SCI. MAR., 64 (Supl. 1): 237-240 SCIENTIA MARINA 2000

TRENDS IN HYDROZOAN BIOLOGY - IV. *C.E. MILLS, F. BOERO, A. MIGOTTO and J.M. GILI (eds.)*

Additional notes on *Clathrozoella drygalskii* (Vanhöffen, 1910) (Cnidaria, Hydrozoa)*

W. VERVOORT

National Museum of Natural History, Leiden, The Netherlands

SUMMARY: Study of the material of *Clathrozoella drygalskii* (Vanhöffen, 1910), a hydroid initially referred to the thecate hydroids but probably better classified in athecate hydroids along with such families as Hydractiniidae and Solanderiidae, has been continued with the help of sectioned material. Owing to the conditions of the material available, sectioning proved to be quite difficult; this combined with the poor condition of preservation provided inadequate and inconclusive results, as a result of which the taxonomic position of this enigmatic genus could not be definitely clarified. However, available evidence seems to suggest that the genus *Clathrozoella* Stechow, 1921, contains at least three species of which one, *C. drygalskii*, occurs in Antarctic, New Zealand and Australian waters, a second to the south of Stewart Island south of New Zealand, and a third exclusively (so far) in the Antarctic. Histological details of the two additional species are still lacking and information on the cnidome of the three species is still insufficient.

Key words: Antarctic, Cnidaria, Hydrozoa, Clathrozoidae, *Clathrozoella*, *Clathrozoon,* morphology.

The re-discovery of the rare hydroid *Clathrozoella drygalskii* (Vanhöffen, 1910), found in the collections of the New Zealand Oceanographic Institute (NIWA), Wellington, New Zealand and subsequently in those of the Museum of Victoria, Melbourne, Australia, was reported previously (Vervoort and Watson, 1996). This species, originally described as *Clathrozoon drygalskii* Vanhöffen, 1910, after Antarctic material collected by the German South Polar Expedition, was initially referred to the family Clathrozoidae Stechow, 1921, because of similarity with *Clathrozoon wilsoni* Spencer, 1890. This resemblance is based on the presence, in both species, of 'false hydrothecae', composed of perisarc tubes with a core of coenosarc. *Clathrozoella drygalskii* differs by the presence of a bottom in that 'false hydrotheca', formed by part of the wall of the preceding 'false hydrotheca'. The polyp is attached to that bottom, communicating with the coenosarc in the tubules. In *Clathrozoon wilsoni* and its relatives the one-layered 'false hydrotheca' is fully embedded in perisarc tubes; the hydrothecal bottom is open and the various hydranths are in direct contact through a system of coenosarc tubes in the interior of the colony as occurs in the majority of thecate hydroids. Those structural differences induced Stechow (1921, 1923) to institute the genus *Clathrozoella* for the reception of *Clathrozoon drygalskii*, though maintaining its position in the family Clathrozoidea, close to the Lafoeidae A. Agassiz, 1865. Both Hirohito (1967) and Bouillon (1985, 1995) expressed doubts concerning the correctness of that view, Hirohito even going so far as to remove *Clathrozoella* from the Clathrozoidae, however

*Received January 20, 1999. Accepted March 1, 1999.

