

SPECTACULARIA VANOPPENAE GEN. ET SP. NOV., A NEW HYDROMEDUSA
(CNIDARIA: HYDROZOA: DIPLEUROSOMATIDAE) FROM THE GREAT BARRIER
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A new genus and species of Hydromedusae is described from the waters off North Queensland. It is placed in the Dipleurosomatidae because of its irregularly branched radial canals, gonads on the radial canals separated from the stomach, hollow marginal tentacles and lack of cirri or cordyli. It differs from all other medusae in its two rows of small, simple, wart-like gonadal papillae. It differs from the other dipleurosomatids in its unique combination of other characters, namely, 5-6 radial canals leaving the stomach, branching dichotomously an irregular number of times; about half as many tentacles as canal branches reaching ring canal, not in correspondence with canal branches; with about 8 globular or heart-shaped stalked clubs between successive tentacles; and lacking ocelli. This report represents the first record of the Dipleurosomatidae in Australian waters. □ *Cnidaria, Hydrozoa, Leptomedusae, Dipleurosomatidae, Hydromedusae.*

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The medusae of North Queensland are the best studied in Australia, but are nonetheless quite incompletely known. Mayer (1915) commented that Queensland waters are remarkable for their poverty of medusa species, but a later survey of this area suggested otherwise, producing several new species and many new distribution records (Kramp, 1953).

From 1958 to the late 1960's, John 'Jack' Handyside Barnes, a physician in Cairns, made a comprehensive collection of medusae from the waters of the Great Barrier Reef and coastal North Queensland. Several species have been described from his collection, including the dreaded Irukandji jellyfish, *Carukia barnesi* Southcott, 1967. Kramp (1961a; 1965) published some of the species forwarded by Barnes, but many others remain in the collection unidentified. The purpose of this paper is to describe a spectacular little hydromedusa found by Barnes in 1964, miraculously unrecognized hitherto for its uniqueness.

MATERIALS AND METHODS

The specimen was found among unidentified material from the J.H. Barnes collection held at the Museum of Tropical Queensland (MTQ). All characters were examined under a dissecting microscope and photographed with a Nikon Cool-Pix 995 held to the ocular. Measurements

were made with Max-Cal digital calipers to the nearest 0.01mm and rounded to nearest 0.1mm.

Specimen notes of the J.H. Barnes collection are held in the Reserve Collection of the James Cook University Library and relate to specimens according to numbers preceded by a 'J'.

SYSTEMATICS

Class HYDROZOA Owen, 1843
Order LEPTOMEDUSAE Haeckel, 1866
Family DIPLEUROSOMATIDAE Russell,
1953

Spectacularia gen. nov.

TYPE SPECIES. *Spectacularia vanoppenae* sp. nov.

DIAGNOSIS. Radial canals 5-6 leaving stomach, branching dichotomously an irregular number of times; with gonads in 2 wart-like rows; with about half as many tentacles as canal branches reaching ring canal; about 8 globular or heart-shaped, stalked clubs between successive tentacles.

Spectacularia vanoppenae sp. nov. (Figs 1-2)

ETYMOLOGY. For my advisor, Madeleine van Oppen.

MATERIAL. Holotype: MTQG55271 (= JHB J1156), Green Island, 4 January 1964, coll. by L.M. Barnes, at surface, winds NE, South-going current.

DESCRIPTION. Bell sub-hemispherical, absolute bell diameter 23.8mm, constricted marginal diameter 13.7mm. Exumbrellar surface smooth, lacking ridges, furrows, or nematocyst warts. Stomach small, oblong in shape, 2.7mm diameter along longest axis, without a peduncle. Manubrium short, amorphous in cross section, with loosely crenulated, poorly defined lips. Five or six main radial canals leave the stomach, dividing dichotomously an irregular number of times; 47 branches reach ring canal. Gonads in opposite or alternate, small, hollow, wart-like papillae, in two rows, one along each side of midline of each branch, restricted to middle region of branches, distal to second bifurcation and about 3mm proximal to ring canal (Fig. 1). Ring canal narrow. Velum weakly developed, of thin, filmy consistency, about 1.5mm wide. Tentacles 24, hollow, coiled; very short, with coils being about as long as velum is wide. Tentacles typically located between radial canals, rarely on same radii as canals. Tentacle bulbs small, globular to heart-shaped, hollow. Tentacular nematocyst warts primarily concentrated on adaxial side. Margin crowded with globular and heart-shaped, narrow-stalked, small clubs, each terminally frosted with nematocysts, approximately 8 clubs between adjacent tentacles (Fig. 2). Statocysts and ocelli not found. Colour after 40 years in formalin: stomach, gonadal papillae and tentacles opaque pinkish; radial canals and marginal papillae pale, translucent pinkish; mesoglea nearly completely transparent, lacking colour.

