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A taxonomic guide to the fanworms (Sabellidae, Annelida) of Lizard Island, Great Barrier Reef, Australia, including new species and new records

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Abstract

This comprehensive taxonomic work is the result of the study of fan worms (Sabellidae, Annelida) collected over the last 40 years from around the Lizard Island Archipelago, Great Barrier Reef, Australia. Some species described herein are commonly found in Lizard Island waters but had not previously been formally reported in the literature. Most species appear to be not particularly abundant, and few specimens have been collected despite the sampling effort in the area over this time period. After this study, the overall sabellid diversity of the archipelago has been greatly increased (by more than 650%). Before this revision, only four sabellid species had been recorded for Lizard Island, and in this paper we report 31 species, 13 of which belong to nominal species, six are formally described as new species (*Euchone danieloi* n. sp., *Euchone glennoi* n. sp., *Jasmineira gustavoi* n. sp., *Megalomma jubata* n. sp., *Myxicola nana* n. sp., and *Paradialychone ambigua* n. sp.), and the identity of 12 species is still unknown (those referred as cf. or sp.). Two species are newly recorded in Australia and two in Queensland. The invasive species *Branchiomma bairdi* is reported for the first time at Lizard Island. The genus *Paradialychone* is reported for Australia for the first time. Standardised descriptions, general photographs of live and/or preserved specimens and distribution data are provided for all species. New species descriptions are accompanied by detailed illustrations and exhaustive morphological information. A dichotomous key for sabellid identification is also included.

Key words: Taxonomy, Queensland, polychaetes, dichotomous key, illustrated guide, invasive species

Resumen

Este exhaustivo trabajo taxonómico es resultado del estudio de los gusanos plumero (Sabellidae, Annelida) colectados durante los últimos 40 años en el archipiélago de Lizard Island, en la Gran Barrera de Coral, Australia. Algunas de las especies descritas en este documento son comunes en las aguas de Lizard Island aunque no habían sido formalmente citados en la literatura. Sin embargo, la mayoría de las especies parecen no ser abundantes, pues tan sólo unos pocos ejemplares han sido encontrados a pesar del esfuerzo de muestreo en la zona y durante este tiempo. Tras este trabajo, la diversidad de sabélidos en el archipiélago se ha incrementado notablemente (en más de un 650%). Antes de esta revisión, sólo cuatro especies de sabélidos habían sido citados en Lizard Island, y en el presente se registran 31 especies, 13 de ellas corresponden a especies nominales, seis son nuevas para la ciencia (*Euchone danieloi* n. sp., *Euchone glennoi* n. sp., *Jasmineira gustavoi* n. sp., *Megalomma jubata* n. sp., *Myxicola nana* n. sp., y *Paradialychone ambigua* n. sp.), y la identidad de 12 aún no ha sido corroborada (referidas como cf. o sp.). Dos especies son nuevos registros para Australia y dos para Queensland. Se documenta por primera vez de la presencia de *Branchiomma bairdi* en el archipiélago, una especie considerada como invasora. El género *Paradialychone* es citado por primera vez en Australia. Se proporcionan descripciones estandarizadas, fotografías de ejemplares vivos y/o preservados y datos de la distribución para todas las especies. Las descripciones de las especies nuevas están acompañadas de ilustraciones detalladas e información morfológica exhaustiva. Se ha incluido, además, una clave dicotómica para la identificación de especies de sabélidos de Lizard Island.

Palabras clave: Taxonomía, Queensland, poliquetos, clave dicotómica, guía ilustrada, especies invasoras

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Introduction

Sabellids or feather-duster worms are characterised, among other features, by an often colourful radiolar crown emerging from the tube which they inhabit, and are well appreciated among divers and aquarium lovers as some species are also exploited for ornamental purposes (Capa *et al.* 2010; Murray *et al.* 2013). Sabellidae is one of the most diverse and ubiquitous polychaete families with over 400 nominal species described to date, currently grouped in 39 genera (Capa *et al.* 2014). They are found in a range of waters from fresh to fully marine conditions, and from intertidal to abyssal depths all over the world, but are particularly abundant and diverse in tropical areas and coral reefs (Giangrande & Licciano 2004).

Sabellids live inside tubes they build with secreted mucus and attached mud or sand particles, with the exception of *Glomerula* Nielsen, 1931, which constructs calcium carbonate tubes. They can project their radiolar crown out of the tube for feeding or respiratory needs or withdraw into it for protection from predation. Some species are capable of boring into calcium carbonate of shells and are considered as parasites of marine and fresh water molluscs or active bioeroders of coral reefs (e.g., Jones 1974; Chughtai & Knight-Jones 1988; Culver *et al.* 1997; Fitzhugh & Rouse 1999; Hutchings 2008; Goldberg 2013).

Sabellidae has been the subject of several taxonomic and systematic amendments in the past. Fabriciidae is currently considered a separate family, instead of a subfamily within Sabellidae, after being recovered as a sister clade to Serpulidae (Kupriyanova & Rouse 2008).

Only four sabellid species had been reported from Lizard Island previous to this study: *Glomerula pilosetosa* (Perkins, 1991), *Terebrasabella hutchingsae* Murray & Rouse, 2007, *T. fitzhughi* Murray & Rouse 2007, and *Megalomma interrupta* Capa & Murray, 2009. Of course, many other species were known to inhabit the archipelago waters but had not been recorded in the literature. Other taxonomic or faunistic studies reporting sabellids from nearby localities within the Great Barrier Reef include Rouse (1990), Hartmann-Schröder (1991), Knight-Jones & Mackie (2003), Capa (2007) and Capa *et al.* (2011, 2013), increasing the total number of sabellid species documented for this area to 12.

The aim of the present paper is to provide a tool for identification of sabellid species from Lizard Island in order to increase the knowledge of the diversity and great beauty of representatives of this family in this archipelago and along shallow environments of the Great Barrier Reef. For this purpose we are: (1) including descriptions of all species found in waters around Lizard Island (short descriptions in the case of species recently described in the literature; detailed and thorough descriptions for all new species and new records; or extra new information in the case where descriptions in the literature are incomplete); (2) providing illustrations to complement the descriptions and aid species identification, including in most cases colour micrographs of live specimens and scanning electron micrographs of some of the diagnostic features when necessary; (3) providing a dichotomous key for species identification.

Material and methods

Material belonging to the Australian Museum (AM), Sydney, and Museum and Art Galleries of the Northern Territory (NTM), Darwin, collected during several surveys over 40 years, was studied. Examination and photography of live specimens was possible after participation in the Lizard Island Polychaete Workshop (August 2013), and the three Census of Marine Life Coral Reef (CReefs) expeditions 2009–2012 at Lizard Island. Specimens were mostly sorted in the field and either fixed in formalin and preserved in 70–80% ethanol or fixed and preserved in 96–100% ethanol. They were studied using dissecting and compound microscopes. Photographs of live specimens were taken in the lab with a Canon 5d Mark II camera, with a Canon MP-E 1-5x Macro f2.8 or a Canon 100mm f2.8L II USM Macro lenses. For underwater photos a Subal C5DM2 underwater housing was used. Photographs of preserved specimens were taken using a Leica DFC 420 camera attached to a Leica MZ 16A light microscope or a DM 6000B compound microscope (Leica Microsystems, Wetzlar, Germany), or an Olympus BX50 upright compound microscope with a SPOT flex CCD camera. Stacks of multi-focus shots were merged into a single photograph to improve resolution with Leica Application Suite v3.7 software (Leica Microsystems, Wetzlar, Germany) or using Helicon Focus software. Some specimens were stained with methyl blue or methyl green to increase contrast and thus visually enhance important diagnostic features. Some parapodia were mounted

in glycerine on microscope slides for examination of chaetae using a compound microscope. Scanning electron micrographs (SEM) were taken of specimens using either a JEOL-JSM-6480 at the Cellular and Molecular Imaging Core Facility (CMIC) of the Faculty of Medicine of the Norwegian University of Sciences and Technology (NTNU), or at the Australian Museum SEM Laboratory using a Zeiss EVO LS15 SEM with a Robinson Backscatter detector. Drawings were made using a camera lucida attached to an Olympus BX-50 compound microscope with interference contrast optics (Nomarsky).

Although generic diagnoses have not been included (these are available in Capa *et al.* 2014), generic features have been incorporated into the species descriptions. Recently well described species are not necessarily described thoroughly herein, but enough information is given for species identification and characterisation, and references to additional literature are provided. All descriptions follow a standard format and consistent morphological attributes have been described. However, in cases of generic or species' outstanding autapomorphies (features only present in a single genus or species), these characters have been inserted as such into the diagnosis, instead of mentioning its absence in all the rest of the descriptions. Some attributes refer to length or size of the character in question. In order to simplify the descriptions we have used the terms short, medium or long for dorsal radiolar appendages and uncini handles, and standard measurements for these terms are described in Table 1. The terminology used for chaetal morphology follows Capa *et al*. (2014). In cases where the description includes broadly-hooded capillary chaetae, these chaetae have been classified using the terminology in the literature (e.g., Capa & Murray 2009) based on the length of the hood compared with width – type A, chaetae with broader hoods and distal ends narrowing abruptly; and type B, chaetae with more slender hoods and with a progressively tapering distal tip. The type C chaetae described by Tovar-Hernández & Carrera (2011) we consider to be paleate and therefore are not a type of broadly-hooded chaetae.

TABLE 1. Characters and simplified states referred to in the species descriptions.

	Short	Medium	Long
Dorsal radiolar appendage	shorter than the length of 2 thoracic chaetigers	between the length of 2-5 thoracic chaetigers	longer than 5 thoracic chaetigers
Uncinus handle	shorter than the length of main fang to breast	less than twice the length of main fang to breast	more than twice the length of main fang to breast

Collection details are provided for all material examined, including exact location, coordinates, depth and habitat, in most cases. Specimens which were collected and registered during the Lizard Island Polychaete Workshop 2013, and cited herein under Material Examined sections, are referred to only by their Registration Number (prefix AM W.) and Collection Event Code (prefix MI QLD). For a list detailing complete collection information for these Collection Event Codes as well as maps showing the collection sites, refer to Ribas & Hutchings (2015, this volume). Number of specimens under each registration number is one unless otherwise specified.

Key to Lizard Island Sabellidae

1. Radiolar eyes present (e.g., Figs 2B, M, 3B, 13F, 16E, I21F, 22F) 2
- Radiolar eyes absent 14
2. (1) Radiolar eyes compound, formed by compacted groups of ommatidia 3
- Radiolar eyes as loose groups of simple ocelli on lateral margins of radioles, arranged in clusters, rows or dispersed along radioles (e.g., Figs 16E, I, 22F) 6
3. (2) Radiolar eyes as paired units, along both lateral margins of radioles (e.g., Figs 2B, M, 3B) 4
- Radiolar eyes, as single units per radiole, on subdistal end of radioles (e.g., Figs 11E, 13F, 22H) 10
- Radiolar eyes, as unpaired units (single or forming one row) on outer margins of radioles (Fig. 21F). . . . . *Pseudopotamilla* sp. cf. *P. reniformis* (Bruguière, 1789)
4. (3) Outer margins of radioles with stylodes; radiolar flanges absent (Fig. 3B–E). 5
- Outer margins of radioles without stylodes; with or without radiolar flanges 9
5. (4) Macrostylodes present (up to four times the length of other stylodes). Unpaired basal stylodes present, longer than width of

rachis. Bright orange spots between pairs of radiolar eyes on live and often preserved specimens (Fig. 2A–B) . . . . . *Branchiomma bairdi* (McIntosh, 1885)

- Macrostylodes absent (long stylodes only twice length of other stylodes). Unpaired basal stylodes as long as or shorter than rachis. Radioles reddish and white, without bright orange spots (Fig. 3C–E) . . . . . *Branchiomma* sp.

