black apical setae (Fig. 96a,b) (NSW, Qld) *A. albisignatus*
- Surstylus with distal U-shaped excavation; cercus clavate, with only 1 long apical seta (Fig. 96c,d) (Qld) *A. walkeri*

21. All coxae and legs black; lateral frons with dense long black hairs; CIII with strong pale lateral seta; It unmodified; surstylus dorsally prolonged (Fig. 96e) (NSW) *A. wokoensis*
- CI, femora and tibiae mostly yellow 22
22. FII basoventrally with 3 long pale setae; It₅ unmodified; frons with long vertical seta; epandrium with basoventral projection; surstylus upturned and bearing blade-like seta; cercus with mound at one-third which bears 4 blade-like setae (Fig. 99f,g) (Christmas Island) *A. natalis*
- FII ventrally bare; It₅ flattened into black flag (Fig. 99e); frons with weak vertical seta; cercus with elongate ventral arm and clavate dorsal arm with curved apical setae (Fig. 99d) (ACT, NSW) *A. montanorum*

***Amblypsilopus graciliventr* (Parent)**

Sciapus graciliventr Parent, 1933a: 178.

Amblypsilopus graciliventr.—Bickel & Dyte, 1989: 394.

Type material. The male holotype of *Sciapus graciliventr* is from Townsville, Qld (BMNH, examined).

Additional material. Northern Territory – 3 males, Katherine, 17 Mar. 1969; unassociated females which possibly represent this species: Caranbirini Waterhole, 33 km south-west of Borroloola, 22 Apr. 1976; Koongarra, east of Mount Cahill, 15 Nov. 1972, 7 Mar. 1973 (ANIC). Queensland – 11 males, 2 females, Repulse Creek, 23 km north-east of Bauhinia Downs, at light, 22 Apr. 1981; male, 2 females, Ingham, 15 Mar. 1961 (ANIC); male, 3 females, 50 km north of Marlborough, 9 Feb. 1975 (QDPI). Western Australia – unassociated females which possibly represent this species: south of Cape Bertholet, West Kimberley, 16 Apr. 1977; Kimberley Research Station, 9 Jan. 1961 (ANIC).

Description – male. Length: 4.3; wing: 3.3 x 1.0.

Head. Frons metallic green bronze with dusting of silvery pruinosity; face and clypeus with dense silvery pruinosity; face bulging and clypeus free from eye margins; palp and proboscis yellow; major head setae yellow-brownish; antenna yellow with yellow setae; first flagellomere subtriangular, arista dorsal; ventral postcranium with abundant pale hairs.

Thorax. Dorsum metallic green-bronze with some silvery pruinosity; pleura with grey pruinosity; setae pale yellow; 3-4 short anterior ac present; 5 dc present: 2 strong posteriors, dc_{3,4} as weak hairs, and 1 strong anterior dc (MSSC); 1 pa, 2 sa, 2 sr, 2 npl, 1 hm and 1 pm present.

Legs. CI yellow; CII and CIII brownish basally, becoming yellowish distad; remainder of legs yellow, including tarsi; CIII with pale lateral seta; I: 5.0; 6.0; 8.0/3.5/1.5/1.0/0.5; It₁ relatively long; TI with curved posterior seta at nine-tenths (MSSC); It₅ unornamented; II: 5.0; 7.0; 7.0/2.0/1.5/1.0/0.5; III: 6.0; 11.0; 5.0/2.0/1.5/1.0/0.5.

Wing. With faint brown clouding present posterior to R₁, behind costa, and along basal M (MSSC) (Fig.

127g); M₂ present as trace; CuAx ratio: 1.3; lower calypter yellow with dark brown rim and with fan of pale setae; haltere pale yellow.

Abdomen. Mostly metallic green with bronze reflections and yellow setulae; membranous area of tergum 1 yellow; terga 2-4 yellow with posterior green-brown bands; terga 5-7 metallic green; segment 7 trapezoidal and sternum 7 developed strongly only distally; hypopygium dark brown with yellow cerci, surstyli and hypandrium (Fig. 95a); epandrium subrectangular; hypandrium developed as curved hood; aedeagus dorsally serrate; 2 short epandrial setae present; 2 bristles of epandrial lobe developed separately, each on short separate pedicel; surstylus digitiform and with short apical setae as figured; cercus subrectangular with group of 4 pedunculate dorsobasal setae, and distinctive apical clavate seta and apical forked seta, and with other setae as figured.

Female. Similar to male except lacking MSSC; otherwise as noted: first flagellomere somewhat infuscated; 5 strong dc present, the anterior 3 somewhat shorter than posterior 2; podomere ratios as: I: 5.5; 5.0; 4.5/2.0/1.5/1.0/0.5; II: 5.0; 4.5; 4.0/1.5/1.0/0.5/0.5; III: 6.0; 9.0; 4.0/2.0/1.5/1.0/0.5; wing hyaline (Fig. 127h); abdominal terga 1-3 mostly yellowish with varying infuscation; terga 4-6 mostly metallic green.

Remarks. *Amblypsilopus graciliventr* occurs from south-eastern interior Queensland at least as far north as Ingham, and across northern Australia to Arnhem Land and possibly the Kimberley Ranges, WA (Fig. 94).

The male wing has faint clouding posterior to R₁.

***Amblypsilopus annanensis* n.sp.**

Type material. HOLOTYPE male, Queensland, Annan River, 3 km west by south of Black Mountain, at light, 26 Apr. 1981, D.H. Colless; PARATYPE male, 1 km north of Rounded Hill, 15°17'S 145°13'E, at light, 5 May 1981 (ANIC).

Additional material. Three females possibly representing this species: Queensland – 3.5 km south-west by south of

Mount Baird, 15°10'S 145°07'E, 3-4 May 1981 (ANIC).

Description – male. Length: 2.7; wing: 2.3 x 0.8; similar to *A. graciliventr* except as noted.

Thorax. Only 4 dc present, 2 strong posteriors, dc₃ as weak hair, and 1 strong anterior.

Legs. TI with pale curved posterior seta at nine-tenths and It₁ with similar seta near base (MSSC).

Wing. Hyaline; CuAx ratio: 1.7.

Abdomen. Tergum 1 greenish; terga 2-4 yellow with only posterior metallic green-brown band; terga 5-7 metallic green; hypopygium (Fig. 95f); hypandrium developed as curved hood; aedeagus dorsally serrate; 2 epandrial setae present; epandrial lobe and bristles apparently not developed; surstylus digitiform, with short apical setae as figured; cercus elongate, tapering, with distinctive branched apical seta, subtended by another strong seta, and with other setae as figured.

Female. Similar to male except lacking MSSC and

as noted: podomere ratios as in female *A. graciliventr*; abdominal segments 1-4 red-yellow; segments 5-6 metallic green.

Remarks. *Amblypsilopus annanensis* is known only from the base of the Cape York Peninsula.

***Amblypsilopus bimestris* n.sp.**

Type material. HOLOTYPE male, PARATYPES 5 females, Queensland, 3 km north-east of Mount Webb, 15°03'S 145°09'E, at light, 30 Apr.-1 May 1981, D.H. Colless (ANIC).

Description – male. Length: 3.3; wing: 2.7 x 0.8; similar to *A. graciliventr* except as noted.

Head. Head setae black; dorsal and ventral seta of pedicel black; apex of first flagellomere brownish.

Thorax. Dorsum metallic green with dense grey

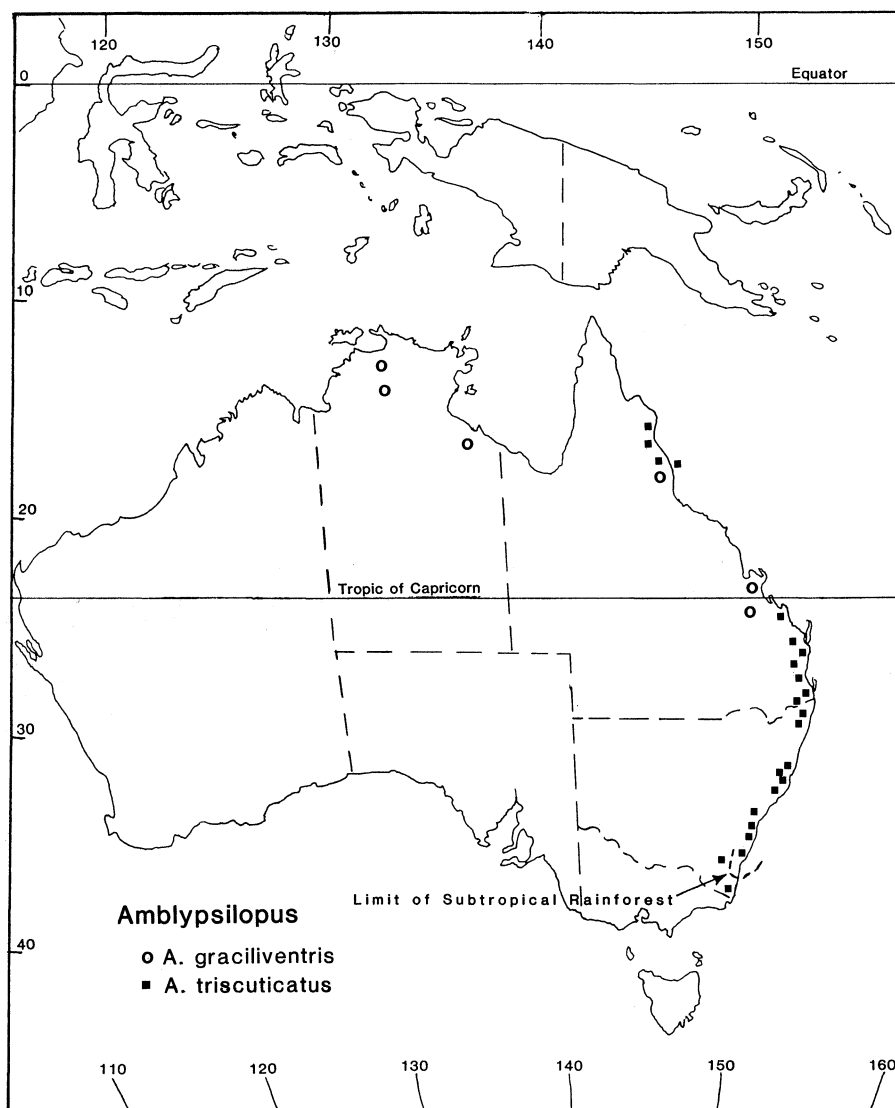


Fig.94. Distribution, some species of the *Amblypsilopus triscuticatus* Group.

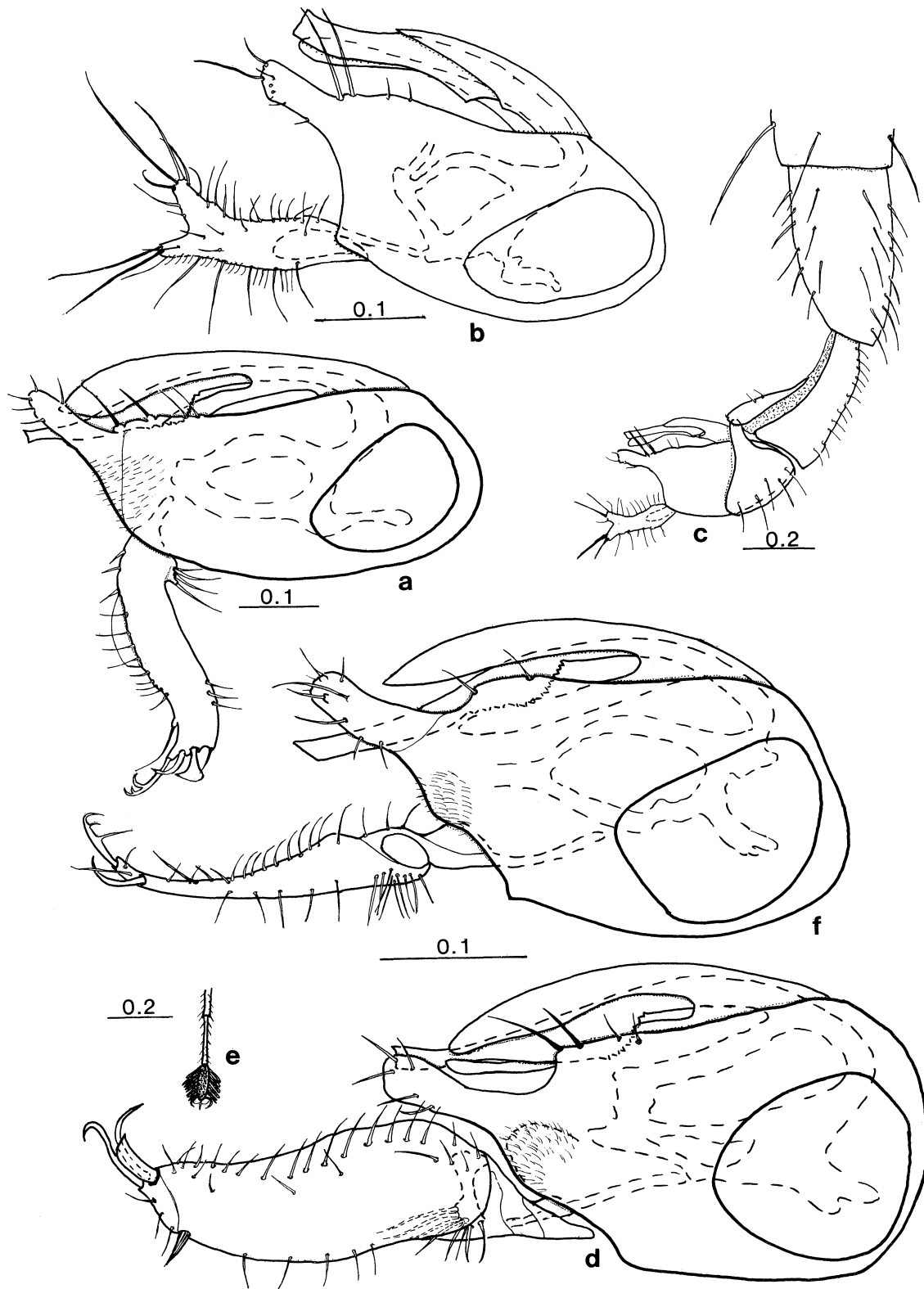


Fig.95. *Amblypsilopus graciliventris*, Bauhinia Downs, Qld: a – hypopygium, left lateral. *A. byrnei*, Humpty Doo, NT: b – hypopygium, left lateral; c – male abdomen, left lateral. *A. bimestris*, Mount Webb, Qld: d – hypopygium, left lateral; e – male It₅, dorsal. *A. annanensis*, Rounded Hill, Qld: f – hypopygium, left lateral.

pruinosity; thoracic setae black; 3 strong irregularly paired ac; 2 strong posterior dc with 4 weak hair-like anterior dc present.

Legs. I: 6.0; 8.0; 9.0/4.5/1.5/1.0/1.0; TI with pale curved posterior seta at four-fifths (MSSC); It_5 developed as flattened black flag (MSSC) (Fig. 95e); II: 5.0; 8.5; 7.0/2.0/1.5/1.0/0.5; III: 6.0; 12.0; 5.0/3.0/2.0/1.0/0.5.

Wing. Hyaline; M_2 as faint trace to apex; CuAx ratio: 1.8.

Abdomen. Tergum 1 greenish; terga 2-4 yellow with only posterior metallic green-brown band; terga 5-7 metallic green; segment 7 trapezoidal with sternum 7 only strongly developed distally; hypopygium entirely dark brown (Fig. 95d); epandrium subrectangular; hypandrium developed as curved hood; aedeagus dorsally serrate; 2 epandrial setae present; 2 bristles of epandrial lobe each arising separately from margin of epandrium; surstylus digitiform and with setae as figured; cercus broad and subrectangular, with group of dorsobasal setae, and distinctive apical blade-like seta subtended by 2 strong curved setae, and with other setae as figured.

Female. Similar to male except lacking MSSC; otherwise similar to female *A. graciliventris*.

Remarks. *Amblypsilopus bimestris* is known only from the type locality at the base of the Cape York Peninsula, Queensland.

Amblypsilopus byrnei n.sp.

Type material. HOLOTYPE male, PARATYPES 4 males, 3 females, Northern Territory, 5 km south-east of Humpty Doo, unburnt monsoonal woodland, malaise trap, 3 Dec. 1991-9 Jan. 1992; PARATYPES 2 males, 6 females, same but 11 Jan.-28 Feb. 1992 (AMS).

Additional material. Queensland – 4 males, 12°42'S 142°42'E, 7 km south of Batavia Downs, 23 Nov.-11 Dec. 1992 (ANIC).

Description – male. Length: 3.4; wing: 3.2 x 1.0; similar to *A. graciliventris* except as noted.

Head. Frons metallic blue-green with dusting of silvery pruinosity; face and clypeus with dense silvery pruinosity; face bulging; major head setae black; scape and base of pedicel yellowish, but distal antenna dark brown; first flagellomere subrectangular, arista dorsal.

Thorax. Dorsum metallic blue-green, with dusting of silvery pruinosity; pleura with grey pruinosity; setae black; 3-4 short pairs anterior ac and 2 pairs longer posterior ac present.

Legs. CI yellow; CII and CIII infuscated basally, becoming yellowish distad; remainder of legs yellow, although distal tarsi darkened, except as noted; CIII with pale lateral seta; I: 6.5; 8.0; 8.0/4.2/2.7/0.8/0.8; TI with curved posterior seta at nine-tenths (MSSC); It_4 white (MSSC) and It_5 developed as pinnate black flag (similar

to Fig. 95e) (MSSC); II: 6.5; 8.5; 9.0/3.2/2.0/0.8/0.5; III: 9.0; 13.5; 6.5/3.2/2.0/1.0/0.5.

Wing. Hyaline; M_2 distinct; CuAx ratio: 1.3; lower calypter yellow with brown rim and with fan of pale setae; haltere yellow.

Abdomen. Metallic green with bronze reflections and black setae; lateral areas of terga 1-2 yellow; segment 7 about as long as hypopygium (Fig. 95c); hypopygium dark brown with yellow cerci (Fig. 95b); epandrium subrectangular; hypandrium with lateral arm to right of aedeagus; aedeagus with dorsal angle but not dorsally serrate; 2 short epandrial setae present; 2 bristles of epandrial lobe each developed on short separate pedicel; surstylus digitiform and with short apical setae as figured; cercus subrectangular and short, with 2 apical projections, each bearing strong apical setae.

Female. Similar to male except lacking MSSC, otherwise as noted: antenna entirely dark brown; podomere ratios similar to those of female *A. graciliventris*; TII with ad-pd setal pair at one-fifth; abdomen mostly metallic green.

Remarks. *Amblypsilopus byrnei* is known from monsoonal woodland near Darwin, Northern Territory, and the northern Cape York Peninsula, Queensland. This species is close to *A. bimestris*. However, unlike both *A. bimestris*, the aedeagus is not dorsally serrated.

Amblypsilopus albisignatus n.sp.

Type material. HOLOTYPE male, PARATYPE male, New South Wales, Ku-ring-gai Chase National Park, McCarr's Creek, subtropical rainforest, 5 Jan. 1985, D.J. Bickel; PARATYPES 2 males, 3 females, Mooney Mooney Creek, near Gosford, 3 Dec. 1976 (AMS).

Additional material. New South Wales – male, Upper Allyn, near Eccleston, 17 Nov. 1965; "Lorien", near Lansdowne, 22-29 Nov. 1987 (AMS); female, Otford, Royal National Park, 31 Dec. 1962 (ANIC). Queensland – 2 males, 4 females, Bunya Mountains National Park, Horse Gully Creek, 500 m, dry sclerophyll forest, 6 Dec. 1985, 26 Nov. 1992 (AMS).

Description – male. Length: 4.2; wing: 3.3 x 1.3; similar to *A. graciliventris* except as noted.

Head. Vertex, frons, face, clypeus metallic blue-green and setae black; antenna black.

Thorax. Dorsum shining metallic blue-green with only dusting of pruinosity; setae black; 2 pairs ac, with short setulae anteriorly; 2 strong posterior dc, with 4-5 short weak hair-like dc anteriad.

Legs. CI, femora, tibiae, and all t_1 yellow; CII and CIII, and distal tarsomeres dark brown except as noted; CI with pale lateral setae; CIII with pale lateral seta; I: 6.5; 9.5; 19.0/4.5/4.0/0.7/1.0; TI with long curved posterior seta at four-fifths (MSSC); It_1 rather long and thin (MSSC); It_5 slightly flattened and silvery (MSSC);

II: 7.0; 11.0; 15.0/3.5/2.0/1.0/1.0; III: 10.0; 18.5; 9.5/3.5/2.0/1.0/1.0.

Wing. Hyaline; M_2 absent, or at most developed as short stub, and marked only by trace; CuAx ratio: 2.0.

Abdomen. Metallic green with bronze reflections; on segments 2-6, basal half of each tergum and narrow

band on preceding adjacent matt brown; segment 7 elongate trapezoidal, with sternum 7 only present distally (Fig. 96b); hypopygium dark brown with yellow surstylus and cercus (Fig. 96a); hypandrial arm extending almost to apex of aedeagus; 2 short epandrial setae present; epandrial lobe bristles project medially;

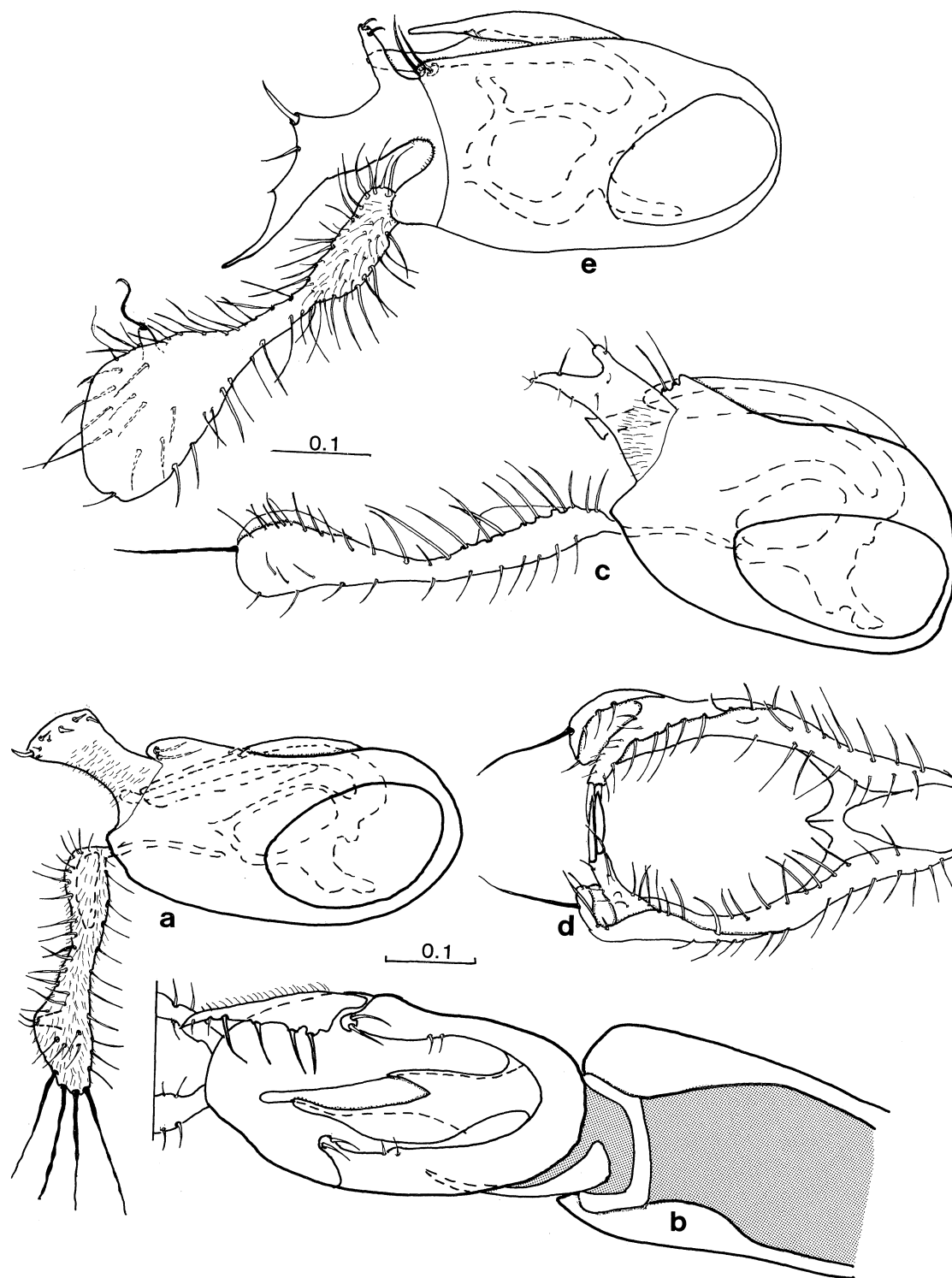


Fig.96. *Amblypsilopus albisignatus*, Ku-ring-gai Chase, NSW: a – hypopygium, left lateral; b – male postabdomen, ventral. *A. walkeri*, Ugly Gully, Qld: c – hypopygium, left lateral; d – male cerci, dorsal. *A. wokoensis*, Woko National Park, NSW: e – hypopygium, left lateral.

surstylus lobate, with row of short stout setae along distal margin; cercus clavate, somewhat expanded distally, with 4 black crenulated apical setae, and with medially projecting pedicel bearing 2 apical setae.

Female. Similar to male except lacking MSSC; otherwise as noted: also with 2 strong posterior dc and 3 weak anterior dc; I: 6.0; 6.0; 4.5/1.5/1.5/1.0/1.0; II: 6.0; 8.0; 5.5/1.5/1.0/0.7/0.7; III: 8.0; 11.0; 3.5/2.0/1.0/1.0/0.5.

Remarks. *Amblypsilopus albisignatus* is known from moist forests along the coast and ranges of central New South Wales and dry sclerophyll forest in the Bunya Mountains, Queensland. In males, It_1 is almost twice the length of TI (MSSC).

***Amblypsilopus walkeri* n.sp.**

Type material. HOLOTYPE male, Queensland, Ugly Gully via Mount Crosby, 23 Mar. 1979, K. Walker (UQIC).

Additional material. Queensland – 12 males, 4 females, Forty Mile Scrub National Park, 55 km south-west of Mount Garnet, at light, 29 Nov. 1981 (ANIC).

Description – male. Length: 3.8–4.0; wing: 3.3 x 1.0.

Head. Vertex metallic green with some silvery pruinosity; face, and clypeus blue-green with dusting of silvery pruinosity; setae black; antenna black; first flagellomere short subtriangular, and with dorsoapical arista.

Thorax. Mesonotum metallic green with bronze reflections; setae black; 2–3 short offset pairs of long ac present; 6 dc present: 2 strong posteriors, dc_3 and dc_4 as weak hairs, and 2 strong anterior dc.

Legs. CI and CII, most of CIII, femora, tibiae and all t_1 yellow; distal tarsomeres dark brown except as noted; CI and CII with pale anterior setae; CIII with pale lateral seta; I: 6.0; 8.5; 13.5/2.5/2.0/1.0/0.8; TI with long curved posterior seta at four-fifths (MSSC); It_1 relatively long and thin; It_3 flattened and silvery (MSSC), contrasting with dark brown $It_{2,4}$; II: 7.0; 10.0; 7.0/2.5/1.7/1.0/0.5; III: 8.0; 14.0; 7.0/2.5/2.0/1.0/0.5.

Wing. Hyaline; lower calypter yellow with black rim and pale setae; haltere yellow; CuAx ratio: 1.7.

Abdomen. Metallic green with bronze reflections; hypopygium dark brown with pale yellow cercus and surstylus (Fig. 96c); epandrial setae not evident; epandrial lobe broad, with 2 adjacent bristles; surstylus with distal excavation and with short setae as figured; cercus clavate, somewhat expanded distally with single black undulating apical seta, and with medianly projecting pedicel bearing 2 apical blade-like setae (Fig. 96d).

Female. Similar to male except lacking MSSC; otherwise as noted: face metallic green with little

pruinosity; 5 strong dc present; all coxae and legs entirely yellow; I: 5.0; 6.0; 5.5/2.0/1.5/1.0/1.0; II: 6.0; 7.5; 6.0/2.0/1.5/1.0/0.5; III: 6.0; 10.0; 5.0/2.0/1.5/1.0/0.5.

Remarks. *Amblypsilopus walkeri* is known from south-eastern Queensland and the Forty Mile Scrub in northern Queensland. Specimens from both localities are identical in details of the cercus and surstylus. However, It_1 is relatively longer in the Ugly Gully specimen and I regard this only as intraspecific variation in a MSSC.

This species shares similar MSSC with *A. albisignatus*.

***Amblypsilopus uneorum* n.sp.**

Type material. HOLOTYPE male, Queensland, Lamington National Park, O'Reilly's, 28°14'S 153°08'E, canopy fogging, Site H-5, Dec. 1989; PARATYPE female, same but Site H-4, Jan. 1989 (AMS).

Description – male. Length: 4.4; wing: 5.0; similar to *A. graciliventris* except as noted.

Head. Frons, face and clypeus metallic blue-green and covered with dense silvery pruinosity; face strongly bulging (MSSC); clypeus wide and distinctly separated from margins of eyes; palp yellow with 2 strong black setae; proboscis yellow; scape and pedicel black, first flagellomere yellow; pedicel with strong ventral and somewhat weaker dorsal setae; first flagellomere short subrectangular; arista dorsal, and about two-thirds body length.

Thorax. Metallic blue-green with some grey pruinosity; 3 pairs strong ac present; 2 strong posterior dc, with 5 weak hair-like anterior dc (MSSC).

Legs. CI, all trochanters, femora, tibiae, It , It_1 and $III t_1$ yellow; CII black but yellow at apex, CIII black; distal tarsomeres II and III dark brown; femora ventrally bare; I: 10.5; 11.5; 6.5/4.5/2.0/1.3/0.8; TI with long curved pv seta at seven-eighths (MSSC); It_1 strongly flattened in basal third with pale ventral pile (MSSC); It_1 with pv row of curved setae, which continues but more closely spaced along It_2 (MSSC); II: 12.0; 14.5; 10.5/3.0/2.0/1.2/0.8; TII with weak anterior seta at two-fifths, otherwise mostly bare; III: 13.0; 18.0; 8.0/3.8/2.0/1.2/0.7; $III t_{3,5}$ slightly flattened with ventral pad-like surface (MSSC).

Wing. Hyaline; m-cu slightly bowed in center; CuAx ratio 1.8.

Abdomen. Metallic blue-green with matt brown bands at tergal overlap; hypopygium black with yellowish cercus (Fig. 99a); epandrium subrectangular; hypandrium covering most of aedeagus, and hypandrial arm extending almost to apex of aedeagus; aedeagus broad and dorsally serrate; ventral epandrial margin with 6 short setae, not clearly differentiated into epandrial setae and setae of epandrial lobe; surstylus short, lobate, fused to epandrium, and with setae as figured; cercus short, apically forked and with arms of fork bearing strong setae.

Female. Similar to male but lack MSSC and as noted: strong vertical seta present, subequal to postvertical seta; 4 strong dc present; CI with 3 strong pale distolateral setae (FSSC); TI and It_1 unmodified; TII with ad setae at one-fifth, three-fifths and three-quarters, and short pd setae at one-fifth, half and three-quarters; TII and IIt unmodified; IIIIt unmodified; TIII with strong ad at one-fifth.

Remarks. *Amblypsilopus uneorum* was collected by insecticide fogging and knock-down in the canopy of subtropical rainforest in the McPherson Ranges, south-eastern Queensland. This species is close to the sympatric *A. canungra*, which also has a bright yellow first flagellomere.

This species is rather large-sized compared to other *triscuticatus* Group species, and some characters (pad-like IIIIt₃₋₅, flattened It_1 with ventral pile and posterior row of curved setae) superficially suggests a relationship with the *Chrysosoma arrogans* Group and some undescribed species from New Caledonia. However the IIIIt₃₋₅ is not strongly flattened, and the male hypopygium definitely of the *triscuticatus* Group.

This species is named for the University of New England collectors who undertook the rainforest canopy fogging project.

Amblypsilopus canungra n.sp.

Type material. HOLOTYPE male, Queensland, O'Reilly Guest House, via Canungra, Lamington National Park, malaise trap on edge rainforest, 3 Feb.-2 Mar. 1980 (QDPI).

Additional material. New South Wales – 2 males, Tooloom Scrub, Legume Road near Urbenville 10 Jan. 1988 (AMS). Queensland – 3 males, 2 females, Mount Glorious, canopy of *Argyrodendron actinophyllum*, subtropical closed forest, 6-13 Nov. 1986, 22-29 Jan. 1987, 2-23 Apr. 1987, 28 Jan.-4 Feb. 1988; male, O'Reilly's, Lamington National Park, canopy fogging, subtropical rainforest, Dec. 1988; male, Bunya Mountains, 960 m, at road to Nanaga, rainforest, 26 Nov. 1992 (AMS); female, Numimbah, 20 Apr. 1936 (QDPI).

Description – male. Length: 3.0; wing: 2.7 x 1.0; similar to *A. graciliventris* except as noted.

Head. Setae black; scape and pedicel black, first flagellomere yellow; pedicel with strong dorsal and ventral setae; first flagellomere short, rounded.

Thorax. Setae black; 3 pairs long ac present; 2 strong posterior dc and 4 pale weak hair-like dc anteriorly (MSSC).

Legs. CI yellow; CII and CIII dark brown; trochanters, femora, tibiae and tarsi yellow; CI and CII with pale anterior hairs and CIII with strong pale lateral seta; I: 6.0; 8.5; 3.5/1.5/1.0/1.0/0.5; TI with pale curved posterior seta at four-fifths (MSSC); It_1 basally with some ventral pale pile which continues distad as pale setae (MSSC); II: 6.5; 8.5; 5.0/1.5/1.0/0.8/0.5; III: 7.5; 11.0; 4.0/2.0/1.5/1.0/0.8.

Wing. Hyaline; CuAx ratio: 1.1.

Abdomen. Metallic green with bronze reflections; hypopygium (Fig. 99b); epandrium subrectangular; hypandrial arm arising beyond midlength of hypandrium and extending on right side of aedeagus; aedeagus dorsally serrate, simple; 3 long epandrial setae present, projecting internally; epandrial lobe apparently absent or fused into surstylus; surstylus massive and lobate, with 2 strong median bristles and other setae as figured; cercus with relatively thick base which bears group of ventral spine-like setae, and which tapers distad and bears long curved setae as figured.

Female. Similar to male but lacking MSSC; also with scape and pedicel black and first flagellomere yellow; 4 strong dc present.

Remarks. *Amblypsilopus canungra* is known from montane subtropical rainforests in south-eastern Queensland and north-eastern New South Wales. Specimens have been taken from rainforest canopy as well as at ground-level.

Amblypsilopus trudis n.sp.

Type material. HOLOTYPE male, PARATYPES 6 males, 4 females, Queensland, Forty Mile Scrub National Park, 55 km south-west of Mount Garnet, at light, 29 Nov. 1981, D.H. Colless (ANIC).

Description – male. Length: 4.0; wing: 3.3 x 1.0.

Head. Frons metallic green with dusting of silvery pruinosity; face, and clypeus metallic green, and covered with orientated silvery pruinosity, evident when viewed laterally; setae black; palp and proboscis yellow; antenna black; first flagellomere short subtriangular, and with dorsoapical arista.

Thorax. Setae black; 2-3 pairs short irregularly paired ac; 6 dc present: 2 strong posteriors, dc_3 and dc_4 as weak hairs, and 2 strong anteriors.

Legs. CI, femora, tibiae and all t_1 yellow, except base of CI darkened, and distal third of FIII dark brown; CII, CIII and distal tarsomeres dark brown; CI and CII with pale anterior setae; CIII with pale lateral seta; I: 5.0; 7.0; 7.0/2.5/1.2/1.0/0.5; TI with long curved posterior seta at four-fifths (MSSC); It_1 subequal to TI; It_5 unmodified; II: 6.5; 8.0; 7.0/2.0/1.5/1.0/0.5; III: 7.0; 12.0; 5.0/2.0/1.5/0.8/0.5.

Wing. Elongate, hyaline; lower calypter dark brown with fan of dark setae; haltere with yellow club and infuscated stalk; CuAx ratio: 1.3.

Abdomen. Metallic green with bronze reflections; hypopygium (Fig. 97a); hypandrium with short hood which is dorsally serrate; hypandrial arm elongate, narrow, extending almost to apex of aedeagus; 2 short epandrial setae present; epandrial lobe with short basal bristle and long apical bristle; surstylus digitiform,

flattened and narrowed distally, and with setae as figured; cercus flattened and spatulate, and bearing distinctive ventral peduncle with apical blade-like seta and lateral seta; cercus also with curved ventral marginal setae.

Female. Similar to male except lacking MSSC and as noted. Face and clypeus covered with silvery pruinosity; FIII entirely yellow; I: 5.0; 6.0; 5.5/2.0/1.5/1.0/1.0; II: 6.0; 7.5; 6.0/2.0/1.5/1.0/0.5; III: 6.0; 10.0; 5.0/2.0/1.5/1.0/0.5.

Remarks. *Amblypsilopus trudis* is known only from the Forty Mile Scrub, west of the Cairns district, Queensland. In details of the hypopygium, it is very close to *A. loriensis* from New South Wales.

***Amblypsilopus bimus* n.sp.**

Type material. HOLOTYPE male, Queensland, 11°45'S 142°35'E, Heathlands, 8 Dec. 1992-19 Jan. 1993, malaise trap, P. Zborowski (ANIC).

Description – male. Length: 3.5; wing: 2.9 x 0.9; similar to *A. trudis* except as noted.

Legs. CI, femora, tibiae and all t_1 yellow, except base of CI darkened; CII and CIII dark brown; distal tarsomeres infuscated; CI and CII with pale anterior setae; CIII with pale lateral seta; I: 3.5; 4.2; 6.3/1.6/1.8/1.2/0.5; TI with long curved posterior seta at four-fifths (MSSC), followed distally to apex by row of pale short curved hairs (MSSC); It_1 distinctly longer than TI ; It_5



Fig.97. *Amblypsilopus trudis*, Forty Mile Scrub, Qld: a – hypopygium, left lateral. *A. basseti*, Mount Glorious, Qld: b – hypopygium, left lateral. *A. lismorensis*, Boatharbour Reserve, NSW: c – hypopygium, left lateral. *A. bimus*, Heathlands, Qld: d – hypopygium, left lateral.

flattened, dark brown in basal third and white distally (MSSC); II: 4.0; 5.2; 6.2/1.7/1.2/0.7/0.5; IIt₁ distinctly longer than TII (MSSC?); III: 5.8; 8.7; 4.5/1.7/1.2/0.7/0.5.

Wing. Lower calypter with fan of brown setae; haltere entirely yellow.

Abdomen. Metallic green with bronze reflections; hypopygium (Fig. 97d); hypandrium with short hood which is dorsally serrate; hypandrial arm elongate, narrow, extending almost to apex of aedeagus; 2 short epandrial setae present; surstylus digitiform, flattened and narrowed distally, and with setae as figured; cercus flattened and spatulate, and bearing distinctive ventral peduncle with 2 apical blade-like setae and lateral seta; other setae as figured.

Female. Unknown.

Remarks. *Amblypsilopus bimus* is known only from Heathlands, northern Cape York Peninsula, Queensland. It is most closely related to *A. trudis* is from the Cairns district, and the hypopygia of the two species are almost identical (compare Fig. 97a,d). However, they can be distinguished by leg I MSSC.

Amblypsilopus loriensis n.sp.

Type material. HOLOTYPE male, New South Wales, Lorient Refuge, 3 km north of Lansdowne, via Taree, rainforest margin, malaise trap, 14-25 Feb. 1988, G. Williams; PARATYPES 4 males, same data but 12-31 Jan 1987, 21-28 Feb. 1988 (AMS).

Additional material. New South Wales – male, Kiwarra State Forest, Breakneck Lookout, south-west of Taree, 14 Jan. 1993, dry rainforest (AMS).

Description. Similar to *A. trudis* except as noted.

Legs. Coxae, basal three-quarters of FI and FII, and all FIII brown; tibiae and all t₁ yellow; distal tarsomeres dark brown except as noted below; CI and CII with pale anterior setae; CIII with pale lateral seta; It₁ distinctly longer than TI; It₅ flattened and black (MSSC); It₅ flattened, dark brown in basal third and white distally (MSSC); IIt₁ distinctly longer than TII (MSSC?).

Wing. Wing somewhat smokey; M₂ forming a distinct stub at junction with M₁, and continuing to apex as trace; CuAx ratio: 1.7; lower calypter with black rim and fan of black setae; haltere brown.

Abdomen. Hypopygium similar to Figure 97a; surstylus digitiform, flattened and more prolonged than in *A. trudis*; cercus lobate, and bearing distinctive ventral peduncle with apical blade-like seta and lateral seta.

Female. Unknown.

Remarks. *Amblypsilopus loriensis* is known from mixed subtropical and dry rainforest in the Manning drainage of northern New South Wales. Both this species and the northern Queensland species *A. trudis* have similar cerci, but can be distinguished by leg colour differences and the It₅ MSSC.

Amblypsilopus lismorensis n.sp.

Type material. HOLOTYPE male, PARATYPES 3 females, New South Wales, Boatharbour Nature Reserve, north-east of Lismore, 16 Nov. 1988, D.J. Bickel (AMS).

Additional material. New South Wales – male, 0.5 km south-east of Lansdowne, riverine rainforest, 11 Dec. 1992; male, Wingham, riverine rainforest, 3 Nov. 1988 (AMS).

Description – male. Length: 4.3; wing: 3.3 x 1.0; similar to *A. trudis* except as noted.

Head. Frons, face and clypeus metallic blue-green with dusting of silvery pruinosity; face slightly bulging; palp and proboscis yellow; setae black; antenna black; first flagellomere short subtriangular with dorsoapical arista.

Thorax. Dorsum metallic blue-green; pleura with grey pruinosity; setae black; 2 pairs long ac present; 5 dc present; 2 strong posteriors, with anterior dc as weak hairs; lateral scutellars absent.

Legs. CI, femora, tibiae and all t₁ yellow, except FIII knee dark brown; CII and CIII dark brown; distal tarsomeres dark brown; CI and CII with pale anterior hairs; CIII with pale lateral seta; I: 5.5; 7.0; 8.5/2.5/1.5/0.8/0.6; TI with long curved posterior seta at nine-tenths (MSSC); It unornamented; II: 6.5; 8.5; 8.5/ (distal tarsomeres missing); IIt₁ relatively long, subequal to TII (MSSC); III: 8.5; 12.5; 6.0/2.0/1.5/0.8/0.5.

Wing. Hyaline; M₂ well developed almost to margin; CuAx ratio: 2.2; lower calypter yellow with dark brown rim and black setae; haltere yellow.

Abdomen. Metallic blue green; hypopygium dark brown with yellow cerci (Fig. 97c); epandrium subrectangular; 2 short epandrial setae present; 2 bristles of epandrial lobe separate and not pedunculate; surstylus hatchet-shaped, with strong tusk-like setae as shown; cercus with subrectangular setose base, from which rises distal oblong section which bears median pedunculate seta, and 2 long undulating apical setae.

Female. Similar to male except lacking MSSC; otherwise as noted: 5 strong dc present; IIt₁ shorter than TII.

Remarks. *Amblypsilopus lismorensis* is known only from riverine rainforest in northern New South Wales, from a remnant near Lismore and along the lower Manning River near Taree.

Amblypsilopus wokoensis n.sp.

Type material. HOLOTYPE male, New South Wales, Upper Allyn River, opposite White Rock, 11 Nov. 1981, T. Weir (ANIC); PARATYPE male, Woko National Park, north of Gloucester, subtropical rainforest, 24 Nov. 1990 (AMS).

Additional material. New South Wales – male, Cherry Tree State Forest, 28°59'S 152°45'E, 26–30 Oct. 1993, yellow pans, rainforest-sclerophyll forest ecotone (AMS).

Description – male. Length: 4.1; wing: 3.6 x 1.2; similar to *A. trudis* except as noted.

Head. Vertex, frons, face and clypeus dark metallic blue-green; setae black; lateral frons with dense field of long black setae (MSSC), distinct vertical seta not evident; palp brown, proboscis yellowish; antenna black; first flagellomere short subtriangular, and arista dorsoapical.

Thorax. Metallic blue-green with little pruinosity; setae black; 3 pairs long ac present; 6 dc present: 2 strong posteriors and 4 weak anterior hair-like setae (MSSC); lateral scutellars absent.

Legs. Coxae and remainder of legs black; CI and CII with pale anterior setae; CIII with strong pale lateral seta; femora with long pale ventral hairs (MSSC?); I: 6.0; 7.5; 7.0/2.5/2.0/0.8/0.5; TI with long curved posterior seta at four-fifths (MSSC); It unmodified; II: 6.0; 8.0; 8.5/2.0/1.5/0.8/0.5; TII bare of major setae; IIt₁ longer than TII (MSSC); III: 8.5; 13.0; 6.5/2.5/1.5/1.0/0.5.

Wing. Elongate, hyaline; M₂ strong and distinct almost to margin; lower calypter black with black setae; CuAx ratio: 2.6; haltere black.

Abdomen. Dark metallic green with bronze reflections; hypopygium black with brownish cerci (Fig. 96e); hypandrium with short hood; epandrial setae not evident; epandrial lobe as short mound with 2 short bristles; surstylus elongate triangular with pointed apex, and with ventral digitiform projection bearing short apical and subapical setae, and other setae as figured; cercus spatulate, with distinctive subapical median peduncle which bears long curved seta and with setae as figured.

Female. Unknown.

Remarks. *Amblypsilopus wokoensis* is known only from subtropical rainforest in the headwaters of the Hunter and Manning drainages, New South Wales. The species is close to *A. lismorensis*.

Of particular interest in *Amblypsilopus wokoensis* is the development of long dense hairs on the male lateral frons (MSSC), unusual in *Amblypsilopus* and more characteristic of *Krakatauia*, *Parentia*, and some *Chrysosoma* groups.

Amblypsilopus triscuticatus (Hardy)

Sciapus triscuticatus Hardy, 1930: 129.

Type material. Hardy described *Sciapus triscuticatus* from specimens collected at Brisbane. The types are lost, presumably destroyed. However, based on Hardy's description and figures, it is possible to identify this widespread species with confidence.

Neotype here designated, male, bearing the label "Wilson's Creek, near. Mullumbimby, N.S.W., 29 Jan. 1961, D.K. McAlpine" (AMS).

Additional material. Australian Capital Territory – Black Mountain. New South Wales – metropolitan Sydney; Towra Point; Gloucester River, Barrington Tops; Clyde Mountain, Cabbage Tree Creek; Upper Allyn River; Waterfall, Royal National Park; Minnamurra Falls, near Kiama; McCarr's Creek, Ku-ring-gai Chase National Park, subtropical closed forest; Bawley Point, near Bateman's Bay; Katoomba; North Cronulla, mangroves; Wilson Creek, near Mullumbimby; Mooney Mooney Creek, near Gosford; Putty Road and Darkey Creek; "Lorien", near Lansdowne; Harrington, littoral rainforest; Shoalhaven River, west of Nowra; Nadgee River, wet sclerophyll forest (female only). Queensland – metropolitan Brisbane; near Nambour; Eurimbula-Miriam Vale; Mount Tambourine; Southport; Mount Mee; Dunk Island; Obi Obi Creek, south of Mapleton; Coolool National Park; Lamington National Park; Maalan; Evelyn; Milla-Milla; Mount Walsh; Violet Gorge, Carnarvon National Park; Bunya Mountains: Horse Gully Creek, 500 m, dry sclerophyll forest, and at road to Nanaga, 900 m, rainforest.

Collection dates – Sydney district: late Oct.–Apr., with northern New South Wales collections from early Oct.–late Apr.; Black Mountain, ACT: Jan.–Feb.; south-eastern Queensland: early Oct.–May (more than 300 specimens examined: AMS, ANIC, QDPI, UQIC, MVM, CAS).

Description – male. Length: 5.0–5.3; wing: 4.2 x 1.2; habitus, Figure 93.

Head. Frons, face and clypeus metallic blue-green with dense grey pruinosity; head setae black; palp yellow with black setae; proboscis yellow; antenna yellow (Fig. 98c); pedicel with black setae; first flagellomere rounded; arista dorsal, its length about one and a half head height.

Thorax. Dorsum metallic blue-green with grey pruinosity; scutellum metallic blue; pleura covered with light dusting grey pruinosity; setae black; 3 pairs long ac present; 2 strong posterior dc present, with 4 weak hair-like anterior dc; 1 pa, only 1 sa, 2 sr, 2 npl, 1 hm and 1 strong pm present.

Legs. CI, femora, tibiae and It₁₋₄, IIt₁₋₂ and IIIIt₁ yellow; CII, CIII and distalmost tarsomeres dark brown; CI with 3–4 strong pale distolateral setae; CIII with pale lateral seta; I: 9.0; 12.0/9.5/4.0/2.0/1.0/1.0; TI with long curved posterior pale seta at four-fifths (MSSC); tarsus I very thin, and It₁ long and curved (MSSC); It₅ flattened into wide black apical flag (MSSC); II: 9.0; 13.0; 11.0/3.0/2.0/1.0/1.0; III: 11.0; 18.0; 9.0/3.0/2.0/1.0/1.0.

Wing. Hyaline (Fig. 127i); M₂ and marked only by trace to margin; CuAx ratio: 1.7; lower calypter yellow with brown rim and fan of pale setae; haltere yellow.

Abdomen. Metallic green with bronze reflections except as noted: tergum 1 yellowish dorsally; terga 2-4 yellow, each with distal dark brown matt band; tergum 5 yellow only basoventrally; tergum 6 metallic green; segment 7 subtriangular, expanding distally, with sternum 7 only strongly developed distally (Fig. 98b); epandrium dark brown and cerci, surstyli and hypandrium yellow (Fig. 98a); epandrium subrectangular; hypandrial hood almost as long as hypandrial arm; hypandrial arm arising near base of hypandrium and extending to right of aedeagus; aedeagus is narrowed and tapering, and unusually long, extending beyond

surstylus; 2 short epandrial setae present; 2 bristles of epandrial lobe on short pedicel and projecting medially; surstylus fused to epandrium; surstylus lobate, without indentations or projections; cercus narrow and elongate, with basal section which bears midventrally 2 long curved blade-like setae, and with distinct bend, beyond which arises narrow distal extension (at rest, cercal extension often curled under abdomen).

Female. Similar to male except lacking MSSC and as noted: 4 strong dc present; I: 7.5; 8.0; 6.0/2.5/2.0/1.0/1.0; II: 8.5; 10.0; 7.5/2.0/1.5/1.0/1.0; TII with strong

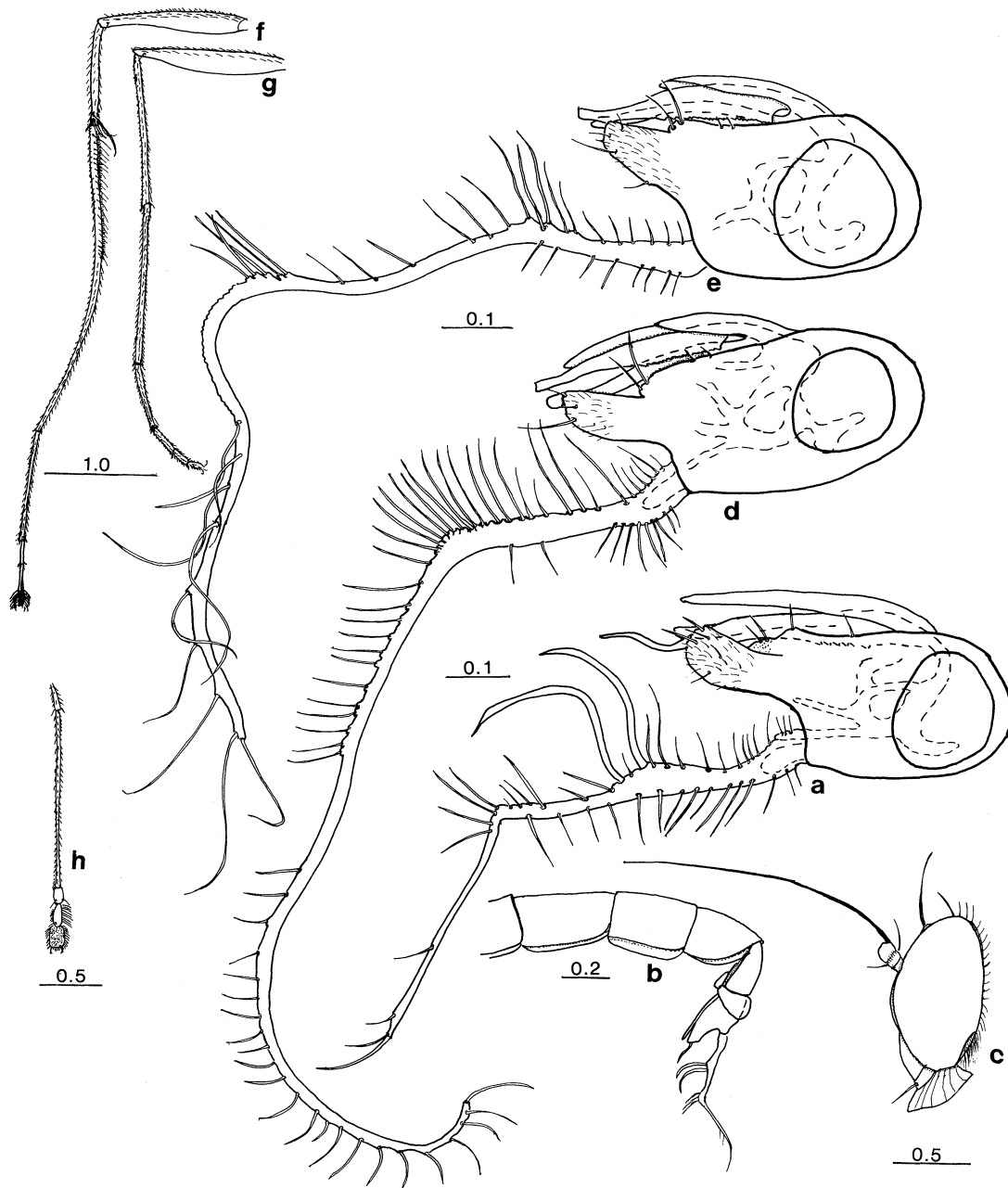


Fig. 98. *Amblypsilopus triscuticatus*, Brisbane, Qld: a – hypopygium, left lateral; b – male postabdomen, left lateral; c – male head, left lateral. *A. moggillensis*, Moggill State Forest, Qld: d – hypopygium, left lateral. *A. brevitiba*, Ku-ring-gai Chase, NSW: e – hypopygium, left lateral; f – male left leg I, posterior; g – female left leg I, posterior. *A. rentzi*, near Batemans Bay, NSW: h – male left tarsus I, dorsal.

ad at one-fifth; III: 10.0; 14.0; 6.0/3.0/1.5/1.0/1.0; wing shorter (Fig. 127j); abdomen usually yellow, but with varying degrees of metallic green infuscation: with terga 1-4 ranging from entirely yellow with only dark posterior bands to almost entirely metallic green (extent of metallic green infuscation is possibly a function of specimen age).