Notes From Living Specimen. Notes from the specimen catalog of Barnes read, 'Branching radial canals blue-black, serrated. Shape before preservation [hemisphere indicated by sketch]. No similar specimen seen by me previously'.

Artifacts of Preservation. Several physical features were noted which are assumed to be artifacts of preservation. The margin of the preserved specimen is curled inward; the presumed bell shape in life is shallowly domed. Several irregular creases are present on the exumbrella; the exumbrella is assumed to be smooth in life. Statocysts and ocelli were not observed; after 40 years in formalin, one might expect that they would be obscured, but this is not always the case. Leptomedusan statocysts are typically visible as minute 'bubbles' on the margin even many years after preservation, even though the statoliths inside are long since disintegrated. Similarly, I have studied

specimens from the collections of Mayer, Bigelow and Kramp, which still have faint shadows of ocelli after many years in preservative. Although caution must be exercised in any conclusions pertaining to absence of statocysts and ocelli, the taxonomic conclusions herein are based on structures such as radial canal branching pattern, marginal clubs and gonad form.

Radial Canal Branching. The number of radial canals is left open to interpretation, because of the branching pattern. One of the canals is branched at the root, so it could be interpreted as being either one that is branched or two that are fused. For this reason, I have stated the radial canal number as five or six.

REMARKS. *Spectacularia vanoppenae* is distinctive from all other Hydromedusae in the peculiarly wart-like gonadal papillae. Gonadal processes, which have been sometimes referred to as papillae, are present in only a few other hydrozoan species, but, when present, are entirely different from those in *S. vanoppenae*. In *Olindias* spp. (Trachymedusae: Olindiadidae) the papillae are more crowded and more haphazardly arranged, and longer and more digitiform or palmate in shape (Mayer, 1910). In *Ptychogena* spp. (Leptomedusae: Laodiceidae) the papillae are typically longer and more pronounced than those of *S. vanoppenae* and are arranged in an elaborately laterally folded pattern of some sort (Mayer, 1910), whereas those of *S. vanoppenae* are simply in two imperfect rows of dot-like evaginations, one row on either side of the midline of each canal branch. In *Wuvula* spp. (Leptomedusae: Laodiceidae) the papillae are voluminous vesicles containing zooxanthellae and are relatively larger and longer than the papillae of *Spectacularia* (Bouillon et al., 1988). Furthermore, despite any superficial resemblance implied by the term 'papillae', *Spectacularia* could not easily be mistaken for *Olindias*, *Ptychogena*, or *Wuvula*, based on comparison of the papillae or nearly any other character.

Within the Dipleurosomatidae, another species, namely *Dipleurosoma pacificum* Agassiz and Mayer, 1902, is described as having 'slightly papillate' surfaces of the gonads, but it is clear from the remainder of the description and the illustration that the crowded ova give the gonadal surface a lumpy appearance, rather than the truly papillate condition as in the gonad of *S. vanoppenae*. It would be highly unlikely that the two species would be confused.



FIG. 1. *Spectacularia vanoppenae* gen. et sp. nov., holotype, whole medusa; absolute bell diameter is 23.77mm.