6. (2) Branchial lobes elongate, greater than length of first four thoracic segments. Collar chaetae arranged in long J- or C-shaped rows (> <; e.g., Fig. 16C) 7

- Branchial lobes not elongated, less than length of first four thoracic chaetigers (Fig. 22E). Collar chaetae arranged in oblique rows (/ \). . . . . *Sabellomma cupoculata* Capa & Murray, 2015

7. (6) Radiolar ocelli arranged in a single row (Fig. 16B, E, I) 8

- Radiolar ocelli arranged in teardrop-shaped groups (Fig. 17B) . . . . . *Notaulax* sp. 3

8. (7) Rows of ocelli similar to the length of 8–10 pinnule bases (Fig. 16B, E) . . . . . *Notaulax* sp. 1

- Rows of ocelli from basal membrane to almost distal tips, along the length of over 40 pinnule bases (Fig. 16I). . . . . *Notaulax* sp. 2

9. (4) Outer margins of radioles with conspicuous radiolar flanges along their length; radiolar crown lacking colour in, at least, preserved material (Fig. 2J, M). . . . . *Bispira serrata* Capa, 2008

- Outer margins of radioles smooth or with narrow discontinuous flanges; radiolar crown typically with purple-brown irregular transverse bands in both live and preserved specimens (Fig. 2A–B) . . . . . *Bispira manicata* (Grube, 1878)

10. (3) Radiolar eyes on short stalk, on ventral margin of distal tips of radioles (Fig. 22H). . . . . *Stylomma palmatum* (Quatrefages, 1866)

- Radiolar eyes sessile, either spherical or surrounding the radiole subdistally (Fig. 13B, F) 11

11. (10) Radiolar eyes present on most radioles (Fig. 13F) 12

- Eyes present on a few dorsalmost radioles (1–5 pairs) only (Fig. 13B). 13

12. (11) Eyes present on dorsalmost and lateral radioles with eyeless radioles in between; caruncle absent; dorsal margins of collar fused to faecal groove but not forming spatulate flaps (Fig. 11E) . . . . . *Megalomma interrupta* Capa & Murray, 2009

- Eyes present on most radioles (not in described specimen regenerating radioles); caruncle present; dorsal margins of collar fused to faecal groove and forming spatulate flaps (Fig. 11C). . . . . *Megalomma* sp. cf. *M. acrophthalmos* (Grube, 1878)

- Eyes present on all radioles; caruncle absent; dorsal margins of collar separated by wide gap, not forming pockets nor presenting spatulate flaps. . . . . *Megalomma* sp.

13. (11) Eyes present on a few dorsalmost radioles (1–5 pairs) only; caruncle present; collar dorsal margins fused to faecal groove and forming flanking pockets at either side . . . . . *Megalomma jubata* n. sp.

- Eyes present on dorsalmost radioles (1–2 pairs) only; caruncle absent; collar dorsal margins separated but forming low pockets on some specimens (Fig. 13B–C) . . . . . *Megalomma* cf. *kaikourense* Knight-Jones, 1997

14. (1) Dorsum of anterior thoracic segments with spongy cushion-like structure (Fig. 2H) . . . . . *Bispira porifera* (Grube, 1878)

- Spongy, cushion-like structure absent 15

15. (14) Posterior peristomial ring collar absent (Figs 1C–D, 14C–D) 16

- Collar present (e.g., Figs 2C, G, L, 3B, 4A, 5E). 17

16. (15) Abdominal uncinial tori forming belts around chaetigers (Fig. 14E–G). Radiolar basal membrane long, about 1/3 of length of radioles (Fig. 14A) . . . . . *Myxicola nana* n. sp.

- Abdominal uncini in discrete, short tori, dorsal to neuropodial chaetae (Fig. 1H). Radiolar basal membrane inconspicuous (Fig. 1B, D). . . . . *Amphiglena maiteae* Capa & Rouse, 2007

17. (15) Posterior abdominal chaetigers flattened ventrally forming a pre-pygidial depression, with flanged margins (e.g., Figs 5M–N, 6F, 7L–M). Pygidium conspicuous, well delimited, with or without a cirrus 18

- Posterior abdominal chaetigers narrowing progressively toward pygidium. In some cases, posterior chaetigers slightly flattened dorsoventrally but not forming conspicuous ventral pre-pygidial depression. Pygidium conspicuous, well delimited, without a cirrus 19

- Posterior abdominal chaetigers enlarged, sac-like, with unremarkable external segmentation. Pygidium inconspicuous . 27

18. (17) Collar with small shallow midventral depression (not incision, Figs 4C, 5E). Pre-pygidial depression with wide flanges joined anteriorly by an almost spherical flap (Fig. 5N). Pygidial cirrus absent (Figs 4A, 5M–N). Conspicuous pigmentation pattern on the crown with spots and transverse lines (may fade on preserved specimens, Fig. 4A–B). . . . . *Euchone danieloi* n. sp.

- Collar with midventral incision (Figs 6A, 7C). Pre-pygidial depression with raised lateral flanges joined ventrally, but lacking a conspicuous anterior flap (Fig. 7M). Pygidial cirrus present (Fig. 7L, M). Pigmentation absent . . . . . *Euchone glennoi* n. sp.

19. (17) Companion chaetae (row of additional chaetae parallel to uncini on thoracic chaetigers) absent. 20

- Companion chaetae present (Figs 8B, 23D, G) 23

20. (19) Abdominal neuropodia conical, with chaetae arranged in a C-row (e.g. Fig. 2F). Inferior thoracic and inferior abdominal chaetae spine-like. Thoracic uncini acicular. Interramal eyespots present (Fig. 22C–D) 21

- Abdominal neuropodia inconspicuous, with chaetae emerging from the body wall forming straight rows (Fig. 10J). Inferior thoracic chaetae paleate (Fig. 10G). Abdominal chaetae narrowly hooded only (Fig. 10J). Thoracic uncini avicular. Interramal eyespots absent (Fig. 9A) 26

21. (20) Collar dorsal margins fused to faecal groove forming flanking pockets at either side (Fig. 22B). Ventral sacs located inside radiolar lobes . . . . . *Sabellastarte* sp.

- Collar dorsal margins separated by wide gap. Ventral sacs located outside of radiolar lobes (e.g. Fig. 2L) 22

22. (21) Radiolar flanges absent. . . . . *Pseudobranchiomma* sp. 1

- Radiolar flanges serrated . . . . . *Pseudobranchiomma* sp. 2

23. (19) Companion chaetae with enlarged subdistal hood, with dentate appearance, and with thin distal mucro, compressed laterally 24

- Companion chaetae with flattened subdistal hood 25

24. (23) Fleshy swellings on dorsum of first two thoracic chaetigers (Fig. 20B–C) . . . . . *Parasabella aberrans* (Augener, 1926)

- Dorsum of thoracic chaetigers all similar, smooth . . . . . *Parasabella* sp. cf. *P. japonica* (Moore & Bush, 1904)

25. (23) Calcareous tube. Thoracic uncini without handle. Companion chaetae resembling small paleate chaetae with almost symmetrical edges (Fig. 8F); eight thoracic chaetigers. . . . . *Glomerula piloseta* (Perkins, 1991)

- Mucous tube with sediment particles. Thoracic uncini with long handles (twice the length of the distance between breast and main fang). Companion chaetae with symmetrical teardrop shaped hood. Generally more than eight and up to 22 thoracic chaetigers (Fig. 20I) . . . . . *Perkinsiana anodina* Capa, 2007

26. (20) Collar with crenulated anterior margin and incised midventrally (Fig. 10A–C). Thoracic uncini with several rows of teeth progressively decreasing in size distally (Fig. 10H–I). Specimens often found with radiolar crown broken off at abscission plane (Figs 9D–E, 10A–B, D) . . . . . *Jasmineira gustavoi* n. sp.

- Collar with sooth and entire anterior margin (Figs 18B, 19A–C). Thoracic uncini with a main tooth on top of main fang and additional rows of smaller distal teeth (Fig. 19F–G). Crown abscission not reported in the genus . . . . . *Paradialychone ambigua* n. sp.

27. (17) Uncini of chaetiger 2 and abdominal chaetigers palmate, with different-sized teeth arranged in a semicircle over main fang (Fig. 23E–F), vestigial breast and long handle . . . . . *Terebrasabella hutchingsae* Murray & Rouse, 2007

- Uncini with similar-sized teeth as crest above main fang (Fig. 23C), on both thoracic and abdominal chaetigers . . . . . *Terebrasabella fitzhughi* Murray & Rouse, 2007

Taxonomic account

Genus *Amphiglena* Claparède, 1864

Type-species. *Amphiglena mediterranea* Leydig, 1851.

Amphiglena maiteae Capa & Rouse, 2007
(Fig. 1)

Amphiglena maiteae Capa & Rouse, 2007: 345–348, figs 4I–J, 8.

Material examined. AM W.44465, MI QLD 2419; AM W.44470, MI QLD 2437.

Description of material examined. Specimens up to 2.5 mm long, 0.2 mm wide, with 7–8 thoracic and 9–19 abdominal chaetigers. Live specimens unpigmented, with orange gut observed through transparent body and with clearly distinguishable white ventral shields (Fig. 1A). Red peristomial eyes and pygidial eyespots. Preserved specimens unpigmented with eyespots faded to dark brown (Fig. 1B). Methyl blue stains only ventral shields in ethanol-fixed specimens (Fig. 1C). Radiolar crown with semicircular lobes, and four pairs of radioles (Fig. 1A). Dorsal basal flanges absent. Ventral basal flanges extend from the proximal pinnule of the ventralmost radiole, continuing and fused to the posterior peristomial ring, with a transverse incision (synapomorphy for the genus, Fig. 1D, white arrow). Basal membrane and radiolar flanges absent. Two rows of vacuolated cells supporting radioles basally. Radiolar eyes absent. Dorsal lips with medium-length dorsal radiolar appendages. Dorsal pinnular appendages absent. Ventral lips, parallel lamellae and ventral sacs absent. Posterior peristomial ring collar absent. Glandular ridge on anterior chaetigers absent (Fig. 1C). Interramal eyespots absent. Thoracic ventral shields separated from the neuropodial tori by a narrow gap (Fig. 1C). First chaetiger with narrowly-hooded superior chaetae and broadly-hooded inferior notochaetae in oblique rows. Following thoracic chaetigers with low notopodia, bearing superior elongate broadly-hooded and inferior paleate chaetae (Fig. 1E). Thoracic neuropodial uncini avicular, with more than five rows of small, similar-sized teeth covering half the main fang (Fig. 1F), breast well developed, handle of medium length. Companion chaetae geniculate, with straight shaft and elongate mucro with a dentate appearance at base (Fig. 1E–F). Abdominal neuropodia inconspicuous with broadly-hooded neurochaetae (Fig. 1G). Abdominal notopodia with up to four uncini per torus, uncini with more than five rows of small similar-sized teeth above the main fang (Fig. 1H), well developed breast, and short handle. Pre-pygidial abdominal depression absent. Pygidium conical with eyespots on lateral margins of pygidium (Fig. 1B). Pygidial cirrus absent (Fig. 1I). Tube unknown.

Remarks. *Amphiglena maiteae* is distinguished from other congeners by a unique combination of features: four pairs of radioles with about 10 pairs of pinnules that are longer towards the distal end of the radioles, ventral basal flanges from the proximal pinnule of the ventralmost radiole, extending to the posterior peristomial ring, and thoracic uncini with medium-sized handles (Capa & Rouse 2007). First record from Queensland.