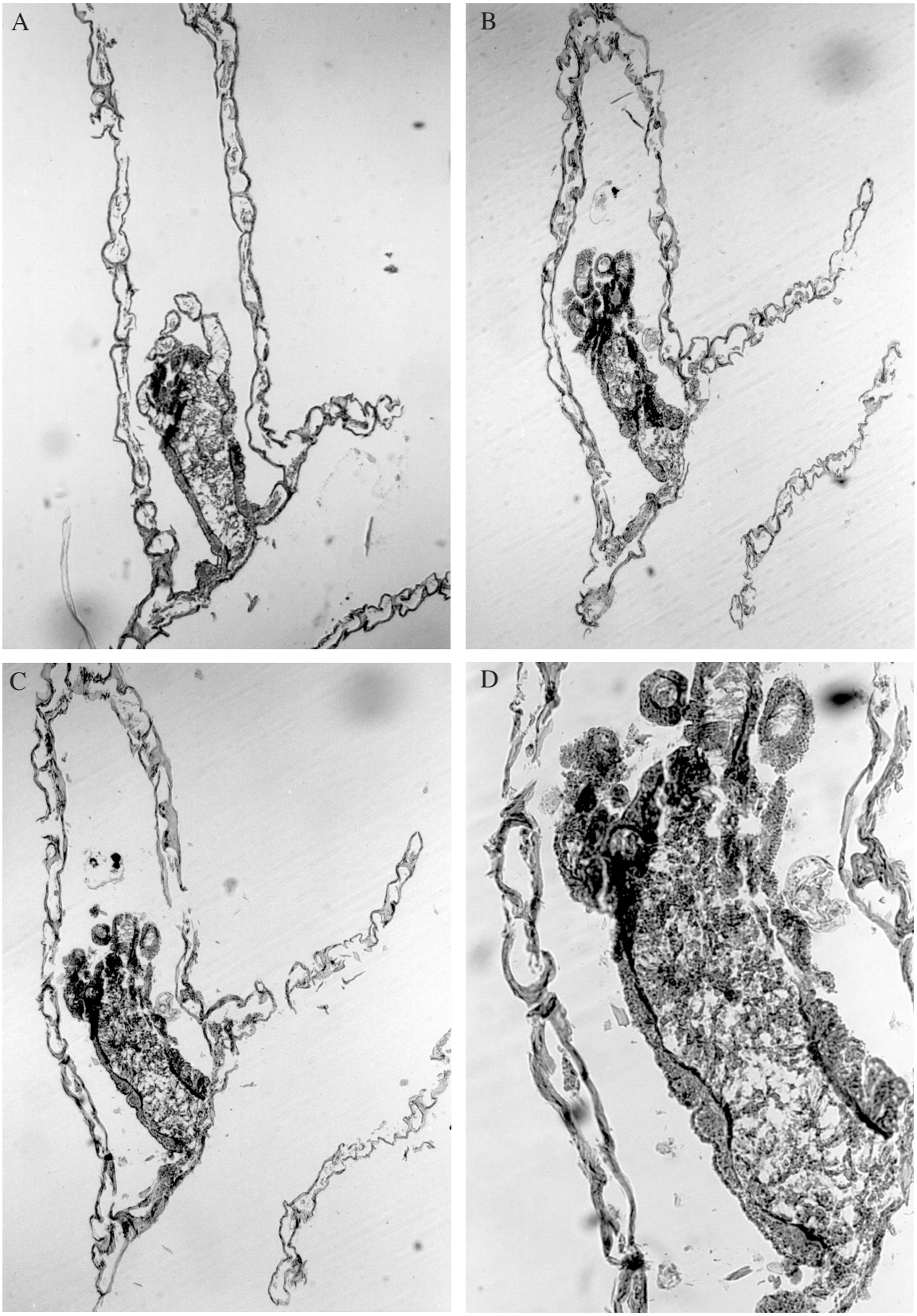

FIG. 1. – A-D, *Clathrozoella drygalskii* (Vanhöffen, 1910), longitudinal sections through a 'false hydrotheca' with hydranth attached to bottom. In A and C the attachment of the gonophore is just visible; in B-D the commensal copepod (?) is visible on the right side of the polyp. Magnifications: A-C, x41; D, x105.

without clarifying its systematic position because of lack of knowledge of the gonosome. That systematic position has remained enigmatic ever since though from the evidence so far available it seems clear that its most likely position is with the Athecate hydroids amongst such families as Hydractiniidae L. Agassiz, 1862, and Solanderiidae Marshall, 1892. Two structural details are essential for a definite solution, viz. knowledge of the gonosome and mode of reproduction, and information on the cnidome. To this end histological sections of some of the colonies were made; the provenance of this material is specified in Vervoort and Watson (1996). Unfortunately the New Zealand material turned out to be badly preserved but sections of the Australian material, prepared in the classical way and stained with Mallory-Heidenhain's triple stain, provided several reasonable longitudinal sections of the polyps and sufficed to confirm Vanhöffen's quite accurate and detailed observations on the gross anatomy of the polyp, its attachment to the bottom of the 'false hydrotheca' and the presence of a strand of tissue in the tubules that build up the 'false hydrothecae' and the colony. The polyp is a simple, sac-like structure with a conical hypostome surrounded by a single whorl of filiform tentacles. Nematocysts are visible in the ectoderm but owing to the method of preservation details are difficult to observe. Two size classes of desmones can be distinguished, but there is no conclusive evidence to suggest also the presence of euryteles or stenoteles, that almost certainly must have been present if we are dealing with an athecate hydroid. In one of the sections a commensal animal, probably a copepod, was observed in the space between polyp and internal wall of the 'false hydrotheca'.

In a series of sections of one of the Australian colonies a small, developing gonophore was observed next to the hydranth, communicating, as the polyp, with the coenosarc of the tubules. This gonophore is a conical structure half as height as the column of the hydranth, containing a single developing oocyte. Unfortunately the best sections of this series are slightly folded.