Remarks. *Amblypsilopus triscuticatus* is a common species along the eastern coast of Australia, occurring from at least Dunk Island, Queensland (northernmost male record) to the Nadgee River, New South Wales (near the Victorian state border), as well as rather cold montane woodland at Katoomba, NSW and Black Mountain, ACT (Fig. 94).

This species has been collected from rainforest, wet sclerophyll forest and mangroves, as well as gardens and orchards, and I have often seen it on windows inside houses. It is one of the few species of *Amblypsilopus* which extends beyond the limit of subtropical rainforest on the southern coast of New South Wales. Its wide range and abundance in disturbed habitats makes it a candidate for accidental introduction through commerce.

Females display varying abdominal colouration, from almost entirely yellow to almost entirely metallic green.

Amblypsilopus basseti n.sp.

Type material. HOLOTYPE male, Queensland, Mount Glorious, near Brisbane, canopy of *Argyrodendron actinophyllum*, subtropical rainforest, 5-12 Mar. 1987, Y. Basset; PARATYPES 3 males, female, same data but 11-18 Dec. 1986, 5-12 Jan. 1987 (AMS).

Additional material. New South Wales – male, 5 females, Dorrigo National Park, Glades Area, subtropical rainforest, 8 Jan. 1988 (AMS).

Description – male. Length: 5.1-5.3; wing: 4.2 x 1.2; similar to *A. triscuticatus* except as noted.

Head. Vertex, frons, face and clypeus covered with dense silvery pruinosity; scape and pedicel black, first flagellomere yellow.

Thorax. Dorsum, scutellum and pleura metallic blue-green and covered dense silvery orientated silvery pruinosity, especially evident in anterior view.

Legs. CI, femora, tibiae and It_{1-4} , III_{1-2} and III_1 yellow; CII, CIII and distalmost tarsomeres dark brown; CI with 3-4 strong pale distolateral setae and with some silvery pruinosity; CIII with pale lateral seta; I: 7.0; 10.0/15.0/4.0/0.5/0.5/0.7; TI with long curved posterior pale seta at four-fifths (MSSC); It_1 very long and thin, and with some short ventral setae in basal one-eighth (MSSC); It_{3-5} each very short and flattened, and It_5 dark brown and slightly flattened (MSSC); 8.0; 11.0; 9.0/3.0/1.8/1.0/1.0; III: 9.0; 15.0; 7.0/3.0/1.8/1.0/1.0.

Wing. Hyaline; M_2 absent, or marked only by trace to margin.

Abdomen. Metallic green with bronze reflections; hypopygium dark brown with yellow cerci, surstyli and hypandrium (Fig. 97b); epandrium subrectangular; hypandrial hood short; hypandrial arm extending to right of aedeagus; aedeagus narrowed and tapering; 2 short well separated epandrial setae present; 2 bristles of epandrial lobe on short pedicel; surstylus fused to epandrium; surstylus lobate, without indentations, and with setae as figured; cercus elongate, and distally forked, ventral arm with 5 distal blade-like seta and dorsal arm with long apical seta.

Female. Similar to male except lacking MSSC, podomere ratios similar to those of female *A. triscuticatus*, and abdomen metallic green.

Remarks. *Amblypsilopus basseti* was collected by insecticide fogging and knock-down in the canopy of *Argyrodendron actinophyllum*, at Mount Glorious, south-eastern Queensland. It is also known from ground level collections in north-eastern New South Wales.

This beautiful species is covered with orientated silvery pruinosity on the head and thorax, giving maximum effect when viewed anteriorly in an arc 45° either side of the median sagittal plane. It_1 is very long and bears some short basoventral setae.

Amblypsilopus moggillensis n.sp.

Type material. HOLOTYPE male, Queensland, Moggill State Forest, 26 km west of Brisbane, malaise trap, 17 Oct. 1983, E.L. Schlinger & M.E. Irwin (ANIC); PARATYPES male, 3 females, Gatton, Reserve Station, malaise trap, 24-30 Mar. 1981 (QDPI); 2 males, female, Brisbane, 29 Sept. 1935, 6 May 1935 (UQIC); male, Kholo, 19 Oct. 1972 (CNC).

Additional material. Queensland – male, Carnarvon National Park, camp at Carnarvon Creek, riverine forest, yellow pans, 28 Nov. 1992 (AMS); male, 28 km west of Monto, 21 Nov. 1962 (CAS).

Description – male. Length: 5.0; wing: 4.0 x 1.4; similar to *A. triscuticatus* except as noted.

Head. Antenna yellow; pedicel with yellowish-brown dorsal and ventral setae.

Legs. CI and remainder of legs yellow, except distalmost tarsomeres dark brown; CII and CIII dark brown becoming yellowish distally; I: 7.0; 10.0/9.0/4.2/2.0/0.7/0.5; TI with curved posterior pale seta at seven-eighths (MSSC); It_1 long and curved; It_3 flattened and only slightly expanded into blackish apical flag (MSSC); II: 7.0; 10.0; 9.0/2.7/2.0/0.7/0.5; III: 9.0; 14.0; 7.0/3.0/2.0/1.0/0.5.

Abdomen. Abdomen also with extensive basal translucent yellow cuticle; hypopygium (Fig. 98d); hypandrial hood almost as long as hypandrial arm; aedeagus with dorsal serrations and not extending

much beyond surstylus; 2 short epandrial setae present; epandrial lobe bristles arising from short pedicel; surstylus lobate, without indentations or projections, and with setae as figured; cercus narrow and very long, with ventral setae along entire length and dorsal setae present only basally.

Female. Lacking MSSC; similar to female *A. triscuticatus* except 2 sa present and antennal pedicel with yellow setae.

Remarks. *Amblypsilopus moggillensis* occurs from south-eastern to central Queensland. It is closely related to *A. triscuticatus* and both species have similar MSSC. They differ in details of the cercus, nature of the It_5 flag (MSSC), and the colour of the antennal setae. Also, *A. triscuticatus* has a very elongate and thin male It_1 (MSSC), which is of more normal thickness in *A. moggillensis*.

Amblypsilopus kaputar n.sp.

Type material. HOLOTYPE male, PARATYPE female, New South Wales, Mount Kaputar National Park, creek crossing Park road, 750 m, yellow pans, 18 Nov. 1990, D.J. Bickel (AMS).

Description – male. Length: 3.2; wing: 2.8 x 1.0; similar to *A. triscuticatus* except as noted.

Head. Frons, face and clypeus metallic blue-green with dense grey pruinosity; head setae black; palp and proboscis yellow; antenna yellow, but with first flagellomere infuscated distally; pedicel with yellow dorsal and ventral setae.

Thorax. Dorsum metallic blue-green with grey pruinosity; scutellum metallic blue; pleura covered with dusting grey pruinosity.

Legs. CI, femora, tibiae and tarsi mostly pale yellow, except $It_{3,4}$ infuscated and It_5 white; distalmost tarsomeres II and III somewhat infuscated; CII and CIII dark brown; I: 5.0; 7.0/5.0/2.8/2.0/1.0/1.0; TI with curved pv seta at seven-eighths (MSSC); It_1 not greatly elongate; It_5 flattened and white, in marked contrast to darkened preceding tarsomeres (MSSC). II: 6.5; 8.5; 5.5/2.2/1.5/0.8; 0.8; TII with short anterior seta at three-fifths, otherwise mostly bare; III: 8.0; 11.5; 5.0/2.5/1.8/0.8/0.8.

Wing. CuAx ratio: 1.3; lower calypter yellow with fan of pale setae; haltere yellow.

Abdomen. Entirely metallic blue to green, without basal translucent yellow areas; cercus very similar to that of *A. moggillensis* (as in Fig. 98d), yellow, elongate and curved, and with ventral setae along entire length and dorsal setae present only basally.

Female. Similar to male except lacks MSSC, and as noted: TII with strong ad only at one-sixth, and with a few tiny anterior setae; abdomen also mostly

metallic green.

Remarks. *Amblypsilopus kaputar* is known only from an intermittent creek in dry sclerophyll forest on the steep slopes of Mount Kaputar, Nandewar Range. This range drains to the New South Wales interior, and it is unusual to find *triscuticatus* Group species on the drier tablelands and western slopes. However, the Nandewar Range has pockets of dry rainforest and wet sclerophyll forest at higher elevations, and the region may have been much moister in the past. *Amblypsilopus kaputar* is possibly a relict species being maintained in pockets of moisture sufficient for at least a spring flight period.

Amblypsilopus kaputar is most closely related to *A. moggillensis* from south-eastern Queensland, and both species have similar cerci.

Amblypsilopus rentzi n.sp.

Type material. HOLOTYPE male, New South Wales, Bawley Point, 35°30'S 150°42'E, 9 Oct. 1992, at light, D.C.F. Rentz & K. McCarron (ANIC).

Description – male. Length: 5.7; wing: 5.0 x 1.5; similar to *A. triscuticatus* except as noted.

Head. Scape and pedicel black, pedicel with yellowish ventral setae; first flagellomere yellow; arista dark brown.

Thorax. Four pairs long ac present.

Legs. CI, trochanters, femora, tibiae and basal tarsomeres yellow; distalmost tarsomeres infuscated except as noted; I: 7.5; 9.5; 8.0; 5.0/0.4; 0.6/0.8; TI with long curved posterior pale seta at seven-eighths (MSSC); basal tenth of It_1 slightly expanded with pale ventral pile (MSSC); $It_{3,5}$ flattened (Fig. 98h), with It_4 bearing posterior row of black pinnate setae, with It_5 strongly flattened into wide apical flag which is dorsally black, and $It_{4,5}$ ventrally covered with shining silvery pruinosity, evident when viewed at an acute angle (all MSSC); II: 7.0; 10.0; 8.0/2.2/1.5/0.8/0.7; III: 9.0; 13.0; 7.0/2.5/1.8/1.0/0.6.

Wing. Hyaline; CuAx ratio: 2.0.

Abdomen. Entirely metallic blue-green with bronze reflections and with dusting of grey pruinosity; epandrium dark brown, with cerci, surstyli and hypandrium yellow (not figured); cercus very long (not unlike Fig. 98e), and with row of very long pale ventral setae in distal third.

Female. Unknown.

Remarks. *Amblypsilopus rentzi* is known only from its type locality near Bateman's Bay, New South Wales, near the southern limit of the *triscuticatus* Group's range. The MSSC of tarsus I are diagnostic. This species is most closely related to *A. triscuticatus* and *A. brevitibia*.

***Amblypsilopus brevitibia* n.sp.**

Type material. HOLOTYPE male, PARATYPES 7 males, 5 females, New South Wales, Ku-ring-gai Chase National Park, McCarr's Creek, subtropical closed forest, 5 Jan. 1985, D.J. Bickel (AMS).

Additional material. New South Wales – 3 males, 2 females, Mooney Mooney Creek, near Gosford, 20-25 Nov. 1975, 3 Dec. 1976; 2 males, Myall Lakes National Park, Mungo Brush, 24 Nov. 1987, littoral rainforest, yellow pans (AMS); male, Bawley Point, 35°30'S 150°24'E, 9 Jan 1993 (ANIC).

Description – male. Length: 4.3-4.5; wing: 3.8 x 1.0; similar to *A. triscuticatus* except as noted.

Head. Antenna yellow but first flagellomere brownish; pedicel with black dorsal and ventral setae.

Thorax. Dorsum bright metallic green with grey pruinosity; 2 sa present.

Legs. CI, femora, tibiae, basal tarsomeres yellow except as noted; CII and CIII and distalmost tarsomeres dark brown; I: 7.5; 5.0; 14.0/5.0/1.5/1.5/1.0; TI with short subapical curved posterior pale seta (MSSC); It_1 (Fig. 98f) very long, thin and curved, and almost 3 times length of TI (MSSC), and with fine white ventral pile in basal half which is subtended anteriorly and posteriorly by row of short black setae (MSSC); It_2 dark brown, It_{3-4} silvery (MSSC), with It_5 flattened into black flag (MSSC); II: 7.5; 11.0; 9.0/3.0/2.0/1.0/1.0; III: 9.0; 15.0; 8.0/3.0/2.0/1.5/1.0.

Wing. Hyaline; CuAx ratio: 1.3.

Abdomen. Entirely metallic green with bronze reflections; on segments 2-6, basal half of each tergum and narrow band on preceding adjacent tergum matt brown; hypopygium dark brown with cercus yellow basally and brown distad (Fig. 98e); hypandrial arm present to right of aedeagus; aedeagus serrated dorsally; 2 short epandrial setae present; epandrial lobe very short, with 2 short bristles; surstylus fused to epandrium; surstylus lobate, without indentations, and with setae as figured; cercus very narrow, elongate and bare of setae along most of dorsal margin, but with pedunculate ventral setae at midlength, and with long curved distal setae.

Female. Similar to male except lacking MSSC and as noted; antenna entirely yellow; 4 strong dc present; podomere ratios as: I: 7.0; 7.5; 7.5/3.0/1.5/1.0/1.0; II: 7.0; It_1 subequal in length to TI (Fig. 98g); 10.0; 8.0/2.5/1.5/1.0/1.0; III: 9.0; 14.0; 6.0/3.0/1.5/1.0/1.0; abdomen metallic green dorsally and yellow ventrally.

Remarks. *Amblypsilopus brevitibia* is known from wet forests along the New South Wales coast from Myall Lakes to Batemans Bay.

The male TI is very short and It_1 unusually long, so that the fore basitarsus is almost three times the length of its tibia. This extreme leg dimorphism has also affected the female phenotype in that It_1 is subequal in length to TI, whereas in all other females of the

triscuticatus Group, It_1 is distinctly shorter than TI (see Fig. 98f,g).

***Amblypsilopus arboreus* n.sp.**

Type material. HOLOTYPE male, PARATYPES 13 males, 5 females, Northern Territory, Kakadu National Park, Jim Jim Billabong Road, near Cooida, on trunk *Eucalyptus papuana*, 17 Jan. 1992, D.J. Bickel (AMS).

Additional material. Northern Territory – male, 5 km south-east of Humpty Doo, unburnt monsoonal woodland, malaise trap, 3 Dec. 1991-9 Jan. 1992 (NTMD); male, Darwin, light trap, Jan. 1958 (ANIC); female, Wangi Road, north of Litchfield Park, on trunk *Eucalyptus* sp., 14 Jan. 1992 (AMS).

Description. Length 3.2; wing: 3.0 x 0.8.

Head. Frons, face, and clypeus metallic green with some grey pruinosity; head setae black; palp and proboscis yellowish; antenna black; arista dorsal and equal to head height.

Thorax. Dorsum metallic blue-green with grey pruinosity; scutellum metallic blue; pleura with dusting of grey pruinosity; setae black; 3-4 pairs tiny ac present; dc with 2 strong posterior setae, 2 tiny setae anterior, and strong dc seta anteriormost; lateral scutellar setae absent.

Legs. CI green but yellow distally and medianly; CII and CIII dark brown; femora, tibiae and tarsi yellow except as noted; I: 5.0; 5.5; 9.0/1.5/2.0/0.8/0.8; TI with long curved posterior pale seta at two-thirds (MSSC); It_1 relatively long (MSSC); It_2 flattened, white (MSSC); II: 4.0; 6.0; 8.5/1.8/1.2/0.8/0.5; It_1 longer than TII (MSSC); III: 6.0; 11.0; 5.5/2.0/1.5/0.8/0.5.

Wing. Hyaline; M_2 marked only by trace to margin; CuAx ratio: 1.5; lower calypter yellow with brown rim and fan of pale setae; haltere pale yellow.

Abdomen. Entirely metallic blue-green with bronze reflections; hypopygium dark brown with yellow cerci (Fig. 99c); epandrium ovate; hypandrium elongate, simple, without left lateral arm; aedeagus elongate; epandrial setae not evident; epandrial lobe broad, projecting above ventral margin of epandrium, and with 2 curved setae; surstylus prolonged into digitiform projection and bearing 2 large ventral blade-like setae, broad blunt curved ventral seta, internally arising long ventral blade-like seta, and cuticular projection which bears strong seta and 2 short apical setae; cercus elongate, thin, with scattered long dorsal setae, and closely spaced ventral setae.

Female. Similar to male except lacking MSSC and as noted; CI yellowish; abdomen mostly metallic green.

Remarks. *Amblypsilopus arboreus* is known from Arnhem Land, Northern Territory. Specimens were collected on trunks of smooth-barked eucalypts, especially *Eucalyptus papuana*, in open monsoonal



Fig.99. *Amblypsilopus uneorum*, Lamington National Park, Qld: a – hypopygium, left lateral. *A. canungra*, Canungra, Qld: b – hypopygium, left lateral. *A. arboreus*, Darwin, NT: c – hypopygium, left lateral. *A. montanorum*, Black Mountain, ACT: d – hypopygium, left lateral; e – male It., dorsal. *A. natalis*, Christmas Island: f – hypopygium, left lateral; f – left cercus, ventral. *A. tortus*, Heathlands, Qld: h – hypopygium, left lateral.

woodland and along swamp margins. Individuals make short lateral and vertical flights up trunks, and at rest, their bodies are parallel to the trunk surface. Dolichopodidae in the subfamily Medeterinae (genera *Medetera* and *Corindia*) were collected on the same trunks.

This species is very close to *A. tortus*, and males of both species have various projecting modified setae on the surstylus and a long and flagellate cercus.

***Amblypsilopus tortus* n.sp.**

Type material. HOLOTYPE male, PARATYPES 2 males, female, Queensland, 11°45'S 142°35'E, Heathlands, 15-26 Jan. 1992, I. Naumann & T. Weir, malaise trap (ANIC).

Additional material. Queensland – male, 12°39'S 142°41'E, 4 km north-east of Batavia Downs, 11 Dec. 1992-17 Jan. 1993; male, 12°42'S 142°42'E, 7 km south of Batavia Downs, 8 Mar.-4 Apr. 1993 (ANIC).

Description. Length 3.3; wing: 2.8 x 0.8; similar to *A. arboreus* except as noted.

Legs. CI green but yellow distally and medianly; CII and CIII dark brown; femora, tibiae and tarsi yellow except as noted; I: 3.8; 4.2; 7.5/1.2/1.3/0.8/0.4; TI with long curved posterior pale seta at two-thirds (MSSC); It_1 relatively long (MSSC); It_{3-4} black and slightly laterally flattened, with It_5 black, dorsoventrally flattened and appearing twisted with respect to the preceding tarsomeres; II: 4.0; 4.8; 6.4/1.5/1.0/0.5/0.3; IIt, longer than TII (MSSC); III: 5.0; 8.5; 4.8/1.7/1.1/0.7/0.3.

Wing. CuAx ratio: 1.6.

Abdomen. Entirely metallic blue-green with bronze reflections; hypopygium dark brown with yellow cerci (Fig. 99h); epandrium ovate; hypandrium elongate, simple, without left lateral arm; epandrial setae not evident; epandrial lobe broad and subtriangular, and with 2 curved setae; surstylus prolonged into digitiform projection, bearing large blade-like seta and curved striated ventral seta, and with dorsal digitiform projection; cercus elongate, thin, with scattered long dorsal setae, and closely spaced ventral setae.

Female. Similar to female *A. arboreus*.

Remarks. *Amblypsilopus tortus* is occurs in monsoonal woodland on the northern Cape York Peninsula. It is very close to *A. arboreus* from Arnhem Land and the two species should be regarded as sister species, differing primarily in details of the surstylar setae and leg I MSSC. Possibly *A. tortus* is also associated with trunks of smooth-barked eucalypts.

***Amblypsilopus montanorum* n.sp.**

Type material. HOLOTYPE male, New South Wales,

Springwood, Blue Mountains, 10 Jan. 1956, D.K. McAlpine (AMS).

Additional material. New South Wales – male, Barrington Tops National Park, Upper Williams River, 550 m, 26 Jan. 1987 (AMS). Australian Capital Territory – male, Blundell's Creek, 3 km east of Piccadilly Circus, 850 m, Jan. 1984; 4 males, Black Mountain, Dec. 1987 (ANIC)

Description – male. Length: 4.7; wing: 4.0 x 1.2; similar to *A. triscutatus* except as noted.

Head. Antenna black.

Legs. TI with long curved posterior pale seta at five-sixths (MSSC); It_1 curved and with fine white pile ventrally (MSSC); It_4 relatively short; It_5 flattened into black apical flag (Fig. 99e) (MSSC); TII with 2-3 black anterior setae.

Wing. Hyaline; CuAx ratio: 2.5.

Abdomen. Entirely metallic green with bronze reflections; on segments 2-6, basal half of each tergum and narrow band on preceding adjacent tergum matt brown; hypopygium dark brown with yellow cerci and surstyli (Fig. 99d); hypandrial hood relatively short; hypandrial arm broad, and extending to right of aedeagus; aedeagus relatively broad and dorsally serrate; epandrial setae absent; epandrial lobe well developed with strong apical and subapical bristles; surstylus fused to epandrium; surstylus lobate, without indentations and with setae as figured; cercus with swollen base bearing elongate ventral arm and clavate distal arm with long curved apical setae.

Female. Unknown.

Remarks. *Amblypsilopus montanorum* is known from montane habitats in the eastern Australian highlands, the Blue Mountains and Barrington Tops, NSW and the Canberra district, ACT. The branched cercus is unusual, and in comparison with other *triscutatus* Group members, it has the plesiomorphic character of a well-developed epandrial lobe.

***Amblypsilopus natalis* n.sp.**

Type material. HOLOTYPE male, PARATYPES 6 males, 6 females, Christmas Island, 1939-1940, Dr. C.A. Gibson-Hill (BMNH); PARATYPE male, same, but Rose Hill garden, 3 Oct. 1964 (ANIC).

Additional material. Christmas Island – 8 males, 6 females, north part of island, Jan. 1898 (BMNH); male, 3 km north of South Point, 22 Apr. 1989 (ANIC).

Description – male. Length: 5.5; wing: 4.5 x 1.4.

Head. Frons, face and clypeus metallic blue-green with dusting of pruinosity; strong vertical seta present, almost as long as ocellars; face slightly bulging; setae black; palp and proboscis yellow; antenna black; first

flagellomere subtriangular; arista dorsal to dorsoapical, its length about one and a quarter head height.

Thorax. Dorsum metallic blue-green with grey pruinosity; scutellum metallic blue; pleura covered with light dusting grey pruinosity; setae black; 2 pairs long ac present; 2 strong posterior dc present, with 4 weak hair-like anterior dc; 1 pa, only 1 sa, 2 sr, 2 npl, 1 hm, and 1 strong pm present; median scutellars strong, laterals absent.

Legs. CI, femora, tibiae and It_{1-4} , IIt_{1-2} and $IIIIt_1$ yellow; CII, CIII and distalmost tarsomeres dark brown; CI with 3-4 pale distolateral setae; CIII with pale lateral seta; I: 8.0; 10.0/8.5/3.5/2.0/1.0/1.0; TI with long curved posterior pale seta at four-fifths (MSSC); II: 9.0; 11.5/13.0/3.0/2.0/1.0/1.0; FII in basal half with 3 long pale ventral setae (MSSC); III: 10.0; 17.0; 8.0/3.0/2.0/1.0/1.0.

Wing. Hyaline; M_2 short, marked only by trace to margin; CuAx ration: 1.8; lower calyptera with fan of pale setae; haltere yellow.

Abdomen. Metallic green with bronze and each tergum with distal dark brown matt band; hypopygium brown with yellow cerci (Fig. 99f); epandrium subrectangular and projecting distad of surstylus; digitiform projection present on basoventral margin of epandrium; hypandrial hood relatively short; hypandrial arm extending almost to apex of aedeagus; aedeagus elongate; 2 short epandrial setae present; epandrial lobe distinct and bearing 2 short setae; surstylus upturned, small and digitiform, and bearing blade-like seta; cercus elongate and tapering, with mound at one third which bears 4 blade-like setae (Fig. 99g), black lateral setae, and long subapical seta.

Female. Similar to male except lacking MSSC and as noted: frontoclypeal suture not strongly evident; thorax green with grey pruinosity; FII ventrally bare; abdomen green.

Remarks. *Amblypsilopus natalis* is found only on Christmas Island in the Indian Ocean. It is very close to *A. renschi* from Lombok, and *A. flavipes* from Java and Lombok. All have long pale ventral setae on FII (MSSC) (males of both *A. renschi* and *A. flavipes* have long pale ventral setae on FI and FIII as well), an upturned surstylus, a distal extension of the epandrium beyond the surstylus, and elongate cerci. This assemblage of species is found on Sunda Archipelago and Christmas Island.

The *pallidicornis* Group

Diagnosis. **Head.** Males usually with very weak vertical seta; female verticals strong; antenna entirely yellow; first flagellomere subtriangular, with dorsoapical to apical arista; arista of both sexes long, more than one and a half times head height, and often more than twice head height (Fig. 100f).

Thorax. Often with yellow pleura; 2-3 pairs long ac

present; male with 2 strong posterior dc and 3-4 weak hairs anteriorly (MSSC); female with 5 strong dc; lateral scutellar setae absent.

Legs. All coxae, femora, tibiae and tarsi mostly yellow; male tibiae devoid of major setae; male TI on distal quarter with long curved pale posterior seta (MSSC); male It_5 sometimes flattened as black flag (MSSC); male IIt and $IIIIt$ unmodified.

Wing. Hyaline, or with faint anteroapical clouding, and similar to Figure 127i; crossvein m-cu straight.

Abdomen. Often with yellow translucent yellowish basal segments in both sexes; epandrial lobe usually strongly reduced and epandrial lobe setae appear to arise from epandrial margin; hypandrium usually with left lateral arm; aedeagus usually dorsally serrate and with dorsal angle; surstylus usually rounded and lobate, without dorsal and ventral divisions; cercus usually elongate and often bearing capitate setae.

Remarks. Most males of the *Amblypsilopus pallidicornis* Group have a curved posterior setae on distal TI (MSSC), a synapomorphy which links it with the *triscuticatus*, *neoplatypus* and *zonatus* Groups. In genitalic structure, the *pallidicornis* Group is close to the *triscuticatus* Group.

While species of the three other related Groups have a short dorsal arista, the *pallidicornis* Group is further defined by an elongate apical arista in both sexes which is usually more than twice the head height. Because of this apical arista, *Amblypsilopus pallidicornis* had been placed in *Chrysosoma*. However, all other characters place it and related species near *Amblypsilopus*. This is another case of independent development of the apical arista in the Sciapodinae.

The *pallidicornis* Group has a broad range throughout the Oriental and Australasian regions, and *Amblypsilopus pallidicornis* itself ranges from the Seychelles to French Polynesia and the Hawaiian islands and probably has been partially spread by human commerce. *Amblypsilopus biprovincialis* is known from northern Australia and Micronesia. I have seen additional undescribed species from New Guinea and Malaysia.

In Australia, the five species of *pallidicornis* Group are found across the monsoonal North and along the eastern coast to northern New South Wales. I have seen unassociated females from the Cape York Peninsula which represent additional undescribed species.

Included species:

biprovincialis n.sp. Australia (Qld, NT), Micronesia (Truk).

exul Parent, 1932c: 240. (*Sciapus*) (MNHP, not seen), France, Netherlands (all specimens from greenhouses), **n.comb.**

Sciapus exul was described from specimens found in French greenhouses, and its mating behaviour recorded by Van Ooststroom (1944) in Netherlands greenhouses. However, this species is definitely not Palearctic and its origin has remained

unknown.

I have examined specimens from populations in the Leiden Hortus (ZMUA), and the species clearly belongs in the Indo-Pacific *Amblypsilopus pallidicornis* Group, and is similar to undescribed species from Malaysia and Papua New Guinea. The following features are diagnostic for *A. exul*: frons, face and clypeus metallic blue-green with only dusting of pruinosity; lateral frons with short dark vertical seta; palp and proboscis yellow; antenna yellow, similar to Figure 100f; thorax metallic blue-green with grey pruinosity; all coxae and remainder of legs yellow; CI and CIII with black setae (in contrast to the pale coxal setae of *A. pallidicornis*); TI with curved posterior seta at seven-eighths (MSSC); *It*₅ unmodified; wing hyaline; hypopygium (Fig. 100g); cercus relatively short and with distinctive curved capitate subapical seta.

I have seen several undescribed species from Papua New Guinea (BPBM) and Malaysia (BMNH) which are closely related to *A. exul*, and have similar truncated cerci with apical capitate setae. However, they have pale coxal seta, black *It*₅ flag (MSSC), densely pruinose frons, and/or other diagnostic MSSC.

gressitti n.sp. Australia (NT).

julius n.sp. Australia (Qld).

pallidicornis Grimshaw, 1901: 12. (*Gnamptopsilopus*) (BMNH, examined), Hawaiian Islands, Society Islands, Marquesas Islands, Guam, Belau, Taiwan, Seychelles.

fulgidipenne Enderlein, 1912: 377. (*Chrysosoma*) (Warsaw, not seen female only), Taiwan.

This species is widespread throughout the western Pacific and Indian Oceans. Possibly it was accidentally introduced to Polynesia and the Seychelles by human transport, but it occurs at relatively high elevations (300 m in the Seychelles and 850 m in the Marquesas), suggesting a rather long presence in these islands. For description and figures, see Bickel (in press). Also see Remarks in species section for *A. julius*. Becker (1922c:152) placed the two species in synonymy.

The Papua New Guinea record cited in Bickel & Dyte (1989) was based on misidentified specimens, and should be ignored.

Additional records. French Polynesia: Marquesas Islands: Nuku Hiva Island: Terre Deserte 850 m, and Taipi Vaii, 50 m (BPBM).

pseudexul n.sp. Australia (NSW).

williamsi n.sp. Australia (NSW, Qld).

Key to Males of the *Amblypsilopus pallidicornis* Group

1. TI without long curved distal posterior seta; 3 ac present; arista slightly more than one and a half times head height; *It*₅ flattened into black apical flag; tergum 6 with normal posterior setae; cercus (Fig. 100h) cercus elongate, and with strong curved ventral setae (NSW) *A. pseudexul*
- TI with long curved posterior seta; 2 ac present; arista more than twice head height; other features various 2
2. Cercus elongate, with 3 somewhat crooked midventral setae (Fig. 100a); *It*₁ distinctly longer than TI; *It*₅ flattened into black pinnate flag; CI and CIII with pale setae (NT, Qld, Truk) *A. biprovincialis*
- Cercus without the 3 crooked ventral setae; other features various 3
3. Pair of long posterior setae arising from tergum 6 (Fig. 100c); cercus without capitate setae 4
- Tergum 6 without long setae; cercus with capitate setae 5
4. Pleura metallic green; *It*₅ flattened into black apical flag; *It*₁ unmodified; cercus elongate with setae as figured (Fig. 100d) (NSW, Qld) *A. williamsi*
- Pleura mostly yellow-brown; *It*₅ unmodified; *It*₁ with strong black basoventral seta; cercus with 3 distinctive leaf-shaped setae (Fig. 100b) (NT) *A. gressitti*

5. Thoracic pleura and abdomen mostly metallic green; It_1 distinctly shorter than TI ; It_5 unmodified; CI and $CIII$ with black setae; cercus with capitate subapical seta (Fig. 100a) (European greenhouses, but provenance unknown) *A. exul*
- Thoracic pleura and abdomen mostly yellow 6
6. CI and $CIII$ with black setae; It_5 slightly flattened into black flag; cercus with 2 long ventral capitate setae (Fig. 100e) (Qld) *A. julius*
- CI and $CIII$ with pale setae; It_5 not flattened (Seychelles, south-east Asia, Pacific islands) *A. pallidicornis*

***Amblypsilopus biprovincialis* n.sp.**

Type material. HOLOTYPE male, Northern Territory, male, Nourlangie Creek, 8 km north of Mount Cahill, 16 May 1973, D.H. Colless (ANIC).

Additional material. Northern Territory – male, Darwin, 24 May 1964 (SAM), 10 Nov. 1979 (NTMD); male, East Point, Darwin, 1–31 May 1975 (NTMD); male, female, Arnhem Land, Maningrida, 16 Mar. 1961 (BPBM). Queensland – male, 3 km north-east of Mount Webb, 15°03'S 145°09'E, malaise trap, 2 May 1981 (ANIC); possible females: Ingham, 2 June 1959; Innisfail, 30 Oct. 1959 (ANIC).

Description – male. Length: 5.0; wing: 3.8 x 1.2.

Head. Frons, face and clypeus metallic blue-green with some grey pruinosity; vertical seta present as pale weak hair (MSSC); palp yellow with pale setae; proboscis yellow; antenna yellow; first flagellomere subtriangular; arista dorsoapical, its length about twice head height.

Thorax. Metallic blue-green with grey pruinosity; scutellum metallic blue; pleura covered with light dusting of grey pruinosity.

Legs. CI , femora, tibiae and tarsi yellow, except as noted; CII and $CIII$ basally brown, becoming yellow distally; CI with 3 strong pale distolateral setae; I : 7.0; 10.0/14.0/3.5/3.5/2.0/1.0; TI with long curved posterior pale seta at seven-eighths and with subapical pale pile (MSSC); It_1 very long and slightly curved; It_5 flattened into black pinnate apical flag (MSSC); II : 8.0; 11.0; 10.0/3.0/2.0/1.5/1.0; III : 9.0; 17.0; 8.0/4.0/2.0/1.0/1.0.

Wing. Hyaline; $CuAx$ ratio: 1.5; lower calypter yellow with brown rim and fan of pale setae; haltere yellow.

Abdomen. Metallic green with bronze reflections; on segments 2–6, basal half of each tergum and narrow band on preceding adjacent tergum matt brown; terga 1 and 2 yellow laterally and ventrally; hypopygium (Fig. 100a) dark brown and cerci, surstyli and hypandrium yellow; epandrium subrectangular; hypandrial arm very thin and extending to right of aedeagus; aedeagus relatively broad, with truncated apex and dorsally serrated; 2 epandrial setae present; 2 bristles of epandrial lobe developed separately, each on short pedicel; surstylus fused to epandrium; surstylus lobate, without indentations, and with 2 strong curved apical setae and

other setae as figured; cercus elongate, with 3 long somewhat crooked midventral setae, middle seta shorter than setae basad and distad.

Female. Similar to male except lacking MSSC; also with 2 strong ac; It_1 shorter than TI ; It_5 unmodified.

Remarks. *Amblypsilopus biprovincialis* is found in the Northern Territory and tropical Queensland, and also the Micronesian Truk island group (see Bickel, in press). The only obvious difference between the Australian and Micronesian specimens is that It_5 is not as strongly developed into a black pinnate flag (MSSC) on Truk males. The species probably occurs on islands between northern Australia and Micronesia.

***Amblypsilopus julius* n.sp.**

Type material. HOLOTYPE male, PARATYPE female, Queensland, Iron Range, 9 km east-north-east of Mount Tozer, 12°43'S 143°17'E, 5–10 July 1986, T. Weir & A. Calder (ANIC).

Description – male. Length: 4.3; wing: 4.0 x 1.3.

Head. Vertex, frons and face metallic blue with dusting of silvery pruinosity; lateral slope of frons with some short pale setae; clypeus with dense silvery pruinosity and protruding; palp and proboscis yellow; palp with strong black lateral seta and weaker apical seta; antenna yellow (Fig. 100f); first flagellomere short and triangular; arista apical and long, about times head height.

Thorax. Dorsum metallic green-bronze with some silvery pruinosity; pleura, including metepimeron yellow with grey pruinosity; setae black.

Legs. All coxae and legs yellow except as noted; CI with 3 black distolateral setae, CII with 2 black distolateral setae, and $CIII$ with black lateral seta; I : 8.0; 12.0; 12.0/4.0/2.5/2.0/1.0; TI with long curved posterior seta at nine-tenths (MSSC); It_5 only slightly flattened and black; II : 9.0; 17.0; 11.0/4.0/2.5/2.0/1.0; III : 12.0; 21.0; 9.0/4.0/2.5/1.5/1.0.

Wing. Hyaline but with faint brown clouding anteroapically; M_2 present as trace.

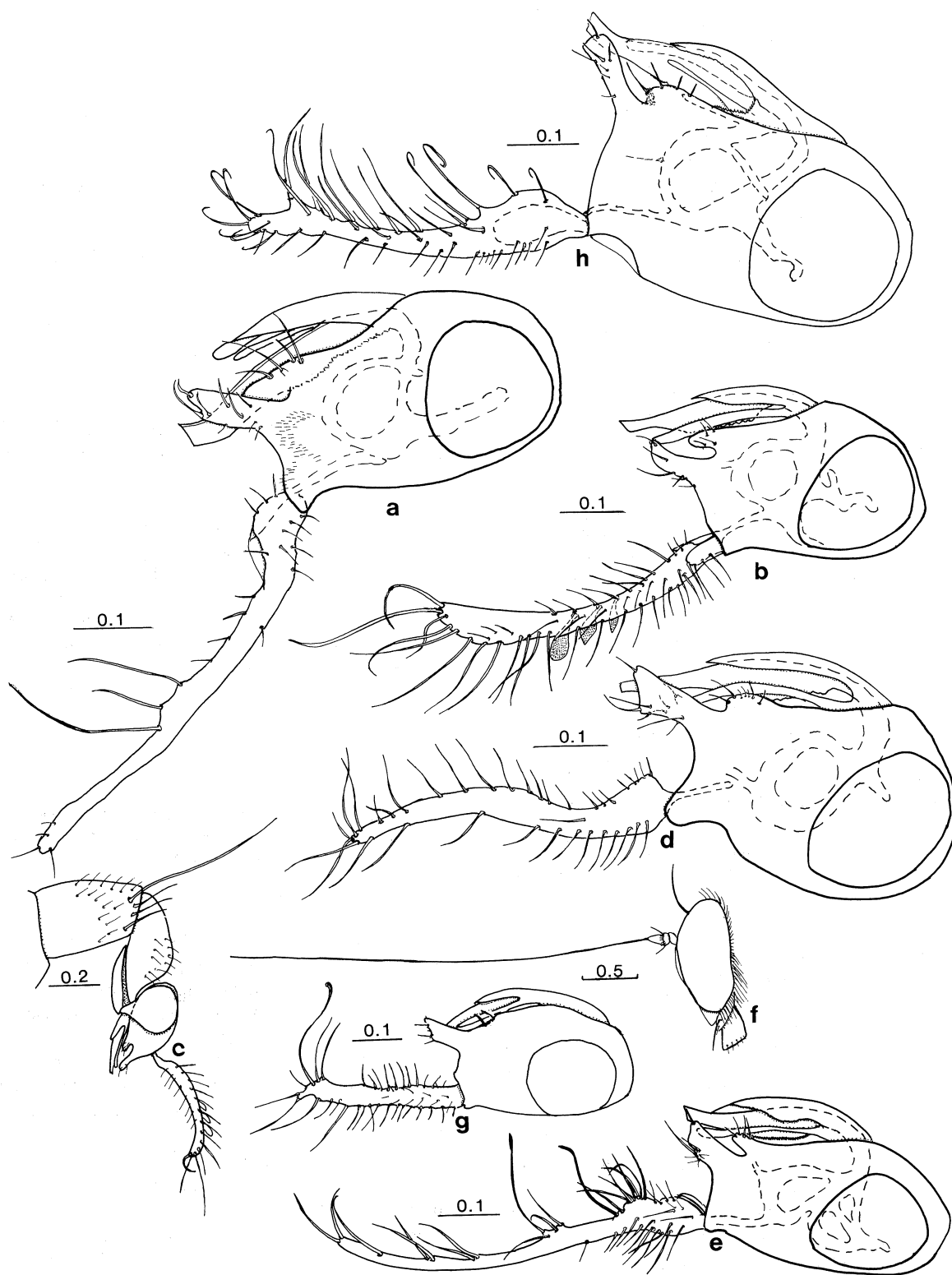


Fig.100. *Amblypsilopus biprovincialis*, Darwin, NT: a – hypopygium, left lateral. *A. gressitti*, Humpty Doo, NT: b – hypopygium, left lateral; c – male postabdomen, left lateral. *A. williamsi*, Lansdowne, NSW: d – hypopygium, left lateral. *A. julius*, Iron Range, Qld: e – hypopygium, left lateral; f – male head, left lateral. *A. exul*, Leiden, Netherlands (ex greenhouse): g – hypopygium, left lateral. *A. pseudexul*, Lansdowne, NSW: h – hypopygium, left lateral.

Abdomen. Yellow, but each segment 1-5 with distal brown band around tergal overlap; vestiture black; segment 5 with row of 6 black posteriorly directed ventral setae; hypopygium dark brown with yellow cerci; (Fig. 100e); epandrium subrectangular; hypandrial hood dorsally serrate; hypandrial arm arising near base and almost as long as aedeagus; aedeagus dorsally serrate; epandrial setae and 2 short epandrial lobe bristles arising together on same pedicel; surstylus truncate with setae as figured; cercus elongate with 2 long distinctive ventral capitate setae.

Female. Similar to male except lacking MSSC and as noted: clypeus with dense silvery pruinosity; palp also with strong seta; long apical arista also present; thoracic dorsum similar, although possibly varying to almost entirely yellow with blue metallic reflections (see Remarks); coxae also with strong black setae; It_5 yellow; wing with very faint anteroapical cloud; abdomen also yellow with brown bands at tergal overlap.

Remarks. *Amblypsilopus julius* occurs at Iron Range, Cape York Peninsula, and possibly in the Cairns district (female specimens only).

Females can be distinguished by the following characters: long apical arista, densely pruinose clypeus, palp with strong seta, abdomen yellow, and CI with 3 strong black distolateral setae.

Some females from the base of the Cape York Peninsula (Shipton's Flat, 17 May 1981; Upper Mulgrave River, 15 km up Goldsborough Road, 9 May 1967; Wongabel State Forest, via Atherton, 19-20 May 1980, all ANIC) are similar to the Iron Range female except the thorax has little pruinosity and is almost entirely yellow with metallic blue reflections on the mesoscutum and scutellum.

Amblypsilopus julius is close to the widespread Indo-Pacific *A. pallidicornis*. However, the Queensland *A. julius* has black coxal setae, while *A. pallidicornis* has yellow coxal setae and a different configuration of capitate setae on the cercus (eg, compare Fig. 100e with fig. 61h in Hardy & Kohn, 1964).

Amblypsilopus gressitti n.sp.

Type material. HOLOTYPE male, Northern Territory, Humpty Doo, Adelaide River, 23 Sept. 1960, J.L. Gressitt (BPBM).

Additional material. Northern Territory – male, Larrakeyah, 12°28'S 130°50'E, 15 Aug. 1991 (ANIC); 2 males, 15 females, Berry Springs, monsoonal vine forest, malaise trap, 26 June-6 July, 6-20 July, 20 July-29 Aug., 27 Sept.-30 Oct. 1991, 11 Jan.-24 Feb. 1992; female, Casurina Point, Darwin, 14 Jan 1992; female, Berrimah, 3 Sept. 1985 (NTMD).

Description – male. Length: 4.4; wing: 3.8 x 1.2.

Head. Frons and face metallic blue-green with silvery pruinosity; clypeus and lateral extensions to sides of

eyes yellow and covered with dense silvery pruinosity; palp yellow with pale setae; proboscis yellow; antenna yellow; first flagellomere subtriangular; arista dorsoapical, its length about two and a half times head height.

Thorax. Dorsum, scutellum and mesepisternum metallic green with dusting of grey pruinosity; pleura almost entirely yellow except for metallic green anepisternum, meron and anteroventral katapisternum; setae black.

Legs. All coxae and legs yellow, except distalmost tarsomeres dark brown; I: 7.0; 10.0/9.0/3.0/2.0/1.5/0.8; TI with curved posterior pale seta at four-fifths (MSSC); It_1 at base with strong black ventral seta; It_5 unmodified; II: 8.5; 13.5; 10.0/2.5/2.0/1.0/0.8; III: 9.0; 18.0; 8.0/3.5/2.0/1.0/0.8.

Wing. Hyaline; CuAx ratio: 1.3; lower calypter yellow with brown rim and fan of pale setae; haltere yellow.

Abdomen. Terga 2-3 mostly yellow, but metallic green dorsomedianly; tergum 4 yellow; terga 5 and 6 metallic green; tergum 6 with long posteriorly directed setae, subtended ventrally by row of 3 strong setae along tergal margin (MSSC) (Fig. 100c); hypopygium dark brown with yellow cerci (Fig. 100b); epandrium subrectangular; aedeagus dorsally serrate; setose epandrial projection near surstylus possibly represents epandrial setae and epandrial lobe; surstylus lobate with setae as figured; cercus digitiform, somewhat expanded distally with elongate setae, and with 3 distinctive internally projecting leaf-shaped setae.

Female. Similar to male except lacking MSSC and as noted: clypeus also yellow and covered with dense silvery pruinosity; thorax almost entirely yellow except mesonotum with varying amounts metallic blue-green colouration, but mostly forming band between dc rows and expanding posterolaterally posteriad covering most of dorsum; It_1 also with distinct basoventral seta, but shorter than in male; abdomen mostly yellow, but dorsum of terga 2-5 metallic blue-green.

Remarks. *Amblypsilopus gressitti* is found in Arnhem Land, Northern Territory. The three leaf-shaped setae of the cercus are diagnostic. The clypeus is yellow, in marked contrast to the metallic blue-green face. Also of interest is the basoventral seta of It_1 which is stronger in the male than female.

This species is closely related to *A. williamsi* of New South Wales, and both species share the long posterior seta on male tergum 6 (sometimes broken off specimens).

Amblypsilopus williamsi n.sp.

Type material. HOLOTYPE male, PARATYPE male, New South Wales, "Lorien", 3 km north of Lansdowne, rainforest margin, malaise trap, 23-29 Feb. 1987, G. Williams; PARATYPE male, same data but 29 Mar.-5 Apr. 1987 (AMS).

Additional material. New South Wales – male, female, Kiwarra State Forest, near Taree, Breakneck Lookout, dry

rainforest, 14 Jan. 1993 (AMS). Queensland – Moggill State Forest, 21 Dec. 1987 (CAS).

Description – male. Length: 4.4; wing: 3.8 x 1.2.

Head. Frons, face and clypeus metallic blue-green with silvery pruinosity which is particularly dense on the face and clypeus; palp yellow with yellow setae; proboscis yellow; antenna yellow; first flagellomere short subtriangular; arista dorsoapical, its length about two and a half times head height.

Thorax. Metallic blue-green with grey pruinosity, except postpronotum with yellowish cuticle; pleura blue-green and covered with dusting grey pruinosity; setae black.

Legs. CI, femora, tibiae and tarsi yellow except as noted; CII and CIII mostly yellow, but brownish basally; CI with 3-4 pale distolateral setae; CIII with pale lateral seta; I: 8.0; 12.5/11.0/4.0/4.2/2.0/1.0; TI with long pale posterior pale seta at seven-eighths (MSSC); It_{2-4} white (MSSC), and It_5 flattened into small black apical flag (MSSC); II: 10.0; 15.0; 12.0/3.0/2.0/1.5/1.0; III: 11.0; 19.0; 8.5/4.0/2.0/1.5/1.0.

Wing. CuAx ratio: 1.3.

Abdomen. Tergum 6 with pair of long posteriorly directed setae, as in Figure 100c; epandrium dark brown with yellowish cerci, surstyli and hypandrium (Fig. 100d); epandrium subrectangular; hypandrial arm arising near base of hypandrium; aedeagus dorsally serrate; group of setae present on ventral margin epandrium and possibly representing epandrial setae and bristles of epandrial lobe; surstylus fused to epandrium, distally truncate and with setae as figured; cercus elongate with setae as figured.

Female. Unknown.

Remarks. *Amblypsilopus williamsi* was collected in mixed wet sclerophyll and subtropical rainforest on the New South Wales northern coast and south-eastern Queensland. This species and the related *A. gressitti* from the Northern Territory both have a pair of long posteriorly directed setae arising from tergum 6 (Fig. 100c).

Amblypsilopus pseudexul n.sp.

Type material. HOLOTYPE male, New South Wales, 0.5 km south of Lansdowne, 15 Jan. 1993, riverine rainforest, G.A. Williams (AMS).

Description – male. Length: 5.5; wing: 3.3 x 1.3.

Head. Frons, face and clypeus metallic blue-green with dense grey pruinosity; head setae black; strong postvertical seta present; vertical seta short and pale; palp yellow with black setae; proboscis yellow; antenna yellow; pedicel with black setae; first flagellomere rounded; arista dorsoapical, and about one and a half times head height.

Thorax. Dorsum metallic blue-green with grey pruinosity; scutellum metallic blue; pleura metallic green with dusting of grey pruinosity; setae black; 3 pairs long ac present; 2 strong posterior dc present, with 3 shorter but still strong (ie, not hairlike) anterior dc; lateral scutellars absent.

Legs. All coxae, trochanters I and II, all femora, tibiae, It_{1-4} , III_t and III_t , yellow; trochanter III, It_5 and III_{2-5} dark brown; CIII with pale lateral seta; I: 5.5; 6.5; 4.0/2.5/2.0/1.5/1.0; TI without curved posterior seta; It_1 curved, and with slight ventral pad with pale pile at very base (MSSC); It_5 flattened into black apical flag (MSSC); II: 5.0; 7.5; 5.5/2.0/1.5/0.8/0.7; TII with anterior seta at three-fifths; III: 7.0; 10.0; 4.2/2.4/1.3/1.0/0.5.

Wing. CuAx ratio: 1.1; lower calypter yellow with brown rim and fan of pale setae; haltere yellow.

Abdomen. Terga 1-4 yellow, each with distal dark brown band; terga 5-6 metallic green with bronze reflections; vestiture black; tergum 6 with normal posterior setae; hypopygium (Fig. 100h) black with yellow cerci; epandrium subrectangular; hypandrial hood almost as long as hypandrial arm; hypandrial arm arising near base of hypandrium; aedeagus broad, with dorsal serration and narrowing distally; group of setae present on ventral margin epandrium and possibly representing epandrial setae and bristles of epandrial lobe; surstylus fused to epandrium, short, digitiform, and with setae as figured; cercus elongate, and with strong curved ventral setae as figured (without capitate setae).

Female. Unknown.

Remarks. *Amblypsilopus pseudexul* is known only from riverine rainforest near the mouth of the Manning River, northern New South Wales.

It is distinctive in lacking the male TI curved seta (MSSC) which is an important synapomorphy of the *pallidicornis* Group and other related *Amblypsilopus* Group. This loss is regarded as an autapomorphic loss in this species only. However, other characters, especially the structure of the hypopygium support its inclusion in the *pallidicornis* Group.

Amblypsilopus pseudexul is sympatric with the related *A. williamsi*.

The *zonatus* Group

Diagnosis. **Head.** Male with very weak vertical seta, female verticals strong; male face slightly bulging; first flagellomere subrectangular, arista dorsal (Fig. 102b).

Thorax. Ac absent, or at most only 1 pair present in males; male with 4 dc, with dc_3 reduced to a weak hair (MSSC), female with 4 strong dc; lateral scutellar setae absent.

Legs. Relatively long; male TI with long curved posterior subapical seta (MSSC); male III_{4-5} dv flattened,

padlike (MSSC).

Wing. Male wing often strongly modified, with M_2 reduced to lost and M_1 parallel to R_{4+5} (MSSC); female wing unmodified; male wing with apical maculation (MSSC); females wing hyaline.

Abdomen. Male abdomen long, almost 3 times the length of thorax; epandrium subtriangular; hypandrial hood and hypandrial arm extend almost to apex of aedeagus; surstylus usually reduced in size and curved; cercus usually elongate with basoventral projection.