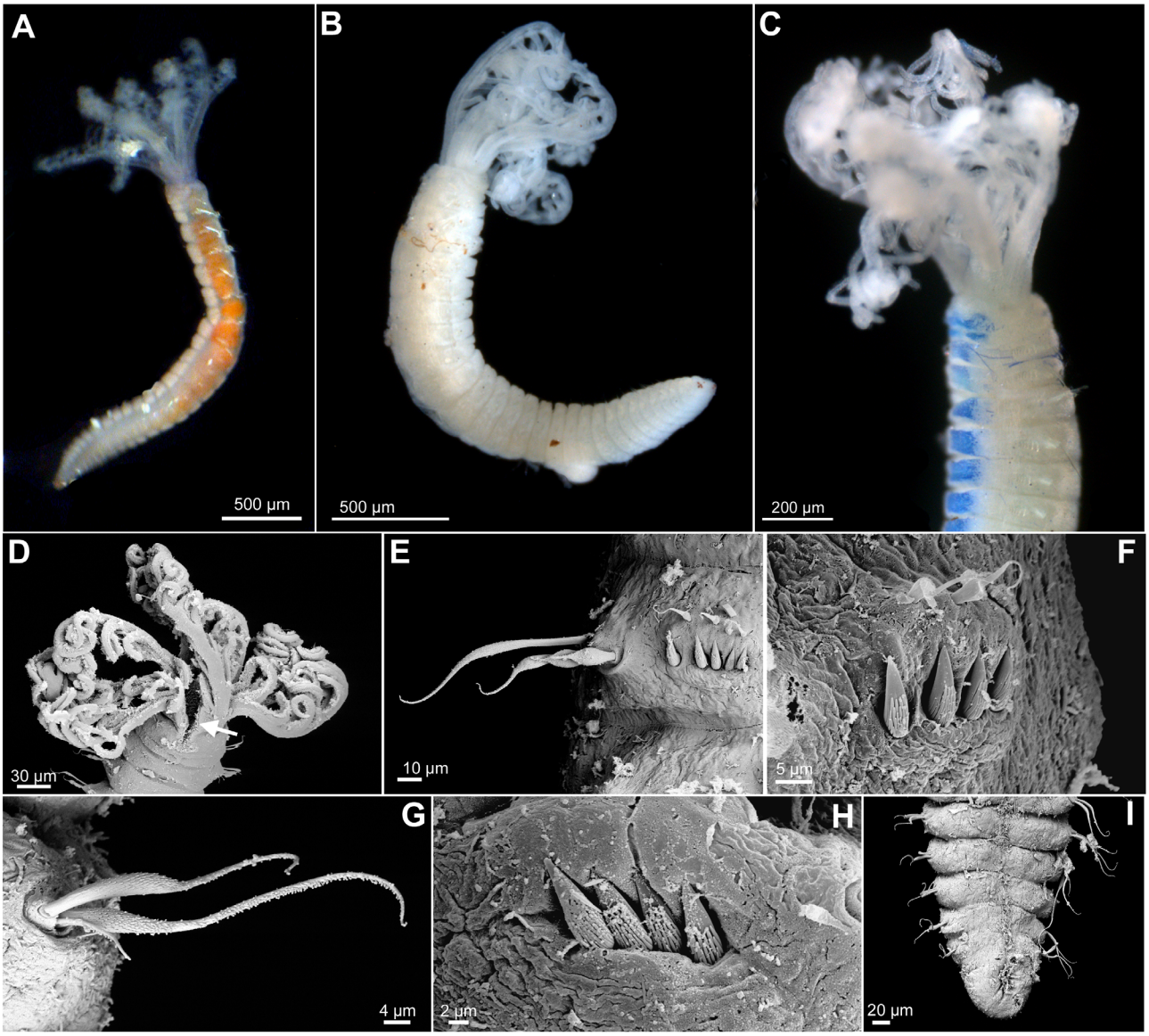

FIGURE 1. *Amphiglena maiteae*. A. Live specimen, lateral view; B. Preserved specimens lateral view; C. Preserved specimens stained with methyl blue; anterior end ventrolateral view, showing a gap between thoracic tori and ventral shields; D. Anterior end, ventral view, showing the long ventral basal flanges extended posteriorly to the posterior peristomial ring (arrow); E. Anterior thoracic parapodium, with superior elongate broadly-hooded and inferior paleate chaetae, neuropodial uncini and companion chaetae; F. Detail of thoracic uncini dentition and companion chaetae; G. Midabdominal chaetae; H. Midabdominal uncini; I. Posterior chaetigers and pygidium, ventral view.

Habitat. On rocks, boulders and associated algae from the intertidal.
Type locality. Lennox Head, New South Wales.
Distribution. Australia (New South Wales, Queensland).

Genus *Bispira* Krøyer, 1856

Type-species. *Amphitrite volutacornis* Montagu, 1804.

***Bispira manicata* (Grube, 1878)**
(Fig. 2A–F)
Sabella manicata Grube, 1878: 255–256, pl. 14, fig. 3.
Bispira manicata.—Knight-Jones & Perkins 1998: 424–426, fig. 15; Capa 2008: 309–314, figs 4G–N, 5A–G, 6.
Bispira tricyclia.—Knight-Jones & Perkins 1998: 419–422, fig. 13 *fide* Capa 2008.

Material examined. Queensland, Lizard Island: AM W.30378 (3), North Point, 14°39′ S, 145°27′E, 14 m, 25 Oct 2006; AM W.30379, patch reef near Osprey Island, 14°42′S, 145°30′E, 14 m, 26 Oct 2006. One specimen observed (but not collected) at Watsons Bay, around 20 m, Aug 2013 (Fig. 2A).

Description of material examined. Specimens up to 45 mm long and 3 mm wide, with 11–15 thoracic numerous abdominal segments. Live specimens white, with purple or brownish transverse bands on radiolar crown (Fig. 2A–B), with pigmented dorsal lips, ventral sacs and inner side of ventral lappets; purple triangular patches on dorsal and ventral margins of thoracic chaetigers (Fig. 2C–D). Small black interramal eyespots on abdominal chaetigers and on lateral sides of pygidium. The purple pigment turns dark brown in preserved specimens (Fig. 2C–F). Radiolar crown with both lobes involuted ventrally up to one whorl, with several radioles each. Basal membrane reduced. Dorsal and ventral basal flanges absent. Radioles with smooth outer margins or with discontinuous, paired radiolar flanges near radiolar eyes. Four to seven rows of vacuolated cells supporting radioles basally, not extending into radiolar flanges. Two or three pairs of compound radiolar eyes, semispherical in shape, arranged on proximal half of radioles (Fig. 2B). Dorsal lips with long radiolar appendages, dorsal pinnular appendages absent. Ventral lips and parallel lamellae present, ventral sacs prominent and directed outside of crown (Fig. 2C). Collar with short dorsal margins widely separated dorsally (Fig. 2D), lateral notches dividing dorsolateral lobes of collar, ventral lappets separated by midventral incision and bent inwards (Fig. 2C). Glandular ridge on anterior chaetigers absent. Thoracic ventral shields not in contact with adjacent tori (Fig. 2C), first shield with W-shaped anterior margin. Collar chaetae narrowly-hooded, in two oblique rows. Following thoracic chaetigers with conical notopodia (Fig. 2E), bearing characteristic hand-shaped papillae at base of parapodia in large specimens. Superior thoracic chaetae narrowly-hooded, inferior chaetae spine-like. Thoracic neuropodial uncini avicular, with small teeth surmounting main fang over half its length, well developed breast and short handle. Companion chaetae with an asymmetrical distal hood and almost smooth surface. Abdominal chaetae on short, conical neuropodia, anterior spine-like in a C-shaped arrangement (Fig. 2F), posterior chaetae narrowly-hooded. Abdominal uncini similar to thoracic ones, with slightly less developed breast. Pre-pygidial abdominal depression absent. Pygidium as rim with midventral anus; cirrus absent. Tube thick and flexible mainly made of mud with some sand around the opening.

Remarks. This is the only *Bispira* species reported in Australia possessing paired compound radiolar eyes and with typical white and purple (brown in preserved specimens) pigmentation. The most similar species is *B. serrata* Capa, 2008, distinguishable by the presence of distally serrated radiolar flanges and absence of pigmentation on radiolar crown. *Bispira manicata* shares several diagnostic features with other congeners distributed worldwide, such as *B. viola* (Grube, 1863), *B. mariae* Lo Bianco, 1893 and *B. guinensis* (Augener, 1922). Close examination of species is required to establish species boundaries, especially after evidence that *B. manicata* has been found on ship hulls and is considered as cryptogenic (Capa 2014). First record for Lizard Island.

Habitat. Muddy and sandy sediments near coral reefs, crevices in rocks, coral rubble or dead coral (Capa 2008).

Type locality. Bohol Island, Philippines.

Distribution. Philippines, Indonesia, Australia (Western Australian, Northern Territory, Queensland).

***Bispira porifera* (Grube, 1878)**
(Fig. 2G–I)

Sabella porifera Grube, 1878: 252, pl. 14, fig. 3.
Bispira porifera.—Knight-Jones & Perkins 1998: 426–428, fig. 16; Capa 2008: 307–309, figs 2–3, 4A–F.

Material examined. AM W.36960, Queensland, Lizard Island, channel bommies, 14°41′18″S, 145°27′50″E, coral rubble, 12 m, 25 Aug 2010. Other specimens cited in Capa (2008).

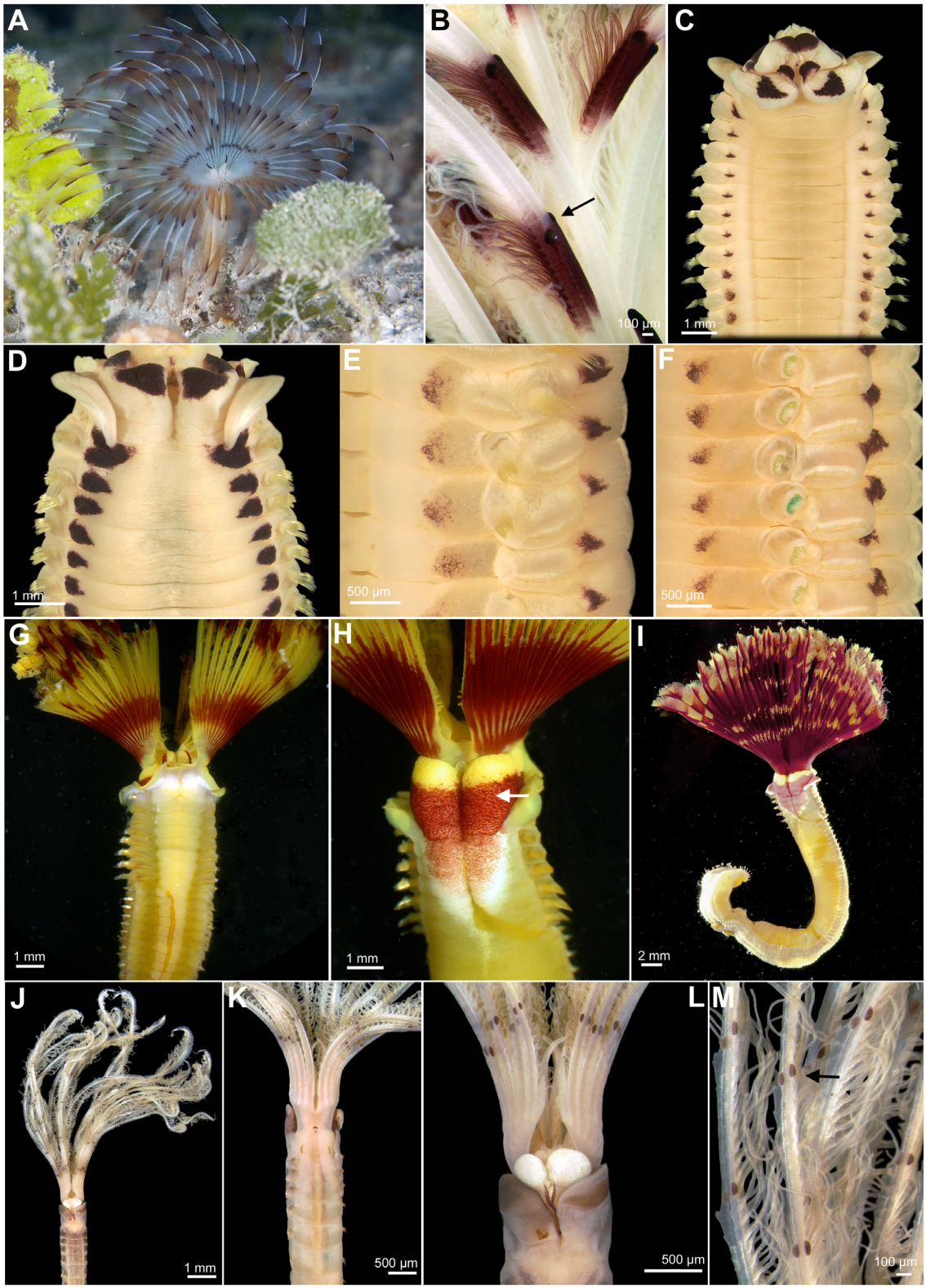

FIGURE 2. A–F. *Bispira manicata.* A. Live specimen with exposed radiolar crown; B. Detail for paired compound radiolar eyes (arrow); C. Anterior thoracic chaetigers, ventral view; D. Same, dorsal view; E. Detail of thoracic parapodia; F. Detail of abdominal parapodia showing neuropodial chaetae arranged in a C-shaped pattern; G–I. *Bispira porifera*, live specimens. G. Anterior end, ventral view; H. Same dorsal view, showing the conspicuous spongy cushion-like dorsal structures (arrow); I. Complete specimen, dorsal view; J–M. *Bispira serrata*, preserved specimen; J. Anterior end ventral view; K. Same, dorsal view, showing well separated dorsal collar margins; L. Detail of base of radiolar crown and collar, with conspicuous ventral sacs located outside of crown; M. Detail of radioles with serrated radiolar flanges and compound paired radiolar eyes (arrow). Photographs by: A – Alexander Semenov; B–F, J–M – Eunice Wong; I – Gary Cranitch.

