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6 College Street, Sydney NSW 2010, Australia



# NOTES ON AUSTRALIAN ATHECATE HYDROIDS.

By

E. A. BRIGGS, D.Sc.,

Lecturer in Zoology, University of Sydney.

The following notes refer to two Athecate Hydroids—(i) the fresh water *Cordylophora lacustris* Allman, from the Myall Lakes, New South Wales, and (ii) the marine *Bougainvillia ramosa* (van Beneden) from Port Jackson, Sydney.

The occurrence of *Cordylophora lacustris* in the Myall Lakes is extremely interesting, since this widely distributed colonial Hydroid has been recorded previously in Australian waters only from Parramatta, near Sydney (Whitelegge and von Lendenfeld), and from a small tributary of the River Inglis, between Wynyard and Flowerdale, Northern Tasmania (Flynn).

The marine Hydroid, *Bougainvillia ramosa* (van Beneden), which occurs abundantly on the piles of the wharf at Watson's Bay, Port Jackson, is the first representative of the genus *Bougainvillia* to be recorded from the coastal waters of New South Wales.

## I. On *Cordylophora lacustris* from Myall Lakes, N. S. Wales.

Genus *Cordylophora* Allman.

*Cordylophora lacustris* Allman.

? *Tubularia caspia* Pallas, 1771.

*Cordylophora lacustris* Allman, Monograph of Gymnoblasic or Tubularian Hydroids, Ray Soc., I, 1871-1872, p. 252, pl. iii, figs. *Id.*, Stechow, Zool. Jahrb., Syst., Bd. xxxii, 1912, p. 343 (synonymy).

*Cordylophora whiteleggei* Lendenfeld, Zool. Jahrb., Syst., Bd. ii, 1887, p. 97, pl. vi, figs. 11-12.

*Cordylophora caspia* (Pallas), Roch, Zeitsch. für Morph. und Ökologie der Tiere, Bd. ii, 1924, p. 350.

*Cordylophora fluviatilis* Hamilton, Finlay, Austr. Zoologist, v, 3, 1928, p. 258.

During a biological survey of the fresh water Myall Lakes on the north coast, New South Wales, several submerged logs were removed from the water at Bombah Point, a narrow tongue of land between Booloombayt Lake and The Broadwater. An examination of these logs revealed the presence of many small colonies of the widely distributed fresh water Hydroid, *Cordylophora lacustris* Allman.

The lakes, comprising Myall Lake, Booloombayt Lake, and The Broadwater, form a chain of communicating water-ways parallel to the coast and separated from the sea by a strip of land, which varies from a quarter of a mile to three

miles in width. The Broadwater is connected with Port Stephens and the sea by the narrow tortuous channel of the Lower Myall River. The water in the lakes is quite fresh, and is not affected by the rise and fall of the tide in the Lower Myall River. At the time of my visit (September, 1922), the lakes were in flood, and had risen to about three feet above their normal level.

The specimens of *C. lacustris* from the Myall Lakes exhibit very little branching, and reach a height of only 10 mm. Their salient features, however, agree in detail with the descriptions and figures of the European species, which is known to attain most luxuriant development in brackish water. It thrives also in fresh water, although the colonies are there less robust, and the branches are usually considerably reduced compared with specimens from brackish water.

A comparison of my specimens with material received from England leaves no doubt as to their identity with *C. lacustris*. The characters of the trophosome agree in all respects, while the mature colonies bear gonophores, which are indistinguishable from those of Allman's species. I have also compared my specimens with a mounted preparation of *C. whiteleggei*, which I find is in complete agreement with the generally accepted characters of the somewhat variable *C. lacustris*.

The small size of the Myall Lakes specimens is, I believe, to be directly attributed to their occurrence in fresh water. The growth differences in *Cordylophora*, noted by many writers, indicate a very close relation between the increase or decrease in the relative amounts of certain essential salts in the water. This view certainly gains support from the experimental work of Roch, whose comprehensive studies have been directed towards the solution of two very important questions, *viz.*: (1) Within what limits of salinity is it generally possible for *Cordylophora* to live, and (2) Have the individual salts of the surrounding medium an influence on the external form of the colonies?

As a result of Roch's experiments, it is evident that chlorine, sodium and potassium cannot be replaced by other elements in the water. If one of these elements is wanting in brackish water, the colonies die in a very short time. If sulphur is absent, then the formation of gonophores will be prevented, but if magnesium or calcium is lacking, a rank growth of the colonies will be brought about, in conjunction with very free sexual multiplication.

Although an exact chemical analysis of the water in the Myall Lakes is not available, it is very probable that the stunted growth of the *Cordylophora* can be attributed to the presence of calcium salts, which undoubtedly arrest the development of colonies living in fresh and brackish waters.

*Synonymy.*—A careful examination of the Myall Lakes specimens definitely establishes their identity with *C. lacustris*, nor can I find any characters which separate them from Lendenfeld's *C. whiteleggei*. Consequently, I have arranged the synonymy as above, reducing the status of *C. whiteleggei* to that of a synonym of *C. lacustris*.

I have retained Allman's name, *C. lacustris*, for this species, which Roch identifies with *Tubularia caspia* Pallas, and proposes to call *Cordylophora caspia* (Pallas). Bedot admits that "il est possible que la *Tubularia caspia* de Pallas soit l'espèce à laquelle Allman a donné le nom de *Cordylophora lacustris*, mais cela n'est pas certain, car la description de Pallas est très vague et n'indique aucun caractère permettant de faire une détermination exacte." He concludes, therefore,

that it is preferable to retain the name *Cordylophora lacustris*, and to place among its synonyms *Tubularia caspia* with a query, since the latter appears to be an indeterminate species.