Remarks. The *zonatus* and *triscuticatus* groups are closely related, both having long legs, male TI with a posterior curved seta (MSSC), and similar hypopygia. However, the posterior curved TI seta is subapical in the *zonatus* Group, but in the distal quarter in the *triscuticatus* Group.

Male wings in the *zonatus* Group are usually modified, with an apical maculation, a tendency for M_1 to become parallel with R_{4+5} and M_2 to become reduced or lost. The modified wings of male

Amblypsilopus zonatus was the basis on which Parent (1932a) erected the genus *Australiola*, here regarded as a junior synonym of *Amblypsilopus*. The *zonatus* Group is found in eastern Australia and Lord Howe and Norfolk Islands, although one species, *A. putealis*, occurs disjunctly in north-western Australia.

The eastern coastal Australian species are good trans-oceanic dispersalists. One species has colonised Norfolk Island, and two others have reached Lord Howe Island, where one of them gave rise to two endemic insular species (Fig. 101).

The assemblage of species derived from *Amblypsilopus zonatus* is of particular interest. *Amblypsilopus zonatus* is a common eastern Australian coastal species which also occurs on Lord Howe Island. The unusual modifications of the male wing are distinctive. *Amblypsilopus cursus*, known only from its southern New South Wales type locality, is identical to *A. zonatus* except for details of the hypopygium.

The two endemic Lord Howe Island species,

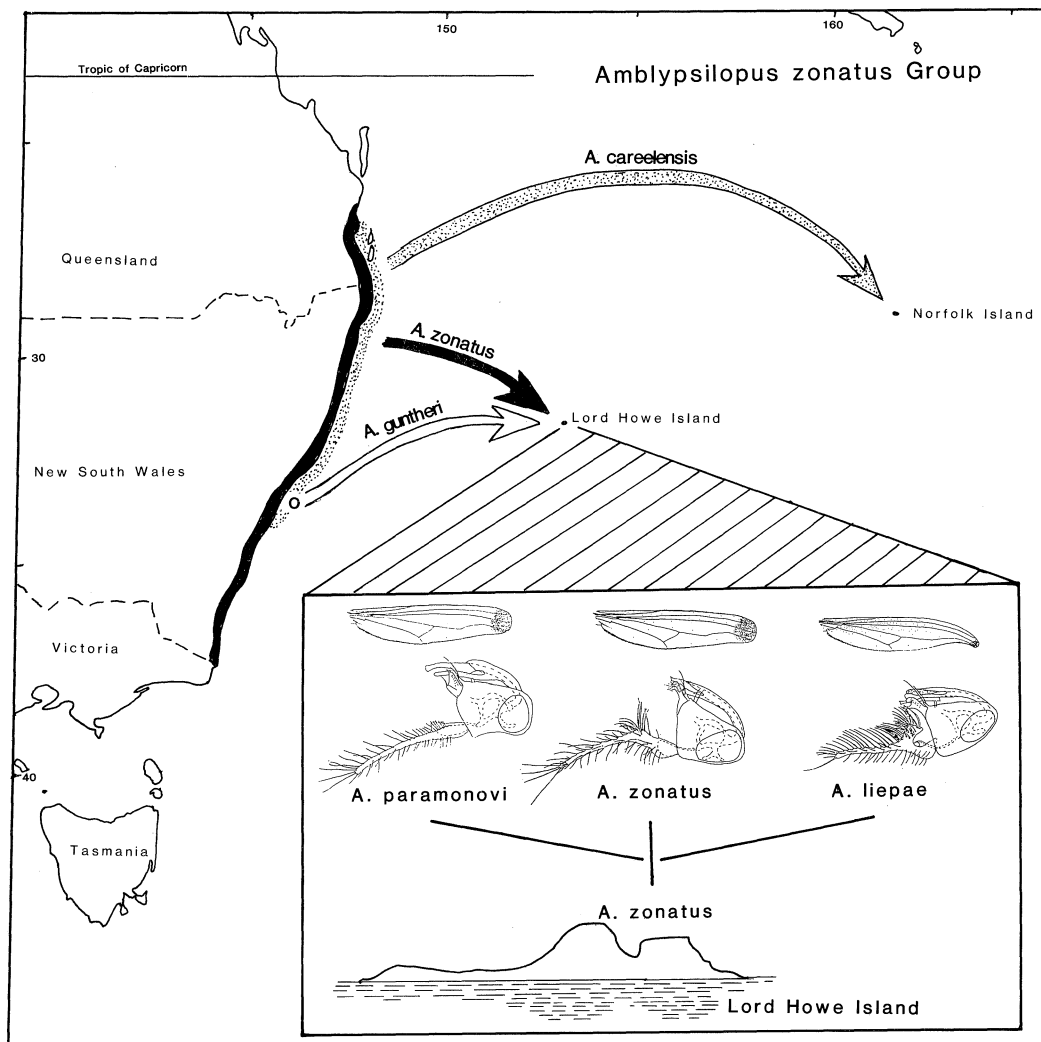


Fig.101. Distribution of some *Amblypsilopus zonatus* Group species, and the speciation of *A. zonatus* on Lord Howe Island.

Amblypsilopus paramonovi and *A. liepae*, are derived from *A. zonatus*, and the three species are sympatric on the island. *Amblypsilopus paramonovi* and *A. zonatus* have identical wings but different cerci. *Amblypsilopus liepae*, however, underwent a more dramatic change during speciation, altering both its hypopygium and wing. In *A. liepae* the ancestral *A. zonatus* wing was modified even further, developing a white subapical spot and falcate tip (compare Fig. 128a,d). As well, it should be noted that *A. liepae* has a pair of strong acrostichal setae, which are absent in the ancestral *A. zonatus*. This is a renewed expression of an plesiomorphic character which had been lost in *A. zonatus*.

The preceding scenario has an ancestral species, *Amblypsilopus zonatus*, which arose on the Australian mainland, reaching Lord Howe Island and giving rise to two daughter species. Clearly the relationship is that of mother-daughter rather sister species, as *A. zonatus* has remained indistinguishable from mainland populations after having speciated. Lord Howe Island itself is the subaerial eroded remnant of a large shield volcano which was built up during the late Miocene, some six to seven million years ago (McDougall *et al.*,

1981). Trans-oceanic dispersal of *Amblypsilopus zonatus* and subsequent speciation would have occurred probably in Pliocene or Pleistocene times.

Amblypsilopus guntheri occurs both on coastal New South Wales and Lord Howe Island, and represents a second colonisation of that island from the continent. *Amblypsilopus careelensis* occurs in mangroves and other coastal habitats from central New South Wales to south-eastern Queensland, and has dispersed to Norfolk Island.

The *Amblypsilopus zonatus* Group comprises seven species.

careelensis n.sp. Australia (NSW, Qld), Norfolk Island.

cursus n.sp. Australia (NSW).

guntheri n.sp. Australia (Lord Howe Island, NSW).

liepae n.sp. Australia (Lord Howe Island).

paramonovi n.sp. Australia (Lord Howe Island).

putealis n.sp. Australia (WA).

zonatus Parent, 1932a: 128. (*Sciapus*) (ANIC, examined, female only), Australia (NSW, Qld, Lord Howe Island).

tonnoiri Parent, 1932a: 123. (*Australiola*) (ANIC, examined), Australia (NSW).

Key to Males of the *Amblypsilopus zonatus* Group

1. Wing with falcate apex and white area basad of brown tip (Fig. 128d); M_2 absent and M_1 almost parallel to R_{4+5} ; cercus with large ventral subrectangular projection bearing blade-like setae (Fig. 103a) (Lord Howe Island) *A. liepae*
- Wing apex rounded, not falcate 2
2. Wing with M_2 absent and M_1 almost parallel with R_{4+5} (Fig. 128a); wing always with large apical dark brown maculation and antenna entirely red-yellow 3
- Wing with M_2 present as distinct vein, and M_1 arched towards R_{4+5} 5
3. Hypandrial arm extending well beyond hypandrial hood; surstylus broad, with strong dorsal seta and tapering ventrally; cercus elongate and setose, with slight basal mound; (Fig. 102c) (NSW) *A. cursus*
- Hypandrial arm extending only slightly well beyond apex of hypandrial hood; surstylus dorsally flexed 4
4. Cercus elongate, digitiform and sparsely setose, and with basal mound bearing long ventral seta and short peduncle bearing 2 apical setae (Fig. 102d) (Lord Howe Island) *A. paramonovi*
- Cercus elongate, tapering and with basal densely setose lateroventral mound (Fig. 102a) (NSW, Qld, Lord Howe Island) *A. zonatus*
5. Wing apex with large circular brown spot (Fig. 103e); antenna entirely red-yellow; cercus elongate, setose and with digitiform basal projection bearing strong pale setae (Fig. 103d) (WA) *A. putealis*
- Wing with small light brown maculations near tip or around apices of veins; first flagellomere mostly dark brown 6

6. Wing with brown clouding anteroapical of vein M (Fig. 128c); cercus short, with large basal pedicel bearing group of long blade-like ventral setae and 2 external setae (Fig. 103c) (NSW, Lord Howe Island) *A. guntheri*
- Wing with brown clouding over apices of veins R_{2+3} , R_{4+5} and M_1 , apex of M_2 , and faintly near marginal extension of CuA; cercus elongate, flagelliform, with digitiform basal projection which bearing long setae (Fig. 103b) (Qld, NSW, Norfolk Island) *A. careelensis*

Amblypsilopus zonatus (Parent)

Sciapus zonatus Parent, 1932a: 128.

Australiola tonnoiri Parent, 1932a: 123 (syn. Bickel & Dyte, 1989).

Amblypsilopus zonatus.—Bickel & Dyte, 1989: 395.

Type material. Parent described *Australiola tonnoiri*, the type of his genus *Australiola*, from a male collected at Woy Woy, NSW (ANIC, examined). He based the genus on the distinctively modified male wings, which are elongate and parallel sided, with M_2 lost, M_1 and R_{4+5} parallel, and the apex covered by a large brown spot (all MSSC). In the same paper, he described *Sciapus zonatus* from a female also taken at Woy Woy (ANIC, examined). *Sciapus zonatus* is identical to females commonly collected with *A. tonnoiri* and to that of a pair taken in copulo. The female bears the characters of *Amblypsilopus*, and since the modified wing of *Australiola* is a MSSC, *Australiola* is placed in synonymy with *Amblypsilopus*. Because the name *Sciapus tonnoiri* was used for a New Zealand species, *Australiola tonnoiri* is placed in synonymy with *Amblypsilopus zonatus*.

Additional material. Lord Howe Island – Mount Lidgebird foothills, Dec. 1972. New South Wales – Hawks Nest, paperbark-sedge swamp, 24 Nov. 1987; Wallagoot Lake, 19 Jan. 1962; Old Bar, mouth of Manning River, 28 Nov. 1987; Narooma, 25 Jan. 1963; Nadgee Nature Reserve, 13-15 Feb. 1986; south of Bateman's Bay, 2 Dec. 1949, 1 Feb. 1973; Bawley Point, 35°30'S 150°42'E, 25 Dec. 1992, 21 Jan. 1993; "Lorien", near Lansdowne, 7-28 Feb. 1987, 4 Oct.-6 Dec. 1987; 0.5 km south-east of Lansdowne, riverine rainforest, 19 Dec. 1992; Ballina, 1 Mar. 1965; Lennox Head, 24 Nov. 1985; Lake Arragan, east of Maclean, 24 Nov. 1985; Bundjalung National Park, near Evans Head, 15 Nov. 1993; Laurieton, dry sclerophyll forest; Botany Bay, Towra Point, 29 Mar. 1986; Harrington, 27 Nov. 1987, mangroves; Richmond River, May 1927; Ulladulla Beach, 20 Feb. 1972; metropolitan Sydney: Bronte, North Bondi, Centennial Park and Mosman, dates inclusive of 12 Nov.-18 Mar., various years; Mooney Mooney Creek, near Gosford, 16 Nov. 1978. Queensland – Brisbane, 10 Oct. 1962 (93 males, 49 females, AMS, ANIC, QDPI, USNM, BMNH).

Description – male. Length 6.2-6.4; wing: 6.0 x 1.4.

Head. Vertex, frons bright shining metallic green, with dusting of grey pruinosity; face and clypeus metallic blue-green with dense grey pruinosity; clypeus free from sides of eyes; proboscis yellow; antenna entirely red-yellow (Fig. 102b); arista black, dorsal, about as long as head width.

Thorax. Dark shining blue-green; scutellum dark blue;

pleura with some grey pruinosity; setae black; ac absent; 1 pa, only 1 sa present, 1 sr, 2 npl, 1 pm, hm absent.

Legs. CI yellow; CII and CIII basally brown, becoming yellow distally; remainder of legs entirely yellow; CI with pale anterior hairs, CIII with pale lateral seta; I: 11.5; 14.5; 6.0/3.0/2.5/1.5/1.0; TI with subapical posterior pale crooked seta (MSSC); It_1 ventrally with crocheted pale hairs (MSSC); II: 12.0; 19.0; 13.0/4.0/2.5/1.5/1.0; TII bare of major setae; III: 14.0; 22.0; 9.0/5.0/2.0/1.0/1.0; $III_{t-4,5}$ each relatively short, flattened and ventrally padlike (MSSC).

Wing (Fig. 128a). Elongate and narrow with R_{4+5} and M_1 subparallel to apex; M_2 absent, its origin represented only by slight kink in M (MSSC); apex with large circular brown spot (MSSC); anal angle strongly reduced; CuAx ratio: 1.7; lower calypter pale with dark brown rim and pale setae; haltere yellow to slightly infuscated.

Abdomen. Metallic blue-green with bronze-brown matt bands near tergal overlap; brown tergal window present on tergum 1; hypopygium dark brown with yellow cerci (Fig. 102a); epandrium subtriangular; hypandrial arm arising beyond midlength of hypandrium and extending only slightly beyond hypandrial hood; aedeagus simple; 2 epandrial setae present; epandrial lobe with long and short bristle; surstylus deflexed; cercus elongate, setose, and with basal densely setose lateroventral mound.

Female. Similar to male except smaller (length 4.0-4.5; wing 4.0 x 1.3) and lack MSSC; ac absent or represented by tiny anterior setulae; CII and CIII entirely yellow; I: 7.5; 8.0; 5.0/2.5/1.5/1.0/1.0; II: 8.0; 11.0; 8.0/3.0/2.0/1.0/1.0; III: 10.0; 15.0; 6.0/3.5/2.0/1.0/1.0; wing unmodified and hyaline (Fig. 128b); abdomen bright metallic green, much shorter than in male; tergum 1 and lateral tergum 2 yellow.

Remarks. *Amblypsilopus zonatus* is a distinctive coastal species known from southern Queensland to the New South Wales border with Victoria, and Lord Howe Island (Fig. 101). The species is common in gardens and parks as well as riparian and estuarine habitats. The male wing is much longer than the body. For further discussion, see Remarks for the *zonatus* Group.

Amblypsilopus cursus n.sp.

Type material. HOLOTYPE male, PARATYPE female, New

South Wales, Minnamurra River near Princes Highway, mangroves, G.A. Holloway (AMS).

Description – male. Length 4.7; wing: 4.7 x 1.2; male specimen somewhat teneral with pale colouration; similar to *A. zonatus* except as noted.

Wing. Similar to that of *A. zonatus* except apical wing spot very faint (MSSC); CuAx ratio: 3.0.

Abdomen. Hypopygium dark brown with yellow cerci (Fig. 102c); epandrium subrectangular; hypandrial arm extending well beyond hypandrial hood; aedeagus simple; 2 epandrial setae present; surstylus broad and

tapering to ventral point, and with strong dorsal seta; cercus elongate and setose, with slight basal mound.

Female. Similar to female *A. zonatus*.

Remarks. *Amblypsilopus cursus* is known only from the type locality near Kiama on the New South Wales southern coast. It is identical in all respects to *A. zonatus* except for details of the hypandrium, surstylus and cercus. Possibly the two species are conspecific, with the *A. cursus* hypopygium representing an aberration from the usual *A. zonatus* form.

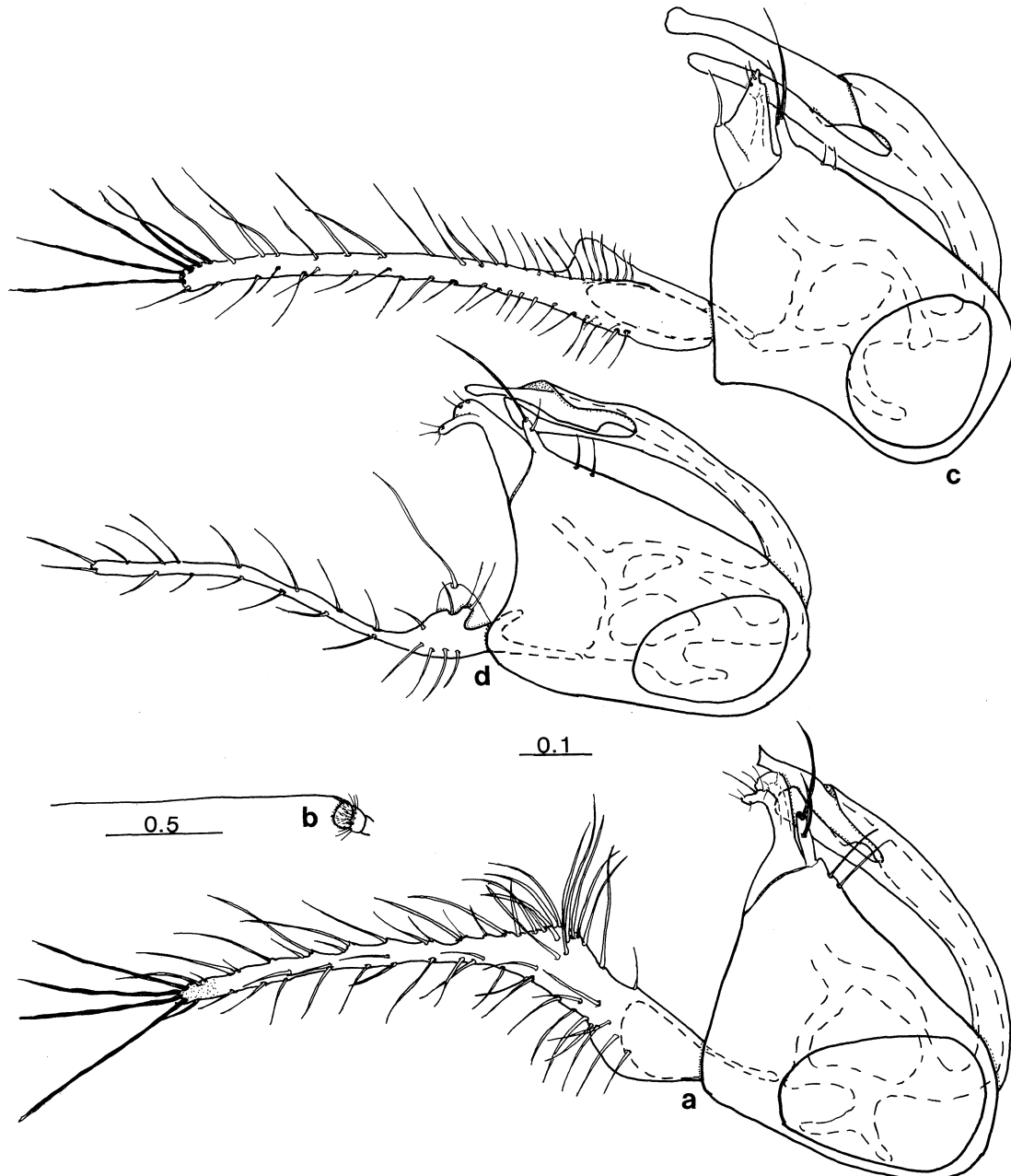


Fig.102. *Amblypsilopus zonatus*, Nadgee, NSW: a – hypopygium, left lateral; b – male antenna, left lateral. *A. cursus*, Minnamurra River, NSW: c – hypopygium, left lateral. *A. paramonovi*, Lord Howe Island: d – hypopygium, left lateral.

Amblypsilopus paramonovi n.sp.

Type material. HOLOTYPE male, PARATYPE male, Lord Howe Island, 1 Dec. 1955, S.J. Paramonov & Z. Liepa (ANIC).

Description – male. Length 6.2-6.4; wing: 6.0 x 1.4; similar to *A. zonatus* in all respects except as noted.

Abdomen. Hypopygium (Fig. 102d); cercus digitiform and sparsely setose, and with basal mound bearing long ventral seta and shorter peduncle bearing 2 apical setae.

Female. Unknown, but probably indistinguishable from females of *A. zonatus* and *A. liepae*.

Remarks. *Amblypsilopus paramonovi* is known only from two specimens collected on Lord Howe Island. Its cercus is distinctly different from that of the widespread and sympatric *A. zonatus*. In all other respects, the two species are identical. For further discussion, see Remarks for the *zonatus* Group.

Amblypsilopus liepae n.sp.

Type material. HOLOTYPE male, Lord Howe Island, Blinky Beach, December, 1972, Z. Liepa; PARATYPES 6 males, same data except Middle Beach, and Mount Lidgebird foothills (ANIC).

Additional material. Lord Howe Island – no specific locale, 30 Nov.-1 Dec. 1955; near Soldier's Creek, 1 Dec. 1966; Mount Lidgebird foothills, Dec. 1972 (7 females, ANIC).

Description – male. Length 6.2-6.4; wing: 6.2 x 1.4; similar to *A. zonatus* except as noted.

Thorax. Three to 4 irregular pairs of short ac present on anterior mesoscutum, with pair of strong ac posteriorly.

Legs. CII and CIII entirely dark brown; relative podomere ratios similar; TI with subapical posterior pale crooked seta (MSSC); It₁ with ventral fine crocheted pale hairs (MSSC).

Wing (Fig. 128d). Elongate and narrow, excavated subapically with curved falcate apex (MSSC); apex brown with subapical white area (MSSC); faint brown streaking between R₂₊₃ and R₄₊₅, and between R₄₊₅ and M (MSSC); M₂ absent (MSSC); CuAx ratio: 3.0.

Abdomen. Hypopygium (Fig. 103a); surstylus with ventral lobe and dorsal digitiform projection; cercus elongate, with long ventral setae strong apical seta, and with large ventral subrectangular projection bearing abundant blade-like setae.

Female. Lack MSSC and similar to female *A. zonatus* except 3-5 irregular pairs ac present.

Remarks. *Amblypsilopus liepae* is endemic to Lord Howe Island and is undoubtedly derived from the widespread *A. zonatus*. It differs from *A. zonatus* in

having a falcate wing tip, a pair of strong ac, and a large the ventral cercal projection. For further discussion, see Remarks for the *zonatus* Group.

Amblypsilopus putealis n.sp.

Type material. HOLOTYPE male, Western Australia, 6 km west of Martin's Well, West Kimberley, 29 Apr. 1977, D.H. Colless; PARATYPE female, same data but 26 Apr. 1977 (ANIC).

Description – male. Length 4.0; wing: 2.9 x 0.9; similar to *A. zonatus* except as noted.

Head. Vertex and frons, face and clypeus bright blue-green; antenna entirely red yellow; arista dorsal, about as long as head width.

Thorax. Ac absent.

Legs. CI black basally, yellow in distal half; CII and CIII black; remainder of legs entirely yellow, base of FIII and distal tarsomeres darkened; TI with subapical posterior pale crooked seta (MSSC); It₁ with pale ventral pile.

Wing (Fig. 103e). With large dark brown apical spot (MSSC); M₁ with anterior curve and subparallel with R₄₊₅ to apex; M₂ short; CuAx ratio: 1.0.

Abdomen. Hypopygium brown (Fig. 103d); epandrium strongly subtriangular; cercus with elongate, setose distal projection, and with digitiform basal projection which bears strong pale setae as figured.

Female. Similar to male except lacking MSSC; 4 strong dc present; wing unmodified; abdomen metallic green.

Remarks. *Amblypsilopus putealis* is known only from the Kimberley region, WA, and is physically isolated from eastern coastal members of the *zonatus* Group.

Amblypsilopus guntheri n.sp.

Type material. HOLOTYPE male, PARATYPES male, 2 females, Lord Howe Island, Mount Lidgebird foothills, December, 1972, Z. Liepa; PARATYPES 12 females: forest near Soldiers Creek, 1 Dec. 1960, at light; Middle Beach and Ned's Beach, Dec. 1972 (ANIC); 3 females, Erskine Valley, 19 Feb. 1971, 16 Dec. 1923 (AMS).

Additional material. New South Wales – male, Cronulla, near mangroves, 9 Dec. 1985 (AMS).

Description – male. Length 6.7; wing: 4.7 x 1.3; similar to *A. zonatus* except as noted.

Head. Vertex, frons, face and clypeus bright shining metallic green, and covered with orientated pruinosity which appears silvery when viewed at oblique angle; scape and pedicel red-yellow to brownish; first flagellomere dark brown.

Thorax. Dark shining blue-green; pair long ac present mid-dorsally, with irregular short ac anteriad.

Legs. CI yellow; CII and CIII brown-green; remainder of legs entirely yellow, except as noted; TI with subapical posterior pale crooked seta (MSSC); It_1 with

ventral fine crocheted pale hairs; TII with ad seta at one-eighth; $IIIIt_{4-5}$ darkened and flattened (MSSC).

Wing (Fig. 128c). With brown clouding anteroapically of M (MSSC); M_1 with anterior curve and subparallel with R_{4+5} to apex; M_2 short; CuAx ratio: 2.0.

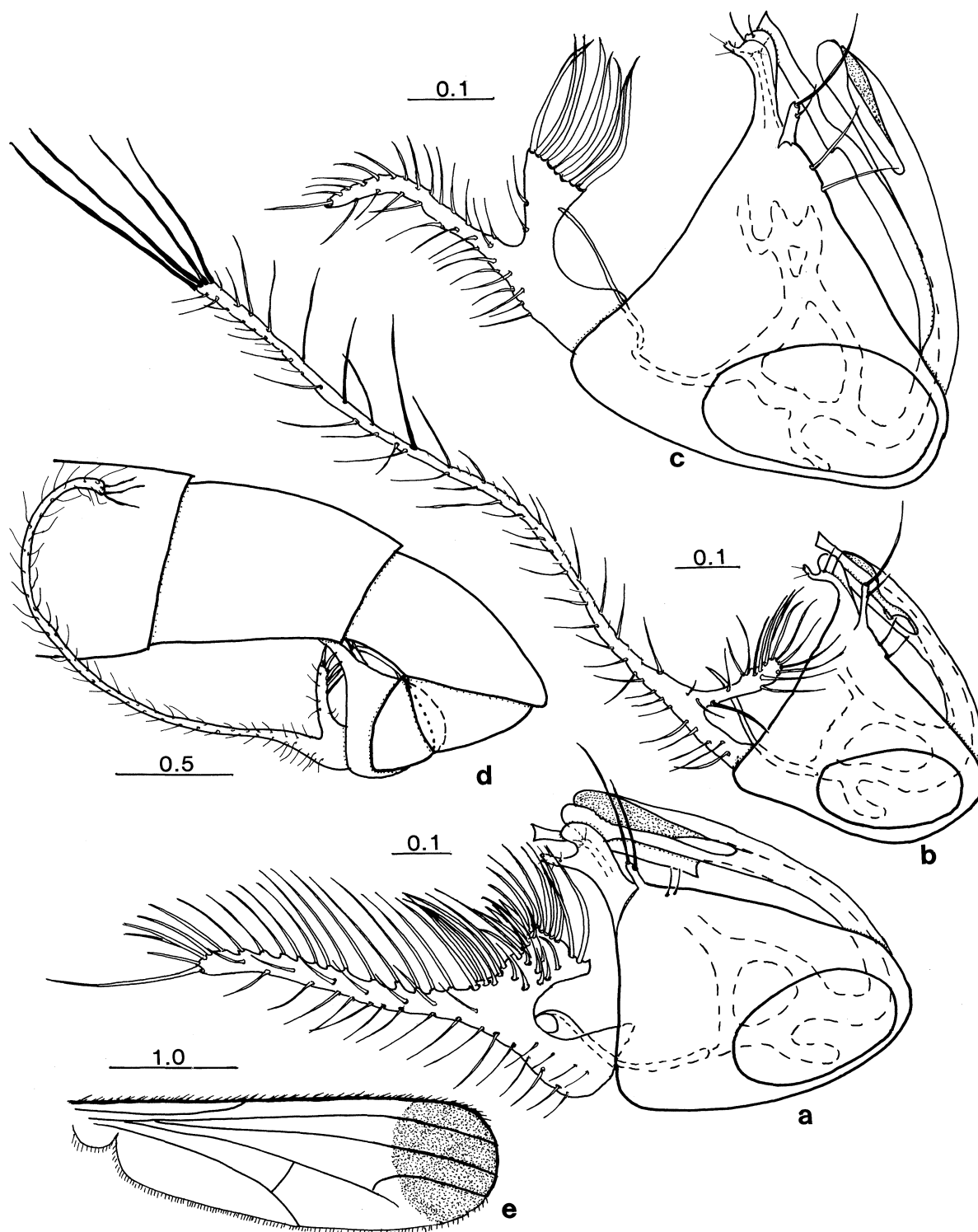


Fig.103. *Amblypsilopus liepae*, Lord Howe Island: a – hypopygium, left lateral. *A. careelensis*, Norfolk Island: b – hypopygium, left lateral. *A. guntheri*, Lord Howe Island: c – hypopygium, left lateral. *A. putealis*, Martin's Well, WA: d – male postabdomen, left lateral; e – male wing, dorsal.

Abdomen. Hypopygium dark brown with brown cerci (Fig. 103c); epandrium strongly subtriangular; hypandrial arm arising beyond midlength of hypandrium and extending only slightly beyond hypandrial hood; surstylus relatively small with median internal projection and dorsal digitiform projection; cercus setose with large clavate basal pedicel which bears group of blade-like ventral setae and 2 external setae.

Female. Similar to male except smaller (length 4.0-4.5; wing 3.7 x 1.3) and lack MSSC; ac absent or represented by 2-3 tiny setulae anteriormost; CII and CIII entirely dark brown; podomere ratios and wing similar to female *A. zonatus*; CuAx ratio: 2.5; abdomen metallic green.

Remarks. *Amblypsilopus guntheri* is found on Lord Howe Island and coastal New South Wales. The first flagellomere of female *A. guntheri* is brown while that of *A. liepae* is yellowish. This species is named for Gunther Theischinger who collected the *Cronulla* specimen.

Amblypsilopus careelensis n.sp.

Type material. HOLOTYPE male, New South Wales, Careel Bay, mangroves, 27 Oct. 1962, D.K. McAlpine; PARATYPES male, 2 females, same data except 15 Dec. 1964, 14 Mar. 1963 (AMS).

Additional material. New South Wales – 2 males, Harrington, mangroves, 27 Nov. 1987, and *Juncus* reed swamp, 8 Jan. 1992, 11 Jan. 1993 (AMS). Norfolk Island – male, 5 females, Bullock's Hut Road, 20 Nov. 1984; Rocky Point Reserve, 14 Nov.-2 Dec. 1984; Mount Bates, 25 Feb. 1958 (ANIC). Queensland – male, Brisbane, no date (AMS).

Description – male. Length 4.2; wing: 3.3 x 1.2; similar to *A. guntheri* except as noted.

Thorax. Two pairs short ac present anteriorly.

Wing. Hyaline but with brown clouding over apices of veins R_{2+3} , R_{4+5} and M_1 , apex of M_2 , and faintly near marginal extension of CuA (MSSC); M_1 with anterior curve and subparallel with R_{4+5} to apex; M_2 short; CuAx ratio: 1.5.

Abdomen. Hypopygium dark brown with cerci basally yellow, distally brown (Fig. 103b); epandrium strongly subtriangular; surstylus relatively small with median

internal projection and dorsal digitiform projection; cercus elongate, flagelliform, and with digitiform basal projection which bears long setae.

Female. Similar to female *A. guntheri*.

Remarks. *Amblypsilopus careelensis* is found along coastal eastern Australia from the Sydney to Brisbane districts, and on Norfolk Island (Fig. 101). It is closely related to *A. guntheri*.

The *argyrodendron* Group

Diagnosis. **Head.** Male with vertical seta very weak or absent; female vertical strong; male face slightly bulging; clypeus not as strongly narrowed as in other *Amblypsilopus*; first flagellomere subrectangular, arista dorsal.

Thorax. Ac totally absent; male with 4 dc, with dc_3 reduced to weak hair (MSSC); female with 4 strong dc; lateral scutellar setae absent.

Legs. Male III t_{4-5} flattened, padlike (MSSC).

Wing. Usually both sexes with apical maculation, although fainter in female.

Abdomen. Epandrium usually subtriangular; hypandrial hood and hypandrial arm extend almost to apex of aedeagus; basal epandrial lobe seta sometimes short and forked; cercus usually elongate, often massive.

Remarks. The *argyrodendron* Group is defined by having an elongate, often massive cercus, an apical wing maculation in males (sometimes also females), ac absent, and males with four dc, with dc_3 only reduced to weak hair. Although the last three characters are shared the *zonatus* Group, the *argyrodendron* Group lacks the TI posterior curved subapical seta (MSSC) present on the *zonatus* Group. As well two members of the *argyrodendron* Group have one epandrial lobe seta forked. Possibly the *argyrodendron* Group was derived from the *zonatus* Group, having lost the TI curved apical seta (whose expression, albeit on a different podomere is retained in *A. fustis*, q.v.).

The *Amblypsilopus argyrodendron* Group comprises three species, from tropical and subtropical eastern Australia.

***argyrodendron* n.sp.** Australia (Qld, NSW).

***fustis* n.sp.** Australia (Qld).

***triduum* n.sp.** Australia (Qld).

Key to Males of the *Amblypsilopus argyrodendron* Group

1. Clypeus and thoracic pleura yellow; It_1 with long pale crocheted posterior subapical seta (Fig. 104e) (MSSC); setae of epandrial lobe not forked; cercus massive with digitiform tip (Fig. 104d) (Qld) *A. fustis*
- Clypeus and thoracic pleura mostly metallic green; It_1 bare; basal seta of epandrial lobe forked 2

2. M_1 subparallel to R_{4+5} ; epandrium dark brown; surstylus ventrally flattened; cercus appearing fleshy and densely setose with long black crenulated subapical setae (Fig. 104a) (Qld, NSW) *A. argyrodendron*
- M_1 diverging from R_{4+5} (Fig. 128e); hypopygium mostly yellow; surstylus with massive ventral lobe and dorsal digitiform projection; cercus elongate with curved ventral projection at one-third and long black setae along distal two-thirds to apex (Fig. 104c) (Qld) *A. triduum*

***Amblypsilopus argyrodendron* n.sp.**

Type material. HOLOTYPE male, Queensland, Mount Glorious, near Brisbane, canopy of *Argyrodendron actinophyllum*, subtropical closed forest, 29 Jan.-5 Feb. 1987, Y. Basset; PARATYPES 2 males, 2 females, same data but 22-29 Jan. 1987, 19-26 Feb. 1987, 20-27 Mar. 1987 (AMS).

Additional material. New South Wales – male, Upper Allyn River, 14 Feb. 1968; female, same data but 22 Apr. 1970 (ANIC); female, Huonbrook near Mullumbimby, 3 Mar. 1965; male, Tooloom Scrub, near Urbenville, on *Alocasia* leaf, 10 Jan. 1988; 2 females, Dorrig National Park, Glades Area, 7 Jan. 1988, subtropical rainforest, on *Hydrocotyle pedicellosa* (AMS).

Description – male. Length 3.6-4.0; wing: 3.5 x 1.6.

Head. Vertex, frons, face and clypeus metallic blue-green with grey pruinosity; vertical seta weak; clypeus almost adjacent to sides of eyes; proboscis yellow; antenna entirely yellow; arista black, dorsal, slightly longer than head height.

Thorax. Dark shining blue-green; pleura with some grey pruinosity; setae black; ac absent.

Legs. All coxae and remainder of legs yellow; CI with pale anterior hairs, CIII with pale lateral seta; I: 5.0; 6.5; 6.5/0.8/0.7/0.8/0.5; It_1 subequal to TI ; II: 5.5; 9.0; 6.5/2.0/1.2/0.8/0.5; TII bare of major setae; III: 7.5; 11.5; 4.0/2.0/0.8/0.5/0.5; $III_{t_{4-5}}$ each relatively short, strongly flattened and ventrally padlike (MSSC) (Fig. 104b).

Wing. Hyaline but apex covered by brown maculation; M_1 subparallel with R_{4+5} to apex; M_2 faint; m-cu slightly curved; CuAx ratio: 2.0; haltere yellow.

Abdomen. Mostly metallic green; hypopygium dark brown with brown cerci (Fig. 104a); epandrium subrectangular; hypandrial hood with some serrations; epandrial lobe short, with 1 normal bristle and other bristle deeply forked; surstylus subrectangular and ventrally flattened with setae as figured; cercus twisted, and appearing fleshy and densely setose, especially along the dorsal margin, and bearing 3 long black subapical setae.

Female. Similar to male except lack MSSC; TII with ad seta at one-sixth; wing also with apical maculation but clouding faint and only present anterior of M_1 ; abdominal tergum 1 and lateral area of tergum 2 yellow.

Remarks. The type series of *Amblypsilopus argyrodendron* was taken by a malaise trap in the

canopy of subtropical rainforest near Brisbane, Queensland. This species has also been collected at ground-level and is found in subtropical rainforest south to the Barrington Tops drainage, New South Wales. Its cercus is distinctive and both sexes have maculated wings, although fainter in the female.

***Amblypsilopus triduum* n.sp.**

Type material. HOLOTYPE male, PARATYPES 19 males, 8 females, Queensland, 14 km west by north of Hope Vale Mission, 15°16'S 144°49'E, malaise trap, 8-10 Oct. 1980, D.H. Colless (ANIC).

Description – male. Length: 4.1; wing: 2.8 x 0.9.

Head. Vertex, frons dark metallic blue with dusting of brownish pruinosity; vertical seta weak; face and clypeus covered with dense brown pruinosity; face bulging; fronto-clypeal suture strong; palp, proboscis and antenna yellow.

Thorax. Metallic blue-green and with brownish pruinosity; pleura covered with silvery pruinosity.

Legs. All coxae and legs yellow, with only distal tarsomeres infuscated; CI with 3 pale setae; I: 6.0; 7.0; 5.5/1.7/1.0/0.7/0.5; It_1 apically with some pale posterior hairs (MSSC); II: 6.2; 9.0; 7.0/2.2/1.3/0.7/0.5; III: 7.5; 11.5; 5.0/2.5/1.0/0.7/0.5.

Wing. With brown apical spot (MSSC) (Fig. 128e); M_1 diverging from R_{4+5} not subparallel; M_2 fading out towards margin; CuAx ratio: 2.3; lower calypter yellow with fan of brownish setae; haltere yellow with infuscated club.

Abdomen. Metallic green-bronze with matt bands near tergal overlap; base of epandrium dark brown, with distal epandrium, cerci and surstyli yellow cerci (Fig. 104c); epandrium subrectangular; hypandrial arm arising beyond midlength of hypandrium; hypandrial arm ventrally serrate; epandrial lobe with long apical bristle, and very short forked subapical bristle; surstylus with large ventral lobe which bears 3 setae, and with dorsal digitiform projection; cercus elongate with distinctive curved ventral projection at one-third and long black setae along distal two-thirds to apex.

Female. Similar to male except lacks MSSC and as noted: first flagellomere brownish apically; thorax entirely yellow with only metallic blue-green band extending across dorsum and scutellum between dc rows, and with

yellowish pruinosity; 4 strong dc present; TII with ad at one-sixth and weak ad and pd setae; wing with faint brown clouding anteroapically; abdomen metallic green except for yellow translucent lateral margins of terga 1-4 and bases of terga 2-3.

Remarks. *Amblypsilopus triduum* is known only from the Cape York Peninsula type locality. The female has a distinctive yellow thorax with a metallic blue-green dorsal band. On the basis of colouration, it is readily separated from female *A. fustis*, q.v.

***Amblypsilopus fustis* n.sp.**

Type material. HOLOTYPE male, Queensland, 16 km north-east of Heathlands, 11°41'S 142°42'E, at light, 22 Mar. 1992, G. Daniels & M.A. Schneider (McEvey Number 10145); PARATYPES 3 females, same but malaise trap, 13 Mar. 1992 (Numbers 9486, 9500), and 16 Mar. 1992 (Number 9734) (AMS).

Additional material. Queensland – female, 11 km east-north-east of Mount Tozer, Iron Range, 11-16 July 1986 (ANIC).

Description – male. Length: 4.3; wing: 3.5 x 1.2.

Head. Frons, face, metallic blue-green with dusting of grey pruinosity; vertical seta absent; head setae black; clypeus yellow with dense grey pruinosity; palp yellow with yellow setae; proboscis yellow; antenna yellow pedicel with black dorsal and ventral setae; first flagellomere subrounded; arista dorsal, its length about one and a half times head height.

Thorax. Dorsum metallic blue-green with grey pruinosity; scutellum metallic blue; pleura pale yellow; setae black.

Legs. All coxae and remainder of legs yellow, with only distalmost tarsomeres darkened; CI with 3 strong pale distolateral setae; CIII with pale lateral seta; I: 4.5; 5.5/5.5/1.0/1.0/0.7/0.4 (Fig. 104e); It_1 elongate, subequal to Tl_1 , and with long pale crocheted posterior subapical seta (MSSC); It_2 with some pale ventral hairs (MSSC);

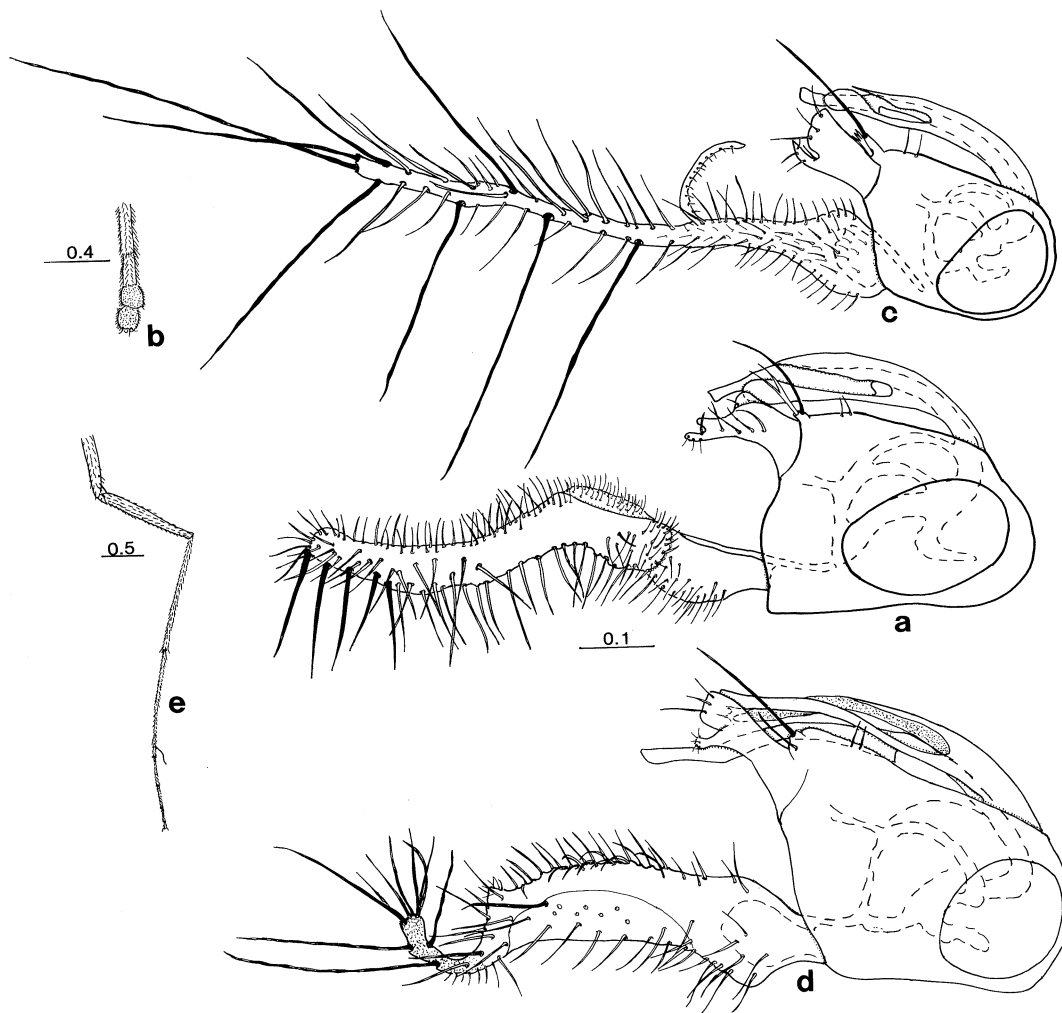


Fig.104. *Amblypsilopus argyrodendron*, Mount Glorious, Qld: a – hypopygium, left lateral; b – male left distal tarsus III, ventral. *A. triduum*, Hope Vale Mission, Qld: c – hypopygium, left lateral. *A. fustis*, Heathlands, Qld: d – hypopygium, left lateral; e – male leg I, anterior.

II: 5.0; 8.2; 6.0/1.5/1.0/0.6/0.4; TII bare; III: 6.3; 10.2; 3.8/1.7/0.6/0.5/0.5; III₄₋₅ flattened, padlike (MSSC).

Wing. Wing with smokey infuscation from costa to just posterior of R₄₊₅, and becoming confined to cell R₃ towards wing base; otherwise venation similar to Fig. 128d; CuAx ratio: 1.9; lower calypter yellow with fan of pale setae; haltere yellow.

Abdomen. Tergum 1 yellowish dorsally; each tergum 2-5 yellow centrally, with brown anterior band and metallic green posterior band; terga 6-7 yellow with metallic green reflections; sternum 8 and hypopygium yellow except for black surstyli and black cercus; hypopygium (Fig. 104d); epandrium subtriangular; hypandrial hood almost as long as hypandrial arm; aedeagus extending beyond surstylus; 2 epandrial setae present; 2 bristles of epandrial lobe on short pedicel and projecting medially; cercus elongate, massive and lobate basally, with narrowed and medially curved truncate apex which bears long black undulating setae.

Female. Similar to male except lacking MSSC and as noted: strong black vertical seta present; clypeus also yellow; thorax almost entirely translucent yellow except for median metallic green area, extending back from mesonotal suture and expanding lateroposteriorly to fill the area between the dc rows and onto the scutellum (the scutellum laterad of the lateral scutellar setae is yellow); CI with 3 brownish distolateral setae; CIII with brownish lateral seta; I: 4.0; 4.7; 3.8/1.3/1.0/0.6/0.3; leg I unmodified; II: 4.5; 7.0; 4.5/1.5/1.0/0.7/0.4; TII with ad setae at one-eighth, two-thirds and subapically; III: 6.2; 8.5; 3.1/1.8/1.0/0.8/0.5; wing entirely hyaline; abdomen mostly translucent yellow except for darkened posterior margins of terga 2-5 and some dorsomedian metallic green infuscation.

Remarks. *Amblypsilopus fustis* is known only from northern Cape York Peninsula, Queensland. The female thoracic and clypeal colouration is distinctive and enabled association of the single Iron Range female with the Heathlands type series.

Of particular interest is the presence of a long crocheted subapical seta on male It₁ (MSSC). This seta is identical to a seta found on tibia I of many male *Amblypsilopus* species in groups close to the *argyrodendron* Group (also see discussion under genus *Amblypsilopus*). Although no male in the *argyrodendron* Group has such a TI seta, it possibly was present in an ancestor but suppressed in the Group. This distinctive

male seta thus finds expression in *A. fustis*, but on a different podomere of the same leg.

The *glaciunguis* Group

Diagnosis. **Head.** Male vertical seta very weak, but more strongly developed in females; male face slightly bulging; first flagellomere rounded or subtriangular and protruding well beyond base of dorsal arista (Fig. 105b,f).

Thorax. Ac present only on anterior half of mesoscutum, with 2 pairs short anteriors and 1 pair long posteriors; male with 4 dc, 2 strong posterior and 1 strong anterior dc, with dc₃ as weak hair (MSSC); female with 4 strong dc; only 1 sa present; median scutellar setae strong, laterals absent.

Legs. Male II₁ and It₁ both very long, longer than their adjacent tibiae (both MSSC); II₄₋₅ somewhat flattened and each segment very short; II₄ bearing bright silvery flag (possibly modified seta) across tip of tarsus or covering II₅ (Fig. 105c) (MSSC) (this MSSC occurs on It₄ in a New Guinea species, see Remarks, below); III₄₋₅ each very short, only slightly flattened (MSSC).

Abdomen. Epandrium tapering subrectangular; hypandrial arm arising beyond midlength of hypandrium; surstylus lobate, with membranous attachment to epandrium.

Remarks. The *Amblypsilopus glaciunguis* Group is confined to northern Queensland, the Northern Territory, and New Guinea. All Australian species have a bright silvery flag which originates from II₄ (Fig. 105c).

Of particular interest is an undescribed species from Igora, near Saiho, Papua New Guinea (AMS) which is almost identical to the Australian *A. glaciunguis*, except the transverse silvery flag arises from It₅ (not II₄), and It is greatly prolonged and thin, almost flagellate, with the leg I podomere ratios as: 6.0; 8.0; 9.5/8.0/3.0/1.5/1.0. Remarkably, the distinctive silvery flag MSSC is similar but occurs on a different leg.

Also of note, *A. kakaduensis* has a strong curved seta on male TI (MSSC) which links the *glaciunguis* Group with the *triscuticatus* Group.

The *Amblypsilopus glaciunguis* group contains the following Australian species.

glaciunguis n.sp. Australia (Qld).

jullatensis n.sp. Australia (Qld).

kakaduensis n.sp. Australia (NT).

Key to Australian Males of the *Amblypsilopus glaciunguis* Group

1. Small, body shorter than 3.5; first flagellomere rounded subtriangular (Fig. 105f); CI with only pale yellow anterior setae; TI with strong pale slightly crocheted posterior seta; cercus relatively short, dorsally setose and ventrally bare, with setose apex (Fig. 105e) (NT) *A. kakaduensis*
- Body longer than 4.0; first flagellomere rounded (Fig. 105b); CI with pale anterior hairs and with 3-4 brown distolateral setae; TI bare; cercus long 2

2. Surstylus with strong dorsal setae; cercus elongate with bent knob-like projection which bears long setae; (Fig. 105a) (Qld) *A. glaciunguis*
- Surstylus with short dorsal digitiform projection; cercus elongate, and at midlength with 2 curved ventral setae, and distad with abundant dorsal and ventral setae (Fig. 105d) (Qld) *A. jullatensis*

***Amblypsilopus glaciunguis* n.sp.**

Type material. HOLOTYPE male, PARATYPE male, Queensland, The Intake, via Redlynch, 30 Dec. 1966, D.K. McAlpine & G.A. Holloway (AMS); PARATYPES 2 males, Bellenden-Ker Range, Cableway Base, 100 m, rainforest, 17 Oct.-2 Nov. 1981, Earthwatch/Queensland Museum (ANIC).

Additional material. Queensland – male, Kuranda, Russet Park, 24 Dec. 1962 (CAS).

Description – male. Length: 5.0; wing: 4.0 x 1.3.

Head. Vertex and frons shining metallic green with bronze reflections; face and clypeus metallic blue-green with dusting of grey pruinosity; face slightly bulging; palp and proboscis yellow; antenna black; pedicel with short dorsal and ventral setae; first flagellomere rounded (Fig. 105b); arista dorsal, about as long as head width.

Thorax. Dorsum bright metallic green with bronze reflections and with dusting of pruinosity; pleura with silvery pruinosity; setae black; ac present only on anterior half of mesoscutum, with 2 pairs short anteriors and 1 pair long posteriors; 4 dc, 2 strong posterior and 1 strong anterior dc, with dc₃ as weak hair; 1 pa, only 1 sa, only 1 sr, 2 npl, 1 hm and 1 pm present; median scutellars strong, laterals absent.

Legs. CI yellow; CII and CIII brownish; trochanters, femora and tibiae yellow; tarsi brownish; CI with pale anterior hairs and with 3-4 brown distolateral setae; CIII with tuft of pale lateral hairs; I: 8.0; 9.5; 10.0/3.0/2.5/1.0/0.7; It₁ with some posterior pale setae on distal fifth (MSSC); II: 8.0; 13.0; 14.0/4.0/2.5/0.3/0.4; IIt₁ longer than TII; IIt₄₋₅ somewhat flattened and each segment very short; IIt₄ with lateral extension bearing bright silvery elongate flag across tip of tarsomere (Fig. 105c) (MSSC); III: 11.0; 18.0; 7.0/4.5/2.0/0.7/0.5; IIIIt₄₋₅ very short, only slightly flattened (MSSC).

Wing. Hyaline; M₁ in gentle arch to apex; CuAx ratio: 2.0; lower calypter yellow with black rim and with fan of pale setae; haltere yellow.

Abdomen. Metallic green with bronze reflections; on segments 2-6, basal half of each tergum and narrow band on preceding adjacent matt brown; sternum 7 reduced to narrow band; hypopygium dark brown with yellow cerci (Fig. 105a); epandrium tapering subrectangular; hypandrial arm arising beyond midlength of hypandrium; aedeagus simple; 2 epandrial setae present; epandrial lobe with 2 bristles; surstylus lobate, with suture along epandrium, and with setae as figured; cercus elongate with distinctive bent knob-like

projection which bears long setae, and with other setae as figured.