Description of material examined. Specimens up to 130 mm long, 5 mm wide, with eight thoracic and numerous abdominal chaetigers. Live specimens bright yellow with red transverse bands on radiolar crown, some red pigment on ventral sacs and on inside surface of ventral lappets, collar white, and dorsal spongy cushions yellow, red and white (Fig. 2G–I). Small, almost inconspicuous interramal eyespots on abdominal chaetigers. There is some variability in the width of red bands in crown and pigmentation of the spongy cushions, but all specimens from Lizard Island examined had same colour-morph. No pink specimens found in Lizard Island area (as in Capa 2008). Preserved specimens lose the white pigmentation and the red pigment turns brown. Radiolar crown with both lobes involuted ventrally up to one whorl, with several radioles each. Dorsal and ventral flanges absent (Fig. 2G–H). Basal membrane up to $^1/_3$ of the length of the radiolar crown, radiolar flanges reduced. Over 10 vacuolated cells supporting radioles basally. Radiolar eyes absent. Dorsal lips with long radiolar appendages, two or three dorsal pinnular appendages present. Ventral lips and parallel lamellae present, ventral sacs prominent and directed outside of crown (Fig. 2G). Collar with well developed dorsal margins, widely separated dorsally, midventral incision separating ventral lappets (Fig. 2G). Glandular ridge on anterior chaetigers absent. Thoracic ventral shields in contact with adjacent tori, first shield with W-shaped anterior margin (Fig. 2G). Collar chaetae narrowly-hooded, in two oblique rows. Following thoracic chaetigers with conical notopodia, superior thoracic chaetae narrowly-hooded, inferior chaetae spine-like. Thoracic neuropodial uncini avicular, with small teeth surmounting main fang on half its length, well developed breast and short handle; companion chaetae with asymmetrical distal hood and almost smooth surface. Abdominal neuropodia short, conical, bearing superior narrowly-hooded chaetae and spine-like inferior chaetae in a short C-shaped arrangement. Abdominal uncini similar to thoracic ones, with slightly less developed breast. Pre-pygidial abdominal depression absent. Pygidium as rim with midventral anus, and lateral groups of eyespots. Pygidial cirrus absent. Tube is mainly chitinous, translucent and orange or brown, with the anterior part covered by mud.

Remarks. This species is characterised by the presence of a spongy structure on the dorsum of the anterior thoracic chaetigers, variable in size and pigmentation, a feature which is unique among Australian congeners and only shared with *B. paraporifera* Tovar-Hernández & Salazar-Vallejo, 2006, from the Caribbean. The latter species is distinguishable from *B. porifera* by the presence of radiolar eyes. According to Knight-Jones and Perkins (1998), the species could be widespread in the warmer waters of the Indo-Pacific. It was previously recorded from Cape York in Queensland by Augener (1922). First record from Lizard Island.

Habitat. Associated with coral or coral rubble in shallow water (1–15 m).

Type locality. Philippines.

Distribution. Philippines, India, Sri Lanka, Zanzibar, Red Sea, Mozambique, Madagascar, Australia (Western Australia, Northern Territory, Queensland).

Bispira serrata Capa, 2008

(Fig. 2J–M)

Bispira serrata Capa, 2008: 314–317, figs 4O–W, 5H–L, 7.

Material examined. Queensland, Lizard Island: AM W.36979 (2), Watson's Bay, 14°39′26″S, 145°37′3″E, coral rubble, 4.5 m, 28 Aug 2010; AM W.45025, MI QLD 2441.

Description of material examined. Specimens up to 55 mm long, 1 mm wide, with eight thoracic and numerous abdominal chaetigers (over 100 in some specimens). Live specimens white with faint purple transverse bands, dark radiolar eyes on radiolar crown and pigmented thoracic chaetigers, more obvious ventrally. Interramal eyespots present on both thoracic and abdominal chaetigers, may be inconspicuous. Pigment turns brown in preserved specimens (Fig. 2J–M). Radiolar crown with lobes semicircular or slightly involuted ventrally, several radioles each. Dorsal basal flanges rounded, as long as 1–2 thoracic chaetigers, ventral basal flanges absent. Basal membrane about $^1/_4$ of length of crown, radioles with paired lateral flanges, smooth proximally, serrated distally. Four rows of vacuolated cells supporting radioles basally with additional smaller ones supporting radiolar flanges. Four to eight pairs of compound, ovoid, brown radiolar eyes on radiolar lateral margins (Fig. 2J–M). Dorsal lips with long radiolar and one pair of pinnular appendages. Ventral lips and parallel lamellae well developed, large ventral sacs outside radiolar crown (Fig. 2L). Posterior peristomial ring collar with margins separated dorsally by a wide gap, deep dorsolateral oblique notches, inflated ventral lappets divided midventrally by a long incision (Fig.

2L). Thoracic ventral shields separated from neuropodial tori. Collar chaetae, superior elongate narrowly-hooded and inferior spine-like chaetae, arranged in oblique rows. Following chaetigers with conical notopodia with elongate narrowly-hooded superior chaetae and spine-like inferior chaetae. Neuropodia with avicular uncini, with 3–4 rows of teeth above the main fang, occupying half its length, gradually diminishing in size, with well developed breast and short handle. Companion chaetae with dentate appearance on proximal half of hood and distally asymmetrical. Abdominal chaetigers with elevated neuropodia with superior elongate narrowly-hooded and inferior spine-like chaetae. Pre-pygidial abdominal depression absent. Pygidium with median incision, and two subtriangular lateral structures, pygidial eyes absent. Pygidial cirrus absent. Tube made of mud with coloured transverse bands in most specimens, with an inner and outer layer of mucus that gives them a shiny and smooth aspect with many soft branches on the posterior blindly-ending tube.

Remarks. *Bispira serrata* is characterised by its long and thin body, radioles with serrated flanges and paired compound eyes, and conspicuous fleshy and pigmented ventral lappets. It also differs from other congeners by the presence of thoracic uncini with short handles and with teeth above the main fang decreasing in size distally (instead of being similarly sized), and the chaetal arrangement in abdominal chaetigers, with the inferior row consisting of a few chaetae in a straight line instead of a C-shaped fascicle. Inferior collar chaetae described as broadly-hooded (Capa 2008) but verified to be as in description above. First record for Lizard Island.

Habitat. Mudflats, sandy sediments and coral rubble in shallow water (0–5 m).

Type locality. Calliope River, Queensland.

Distribution. Australia (Western Australia, Queensland).

Genus *Branchiomma* Kölliker, 1858

Type-species. *Amphitrite bombyx* Dalyell, 1853.

Branchiomma bairdi (McIntosh, 1885)

(Fig. 3A–B)

Dasychone bairdi McIntosh, 1885: 495–497, pl. 30A, figs 13–15, pl. 39A, figs 2, 9; Monro, 1933: 267; Rioja 1951: 513–516: pl. 1, figs 1–7; 1958: 286–287.

Branchiomma bairdi.—Tovar-Hernández & Knight-Jones 2006: 13–17, figs 3A–D, H–K, 9C–D, 10C, 11B; Tovar-Hernández *et al.* 2009: 2–5, figs 2–4.

Material examined. Queensland, Lizard Island: AM W.197052, lagoon, 14°40'S, 145°27'E, 1977; AM W.35630, Mermaid Cove, 14°38′45″S, 145°27′13″E, coral rubble, 2 m, 8 Apr 2008; AM W.40925, south of Mermaid Cove, 14°38′53″S, 145°27′E, coral rubble, 14.5 m, 1 Sep 2010; AM W.36486, Lagoon, 14°23′25″S, 145°16′25″E, sand, 1–10 m, 12 Feb 2009; AM W.40934, Lagoon between South Island and Palfrey Island, 14°41′50″S, 145°27′1″E, coral rubble, 2 m, 1 Sep 2010; AM W.40923 (2), MacGillivray Reef, 14°39′23″S, 145°29′31″E, coral rubble, 22 m, 29 Aug 2010; AM W.40895, AM W.40898, North Direction Island, south deep reef slope, 14°45′4″S, 145°30′45″E, 6–28 m, 4 Sep 2010; AM W.35629, Outer Barrier, Day Reef, 14°28′35″S, 145°32′38″E, *Halimeda* algae and coral rubble, 12 m, 16 Apr 2008.

Description of material examined. Specimens up to 25 mm long, 3 mm wide, with 4–8 thoracic and numerous abdominal chaetigers. Live specimens with radiolar crown with multiple thin green bands and orange spots between each pair of eyes, olive-green dorsal lips with an orange mid-rib (Fig. 3A–B). Body dark green with small brown spots. Interramal dark spots large on first thoracic segments (Fig. 3A–B), smaller on abdominal chaetigers. Preserved specimens with general dark brownish pigmentation, and darker spots. The orange spots on radioles remain for at least some time in most specimens (Fig. 3B). Radiolar crown with basal lobes semicircular or slightly involuted ventrally. Dorsal and ventral basal flanges absent. Basal membrane reduced. Radiolar flanges absent. Paired stylodes present, a generic feature in *Branchiomma* and unique among sabellids (Fig. 3A–B), digitiform, shorter than or similar to the width of rachis, except for macrostylodes mainly in distal half of radiole, strap-like, and up to four times as long as neighbouring pairs; unpaired basal stylodes present, also longer than width of rachis (Fig. 3B). Radioles with paired compound eyes, dark red or black, along lateral margins of radioles alternating with stylodes (Fig. 3A–B). Dorsal lips with long radiolar appendages; ventral lips and parallel lamellae

present; ventral sacs outside or radiolar crown. Posterior peristomial ring collar with well separated dorsal margins; ventral lappets separated by a midventral incision (Fig. 3A–B). Glandular ridge on chaetigers anterior chaetigers absent. Interramal eyespots present in thorax and abdominal chaetigers. Ventral shields conspicuous, in contact with neuropodial tori (Fig. 3A); first one with M-shaped anterior margin. Collar chaetae with superior narrowly-hooded notochaetae, inferior spine-like notochaetae arranged in oblique rows. Following thoracic chaetigers with notopodia as conical lobes (Fig. 3A–B), with superior narrowly-hooded notochaetae, inferior spine-like notochaetae. Thoracic uncini avicular, with two rows of teeth over main fang, occupying about half of main fang, breast well developed, handle very short. Companion chaetae absent. Abdominal neuropodia as conical lobes with superior narrowly-hooded neurochaetae and inferior spine-like neurochaetae arranged in a C-shaped pattern. Uncini avicular, with three rows of teeth above main fang, breast well developed, handle very short. Pre-pygidial abdominal depression absent. Bilobed pygidium with eyespots on lateral margins. Pygidial cirrus absent. Leathery tubes covered with mud and sometimes, epifauna on anterior end.