Two other features, namely the marginal clubs and the branching of the radial canals, are worthy of comment. First, the marginal clubs are somewhat reminiscent of the marginal clubs of *Olindias*, though in *S. vanoppenae* they are highly irregularly shaped, whereas in *Olindias* they tend to be quite regularly rounded. They would also be unlikely to be confused for the cordyli of the laodiceids, because cordyli are an order of magnitude smaller, more elongate and flask-shaped and are comprised of vacuolated cells. Cordyli are generally interpreted as sensory structures and they lack nematocysts. In contrast, the clubs of *S. vanoppenae* are large, irregularly shaped, dense structures, terminally covered with nematocysts. Second, the branching of the radial canals is clearly of the Dipleurosomatidae form (i.e., irregular) rather than the Laodiceidae or Aequoreidae forms (i.e., regular).

DISCUSSION

The assignment of *Spectacularia vanoppenae* gen. et sp. nov. to the Dipleurosomatidae is based on the irregular branching and arrangement of the radial canals, the narrow stomach attached

directly to the body and the absence of cirri or cordyli. The genus *Spectacularia* does not seem to have a close affinity with any of the other genera in the family (Table 1). Like *Dipleurosoma*, it has more than 4 primary radial canals leaving the stomach. But the two genera differ greatly in the general form of the radial canals and the number of tentacles. Furthermore, *Spectacularia* appears to lack ocelli, which are present in *Dipleurosoma*; even with ocelli, the two species would not be confused. Like *Cannota* and *Cuvieria*, *Spectacularia* has marginal clubs. However, these structures are of a similar form in *Cannota* and *Cuvieria*, namely, small, narrow and evenly spaced, whereas they are entirely different in *Spectacularia*, being globular to heart-shaped and densely crowded.

Perhaps the most similar overall species to *Spectacularia* is *Cuvieria huxleyi* (Haeckel, 1879), in that both species have numerous branches to the canals, far fewer tentacles than canal branches reaching the ring canal and marginal clubs. However, the two species would not be easily mistaken for one another because in



FIG. 2. *Spectacularia vanoppenae* gen. et sp. nov., detail of 6mm section of margin, showing arrangement of tentacles and clubs.

C. huxleyi the canal branches arise from the sides of the 4 main radial canals, the gonads reach the ring canal, the tentacles have ocelli and the marginal clubs tend to be in correspondence with the radial canals and branches. In contrast, in *S. vanoppenae* the canal branches arise dichotomously, the gonads do not reach the ring canal, the tentacles appear to lack ocelli and the marginal clubs greatly outnumber the canal branches.

For the genus *Cuvieria*, it is unclear why Bouillon & Boero (2000) spelled the generic name as '*Cuviera*'. In the original illustration by Péron (1807) it is spelled in the former way and subsequent major authors spelled it in the conventional way as well (Mayer, 1910; Kramp, 1961b). It seems that whatever the reason of Bouillon & Boero, the correct spelling of the name should be as in the original, *Cuvieria*.

This report represents the first record of the family Dipleurosomatidae in Australian waters. The nearest other record was that of Bouillon

(1984), who reported *Dichotomia cannooides* Brooks, 1903, from the northern coast of Papua New Guinea.

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LITERATURE CITED

- AGASSIZ, A. & MAYER, A.G. 1899. Acalephs from the Fiji Islands. Bulletin of the Museum of Comparative Zoology, Harvard 32(9): 157-189, + 17 plates.
 1902. Reports of the scientific research expedition to the tropical Pacific. U.S. Fish Comm. St. Albatross, 1899-1900. III. The Medusae.

TABLE 1. Comparison of the characters of the genera in the Dipleurosomatidae. Literature used: Péron, 1807; Boeck, 1866; Haeckel, 1879; Agassiz & Mayer, 1899; Brooks, 1903; Mayer, 1910; Russell, 1953; Kramp, 1961b; Bouillon & Boero, 2000. Abbreviations: radial canals (RC), radial canal origins leaving stomach (RCO), radial canal branches reaching ring canal (RCB).