Female. Unknown.

Remarks. *Amblypsilopus glaciunguis* is a distinctive species, easily recognised by the transverse silvery flag on IIt₅ and bent cercus. This species is found in rainforests in the Cairns district, Queensland. (See Remarks in introductory section regarding a closely related undescribed Papua New Guinea species.)

***Amblypsilopus jullatensis* n.sp.**

Type material. HOLOTYPE male, Queensland, Thornton Range, near Daintree River, 7 Jan. 1967, D.K. McAlpine & G.A. Holloway (AMS); PARATYPE male, Rex Range Lookout, via Jullaten, malaise trap, 9 Nov.-2 Dec. 1981 (QDPI).

Description – male. Length: 4.7; wing: 4.0 x 1.4; similar to *A. glaciunguis* except as noted.

Legs. CI yellow; CII and CIII brownish; trochanters, femora, tibiae and tarsi yellow, except IIIIt₂₋₅ darkened; CI with pale anterior hairs and with 3-4 brown distolateral setae; I: 9.0; 10.5; 11.0/3.0/2.5/1.5/0.7; It₁ without posterior setae; II: 9.0; 14.0; 15.0/4.0/2.5/0.3/0.4; IIt₁ longer than TII; IIt₄₋₅ each relatively short; IIt₄ also with of bright silvery flag (MSSC); III: 13.0; 21.0; 8.0/5.0/2.5/0.8/0.5; IIIIt₄₋₅ dorsoventrally flattened with ventral pad-like surface (MSSC).

Wing. CuAx ratio: 2.0.

Abdomen. Hypopygium (Fig. 105d); surstylus lobate with short dorsal digitiform projection, with membranous attachment to epandrium, and with setae as figured; cercus elongate with ventral surface bare to midlength; cercus at midlength with 2 long curved ventral setae and distal section of cercus with abundant dorsal and ventral setae.

Female. Unknown.

Remarks. *Amblypsilopus jullatensis* is found in the Cairns district, Qld and is closely related to *A. glaciunguis*.

***Amblypsilopus kakaduensis* n.sp.**

Type material. HOLOTYPE male, PARATYPE female, Northern Territory, Koongarra, 15 km east of Mount Cahill,

6-9 Mar. 1973, D.H. Colless (ANIC).

Description – male. Length: 3.2; wing: 2.2 x 0.8; similar to *A. glaciunguis* except as noted.

Head. Vertex and frons metallic blue-green with dusting of grey pruinosity; face and clypeus metallic blue-green with silvery pruinosity; first flagellomere rounded subtriangular (Fig. 105f).

Legs. CI with only pale yellow anterior setae; TI with strong pale slightly crocheted posterior seta (MSSC); II_t₅ bearing broad leaf-shaped silvery flag, and covering most of II_t₅ (MSSC); III_t₄₋₅ very short and dorsoventrally flattened, with ventral pad-like surface (MSSC).

Wing. CuAx ratio: 1.7.

Abdomen. Hypopygium dark brown with yellow cerci (Fig. 105e); epandrium tapering subrectangular;

hypandrial arm arising beyond midlength of hypandrium; 2 epandrial setae present; epandrial lobe with 2 bristles; surstylus lobate, with membranous attachment to epandrium, and with setae as figured; cercus relatively short, dorsally setose and ventrally bare, tapering distally, with setose apex.

Female. Similar to male except lack MSSC and as noted: first flagellomere shorter, with shorter subtriangular projection; 2 rows of weak ac and 4 strong dc present; length III_t₁ less than TII; II_t and III_t normal.

Remarks. *Amblypsilopus kakaduensis* is known from Arnhem Land, Northern Territory. It is distinctly smaller and has a much shorter cercus than the two other species in the *glaciunguis* Group, which are both from Queensland.

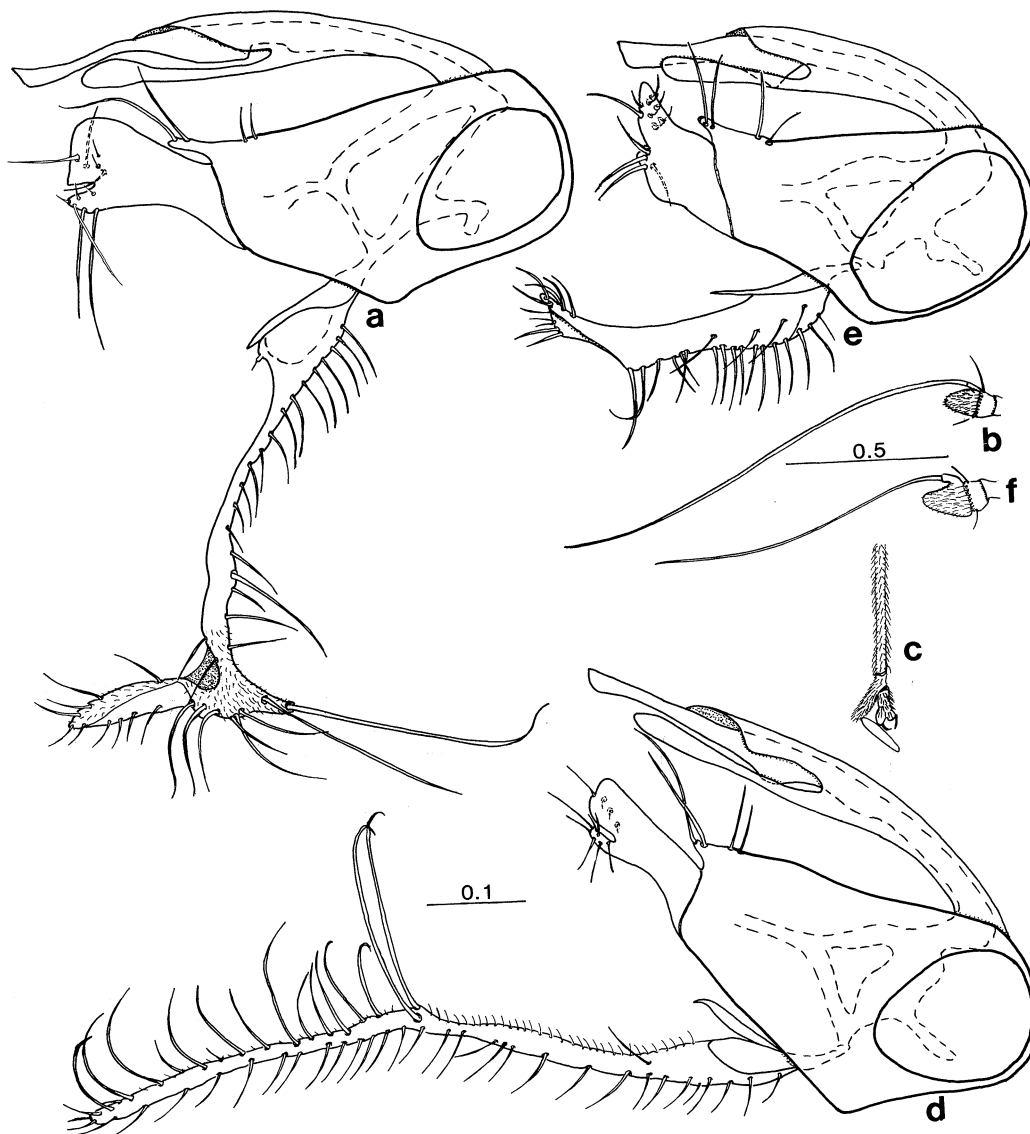


Fig.105. *Amblypsilopus glaciunguis*, Bellenden Ker, Qld: a – hypopygium, left lateral; b – male antenna, left lateral; c – male left II_t₃₋₅, dorsal. *A. jullatensis*, Jullaten, Qld: d – hypopygium, left lateral. *A. kakaduensis*, Koongarra, NT: e – hypopygium, left lateral; f – male antenna, left lateral.

The *anomalicornis* Group

Diagnosis. *Head.* Vertical seta weak and hairlike in male, strong in female; male first flagellomere enlarged and subtriangular, often appearing fleshy and inflated, with dorsobasal arista (group autapomorphy); pedicel often with median projection (Fig. 106c,f) (MSSC); female antenna unmodified, subrectangular (Fig. 106g).

Thorax. Ac present only anterior of mesonotal suture, usually as 3-4 pairs short setae, or 1-2 pairs long setae; male with 4 dc, and with dc₃ as weak hair (MSSC); female with 4 strong dc; lateral scutellar setae absent.

Legs. Male TI mostly bare of major seta, female with some short dorsal seta; male TII with short ad and pd setae, more strongly developed in female; some species with the following MSSC: flattened or flag-like modification of It, elongate curved hairs along distal quarter of It₁, and prolonged tarsomeres on leg I or II.

Wing. Male wing sometimes modified with maculated or falcate apex (MSSC); crossvein m-cu slightly sinuous; CuAx ratio greater than 1.6.

Abdomen. In males relatively long, almost 3 times the length of thorax and unicolourous metallic green-blue; female abdominal terga 1 and 2 mostly yellow; hypandrial arm arising beyond midlength and extending just beyond apex of hypandrial hood; epandrial lobe sometimes with 4-8 bristles (normally only 2 bristles are present on the epandrial lobe); male cercus often with strongly setose dorsal and ventral arms.

Remarks. The *Amblypsilopus anomalicornis* Group is easily recognised by the distinctive inflated male first flagellomere (MSSC). Females, although readily placed in the Group on the basis of ac chaetotaxy, are usually difficult to identify unless associated with males. The *anomalicornis* Group shows similarities with the *zonatus* Group, both groups having variously developed similar

MSSC: flattened or flag-like modification of It, and darkened or falcate wing apices.

Three species, *A. cooki*, *A. baroalba* and *A. birraduk* have four to eight setae on the epandrial lobe, while in most Sciapodinae, only two long setae are present. Some *aryrodendron* Group species also shows modification of epandrial lobe setae.

The *anomalicornis* Group is confined to Australia and New Guinea. In addition to the two named New Guinea species, I have seen two undescribed species from Papua New Guinea (AMS, ANIC). In Australia, species are found in the tropical rainforest, monsoonal woodland and vine forests, and in subtropical rainforests of Queensland and New South Wales. The nine Australian species can be divided into two assemblages, as separated in the key:

I. *A. mollis*, *A. bereni* and *A. augustus* (south-east Queensland to north-east New South Wales, and Cairns district, Queensland).

II. *A. anomalicornis*, *A. birraduk*, *A. baroalba*, *A. cooki*, *A. uptoni* and *A. webbensis* (tropical northern Australia).

The *anomalicornis* group includes the following species.

anomalicornis Becker, 1922: 199. (*Sciapus*) (ZSI, not seen), Australia (NT, WA, Qld).

augustus n.sp. Australia (Qld).

baroalba n.sp. Australia (NT).

basistylatus Parent, 1939a: 164. (*Sciapus*) (ANIC, examined), Papua New Guinea.

bereni n.sp. Australia (Qld, NSW).

birraduk n.sp. Australia (NT).

cooki n.sp. Australia (Qld, NT).

mollis Parent, 1932a: 125. (*Sciapus*) (DEI, not seen, female only), Australia (NSW, Qld).

uptoni n.sp. Australia (NT).

variabilis de Meijere, 1913a: 346. (*Psilopus*) (ZMUA, examined), Irian Jaya, Papua New Guinea.

webbensis n.sp. Australia (Qld).

Key to Australian Males of the *Amblypsilopus anomalicornis* Group

1. Two to 3 pairs long ac present; first flagellomere enlarged but not inflated (Fig. 108b); cercus without ventral arm; III_t₅ flattened (Assemblage I) 2
- Three to 4 pairs short ac present; first flagellomere inflated and fleshy; cercus with well-developed ventral arm; III_t₅ unmodified (Assemblage II) 4
2. Wing apex falcate with opaque white apical spot subtended basally by brown clouding (Fig. 128i); 1 pair strong ac present; cercus with group of wide setae ventrally and with numerous long curved setae distad (Fig. 108c) (Qld, NSW) *A. bereni*
- Wing shape unmodified; 2 pairs strong ac present 3

3. Wing hyaline; cercus with group of curved setae on ventral mound, and with single apical curved seta (Fig. 108a) (NSW, Qld) *A. mollis*
- Wing with distinct brown apical spot; cercus digitiform, and distally with row of long curved ventral setae (Fig. 108d) (Qld) *A. augustus*
4. Pedicel projecting dorsally along first flagellomere in median view (Fig. 106f); It_5 flattened as triangular flag; both dorsal and ventral cercal arms elongate and subequal 5
- Pedicel not projecting dorsally, but forming normal curved margin along base of first flagellomere (Fig. 106c,i); It_5 unmodified or entire It_{2-5} flattened; dorsal cercal arm short, less than one-quarter length of ventral arm 8
5. Wing apex with brown spot (Fig. 128h) 6
- Wing entirely hyaline (Fig. 128g) 7
6. It_5 black but pinnate, not compact (Fig. 107b); dorsal cercal arm with setae along ventral margin only; ventral cercal arm with basal knob-like projection (Fig. 107a) (NT) *A. baroalba*
- It_5 flag black and compact; dorsal cercal arm with setae along both dorsal and ventral margins; ventral cercal arm with basal triangular projection (Fig. 107d) (Qld, NT) *A. cooki*
7. It_5 as silvery-white triangular flag; It_3 very long, equal to FI; dorsal and ventral cercal arms diverge at right angle; epandrial lobe with 6 setae (Fig. 107c) (NT) *A. birraduk*
- It_5 as black triangular flag; It_3 much shorter than FI; dorsal and ventral cercal arms subparallel; epandrial lobe with 2 setae (Fig. 106d) (WA, NT, Qld) *A. anomalicornis*
8. It_{2-5} dark brown, flattened, and with dorsal fringe of black setae (Fig. 106b); dorsal cercal arm strongly recurved basad (Fig. 106a) (NT) *A. uptoni*
- It_{2-5} normal, not flattened; dorsal cercal arm short, not recurved, and bearing 3 to 4 long apical setae (Fig. 106h) (Qld) *A. webbensis*

***Amblypsilopus anomalicornis* (Becker)**

Sciapus anomalicornis Becker, 1922:199.

Amblypsilopus anomalicornis.—Bickel & Dyte, 1989: 394.

Type material. Becker described *Sciapus anomalicornis* from a single male taken at Palmerston (= Darwin, Northern Territory) (ZSI, not seen). Based on his description and figures, this species is identified with confidence.

Additional material. Northern Territory – Bessie Springs, 16°40'S 135°51'E, near Cape Crawford, 26 Oct. 1975; Mount Cahill, Kakadu National Park, 25 Oct. 1972; near Borroloola, 16°08'S 136°06'E, 2 Nov. 1975, 17 Apr. 1976; Coomalie Creek, 8-12 Aug. 1977 (NTMD). Queensland – 6 km west of Mareeba, 17°00'S 145°22'E, 15 May 1977; Mount Webb, 15°03'S 145°09'E, 1 Oct. 1980, 30 Apr. 1981; south-west of Mount Baird, 15°10'S 145°07'E, 3 May 1981; Mount Rounded,

15°17'S 145°13'E, 6 May 1981. Western Australia – Carson Escarpment, 14°49'S 126°49'E, 9-15 Aug. 1975; Drysdale River, 15°02'S 126°55'E, 3-8 Aug. 1975 (13 males, 26 females, all ANIC except where noted).

Description – male. Length: 4.7-5.3; wing: 4.0 x 1.1 (habitus, Fig. 106e).

Head. Vertex, frons metallic green with bronze reflections and dusting of grey pruinosity; face slightly bulging beneath antenna; face and clypeus metallic blue with dense silvery pruinosity; clypeus free from eye margins; palp and proboscis yellow; antenna entirely red-yellow; scape short; pedicel elongate and forming dorsal support for enlarged first flagellomere (Fig. 106f); first flagellomere subtriangular, with tip darkened; arista dorsobasal, about as long as head height; ventral postcranium with pale setae.

Thorax. Dorsum metallic blue-green, with some silvery

pruinosity anteriad, and pleura covered with dense silvery pruinosity; setae black; 3-4 pairs short anterior ac present, with strong pair at median extension of

mesonotal suture; 1 pa, only 1 sa, only 1 sr, 2 npl, 1 short hm, and 1 pm present.

Legs. CI, all trochanters, femora, tibiae, and t_{1-4}

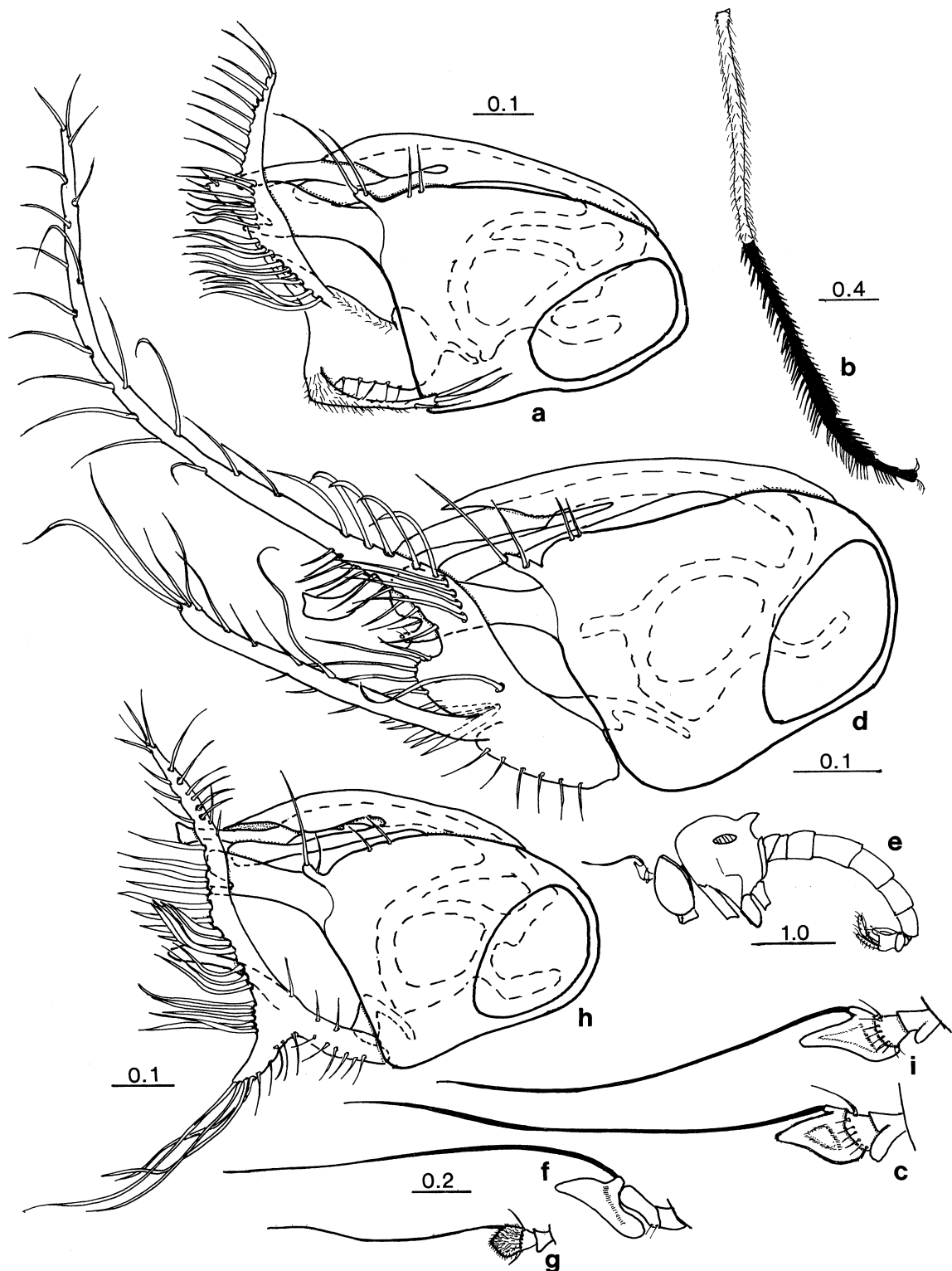


Fig.106. *Amblypsilopus uptoni*, Katherine, NT: a – hypopygium, left lateral; b – male right tarsus I, anterior; c – male left antenna, median. *A. anomalicornis*, Bessie Springs, NT: d – hypopygium, left lateral; e – male habitus, left lateral; f – male antenna, left median; g – female antenna, left lateral. *A. webbensis*, Mount Webb, Qld: h – hypopygium, left lateral; i – male left antenna, median.

yellow; CII and CIII brown; t_5 of all legs black; CIII with pale lateral bristle; I: 7.5; 8.5; 6.0/4.0/3.0/2.5/1.0; It_2 distinctly twisted and with basal excavation on ventral surface; It_5 modified as small black triangular flag (MSSC); II: 8; 10; 8.5/3.5/2.5/1.0/0.5; III: 10; 14.5; 6.0/4.0/2.5/1.0/0.5.

Wing. Hyaline (Fig. 128g); M_1 forming gradual arch to apex; M_2 present as distinct fold; m-cu slightly sinuous; CuAx ratio: 1.7; lower calypter yellow with black rim and with fan of pale setae; haltere yellow.

Abdomen. Metallic green; on segments 2 to 6, basal half of each tergum and narrow band on preceding segment matt brown; posterior margin of each tergum with short black setae; hypopygium dark brown with yellow cerci (Fig. 106d); epandrium subrectangular; hypandrial hood bearing dorsal serrations; left arm of hypandrium extending beyond hood; aedeagus extending beyond surstylus; 2 adjacent epandrial seta present; epandrial lobe with 2 bristles; surstylus with dorsal thumb-like projection; cercus with 2 subparallel arms, the ventral arm much longer and curving ventrad; cercus with curved setae and bands of bristles as figured.

Female. Similar to male except lacks MSSC and as noted: shorter, body length 3.3-3.7; clypeus wider, with sides adjacent to eye margins; face flat; antenna yellowish, with first flagellomere somewhat infuscated; first flagellomere normal, not enlarged (Fig. 106g); 4 strong dc; all coxae, legs yellow, except for darkened tarsomere 5; It unmodified; TII with ad at one-fifth, half and subapically; TIII with ad and pd setae; I: 6.0; 6.5; 4.5/2.0/1.5/1.0/1.0/0.5; II: 6.0; 8.0; 6.0/3.0/2.0/1.0/0.5; III: 8.0; 11.0; 4.0/3.0/2.0/1.0/0.5; abdomen bright metallic green with yellow venter and with tergum 1 yellow and tergum 2 partially to totally yellow.

Remarks. *Amblypsilopus anomalicornis* is found across tropical Australia, from the Cairns district and Cape York Peninsula, Queensland across the monsoonal north to Arnhem Land, Northern Territory and the Kimberley Ranges, Western Australia.

Amblypsilopus uptoni n.sp.

Type material. HOLOTYPE male, Northern Territory, Katherine Gorge, 24 km north-east of Katherine, 16 Oct. 1972, M.S. Upton (ANIC).

Description – male. Length: 6.0; wing: 5.3 x 2.0; similar to *A. anomalicornis* except as noted.

Head. Vertex, frons shining metallic blue-green; antenna yellowish; pedicel without dorsal extension into first flagellomere, but forming broad, curved basal connection (Fig. 106c); arista dorsobasal.

Thorax. Bright metallic blue-green.

Legs. CI, femora, tibiae, basal tarsomeres brown; CII and CIII and distal tarsomeres brown; I: 9.5; 11.0; 10.0/9.0/2.5/1.0/1.0; TI with strong subapical pd seta; It_1

slightly curved and with ventral white pile; It_2 relatively long; $It_{2,5}$ dark brown, laterally flattened, with dorsal fringe of flattened setae, and with surface appearing silvery when viewed from acute angle (Fig. 106b) (MSSC); II: 12.0; 15.0; 12.0/4.5/3.0/1.5/1.0; III: 13.0; 21.0; 8.0/5.0/3.5/2.0/1.0.

Wing. M-cu joining M at distinctly smaller angle; CuAx ratio: 2.6.

Abdomen. Posterior margin of tergum 6 with strong setae; hypopygium (Fig. 106a); 2 epandrial setae present; epandrial lobe with 2 bristles; cercus with distinctive short strongly recurved dorsal arm bearing group of apical setae; ventral arm basally broad, tapering distad and with rows of outwardly directed setae as figured.

Female. Unknown.

Remarks. *Amblypsilopus uptoni* is known only from Katherine Gorge, Northern Territory. Both this species and the following, *A. webbensis*, have a similar antennal pedicel and short dorsal cercal arm.

Amblypsilopus webbensis n.sp.

Type material. HOLOTYPE male, PARATYPES 3 males, 5 females, Queensland, 3 km north-east of Mount Webb, 2-3 Oct. 1980, malaise trap, D.H. Colless; PARATYPE male, same data, but 30 Apr.-1 May 1981 (ANIC).

Additional material. Queensland – Mount Cook National Park, 15°29'S 145°16'E, 10 May 1981, 13 Oct. 1980; 14 km west by north of Hope Vale Mission, 15°16'S 144°59'E, 8 Oct. 1980; Bramston Beach near Innisfail, open savannah, 30 Apr. 1967; 11 km east-north-east of Mount Tozer, Iron Range, 28 June-10 July 1986; Heathlands, 11°45'S 142°35'E, 15-26 Jan. 1992, yellow pans (ANIC); 15 km north of Tully, 14 Apr. 1980 (USNM) (10 males, 20 females examined).

Description – male. Length: 6.7; wing: 5.0 x 1.7; similar to *A. anomalicornis* except as noted.

Head. Vertex, frons shining metallic blue-green; pedicel without dorsal extension into first flagellomere, but forming normal broad, curved basal connection (Fig. 106i).

Legs. Lack distinctive MSSC.

Abdomen. Hypopygium (Fig. 106h); epandrium subrectangular; 2 epandrial setae present; epandrial lobe with 2 strong bristles; cercus with short dorsal arm bearing strong apical setae, and elongate ventral arm with basal digitiform projection and rows of blade-like setae as figured.

Female. Similar to female *A. anomalicornis* except as noted: length: 5.0; vertex and frons shining metallic blue-green.

Remarks. *Amblypsilopus webbensis* is found in tropical northern Queensland, between Iron Range and Innisfail. *A. webbensis* and *A. cooki* occur sympatrically

in northern Queensland. Although females of the two species cannot be reliably separated, some female paratypes are designated on the basis of association with males.

Unassociated females which might be either species were taken at: Moses Creek, north-east of Mount Finnigan, 16 Oct. 1980; Annan River, south-west of Black Mountain, 28 Sept. 1980; Mossman Gorge, 24 Apr. 1967 (8 females, ANIC).

***Amblypsilopus birraduk* n.sp.**

Type material. HOLOTYPE male, Northern Territory, Birraduk Creek, west-south-west of Nimbuwah Rock, 4 June 1973, at light, D.H. Colless (ANIC).

Description – male. Length: 6.0; wing: 5.1 x 1.7; similar to *A. anomalicornis* except as noted.

Head. Vertex, frons shining metallic blue-green; pedicel with dorsal extension into first flagellomere.

Legs. CI, femora, tibiae, It, IIt₁₋₄ and IIIIt₁ yellow; CII and CIII, and remaining tarsomeres brown; I: 9.0; 10.0; 6.0/5.5/9.0/0.5/1.0; TI in distal quarter with row 5-6 long pale posterior apically curved hairs; It₃ very long; It₅ with flattened pinnate silvery hairs (MSSC); II: 9.5; 13.0; 11.0/4.0/3.5/1.0/0.5; III: 13.0; 19.0; 6.5/5.0/4.0/1.0/0.5.

Abdomen. Metallic blue-green; hypopygium (Fig. 107c); epandrium subtriangular; 2 separated epandrial setae present; epandrial lobe bearing 6 subequal setae; cercus with long divergent dorsal and ventral arms, and bearing elongate curved setae as figured.

Female. Unknown.

Remarks. *Amblypsilopus birraduk* is known only from Arnhem Land, Northern Territory.

***Amblypsilopus baroalba* n.sp.**

Type material. HOLOTYPE male, PARATYPES 2 males, Northern Territory, Baroalba Creek Springs, 19 km north-east by east of Mount Cahill, at light, 16 Nov. 1972, D.H. Colless (ANIC).

Description – male. Length: 7.3; wing: 5.3 x 1.8; similar to *A. anomalicornis* except as noted.

Head. Vertex and frons shining metallic blue-green.

Legs. CI, femora, tibiae, basal tarsomeres yellow; CII and CIII and distal tarsomeres brown; I: 9.0; 12.0; 6.5/4.0/10.0/0.5/1.0; TI with 5 pale curved posterior setae in distal quarter; It₁ slightly curved; It₃ very long and thin (MSSC); It₅ flattened, with fringe of black pinnate hairs (Fig. 107b) (MSSC); II: 10.0; 14.5; 12.0/4.5/3.5/1.0/1.0; III: 13.0; 21.0; 7.0/5.0/4.0/1.0/1.0.

Wing. Apex with brown cloud centered around apices of veins R₂₊₃, R₄₊₅ and M.

Abdomen. Posterior margin of terga 6 and 7 with long black setae; hypopygium (Fig. 107a); 2 separate epandrial setae present; epandrial lobe with 8 setae; cercus with thin elongate dorsal arm bearing basal knob and bands of setae as figured.

Female. Unknown.

Remarks. *Amblypsilopus baroalba* is known only from Arnhem Land, Northern Territory.

***Amblypsilopus cooki* n.sp.**

Type material. HOLOTYPE male, PARATYPES 5 males, Queensland, Mount Cook National Park, 15°30'S 145°09'E, 10-12 May 1981, malaise trap, D.H. Colless; PARATYPES male, same data but 12 Oct. 1980; 12 males, 3 females, 1 km west of Cooktown, 15°28'S 145°15'E, 13 May 1981, malaise trap, D.H. Colless (ANIC).

Additional material. Northern Territory – Wildman River, cashew plantation, 1 Nov. 1989; East Point, Darwin, 7-31 May 1975; 14 km south by east of Mudginberri, 11 June 1973; 5 km south-east of Humpty Doo, malaise trap, unburnt monsoonal woodland, 11 Jan.-28 Feb. 1992; Berry Springs, monsoonal vine forest, malaise trap, 26 June-6 July, 20 July-29 Aug., 30 Oct.-4 Dec. 1991, 9 Jan.-28 Feb. 1992 (6 males, 8 females, NTMD, AMS).

Description – male. Length: 6.7; wing: 5.3 x 1.6; similar to *A. anomalicornis* except as noted.

Head. Vertex, frons shining metallic blue-green.

Legs. CI, all femora, tibiae, It₁₋₄, IIt₁₋₃ and IIIIt₁ yellow; CII and CIII green-brown with grey pruinosity; distal tarsomeres brown; TI with 3-4 pale almost crocheted posterior setae along distal fifth (MSSC); It₅ expanded as black triangular flag (MSSC).

Wing. Apex with distinct brown spot (Fig. 128h) (MSSC).

Abdomen. Hypopygium (Fig. 107d); 2 epandrial seta present; epandrial lobe with 4 strong setae; cercus with 2 elongate arms, arising at right angle to each other; dorsal arm bare basally, with elongate curved setae along both sides of arm distad; ventral arm with basal triangular projection and with rows of setae as figured.

Female. Similar to male except lacking MSSC and as noted: shorter, length 4.7-5.0; first flagellomere somewhat infuscated; antenna unmodified; TI with ad seta at one-eighth and pd setae at one-third and two-thirds; TII with ad setae at one-fifth, half and subapically, and pd setae at one-third, half and subapically; abdomen bright metallic green with yellow venter and with distinctive dorsal yellow band around anterior tergum 2.

Remarks. *Amblypsilopus cooki* is known from the Cooktown area, northern Queensland and Arnhem Land, Northern Territory. *Amblypsilopus cooki*, *A. baroalba* and *A. birraduk* have similar MSSC and hypopygia and

are closely related. Of particular note in these three species is the epandrial lobe, which bears four to eight setae, while normally only two setae are present in the Sciapodinae.

***Amblypsilopus mollis* (Parent), n.comb.**

Sciapus mollis Parent, 1932a: 125.

Amblypsilopus mollis.—Bickel & Dyte, 1989: 394.

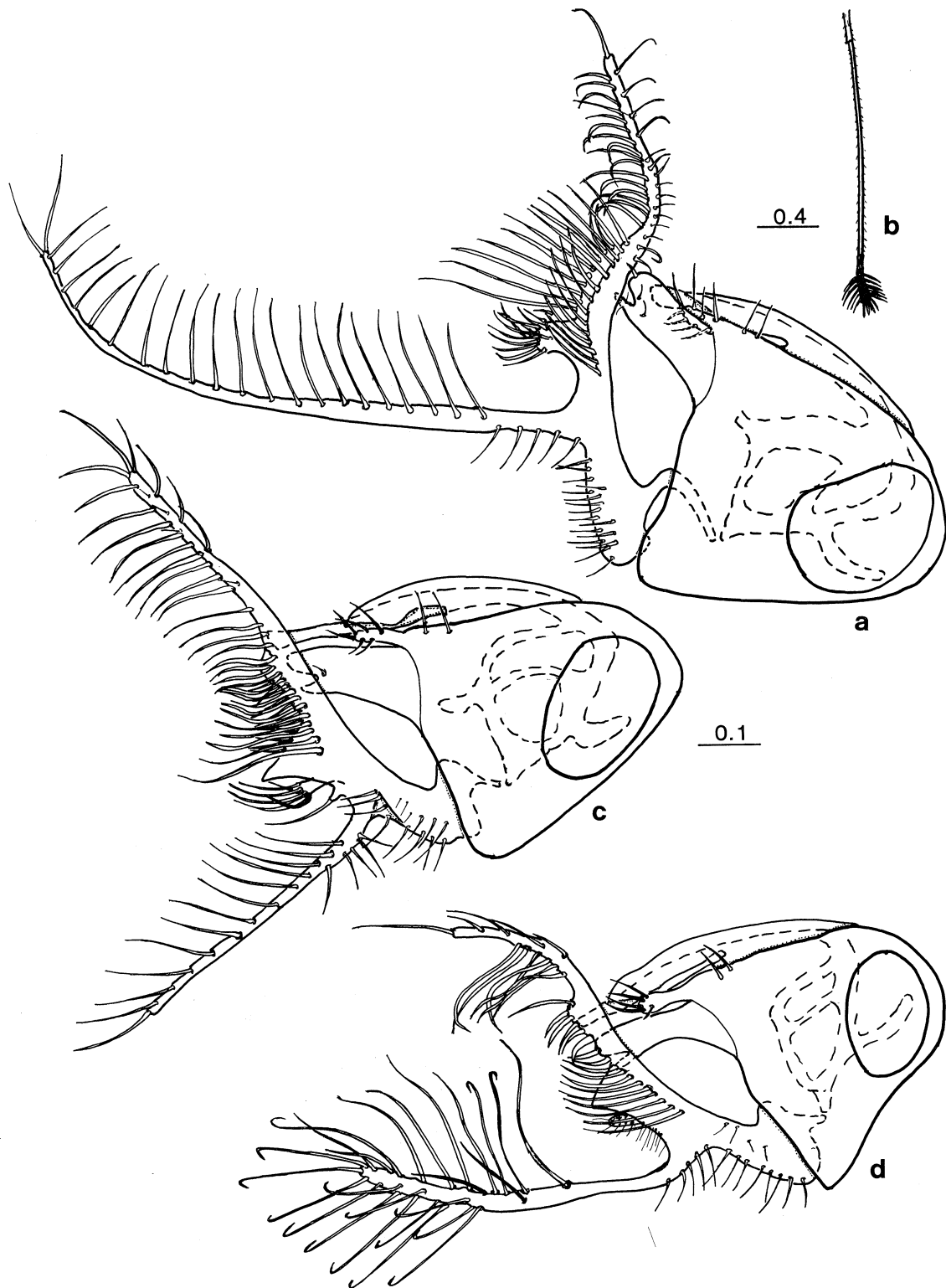


Fig.107. *Amblypsilopus baroalba*, Mount Cahill, NT: a – hypopygium, left lateral; b – male left tarsus I, dorsal. *A. birraduk*, Birraduk, NT: c – hypopygium, left lateral. *A. cooki*, Mount Cook, Qld: d – hypopygium, left lateral.

Type material. Parent described *Sciapus mollis* from a female taken at "Eungal", NSW (= Eungai, on the northern New South Wales coast). I have not examined the holotype (DEI), but Parent's description accurately portrays the female of the species considered below.

Additional material. New South Wales – "Lorien", near Lansdowne, edge rainforest, 1-8 Feb. 1987, 7-15 Feb. 1988; Harrington, littoral rainforest, 14 Jan. 1993. Queensland – Indooroopilly, malaise site, 14-21 Mar. 1982, 1 Jan.-21 Mar. 1983, 5-12 Dec. 1984; Mapleton, 23 Oct. 1980; Brisbane, 2 Oct. 1936; Sandgate, 23 Oct. 1960; North Pine River (near Brisbane), 17 Nov. 1929; Mount Tamborine, 1 Jan.-12 Feb. 1982; south-west of Springsure, Salvator Rosa National Park, Nov. 1990 (11 males, 16 females, AMS, QDPI, QMB, MVM).

Description – male. Length: 6.9-7.1; wing: 5.3 x 2.0; similar to *A. anomalicornis* except as noted.

Head. Vertex and frons deep shining metallic blue-green; pedicel not forming dorsal support for first flagellomere; first flagellomere not as expanded as in other species of *anomalicornis* group, and with sharper apex (Fig. 108b).

Thorax. Two pairs strong ac present, with some shorter ac on anterior slope of mesoscutum.

Legs. CI, femora, tibiae, It_{1-4} , IIt_{1-3} and III_t yellow; CII and CIII, and remaining tarsomeres dark brown; podomere ratios similar; III_t slightly flattened, padlike (MSSC).

Wing. Hyaline but with faint brown infusion near apex (MSSC); CuAx ratio: 1:8.

Abdomen. Hypopygium dark brown with yellow cerci (Fig. 108a); epandrium subtriangular; hypandrial arm only slightly longer than hypandrial hood; 2 epandrial setae present near epandrial lobe; surstylus with lobate ventral projection and with dorsal thumb-like projection which bears long seta; cercus at midlength with distinct ventral mound which bears 6 long curved setae, and with thin distal arm which bears 1 long curved apical seta.

Female. Similar to male except lacking MSSC and as noted: scape and pedicel yellow, first flagellomere dark brown; tergum 1 and anterior half tergum 2 yellow, remainder of abdomen bright metallic green.

Remarks. *Amblypsilopus mollis* is known from the uplands of central Queensland, and along the coast and ranges from south-eastern Queensland to the Manning River, New South Wales. It has been collected in a variety of habitats.

Amblypsilopus bereni n.sp.

Type material. HOLOTYPE male, PARATYPE female, New South Wales, "Lorien", near Lansdowne, edge rainforest, malaise trap, 30 Nov.-6 Dec. 1987, G. Williams. PARATYPES male, female, same but 9-13 Mar. 1985 (AMS).

Additional material. Queensland – male, Conondale Ranges, Booloomba Creek, near Kenilworth, 1-3 Mar. 1985 (AMS).

Description – male. Length: 6.3; wing: 6.0 x 2.0; similar to *A. mollis*, except as noted.

Head. First flagellomere also not inflated, and with sharp apex.

Thorax. One offset pair of strong ac at mesoscutal suture, with short setulae anteriormost.

Legs. III_t slightly flattened, padlike (MSSC).

Wing (Fig. 128i). Hyaline with wing apex narrowed and slightly falcate, and with opaque white apical spot, subtended basally by distinct brown clouding (MSSC); M_2 prolonged and subparallel with R_{4+5} (MSSC); crossvein m-cu sometimes with short external stub vein; CuAx ratio: 2.0.

Abdomen. Hypopygium (Fig. 108c); surstylus with lobate ventral projection and with dorsal thumb-like projection which bears 2 long setae; cercus basoventrally with group of flattened setae and with distal arm which bears numerous long curved setae to apex.

Female. Similar to female *A. mollis*.

Remarks. *Amblypsilopus bereni* is known from the Conondale Ranges, south-eastern Queensland and the Taree district, New South Wales, but probably occurs in the intervening area. It is very close to *A. mollis* and possibly derived from that species, having evolved a falcate wing with an apical white spot from the unmodified *A. mollis* wing. The two species appear to be sympatric over a wide area and were taken in the same malaise trap (but at different times) at a site near Lansdowne, NSW. The falcate male wing show a strong resemblance to that of *A. guntheri*, in the *zonatus* Group (Fig. 128c).

This species is named for Beren Williams, who has assisted me on collecting trips and provided valuable information.

Amblypsilopus augustus n.sp.

Type material. HOLOTYPE male, Queensland, The Boulders, Bellenden-Ker National Park, 28 Aug. 1986, E. Sugden (AMS).

Description – male. Length: 6.7; wing: 5.0 x 1.4; similar to *A. mollis* except as noted.

Head. Antenna black.

Thorax. Two pairs strong ac anterior to mesoscutal suture, with very weak pair anteriad.

Legs. CI, all femora, tibiae and t_1 yellow; CII and CIII, and remaining tarsomeres dark brown; III_t slightly flattened, padlike (MSSC).

Wing. Hyaline with distinct brown anteroapical spot, slightly more extensive than that of Fig. 128h; CuAx ratio: 2.3.

Abdomen. Hypopygium (Fig. 108d,e); 2 epandrial setae present near epandrial lobe; surstylus with lobate ventral projection and with dorsal thumb-like projection which bears setae as figured; cercus elongate

and digitiform and distally with row of long curved ventral.

Female. Unknown.

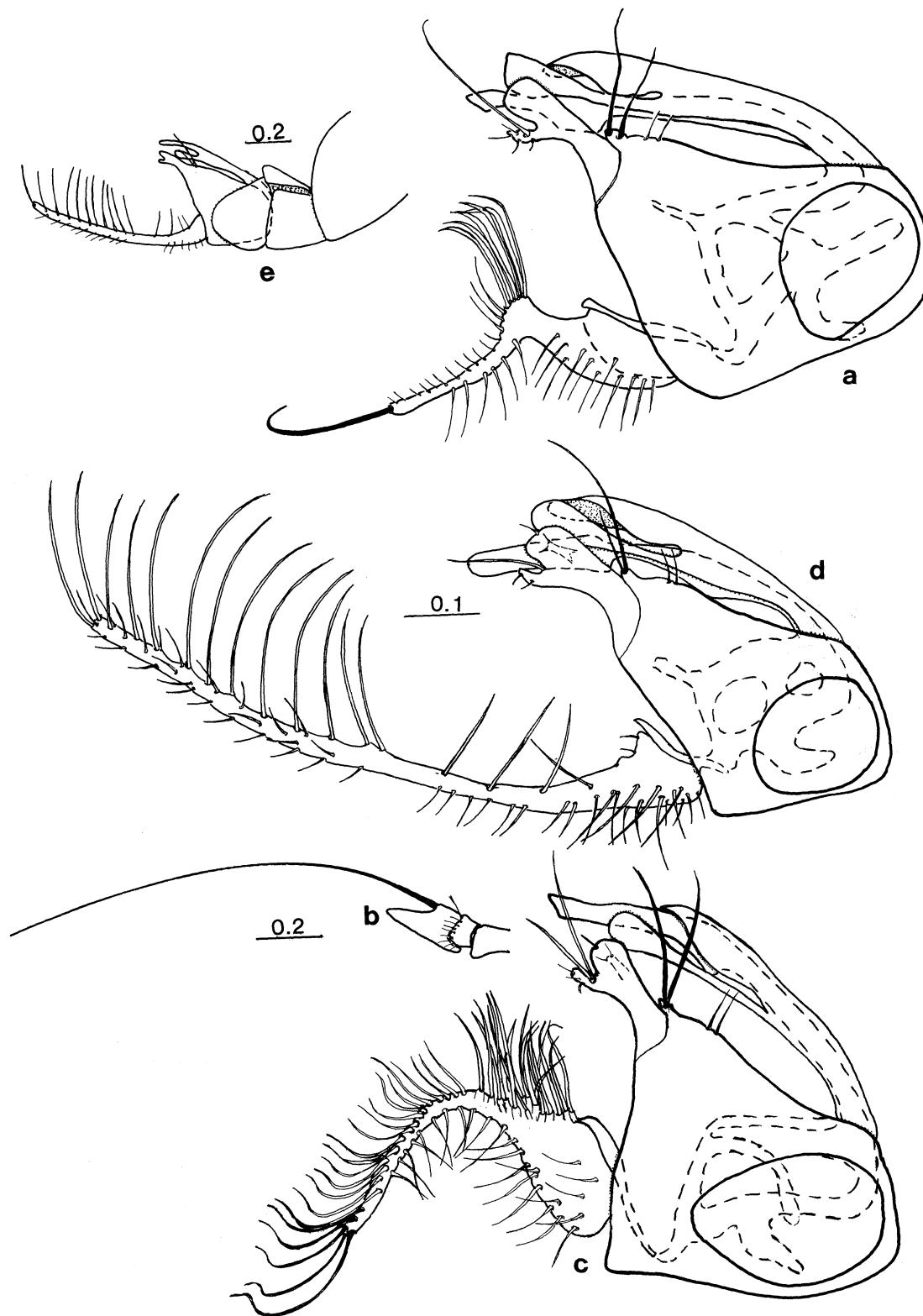


Fig.108. *Amblypsilopus mollis*, Indooroopilly, Qld: a – hypopygium, left lateral; b – male antenna, left lateral. *A. bereni*, Conondale Ranges, Qld: c – hypopygium, left lateral. *A. augustus*, The Boulders, Qld: d – hypopygium, left lateral; e – male postabdomen, left lateral.

Remarks. *Amblypsilopus augustus* is known from tropical rainforest in the Cairns district, Queensland.

The *bertiensis* Group

Diagnosis. *Head.* Males usually with very weak vertical seta; female verticals strong; clypeus free from sides of eyes but not strongly narrowed; arista dorsal to dorsoapical.

Thorax. Three to 4 pairs long ac present; 2 strong posterior dc, and 2 weak hairs anterior, and strong dc anteriormost (MSSC); female with 5 strong dc; lateral scutellar setae weak, about one-sixth length of medians or absent.

Legs. Where known, legs mostly yellow; male TI unmodified; TII with some ad-pd setal pairs; where known, III_t₄₋₅ each distinctly flattened (MSSC) (similar to Fig. 104b).

Wing. Crossvein m-cu straight.

Abdomen. Often with yellow translucent yellowish basal segments in both sexes; epandrial lobe sometimes

strongly reduced and thus epandrial lobe setae appear to arise from epandrial margin; hypandrium usually with left lateral arm; aedeagus usually dorsally serrate and with dorsal angle; surstylus usually rounded and lobate, without dorsal and ventral divisions; cercus usually elongate and often bearing capitate setae.

Abdomen. Male surstylus with lateral cylindrical projection which bears strong apical setae.

Remarks. The *bertiensis* Group comprises two species from the Cape York Peninsula, Queensland. The distinctive surstylus with its lateral cylindrical projection, unites the two included species. Possibly *Amblypsilopus tinarooensis* has III_t₄₋₅ each flattened, but the single male specimen is missing both legs III.

The surstylus of the *Amblypsilopus bertiensis* Group, with its lateral cylindrical projection, is not unlike that of *Krakatauia funeralis* (see Fig. 44a) but other characters are not concordant with the definition of *Krakatauia*.

Included species:

bertiensis n.sp. Australia (Qld).

tinarooensis n.sp. Australia (Qld).

Key to Males of the *Amblypsilopus bertiensis* Group

1. It₁ with 3 black spine-like posteroapical setae, and It₂ strongly flattened with ventral pad-like surface and with strong subapical posterior seta (Fig. 109b); cercus relatively short (Fig. 109a) (Qld) *A. bertiensis*
- It unmodified; cercus with long filiform distal projection (Fig. 109c) (Qld) *A. tinarooensis*

Amblypsilopus bertiensis n.sp.

Type material. HOLOTYPE male, PARATYPES 2 males, 2 females Queensland, Bertie Creek, 1 km south-east of Heathlands, 11°49'S 142°30'E, yellow pans, 12 Feb. 1992, A. Wells (AMS). PARATYPES 8 males, 11 females, junction, 16 km north-east of Heathlands, 11°41'S 142°42'E, malaise trap, 13-22 Mar. 1992; male, female, Bertie Creek pump, near Heathlands, 11°46'S 142°36'E, malaise trap, 15-17 Mar. 1992; 2 females, Captain Billy track, Heathlands, 11°37'S 142°49'E, sweeping, 11 Mar. 1992; male, Bamaga junction, 23 Mar. 1992 (AMS).

Description – male. Length 4.3-4.5; wing: 3.5 x 1.2.

Head. Frons metallic green with bronze reflections; strong black postvertical setae present; pale weak vertical seta present on lateral frons; pair strong diverging ocellar setae present; face and clypeus metallic blue-green with silvery pruinosity; face only slightly bulging; palp and proboscis yellow with yellow setae; antenna yellow; pedicel with black dorsal and ventral setae; arista dorsal, length about twice head height.

Thorax. Dorsum dark metallic blue-green with little pruinosity; scutellum metallic blue; pleura covered with grey pruinosity; setae black; 3 pairs long ac present; 2

strong posterior dc, and 2 weak hairs anterior, and strong dc anteriormost (MSSC); lateral scutellar setae weak, about one-sixth length of medians or sometimes absent.

Legs. CI, femora, tibiae, and all t₁ yellow; CII and CIII dark brown basolaterally, yellow distad; all t₂₋₅ dark brown; CI with 3 pale distolateral setae, CIII with group of pale lateral setae; femora with only short pale ventral hairs; I: 5.0; 6.0; 1.2/2.2/2.0/1.0/0.8; TI unmodified; It₁ slightly flattened with 2-3 black posterior setae and group of 3 black spine-like posteroapical setae, and It₂ strongly flattened with ventral pad-like surface and with strong subapical posterior seta (MSSC) (Fig. 109b); II: 6.0; 8.5; 6.0/2.0/1.5/0.8/0.5; TII with offset ad-pd setae at one-eighth, one-third, half, two-thirds and subapically with ad setae stronger than pd, and with some weak ventral setae; III: 7.0; 11.5; 4.5/2.3/1.2/0.6/0.6; III_t₄₋₅ each distinctly flattened (MSSC) (similar to Fig. 104b).

Wing. Hyaline (similar to Fig. 128g); m-cu straight; CuAx ratio: 2.1; lower calypter yellow with fan of pale setae; haltere yellow.

Abdomen. Elongate; dark metallic green with bronze reflections; on segments 2-6, basal half of each tergum and narrow band on preceding adjacent matt bronze-brown; segment 7 dark brown; hypopygium (Fig. 109a) dark brown; epandrium subtriangular; hypandrium with

left lateral arm not reaching apex of aedeagus; aedeagus with dorsal angle; epandrial lobe highly reduced, with 2 bristles arising apparently from epandrium; surstylus with lateral cylindrical projection which bears strong apical setae; cercus with distinctive subtriangular projection and with 2 long subapical setae and short hooked apical seta.

Female. Similar to male except lacking MSSC; otherwise as noted: strong black vertical seta present; clypeus adjacent to eyes; face not bulging; 5 strong dc present; I: 6.0; 5.5; 4.0/1.8/1.2/0.8/0.5; TI with offset ad-pd pair at one-fifth; It_1 longer than It_2 and both tarsomeres unmodified; $III t_{4-5}$ unmodified; abdomen dorsally metallic green, ventrally translucent yellow; tergum 2 with yellow anterior band.

Remarks. *Amblypsilopus bertiensis* is known only from the Jardine River drainage in northern Cape York

Peninsula where it appears to be common. Most specimens were collected from monsoonal vine forest.

The flattened male leg I tarsomeres with their strong posterior setae are distinctive for this species.

Amblypsilopus tinarooensis n.sp.

Type material. HOLOTYPE male, Queensland, base of Tinaroo Falls, 30 Mar. 1976, I.D. Galloway (QDPI).

Description – male. Length 4.2; wing: 4.0 x 1.3.