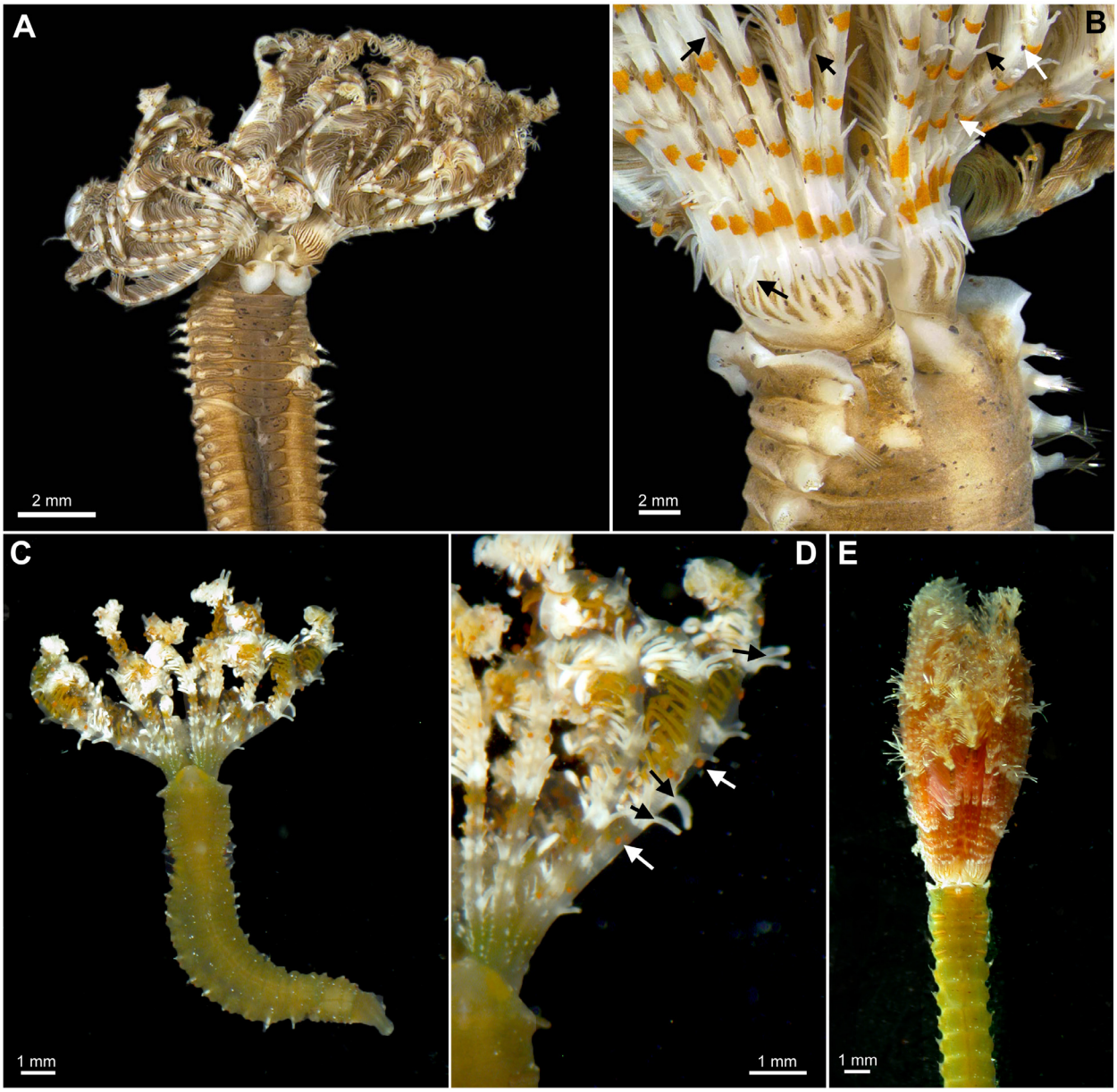

FIGURE 3. A, B. *Branchiomma bairdi*, preserved specimens. A. Anterior end, ventral view, showing the radiolar crown, thorax and anterior abdominal chaetigers; B. Detail of base of radiolar crown, showing stylodes (black arrows) and paired compound eyes (white arrows) and anterior thoracic chaetigers, with collar dorsal margins widely separated; C–E. *Branchiomma* sp., live specimens; C. Whole specimen, ventral view, regenerating posterior end; D. Radiolar crown with paired radiolar eyes (white arrows) and stylodes (black arrows); E. Specimen with four thoracic chaetigers, anterior end, ventral view. Photographs: A–B by Eunice Wong.

Remarks. *Branchiomma bairdi* is distinguished from other congeners by the presence of strap-like and long macrostylodes (up to four times the length of the neighbouring digitiform stylodes, not so large in small specimens), and the colour pattern, with olive-green bodies and conspicuous bright orange spots alternating with radiolar eyes. This species was originally described from the Caribbean but has recently been reported is other biogeographical areas as an invasive species (Tovar-Hernández *et al.* 2009, 2012; Arias *et al.* 2013; Capa *et al.* 2013; Capa 2014). First record from Lizard Island.

Habitat. Associated with a variety of shallow water environments, ranging from fine sediments to hard substrates, including ship hulls, pylons, and other man-made surfaces.

Type locality. Bermuda.

Distribution. Caribbean, California, Eastern Mediterranean and Australia (Queensland).

***Branchiomma* sp.**
(Fig. 3C–E)

Branchiomma sp. D. Capa *et al*. 2013.

Material examined. Queensland, Lizard Island: AM W.197053 (4), lagoon, dropoff between Bird Islet and South Island, 14°42′S, 145°28′E, prepared coral block, 9 m, Apr 1978; AM W.35631, bommie near entrance to lagoon, 14°41′13″S, 45°27′56″E; AM W.40721, 14°41′34″S, 145°28′2″E, 2 m, coral rubble, 11 Apr 2008; AM W.40897 (5), Turtle Beach, 14°39′9″S, 145°27′3″E, 9.5 m, 7 Sep 2010; AM W.40899 (3), North Direction Island, lagoon patch reef, 14°44′43″S, 145°30′18″E, 8.5–25 m, 4 Sep 2010; AM W.40924 (3), North Direction Island, 14°44′43″S, 145°30′18″E, coral rubble, 8 m, 26 Aug 2010; AM W.40929, fringing reef on east side of North Direction Island, 14°44'43"S, 145°30'18"E, coral rubble, 1 m, 26 Aug 2010; AM W.40931 (4), south of South Direction Island, 14°42′31″S, 145°31′53″E, coral rubble, 15 m, 26 Aug 2010; Outer Barrier: AM W.36494 (2), Yonge Reef, 14°35′59″S, 145°37′52″E, coral rubble and sand, 2 m, 12 Feb 2009; AM W.40901, Yonge Reef, 14°34′22″S, 145°37′8″E, sand & coral rubble, 25 m, 10 Sep 2010; AM W.40933 (6), Turtle Beach, 14°39′8″S, 145°27′4″E, coral rubble, 1 m, 30 Aug 2010; AM W.40926, lagoon, 14°41′13″S, 145°27′18″E, coral rubble, 1 m, 31 Aug 2010; AM W.40928 (5), MacGillivray Reef, 14°39′23″S, 145°29′31″E, coral rubble, 22 m, 29 Aug 2010; AM W.43876, MI QLD 2329; AM W.43877, MI QLD 2335; AM W.43881, MI QLD 2331; AM W.43932, MI QLD 2342; AM W.43936, MI QLD 2348; AM W.44207, MI QLD 2370; AM W.44212, MI QLD 2359 (5); AM W.44365, MI QLD 2359 (10); AM W.44366, MI QLD 2401 (3).

Description of material examined. Specimens up to 8 mm long and 1.7 mm wide. All specimens with 4–6 thoracic (Fig. 3C–E) and numerous abdominal chaetigers. Live specimens with reddish irregular transverse bands alternating with white bands; radiolar eyes bright orange (Fig. 3C–E). Body bright green with few dark and white spots (Fig. 3C–E). Dark interramal eyespots on thoracic and abdominal chaetigers, conspicuous in small specimens. Preserved specimens with radiolar crown with irregular purple-brown pigment, the pigment along the body fades and only a few spots, if any, remain on anterior thoracic chaetigers. Radiolar crown with basal lobes semicircular. Dorsal and ventral basal flanges absent. Basal membrane reduced. Radiolar flanges absent. Paired stylodes present, a generic diagnostic feature in *Branchiomma* and unique feature among sabellids, digitiform, about the width of rachis, except for one or two pairs in the distal half of radioles that are longer and flattened (in larger specimens, Fig. 3E). Paired compound radiolar eyes, alternating with stylodes along radioles (Fig. 3C–E). Dorsal lips with long radiolar appendages; ventral lips and parallel lamellae present; ventral sacs outside radiolar crown. Posterior peristomial ring collar with well separated dorsal margins, ventral lappets separated by a midventral incision. Glandular ridge on chaetigers 1 or 2 absent. Ventral shields conspicuous, in contact with neuropodial tori (Fig. 3C, E); first one with m-shaped anterior margin. Collar chaetae with superior notochaetae narrowly-hooded, inferior notochaetae spine-like arranged in oblique rows. Following thoracic chaetigers with notopodia as conical lobes (Fig. 3E), with superior notochaetae narrowly-hooded, inferior notochaetae spine-like. Thoracic neuropodial uncini avicular, with two rows of teeth over main fang, occupying about half of main fang, breast well developed, handle very short. Companion chaetae absent. Abdominal neuropodia as conical lobes with superior narrowly-hooded neurochaetae and inferior spine-like neurochaetae arranged in a C-shaped pattern. Uncini avicular, with three rows of teeth above main fang, breast well developed, handle very short. Pre-pygidial abdominal depression absent. Bilobed pygidium with eyespots on both sides. Pygidial cirrus absent. Leathery tubes covered with mud on exposed anterior end.

Remarks. This species was characterised and defined by molecular markers as *Branchiomma* sp. D (in Capa *et al.* 2013). Some of the diagnostic morphological features of this species are the presence of a posterior peristomial ring collar with wide separated dorsal margins, the digitiform stylodes along radioles, with one or two pairs that are about twice as long as their neighbours and flattened and thoracic uncini with two rows of small teeth over the main fang. Colour is also characteristic: orange and white-banded radiolar crown, with the proportion of the two pigments varying among specimens (e.g., Fig. 3C, E), and a bright green body with a few bright white and dark red-brown spots. The genus is in need of a worldwide revision, considering that several species, like this one, could have been translocated out of their natural distribution range (Capa *et al*. 2013). It is difficult to know if the species described herein has already been described or if it should be described as new. Many specimens examined are regenerating anterior or posterior ends (Fig. 3C) or possess bifurcated posterior ends, indicating they can reproduce asexually by scissiparity, but also have 4-6 thoracic segments, suggesting that they may all be juvenile.

Habitat. Coral rubble and other hard substrates with algae and epifauna, 1–15 m.

Distribution. Hawaii, Australia (Western Australia and Queensland).

Genus *Euchone* Malmgren, 1866

Type-species. *Sabella analis* Krøyer, 1856.

Euchone danieloi n. sp.

(Figs 4–5)

Material examined. Queensland, Lizard Island. Holotype: AM W.45167, MI QLD 2444; Paratypes: AM W.45486, MI QLD 2445 (3); AM W.47402 (on SEM), Watson's Bay, 14°39′26″S, 145°27′3″E, sand, 6.5 m, 28 Aug 2010.

Description. Holotype 4.7 mm long (crown 1.5 mm), 0.4 mm wide, with eight thoracic and 12 abdominal chaetigers. Specimens not studied alive. Preserved specimens with 3–4 bands of pigment on radioles and pinnules, with some paired darker brown pigment spots embedded in radiolar rachis and adjacent flanges (Fig. 4A–B). Body lacking pigmentation (Fig. 4A–B). Two red eyespots on sides of peristomium (Fig. 4A) and two on sides of pygidium (Fig. 4F). Methyl blue stain reveal two transverse glandular bands on thoracic ventral shields and biannulate glandular bands on posterior abdominal segments (Fig. 4C–E). Glandular ridge in chaetiger two very narrow. Radiolar crown with semicircular lobes, with six pairs of radioles and two pairs of ventral radiolar appendages (Fig. 4A–B). Dorsal and ventral flanges absent. Basal membrane about $^{1}/_{2}$ length of radioles. Radioles with narrow flanges; tapering tips distally bare of pinnules for $^{1}/_{6}$ the length of radioles (Fig. 5A). Two rows of vacuolated cells supporting radioles basally, not extended to radiolar flanges. Radiolar eyes absent. Dorsal lips with short radiolar appendages; pinnular appendages absent (Fig. 5B–C). Ventral lips and parallel lamellae present; ventral sacs absent. Anterior peristomial ring lobe distally entire and digitiform, exposed beyond posterior peristomial ring collar (Fig. 5D–E). Collar well developed with dorsal margins fused to faecal groove, anterior margin entire ventrally with a small shallow midventral depression (Fig. 5D–E). Glandular ridge present on chaetiger 2, very narrow. Ventral shields only distinguishable after methyl blue staining (Fig. 4C). Interramal eyespots absent. Collar chaetae narrowly-hooded arranged in oblique rows. Following thoracic notopodial prechaetal and postchaetal lobes well developed, superior notochaetae broadly-hooded, inferior shorter broadly-hooded (type B), with additional row of bayonet chaetae present (Fig. 5G–H). Thoracic neuropodia uncini acicular with five rows of similar-sized teeth over main fang, covering half its length (Figs 4G, 5I). Companion chaetae absent. Abdominal chaetae on short, slightly elevated neuropodia, with elongate narrowly-hooded chaetae in transverse rows (Fig. 5J). Notopodia of anterior abdominal chaetigers with avicular uncini with five rows of similar-sized teeth over main fang, covering half its length (Figs 4I, 5K), well developed breast and very short handle. Posterior chaetigers containing the pre-pygidial depression with uncini with 6–7 rows of teeth over main fang, covering most of its length, enlarged rounded breasts and handles absent (Figs 4H, J, 5L). Abdomen with a broad pre-pygidial depression occupying six chaetigers, with raised membranous lateral flanges connected anteriorly by a rounded membrane (Fig. 5M–N). Pygidium bluntly rounded, with two red pygidial eyespots (Figs 4F, 5M–N). Pygidial cirrus absent (Fig. 5M–N). Tube not observed.

