

# VARIATION IN THE AUSTRALIAN KINGFISHERS (AVES: ALCEDINIDAE)

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(Figure 1)

(Manuscript received 17.12.56)

The present work has as its objective a study of infraspecific variation and speciation in the Australian Alcedinidae.

**Species and Range:** There are ten species of kingfishers in Australia, and they fall into five genera. Dominant, and the most widespread, are the forest kingfishers (*Halcyon*), of which there are four species. Two "giant" kingfishers (*Dacelo*) do much of their feeding on the ground. Two small, long-billed, short-tailed river kingfishers (*Alcyone*), single members of the New Guinea genera *Tanysiptera* (long-tailed kingfishers) and *Syma*, make up the rest of the fauna.

In terms of distribution and habitat the kingfishers separate out as follows: *Syma torotoro* and *Tanysiptera sylvia*, confined to rain-forests and scrubs of the north-eastern corner of the continent; *Alcyone pusilla* and *Halcyon chloris*, mangroves and inlets of the north; *Halcyon macleayi*, rain-forests and sclerophylls of the east; *Alcyone azurea*, rivers of the east and north; *Halcyon sancta*, migratory species (in the south) with a wide range, but concentrating for breeding in the better sclerophylls and savannahs; *Dacelo novaeguineae* and *Dacelo leachii*, southern and eastern sclerophylls and savannahs in the case of the former and northern savannahs in the latter; *Halcyon pyrrhopygia*, an inhabitant of the dry interior of the continent. Where more than one kingfisher occurs over a section of the continent different vegetation associations are occupied or food requirements are distinct. In the south-eastern sclerophyll forests, for example, the forest *Halcyon sancta* and *Dacelo novaeguineae* obviously have different ecological requirements (the former is much smaller, having a wing-length of 90-100 mm, the latter being 215-230 mm). The water kingfisher, *Alcyone azurea*, obtains its food exclusively by diving.

The bulk of Australian species has obviously had a northern origin, in several instances in the not too distant past. *Tanysiptera sylvia* and *Syma torotoro* are New Guinea species with a mere toehold in the tropical north-eastern corner. *Alcyone pusilla*, another northern species, is restricted to the mangrove-fringed shoreline of the Australian north coast. *Halcyon sancta*, extending widely over Australia, and *H. chloris* of the northern mangroves, are members of superspecies extending from Asia to the south-west Pacific. Both are migrants in Australia, suggesting that their occupation of the continent is too brief for them to have become adapted to the temperature and food conditions of winter in the south. *Halcyon macleayi*, an eastern and northern forest species in Australia, is also a migrant in the south of its range.

Species endemic to Australia and that obviously originated here are *Halcyon pyrrhopygia* and the two members of the genus *Dacelo*. *H. pyrrhopygia* is perfectly adapted to life in arid places, whilst both kookaburras (*Dacelo* spp.) extend well inland. *Alcyone azurea* has presumably had a long occupation of the continent for, despite its belonging to a tropical group, there is no migration even in cold areas.

**Material and Methods:** Specimens in the following museums were used in the work: American Museum of Natural History, New York (which houses the Mathews "types"); Australian Museum, Sydney; National Museum of Victoria, Melbourne; South Australian Museum, Adelaide.

Localities from which specimens of the various species have been seen are listed in the taxonomic section. Measurements of specimens were made as follows: *Wing-length*—from angle of wing to tip, straightened along the rule; *Bill-length*—from tip to the base of the first feathers; *Tail-length*—from base of centralmost two feathers to the tip.

The approach in the present work has been to study geographic variation in series of adult male specimens and to confirm any trends with the adult females. Detailed measurements of the former are set out in the body of the text. In the case of migratory and nomadic species only specimens collected during the breeding season have been used. Specific descriptions, plus those of sex and immature forms, are not given as they have been amply covered in the various standard works on Australian ornithology. It may be mentioned,