Head. Frons shining metallic blue-green; lateral slope of frons with weak pale vertical seta; face and clypeus metallic green and covered with silvery pruinosity; face not bulging; palp dark brown; proboscis red-yellow; antenna black; scape only slightly swollen; first flagellomere relatively short, triangular; arista dorsoapical,

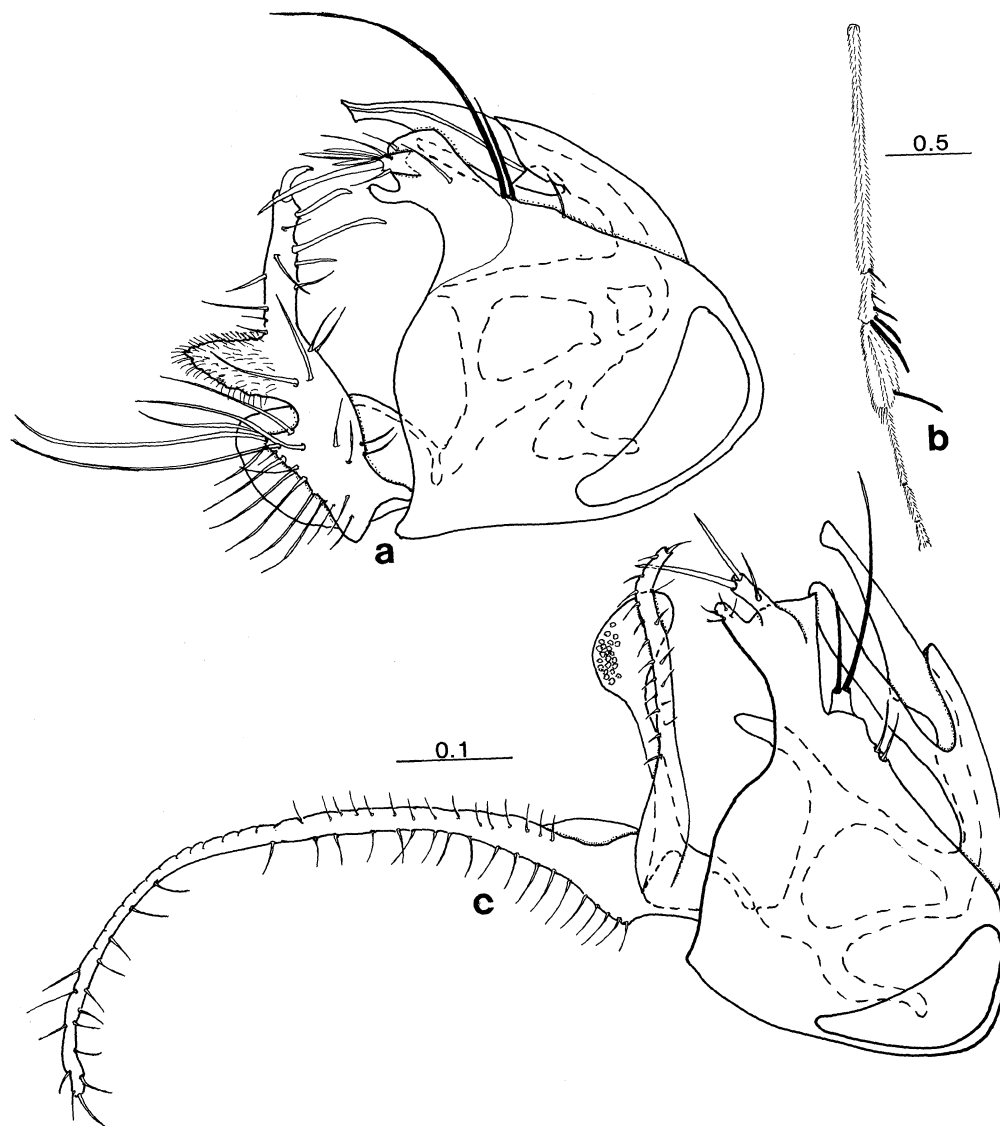


Fig.109. *Amblypsilopus bertiensis*, Bertie Creek, Qld: a – hypopygium, left lateral; b – male tibia and tarsus I, anterior. *A. tinarooense*, Tinaroo Falls, Qld: c – hypopygium, left lateral.

appearing somewhat thickened, and almost twice head height.

Thorax. Shining metallic green with bronze reflections; setae black; pleura with silvery pruinosity; 4 pairs long ac present; 2 strong posterior dc and 2 weak hair-like anterior dc present; lateral scutellars absent.

Legs. Mostly missing on holotype; CI yellow; CII and CIII dark brown; leg I yellow with brownish distal tarsomere; FII and TII yellow; I: 8.0; 8.5; 4.0/2.0/1.0/1.0/1.0; II: 9.0; 10.5; rest of leg missing; III: missing.

Wing. Hyaline but brownish along anterior margin distad of R_1 and anterior of R_{4+5} ; M_2 extends to margin as fold; m-cu straight; CuAx ratio: 1.5; lower calypter pale yellow with dark brown rim and fan of pale setae; haltere yellow.

Abdomen. Tergum 1 with dark brown dorsal membrane; terga 2-6 metallic green with bronze reflections and matt brown bands around tergal overlap; segment 7 subtriangular with well developed tergum and sternum; hypopygium dark brown with yellow cerci (Fig. 109c); epandrium subrectangular; hypandrial arm elongate, reaching almost to apex of aedeagus; 2 epandrial setae present near base of epandrial lobe; epandrial lobe with 2 apical bristles; surstylus hatchet-shaped with lateral cylindrical projection which bears 2 strong apical setae; cercus elongate, curved and setose, and with long basoventral lateral arm bearing short setae which is subtended medianly by elongate clavate projection with medianly directed setae.

Female. Unknown.

Remarks. *Amblypsilopus tinarooensis* is known only

from a damaged male taken near Cairns, Queensland. Since legs II and III are missing on the specimen, the presence of distinctive leg MSSC is not known.

The trogon Group

Diagnosis. **Head.** Male with very weak vertical seta; female vertical strong; first flagellomere subrectangular, arista dorsal.

Thorax. Ac absent; male with 4 dc, with dc_3 reduced to a weak hair (MSSC); female with 4 strong dc; only 1 sa present; lateral scutellar setae absent.

Legs. Male legs without distinctive MSSC; male tibiae bare; female TII with short ad at one-fifth and subapically.

Abdomen. Male abdomen long, almost 3 times the length of thorax; epandrium subtriangular; hypandrial hood not reaching apex of aedeagus; surstylus curved; cercus very long, or short and digitiform.

Remarks. The *Amblypsilopus trogon* Group is not defined by any strong autapomorphy. It is probably closely related to the *glaciunguis* and *anomalicornis* Groups, having only dc_3 reduced to a weak hair. The highly elongated cerci of *A. trogon* and *A. eotrogon* are striking.

The *trogon* Group occurs in monsoonal Western Australia and Northern Territory and includes the three species.

callainus n.sp. Australia (NT).

eotrogon n.sp. Australia (NT, WA).

trogon n.sp. Australia (WA).

Key to Males of the *Amblypsilopus trogon* Group

1. Cercus not more than twice length of epandrium, and with dorsal setae present only at base and apex (Fig. 110c) (NT) *A. callainus*
 — Cercus elongate, more than 3 times the length of epandrium 2
2. Cercus narrow, whiplike, with strong sub-basal bend bearing 2 strong ventral setae; distal cercus black and narrow (Fig. 110a) (WA) *A. trogon*
 — Cercus slightly broader and expanded distally; weak sub-basal bend bearing 3 strong ventral seta; distal cercus pale yellow and subapically expanded (Fig. 110b) (NT, WA) *A. eotrogon*

Amblypsilopus trogon n.sp.

Type material. HOLOTYPE male, PARATYPES 14 males, 10 females, Western Australia, Carson Escarpment, 14°49'S 126°49'E, 9-15 Aug. 1975, I.B.F. Common & M.S. Upton, Drysdale River Survey, 1975, Site 1 (ANIC).

Description — male. Length: 3.6; wing: 2.8 x 1.0.

Head. Vertex, frons, face and clypeus metallic blue with dense grey pruinosity; face bulging; clypeus free from margin of eyes; palpi and proboscis yellow; antenna black; first flagellomere rounded; arista about as long as head width.

Thorax. Metallic blue-green with dusting of grey pruinosity; pleura with dense grey pruinosity; setae black; 1 pa, only 1 sa, 1 sr, 2 npl, 1 weak hm and 1 strong

pm present.

Legs. CI yellow; CII and CIII dark brown; remainder of legs yellow, with only distal tarsomeres infuscated; leg setae black; CI and CII with pale anterior setae; CIII with pale lateral setae; male tibiae without major setae or significant MSSC; I: 6.0; 5.5; 3.0/1.5/1.0/0.5/0.5; II: 5.0; 7.0; 5.0/1.5/1.0/0.5/0.5; III: 7.0; 10.0; 3.5/2.5/1.5/0.7/0.5.

Wing. Hyaline; M_2 reduced to short stub, but continuing as fold to margin; m-cu straight; CuAx ratio: 1.7; lower calypter yellow with dark rim and fan of pale setae; haltere yellow.

Abdomen. Metallic blue-green with matt brown bands near tergal overlap; sternum 7 somewhat reduced; epandrium dark brown with conspicuous elongate cerci (Fig. 110a); epandrium subtriangular; 2 epandrial setae present; hypandrial arm arising at midlength of hypandrium and extending beyond apex of hypandrial hood; epandrial lobe with 2 bristles; surstylus short, with dorsal digitiform projection; cercus black, elongate and whiplike, with strong subbasal bend which bears 2 strong ventral setae and other shorter setae; distal cercus narrow and curved.

Female. similar to male except CIII yellow.

Remarks. *Amblypsilopus trogon* is known only from the type locality in the Drysdale River district, Western Australia.

Amblypsilopus eotrogon n.sp.

Type material. HOLOTYPE male, PARATYPES 2 males, Northern Territory, 16 km east by north of Mount Cahill, at light, 16 Nov. 1972, D.H. Colless; PARATYPE male, Nourlangie Creek, 6 km east of Mount Cahill, 18 Nov. 1972 (ANIC).

Additional material. Western Australia – male, Emma Gorge, El Questro Station, East Kimberley, 28 Dec. 1991 (AMS).

Description – male. Length: 3.8; wing: 2.6 x 1.0; similar to *A. trogon* in all respects except for structure of cercus.

Abdomen. Cercus with weaker subbasal bend which bears three strong ventral seta; elongate distal cercus pale, wider and subapically expanded (Fig. 110b).

Female. Unknown.

Remarks. *Amblypsilopus eotrogon* is known from Arnhem Land, Northern Territory and the eastern Kimberleys, Western Australia. The cercus of this species is distinctly different from that of *A. trogon*.

Amblypsilopus callainus n.sp.

Type material. HOLOTYPE male, PARATYPES 3 females, Northern Territory, Baroalba Creek Springs, 19 km north-east

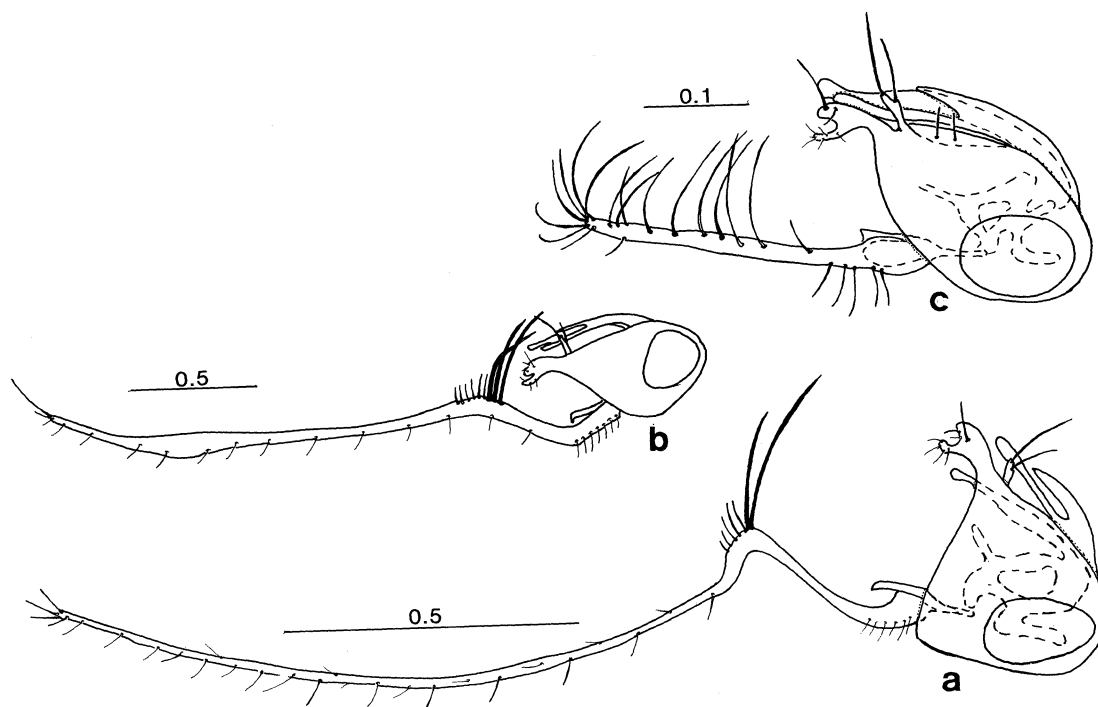


Fig.110. *Amblypsilopus trogon*, Drysdale River, WA: a – hypopygium, left lateral. *A. eotrogon*, Mount Cahill, NT: b – hypopygium, left lateral. *A. callainus*, Mount Cahill, NT: c – hypopygium, left lateral.

of Mount Cahill, 28-29 Oct. 1972; PARATYPES male, 16 km east by north of Mount Cahill, 16 Nov. 1972; 2 males, Koongarra, 15 km east of Mount Cahill, 15 Nov. 1972, 12 June 1973; D.H. Colless (ANIC).

Description – male. Length: 2.2; wing: 1.6 x 0.7.

Head. Vertex not deeply excavated; frons, face and clypeus metallic blue-green with grey pruinosity; palpus and proboscis yellow; antenna dark brown; arista about as long as head width.

Thorax. Dorsum metallic blue-green with dusting of grey pruinosity; pleura with dense pruinosity; setae black; 1 pa, 1 sa, 1 sr, 2 npl, 0 hm and 1 pm present.

Legs. CI, distal CII and CIII, all femora, tibiae and all t_{1-4} yellow; basal CII and CIII and all t_5 black; CI and CII with pale anterior hairs; CIII with pale lateral seta; tibiae without major setae; I: 3.4; 3.6; 2.0/1.0/0.8/0.4/0.4; II: 3.5; 4.7; 3.1/1.5/1.0/0.4/0.4; III: 8.0; 11.0; 4.0/3.0/1.5/1.0/1.0.

Wing. Elongate, hyaline (Fig. 128j); M_2 present only as faint fold to margin but M_1 with distinct bend at junction; CuAx ratio: 1.2; lower calypter yellow with black rim and fan of pale setae; haltere yellow.

Abdomen. Metallic green with bronze reflections; sternum 7 reduced to narrow band; hypopygium dark brown with yellow cerci (Fig. 110c); surstylus with digitiform dorsal arm and with setae as figured; cercus digitiform and simple, with dorsal setae only present at base and apex, and other setae as figured.

Female. Similar to male except lacks MSSC.

Remarks. *Amblypsilopus callainus* is known only from Arnhem Land, Northern Territory. This species is relatively small.

The *flaviappendiculatus* Group

Diagnosis. **Head.** Vertex distinctly excavated; both sexes with strong vertical seta; male face slightly bulging; male clypeus free from margin of eyes (Fig. 112c); female clypeus adjacent to sides of eyes; first flagellomere subrectangular; arista dorsal and about as long as head width.

Thorax. Usually 1 to 3 pairs of long ac present; male with 2 strong posterior dc, and 3-4 weaker hair-like dc anteriorad (MSSC); female with 4-5 strong dc; lateral scutellar seta as weak hair, or absent.

Legs. Coxa I, and all femora and tibiae usually yellow; male TI usually with pale crocheted posterior hairs (MSSC), confined either to distal half (eg, Fig. 112d) or present along entire tibia (Fig. 113e); male III_{3-4} or III_{3-5} dorsoventrally flattened and padlike (MSSC).

Wing. M_1 often in long arc to apex; m-cu straight (eg, Fig. 129a).

Abdomen. Hypandrial hood short, narrow, covering

only base of aedeagus; left hypandrial arm usually very long and extending to apex of aedeagus; epandrial lobe often prolonged; surstylus with weakly sclerotised dorsal lobate projection which often extends laterally and covers cercal base; cercus sometimes elongate and whiplike.

Remarks. Most males of the *flaviappendiculatus* Group have curved posterior TI setae (MSSC), III_{3-5} dorsoventrally flattened and padlike (MSSC), hypandrial hood usually very short, hypandrial arm narrow and elongate, epandrial lobe well developed, and surstylus often with dorsal lobate projection (not unlike a similar but homoplastic development of the surstylar lobe in *Austrosclapopus connexus*, compare Fig. 77c with Fig. 113g).

The *flaviappendiculatus* Group is related to the *topendensis* Group, whose two members have a similar hypandrium and lobate surstylar projection.

The *flaviappendiculatus* Group is known from south-eastern Asia, and Australia. In Australia, most species occur in the tropical monsoonal woodland and vine forests of the Arnhem Land and the Cape York Peninsula. However, *Amblypsilopus fonsecai* is found as far south as the Sydney district. The widespread Oriental-Australasian *A. flaviappendiculatus* extends into tropical Queensland and the Northern Territory (Fig. 111).

The *flaviappendiculatus* Group includes the following species.

cahillensis n.sp. Australia (NT).

edwardsi n.sp. Australia (NT).

flaviappendiculatus de Meijere, 1910: 94. (*Agonosoma*) (ZMUA, examined), Indonesia (Java, Flores), Philippines, China, Vietnam, Australia (NT, Qld).

dolichocnemis Frey, 1925: 17. (*Psilopus*) (ZMH, examined), Philippines.

brevitarsis Parent, 1932b: 110. (*Sciapus*) (MLUH, examined), Indonesia (Flores).

For discussion, see species section below.

fonsecai n.sp. Australia (NSW, Qld).

mensualis n.sp. Australia (Qld, NT).

guldensis n.sp. Australia (Qld).

subtilis Becker, 1924: 130. (*Sciapus*) (DEI, examined), Taiwan, **n.comb.**

This species has a yellow first flagellomere and very short It_1 , similar to *A. flaviappendiculatus*. However, the cercus is long and whiplike.

The syntypes comprise a male and two females, not two males and a female as noted by Becker. I have seen a male from Taiwan: Pukai (MCZ).

Lectotype here designated: male, bearing label "Maruijama (Form.) H. Sauter iv-1914".

trahens Frey, 1925: 16. (*Sciapus*) (ZMH, examined), Philippines, **n.comb.**

The surstylus has a distinct dorsal lobate projection.

Key to Australian Males of the *Amblypsilopus flaviappendiculatus* Group

1. Antenna entirely yellow and with pale setae on pedicel; all coxae yellow; FIII with long fine pale av setae; epandrial lobe with stout curved seta (Fig. 112e,f) (NT) *A. edwardsi*
 — At least scape and pedicel black; other features various 2
2. Scape and pedicel black; first flagellomere yellow 3
 — Antenna entirely black 4
3. Tarsus I very short, less than one-third length of TI; only 1 pair ac present; TI with group of long pale subapical setae (Fig. 112d); surstylus with short dorsal lobate projection; cercus short (Fig. 112a,b) (NT, Qld) *A. flaviappendiculatus*
 — Tarsus I longer than half length TI; 2-3 pairs ac present; TI with only very short pale posterior setae, if distinguishable; cercus long and curved; surstylus with enlarged, weakly sclerotised dorsally and ventrally projecting lobe with dorsal point (Fig. 113b,c) (NT) *A. cahillensis*
4. Large, wing length longer than 3.8; It_5 flattened into black flag; TI with pale curved posterior setae along entire length; cercus with digitiform projection bearing 3 apical setae; surstylus with dagger-like projection (Fig. 113a) (NSW, Qld) *A. fonsecai*
 — Smaller, wing length less than 3.0; It_5 unmodified; TI with pale slightly crocheted posterior setae in distal half 5
5. Cercus with group of distinctive ventral pedunculate setae at elbow-like bend; surstylus with cordate dorsal projection (Fig. 113d) (Qld, NT) *A. mensualis*
 — Cercus elongate and setose; surstylus with rounded lobate dorsal projection covering base of cercus (Fig. 113g) (Qld) *A. quldensis*

Amblypsilopus flaviappendiculatus (de Meijere)

Agonosoma flaviappendiculatus de Meijere, 1910: 94.

Psilopus dolichocnemis Frey, 1925: 17 (syn. Bickel & Dyte, 1989).

Sciopus brevitarsis Parent, 1932b: 110 (syn. Bickel & Dyte, 1989).

Type material. De Meijere described *Agonosoma flaviappendiculatus* from a male collected in Java (ZMUA, examined). The hypopygium, antennal colour and unusual podomere ratios of male leg I are distinctive for the species. *Psilopus dolichocnemis*, based on a male from the Philippines (ZMH, examined) is conspecific. The description and figures of *Sciopus brevitarsis*, based on a male from Flores (MLUH, examined; specimen lost, represented only by pinned label) are identical to de Meijere's and Frey's types. (In his description, Parent (1932b: 110) had suggested a possibly synonymy between *P. dolichocnemis* and *S. brevitarsis*). I have also examined a male from Vietnam (BMNH) noted by Parent (1934b: 294).

Additional material. Northern Territory – Oenpelli Road and Arnhem Highway, 6 June 1988; Berry Springs, monsoonal vine forest, 27 Sept.-30 Oct. 1991; near Humpty Doo, 11 Jan.-28 Feb. 1992, unburnt monsoonal woodland (NTMD): East Jabiru, 24-28 May 1988, yellow pans; 5 km north-north-west of Cahills Crossing, East Alligator River, 8-9 May 1973; Cooper Creek, 19 km east by south of Mount Borradaile, 5 May 1973; 20 km west of Humpty Doo, 10 June 1964; Burnside Station, Brocks Creek, 22 Apr. 1932; Horn Island, Sir Edward Pellew Group, 6-14 Feb. 1968 (QDPI). Queensland – Mount Cook National Park, 10-13 May 1981, malaise trap; Bramston Beach, near Innisfail, 30 Apr. 1967; Palmerston National Park, Crawford's Lookout, 1 Apr. 1976 (QDPI) (12 males, 9 females, all ANIC except where noted).

Extralimital records. Males, China – Hong San, south-east Kiangsi; Hainan Island (USNM).

Description – male. Length: 4.3-4.5; wing: 3.4 x 1.2. *Head.* Vertex, frons and face below antenna shining metallic blue-green; frons with strong vertical seta; lower

face and clypeus with silvery pruinosity; palp and proboscis yellowish; scape and pedicel black; first flagellomere bright yellow; pedicel with single dorsal and ventral setae (Fig. 112c); first flagellomere subrectangular; arista short, as long as head width; ventral postcranium with abundant pale setae.

Thorax. Metallic blue-green with bronze reflections; pleura with grey pruinosity; setae black; scutellum metallic blue; only 1 pair strong anterior ac; 2 strong posterior dc, with 4 short, weak hair-like dc anterior (MSSC); 1 pa, 1 sa, 2 sr, 1 weak hm, 1 stronger pm and 2 npl present; lateral scutellars as weak hairs.

Legs. CI, femora, tibiae, and basal tarsomeres yellow; CII and CIII and distalmost tarsomeres black; CI with pale anterior hairs and with 3-4 strong pale setae distolaterally; CIII laterally with tuft of pale hairs; I: 7.5; 11.5; 1.0/0.7/0.7/0.5/0.5 (Fig. 112d); TI elongate with some long curved pale crocheted posterior setae in distal quarter and with tuft of hairs at apex (MSSC); It_1 very short (MSSC); II: 6.0; 10.5; 6.5/2.0/1.0/0.5/0.5; III: 8.0; 12.0; 5.0/2.0/1.0/1.0/0.5; TIII with ad at one-fifth; $III_{t_{3-5}}$ black, flattened, with ventral pad-like surface (MSSC).

Wing. Hyaline (Fig. 129a); M_1 with elbow-shaped bend; M_2 weakly developed; m-cu straight; CuAx ratio: 2.0; lower calypter yellow with black rim and pale setae; haltere yellow.

Abdomen. Metallic green, and on segments 2-6, basal half of each tergum and narrow band on adjacent tergum matt brown; tergum 7 trapezoidal, with sternum either absent or fused with tergum, and with excavation subtended by single short seta on each dorsal corner (Fig. 112b); hypopygium dark brown with yellow cerci (Fig. 112a); hypandrial arm long and expanded apically; 2 short epandrial seta present on incurved projection; surstylus with curved ventral arm and relatively small dorsal lobate projection; cercus short, with arm arising

from short base and setae as figured.

Female. Similar to male except lacking MSSC, otherwise as noted; antennal colouration similar; also only 1 pair strong anterior ac; podomere ratios as follows: I: 6.0; 6.5; 3.0/1.2/1.0/0.5/0.5; II: 6.0; 7.0; 5.0/2.0/1.0/0.5/0.5; III: 7.0; 10.0; 4.0/2.0/1.0/0.5/0.5; tergum 2 with yellow anterolateral corners.

Remarks. *Amblypsilopus flaviappendiculatus* is found from the Philippines, southern China, and Vietnam, to Indonesia, tropical Queensland and the Northern Territory (Fig. 111). Apart from the hypopygium, it is distinctive in having the first flagellomere bright yellow, only 1 pair of ac, a highly elongated male TI with corresponding reduction of It_1 , and a fused trapezoidal abdominal segment 7.

Amblypsilopus edwardsi n.sp.

Type material. HOLOTYPE male, Northern Territory, Rimbija Island, Wessel Group, 11°01'S 136°45'E, 20 Jan. 1977, E.D. Edwards; PARATYPES 2 males, 8 females, same but 15 Jan.-14 Feb. 1977 (ANIC).

Description – male. Length: 3.0; wing: 2.0 x 0.5.

Head. Vertex, frons, face and clypeus bright metallic green and covered with silvery pruinosity (pruinosity evident when viewed at oblique angle but appears bright metallic green when viewed perpendicular to surface); palp, proboscis pale yellow; antenna yellow; pedicel with yellow dorsal and ventral setae; arista dorsal, black simple.

Thorax. Dorsum metallic green with bronze reflections; pleura covered with dense grey-silvery pruinosity; setae

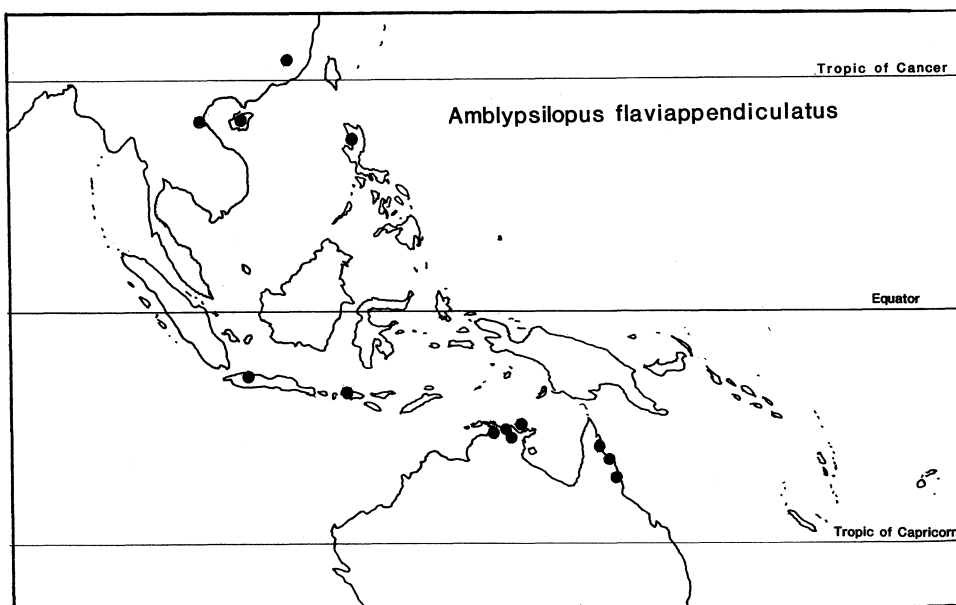


Fig.111. Distribution, *Amblypsilopus flaviappendiculatus*.

yellow to brown; 4-5 pairs short ac; 2 strong posterior dc, with 4-5 weak anterior setae; posteriormost pair dc offset laterally; only 1 sa present; lateral scutellars absent.

Legs. All coxae and remainder of legs yellow, only t_5 on each leg dark brown; I: 5.0; 5.5; 2.0/1.5/1.0/1.0/0.7; TI with 2 posteroventral pale curved setae and 3-4 pale posterior hairs in distal quarter (MSSC); TI

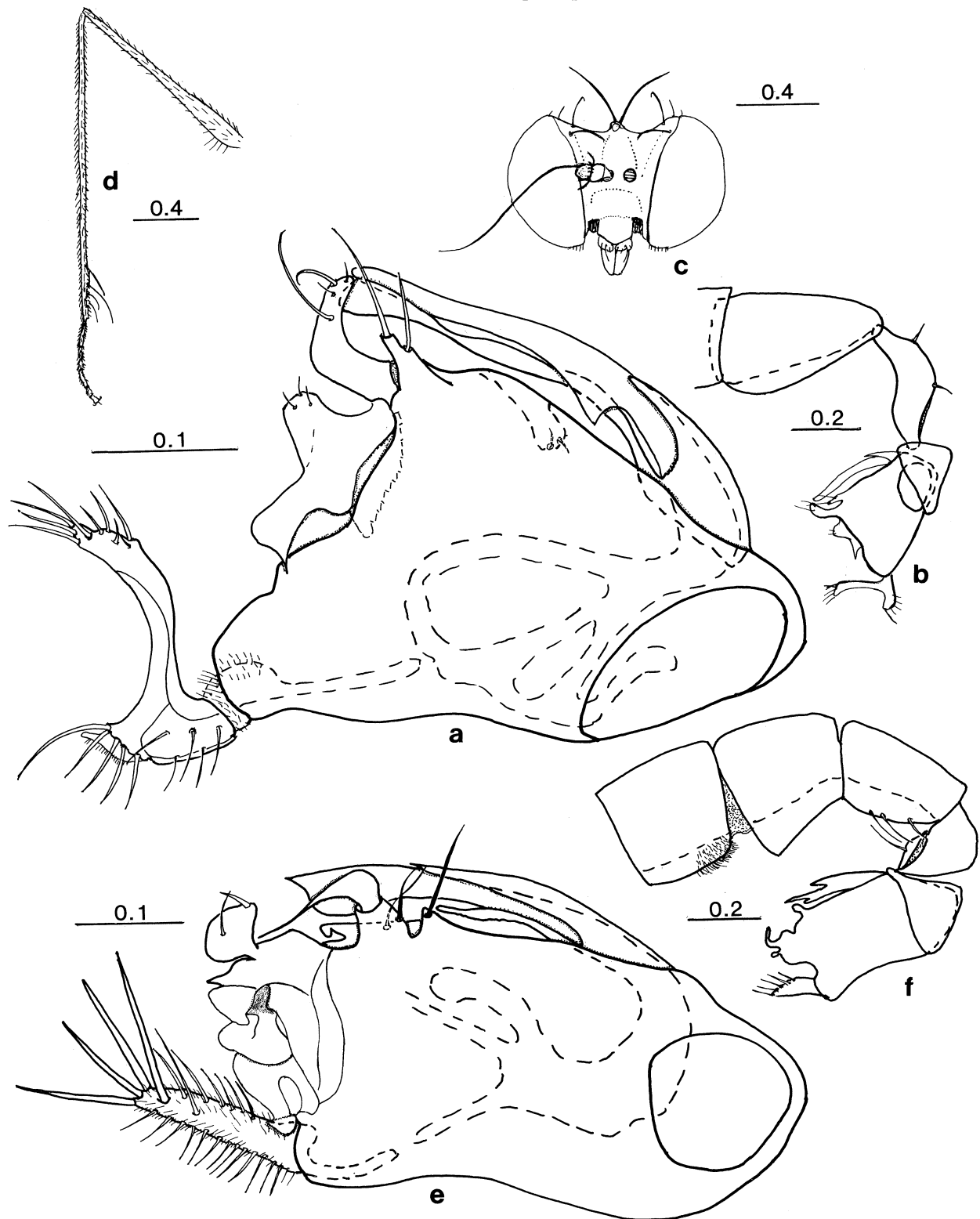


Fig.112. *Amblypsilopus flaviappendiculatus*, Mount Cook, Qld: a – hypopygium, left lateral; b – male postabdomen, left lateral; c – male head, anterior; d – male left leg I, posterior. *A. edwardsi*, Wessel Islands, NT: e – hypopygium, left lateral; f – male postabdomen, left lateral.

expanded apically and bearing numerous short curved pale setae; II: 5.0; 6.0; 4.0/2.0/1.5/0.7/0.7; III: 6.0; 8.5; 3.5/2.0/1.0/1.0/0.5; FIII with long curved av setae subtended by shorter pale setae; III₃₋₄ flattened with pale yellow ventral pads (MSSC).

Wing. Hyaline, distinctive (Fig. 129b); M₂ ends in short stubvein, not continuing to apex; M₁ arising at right angle from M; CuAx ratio: 1.1; lower calypter pale yellow with dark brown rim and fan of pale setae.

Abdomen. Tergum 4 posteroventrally with tufts of fine pale hair (Fig. 112f) (MSSC); hypopygium dark brown with yellow cerci (Fig. 112e); epandrium subrectangular; hypandrial arm relatively short; aedeagus somewhat expanded apically; epandrial seta long, arising from mound; epandrial lobe with stout pedicel and bearing large, curved tapering blade-like seta, and with 2 normal setae arising from base; cuticular ridge present medially of epandrial lobe; surstylus with dorsal projection and various protuberances as figured; cercus short with group of 4 strong spine-like apical setae.

Female. Similar to male except lacking MSSC; otherwise as noted: 2 strong posterior dc present with 3-4 slightly shorter but strong anterior dc; abdomen mostly yellow; in dorsal view, only posterior margin of tergum 2, most of tergum 3, and terga 4 and 5 metallic green; tergum 1, anterolateral corner of tergum 2, and lateral and ventral areas of terga 1-5 yellow.

Remarks. *Amblypsilopus edwardsi* is a distinctive species known only from the islands off Arnhem Land, Northern Territory. It is pale with major setae yellow. Although its hypopygial structure is distinct from that of other members of the *flaviappendiculatus* Group (short hypandrial arm and modified epandrial lobe seta), it is included because of its leg MSSC.

Amblypsilopus fonsecai n.sp.

Type material. HOLOTYPE male, New South Wales, Narrabeen, 1-6 Dec. 1972, E.A. Fonseca; PARATYPE male, Terry Hills, 18 Feb. 1973 (BMNH).

Additional material. Queensland – male, Byfield State Forest, near Yeppoon, 5 Jan. 1976 (AMS); male, Moggil Farm, west of Brisbane, 23-27 Jan. 1961 (BPBM).

Description – male. Length 5.0; wing: 4.1 x 1.4; similar to *A. flaviappendiculatus* except as noted.

Head. Antenna black.

Thorax. Three pairs long ac and 2 sa present; lateral scutellars about one-third length of medians.

Legs. CI, femora, tibiae and basal tarsomeres yellow; CII, CIII and distalmost tarsomeres black; I: 7.0; 9.5; 8.0/3.0/3.0/2.0/1.0; TI with pale curved posterior setae along entire length (MSSC); It₅ flattened into black triangular flag (MSSC); II: 8.0; 11.5; 9.0/3.0/2.0/1.0/1.0; TII with ad-pd pair at one-fifth, and ad at half; III: 10.0;

15.0; 7.0/3.0/1.5/1.5/1.0; III₃₋₅ black, flattened, with ventral pad-like surface (MSSC).

Abdomen. Epandrium dark brown with pale translucent surstylar extension over base of cercus (Fig. 113a) relatively large; hypandrial arm elongate and curved away from hypandrial hood; 2 short epandrial setae present on ventral mound; epandrial lobe with short basal bristle and much long apical bristle; surstylus with distinctive dorsal dagger-like projection which extends beyond cercus and with other setae and protuberances as figured; cercus setose, narrow, elongate with digitiform ventral projection which bears 3 apical setae and with apical arm which projects laterally (ie, out of page in figure).

Female. Unknown.

Remarks. *Amblypsilopus fonsecai* is known from the Sydney district, New South Wales and the central Queensland coast.

Amblypsilopus cahillensis n.sp.

Type material. HOLOTYPE male, PARATYPES male, female, Northern Territory, Koongarra, 15 km east of Mount Cahill, 6-9 Mar. 1973, D.H. Colless (ANIC).

Additional material. Northern Territory – 2 males, female, 5 km south-east of Humpty Doo, 14 Jan. 1992, unburnt monsoonal woodland, yellow pans (AMS).

Description – male. Length: 2.7; wing: 2.5 x 0.8; similar to *A. flaviappendiculatus* except as noted.

Head. Antenna also with scape and pedicel brown; first flagellomere yellow.

Thorax. Two to 3 pairs ac present.

Legs. CII and CIII basally brown, distally yellow; I: 4.5; 6.0; 4.0/1.5/1.5/1.0/1.0; distal TI without any pale posterior setae which could be distinguished from normal vestiture; II: 5.5; 6.5; 5.0/2.0/1.0/1.0/0.5; III: 6.0; 8.5; 4.0/1.5/1.0/1.0/0.5; III₃₋₄ dark brown, flattened and with ventral pad-like surface (MSSC).

Wing. CuAx ratio: 1.5.

Abdomen. Male postabdomen (Fig. 113c); epandrium dark brown with pale translucent surstylar extension over base of cercus (Fig. 113b); hypandrial arm elongate, narrow, extending slightly beyond aedeagus; epandrial lobe with long apical bristle and shorter subapical bristle; surstylus with ventral Y-shaped arm, and enlarged weakly sclerotised, dorsally and distally projecting lobe covering cercal base; cercus long, setose narrow and outcurved.

Female. Similar to male but lacking MSSC.

Remarks. *Amblypsilopus cahillensis* is known from monsoonal eucalypt woodland in Arnhem Land, Northern Territory. This species is unusual in lacking the long modified posterior TI setae (MSSC) found on

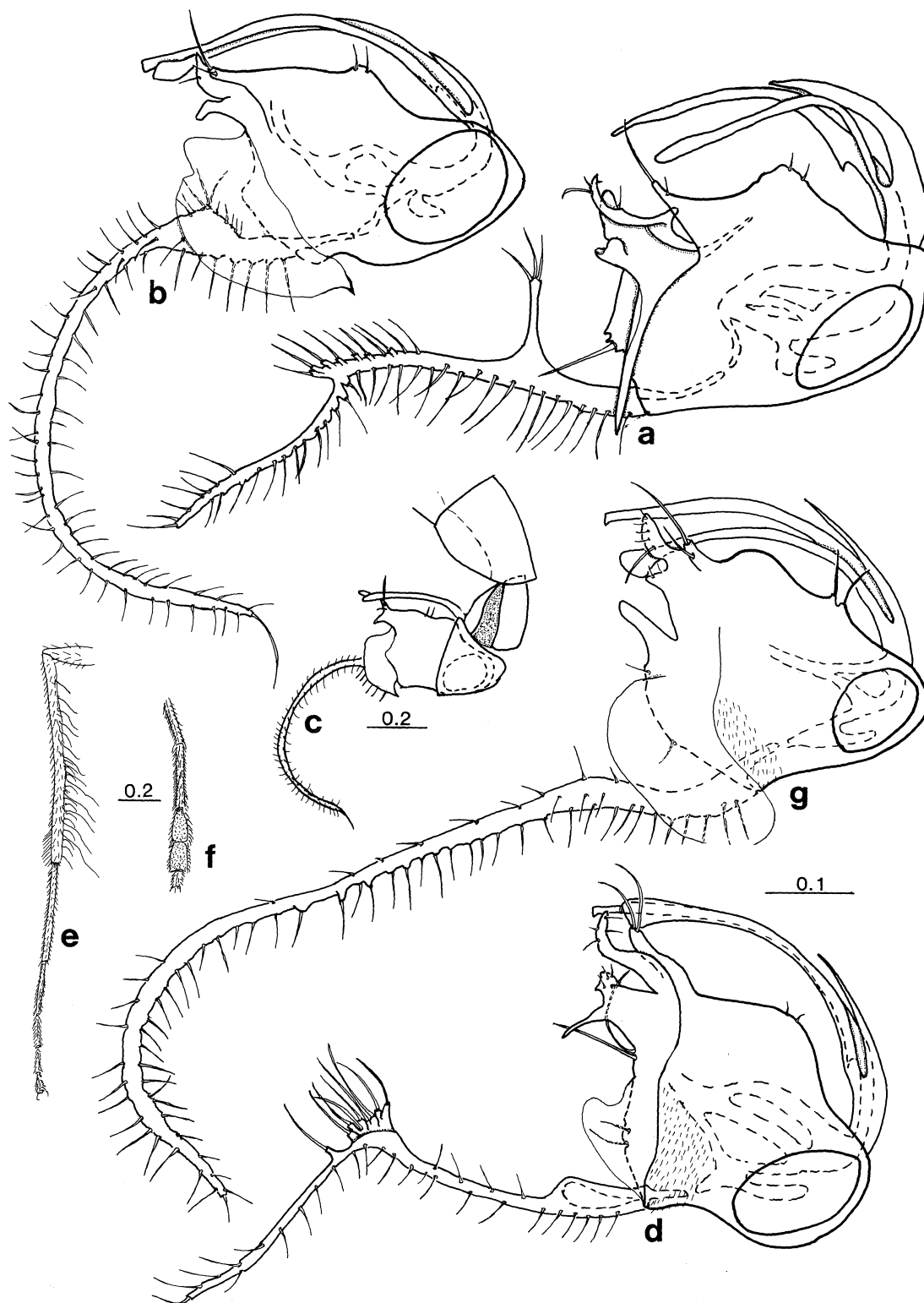


Fig.113. *Amblypsilopus fonsecai*, Byfield State Forest, Qld: a – hypopygium, left lateral. *A. cahillensis*, Mount Cahill, NT: b – hypopygium, left lateral; c – male postabdomen, left lateral. *A. mensualis*, Rounded Hill, Qld: d – hypopygium, left lateral; e – left tibia and tarsus I, posterior; f – left tarsus III, ventral. *A. quldensis*, Mount Webb, Qld: g – hypopygium, left lateral.

other members of the *flaviappendiculatus* Group. However, the structure of the hypopygium clearly places it in the Group.

***Amblypsilopus mensualis* n.sp.**

Type material. HOLOTYPE male, Queensland, 5 km west by north of Rounded Hill, 15°17'S 145°10'E, malaise trap; 7 Oct. 1980, D.H. Colless (ANIC).

Additional material. Northern Territory – 2 males, 5 km south-east of Humpty Doo, 11-13 Jan. 1992, unburnt monsoonal woodland, yellow pans (AMS); 4 males, female, same but 11 Jan.-28 Feb., malaise trap, (NTMD).

Description – male. Length: 3.0; wing: 2.7 x 1.0; similar to *A. flaviappendiculatus* except as noted.

Head. Antenna black.

Thorax. Three pairs strong ac present.

Legs. CI, femora, tibiae and basal tarsomeres yellow; CII, CIII and distalmost tarsomeres dark brown; I: 3.2; 4.6; 2.1/0.8/0.8/0.6/0.4; TI with pale posterior setae along entire length, which are longer in distal half (MSSC) (Fig. 113e); II: 4.2; 5.3; 3.6/1.4/0.8/0.5/0.4; TII bare of major setae; III: 4.2; 6.5; 2.8/1.4/0.6/0.6/0.3; III_{t3-4} black, flattened, with ventral pad-like surface (MSSC) (Fig. 113f).

Abdomen. Epandrium dark brown with pale translucent surstylar extension over base of cercus (Fig. 113d); hypandrial arm long and apically expanded; epandrial lobe with both bristles subequal and virtually apical; surstylus complex, with ventral digitiform projection bearing setae; large dorsal weakly sclerotised cardate projection which extends to base of cercus, and median projection subtended dorsally by 2 strong setae; cercus narrow, elongate with distinctive group of pedunculate setae at elbow-like bend.

Female. Similar to male except lacks MSSC.

Remarks. *Amblypsilopus mensualis* is known from the Cape York Peninsula and unburnt monsoonal woodland in the Northern Territory. There is some variation in the length and number of the long pale posterior hairs on male TI, but the hypopygium is constant over.

A related undescribed species from Taiwan: Bukai (MCZ) has a slightly different cercal structure.

***Amblypsilopus quldensis* n.sp.**

Type material. HOLOTYPE male, PARATYPES 2 females, Queensland, 3 km north-east of Mount Webb, 15°03'S 145°09'E, malaise trap, 30 Apr.-1 May 1981, D.H. Colless (ANIC).

Additional material. Queensland – male, 12°40'S 142°39'E, 3 km west of Batavia Downs, 17 Jan. 1993 (ANIC).

Description – male. Length: 3.0; wing: 2.8 x 1.0; similar to *A. mensualis* except as noted.

Legs. CI, femora, tibiae and basal tarsomeres yellow; CII, CIII and distalmost tarsomeres black; TI also with 7-8 pale slightly crocheted posterior setae in distal half (MSSC).

Wing. CuAx ratio: 1.4.

Abdomen. Epandrium dark brown with pale translucent surstylar extension over base of cercus (Fig. 113g); epandrial lobe with apical bristle and shorter subapical bristle; surstylus complex, with various ventral projections and distinctive large weakly sclerotised lobate dorsal projection which extends beyond base of cercus; cercus very long, narrow and outcurved.

Female. Similar to male but lacks MSSC.

Remarks. *Amblypsilopus quldensis* is known only from two localities on the Cape York Peninsula, Queensland.

The *topendensis* Group

Diagnosis. *Habitus.* Small, less than 2.3 in length; body relatively short and compact.

Head. Major head setae yellow; vertex only shallowly excavated; strong curved vertical seta present on frons of both sexes; male face not bulging; scape and pedicel black, and first flagellomere yellow; first flagellomere subrectangular; arista dorsal, as long as head height.

Thorax. Major thoracic setae yellow; 3 pairs short ac present; 5 dc present, posterior 2 longer, but anterior setae also strong and not weak and hairlike; lateral scutellar setae present as weak hairs.

Legs. TI expanded distally, with posterior row of curved setae and with pale ventral crocheted pile (MSSC); III_{t3-4} dorsoventrally flattened and padlike (MSSC); female FI with 2 pale basoventral setae, absent on male.

Wing. M₂ totally lost and M₁ with gentle bend between m-cu and apex (Fig. 128f).

Abdomen. Hypandrial hood very short, only covering base of aedeagus; hypandrial arm elongate, extending well beyond apex of hood; surstylus with lobate dorsal projection; cercus with long branched filiform arms (Fig. 114a-c).

Remarks. The *topendensis* Group is derived from the *Amblypsilopus flaviappendiculatus* Group, since both groups have similar leg MSSC and hypopygial structure (ie, TI with posterior curved hairs, III_{t4-5} dorsoventrally flattened and padlike, hypandrial hood usually very short, hypandrial arm narrow and elongate, surstylus with dorsal lobate projection (compare Fig. 114b with Fig. 113d,g). However, because of the total loss of vein M₂ and the absence of strongly dimorphic dc, the

topendensis Group is made a separate group. The two last mentioned characters make the *topendensis* Group superficially similar with the new genus *Pilbara*.

The *topendensis* Group is confined to tropical Australia,

where the ancestral *flaviappendiculatus* Group is also diverse. It includes two closely related species.

borroloola n.sp. Australia (NT, Qld).

topendensis n.sp. Australia (NT).

Key to Males of the *Amblypsilopus topendensis* Group

1. Cercus with 3 elongate filiform setose arms; shorter ventral arm projecting towards surstylus and elongate median and lateral arms (Fig. 114b,c) (NT, Qld) *A. borroloola*
- Cercus elongate, curled and setose, with distinctive setae as figured (Fig. 114a) (NT) *A. topendensis*

Amblypsilopus borroloola n.sp.

Type material. HOLOTYPE male, Northern Territory, 22 km west-south-west of Borroloola, 16 Apr. 1976, at light, D.H. Colless; PARATYPES 3 females, Koongarra, 15 km east of Mount Cahill, 6-9 Mar. 1973 (ANIC).

Additional material. Probable females of this species: Northern Territory – Horn Island, Pellew Group, 8-14 Feb. 1968 (UQIC). Queensland – 13 km west of Mount Garnet Road, 2 May 1967; 3.5 km south-west of Mount Baird, 4 May 1981 (ANIC).

Description – male. Length 2.1; wing: 1.8 x 0.6.

Head. Frons metallic green-bronze with dusting of pruinosity; major head setae yellow; strong vertical seta present; face and clypeus with dense silvery pruinosity.

Thorax. Metallic blue-green with brownish pruinosity.

Legs. All coxae and legs yellow with pale setae and vestiture, except distalmost tarsomeres darkened; I: 4.0; 4.5; 1.8/1.0/0.5/0.5; 0.5; distal three-quarters TI swollen, with pv row of long distally curved setae, and ventral crocheted pile (MSSC); II: 4.0; 5.0; 3.5/1.2/0.8/0.5/0.5; III: 5.0; 7.0; 2.5/1.5/0.8/0.8/0.5; III₃₋₄ flattened, with ventral pad-like surface (MSSC); III₅ unmodified.

Wing. Hyaline with yellow veins (Fig. 128f); M₂ completely absent and M₁ with a gentle bend and subparallel with R₄₊₅ to apex; anal angle present CuAx ratio: 1.3; lower calypter yellow with black rim and fan of pale setae.

Abdomen. Metallic green with pale setae; segments 2-3 translucent yellow, with metallic colouration present only on mid-line; hypopygium brown with yellow cerci (Fig. 114b,c); epandrium elongate and tapering; hypandrial arm and aedeagus both elongate, with aedeagus extending beyond apex of arm; epandrial lobe elongate with apical and subapical bristles; surstylus lobate with shield-like dorsal extension; cercus with 3 filiform setose arms: shorter ventral arm projecting towards surstylus and elongate median and lateral arms.

Female. Similar, but lacking MSSC; FI with short pale ventral setae.

Remarks. *Amblypsilopus borroloola* is found from Arnhem Land to the Gulf of Carpentaria region, Northern Territory, and based on female records, possibly in the Cape York Peninsula.

Amblypsilopus topendensis n.sp.

Type material. HOLOTYPE male, Northern Territory, Darwin, April 1955, light trap, J. Reye (ANIC).

Description – male. Length 1.8; wing: 1.3 x 0.5; specimen mounted from alcohol and somewhat discoloured; similar to *A. borroloola* except as noted.

Legs. TI swollen in distal two-thirds, with pv row of long distally curved setae, and ventral crocheted pile (MSSC); III₃₋₄ flattened, with ventral pad-like surface (MSSC); III₅ normal.

Abdomen. Metallic green; on segments 2-6, basal half of each tergum and narrow band on preceding adjacent matt brown; both tergum and sternum 7 well developed; hypopygium brown with yellow cerci (Fig. 114a); epandrium tapering; aedeagus and hypandrial arm both elongate, subequal in length; 2 epandrial setae present; epandrial lobe with long apical and subapical bristles; surstylus lobate with some apical setae, and with small shield-like dorsal extension which bears setose peduncle as figured; cercus elongate, curled and setose, with distinctive setae as figured.

Female. Unknown.

Remarks. *Amblypsilopus topendensis* is known only from Darwin, Northern Territory.

The *rimbija* Group

Diagnosis. General. Body rather compact with relatively short legs.

Head. Vertex distinctly excavated; both sexes with strong vertical setae; male face slightly bulging; male

clypeus free from margin of eyes but not strongly narrowed; female clypeus adjacent to sides of eyes; first flagellomere subrectangular; arista dorsal and about as long as head width.

Thorax. Two pairs of long ac present; male with 2 strong posterior dc, and 3 short hair-like dc anterior (MSSC); female with 5 strong dc; lateral scutellar setae reduced to tiny weak hairs or absent.

Legs. Male TI often with 3 long and widely separated pv setae in distal half, often at half, three-quarters and five-sixths (Fig. 115d), and/or with row of 8-12 shorter and evenly spaced posterior setae (MSSC); male It_1 slightly flattened with pale ventral pile and with 5-6 pale slightly crocheted posterior setae (MSSC); TII of both sexes with offset ad-pd setae in basal quarter and subapically; male $III_{3,5}$ slightly flattened and padlike (MSSC).

Wing. M_2 weak and slightly bowed with respect to M_1 ; m-cu straight; haltere colour sometimes sexually dimorphic, black in males and yellow if females.

Abdomen. Hypopygial peduncle usually with well

developed tergum 7 and basally narrowed sternum 7; hypandrium and aedeagus arching over epandrium; hypandrial hood short and narrow, covering only base of aedeagus; hypandrial arm elongate and extending to apex of aedeagus; epandrial lobe sometimes prolonged; surstylus without weakly sclerotised lobate projection; cercus usually short with strong setae.

Remarks. The *rimbija* Group is defined by the male TI and It_1 MSSC, and similar compact hypopygium. It is closely related to the *flaviappendiculatus* Group with which it shares a flattened $III_{3,5}$ (MSSC), elongate epandrial lobes, short hypandrial hood, and long hypandrial arm which reaches almost to the apex of the aedeagus.

The *rimbija* Group is known from northern Australia, Arnhem Land and the Cape York Peninsula, and species occur in monsoonal woodland and vine forests. As well, some undescribed New Guinea species belong in the Group.