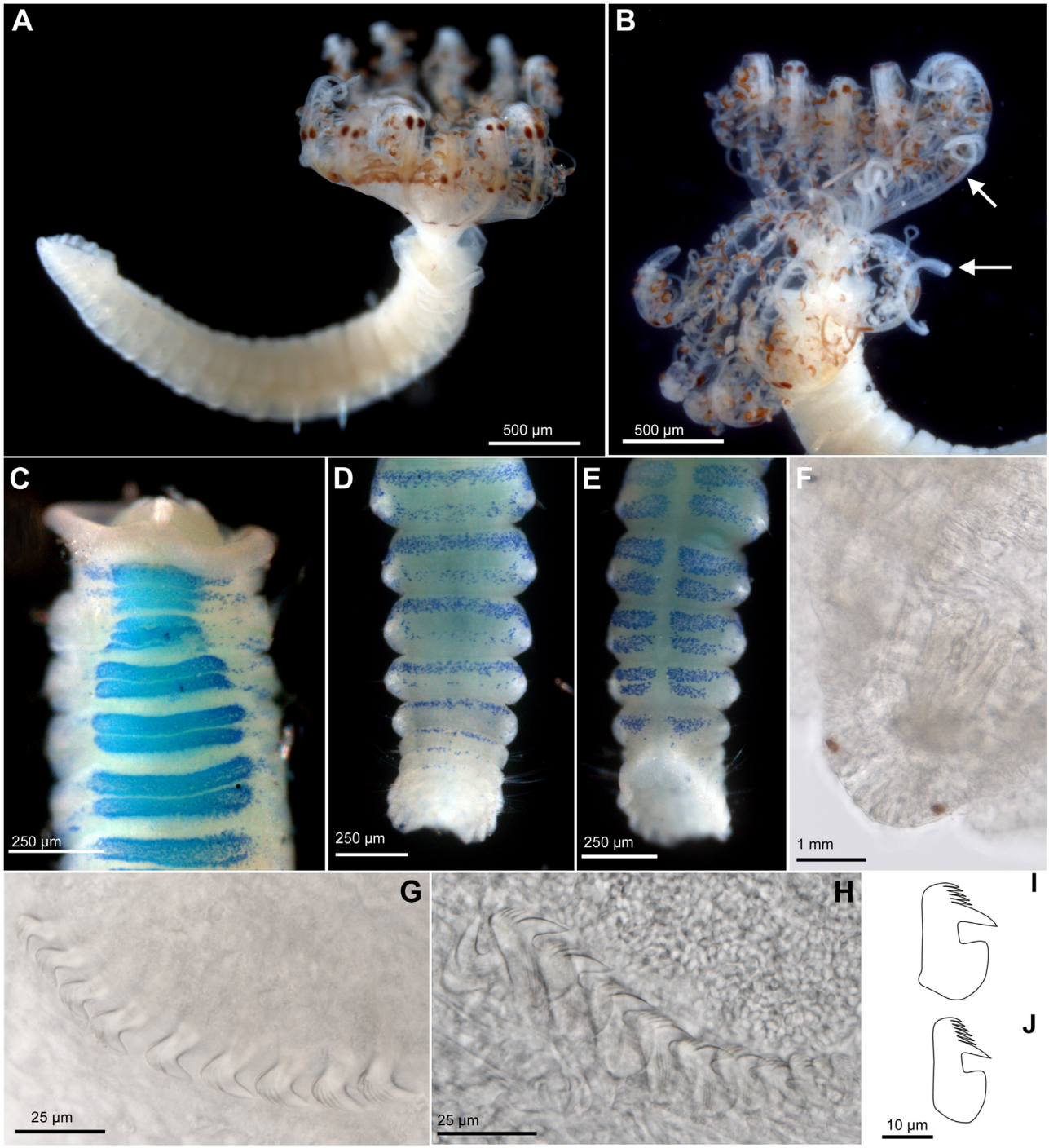

FIGURE 4. *Euchone danieloi* n. sp., preserved specimens. A. Holotype, lateral view; with characteristic radiolar pigmentation pattern; B. Opened radiolar crown showing six pairs of radioles and the ventral radiolar appendages (arrows); C–E. Stained specimens with methyl blue; C. Anterior end, detached radiolar crown, showing the stained ventral shields, divided transversally; D. Posterior end, dorsal view; E. Same, ventral view showing the flanged pre-pygidial depression; F. Detail of the rounded pygidium and eyespots. G. Thoracic acicular uncini; H. Anterior abdominal uncini; I. Drawing, anterior abdominal chaetigers uncinus; J. Drawing, posterior abdominal chaetigers uncinus.

Variation. Size range 2–5 mm in body length, crown up to 3.5 mm long; 0.3–0.8 mm wide. Eight thoracic and 12–15 abdominal chaetigers. Radiolar crown with 6–7 pairs of radioles. In paratypes pre-pygidial depression can occupy up to eight chaetigers.

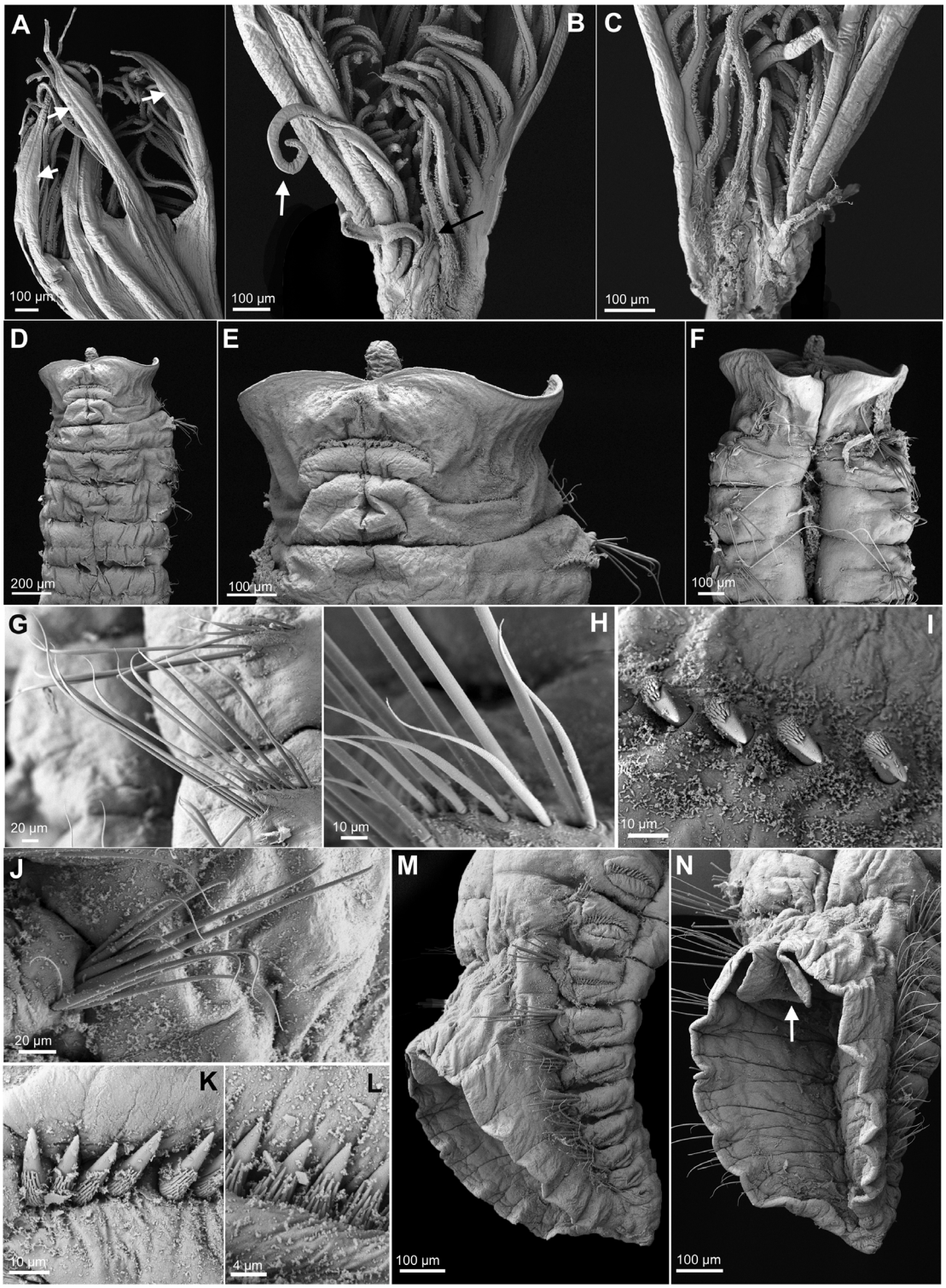

FIGURE 5. *Euchone danieloi* n. sp., scanning electron micrographs. A. Radiolar crown distal end, showing the basal membrane and radiolar flanges (arrows); B. Detached radiolar lobe showing ventral radiolar appendages (white arrow), and dorsal lips (black arrow). C. Opposite radiolar lobe (dorsal lip not visible); D. Anterior thoracic chaetigers, ventral view; E. Detail of ventral anterior collar margin with a small shallow midventral depression; F. Dorsal collar margins fused to faecal groove; G. Thoracic superior broadly-hooded chaetae, inferior shorter broadly-hooded (type B) and additional row of bayonet chaetae; H. Detail of bayonet chaetae; I. Thoracic uncini with five rows of similar-sized teeth over main fang, covering half its length; J. Midabdominal chaetae elongate narrowly-hooded; K. Anterior abdominal uncini with five rows of similar-sized teeth over main fang, covering half its length; L. Posterior abdominal uncini with 6–7 rows of teeth over main fang, covering most of its length; M. Pre-pygidial depression, with flanges, lateral view; N. Same, ventral view, showing the rounded flap on the anterior margin (arrow).

TABLE 2. Known *Euchone* spp. with some distinguishing characters, based on Fitzhugh (2002), original and recent descriptions. States in quotation marks (“ ”) indicates terminology used in original description. (?) indicated doubtful interpretation of attributes, ? unknown. Source of information other than original descriptions: Banse 1970, 1972, Hartman 1976, Fitzhugh 2002, Tovar-Hernández 2007, 2008, Tovar-Hernández & Sosa-Rodríguez 2006, Giangrande & Licciano 2006, Licciano *et al*. 2009. *Euchone purpurea* Tauber 1879, and *E. laurencii* McIntosh, 1916 are omitted from the table, as descriptions, drawings or morphological information about the species could not be found.