	RCO	RCB	Branching	Gonads	Tentacles	Ocelli	Clubs
<i>Cannota</i> Haeckel, 1879	4	12	2 simple side branches	spindle-shaped on RC and branches	12, at base of radial canals	absent	present
<i>Cuvieria</i> Péron, 1807	4	50-60, or ~70	2 main side branches w/ numerous terminal branches	on outermost branches, near ring canal	16, or 50-100, long	present or absent	present or absent
<i>Dichotomia</i> Brooks, 1903	4	32	bifurcate w/ lateral branches	a single, circumferential structure adjacent to manubrium	ca. 50, of 2 different size classes	not noted	absent
<i>Dipleurosoma</i> Boeck, 1866	5+	equal to or a few more than leave the stomach	simple or irregularly branched	on proximal or central portion of RC	ca. 100	adaxial	present or absent
<i>Spectacularia</i> gen. nov.	5-6	47	irregularly dichotomous	two rows of minute papillae, central on all branches	about ½ as many as RC branches, located between branches; short	absent	present

- Memoirs of the Museum of Comparative Zoology, Harvard 26: 139-176.
- BOECK, A. 1866. Om to tilsyneladende bilateral-symmetriske Hydromeduser: *Dipleurosoma typica* og *Stuvitzii*. Videnskabelige Meddelelser fra Dansk naturhistorisk Forening, Kobenhavn 1866 (1867-8) (10, 11): 131-140.
- BOUILLON, J. 1984. Hydromeduses de la mer de Bismarck (Papouasie Nouvelle-Guinée). Partie IV. Leptomedusae (Hydrozoa - Cnidaria). Indo-Malayan Zoology 1(1): 25-112.
- BOUILLON, J. & BOERO, F. 2000. Synopsis of the families and genera of the Hydromedusae of the world, with a list of the worldwide species. *Thalassia Salentina* 24: 47-296.
- BOUILLON, J., SEGHERS, G. & BOERO, F. 1988. Notes additionnelles sur les méduses de Papouasie Nouvelle-Guinée (Hydrozoa, Cnidaria) III. Indo-Malayan Zoology 5: 225-253.
- BROOKS, W.K. 1903. On a new genus of hydroid jelly-fishes. Proceedings of the American Philosophical Society 42: 11-14, 1 pl.
- HAECKEL, E. 1866. Vol. 1. Allgemeine Anatomie der Organismen. Vol. 2. Generelle morphologie der Organismen. (Verlag von Georg Reimer: Berlin).
1879. Das System der Medusen: Erster Theil einer Monographie der Medusen. (G. Fischer: Jena).
- KRAMP, P.L. 1953. Hydromedusae. Scientific Reports of the Great Barrier Reef Expedition 6: 259-322.
- 1961a. Some medusae from northern Australia. Transactions of the Royal Society of South Australia 85: 197-205.
- 1961b. Synopsis of the medusae of the world. Journal of the Marine Biological Association of the United Kingdom 40: 1-469.
1965. Some medusae (mainly Scyphomedusae) from Australian coastal waters. Transactions of the Royal Society of South Australia 89: 257-278.
- MAYER, A.G. 1910. Medusae of the World. Vol. 1 and 2, the Hydromedusae. (Carnegie Institution: Washington DC).
- 1915a. Medusae of the Philippines and of Torres Straits. Being a report on the Scyphomedusae collected by the U.S. Fisheries Bureau steamer 'Albatross' in the Philippine Islands and Malay Archipelago, 1907-1910, and upon the medusae collected by the expedition of the Carnegie Institution of Washington to Torres Straits, Australia, in 1913. Papers of the Tortugas Laboratory 8: 157-202.
- OWEN, R. 1843. Lectures on the comparative anatomy and physiology of the invertebrate animals, delivered at the Royal College of Surgeons, in 1843 [1 Aufl.]. (Longman, Brown, Green and Longmans: London).
- PÉRON, M.F. 1807. Voyage de découvertes aux terres Australes, exécuté par ordre de sa Majesté l'Empereur et Roi, sur les Corvettes le Geographe, le Naturaliste, et la Goelette le Casuarina, pendant les années 1800, 1801, 1802, 1803 et 1804. (l'Imprimerie Imperiale: Paris).
- SOUTHCOTT, R.V. 1967. Revision of some Carybdeidae (Scyphozoa: Cubomedusae), including a description of the jellyfish responsible for the "Irukandji syndrome". Australian Journal of Zoology 15: 651-671.