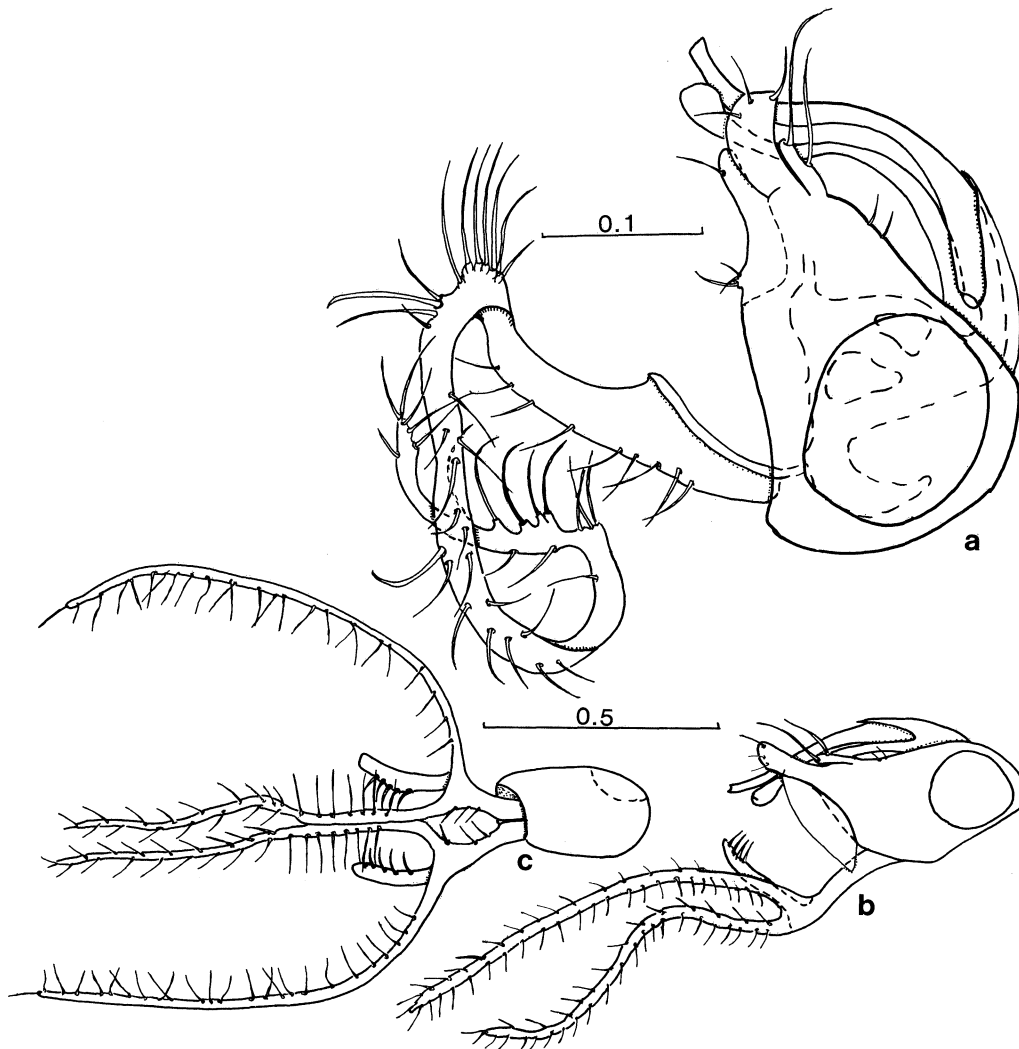


Fig. 114. *Amblysilopus topendensis*, Darwin, NT: a – hypopygium, left lateral. *A. borroloola*, Borroloola, NT: b – hypopygium, left lateral; c – hypopygium, dorsal.

The *rimbija* Group comprises five species.
babindensis n.sp. Australia (Qld).
cobourgensis n.sp. Australia (NT).

rimbija n.sp. Australia (NT, Qld).
wellsae n.sp. Australia (NT).
wongabelensis n.sp. Australia (Qld).

Key to Australian Males of the *Amblysilopus rimbija* Group

1. CI, femora yellow 2
- CI, femora mostly brown to black 3
2. Body length about 2.0; cercus with 2 ventral setose projections (Fig. 115b) (NT) *A. cobourgensis*
- Body length about 3.0; TI swollen with white curled ventral pile along most of its length, and with row of 8 evenly spaced posterior setae (MSSC); cercus thick, curved laterally, not forked (Fig. 116b,c) (Qld) *A. babindensis*
3. Cercus distally expanded with outer row of strong blade-like setae; epandrium with serrated cuticular projection; hypandrial hood with serrations (Fig. 116a) (Qld) *A. wongabelensis*
- Cercus with 2 distinctive ventral prominences, the basal with abundant setae, the distal with 3 blade-like setae; hypandrial hood entire (Fig. 115a) (NT, Qld) *A. rimbija*
- Cercus rather narrower and setose; surstylus not massive but clavate, and epandrial lobe elongate; hypandrial hood slightly serrate (Fig. 115c) (NT) *A. wellsae*

Amblysilopus rimbija n.sp.

Type material. HOLOTYPE male, PARATYPES male, 3 females, Northern Territory, Rimbija Island, Wessel Group, 11°01'S 136°45'E, 26 Jan. 1977, E.D. Edwards; PARATYPES 6 females, same but 3-14 Feb. 1977; 4 males, 6 females, Black Point, Cobourg Peninsula, 10°09'S 132°09'E, 31 Jan. 1977, 15-23 Feb. 1977 (ANIC).

Additional material. Northern Territory – Arnhem Land, Maningrida, 18 Mar. 1961 (BPBM); male, Horn Island, Sir Edward Pellew Group, 15-21 Feb. 1969 (QDPI); male, Darwin, Casurina Point, coastal monsoonal vine forest, yellow pans, 14 Jan. 1992 (AMS). Queensland – male, female, 12°41'S 142°41'E, 5 km south of Batavia Downs, 11 Dec. 1992-17 Jan. 1993 (ANIC).

Description – male. Length: 2.4-2.7; wing: 2.2 x 0.8.

Head. Vertex, frons and face dark metallic blue-green to green; lower face, clypeus with silvery pruinosity; palp and proboscis brownish; antenna black; pedicel with strong dorsal and ventral setae; first flagellomere subrectangular, arista short, about as long as head height.

Thorax. Dark metallic green with bronze reflections; pleura with grey pruinosity; setae black; 3 pairs long ac; 2 strong posterior dc, with 3 short, weak dc anteriorly; 1 pa, 2 sa, 2 sr, 1 weak hm, 1 stronger pm and 2 npl

present; lateral scutellars as tiny weak hairs.

Legs. Basal CI, CII and CIII, all femora to knees, and distalmost tarsomeres dark brown; distal CI, all trochanters, femoral knees, tibiae and basal tarsomeres yellowish; femora with some long pale basoventral setae. I: 4.0; 4.0; 3.0/1.2/0.5/0.5/0.5; TI with very long pale pv seta at half, three-quarters and five-sixths (MSSC), and with pd row of 10-12 setae along entire length (MSSC); It₁ with 5-6 pale slightly crocheted posterior hairs (MSSC), and with pale ventral pile (MSSC); II: 4.0; 5.0; 4.0/1.0/1.0/0.5/0.5; III: 6.0; 7.5; 3.0/1.5/0.8/0.5/0.5; IIIIt₃₋₅ slightly flattened and padlike.

Wing. Hyaline (Fig. 129c); M₂ as weak extension to apex; M₁ with gentle anterior arch; CuAx ratio: 0.6; lower calypter dark brown with dark setae; haltere brownish with dark club.

Abdomen. Dark metallic green; hypopygium (Fig. 115a); hypandrial arm elongate, narrow; epandrial lobe with long apical and subapical bristles; surstylus broad, massive, without dorsal projection and divided into dorsal and ventral arms; dorsal arm with serrations and ventral arm with setae as figured; cercus thick, with distal digitiform extension, and with 2 distinctive ventral projections, basal projection with abundant setae, and distal projection with 3 apical blade-like setae.

Female. Similar to male but without MSSC; haltere yellow.

Remarks. *Amblypsilopus rimbija* is known from monsoonal vine forest, along the coast and offshore islands of Arnhem Land, Northern Territory, and from monsoonal woodland in the Cape York Peninsula.

***Amblypsilopus cobourgensis* n.sp.**

Type material. HOLOTYPE male, PARATYPES male, 3 females, Northern Territory, Black Point, Cobourg Peninsula,

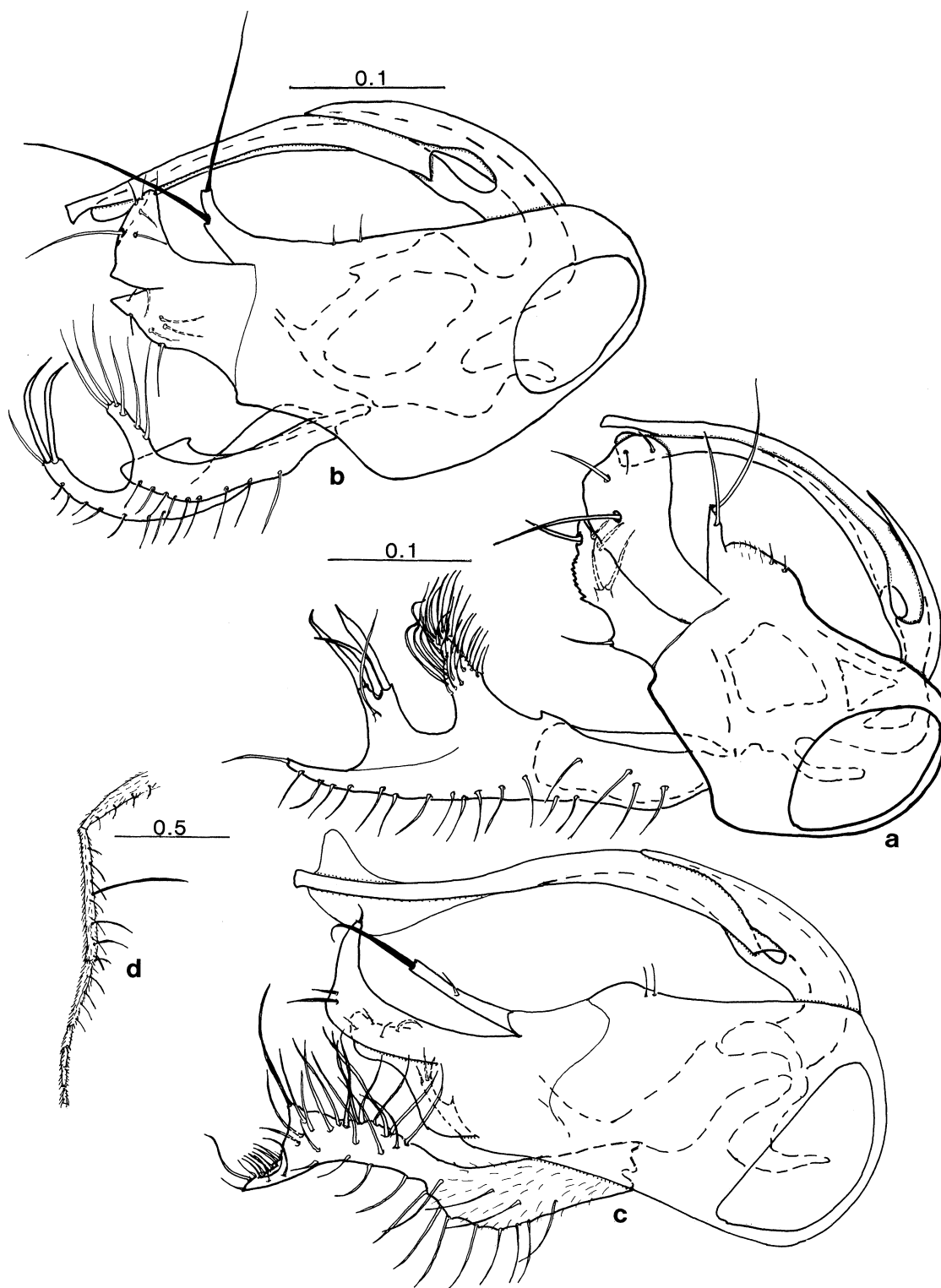


Fig.115. *Amblypsilopus rimbija*, Wessel Islands, NT: a – hypopygium, left lateral. *A. cobourgensis*, Cobourg Peninsula, NT: b – hypopygium, left lateral. *A. wellsae*, Berry Springs, NT: c – hypopygium, left lateral; d – male right leg I, anterolateral.

11°09'S 132°09'E, in *Eucalyptus tetrodonta* forest, 26-31 Jan. 1977, E.D. Edwards; PARATYPE male, same but 15-23 Feb. 1977 (ANIC).

Additional material. Northern Territory – 7 males, female, 5 km south-east of Humpty Doo, unburnt monsoonal woodland, 12 Jan. 1992, yellow pans (AMS), malaise trap, 3 Dec. 1991-9 Jan. 1992 (NTMD); male, Berry Springs, monsoonal vine forest, malaise trap, 30 Oct.-4 Nov. 1991 (NTMD).

Description – male. Length: 2.0; wing: 1.8 x 0.8; similar to *A. rimbija* except as noted.

Legs. CI, femora, tibiae and tarsi yellow; CII and CIII dark brown; TI also with long pale pv setae at half, three-quarters and five-sixths (MSSC), and with pd row of 10-12 setae along entire length (MSSC); It_1 with pale ventral pile (MSSC), and with 4-5 long pale posterior setae in basal half only (MSSC).

Wing. Haltere yellow.

Abdomen. Dark metallic green with bronze reflections; hypopygium dark brown with yellowish cerci (Fig. 115b); dorsal surstylus without serrations; cercus without distal digitiform extension; ventral cercal projection not as setose and lacking setae along external margin; distal cercal projection with 2 blade-like setae and 1 normal seta.

Female. Similar to male except lacks MSSC.

Remarks. *Amblypsilopus cobourgensis* is known from monsoonal woodland and vine forests of Arnhem Land, Northern Territory. It is close to *A. rimbija*, and the two species differ primarily in leg colouration and details of the surstylus and cercus.

Amblypsilopus wellsae n.sp.

Type material. HOLOTYPE male, PARATYPES 6 males, 20 females, Northern Territory, Berry Springs, Northern Territory Wildlife Park, monsoonal vine forest, malaise trap, 30 Oct.-4 Dec. 1991, A. Wells (AMS); PARATYPES 2 males, 23 females, same but 4 Dec. 1991-9 Jan. 1992 (NTMD)

Description – male. Length: 1.8; wing: 1.7 x 0.8; similar to *A. rimbija* except as noted.

Head. Palp and proboscis yellowish.

Thorax. Two pairs long ac present.

Legs. Legs mostly brown, although tibiae and basal tarsomeres sometimes appear yellowish; TI also with very long pale pv seta at half, and with shorter pale pv setae at three-quarters and seven-eighths (MSSC), and with pd row of 10-12 setae along entire length (Fig. 115d) (MSSC); It_1 also with 5-6 pale slightly crocheted posterior hairs (MSSC), and with pale ventral pile (MSSC).

Wing. CuAx ratio: 0.8; haltere black.

Abdomen. Dark metallic green; hypopygium dark brown (Fig. 115c); hypandrial arm elongate, narrow, extending to apex of aedeagus; epandrial lobe prolonged,

with long apical and short subapical setae; surstylus clavate and with internal projections which bear setae; cercus truncate and setose, and with subapical field of short setae as figured.

Female. Similar to male but without MSSC, and as noted: tibiae yellowish; haltere yellow.

Remarks. *Amblypsilopus wellsae* is known only from monsoonal vine forest at Berry Springs, south of Darwin, Northern Territory.

Amblypsilopus wongabelensis n.sp.

Type material. HOLOTYPE male, Queensland, Danbulla Forest Reserve, 13 km north-east of Yungaburra, 17 Nov. 1981, D.H. Colless; PARATYPES 2 males, female, Wongabel State Forest, near Atherton, 17°20'S 145°31'E, at light, 18 Nov. 1981; male, Bellenden Ker Range, Cableway Base, 100 m, 17 Oct.-9 Nov. 1981 (ANIC).

Additional material. Queensland – probable female, Gap Creek, 5 km east-south-east of Mount Finnigan, 14 May 1981; male, Curtain Fig, 17°17'S 145°34'E, 26 Jan. 1988 (ANIC).

Description – male. Length: 2.6; wing: 2.4 x 1.0; a small dark-coloured fly; similar to *A. rimbija* except as noted.

Head. Palp and proboscis yellowish.

Legs. Coxae, legs dark brown to black; CI and CII with pale anterior hairs; CIII with pale lateral seta; FI with row of pale posterior setae; TI with 3 long pale posterior setae in distal half decreasing in size distally; It_1 with posterior row of 6 long crocheted hairs, and with dense ventral white pile (MSSC); III_{3-5} flattened with ventral pad-like surface (MSSC).

Wing. Veins black; M_1 with gentle arch to apex; M_2 as stub; CuAx ratio: 0.9; haltere black.

Abdomen. Black with metallic green reflections; hypopygium entirely black (Fig. 116a); hypandrial arm elongate, and curving to right of aedeagus; epandrium with serrated cuticular projection arising at base of hypandrium; epandrial lobe with 2 long bristles; surstylus broad, massive, and without dorsal projection, but bearing setae as figured; cercus distinctive, clavate, distally expanded with outer row of strong blade-like setae.

Female. Similar to male but lacking MSSC; haltere also black.

Remarks. *Amblypsilopus wongabelensis* is known from rainforests of the Cairns district, Queensland.

An undescribed species from Papua New Guinea: Chimbu River (ANIC) is almost identical but differs in details of the surstylus and cercus.

Amblypsilopus babindensis n.sp.

Type material. HOLOTYPE male, Queensland, The Boulders near Babinda, 10 May 1967, D.H. Colless (ANIC).

Description – male. Length: 3.0; wing: 2.6 x 1.0; similar to *A. rimbija* except as noted.

Head. Palp and proboscis yellow.

Legs. CI yellow; CII and CIII brown; remainder of legs yellow although FIII brownish; TI somewhat swollen with white, curled ventral pile along most of its length, and with row of 7-8 long evenly spaced posterior crocheted setae (MSSC); It_1 unmodified; III_{3-4} slightly flattened and padlike.

Wing. CuAx ratio: 1.0; lower calypter yellow with dark brown rim and with fan of yellowish setae; haltere yellowish.

Abdomen. Hypopygium (Fig. 116b); hypandrial arm elongate, curving to right of aedeagus; surstylus short, with 2 lobes and setae as figured; cercus curved, somewhat expanded distally and projecting laterally from epandrium; when viewed anteriorly, cercus with inner

prominence bearing black setae (Fig. 116c).

Female. Unknown.

Remarks. *Amblypsilopus babindensis* is known only from the type locality in the Cairns district, Queensland.

The cyplus Group

Diagnosis. **Head.** Vertex excavated; both sexes with strong vertical seta; male clypeus free from margin of eyes; first flagellomere subrectangular; arista dorsal and about as long as head width.

Thorax. Three pairs long ac present; 2 strong posterior dc, with 3 short setulae present anteriorly; lateral scutellar setae absent.

Legs. CI and CII with pale anterior hairs; CIII with pale lateral seta; TI clavate, its distal third swollen with pale ventral pile, and bordered anteriorly and posteriorly by pale curved setae (all MSSC); It_1 unmodified; III_{3-4} flattened, with ventral pad-like surface

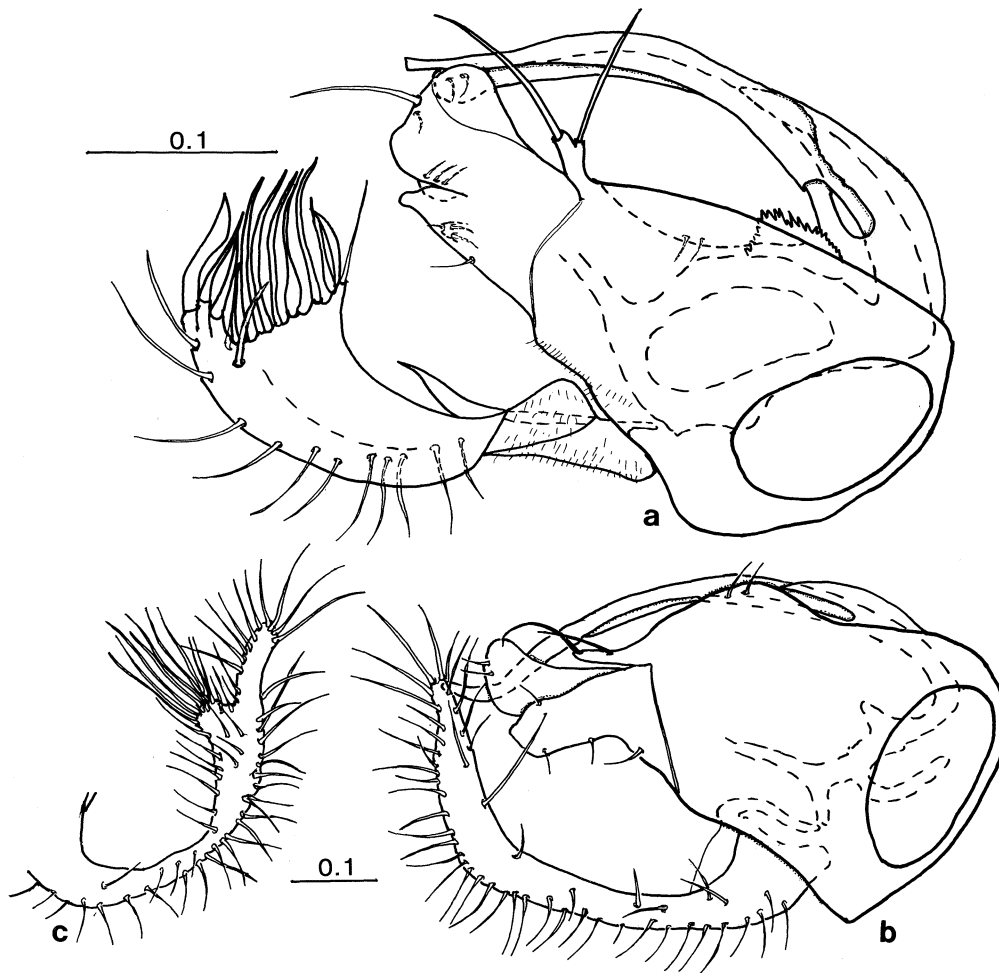


Fig. 116. *Amblypsilopus wongabelensis*, Atherton, Qld: a – hypopygium, left lateral. *A. babindensis*, Babinda, Qld: b – hypopygium, left lateral; c – left cercus, anterior view.

(MSSC).

Wing (similar to Fig. 129a). Hyaline; M_2 present only as trace to margin; m-cu straight; lower calypter yellow with pale setae; haltere yellow.

Abdomen. Both tergum and sternum 7 well developed (eg, Fig. 118e); epandrium subrectangular on often with lobate ventral margin; hypandrial hood elongate and tapering; hypandrial arm elongate and sometimes extending to apex of surstylus (eg, Fig. 118f); aedeagus expanded subapically and shorter than hypandrial arm; epandrial setae absent; epandrial lobe pedunculate with strong apical seta; cercus digitiform, unbranched.

Remarks. The *cyplus* Group comprises three new species and is confined to the monsoonal Cape York Peninsula, where it occurs in woodland and rainforest habitats. It is distinguished by a clavate male TI which is distally swollen and bordered anteriorly and posteriorly by pale curved setae (all MSSC), It_1 unmodified and $III_{t_{3-4}}$ flattened, with ventral pad-like surface (MSSC). It shares this last MSSC with the *flaviappendiculatus* and *rimbijah* Groups.

The *cyplus* Group includes the following species.

bataviensis n.sp. Australia (Qld).

cyplus n.sp. Australia (Qld).

gapensis n.sp. Australia (Qld).

Key to Males of the *Amblypsilopus cyplus* Group

1. All coxae yellow; major head setae yellow; antenna yellow; epandrium (Fig. 118f) with curved lobate ventral margin; surstylus flattened dorsoventrally, with internal pedunculate seta and with strong curved dorsal seta near base; cercus extending beyond apex of surstylus (Qld) *A. cyplus*
- CI yellow; CII and CIII dark brown to metallic green; major head setae black; other features various 2
2. Antenna dark brown; epandrium (Fig. 118g) with curved lobate ventral margin; epandrial lobe with strong apical bristle and shorter subapical seta; surstylus distally bent, internal pedunculate seta and with 2 curved dorsal setae near base (Qld) *A. bataviensis*
- Scape and pedicel black, first flagellomere yellow; hypopygium (Fig. 118c,d); epandrial lobe with single long apical bristle; surstylus small, knoblike, fused to epandrium; epandrium elongate and tapering (Qld) *A. gapensis*

Amblypsilopus cyplus n.sp.

Type material. HOLOTYPE male, PARATYPES 6 males, 9 females, Queensland, 4 km north-east of Batavia Downs, 12°39'S 142°41'E, 11 Dec. 1992-17 Jan. 1993, malaise trap, P. Zborowski; PARATYPES 6 females, same but 17 Feb.-8 Mar. 1993; male, female, same but 7 km south of Batavia Downs, 12°42'S 142°42'E, 8 Mar.-4 Apr. 1993 (ANIC).

Additional material. Queensland — 4 females, probably this species, 22 km north-east of Heathlands Homestead, 11°38'S 142°44'E, 15 Mar. 1992 (AMS).

Description — male. Length 2.3; wing: 1.9 x 0.6.

Head. Vertex and frons metallic blue-green with dusting of silvery pruinosity; major head setae yellow; frons with strong vertical seta; face and clypeus with silvery pruinosity; palp and proboscis yellow; antenna yellow with black dorsal arista which is about as long as head width; ventral postcranium with abundant pale setae.

Thorax. Metallic blue-green; pleura with grey pruinosity; major setae brownish, with other setae yellowish.

Legs. All coxae and remainder of legs yellow, except

It_3 , II_{t_5} and $III_{t_{3-5}}$ dark brown; CI and CII with pale anterior hairs; CIII with pale lateral seta; I: 3.2; 3.3; 1.5/0.6/0.5/0.4/0.3; TI clavate, its distal third swollen with pale ventral pile, and bordered anteriorly and posteriorly by pale curved setae (all MSSC); It_1 unmodified; II: 3.3; 3.5; 2.5/1.0/0.8/0.5/0.4; III: 4.0; 5.0; 2.0/1.0/0.5/0.5/0.2; $III_{t_{3-4}}$ flattened, with ventral pad-like surface (MSSC).

Wing. Hyaline; M_2 present only as trace to margin; CuAx ratio: 1.1; lower calypter yellow with pale setae; haltere yellow.

Abdomen. Metallic blue-green with bronze reflections; vestiture yellow; tergum and sternum 7 dark brown and each well developed; hypopygium (Fig. 118f) dark brown with yellow cerci; epandrium subrectangular, with ventral margin developed as 2 curved lobes; hypandrial hood and arm subequal in length, with arm curved to right of aedeagus; aedeagus expanded subapically; epandrial setae absent; epandrial lobe with strong apical seta and short seta on peduncle; surstylus flattened dorsoventrally, with internal pedunculate seta and with strong curved dorsal seta near base; cercus digitiform and unbranched, and extending well beyond apex of surstylus.

Female. Similar to male except lacking MSSC,

otherwise as noted: TI and III₁ unmodified; abdominal terga entirely metallic green.

Remarks. *Amblypsilopus cyplus* is known from Batavia Downs, northern Cape York Peninsula, and its specific name is an abbreviation of Cape York Peninsula Land Use Survey during which the specimens were collected. It is close to the sympatric *A. bataviensis*.

***Amblypsilopus bataviensis* n.sp.**

Type material. HOLOTYPE male, PARATYPES male, female, Queensland, 4 km north-east of Batavia Downs, 12°39'S 142°41'E, 17 Feb.-8 Mar. 1993; malaise trap, P. Zborowski; PARATYPES male, 2 females, same but 11 Dec. 1992-17 Jan. 1993 (ANIC).

Description – male. Length 2.2; wing: 1.8 x 0.7; similar to *A. cyplus* except as noted.

Head. Vertex and frons metallic blue-green with little pruinosity; major head setae black; lower face, clypeus with silvery pruinosity; palp and proboscis also yellow; antenna dark brown.

Thorax. Setae black.

Legs. CI yellow; CII and CIII metallic blue-green; trochanters and remainder of legs yellow, except It₅, II₅ and III₂₋₅ dark brown; TI also clavate, distal third swollen with pale ventral pile, and bordered anteriorly and posteriorly by pale curved setae (all MSSC); III₃₋₄ flattened, with ventral pad-like surface (MSSC).

Abdomen. Metallic blue-green; vestiture black; hypopygium (Fig. 118g) dark brown with yellow cerci; epandrium subrectangular, with curved lobate ventral margin; hypandrial arm much longer than hood and aedeagus, and curved to right of aedeagus; aedeagus expanded subapically and shorter than hypandrial arm; epandrial setae absent; epandrial lobe with strong apical seta and short seta on peduncle; surstylus distally bent, internal pedunculate seta and with 2 curved dorsal setae near base; cercus digitiform and unbranched, and not extending much beyond apex of surstylus.

Female. Similar to male except lacking MSSC, otherwise as noted: TI and III₁ unmodified.

Remarks. *Amblypsilopus bataviensis* is known from Batavia Downs, northern Cape York Peninsula, where it occurs sympatrically with its closely related sister species *A. cyplus*. The two species differ primarily in antennal and setal colouration and details of the surstylus and cercus.

***Amblypsilopus gapensis* n.sp.**

Type material. HOLOTYPE male, Queensland, Gap Creek, 5 km east-south-east of Mount Finnigan, 15°50'S 145°20'E, 15 May 1981, malaise trap, D.H. Colless (ANIC); PARATYPES

2 males, Daintree-Mossman, 9 Apr. 1971 (ANIC); male, Rex Range Lookout, via Julatten, 22 Dec. 1981-13 Jan. 1982 (QDPI).

Additional material. Queensland – male, Rex Range Lookout, via Julatten, 22 Dec. 1981-13 Jan. 1982 (QDPI).

Description – male. Length 2.4; wing: 2.2 x 0.6.

Head. Vertex, frons and upper face shining metallic blue-green; setae black; face and clypeus with silvery pruinosity; palp and proboscis yellow; scape and pedicel black, first flagellomere yellow; arista short, about as long as head width.

Thorax. Metallic blue-green with bronze reflections; pleura with grey pruinosity; setae black.

Legs. CI, femora, tibiae and basal tarsomeres yellow; CII, CIII, It₅, II₅ and III₂₋₅ dark brown to black; CI and CII with pale anterior hairs; CIII with pale lateral seta; I: 4.0; 4.5; 1.8/1.0/0.5/0.5/0.5; TI swollen in distal third, making TI appear clavate, with pale pile ventrally, and with curved pale crocheted setae anteriorly and posteriorly (MSSC); II: 4.0; 5.0; 3.5/1.2/0.8/0.5/0.5; III: 5.0; 6.8; 2.5/1.5/0.8/0.8/0.5; III₃₋₄ flattened, with ventral pad-like surface (MSSC); III₅ unmodified.

Wing. Hyaline; M₂ present only as trace to margin; CuAx ratio: 1.2; lower calypter yellow with pale setae; haltere yellow.

Abdomen. Metallic green; on segments 2-6, basal half of each tergum and narrow band on preceding adjacent matt brown; both tergum and sternum 7 well developed (Fig. 118e); hypopygium brown with yellow cerci (Fig. 118c,d); epandrium elongate and tapering; hypandrial hood and arm subequal in length; hypandrial arm dorsally serrate; epandrial setae absent; epandrial lobe with single long apical bristle; surstylus small, knoblike, fused to epandrium, and bearing setae as figured; cercus short and simple.

Female. Unknown.

Remarks. *Amblypsilopus gapensis* is known from the Cairns district, Queensland. It has a short simple cercus, flattened tapering epandrium, and a relatively long hypandrial hood.

The *abruptus* Group

Diagnosis. General. Small sized, usually less than 4.0 in length.

Head. Males either with dense black setae on lateral frons (MSSC), or with single strong vertical seta; females always with strong vertical seta; male clypeus narrow and free from margin of eyes; female with clypeus adjacent to sides of eyes; pedicel without short dorsal and ventral setae; first flagellomere short, subtriangular, with dorsal to dorsoapical arista.

Thorax. Usually 2-4 pairs long ac present; male with 2 strong posterior dc and 3-4 weak hair-like anterior dc

(MSSC); females with 5-6 strong dc, decreasing in size anteriorly; lateral scutellar setae reduced to tiny hairs or absent.

Legs. Tibiae mostly bare of major setae although female TII usually with weak ad in basal quarter; male TI sometimes with very weak posterior subapical curved seta (MSSC); male It₅ sometimes flattened (MSSC); male TII and IIt sometimes covered with short erect setae (MSSC); male IIIIt₄₋₅ sometimes slightly flattened (MSSC).

Wing. Hyaline; M₁ curved and elbowlike, but not strongly recurved; crossvein m-cu straight; halteres sometimes dark brown, either in male only or in both sexes.

Abdomen. Relatively long in male; epandrial lobes often separated from epandrium by distinct membranous area; cercus simple and unbranched, and either short and digitiform, or elongate and whiplike.

Remarks. The *abruptus* Group is not defined by any strong apomorphy, but shares mostly primitive characters, such as the simple cercus and unmodified venation. The male legs are mostly unornamented and often lack distinctive MSSC characteristic of other *Amblypsilopus* groups. However, some species close to *A. superans* have a very weak posterior subapical curved seta on TI (MSSC), and other species have flattened IIIIt₄₋₅, suggesting a possible link with the *flaviappendiculatus* Group. As well, *A. abruptus* shows a superficial similarity to some *Krakatuai*.

Some included species originally were placed in *Chrysosoma* by Becker and Parent because of their apical arista. However, the first flagellomere is short and subrectangular to subtriangular in all species, and the arista varies from dorsoapical to apical among closely related species.

The *abruptus* Group is widespread throughout the Old World tropics and includes three Afrotropical species. It is more diverse than the listing suggests. Indeed, the Group may be pantropical, since it has similarities with many New World *Amblypsilopus* species (eg, *A. scintillans*), with similar habitus, short digitiform cercus, and leg II short erect setae (MSSC) [also see discussion of New World *Amblypsilopus*].

The single Australian mainland species, *Amblypsilopus donhi* occurs in northern Queensland. The widespread *A. abruptus* ranges from south-eastern Asia to the Bismarck Archipelago, including Cocos-Keeling and Christmas islands.

The *abruptus* Group includes two assemblages.

I. The following species have an elongate, often whip-like cercus. This assemblage is widely distributed in the Old World tropics, from Africa to the western Pacific. I have seen additional undescribed species from the Nicobar Islands (ZMUC) and the Philippines (MCZ).

abruptus Walker, 1859b: 115. (*Psilopus*) (BMNH, examined), Sulawesi, Java, Sumatra, Irian Jaya, Papua New Guinea, Bismarck Archipelago, Cocos-Keeling Islands, Christmas Island, Taiwan, Philippines, Assam, West Malaysia, Vietnam,

Singapore, Sarawak.

muticus Thomson, 1869: 509. (*Psilopus*) (NRS, examined), Cocos-Keeling Islands.

filatus Wulp, 1884: 227. (*Psilopus*) (ZMUA, examined), Java.

recurrens de Meijere, 1913b: 342. (*Psilopus*) (ZMUA, examined), Irian Jaya.

See species discussion, below.

flabellifer Becker, 1923: 45. (*Sciapus*) (ZMHB, not seen), Madagascar, **n.comb.**

Based on the description and figures, this species belongs in Assemblage I.

ignobilis Becker, 1922a: 171. (*Chrysosoma*) (ZMHB, examined), Taiwan, **n.comb.**

ignobile subsp. ***platypus*** Becker, 1922a: 171. (*Chrysosoma*) (TMB, lost), **n.syn.**

This species also has an outstanding basoventral cercal seta (similar to *A. abruptus*) and but lacks the dense frontal setae and has yellow, not black legs.

Lectotype here designated for *Chrysosoma ignobile*: male, with the label "Formosa Sauter Tainan 1912-iv" (ZMHB).

longifilis Becker, 1923: 28. (*Chrysosoma*) (TMB, lost), Tanzania, Kenya, St Helena, Zaire, **n.comb.**

Based on the description and figures, the species belongs in this assemblage.

munroi Curran, 1924: 218. (*Chrysosoma*) (Natal Museum, not seen), South Africa, Namibia, Mozambique, Sri Lanka, **n.comb.**

I have examined a series of *A. munroi* from the East London type locality which were identified by Curran (AMNH). These were compared directly with a pair from Sri Lanka: Mannar District, north-west of Nanpar (USNM), and they are identical in every respect. Also, unassociated Sri Lanka females from various districts (USNM) are possibly this species.

mutandus Becker, 1922a: 225. (*Condylostylus*) (n.name for *gracilis* de Meijere), **n.comb.**

gracilis de Meijere, 1910: 225. (*Agonosoma*), preoccupied by Aldrich, 1904 (ZMUA, examined), Java.

Becker placed this species in *Condylostylus* because of black setae on the lower calypter, but it clearly belongs in the *Amblypsilopus abruptus* Group as here defined.

pectinatus de Meijere, 1910: 95. (*Agonosoma*) (ZMUA, examined), Java, Cocos Keeling Islands, **n.comb.** (see species discussion, below).

pectoralis de Meijere, 1913a: 54. (*Psilopus*) (ZMUA, examined), Maluku (Waigeu).

The legs, hypopygium and thoracic pleura are yellow.

II. The following species have a short digitiform cercus and some have It₅ flattened (MSSC). This assemblage occurs across the Orient and western Australasia.

albicinctus de Meijere, 1913a: 56. (*Psilopus*) (ZMUA, examined), Maluku.

This species is closely related to *A. donhi* (q.v.), but has It_5 slightly flattened (MSSC) and TII with anterior row of short erect setae (MSSC), but not as long as in *A. donhi*.

Lectotype here designated: male, with label: "Waigau, 4-11-10. Mevr. de Beaumont, leg 1910".

austerus Parent, 1935a: 363. (*Chrysosoma*) (BMNH, examined), Sabah, Saipan, Guam.

A male from Punjab, Pakistan misidentified by Parent as *C. austerum* is *A. pusillus* (BMNH, examined). I have seen specimens from Guam and Saipan (BPBM). (Also see Bickel, in press).

delectabilis Parent, 1932b: 107. (*Sciapus*) (MLUH, examined), Flores, Sumatra, West Malaysia, **n.comb.**

The hypopygium and row of ventral setae on male It are distinctive for this common species. As noted by Parent, the female femora are yellow while those of the male are black.

Additional records. Sumatra: Brastagi (USNM); West Malaysia: Fraser's Hill, Genting Highlands, and Cameron Highlands (BMNH, AMNH, AMS).

donhi n.sp. Australia (Qld).

falcatus Becker, 1922a: 170. (*Chrysosoma*) (type depository not published, not at DEI or ZMNB; probably TMB and lost), Taiwan, **n.comb.**

Becker regarded this species as a possible synonym of *Psilopus fluminis* (= *A. superans*).

gracilitarsis de Meijere, 1914: 86. (*Psilopus*) (ZMUA, examined), Java, Sumatra, West Malaysia, Philippines, **n.comb.**

The first flagellomere is very short and rounded with a dorsoapical arista. The surstylus tapers distally to a point. It_5 is black and only slightly flattened.

Additional records. Java: Salitiga (ANIC); Sumatra: Fort de Kock (ZMUA); and West Malaysia: Penang; Templar Park (BMNH).

Lectotype here designated: male, with label: "Goenoeng Oengoran Java, June 1910".

humilis Becker, 1922a: 172. (*Chrysosoma*) (ZMHB, examined), Taiwan, Nepal, Philippines, China (Hainan Island), West Malaysia, India, Solomon Islands, Western Samoa.

sauteri Becker, 1924: 127. (*Chrysosoma*) (DEI, examined), Taiwan (syn. Bickel & Dyte, 1989).

The holotype of *Chrysosoma sauteri* is badly damaged, missing the antenna and all legs except left III. The hypopygium is identical to that of *C. humile* and the two species agree in all other respects.

The surstylus is upcurved and bears an apical setae, and the cercus tapers to a point as in Becker, 1922a, fig. 135. The legs are yellow.

Additional records. Nepal: Katmandu (CNC); Philippines: Luzon (MCZ); China: Hainan Island (USNM); West Malaysia: Penang (BMNH); Western Samoa: Upolo, Apia; Savaii, Assau (BPBM); Taiwan (MCZ).

Lectotype here designated for *Chrysosoma humile*: male, with the label "Formosa Sauter Tainan 1912-iv" (ZMHB).

lobatus de Meijere, 1916: 27. (*Psilopus*) (ZMUA, examined), Indonesia: Simeulue Island, **n.comb.**

This species was overlooked by Dyte (1975). It has a distinctly flattened $IIIIt_5$ (MSSC), and is close to *A. seticoxa* and *A. simplex*.

A closely related undescribed species occurs in Nepal: Katmandu (CNC).

Lectotype here designated for *Psilopus lobatus*: male, with the label "Edw. Jacobson Sinabang, Simalur Sum. II 1913" (ZMUA).

pusillus Macquart, 1842: 117. (*Psilopus*) (MNHP, not seen), "Indes orientales", India, Sri Lanka, Nepal, Pakistan, Thailand, **n.comb.**

integrum Becker, 1922a: 189. (*Chrysosoma*) (ZMHB, examined), Sri Lanka, India.

This species is common across the Indian subcontinent and has a distinctive outstanding seta at the apex of the cercus (Becker, 1922a, fig. 160). The arista is apical.

Additional records. Sri Lanka (CNC), Nepal: Lothar, near Birgang (CNC), and Thailand: north-west of Fang (ZMUC).

seticoxa de Meijere, 1914: 90. (*Psilopus*) (ZMUA, examined), Java, **n.comb.**

simplex de Meijere, 1910: 99. (*Agonosoma*) (ZMUA, examined), Java, **n.comb.**

Lectotype here designated: male, with label: "Java, I-06, Semarang, Jacobson".

superans Walker, 1860b: 150. (*Psilopus*) (BMNH, examined), Maluku, Irian Jaya, Papua New Guinea.

fluminis de Meijere, 1913b: 344. (*Psilopus*) (ZMUA, examined), Irian Jaya (syn. Bickel & Dyte, 1989).

The male holotype of *Psilopus superans* is missing its head and postabdomen but Parent's redescription (1934a: 32) provided a genitalic figure. A male syntype of *P. fluminis* was compared directly with the *P. superans* and they are identical, including the distinctive silvery pruinosity on abdominal tergum 1 (MSSC), visible in anterior view. TI bears a very weak posterior curved subapical hair (MSSC) and It_5 is flattened (MSSC), neither of which were noted in Parent's redescription. Both Becker and Parent regarded the two species as *Chrysosoma*.

Additional records. Papua New Guinea: Finschhafen (USNM), Maprik and Musgrove River near Port Moresby (AMS).

A related undescribed species from Papua New Guinea: Mendi (BMNH) has black legs, and an undescribed species without It_5 flattened occurs in the Caroline Islands: Ponape (Bickel, in press).

A lectotype is here designated for *Psilopus fluminis* de Meijere: male, with the label, "Z. Niew Guinea, Lorenz, 1909-10, Rivierkamp, 12-ii-10".

variipes Frey, 1925: 19. (*Condylostylus*) (ZMH, examined), Philippines, **n.comb.**

This species is not *Condylostylus*. The short yellow-orange cercus is rather stout. It_5 is flattened and black (MSSC).

Key to Males of the *Amblypsilopus abruptus* Group from Australian Territories

1. Male It_1 and It_2 each strongly flattened, ventrally concave and with pale pile and strong posterior setae (Fig. 117d); cercus elongate and rigid (Fig. 117c) (Cocos Keeling Island) *A. pectinatus*
- Male It_1 and It_2 not flattened 2
2. Lateral frons with abundant black hairs; TII unmodified; cercus elongate, with distinctive strong curved seta near base (Fig. 117b) (Cocos-Keeling Island, Christmas Island) *A. abruptus*
- Frons with single vertical seta; TII distally with av row of 8-10 short erect setae; cercus short and digitiform (Fig. 117a) (Qld) *A. donhi*

Amblypsilopus abruptus (Walker)

Psilopus abruptus Walker, 1859b: 115.

Psilopus muticus Thomson, 1869: 509.

Psilopus filatus Wulp, 1884: 227.

Psilopus recurrens de Meijere, 1913a: 342.

Type material. I have examined the types of all four species, *Psilopus abruptus* from Sulawesi (male, BMNH), *P. muticus* from Cocos-Keeling (male, NRS), *P. filatus* from Java (male, ZMUA) and *P. recurrens* from Irian Jaya (female, ZMUA), and they represent the same species, supporting the established synonymy of these species.

Additional material. Cocos Keeling Group – Home Island, West Island, 12 June 1952, Jan., Oct. 1941 (ANIC, BMNH). Christmas Island – Rocky Point, 17 July 1972 (BPBM); Ethel Beach and Central Workshop, Apr. 1989 (ANIC). Papua New Guinea – Maprik (AMS, ANIC); New Britain, Rabaul (ANIC). Vietnam – de Trang Bon Province (USNM). Indonesia – Tidore Island (USNM). Singapore – (BMNH). Malaysia – Sarawak: Niah (BMNH); Malaysia: Selangor, Templer Park (ZMUC) (23 males, 17 females examined).

Description – male. Length: 4.3-4.7; wing: 3.8-4.0 x 1.3.

Head. Vertex and frons metallic green-blue; frons with abundant black hairs (MSSC); face bulging, metallic blue-violet; clypeus metallic green with silvery pruinosity; clypeus free from margin of eyes; palp and proboscis black; antenna black; pedicel with strong dorsal seta; first flagellomere short triangular; arista dorsoapical and slightly longer than head width.

Thorax. Dark metallic blue-green; pleura with grey pruinosity; setae black; 3 pairs strong ac, posterior pair as long as posterior dc; 2 strong posterior dc, with 4 weak hair-like anterior dc; 1 pa, 2 sa, 2 sr, 2 npl, 1 weak hm and 1 pm present; lateral scutellars absent.

Legs. All coxae and remainder of legs dark brown; CI and CII with black anterior setae; CIII with black lateral seta subtended by weaker pale seta; femora with only weak ventral hairs; I: 6.0; 6.5; 4.5/2.0/1.0/1.0/0.5;

II: 8.5; 11.0; 7.5/3.0/1.5/1.0/0.5; III: 10.0; 14.0; 6.5/3.0/2.0/1.0/1.0.

Wing. Hyaline but with faint smokey wash; R_{2+3} with distinct subapical bend; R_{4+5} with elbow-like bend; M_2 reduced to stub; m-cu straight; CuAx ratio: 2.5; lower calypter brown with dark rim and fan of black setae; haltere brown.

Abdomen. Metallic blue-green with bronze reflections and matt brown bands near tergal overlap; hypopygium dark brown (Fig. 117b); epandrium broadly subtriangular; 2 epandrial setae present; epandrial lobe with 2 bristles; surstylus with large ventral lobe and distinctive subtriangular dorsal lobe; cercus narrow and elongate, with distinctive strong curved seta near base.

Female. Similar to male except lack MSSC and as noted: slope of frons with strong vertical seta; face not bulging; 4 strong dc present; TII with weak ad seta at one-fifth; haltere also brown.

Remarks. *Amblypsilopus abruptus* is a widespread Oriental-Papuan species, found from Assam and south-east Asia to the Bismarck Archipelago. It occurs on the Cocos-Keeling Group and Christmas Island but is unknown from mainland Australia.

Both Becker and Parent placed this species in *Chrysosoma* on account of its antennal structure. However, the arista is dorsoapical on a short first flagellomere, unlike that of true *Chrysosoma*.

This species has a dark cast and the legs are entirely black. Intraspecific size variation is evident among specimens. Of particular importance in distinguishing this species is the strong black curved ventral seta near the base of the cercus and the subtriangular surstylar lobe. Also, the lateral slopes of the frons bear dense black setae (MSSC) and the male face is bulging, both characters unusual for *Amblypsilopus*.

Although the dense frontal setae of male *A. abruptus* is similar to that found in male *Krakatauia*, the vertex is strongly excavated and other features are not concordant with that genus.

Amblysilopus donhi n.sp.

Type material. HOLOTYPE male, PARATYPES 2 males, female, Queensland, Mossman Gorge, 21 Apr. 1967, D.H. Colless; PARATYPES male, Mount Haig, 21 km east by north-east of Atherton, 18 Nov. 1981; male, female, Kuranda State Forest, Black Mountain Road, 20 Apr. 1967 (ANIC).

Additional material. Queensland – male, near Mount Carbine, Windsor Tablelands, 23 Jan. 1988; male, Crystal Creek, Cairns, 19 Apr. 1967; the following are females only: 1 km west of Cooktown, 13 May 1981; Mount Webb National Park, 2 May 1981, 29 Sept. 1981; Gap Creek, south-east of Mount Finnigan, 14 May 1981; Rounded Hill, 7 Oct. 1980 (ANIC).

Description – male. Length: 3.8; wing: 3.0 x 1.2. *Head.* Vertex, frons, face metallic green-blue with

dusting of brownish pruinosity; vertical seta present on frons; clypeus metallic blue with some grey pruinosity; clypeus free from margin of eyes; palp brown and proboscis yellow; antenna black; first flagellomere rounded; arista dorsal and about equal to head width.

Thorax. Metallic green with bronze reflections; pleura with grey pruinosity; setae black; 2 pairs strong ac; 2 strong posterior dc, with 4 weak hair-like anterior dc; 1 pa, 2 sa, 2 sr, 2 npl, 1 weak hm and 1 pm present; lateral scutellars absent.

Legs. All coxae and femora dark brown; tibiae and basal tarsomeres yellowish, and distal tarsomeres dark brown; CI and CII with pale anterior setae; CIII with pale lateral seta; I: 6.0; 6.5; 6.0/2.0/1.5/1.0/0.8; II: 7.0; 8.0; 7.0/2.0/1.5/1.0/0.5; TII distally with av row of 8-10 short erect setae (MSSC); III: 8.0; 12.5; 5.5/2.0/1.5/1.0/0.5; FIII with some pale ventral setae.

Wing. Hyaline with faint smokey wash; R_{2+3} with

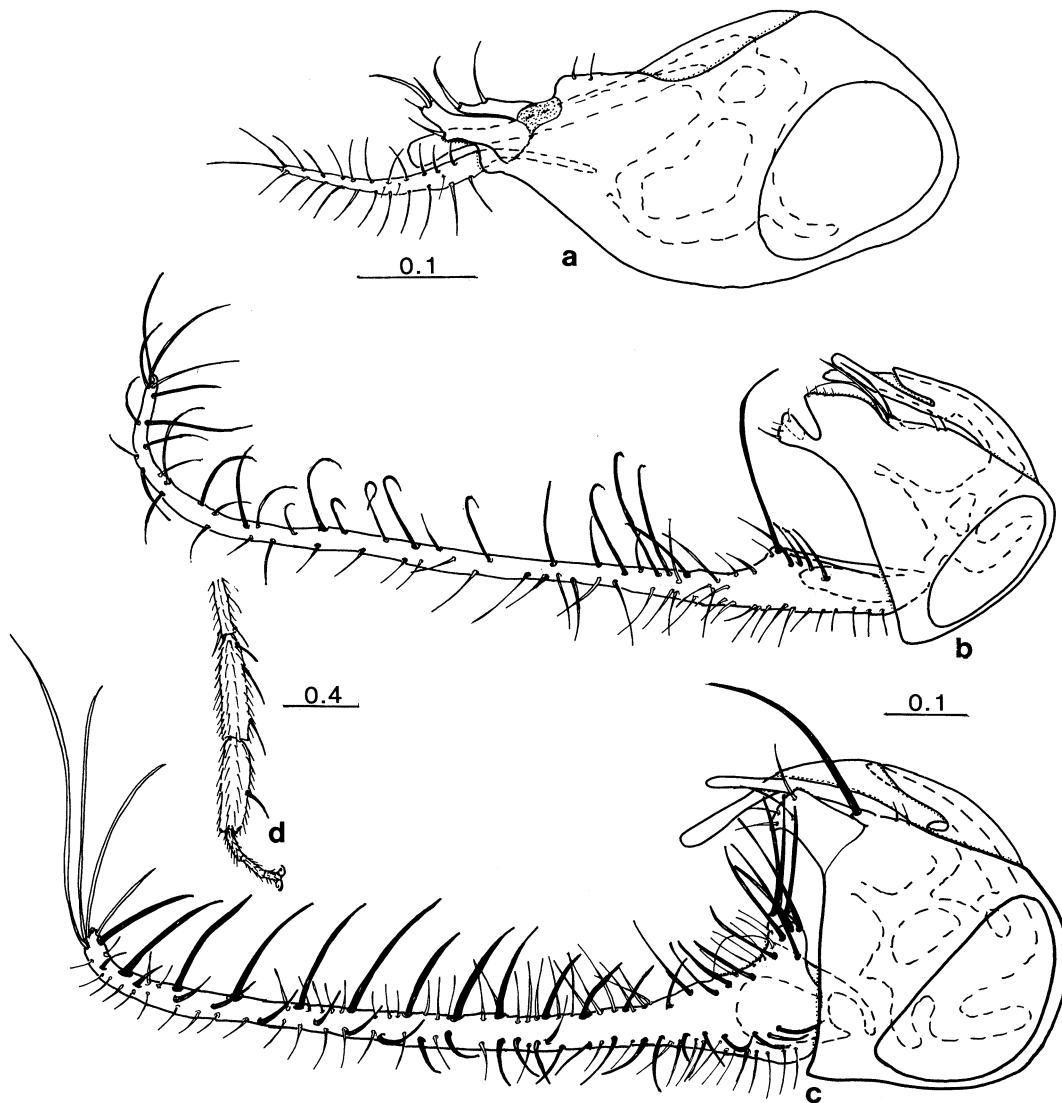


Fig.117. *Amblysilopus donhi*, Mossman Gorge, Qld: a – hypopygium, left lateral. *A. abruptus*, Maprik, PNG: b – hypopygium, left lateral. *A. pectinatus*, Cocos-Keeling Islands: c – hypopygium, left lateral; d – left male It_1 , dorsal.

distinct subapical bend; M_1 with strong elbow-like bend; M_2 reduced to stub; m-cu straight; CuAx ratio: 2.5; lower calypter brown with dark rim and fan of black setae; haltere brown.