Species	No. anterior abdominal chaetigers	No. chaetigers in pre-pygidial depression	Inferior thoracic chaetae	Pre-pygidial depression and flanges	Thoracic ventral shields	Pygidial cirrus	Anterior collar margin	Collar ventral margin	No. pairs of radioles
E. alicaudata Moore & Bush, 1904	17	8	type A (?) “subspatulate”	broad	distinct	absent	smooth	?	15–20
E. analis (Krøyer, 1856)	16–22	9–12	type A “subspatulate”	narrow, ? anterior margin incised	distinct	absent	smooth	slightly incised	9–17
E. arenae Hartman, 1966	6–9	6	type A	narrow, anterior margin incised	distinct	absent	smooth	slightly incised	7
E. bansei Ruff & Brown, 1989	11	6	type B	broad, thin anterior membrane	absent	absent	smooth	entire	4
E. capensis Day, 1961	18–24	7–8	type A	flanged ventrally	distinct	absent	smooth	deeply incised	9
E. cochranae Fitzhugh, 2002	7	8	type B (?) “elongate, narrowly-hooded”	broad, anterior margin incised with elongate flaps on both sides	distinct	?short	smooth	entire	7
E. derjugini Uschakov, 1950	17–19	8–10	type A	?	?	?	?	slightly incised	8–9
E. elegans Verrill, 1873	12–15	8–10	type A	narrow	distinct	?	smooth (?)	slightly incised	6–8
E. eniwetokensis Reish, 1968	8	6	type B	flat, raised anterior margin	weakly developed	absent	smooth	slightly incised	5
E. hancocki Banse, 1970	5	3	type B	?	absent			slightly incised	4

...Continued on next page

TABLE 2. (Continued)

SPECIES	No. anterior abdominal chaetigers	No. chaetigers in pre-pygidial depression	Inferior thoracic chaetae	Pre-pygidial depression & flanges	Thoracic ventral shields	Pygidial cirrus	Anterior collar margin	Collar ventral margin	No. pairs of radioles
E. heterochaeta (Rullier, 1972)	6	8	type B (?)	broad, anterior margin incised with elongate flaps on both sides	?	present	smooth	midventral depression	?
E. heterosetosa Hartman, 1978	21	8	type A	?	present	?	?	?	10
E. incolor Hartman, 1965	6	3	type B	**broad, anterior margin incised	absent	absent	smooth	slightly incised	3
E. limnicola Reish, 1959	8–9	10	type A	flat, raised anterior margin	present		smooth	Entire (?)	5–7
E. longifissurata Uschakov, 1950	17	15	?	?	?	?	smooth	incised	20
E. magna (Fauchald, 1972)	32	7	type A	thickened rim continuous anteriorly (not flanged)	?	absent	smooth	deeply incised	12
E. olegi Zachs, 1933	?	7	?	?	distinct	?	?	?	6
E. pallida Ehlers, 1908	18–20	10–15	type B	broad, flat, short rim	?	?	?	slightly incised or entire	?
E. papillosa (Sars, 1851)	21	8–10	type A	short flanges	distinct	?	smooth	incised	10–15
E. pararosea Giangrande & Licciano, 2006	8	6	type A	broad flanges, anterior medial gap	distinct		crenulated	incised	6
E. perseyi (Zenkewitsch, 1925)	?	?	"short, broadly-hooded"	absent	?	?	?	?	5
E. pseudolimnicola Giangrande & Licciano, 2006	19	9	type A	absent	distinct only after staining	filiform appendage	irregularly crenulated	deeply incised	6

...*Continued on next page*

TABLE 2. (Continued)

SPECIES	No. anterior abdominal chaetigers	No. chaetigers in pre-pygidial depression	Inferior thoracic chaetae	Pre-pygidial depression & flanges	Thoracic ventral shields	Pygidial cirrus	Anterior collar margin	Collar ventral margin	No. pairs of radioles
E. quadrisegmenta Zhao, Westheide & Wu, 1993	4	3	type B	"slightly notched flange"	?	absent		slightly incised	7–8
E. rosea Langerhans, 1884	10–12	5–7	type B "long tip"	broad; anterior margin incised	distinct	absent	smooth	slightly incised	5–8
E. rubrocincta (Sars, 1862)	11–15	10–12	type A "subspatulate"	present	distinct	?	smooth	slightly incised	11–16
E. scotiarum Hartman, 1978	5	3	type B	"caudal funnel" presumably with raised margins	?	?	?	deeply incised	?
E. southerni Banse, 1970	8	4–5	type A	?	distinct	?	?	slightly incised	?
E. undulocincta Hartmann-Schröder & Rosenfeldt, 1989	16	6	type A	narrow	distinct	?	?	deeply incised	9
E. variabilis Hutchings & Murray, 1984	12–17	7–15	type B	narrow, anterior margin incised, triangular flaps on either side	distinct on 1st segment	short	smooth	entire	6
E. velifera Banse, 1972	20–25	7–9	type A "subspatulate"	broad, entire anterior margin	indistinct	absent	smooth	deeply incised	9–10
Euchone danieloi n. sp.	6–7	8	type B	broad, anterior flap large and rounded	distinct	absent	smooth	midventral depression	6–7
Euchone glennoi n. sp.	10–11	8	type B	narrow, with low anterior flap	distinct on 1st segment	short	smooth	slightly incised	6–7

*described from anterior fragment

** The size of flanges can apparently change with contraction (Hartman 1965)

Remarks. This species is characterised by the presence of two pairs of ventral radiolar appendages, basal membrane joining radioles for half their length, collar with a small shallow midventral depression, inferior thoracic chaetae type B, pre-pygidial depression occupying about eight chaetigers with wide flanges joined anteriorly, and lacking a pygidial cirrus. The pigmentation pattern, maintained (at least partially) in preserved specimens, also seems a characteristic feature of the species. Other *Euchone* species that possess an abdominal pre-pygidial depression occupying more than seven chaetigers with lateral flanges, and with inferior thoracic notochaetae that are broadly-hooded of type B include *Euchone cochranae* Fitzhugh, 2002, from the Andaman Sea; *Euchone heterochaeta* (Rullier, 1972), from New Caledonia; *Euchone pallida* Ehlers, 1908, from Kerguelen Islands and Antarctica; and *Euchone variabilis* Hutchings & Murray, 1984, from southeastern Australia (Table 2). *Euchone cochranae* differs from *E. danieloi* n. sp. in the presence of a short pygidial cirrus (Fitzhugh 2002), absent from the new species, and in the shape of the flanges surrounding the pre-pygidial depression, deeply incised and with elongate flaps on either side, in the former species, while there is a rounded, single anterior flap in *E. danieloi* n. sp. *Euchone heterochaeta* differs from the new species by the presence of elongate flaps on either side of the incised anterior margin of the flanges surrounding the pre-pygidial depression, similar to that of *E. cochranae*. The radiolar crown of *E. heterochaeta* is unknown since it was lost in the single reported specimen to date. *Euchone pallida* has only a short rim surrounding the pre-pygidial depression, which is also longer, occupying over 10 chaetigers instead of eight as in the new species (Licciano *et al.* 2009). *Euchone variabilis* differs from the new species in the presence of two elongated flaps on the anterior margin of the flange, instead of a unique rounded flap as in *E. danieloi* n. sp., and the presence of a pygidial cirrus (Hutchings & Murray, 1984) which is absent in the new species. See also Table 2 for a summary of the diagnostic attributes reported in the literature for known all *Euchone* species.

Etymology. This small and attractive *Euchone* species is dedicated to Daniel Capa. He was part of the Lizard Island Polychaete Workshop 2013 at only two years old. Although he was not able to assist with collecting or in the laboratory, all the participants enjoyed his company and acknowledge that he tried hard.

Habitat. Sand sediments, with *Halophila* sea grass, coral rubble and *Halimeda* in shallow subtidal depths to 25 m.

Type locality. Lizard Island.

Distribution. Australia (Queensland: Lizard Island).

Euchone glennoi n. sp.

(Figs 6A–G, 7)

Material examined. Queensland, Lizard Island: Holotype: AM W.36485 ($^1/_2$ crown on SEM), Outer Barrier, Yonge Reef, 14°36′25″S, 145°37′52″E, coarse coral rubble, 30 m, 21 Feb 2009. Paratypes: AM W.47336 (on SEM), same collection data; AM W47340, MI QLD 2445 (with half crown).

Comparative material examined. Holotype of *Euchone variabilis*, AM W.196901, New South Wales, Botany Bay, 33°59′36″S, 151°12′12″E, sand, 4 m, 12 Feb 1975. Paratypes of *Euchone variabilis*, AM W.196902 (7), New South Wales, Botany Bay, 33°59′30″S, 151°09′36″E, sand, 8 m, 17 Jan 1975.

Description. Holotype 7.5 mm long (crown 3 mm), 0.8 mm wide, with eight thoracic and 18 abdominal chaetigers. Live specimens not studied. Preserved specimens are white, without pigment. When stained with methyl green, holotype specimen shows biannulate dorsal and ventral glandular bands on each segment in both thorax and abdomen, with darker ventral shields, and single glandular bands on segments in the pre-pygidial area of the posterior abdomen including patches on the lateral flanges surrounding the depression (Fig. 6A–C). Body with biannulate segments, autapomorphy for *Euchone*. Radiolar crown with two semicircular lobes, each with seven radioles. Dorsal and ventral basal flanges absent. Basal membrane short, about a tenth of radiole length (Fig. 7B). Narrow radiolar flanges along radioles (Fig. 7A–C). Radiolar eyes absent. Dorsal lips with short radiolar appendage, dorsal pinnular appendages absent. Ventral lips and parallel lamellae present, ventral sacs absent. Two pairs of ventral radiolar appendages present (Fig. 7A). Posterior peristomial ring collar with dorsal margins fused to faecal groove and ventral margin with short midventral incision (Fig. 7C, E). Narrow glandular ridge present on chaetiger 2, slightly broader on lateral and dorsal sides (Fig. 6A–B). Ventral shields indistinct (Fig. 6A). Interramal eyespots absent. Thoracic prechaetal and postchaetal lobes well developed, autapomorphies for *Euchone*. Collar chaetae narrowly-hooded, in two oblique rows (Fig. 7F). Following thoracic chaetigers with slightly elevated notopodia; superior thoracic notochaetae narrowly-hooded, inferior, elongated broadly-hooded chaetae (type B),

additional anterior row of bayonet chaetae present (Fig. 7G). Thoracic neuropodial uncini acicular with rows of similar-sized teeth over main fang covering half its length (Fig. 7H), poorly developed breast and long handle (Fig. 6D). Companion chaetae absent. Abdominal neuropodia low and inconspicuous, with narrowly-hooded chaetae in transverse rows. Anterior abdominal uncini avicular with rows of similar-sized teeth above main fang, occupying half its length, quadrangular breast, handle absent (Figs 6E–F, 7J); posterior chaetigers with similar-sized teeth over main fang, occupying $^{3}/_{4}$ of its length (Figs 6G, 7K), smaller rectangular breast, handle absent. Abdomen with 10 anterior chaetigers, and posteriorly with pre-pygidial flanged depression of eight chaetigers, lateral flanges surrounding depression joined anteriorly by a flap which is folded inwards, has a straight to rounded medial margin and which, when expanded, is subequal in height to the adjoining lateral flanges (Figs 6C, 7L–M). Pygidium as a triangular lobe with an incipient cirrus, half the length of the pygidial lobe (Figs 6C, 7L–M). Pygidial eyespots not seen. Tube unknown.