Close inspection of the New Zealand material has proved this material to be composite: the colonies from NZIO Stn D149, south of Stewart Island (roughly 49°S, 167°E), from a depth of 454 m, mentioned by Vervoort and Watson (1996) as having a "thick cover of small algae and diatoms", differ from those of the remaining two New Zealand stations and the Australian material in colony structure. The latter agrees closely with Vanhöffen's detailed description; the walls of the 'false hydrothecae' and consequently the resulting colony, is formed by a network of anastomosing perisarc tubules with a core of coenosarc. The exterior of the 'false hydrothecae' is covered by small, cylindrical nematothecae that are fairly closely packed and form a quite significant feature of this species. All this material clearly represents *Clathrozoella drygalskii* (Vanhöffen, 1910); it has been compared with the lectotype with which it shows no real differences. The Stewart Island material, however, is different. It strikes at a first glance by the much coarser 'false hydrothecae' with a wider bore; the coarseness in appearance being brought about by a thick layer of foreign bodies on the outside of the 'false hydrotheca', formed principally by sand grains, dead Foraminifera, diatoms and small algae, attached to and cemented together and to the exterior of the colonies by threads and tubules of perisarc and mixed with many short, cylindrical nematothecae that do not protrude beyond the surface of this layer of detritus. This material so far proved unsuitable for sectioning and no polyps could be isolated. It is tentatively considered a second species of *Clathrozoella*.

In material collected by USARP (United States Antarctic Research Program) in 1962 and sent to us for sorting and further study, a species of *Clathrozoella* has been found, collected approximately 58.5°S, 60.5°W (Drake Passage) at 3076 m depth, that has every appearance of being a third species of the genus. It is quite characteristically geniculate as the 'false hydrothecae' are not curved but straight, while the nematothecae are shorter, wider and considerably more dispersed than in *Clathrozoella drygalskii*. So far this species has been only cursorily studied, a study much hampered by the paucity of material. No polyps have so far been found in this material.

In conclusion: Vanhöffen's detailed observations on the gross anatomy of *Clathrozoon drygalskii* [now *Clathrozoella drygalskii* (Vanhöffen, 1910)] have been confirmed. This structure and the presence of a gonophore next to the hydranth at the bottom of the 'false hydrotheca' support the suggestion that the species should be referred to the athecate hydroids rather than to the thecate hydroids; this suggestion is not contradicted by the characters of the cnidome as far as that is known at present. The genus *Clathrozoella* Stechow, 1921, probably contains at least three species.

ACKNOWLEDGEMENTS

Sections were prepared by Mr T.J.G.M. van Oyen, technical assistant at the National Museum of Natural History, Leiden, The Netherlands.

REFERENCES

Agassiz, A. – 1865. *North American Acalephae*. In: Illustrated Catalogue of the Museum of Comparative Zoölogy, at Harvard College, no. II: 1-234, figs. Cambridge, Mass., U.S.A.

Agassiz, L. – 1862. *Contributions to the natural history of the United States of America*. Second monograph. Vol. 4: i-viii, 1-380 + (1-10), pls 20-35. Little, Brown and Co., Boston.

Bouillon, J. – 1985. Essai de classification des Hydropolypes - Hydroméduses (Hydrozoa-Cnidaria). *Indo-Malayan Zool.,* 2(1): 29-243.

Bouillon, J. – 1995. Classe des Hydrozoaires (Hydrozoa Owen, 1843). In: P.-P. Grassé (ed.), *Traité de Zoologie*. Anatomie, systématique, biologie, 3: 29-416.

Hirohito. – 1967. A review of the hydroids of the family Clathrozonidae with description of a new genus and species from Japan. *Publs biol. Lab., Imp. Household, Tokyo,* 1967(2): 1-14.

Hirohito. – 1995. The hydroids of Sagami Bay. II, Thecata. *Publs biol. Lab., Imp. Household, Tokyo,* 1995: i-vii, 1-355 (English text); 1-244 (Japanese text), figs 1-106, pls 1-13, frontispiece, postscript. Edited and annotated by M. Yamada.

Marshall, W. – 1892. *Spongiologische Beiträge*. In: Festschrift zur siebzigsten Wiederkehr des Geburtstages von Rudolf Leuckart: 1-36, pls 1-8. Leipzig.

Spencer, W.B. – 1890. A new family of Hydroidea, together with a description of the structure of a new species of *Plumularia*. *Trans. R. Soc. Vict.,* 2(1): 121-140.

Stechow, E. – 1921. Neue Genera und Species von Hydrozoen und anderen Evertebraten. *Arch. Naturgesch.,* (A)87(3): 248-265.

Stechow, E. – 1923. Zur Kenntis der Hydroidenfauna des Mittelmeeres, Amerikas und anderer Gebiete. II. Teil. *Zool. Jb., Syst.* 47(1): 29-270.

Vanhöffen, E. – 1910. Die Hydroiden der Deutschen Südpolar-Expedition 1901-1903. *Dt. Südpol.-Exped.,* 11 (= Zool., 3): 269-340.

Vervoort, W. and J.E. Watson. – 1996. A rare hydroid, *Clathrozoella drygalskii* (Vanhöffen, 1910) in the waters of Australia and New Zealand. In: S. Piraino, F. Boero, J. Bouillon, P.F.S. Cornelius and J.M. Gili (eds.), Advances in hydrozoan biology. *Sci. Mar.*, 60(1): 117-120.