In a recent contribution, "Notes on New Zealand and Australian Gymnoblasic Hydroids," Finlay<sup>1</sup> has attempted to establish the name *Cordylophora fluviatilis* Hamilton, for a brackish water form collected in the Petane (Esk) River, Hawke's Bay, New Zealand. The characters set out by Hamilton agree in their salient features with those of the Myall Lakes specimens, which I regard as identical with *C. lacustris* Allman. Consequently, Hamilton's *C. fluviatilis*, along with *C. whiteleggei* Lendenfeld, falls into the synonymy of Allman's species.

Hargitt (1924), in his paper on the "Hydroids of the Philippine Islands," has described a new species of *Cordylophora*, *C. dubia*, from the Mololas River. Hargitt's material was very poorly preserved, thus rendering specific identification difficult. The discovery of further specimens in the rivers of the Philippine Islands may ultimately prove the specific identity of *C. dubia* with *C. lacustris*. According to Hargitt's description, "the stems were slenderer, hydranths smaller, and gonangia clearly different"—all variable characters when the different growth-forms of *C. lacustris* are taken fully into account, along with the conditions of the habitat.

*Occurrence.*—The Myall Lakes specimens were collected in fresh water at Bombah Point in the Spring of 1922.

As early as 1885, Whitelegge had exhibited, before the Linnean Society of New South Wales, living colonies as well as mounted preparations of *Cordylophora* from Parramatta, some fourteen miles west of Sydney. These specimens later formed part of the material handed to Lendenfeld, who described them as a new species, under the name of *C. whiteleggei*. According to Lendenfeld's account, the hydroids were collected on Characeæ from the Parramatta River, near Sydney, where "Die Fundort liegt weit unterhalb den Region des süßen Wassers, wo die Fluth schon deutlich fühlbar ist. Es dürfte daselbst zu Zeiten das Wasser recht salzig sein." This is not in agreement with Whitelegge's statement in his "List of the Marine and Fresh-Water Invertebrate Fauna of Port Jackson and Neighbourhood," that the specimens were found "on the roots of Myriophyllum in the river, Parramatta Park, near the footbridge." In this situation the animals would occur in quite fresh water, since the stream mentioned by Whitelegge is a considerable distance from the source of the Parramatta River.

Lendenfeld, of course, may have had access to other material, and may have supplemented Whitelegge's collections with specimens from the Parramatta River, in which case they would undoubtedly occur in brackish or even salt water, as the greater part of this arm of Port Jackson is certainly subjected to tidal influences.

## II. On *Bougainvillia ramosa* from Port Jackson, N. S. Wales.

Genus *Bougainvillia* Lesson.

*Bougainvillia ramosa* (van Beneden).

*Eudendrium ramosum* van Beneden, Nouv. Mém. Acad. Bruxelles, xvii, 1844, pp. 41, 56, pl. iv.

*Bougainvillia ramosa* Bedot, Revue Suisse de Zool., xxxii, Fasc. suppl., 1925, p. 101 (synonymy).

<sup>1</sup> Finlay.—Austr. Zool., v, 3, 1928, p. 258.

*Trophosome*.—The characters of the trophosome agree in detail with Allman's description and figures of *B. ramosa* from the English coast. The hydrocaulus attains a height of two inches, and is much branched, forming a profusely ramified colony with a very characteristic, tree-like appearance. The main stem and principal branches are fascicled, but the ultimate branches are monosiphonic. The branching of the colony is somewhat irregular in the proximal region, but towards the distal extremity the branches become arranged in a definitely alternate manner. Each hydranth bears 12 to 14 filiform tentacles arranged in a single verticil around the base of the conical hypostome. The perisarc is continued over the proximal half of the body of each hydranth in the form of a very thin, almost transparent sheath, which is closely adherent to the wall of the polyp.

*Gonosome*.—The gonophores are carried on moderately long peduncles, which spring from the ultimate branches, on which they occur either singly or in subverticillate groups of three or four. The gonophores, in various stages of development, are present in large numbers; the most advanced ones show clearly the four simple labial tentacles attached to the extremity of the manubrium. Each labial tentacle expands distally into a small capitulum charged with nematocysts.

*Locality*.—Specimens of *B. ramosa* were first observed in May, 1918, attached to the piles of the wharf at Watson's Bay, Port Jackson. Prior to that date, no representatives of this species had been met with, although the locality was visited frequently, and the piles examined at brief intervals over a period of six years, from 1912 to 1918. The sudden appearance of these colonies suggests that the original specimens were brought by some ship to the shores of Port Jackson, where the liberated medusæ, having completed their life-cycle, gave rise to the fixed stages, which firmly established themselves in these temperate waters.

Since 1918, I have followed the gradual spread of *B. ramosa* in Sydney Harbour; the species has invaded several localities on the northern and southern shores, and by January, 1930, was well established at Circular Quay, where numerous colonies were to be observed in a flourishing condition on the piles of several wharves.

The occurrence of this typical northern species in the coastal waters of eastern Australia raises an interesting point in connection with the problem of distribution. It appears very unlikely that a living colony of *B. ramosa* could be carried to these shores by ocean currents; on the other hand, there is no reason why such a hardy form should not be transported while attached to the bottom of a vessel. Such a mechanical means of dispersal has been recorded by Browne in the case of *Tubularia crocea*, which was brought, in 1895, from Peru to Plymouth Sound.

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