Abdomen. Metallic blue-green with bronze reflections and matt brown bands near tergal overlap; hypopygium small, dark brown (Fig. 117a); epandrium subovate; hypandrial arm arising near base of hypandrium; aedeagus simple; 2 epandrial setae present, near epandrial lobes; epandrial lobe arising from membranous base forms distally projecting peduncle which bears 2 bristles; surstylus short, simple and bearing setae as figured; cercus digitiform and setose.

Female. Similar to male except lack MSSC and as noted: vertical seta stronger; dc similar to male with anterior dc also weak; CI and femora somewhat yellowish, not as dark as in male; TII unmodified but with weak ad at one-sixth; haltere club yellowish.

Remarks. *Amblypsilopus donhi* is known from the Cairns district, Queensland, and is closely related to *A. albicinctus* from Maluku. The male TII has an anterior row of erect setae (MSSC) in both species, but it is more strongly developed in *A. donhi* than *A. albicinctus*.

Amblypsilopus pectinatus (de Meijere), n.comb.

Agonosoma pectinatum de Meijere, 1910: 95.

Type material. De Meijere described *Agonosoma pectinatum* from a male taken in Java (ZMUA, examined). This species was previously referred to *Sciapus*. The flattened male It_{1-2} and cercus are diagnostic.

Additional material. Cocos Keeling Islands – 3 males, 3 females, no locale, Jan.-Oct., 1941 (BMNH); 3 males, female, Direction Island, West Island, 25 May 1952, 4 June 1952 (ANIC).

Description – male. Length: 3.9-4.0; wing: 3.4 x 1.0.

Head. Vertex, frons, face metallic green with dusting of pruinosity; postvertical seta present; strong black vertical seta present; face not bulging; clypeus green with some silvery pruinosity; clypeus adjacent to margin of eyes; palp yellow with 2 black setae; proboscis yellowish; antenna dark brown; first flagellomere rounded; arista dorsal and about as long as head height.

Thorax. Metallic green with bronze reflections; pleura with grey pruinosity; setae black; 2 pairs strong ac, with 2 pairs short setulae on anterior slope; 2 strong posterior dc, with 4 weak hair-like anterior dc; 1 pa, 2 sa, 2 sr, 2 npl, 1 weak hm, and 1 pm present; lateral scutellars absent.

Legs. CI yellow; CII and CIII dark brown; all femora, tibiae, It_{1-2} , and III_t yellow; remaining tarsomeres and III_t dark brown; CI with 2 stout pale distolateral setae; CIII with pale lateral seta; femora bare; I: 8.0; 8.0; 3.0/

2.5/0.5/0.5/0.8; TI without major setae; It_1 and It_2 each subrectangular and strongly flattened, ventrally slightly concave with pale pile, and It_1 with 2 strong posterior and It_2 with 1 strong posterior seta (Fig. 117d) (MSSC); II: 8.5; 10.0; 7.0/3.0/1.5/0.8/0.8; TII with strong anterior seta at one-quarter and apically, and with apical ventral seta; III: 9.0; 12.0; 5.0/3.0/2.0/1.0/0.8.

Wing. Hyaline; M not as strongly bent as in some *Amblypsilopus*; M_2 present only as fold; m-cu straight but long and joining M more distally than characteristic of genus; CuAx ratio: 2.5; lower calypter pale with dark rim and fan of long pale setae; haltere yellow.

Abdomen. Metallic blue-green with bronze reflections and matt brown bands near tergal overlap; hypopygium brown with yellow cercus (Fig. 117c); epandrium almost square and with short surstylus; hypandrial arm extending well beyond hypandrial hood; aedeagus simple and elongate, extending well beyond the short surstylus; 2 weak epandrial setae present; epandrial lobe short with single strong apical bristle; surstylus short and subrectangular, and bearing setae as figured; cercus elongate and rigid, with ventrobasal mound, and covered strong black projecting lateral and ventral setae along entire length.

Female. Similar to male except smaller, lack MSSC and as noted: 5 strong dc present; CI also with strong pale setae; I: 6.5; 7.0; 3.5/2.0/1.0/0.5/0.8; It_1 and It_2 unmodified; m-cu shorter; CuAx ratio: 1.5.

Remarks. *Amblypsilopus pectinatus* is known only from Java and the Indian Ocean Cocos-Keeling Group.

The flattened male It_1 and It_2 , each with ventral pile and posterior setae, and the strongly reduced It_{3-5} are diagnostic for the species. The epandrial lobe is unusual in having only a single strong apical bristle, instead of the usual two. The rigid yellow cercus with strong black lateral setae also is distinctive. It must be noted that the male clypeus is adjacent to the eyes, unusual for the genus.

Similar homoplastic flattening of male It_1 is also known from the *Chrysosoma arrogans* Group and in *Amblypsilopus bertiensis*. Female *A. pectinatus* show a strong similarity to females of *Narrabeenia* in antennal shape. Also, *A. pectinatus* shows some similarities with the Afrotropical-western Indian Ocean genus *Ethiosciapus* but the relationship is unclear. Overall, the species is best placed in the *abruptus* Group.

Unplaced Australian *Amblypsilopus*

The following species of *Amblypsilopus* are not assigned to any group and are somewhat isolated. Some species, such as *A. aliciensis* and *A. cincinnatus* possibly belong in genera yet to be defined.

aliciensis n.sp. Australia (NT).

cincinnatus n.sp. Australia (Qld).

melasma n.sp. Australia (NT).

sideroros n.sp. Australia (Qld), Papua New Guinea.

Amblypsilopus aliciensis n.sp.

Type material. HOLOTYPE male, PARATYPE male, Northern Territory, 56 km south by east of Alice Springs, 3 Oct. 1978, D.H. Colless; PARATYPES male, 2 females, Waterhouse Range, 39 km south-west by south of Alice Springs, 12 Oct. 1978; female, 41 km south by east of Alice Springs, 4 Oct. 1978; female, Roe Creek, 12 km south-west by west of Alice Springs, 10 Oct. 1978 (ANIC).

Description – male. Length: 2.3; wing: 1.9 x 0.8.

Head. Vertex and frons metallic green-bronze with some grey pruinosity; strong vertical seta present; head setae black; face and clypeus covered with dense grey pruinosity; clypeus broad, adjacent to eyes; palp and proboscis brown; antenna black, arista dorsal.

Thorax. Dorsum metallic green with bronze reflections; scutellum shining metallic green-bronze; pleura with grey pruinosity; ac absent; 5 strong dc present, without dimorphic reduced hair-like dc; lateral scutellars absent.

Legs. CI, all femora and tibiae yellow; CII, CIII and all tarsi brown; legs not elongate; I: 4.5; 4.0; 2.0/1.6/1.0/0.5/0.5; FI bare; It₁ with pale ventral pile in basal half (MSSC); II: 4.5; 5.0; 2.9/1.5/1.0/0.8/0.5; TII with ad setae at one-quarter and subapically; III: 5.0; 6.5; 2.0/2.0/1.0/0.8/0.5; both TIII and III₁ unmodified.

Wing. Membrane milky with dark brown veins (as Fig. 129e); M₁ with gentle arch to apex; M₂ only faintly present; CuAx ratio: 0.7; lower calypter yellow with fan of pale setae; haltere yellow.

Abdomen. Sternum 7 well developed; hypopygium dark brown with yellow cerci (Fig. 119d); hypandrial arm extending to apex of hypandrial hood; aedeagus elongate and extending well beyond hypandrium; dorsal angle present; epandrial lobe with strong apical and weaker subapical bristles; surstylus apically forked, with larger ventral arm; cercus elongate, setose, with 2 strong basoventral setae and with very long undulating apical seta.

Female. Similar to male except smaller and lacking MSSC; 4 strong dc also present; TII with ad at one-quarter and two-thirds and subapically; wing (Fig. 129e).

Remarks. *Amblypsilopus aliciensis* is known only from the Alice Springs district, Northern Territory. The milky wing membrane with contrasting dark brown veins is distinctive. *A. aliciensis* has few MSSC and the hypopygium is of an unmodified and simple form. Possibly it could be associated with *Pseudoparentia* based on the semi-circular clypeus, the four non-dimorphic dc, and the U-shape curvature of vein M₁. However, it lacks MSSC characteristic of the genus and is best kept in *Amblypsilopus*.

Amblypsilopus cincinnatus n.sp.

Type material. HOLOTYPE male, Queensland, Mount Haig, 21 km north-east by east of Atherton, 17 Nov. 1981, at light,

D.H. Colless (ANIC); PARATYPES male, 2 females, Walter Hill Range, Cardstone-Ravenshoe Road, 16 Jan. 1967 (AMS); male, female, 2 miles north of Tully Bridge, Cardstone-Ravenshoe Road, 16 Jan. 1967 (AMS).

Additional material. Queensland – 2 males, The Boulders, near Babinda, 27 Jan. 1991; male, female, Palmerston National Park, 24 km east by north of Ravenshoe, 14 Nov. 1981 (ANIC); female, The Crater, near Herberton, 29 Jan. 1972 (AMS).

Description – male. Length: 6.0; wing: 5.3 x 1.6.

Head. Frons dark metallic blue with dusting of grey pruinosity; face and clypeus metallic blue with dense silvery pruinosity; very weak vertical seta present; face bulging; clypeus tapering distally and free from eyes; palp and proboscis yellow; antenna yellowish; pedicel with black dorsal and ventral setae; first flagellomere rounded subrectangular; arista dorsal, black, and about as long as head width.

Thorax. Metallic blue-green with brown colouration over notopleural area and with irregular violet ac band; pleura metallic green-brown with yellowish cuticle adjacent to sutures and wing base; metepimeron yellow; setae black; ac totally absent; 5 strong dc present, decreasing in size anteriorly, and without sexually dimorphic hair-like setae; 1 pa, 2 sa, 2 npl, 1 hm and 1 pm present; sr absent; lateral scutellars reduced to weak hairs.

Legs. All coxae and legs yellow, with only distal tarsomeres infuscated; setae black; CI with 3 black distolateral setae; CII with dark anterior setae; CIII with black lateral bristle; tibiae without major setae; I: 9.0; 10.0; 11.5/4.0/3.0/1.5/1.5; It₁ longer than TI; It₂ with dorsal pair of branched curled setae (Fig. 119b) (MSSC); II: 9.0; 15.0; 11.5/3.5/2.5/1.5/1.0; TII with offset ad-pd pairs at one-quarter and two-thirds; III: 12.0; 18.5; 8.0/4.5/2.5/1.5/1.0; TIII with posteroapical smooth depression with some stout ventral seta on adjacent III₁ (MSSC).

Wing. Hyaline (as in Fig. 129d); M₁ at right angle to M₂ then gradually approaching R₄₊₅; m-cu straight; CuAx ratio: 1.7; lower calypter yellow with dark rim and fan of pale setae; haltere yellow.

Abdomen. Terga 1-3 yellowish with brown bands adjacent to segment margins; segments 4-7 dark brown; both tergum and sternum 7 well developed; hypopygium including cerci dark brown (Fig. 119a); epandrium subrectangular; hypandrial arm arising beyond midlength of hypandrium; hypandrial hood extending beyond apex of hypandrial arm; hypandrial arm ventrally serrated, not reaching apex of aedeagus; epandrial setae absent; epandrial lobe forming elongate peduncle bearing 2 bristles; surstylus prolonged, digitiform, with apical U-shaped excavation, and with setae as figured; cercus elongate and somewhat deflexed distad, with abundant pale hairs, and 3-4 strong black subapical setae.

Female. Similar to male except lack MSSC and as noted: face not bulging; clypeus adjacent to eyes;

strong vertical seta present; thorax entirely red-yellow with only metallic blue-green band extending across dorsum between dc rows and across scutellum; covered

with yellowish pruinosity; ac also absent; It_5 normal; TII with offset ad-pd setae at one-fifth, two-thirds; TIII with ad at one-fifth; TIII and III₁ unmodified; wing,

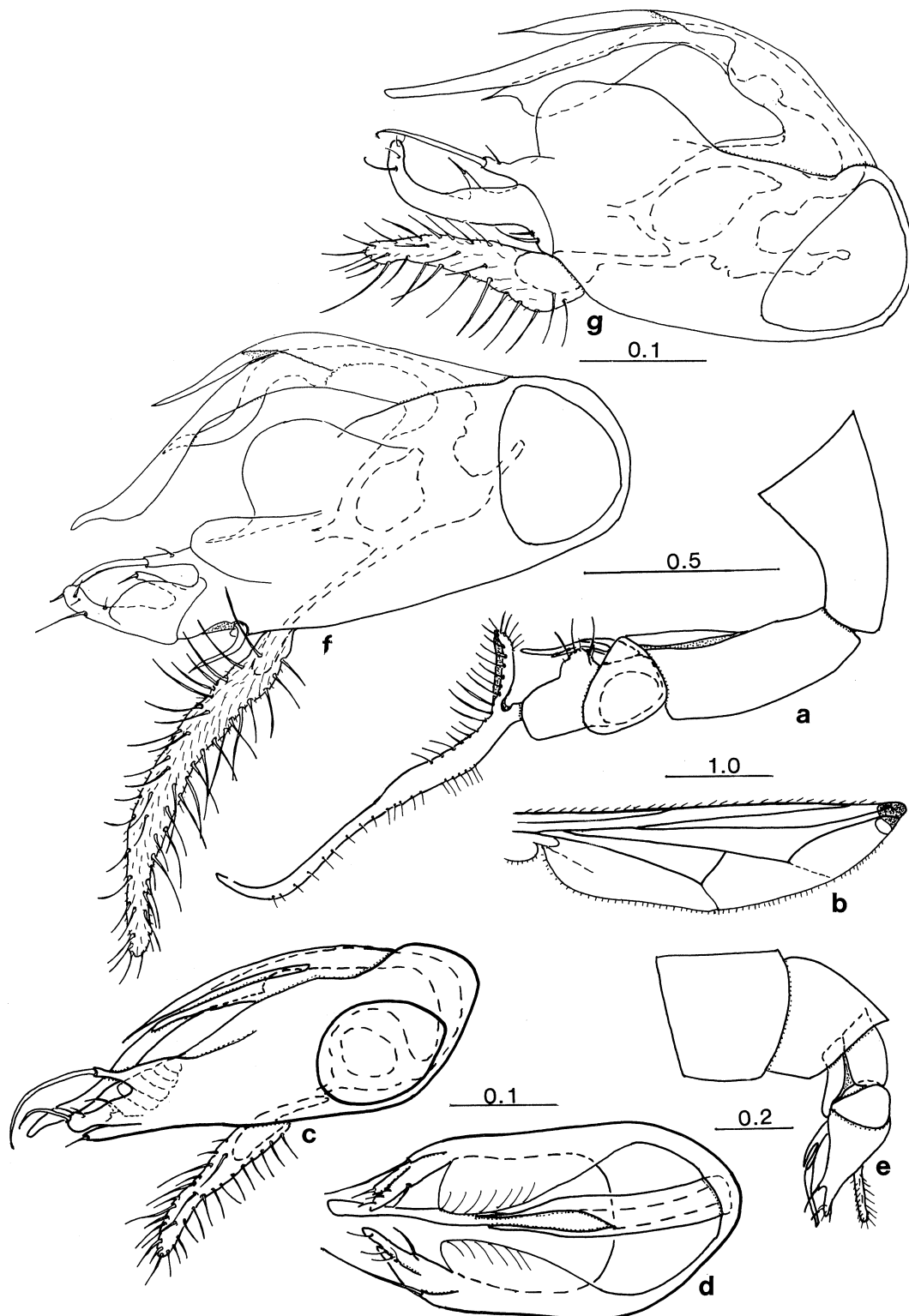


Fig.118. *Amblypsilopus melasma*, near Alice Springs, NT: a – male postabdomen, left lateral; b – male wing, dorsal. *A. gapensis*, Daintree River, Qld: c – hypopygium, left lateral; d – hypopygium, ventral; e – male postabdomen, left lateral. *A. cyplus*, Batavia Downs, Qld: f – hypopygium, left lateral. *A. bataviensis*, Batavia Downs, Qld: g – hypopygium, left lateral.

Figure 129d; abdominal terga 1-4 mostly red-yellow, with brownish basal areas on terga 2-4; terga 5-6 brown-green.

Remarks. *Amblypsilopus cincinnatus* is known from the Cairns district, Queensland. The male has five strong dc, and unusual leg MSSC, It_5 with a dorsal pair of branched curled setae and TIH with posteroapical smooth depression. The female is similar to female *A. triduum* in both having a yellow thorax with a metallic dorsal band.

***Amblypsilopus melasma* n.sp.**

Type material. HOLOTYPE male, Northern Territory, 32 km west-north-west of Alice Springs, malaise trap, 8 Oct. 1978, D.H. Colless (ANIC).

Description – male. Length: 4.2; wing: 3.4 x 1.0.

Head. Vertex, frons and face dark metallic blue; strong vertical seta present; lower face, clypeus covered with dense silvery pruinosity; clypeus semicircular and almost adjacent to lateral margins of eyes; palp and proboscis black; antenna black; first flagellomere subrectangular, arista about as long as head height.

Thorax. Dark metallic green with bronze reflections; pleura with grey pruinosity; setae black; 2 pairs long ac; 2 strong posterior dc, with 3 short, weak dc anterior; lateral scutellars present as tiny weak hairs.

Legs. Coxae and legs entirely dark brown with yellowish knees; CI and CII with pale anterior hairs; $CIII$ with pale lateral seta; I : 6.0; 6.5; 2.2/1.0/0.8/0.5/0.5; TI with very weak posterior subapical seta, slightly crocheted; II : 8.0; 9.0; 5.5/2.0/1.5/0.8/0.5; III : 9.0; 12.0; 6.0/2.0/1.2/1.0/0.8; distal III_2 and III_{3-4} flattened and padlike.

Wing. Elongate, relatively narrow, and hyaline with black triangular apex subtended by white opaque spot (MSSC) (Fig. 118b); R_{2+3} and R_{4+5} parallel almost to apex; M_1 rising almost straight to wing apex and recurved distally (MSSC); M_2 as weak trace to margin; CuAx ratio: 1.8; lower calypter dark brown with dark setae; haltere black.

Abdomen. Dark metallic blue-green with matt coppery bands near tergal overlap; tergal window large; hypopygial peduncle (segment 7) elongate, with sternum 7 well developed; hypopygium (Fig. 118a); epandrium modified so that lobate surstylus positioned along ventral margin and bearing setae as figured; cercus elongate and tapering, with basal setose wing-like projections.

Female. Unknown.

Remarks. *Amblypsilopus melasma* is known only from the type locality near Alice Springs, NT. The male wing is distinctively modified, with a black pointed

apex subtended by a white opaque spot and the cercus is highly elongated. This species has similarities with both the *triscuticatus* and *zonatus* Groups.

***Amblypsilopus sideroros* n.sp.**

Type material. HOLOTYPE male, Queensland, Iron Range, Claudie River near Mount Lamond, 13 Dec. 1971, malaise trap, D.K. McAlpine, G.A. Holloway & D. Sands (AMS).

Additional material. Papua New Guinea – male, Wau, Morobe District, 16 June 1972 (ANIC).

Description – male. Length: 3.0; wing: 2.7 x 1.2.

Head. Vertex, frons, face and clypeus metallic blue-green with dusting of grey pruinosity; setae black; strong vertical seta present; face not bulging; clypeus free from lateral margin of eyes; palp and proboscis yellow; antenna black; first flagellomere rounded; arista dorsoapical, and about as long as head width.

Thorax. Metallic blue-green with some pruinosity; setae black; 2 pairs strong ac present; 2 strong posterior dc with 3 weak hair-like dc present anterior (MSSC); 1 pa, 2 sa, 2 sr, 2 npl, 1 hm, and 1 pm present; lateral scutellars absent.

Legs. CII and $CIII$ dark brown; CI and remainder of legs yellow, with only distal tarsomeres darkened; CI and CII with pale distolateral setae; $CIII$ with pale lateral bristle; FI with 3-4 long pale ventral setae on basal quarter, FII and $FIII$ with pale ventral hairs; I : 5.0; 5.5; 5.0/1.5/1.0/0.8/0.8; TI with pv row of 8-10 pale hairs along distal four-fifths (MSSC?), and apex of TI with ventral tuft of hairs (MSSC?); II : 6.0; 8.0; 7.0/2.0/1.2/1.0/0.5; III bare; III : 7.0; 10.0; 4.5/2.0/1.5/0.8/0.8.

Wing. Hyaline (similar to Fig. 127i); m-cu straight; CuAx ratio: 1.7; lower calypter brown with pale setae; haltere yellow.

Abdomen. Metallic green with brown bands adjacent to tergal overlap on segments 1-5; both tergum and sternum 7 well developed; hypopygium dark brown (Fig. 119c); epandrium tapering subrectangular; hypandrium and aedeagus relatively straight; single epandrial seta present; epandrial lobe unusually developed as projection, distally bearing 7-8 long bristles and numerous curved setae; surstylus produced and subrectangular, with strong curved external seta and pair of dorsobasal setae; cercus relatively stout and clavate, with truncated distal margin which bears short setae and a strong curved apical seta.

Female. Unknown.

Remarks. *Amblypsilopus sideroros* is known from both Iron Range, Cape York Peninsula and the Morobe District, Papua New Guinea, and is the only montane New Guinea species known to occur in Australia. The MSSC on leg I is very weakly developed. The hypopygium is unusual in having strong setae

on the epandrial lobe, a short surstylus and truncated cercus.

Unplaced Oriental and Australasian *Amblypsilopus*

The following Oriental and Australasian *Amblypsilopus* species are not associated with any Group. However, their types exist and/or accurate descriptions make them identifiable. Some may be ascribed to established groups upon future revisionary work. (For example, species may bear diagnostic characters not mentioned in the original descriptions, such as the *triscuticatus* Group's male curved subapical TI seta.)

In addition to the species listed below, there are long series of two related undescribed species from Sabah: Mount Kinabalu, above 1,500 m (BMNH). The cerci of these species bear a superficial resemblance to those of the *Chrysosoma leucopogon* Group, Assemblage IIC, but other characters place them in *Amblypsilopus*. They

are possibly close to *A. mutatus* or *A. penicillatus*.

aurichalceus Becker, 1922a: 198. (*Sciapus*) (TMB, lost, female only), Taiwan, China, **n.comb.**

Although described from females only, the distinctive yellow colouration enables identification. I have seen additional females from China: Tai An Hong, Kiangsi Province (USNM) but no associated males.

cosmochirus Bezzi, 1928: 61. (*Chrysosoma*) (BMNH, examined), Fiji, Tonga, **n.comb.**

Although described as *Chrysosoma*, this species belongs in *Amblypsilopus* on the basis of antennal and hypopygial structure and the absence of strong tibial setae. The hypopygial peduncle (segment 7) and the cerci are both greatly prolonged. The legs are relatively long, and males have It_2 silvery white and $It_{3.5}$ with black feathery setae (MSSC), and IIt_{2-3} are mostly white (MSSC). The first flagellomere is short triangular and the arista dorsoapical. The hypopygium has a short hypandrial hood and the epandrium is prolonged beyond the short surstyli, and similar to the structure of the *triscuticatus* Group species *A. renschi* and *A. natalis* (q.v.). However, *A.*

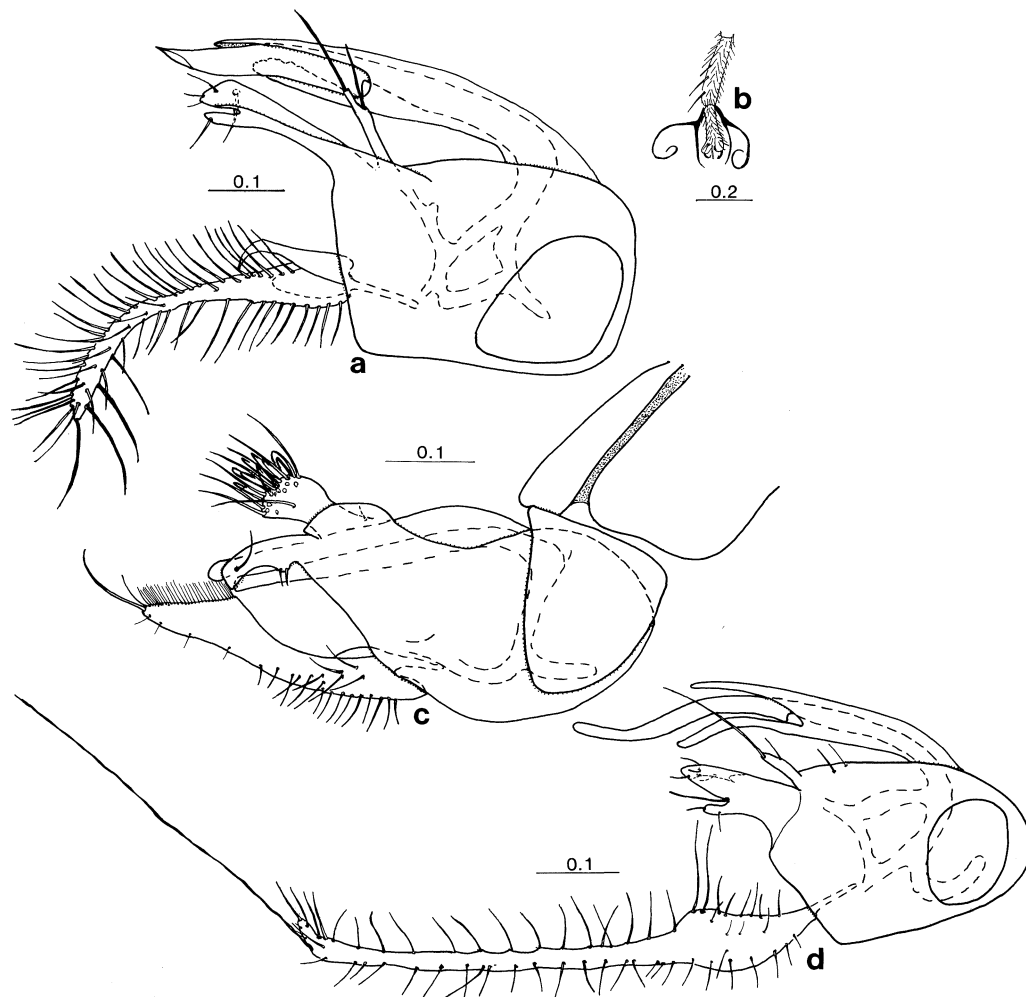


Fig.119. *Amblypsilopus cincinnatus*, Cardstone-Ravenshoe Road, Qld; a – hypopygium, left lateral; b – male tarsus $I_{4.5}$, dorsal; *A. sideroros*, Iron Range, Qld; c – hypopygium, left lateral. *A. aliciensis*, near Alice Springs, NT; d – hypopygium, left lateral.

cosmochirus remains isolated.

Additional records. Males, Fiji: Sigatoka (AMS); Loma Loma, Vanua Balavu (BPBM). Tonga: Vavau, Neiafu (BPBM).

decoratus Becker, 1922a: 154. (*Chrysosoma*) (ZSI, not seen), Bangladesh, **n.comb.**

This species is not a *Chrysosoma*. The distinctive leg MSSC (Becker, 1922a, figs 96, 97) possibly place it in the *flaviappendiculatus* Group.

elegans Walker, 1852: 210. (*Psilopus*) (BMNH, examined), East Indies (?Java), **n.comb.**

The cercus is distinctive and accurately portrayed

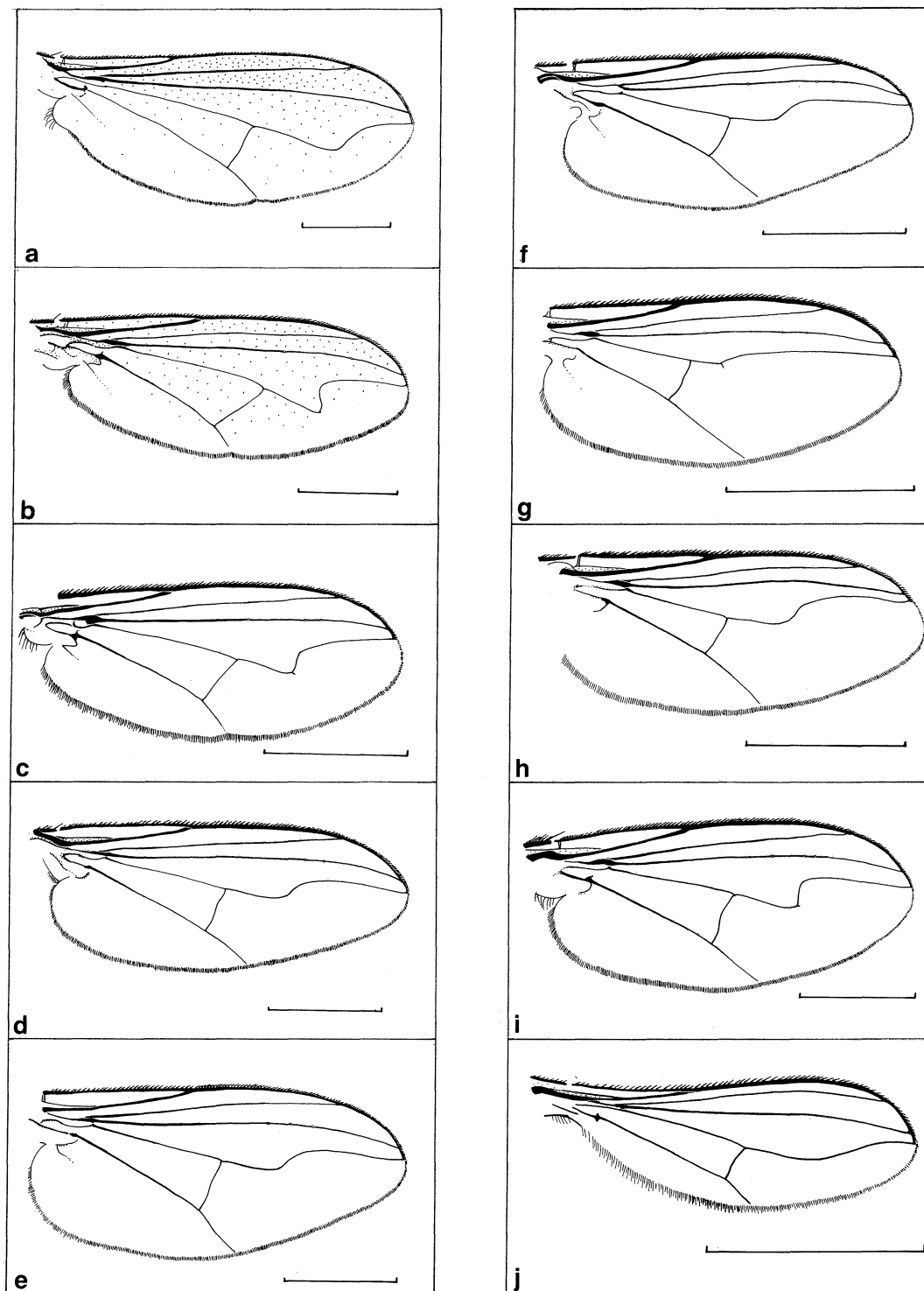


Fig.120. Wing. a – *Amesorrhaga femorata*, male; b – *Negrobovia australensis*, male; c – *N. aculicita*, male; d – *Mesorhaga koongarra*, male; e – *M. canberrensis*, male; f – *M. flavicoma*, male; g – *M. weiri*, male; h – *M. wanbi*, male; i – *M. queenslandensis*, male; j – *Pilbara octava*, male. (Scale line = 1.0 mm).

in Parent's (1934a: 15) redescription.

eupulvillatus (Parent), 1928: 194 (*Condylostylus*). (ZMUH, lost). Tonga.

Amblypsilopus eupulvillatus from Tonga and *A. pulvillatus* from Fiji (see below) are very closely related. Both have male tarsal claws and pulvilli

greatly enlarged on leg I (MSSC). They are definitely *Amblypsilopus*, not *Condylostylus*. Despite the similarity in names, they were described independently and almost simultaneously by Parent and Bezzi, respectively.

Additional specimens near *A. eupulvillatus* from

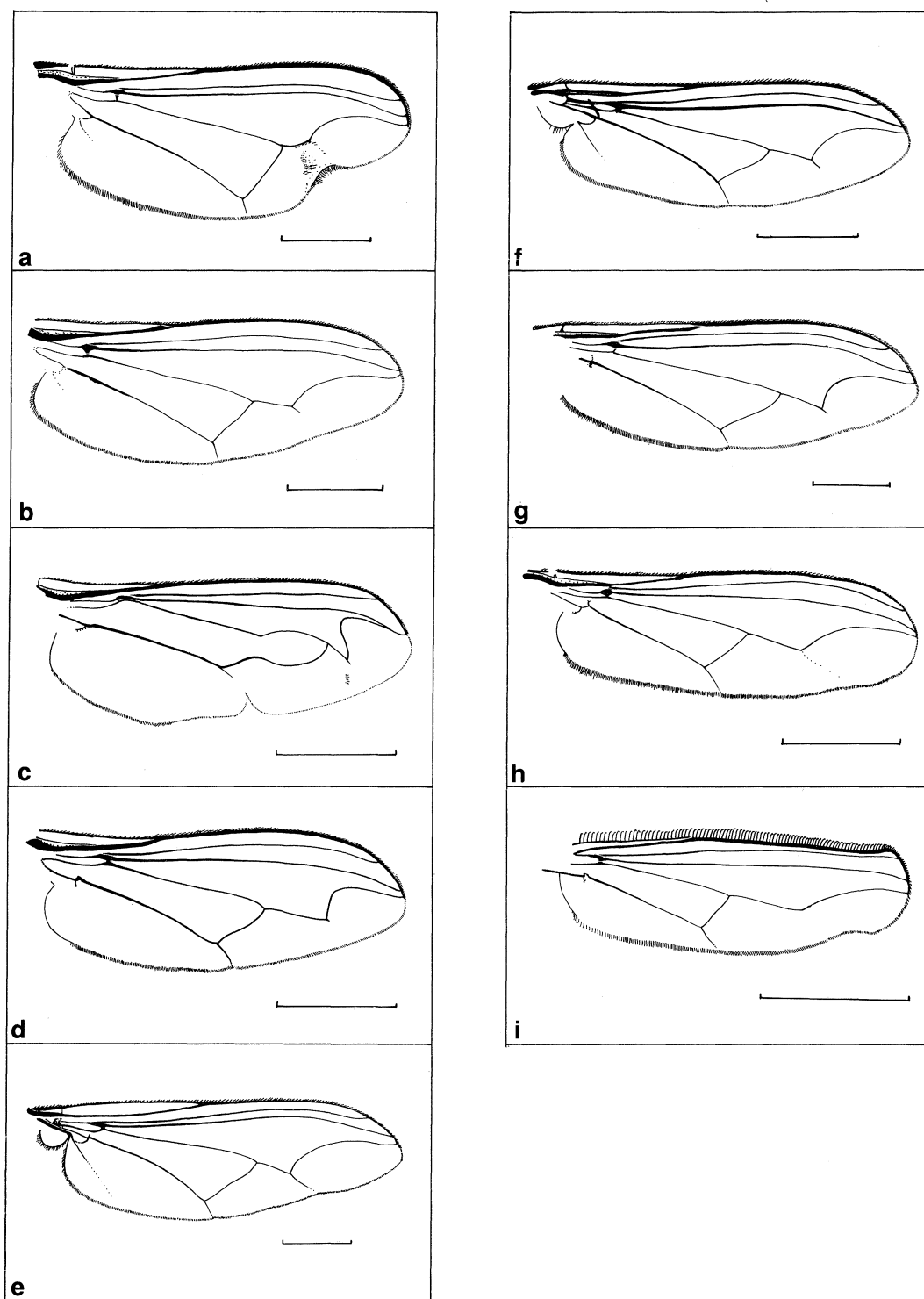


Fig.121. Wing. a – *Dytomyia sordida*, male; b – *D. sordida*, female; c – *D. torresiana*, male; d – *D. torresiana*, female; e – *D. tumifrons*, male; f – *D. flaviseta*, female; g – *Narrabeenia difficilis*, female; h – *Pseudoparentia centralis*, male; i – *P. hangayi*, male. (Scale line = 1.0 mm).

Tonga (USNM) with hypopygium identical to that as figured in Parent. The male has one enlarged claw on It_5 , as emphasised in Parent's description. Neotype here designated for *Condylostylus eupulvillatus* Parent: male, bearing the label "TONGA ISLANDS, Tongatapu Is., Nukualofa, Oct.

25, 1945, David G. Hall" (USNM).

Apart from the types, I have not seen additional specimens of the Fijian *A. pulvillatus*. Bezzi's description notes that the male has one enlarged claw on It_5 , but the text figure shows two enlarged claws on It_5 .

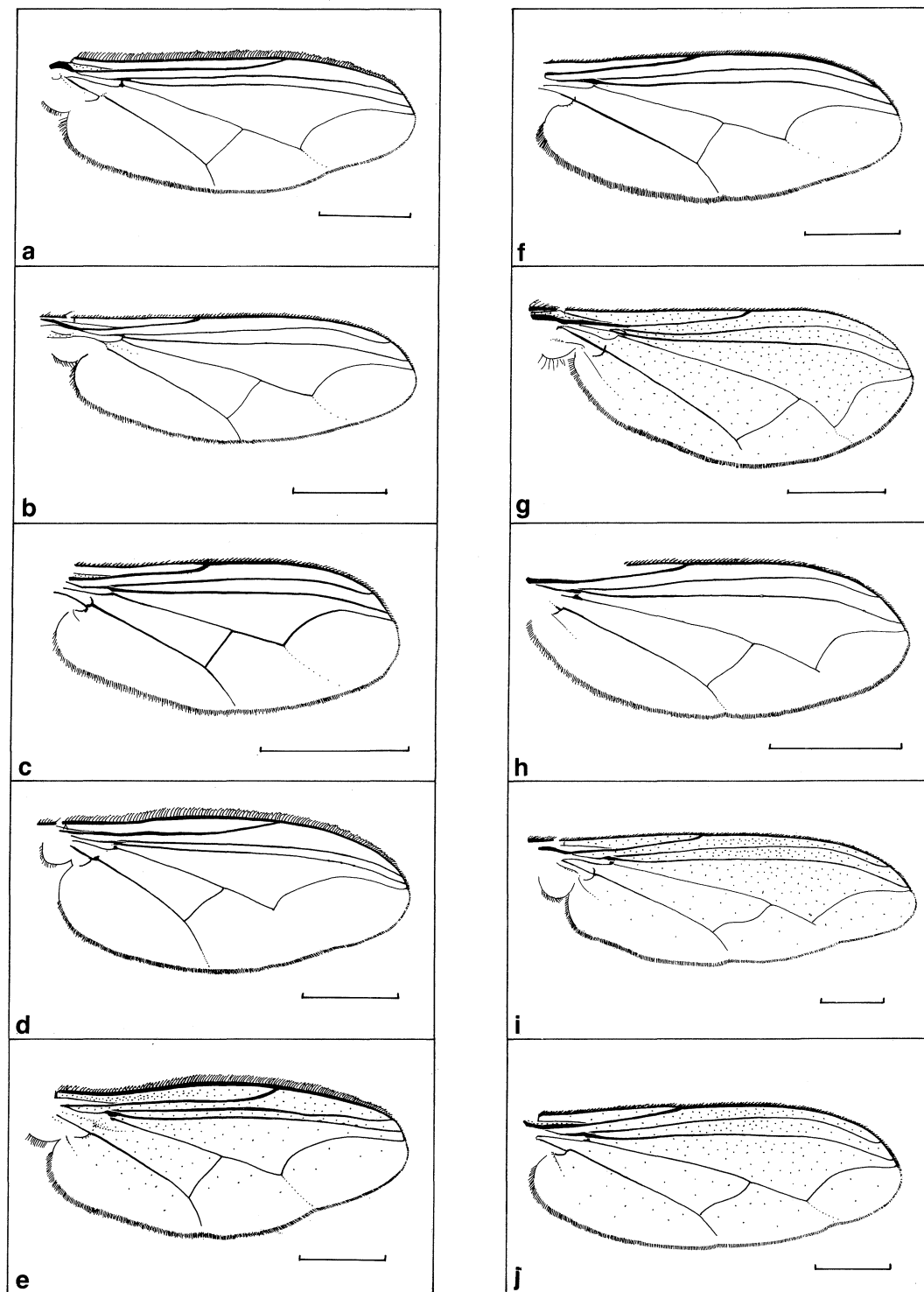


Fig.122. Wing. a – *Parentia dispar*, male; b – *P. dispar*, female; c – *P. kelseyi*, female; d – *P. vulgaris*, male; e – *P. nigropilosa*, male; f – *P. nigropilosa*, female; g – *Krakatauia macalpini*, male; h – *K. macalpini*, female; i – *K. funerale*, male; j – *K. funerale*, female. (Scale line = 1.0 mm).

I have seen two related undescribed species, from Western Samoa: Apia (CED) and Vanuatu: Ambrym (AMS). These species are much smaller and have yellow CI.

The males can be separated by the following characters:

i) all coxae brown; It_5 with 1 thickened claw (MSSC); body length = 4.0 (Tonga) - *A. eupulvillatus*;

ii) all coxae brown; It_5 with 2 (?) thickened claws (MSSC); body length = 3.5 (Fiji) - *A. pulvillatus*;

iii) CI yellow; It_5 with 1 thickened claw (MSSC);

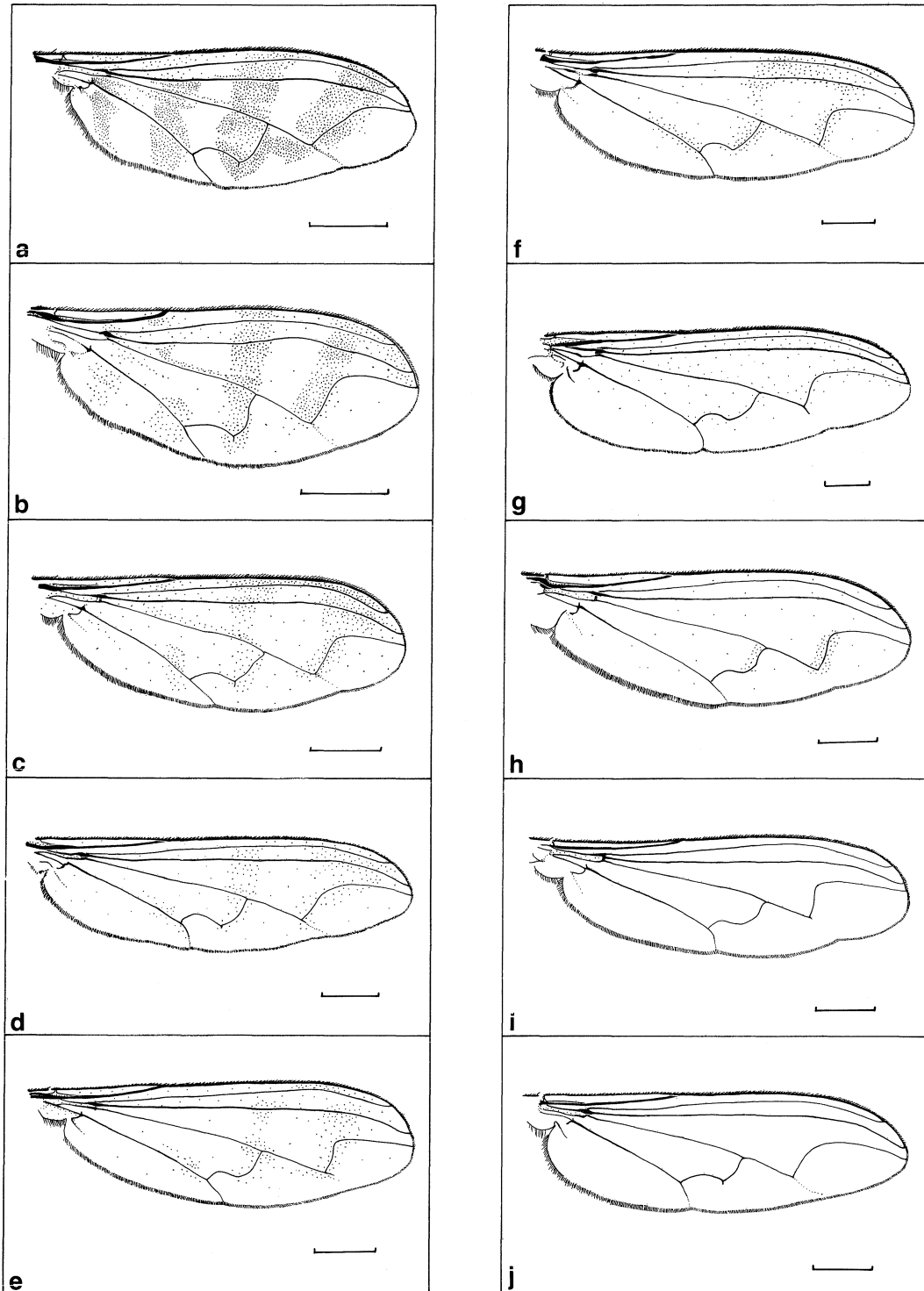


Fig.123. Wing. a - *Heteropsilopus trifasciatus*, female; b - *H. sugdeni*, male; c - *H. plumifer*, male; d - *H. squamifer*, male; e - *H. tweedensis*, female; f - *H. khooi*, male; g - *H. cingulipes*, male; h - *H. brevicornis*, male; i - *H. brindabellensis*, male; j - *H. araluensis*, male. (Scale line = 1.0 mm).

male cercus elongate; length = 3.0 (Samoa) - undescribed species;

iv) CI yellow; It₅ with 1 thickened claw (MSSC); male cercus similar to that figured for *A. eupulvillatus*, length = 3.0 (Vanuatu) - undescribed

species.

filitarsis Parent, 1935a: 199. (*Sciapus*) (BMNH, examined, female only), West Malaysia, **n.comb.**

Parent's (1941: 214) record of this species from the Solomon Islands is based on females and

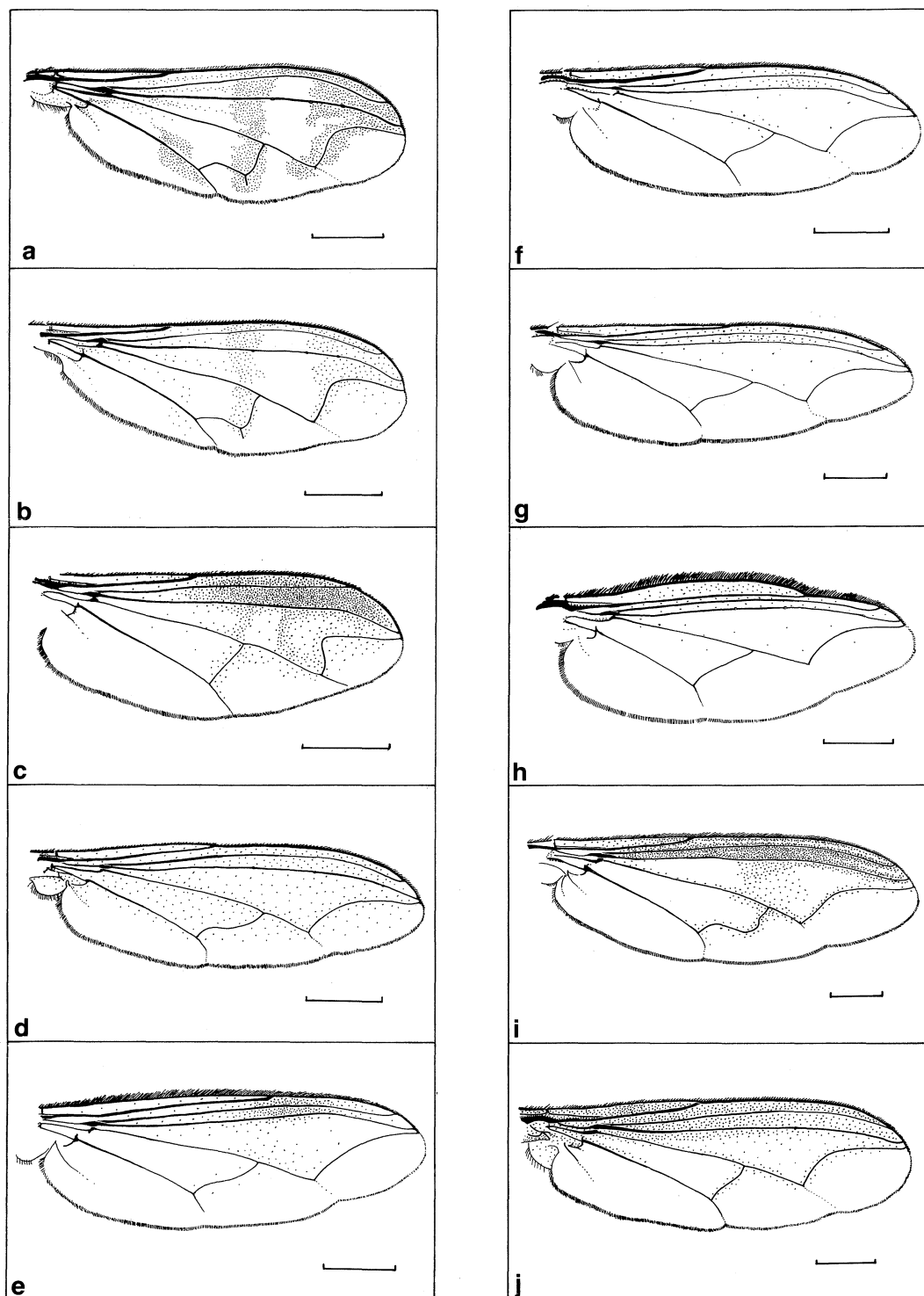


Fig.124. Wing. a – *Heteropsilopus ingenuus*, male; b – *H. ingenuus*, male, teneral; c – *Condylostylus nebulosus*, male; d – *Chrysosoma callosum*, male; e – *C. proliciens*, male; f – *C. proliciens*, female; g – *C. longicornis*, male; h – *C. duplociliatum*, male; i – *C. interruptum*, male; j – *Plagiozopelma ashbyi*, male. (Scale line = 1.0 mm).

thus unsubstantiated.

fruticosus Becker, 1922: 212. (*Sciapus*) (ZSI, not seen), Bangladesh, **n.comb.**

gravipes Becker, 1922a: 199. (*Sciapus*) (ZSI, not seen), Bangladesh, **n.comb.**

This species is possibly in the *triscuticatus* Group.

greenwoodi Bezzi, 1928: 61. (*Chrysosoma*) (BMNH, examined), Fiji.

The male abdomen is basally translucent yellow.

This species is possibly in the *triscuticatus* Group although it lacks the TI posterior setae (MSSC).

imitans Becker, 1922a: 171. (*Chrysosoma*) (ZMHB,

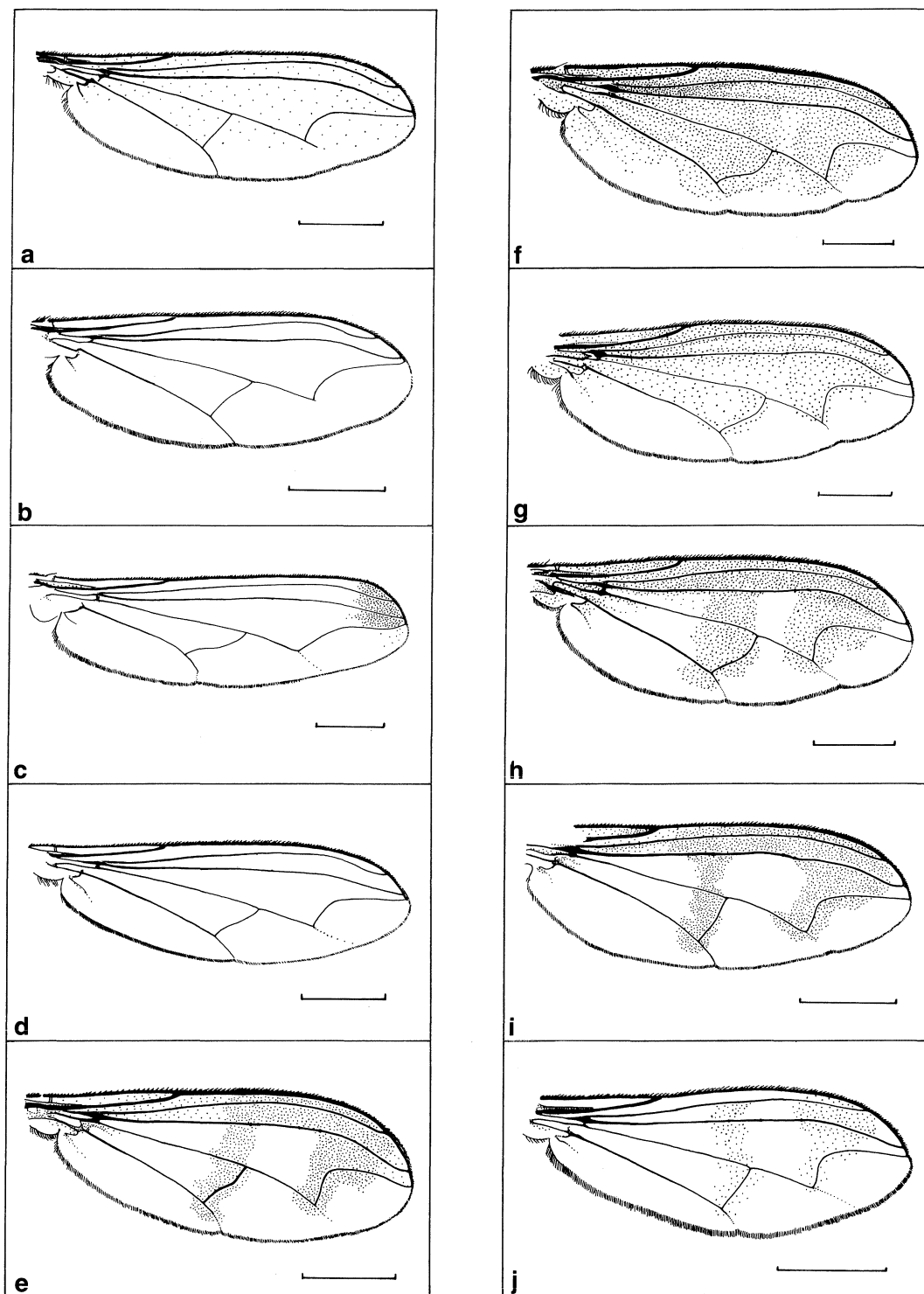


Fig.125. Wing. a – *Plagiozopelma flavipodex*, male; b – *P. mouldsorum*, male; c – *P. terminiferum*, male; d – *P. terminiferum*, female; e – *Austrosciapus proximus*, male; f – *A. triangulifer*, male, Kuranda, Qld; g – same, teneral; h – same; i – *A. bifarius*, male; j – *A. discretifasciatus*, male. (Scale line = 1.0 mm).

examined), Taiwan, **n.comb.**

The figure of the male postabdomen associated with Becker's description is crude and the hypopygium is much closer to that as figured for *A. interdictus* (Becker, 1922a, fig. 175). III_{4,5} are strongly flattened.

Lectotype here designated for *Chrysosoma imitans*: male, with the label "Anping Formosa H. Sauter v-1912" (ZMHB).

infans Becker, 1922a: 205. (*Sciapus*) (ZSI, not seen), India, **n.comb.**

interdictus Becker, 1922a: 201. (*Sciapus*) (TMB, lost),

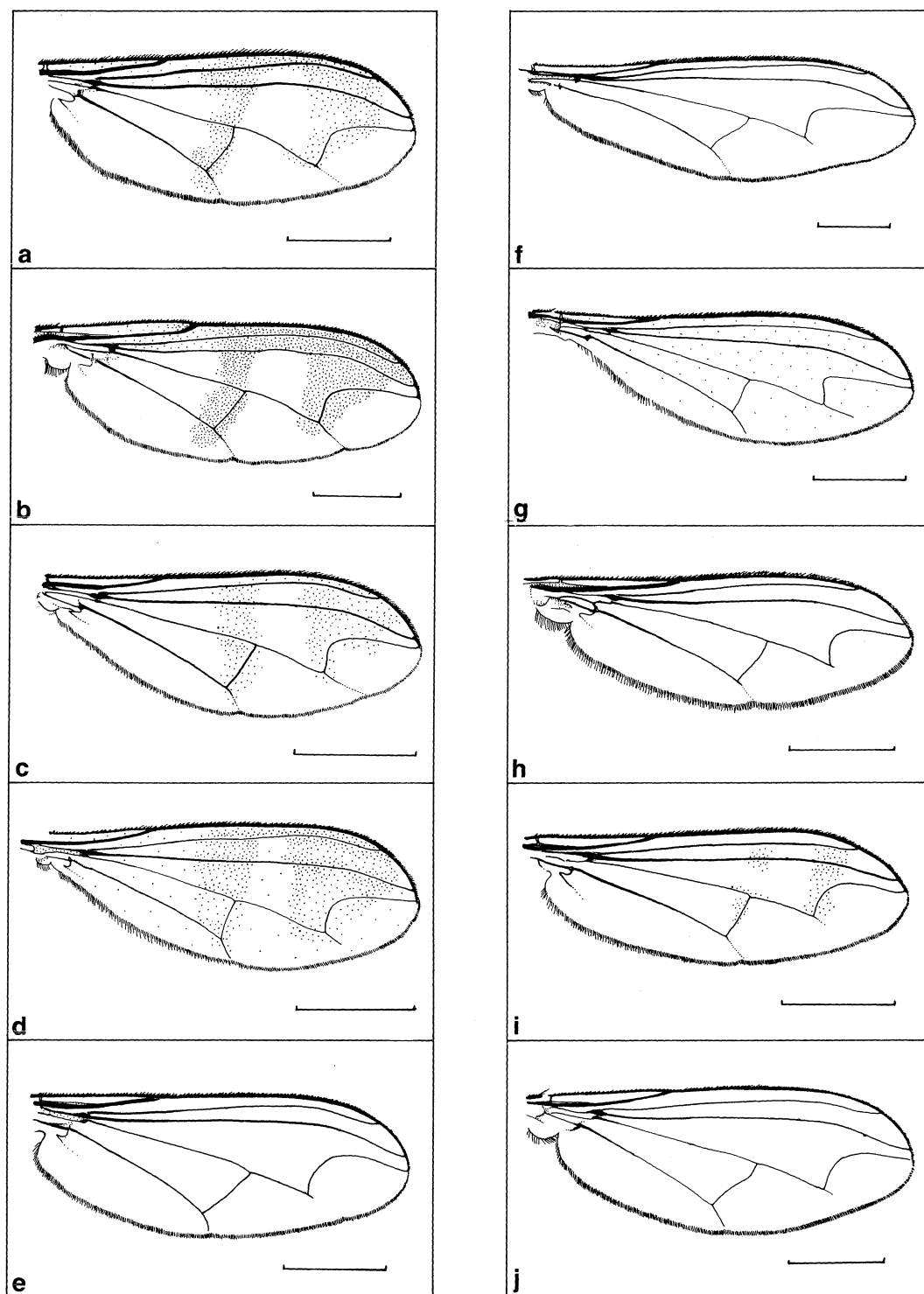


Fig.126. a – *Austrosciapus zentae*, male; b – *A. connexus*, male; c – *A. capricornis*, male; d – *A. collessi*, male; e – *A. riparius*, male; f – *A. crater*, male; g – *A. ravenshoensis*, male; h – *A. tumidus*, male; i – *A. tumidus*, female; j – *A. gwynnae*, male. (Scale line = 1.0 mm).

India, **n.comb.**

The figures of the hypopygium and IIIIt should enable identification of this species.

latilamellatus Parent, 1934b: 295. (*Sciapus*) (BMNH, examined), Vietnam, **n.comb.**

The holotype is badly damaged, missing its head

and most legs. This species is similar in colouration and cercal shape to *A. mutatus*, and they are possibly conspecific. The two species possibly belong in the *triscuticatus* Group.

mutatus Becker, 1922a: 200. (*Sciapus*) (TMB, lost), Taiwan, **n.comb.**

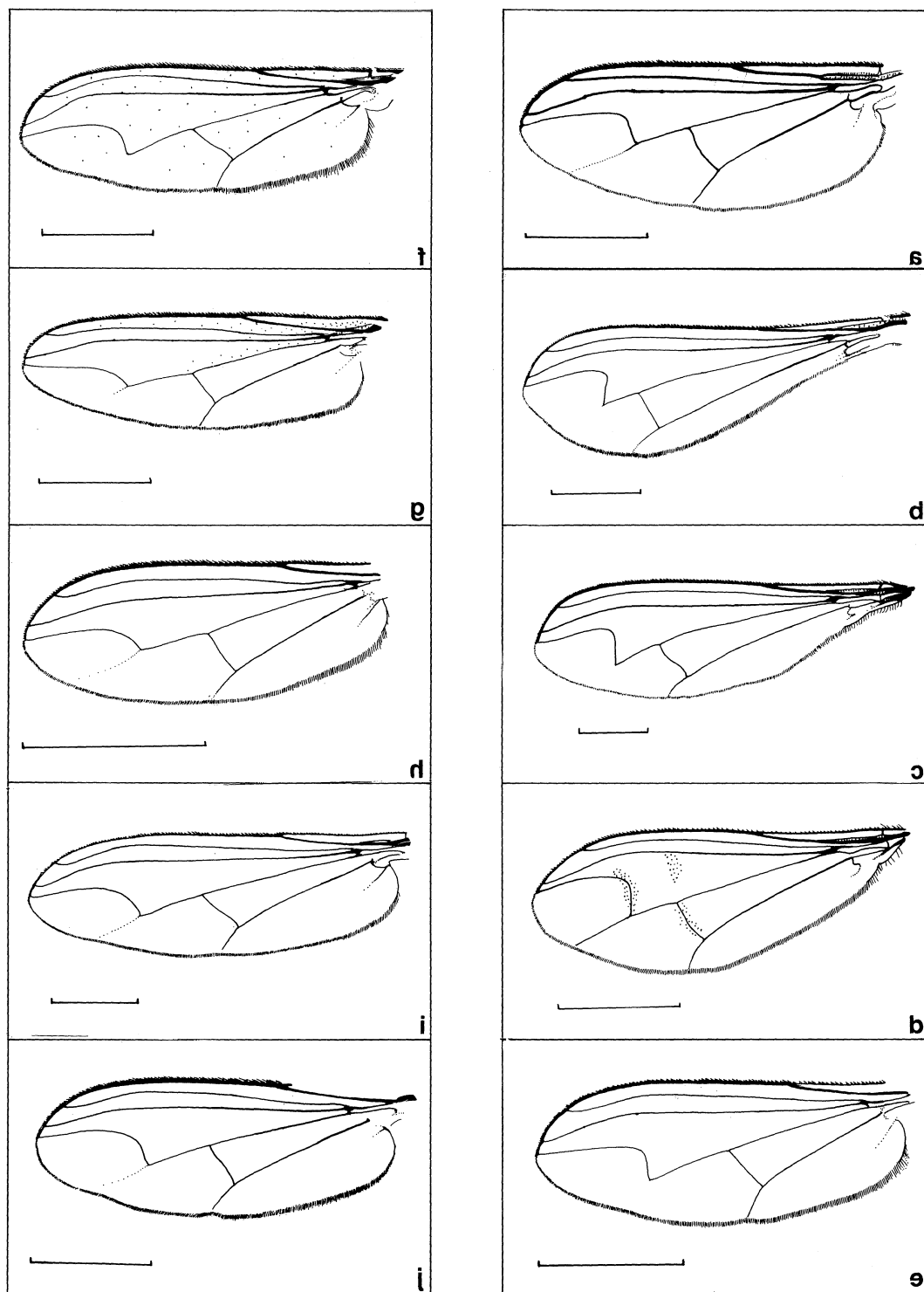


Fig.127. a – *Austrosciapus dendrohalma*, male; b – *A. hollowayi*, male; c – *A. hollowayi*, female; d – *A. pulvillus*, male; e – *Amblypsilopus commoni*, male; f – *A. nambourensis*, male; g – *A. graciliventrus*, male; h – *A. graciliventrus*, female; i – *A. triscuticatus*, male; j – *A. triscuticatus*, female. (Scale line = 1.0 mm).

Becker's hypopygium figure should enable accurate identification. Also see under *A. latilamellatus*.

oscillans Parent, 1935a: 201. (*Sciapus*) (BMNH, examined), West Malaysia, **n.comb.**
Parent was uncertain as to this species' generic

placement (*Sciapus* s.l. or *Chrysosoma*) on account of its antennal structure. The arista is dorsoapical on a subrectangular first flagellomere. The II⁺ MSSC as figured by Parent are distinctive. This species shows superficial similarity to the *Chrysosoma lacteimicans* Group in having wing

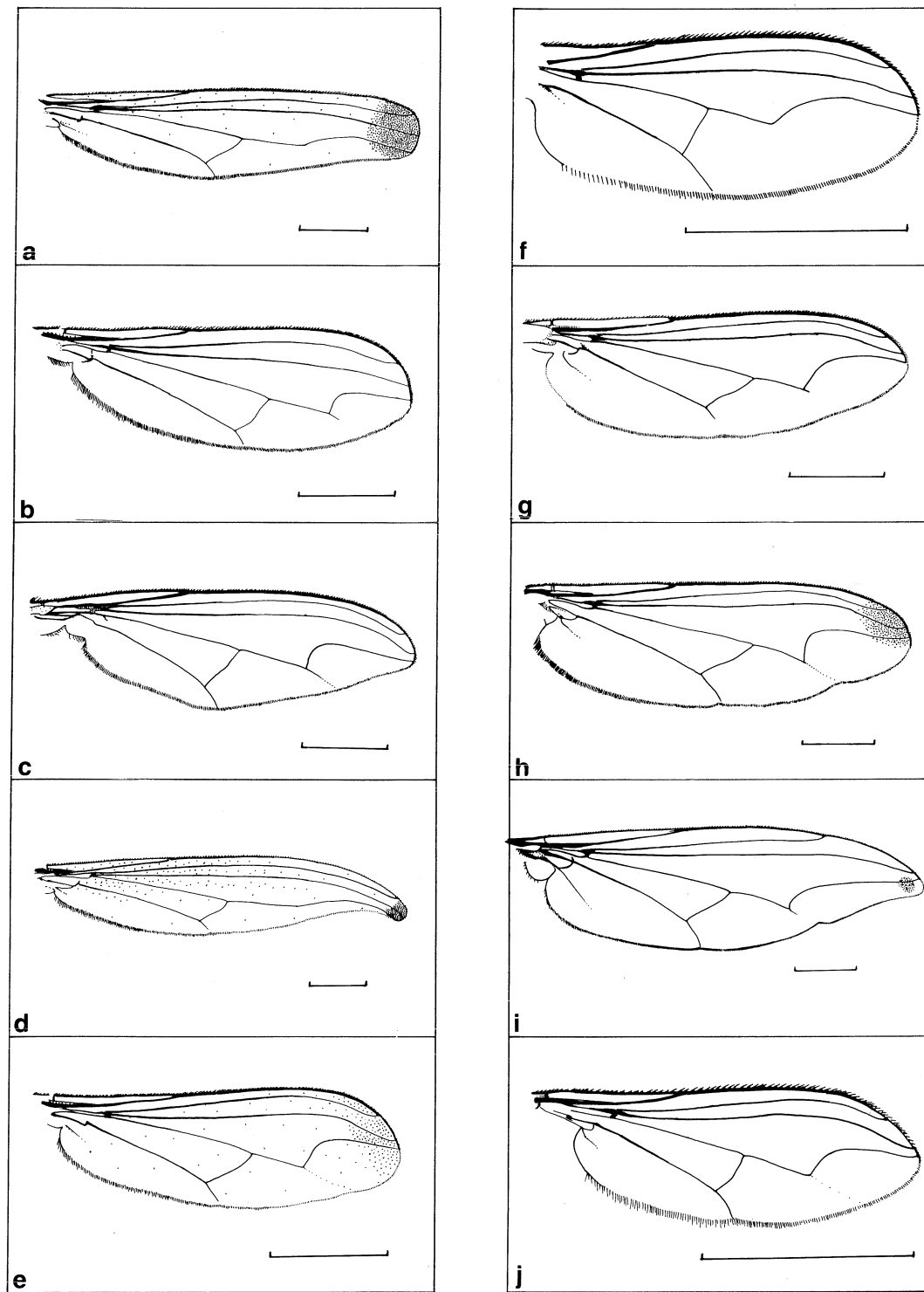


Fig.128. a – *Amblypsilopus zonatus*, male; b – *A. zonatus*, female; c – *A. guntheri*, male; d – *A. liepae*, male; e – *A. triduum*, male; f – *A. borroloola*, female; g – *A. anomalicornis*, male; h – *A. cooki*, male; i – *A. bereni*, male; j – *Amblypsilopus callainus*, male. (Scale line = 1.0 mm).

maculations (although here in both sexes, not just the male as in the *lacteimicans* Group), and having m-cu externally bowed in the centre.

Additional records. West Malaysia: Cameron Highlands, Fraser's Hill and Laurat Hills (BMNH).

A related undescribed species occurs in Sabah: Mount Kinabalu (BMNH).

pallidus de Meijere, 1910: 80. (*Agonosoma*) (ZMUA, examined, female only), Java, **n.comb.**

De Meijere (1914: 88) described a male for the species. This species is almost entirely yellow-orange in colour.

parallelinervis Parent, 1935b: 75. (*Sciapus*) (BMNH, examined, female only), Solomon Islands, **n.comb.**

The distinctive venation as figured by Parent makes association with a male possible.

pediformis Becker, 1922a: 204. (*Sciapus*) (ZSI, not seen), India, Nepal, **n.comb.**

Hollis (1964c) gave brief notes on the female based on specimens from Nepal.

penicillatus Becker, 1922a: 204. (*Sciapus*) (ZSI, not seen), Assam, **n.comb.**

pulvillatus Bezzi, 1928: 68. (*Condyllostylus*) (BMNH, examined), Fiji.

See discussion under *A. eupulvillatus*, above.

tenuipes Becker, 1922a: 174. (*Chrysosoma*) (ZSI, not seen), India, **n.comb.**

Based on Becker's description, noting the knee-shaped bend in M_1 , the long tarsus I, size and similarity to *A. gracilitarsis*, this species belongs in *Amblypsilopus*, possibly in the *triscuticatus* Group.

turbidus Becker, 1922a: 202. (*Sciapus*) (ZSI, not seen), India, **n.comb.**

Notes on New World *Amblypsilopus*

The following species are here newly referred to *Amblypsilopus*, including species previously regarded as *Leptorhethum*; * indicates examination of types or reliably identified specimens.

A. Neotropical (based on Robinson, 1970b, 1975; Milward de Azevedo, 1985).

albifacies Parent, 1931a: 6. (*Sciapus*), **n.comb.**

angelicus Parent, 1930a: 109. (*Sciapus*), **n.comb.***

angustatus Aldrich, 1893: 50. (*Leptorhethum*), **n.comb.***

angustifrons Parent, 1929a: 241. (*Sciapus*), **n.comb.**

antennatus Becker, 1922b: 363. (*Sciapus*), **n.comb.**

armiger Van Duzee, 1931b: 169. (*Sciapus*), **n.comb.***

Also see *Condyllostylus*, Remarks.

bellimanus Van Duzee, 1927b: 10. (*Psilopus*), **n.comb.**

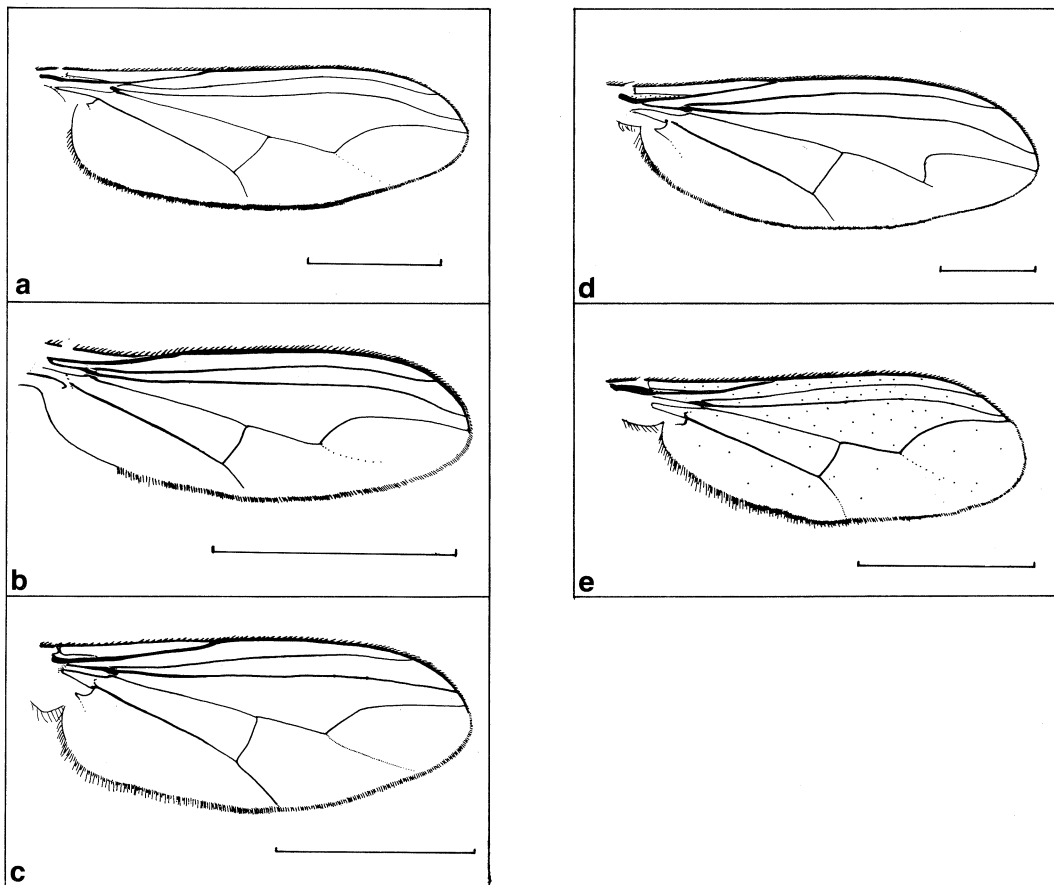


Fig.129. a – *Amblypsilopus flaviappendiculatus*, male; b – *A. edwardsi*, male; c – *A. rimbija*, male; d – *A. cincinnatus*, female; e – *A. aliciensis*, male. (Scale line = 1.0 mm).

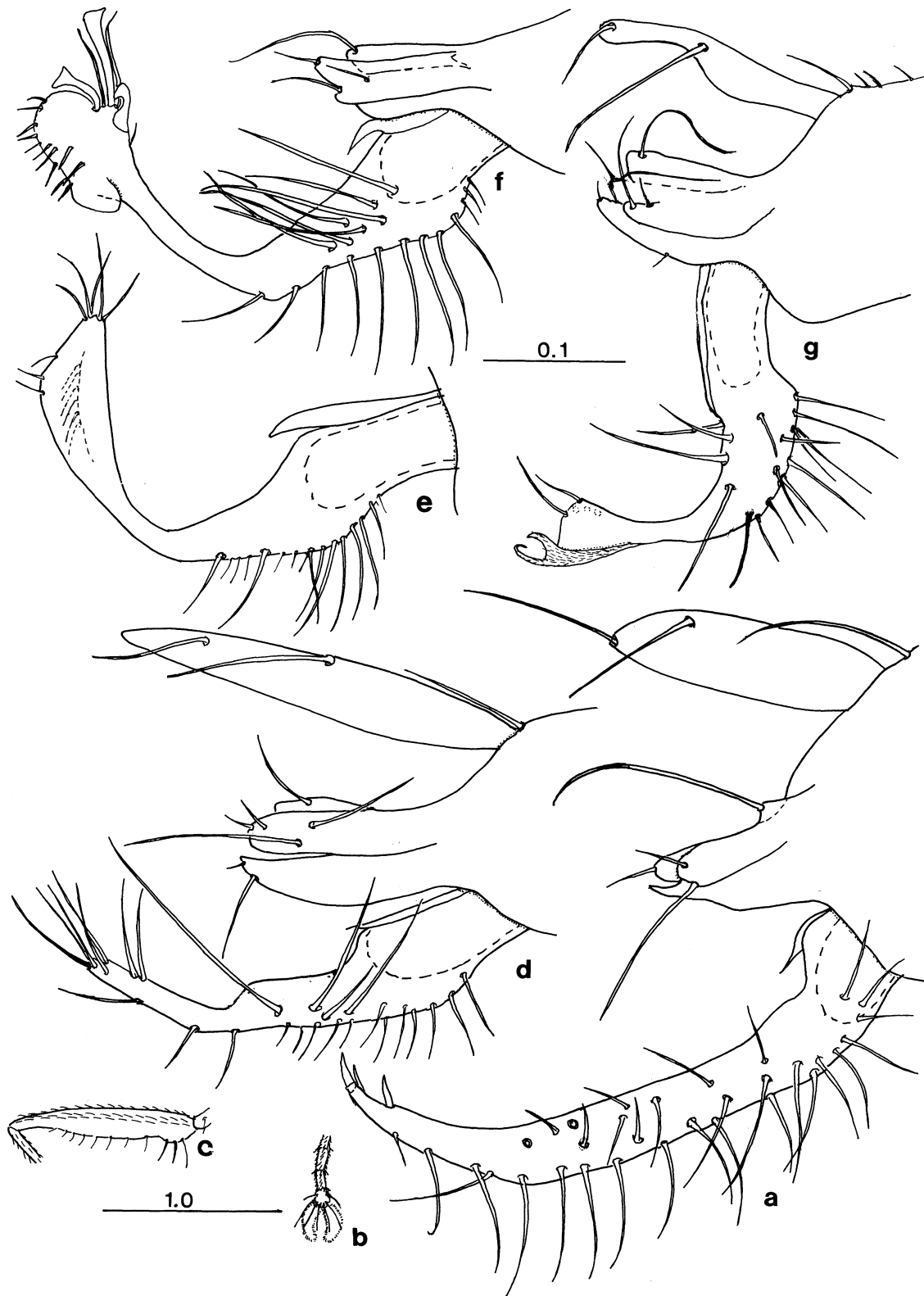


Fig.130. *Mesorhaga zborowskii*, Batavia Downs, Qld: a – surstylus and cercus, left lateral; b – male It_{3-5} , dorsal; c – male FII, anterior. *M. petrensis*, Split Rock, Qld: d – surstylus and cercus, left lateral. *M. emmensis*, Emma Gorge, WA: e – cercus, left lateral. *M. cockatoo*, Cockatoo Creek, Qld: f – surstylus and cercus, left lateral. *M. decembris*, near Borroloola, NT: g – surstylus and cercus, left lateral.

bilobus Van Duzee, 1929a: 3. (*Psilopus*), **n.comb.**
bredini Robinson, 1975: 17. (*Sciapus*), **n.comb.***
capillimanus Enderlein, 1912: 402. (*Psilopus*), **n.comb.**
castus Loew, 1866: 180. (*Psilopus*), **n.comb.**
cilicostatus Van Duzee, 1927b: 8. (*Psilopus*), **n.comb.**
cilipennis Aldrich, 1901: 366. (*Gnamptopsilopus*), **n.comb.***
decoripes Robinson, 1975: 18. (*Sciapus*), **n.comb.***
digitatus Van Duzee, 1914a: 391. (*Sciapus*), **n.comb.**
dominicensis Robinson, 1975: 20. (*Leptorhethum*), **n.comb.***
flaviannulatus Van Duzee, 1929a: 14. (*Psilopus*), **n.comb.**
flavicornis Aldrich, 1896: 342. (*Gnamptopsilopus*), **n.comb.***
flavidus Aldrich, 1896: 341. (*Gnamptopsilopus*), **n.comb.***
gilvipes Enderlein, 1912: 404. (*Psilopus*), **n.comb.**
gratiosus Becker, 1922b: 366. (*Sciapus*), **n.comb.**
inaequalis Van Duzee, 1927b: 8. (*Psilopus*), **n.comb.**
latifacies Van Duzee, 1934b: 370. (*Condylostylus*), **n.comb.**
lectus Becker, 1922b: 366. (*Sciapus*), **n.comb.**
longipes Van Duzee, 1929a: 3. (*Psilopus*), **n.comb.**
luteus Robinson, 1975: 16. (*Sciapus*), **n.comb.***
maculus Wiedemann, 1830: 219. (*Psilopus*), **n.comb.***
medianus Becker, 1922b: 317. (*Condylostylus*), **n.comb.**
mexicanus Aldrich, 1901: 365. (*Gnamptopsilopus*), **n.comb.**
nigrimanus Van Duzee, 1914a: 392. (*Sciapus*), **n.comb.**
noditarsis Becker, 1922b: 368. (*Sciapus*), **n.comb.**
nubillipennis Van Duzee, 1927b: 7. (*Psilopus*), **n.comb.**
papaveroi Milward de Azevedo, 1986: 277. (*Leptorhethum*), **n.comb.**
parrai Milward de Azevedo, 1985: 97. (*Sciapus*), **n.comb.**
parvus Van Duzee, 1933c: 151. (*Sciapus*), **n.comb.**
planipes Van Duzee, 1929a: 6. (*Psilopus*), **n.comb.**
praecipuus Milward de Azevedo, 1985: 99. (*Sciapus*), **n.comb.**
rezendei Milward de Azevedo, 1985: 103. (*Sciapus*), **n.comb.**
spinimanus Van Duzee, 1927b: 6. (*Psilopus*), **n.comb.**
striaticollis Becker, 1922b: 370. (*Sciapus*), **n.comb.**
tenuipes Van Duzee, 1931: 252. (*Leptorhethum*), **n.comb.***
unicinctus Van Duzee, 1927b: 6. (*Psilopus*), **n.comb.**
zucchii Milward de Azevedo, 1985: 101. (*Sciapus*), **n.comb.**

B. Nearctic (based on Foote *et al.*, 1965; Steyskal, 1966, 1973; Harmston, 1971).

bicolor Loew, 1861: 96. (*Psilopus*), **n.comb.***
bradleyi Van Duzee, 1915: 24. (*Sciapus*), **n.comb.***
californicus Steyskal, 1966: 290. (*Sciapus*), **n.comb.**
costalis Aldrich, 1904b: 286. (*Agonosoma*), **n.comb.***
floridanus Harmston, 1971: 85. (*Sciapus*), **n.comb.**
fuscinervis Van Duzee, 1926: 56. (*Psilopus*), **n.comb.**
pollinosus Van Duzee, 1915: 22. (*Sciapus*), **n.comb.***
rotundiceps Aldrich, 1904b: 286. (*Agonosoma*), **n.comb.**
trisetosus Van Duzee, 1932: 2. (*Sciapus*), **n.comb.**
unicoiensis Robinson, 1964: 114. (*Sciapus*), **n.comb.**

C. Species occurring in both Neotropical and

Nearctic regions.

dimidiatus Loew, 1862: 216. (*Psilopus*), **n.comb.***
dorsalis Loew, 1866: 180. (*Psilopus*), **n.comb.***
infumatus Aldrich, 1901: 365. (*Gnamptopsilopus*), **n.comb.**
psittacinus Loew, 1861b: 96. (*Psilopus*), **n.status.***
scintillans Loew, 1861b: 94. (*Psilopus*), **n.comb.***
unifasciatus Say, 1823: 85. (*Dolichopus*), **n.comb.***
variegatus Loew, 1861b: 95. (*Psilopus*), **n.comb.***

The New World *Amblypsilopus* are divided into the following groups.

I. With strong wing maculation in both sexes: *Amblypsilopus dimidiatus*, *A. maculus*, *A. medianus*.

II. With distinct crocheted costal cilia on wing (MSSC); 3 strong CI distolateral setae, more strongly developed in the female, and often with extra CI setation (FSSC) (this is convergent with the Old World *Plagiozopelma flavipodex* Group, q.v.); some species have short erect setae on leg II (MSSC); m-cu sometimes slightly sinuous. This group contains the type species of both *Amblypsilopus* and *Gnamptopsilopus*: *Amblypsilopus angelicus*, *A. bellimanus*, *A. bradleyi*, *A. bredini*, *A. californicus*, *A. castus*, *A. cilicostatus*, *A. cilipennis*, *A. costalis*, *A. decoripes*, *A. dorsalis*, *A. flaviannulatus*, *A. flavidus*, *A. infumatus*, *A. longipes*, *A. luteus*, *A. nigrimanus*, *A. planipes*, *A. psittacinus*, *A. scintillans*, *A. trisetosus*, *A. unicoiensis*, *A. unicinctus*, *A. variegatus*.

III. Milward de Azevedo (1985) described a group of species as the *parrai* Group: *Amblypsilopus angustifrons*, *A. latifacies*, *A. parrai*, *A. praecipuus*, *A. rezendei*, *A. zucchii*.

IV. New World Residue. The following species lack male costal cilia, and usually have short erect setae on leg II (MSSC). Some are possibly close to the *abruptus* group (q.v.), while others are described only from females and are of uncertain placement: *Amblypsilopus albifacies*, *A. angustatus*, *A. antennatus*, *A. armiger*, *A. bicolor* (female only), *A. bilobus*, *A. capillimanus*, *A. dominicensis*, *A. flavicornis* (female only), *A. floridanus*, *A. fuscinervis*, *A. gilvipes* (female only), *A. gratiosus*, *A. inaequalis*, *A. lectus*, *A. mexicanus*, *A. noditarsis*, *A. nubillipennis*, *A. papaveroi*, *A. parvus*, *A. pollinosus*, *A. rotundiceps*, *A. spinimanus*, *A. striaticollis*, *A. tenuipes*, *A. unifasciatus*.

Notes on Afrotropical *Amblypsilopus*

The following valid Afrotropical species (based on Dye & Smith, 1980) are newly referred to *Amblypsilopus*. Additional Afrotropical *Amblypsilopus* are considered in the *abruptus* Group. * indicates examination of identified specimens.

aenescens Vanschuytbroeck, 1952: 138. (*Sciapus*), **n.comb.**
arduus Parent, 1936c: 6. (*Sciapus*), **n.comb.**
auratus Curran, 1924: 217. (*Chrysosoma*), **n.comb.**

- basilewskyi* Vanschuytbroeck, 1960: 319. (*Sciapus*), **n.comb.**
bevisi Curran, 1927: 11. (*Sciapus*), **n.comb.**
bipectinatus Parent, 1934c: 120. (*Sciapus*), **n.comb.**
bonniae Irwin, 1974: 245. (*Sciopolina*), **n.comb.**
coalescens Parent, 1934c: 121. (*Sciapus*), **n.comb.**
cuthbertsoni Parent, 1937a: 129. (*Sciapus*), **n.comb.**
disjunctus Parent 1936: 1. (*Chrysosoma*), **n.comb.**
fasciatus Curran, 1924: 216. (*Sciopolina*), **n.comb.**
finitimus Parent 1939c: 262. (*Chrysosoma*), **n.comb.**
flavicollis Becker, 1923: 40. (*Leptorhethum*), **n.comb.**
 This species is based on a female (ZMHB, not seen) from the Cameroons. Becker noted the strongly projecting clypeus and mouthparts. The wing figure (Fig. 42) for *L. flavicollis* in Vanschuytbroeck (1959) is incorrect.
haemorrhoidalis Becker, 1923: 46. (*Sciapus*), **n.comb.**
inflexus Becker, 1923: 40. (*Sciapus*), **n.comb.**
integer Becker, 1923: 47. (*Sciapus*), **n.comb.**
lenga Curran, 1929: 1. (*Sciapus*) (AMNH, examined), Liberia, **n.comb.**
barbipalpis Parent, 1937a: 128. (*Labenura*, as subgenus of *Sciapus*) (BMNH, examined), Sierra Leone, **n.syn.**
 I have examined the male holotypes of both species and they are identical.
macularivenus Irwin, 1974: 251. (*Sciopolina*), **n.comb.**
miserus Parent, 1935b: 81. (*Chrysosoma*), **n.comb.***
nanus Parent, 1929a: 243. (*Sciapus*), **n.comb.**
nubilis Parent, 1935b: 87. (*Sciapus*), **n.comb.**
parilis Parent, 1931b: 44. (*Chrysosoma*), **n.comb.***
pernigrus Becker, 1923: 30. (*Chrysosoma*), **n.comb.**
rectangularis Parent, 1937c: 13. (*Sciapus*), **n.comb.**
retrovenus Irwin, 1974: 242. (*Sciopolina*), **n.comb.**
rosaceus Wiedemann, 1824: 40. (*Dolichopus*), **n.comb.**
setifrons Parent, 1937c: 14. (*Sciapus*), **n.comb.**
stuckenbergi Vanschuytbroeck, 1957: 3. (*Sciapus*), **n.comb.**
stuckenbergerorum Irwin, 1974: 236. (*Sciopolina*), **n.comb.***
subfascipennis Curran, 1926: 386. (*Sciapus*), **n.comb.**
sudanensis Parent, 1939c: 271. (*Sciapus*), **n.comb.**
tenuicauda Parent, 1936c: 7. (*Sciapus*), **n.comb.**
tropicalis Parent, 1933d: 40. (*Sciapus*), **n.comb.**

Some of the Afrotropical *Amblypsilopus* species can be placed in the following Groups.

I. The *fasciatus* Group. This Group is equivalent to the genus *Sciapolina* as treated in Irwin, 1974 (also see discussion under *Amblypsilopus*, Remarks), and includes: *Amblypsilopus bevisi* (Curran), *A. bonniae* (Irwin), *A. fasciatus* (Curran), *A. macularivenus* (Irwin), *A. retrovenus* (Irwin), *A. stuckenbergerorum* (Irwin).

II. The *lenga* Group. This Group is equivalent to the genus *Labenura*, which has been placed in synonymy with *Amblypsilopus* (see Remarks under *Amblypsilopus*). It contains the single species, *A. lenga*.

III. The *abruptus* Group. The three Afrotropical species of this widespread paleotropical group are

discussed in detail with other members of the group elsewhere in this revision.

Notes on Palearctic *Amblypsilopus*

The following four species are the only Palearctic species referred to *Amblypsilopus*. All are eastern Palearctic and are probably derived from the Orient.

bouvieri Parent, 1927: 480. (*Chrysosoma*), Palearctic China, **n.comb.**

Based on the description, especially noting leg setation, and the wing and hypopygium figures, this species belongs in *Amblypsilopus*, not *Chrysosoma*. Although the arista is apical, the first flagellomere is short and the arista is not much longer than the thorax alone.

janatus Negrobov, 1984: 32. (*Mesorhaga*), Japan, **n.comb.**
Mesorhaga janata, is not *Mesorhaga*, but belongs in another sciapodine genus, probably *Amblypsilopus*. The hypopygium figure accompanying the text shows it to have a small epandrial lobe, left lateral hypandrial arm, and large lobate surstylus with a dorsal digitiform projection, all characters of *Amblypsilopus*, but not *Mesorhaga*.

svenhedini Parent, 1936b: 2. (*Sciapus*), Palearctic China, **n.comb.**

villeneuvei Parent, 1927: 475. (*Sciapus*), Palearctic China, **n.comb.** [nec. *Sciapus villeneuvei* Parent, 1922: 244].

Parent twice used the name *villeneuvei* when describing new species in the genus *Sciapus*. The 1922 species from Belgium is a true *Sciapus* and a junior synonym of *S. laetus* Meigen (see Parent, 1938). *Sciapus villeneuvei* Parent 1927 from north-western China is a different species, and its detailed description indicates it belongs in *Amblypsilopus*.

Nomina Dubia

The types of the following Oriental and Australasian species are lost, damaged, or represented by females lacking diagnostic features. In all cases, the original descriptions are inadequate for accurate identification and/or taxonomic placement, and the species therefore are regarded as *nomina dubia*. Most species are listed in their original combination. Parent (1934a) treats the BMNH Walker species.

adoptatum Parent, 1935a: 357. (*Chrysosoma*) (BMNH, female only, not seen), Sabah.

aequalis Becker, 1922a: 202. (*Sciapus*) (TMB, lost), Taiwan.

brunnescens Becker, 1922a: 205. (*Sciapus*) (TMB, lost), Papua New Guinea.

chromatipes Bigot, 1890: 288. (*Psilopus*) (UMO,

- examined, female only, badly damaged), New Guinea.
This species is a *Chrysosoma*. Parent described the male syntype of *Psilopus chromatipes* as a different species, *C. collini (proliciens Group)*.
- clarus** Walker, 1856: 15. (*Psilopus*) (BMNH, lost), West Malaysia.
- clypeatum** Parent, 1937a: 134. (*Chrysosoma*) (BMNH, examined, female only), India.
- collucens** Walker, 1856: 120. (*Psilopus*) (BMNH, female only, lost), Sarawak.
- derelectus** Walker, 1856: 120. (*Psilopus*) (BMNH, lost), Sarawak.
- dialithus** Bigot, 1890: 298. (*Psilopodinus*) (UMO, examined, female only, badly damaged), Sulawesi.
- fuscopennatum** Bigot, 1890: 287. (*Psilopus*) (UMO, examined, female only), Borneo.
This species is a *Chrysosoma*.
- gilvipes** Enderlein, 1912: 279. (*Chrysosoma*) (Warsaw, not seen, female only), Sumatra.
- illiciens** Walker, 1856: 120. (*Psilopus*) (BMNH, lost), Sarawak.
- imperfectus** Becker, 1922a: 223. (*Condylostylus*) (TMB, lost), India.
- insulanum** Parent, 1939a: 159. (*Chrysosoma*) (ANIC, examined, female only), Bismarck Archipelago.
The damaged female holotype is missing all left legs, most of right leg I and both wings.
- leiopus** Doleschall, 1856: 410. (*Psilopus*) (ZMHB, status unknown), ?Java.
- moderatum** Walker, 1864: 209. (*Psilopus*) (BMNH, examined, female only, badly damaged), Maluku.
This species is a *Chrysosoma*.
- nubeculosum** Becker, 1922a: 175. (*Chrysosoma*) (TMB, lost), Papua New Guinea.
The wing figure is similar to that of *Condylostylus*, not *Chrysosoma*. I have not seen *Condylostylus* from New Guinea.
- oldroydi** Haider, 1957: 198. (*Sciapus*) (BMNH, examined, female only), Bangladesh.
Sciapus oldroydi was described from a shrunken teneral female.
It is referred to *Amblypsilopus*, **n.comb.**, and possibly belongs near the *triscuticatus* Group.
- orciferum** Walker, 1859: 92. (*Psilopus*) (BMNH, examined, female only), Maluku.
The two female syntypes have clouded wings and are *Chrysosoma*, not *Sciapus* as regarded by Parent.
- palmetorum** Doleschall, 1858: 94. (*Psilopus*) (ZMHB, status unknown), Maluku.
- parvulus** Parent, 1934b: 295. (*Sciapus*) (BMNH, female only, examined), Fiji.
This species was referred to *Amblypsilopus* (Bickel & Dyte, 1989).
- pauper** Becker, 1922a: 187. (*Chrysosoma*) (TMB, lost, female only), Taiwan.
- pellucens** de Meijere, 1913a: 346. (*Psilopus*) (ZMUA, examined, female only), Irian Jaya.
- piger** Becker, 1922a: 199. (*Sciapus*) (TMB, female only, lost), Taiwan.
- posterum** Becker, 1922a: 188. (*Chrysosoma*) (TMB, lost), India.
- posticus** Walker, 1856: 16. (*Psilopus*) (BMNH, lost), West Malaysia.
- prolectans** Walker, 1856: 120. (*Psilopus*) (BMNH, lost), Sarawak.
- pusillus** Doleschall, 1856: 409. (*Psilopus*) [preoccupied by *Psilopus pusillus* Macquart, 1842 (= *Amblypsilopus pusillus* (Macquart)) (NNHB, status unknown), ?Java.
- robustum** Walker, 1856: 16. (*Psilopus*) (BMNH, examined, female only), Singapore.
This species is a *Chrysosoma*.
- rubicundum** Becker, 1922a: 150. (*Chrysosoma*) (TMB, lost), Taiwan.
- segnis** Parent, 1934b: 297. (*Sciapus*) (BMNH, female only, examined), Fiji.
This species was referred to *Amblypsilopus* (Bickel & Dyte, 1989).
- setipes** Bigot, 1890: 284. (*Psilopus*) (UMO, examined, female only, badly damaged), Java.
- soror** Parent, 1934b: 291. (*Chrysosoma*) (BMNH, female only, examined), Samoa.
This species was referred to *Amblypsilopus* (Bickel & Dyte, 1989).
- subnotatus** Walker, 1856: 16. (*Psilopus*) (BMNH, lost), West Malaysia.
- tardus** Becker, 1922a: 198. (*Sciapus*) (TMB, lost, female only), Taiwan.
- villipes** Rondani, 1875: 445. (*Psilopus*) (Genoa, not seen), Sarawak.
De Meijere (1910: 88) placed *Psilopus villipes* in possible synonymy with *Agonosoma patelliferum* var. *patellatum* Wulp. Becker (1922a: 178) followed de Meijere but placed the species in synonymy with *Chrysosoma patelliferum* Thomson. There is no indication that either author saw the *P. villipes* types, nor is there any justification for the synonymy based on Rondani's fragmentary description (eg, a white arisal flag, which would have to be the basis for such a synonymy, is not mentioned).
Chrysosoma patelliferum is a Guam endemic, and in the previously accepted synonymy (see Dyte, 1975), *P. villipes* would be the next available name and thus the senior synonym of both *Psilopus patellatum* and *P. pilosulus*. Rondani's description is inadequate and *P. villipes* is best regarded as a *nomen dubium*. I have no information concerning the types.
- viridicollis** Frey, 1917: 9. (*Psilopus*) (ZMH, examined, female only), Sri Lanka.
This small female lacks distinguishing features and I am unable to associate it with a valid genus.

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APPENDIX

List of Sciapodinae of Australia and its Territories

Abbemyia

- nigrofasciata* (Macquart)
regale Parent
chetiscutatum Parent
taree n.sp.

Amblypsilopus**abruptus Group**

- abruptus* (Walker)
donhi n.sp.
pectinatum (de Meijere)

anomalicornis Group

- anomalicornis* (Becker)
augustus n.sp.
baroalba n.sp.
bereni n.sp.
birraduk n.sp.
cooki n.sp.
mollis (Parent)
uptoni n.sp.
webbensis n.sp.

argyrodendron Group

- argyrodendron* n.sp.
fustis n.sp.
triduum n.sp.

bertiensis Group

- bertiensis* n.sp.
tinarooensis n.sp.

cyplus Group

- bataviensis* n.sp.
cyplus n.sp.
gapensis n.sp.

flaviappendiculatus Group

- cahillensis* n.sp.
edwardsi n.sp.
flaviappendiculatus (de Meijere)
dolichonemis Frey
brevitarsis Parent

- fonsecai* n.sp.
mensualis n.sp.
quidensis n.sp.

glaciunguis Group

- glaciunguis* n.sp.
jullatensis n.sp.
kakaduensis n.sp.

neoplatypus Group

- commoni* n.sp.
fonticolus n.sp.
fortescui n.sp.
malensis n.sp.
nambourensis n.sp.
neoplatypus n.name
platypus Parent
nimbuwah n.sp.
papilliferus n.sp.
septentrionalis n.sp.
tozerensis n.sp.

pallidicornis Group

- biprovincialis* n.sp.
gressitti n.sp.
julius n.sp.

pseudexul n.sp.

williamsi n.sp.

rimbija Group

- babindensis* n.sp.
cobourgensis n.sp.
rimbija n.sp.
wellsae n.sp.
wongabelensis n.sp.

topendensis Group

- borrooloola* n.sp.
topendensis n.sp.

triscuticatus Group

- albisignatus* n.sp.
annanensis n.sp.
arboreus n.sp.
basseti n.sp.
bimestris n.sp.
bimus n.sp.
brevitibia n.sp.
byrnei n.sp.
canungra n.sp.
graciliventrus (Parent)
kaputar n.sp.
lismorensis n.sp.
loriensis n.sp.
moggillensis n.sp.
montanorum n.sp.
natalis n.sp.
rentzi n.sp.
tortus n.sp.
triscuticatus (Hardy)
trudis n.sp.
uneorum n.sp.
walkeri n.sp.
wokoensis n.sp.

trogon Group

- callainus* n.sp.
eotrogon n.sp.
trogon n.sp.

zonatus Group

- careelensis* n.sp.
cursus n.sp.
guntheri n.sp.
liepae n.sp.
paramonovi n.sp.
putealis n.sp.
zonatus (Parent)
tonnoiri Parent

Unplaced Amblypsilopus

- aliciensis* n.sp.
cinnatus n.sp.
melasma n.sp.
sideroros n.sp.

Austrosciapus**dendrohalma Group**

- cantrelli* n.sp.
dayi n.sp.
dendrohalma n.sp.
janae n.sp.
nellae n.sp.

***hollowayi* Group**

hollowayi n.sp.
pulvillus n.sp.

***muelleri* Group**

muelleri n.sp.
otfordensis n.sp.

***proximus* Group**

ascitus n.sp.
bifarius (Becker)
capricornis n.sp.
cassisi n.sp.
collessi n.sp.
connexus (Walker)
pachigyna Macquart
crater n.sp.
discretifasciatus (Macquart)
depinctus Becker
genevievae Parent

doddi n.sp.
frauci n.sp.
fraudulosus n.sp.
magus n.sp.
minnamurra n.sp.
proximus (Parent)
quadrinaculatus (Parent)
ravenshoensis n.sp.
riparius n.sp.
triangulifer (Becker)
insecans Becker

zentae n.sp.

***sarinensis* Group**

flavicauda n.sp.
gwynnae n.sp.
sarinensis n.sp.
stevensi n.sp.
tooloomensis n.sp.

***storeyi* Group**

balli n.sp.
dekeyzeri n.sp.
solus n.sp.
storeyi n.sp.

***tumidus* Group**

aprilis n.sp.
broulensis n.sp.
pseudotumidus n.sp.
tumidus (Hardy)

Unplaced *Austrosiapus*

actensis n.sp.

Chrysosoma***aeneum* Group**

interruptum Becker

***leucopogon* Group**

callosum Parent
diversicolor Parent
leucopogon (Wiedemann)
apicalis Wiedemann
conicornis Macquart
curviseta Thomson
loewi Enderlein
snelli Curran
nobile Parent
pseudocallosum n.sp.

***proliciens* Group**

crinicornis (Wiedemann)
filifer Walker

longisetosus Wulp

aeterus Bigot

imparile Parent

duplociliatum Parent

inermis (de Meijere)

lucare n.sp.

proliciens (Walker)

delectans Walker

perficians Walker

albopilosus Wulp

divisum Becker

Dytomyia***flaviseta* Group**

flaviseta n.sp.

***sordida* Group**

bancrofti n.sp.

sordida (Parent)

anomalipennis Hardy

torresiana n.sp.

tumifrons n.sp.

Heteropsilopus***brevicornis* Group**

brevicornis (Macquart)

venustus Walker

volucra Becker

bimaculatus Parent

intermedius n.sp.

***cingulipes* Group**

araluensis n.sp.

brindabellensis n.sp.

caelicus (Parent)

calabyi n.sp.

cingulipes (Walker)

sidneyensis Macquart

grandis Macquart

eximius Walker

chrysurgus Schiner

angulosus Bigot

chalceus White

alatum Becker

micans Parent

metallicum Parent

jacquelineae Parent

ingenuus (Erichson)

gloriosus Parent

khooi n.sp.

meensis n.sp.

plumifer (Becker)

savicensis n.sp.

squamifer Hardy

sugdeni n.sp.

tantanoola n.sp.

trifasciatus (Macquart)

tweedensis n.sp.

Krakatauia***alanae* Group**

alanae n.sp.

malanda n.sp.

***evulgatum* Group**

macalpini n.sp.

obversicornis n.sp.

***funeralis* Group**

claudiensis n.sp.

funeralis Parent
pseudofuneralis n.sp.

trustorum Group

remota n.sp.
trustorum n.sp.

Mesorhaga

canberrensis Group

actites n.sp.
canberrensis n.sp.
chillagoensis n.sp.
coolumensis n.sp.
didillibah n.sp.
gingra n.sp.
lamondensis n.sp.
prima Parent
schneiderae n.sp.
tarooma n.sp.
wirthi n.sp.
yarratt n.sp.

flavicoma Group

flavicoma n.sp.
maceveyi n.sp.
similis n.sp.

geoscopa Group

danielsi n.sp.
geoscopa n.sp.
queenslandensis n.sp.

koongarra Group

cockatoo n.sp.
decembris n.sp.
emmensis n.sp.
gatesae n.sp.
koongarra n.sp.
longipenis n.sp.
martius n.sp.
muche n.sp.
naumanni n.sp.
nerrensis n.sp.
petrensis n.sp.
tindali n.sp.
toddensis n.sp.
turneri n.sp.
varicornis n.sp.
wanbi n.sp.
weiri n.sp.
zborowskii n.sp.

Narrabeenia

difficilis (Parent)
spinipes n.sp.

Negrobovia

aculicita n.sp.
australensis (Schiner)
flavihalteralis n.sp.

Parentia

dispar Group

backyama n.sp.
barbarae n.sp.
caldyanup n.sp.
cardaleae n.sp.
chaineyi n.sp.
dispar (Macquart)
sublectus Walker
separatus Parent
nigrociliatus Parent
dongara n.sp.
dubia (Parent)
gemmans (Walker)
kiwarrak n.sp.
nigropilosa (Macquart)
occidentalis n.sp.
orientalis n.sp.
perthensis n.sp.
royallensis n.sp.
solaris n.sp.
timotheyi n.sp.
tinda n.sp.
tricolor (Walker)
viduus Schiner
amoenus Becker
vulgaris n.sp.
yeatesi n.sp.
yunensis n.sp.

nudicosta Group

kelseyi n.sp.
nudicosta n.sp.
yarragil n.sp.

Unplaced Parentia

gladicauda n.sp.

Pilbara

octava n.sp.

Plagiozopelma

angustifacies Group

mouldsorum n.sp.

flavipodex Group

ashbyi n.sp.
aurifrons n.sp.
flavipodex (Becker)
placidum n.sp.

terminiferum Group

terminiferum (Walker)

Pseudoparentia n. gen.

advena n.sp.
centralis n.sp.
hangayi n.sp.
nullaborensis n.sp.
triosa n.sp.

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