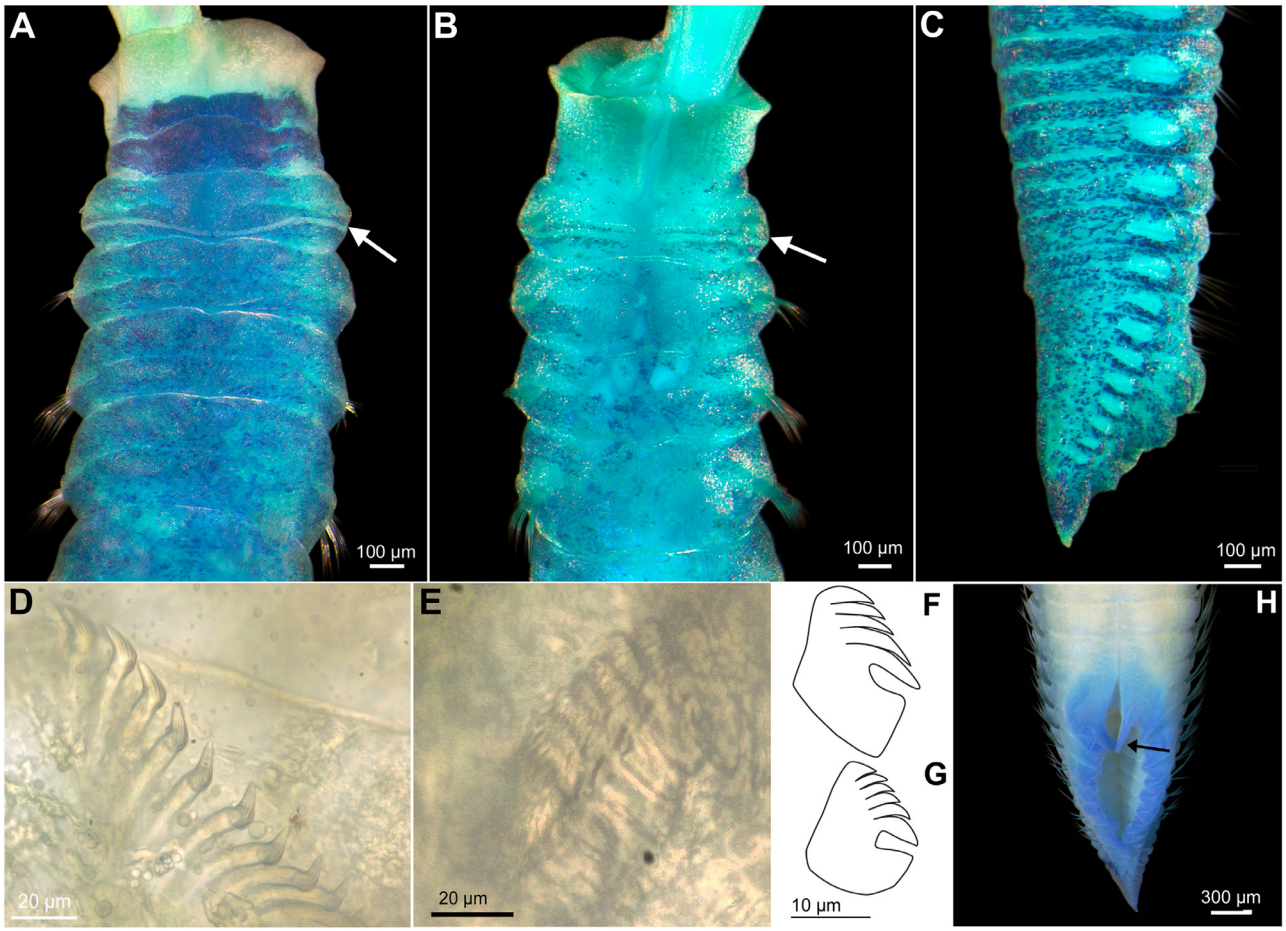

FIGURE 6. *Euchone glennoi* n. sp. A–C. Preserved specimens stained with methyl blue; A. Anterior thoracic chaetigers with a conspicuous first ventral shield and narrow glandular ridge on chaetiger two (arrow); B. Same, dorsal view; glandular ridge, evident (arrow); C. Posterior abdominal chaetigers and pygidium, lateral view; D. Thoracic acicular uncini; E. Posterior abdominal uncini; F. Drawing, anterior abdominal uncinus; G. Drawing, posterior abdominal uncinus; H. *Euchone variabilis*, posterior abdominal segments, with flanged pre-pygidial depression, and pygidium.

Variation. Paratype smaller (5.5 mm long, 0.5 mm wide), with 19 abdominal chaetigers. Holotype female with eggs in last four thoracic and first two abdominal segments. It also has seven pairs of radioles, whereas one paratype possesses six pairs.

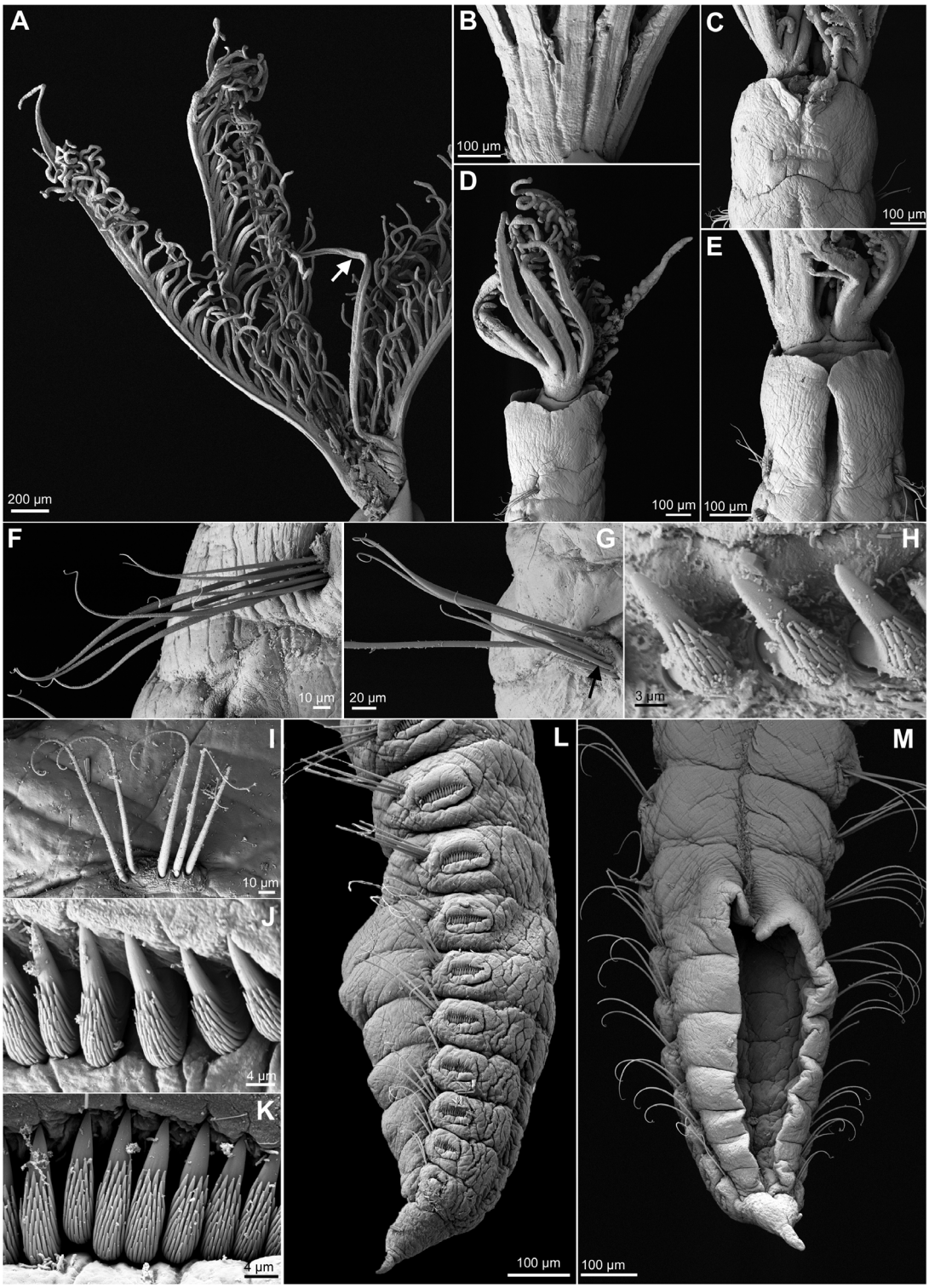

FIGURE 7. *Euchone glennoi* n. sp., scanning electron micrographs. A. Half of the radiolar crown showing ventral radiolar appendages (arrow); B. Detail of base of radiolar crown with short basal membrane; C. Detail of collar, ventral view, with a ventral incision; D. Anterior end of specimen regenerating radiolar crown; E. Collar, with dorsal margins fused to faecal groove; F. Collar chaetae narrowly hooded; G. Thoracic notochaetae, narrowly-hooded, inferior, elongated broadly-hooded chaetae (type B) and anterior row of bayonet chaetae (arrow); H. Thoracic neuropodial uncini acicular with rows of similar-sized teeth over main fang covering half its length; I. Abdominal neuropodial chaetae, narrowly-hooded; J. Anterior abdominal uncini with rows of similar-sized teeth above main fang, occupying half its length; K. Posterior chaetigers with similar-sized teeth over main fang, occupying $^{3}/_{4}$ of its length; L. Posterior abdominal uncini with pre-pygidial depression, side view; pygidium with incipient cirrus; M. Flanged pre-pygidial depression with an enlarged rounded anterior margin; pygidial cirrus present.

Remarks. This small *Euchone* species has several distinctive features that differentiate it from congeners: the presence of a low basal membrane, a posterior peristomial ring collar with a midventral incision, inferior thoracic chaetae of type B, about 18–19 abdominal chaetigers with a pre-pygidial depression in the posteriormost 7–8 chaetigers, provided with raised lateral flanges, and the pygidium bears a pygidial cirrus (Table 2). The most similar species is *Euchone variabilis* Hutchings & Murray, 1984, a species common in southeastern Australia, as both species share the same type of inferior thoracic chaetae (type B), greater than seven chaetigers forming the pre-pygidial depression, raised flanges around the pre-pygidial depression, and the presence of an incipient pygidial cirrus (Table 2, Fig. 6F). However, the basal membrane is much shorter the new species (about one tenth of the length of the crown compared to $^{1}/_{4}$– $^{3}/_{4}$ of the length of radioles in *E. variabilis*), the shape of the collar differs (entire in *E. variabilis* and with a midventral incision in these specimens) and the morphology of the pre-pygidial anterior flanges is also different (with two triangular flaps on either side of a U-shaped anterior medial gap in *E. variabilis*, which are absent in these specimens). The staining pattern with methyl blue/green also differs between the two species – the flanged area in *Euchone variabilis* stains uniformly blue (Wong *et al.* 2014), whereas this species displays a single strong glandular band per segment, even on the raised flanges. Other species showing similar features such as eight or more chaetigers occupying the pre-pygidial depression as well as type B inferior thoracic notochaetae include *E. cochranae, E. heterochaetosa*, *E. pallida* and *E. danieloi* n. sp (Table 2). The new species differs from all these by the presence of an incised ventral collar margin (as compared with *E. cochranae* and *E. danieloi* n. sp.), the presence of high flanges around the pre-pygidial depression (as compared with the low short rim reported in *E. pallida*) and the lack of elongate flaps on either side of the anterior margin of the flanged depression (as compared with their presence reported for *E. heterochaeta* and *E. variabilis*) (Rullier 1972, Hutchings & Murray 1984, Fitzhugh 2002). Some other characters differentiating the species are shown in Table 2.

Etymology. This species is dedicated to Glenn Ferguson, for his support and encouragement for one of us (AM), over many years.

Type locality. Lizard Island.

Distribution. Australia (Queensland: Lizard Island).

Habitat. Coral rubble at shallow subtidal depths to 30 m.

Genus *Glomerula* Nielsen, 1931

Type-species. *Glomerula gordialis* von Schlotheim, 1820.

Glomerula piloseta (Perkins, 1991)

(Fig. 8)

Calcisabella piloseta Perkins, 1991: 262–266, fig. 1–3.
Glomerula piloseta.—Vinn *et al.* 2008: 295.

Material examined. Queensland, Lizard Island: Holotype: AM W.20111, lagoon near entrance, sheltered side of reef, 15 m, 14°40′S, 145°28′E, 3 Mar 1986. Paratypes: AM W.20112 (>10, 1 on SEM), same collection details.

Description of material examined. No pigmentation in preserved specimens. Thorax with 11–15 chaetigers, abdomen with 9–12. Radiolar crown with semicircular lobes, each with five radioles. Dorsal and ventral flanges absent. Basal membrane incipient, narrow radiolar flanges present on proximal quarter of radioles (Fig. 8A). Four rows of vacuolated cells supporting radioles basally. Radiolar eyes absent. Dorsal lips rounded, without radiolar or pinnular appendages. Ventral radiolar appendages and parallel lamellae present; ventral sacs absent. Posterior peristomial ring collar with wide middorsal gap, midventral incision separating long and pointed ventral lappets (Fig. 8A). Glandular ridge on chaetiger 2 absent (Fig. 8A). Thoracic ventral shields in contact with adjacent neuropodial tori (Fig. 8A). Interramal eyespots absent. Collar chaetae narrowly-hooded in superior row and broadly-hooded in inferior row. Following thoracic chaetigers with conical notopodia; superior thoracic notochaetae narrowly-hooded, inferior thoracic notochaetae broadly-hooded; hoods with rough surface formed by numerous fibrous ends of long microtubules that compose the hood structure. (Fig. 8C). Thoracic neuropodia with uncini avicular with several rows of progressively shorter teeth above main fang, over most of its length (Fig. 8D), developed breast and handle absent. One to two companion chaetae per neuropodial torus, beginning on chaetiger

4, superior to dorsalmost uncinus (Fig. 8B) an autapomorphy for the species; companion chaeta with a nearly symmetrical hood and smooth surface (Fig. 8E–F). Abdominal neuropodia slightly elevated (Fig. 8G) with chaetae narrowly-hooded, with hood composed of long fibres (Fig. 8G–H). Abdominal uncini, from anterior and posterior chaetigers similar to thoracic (Fig. 8I–J). Pygidium bilobed, without pygidial cirrus (Fig. 8K). Pygidial eyes absent. Calcareous tube, circular in cross section, coiled, plain, attached to substrate or to other tubes, and sometimes with erect anterior end.

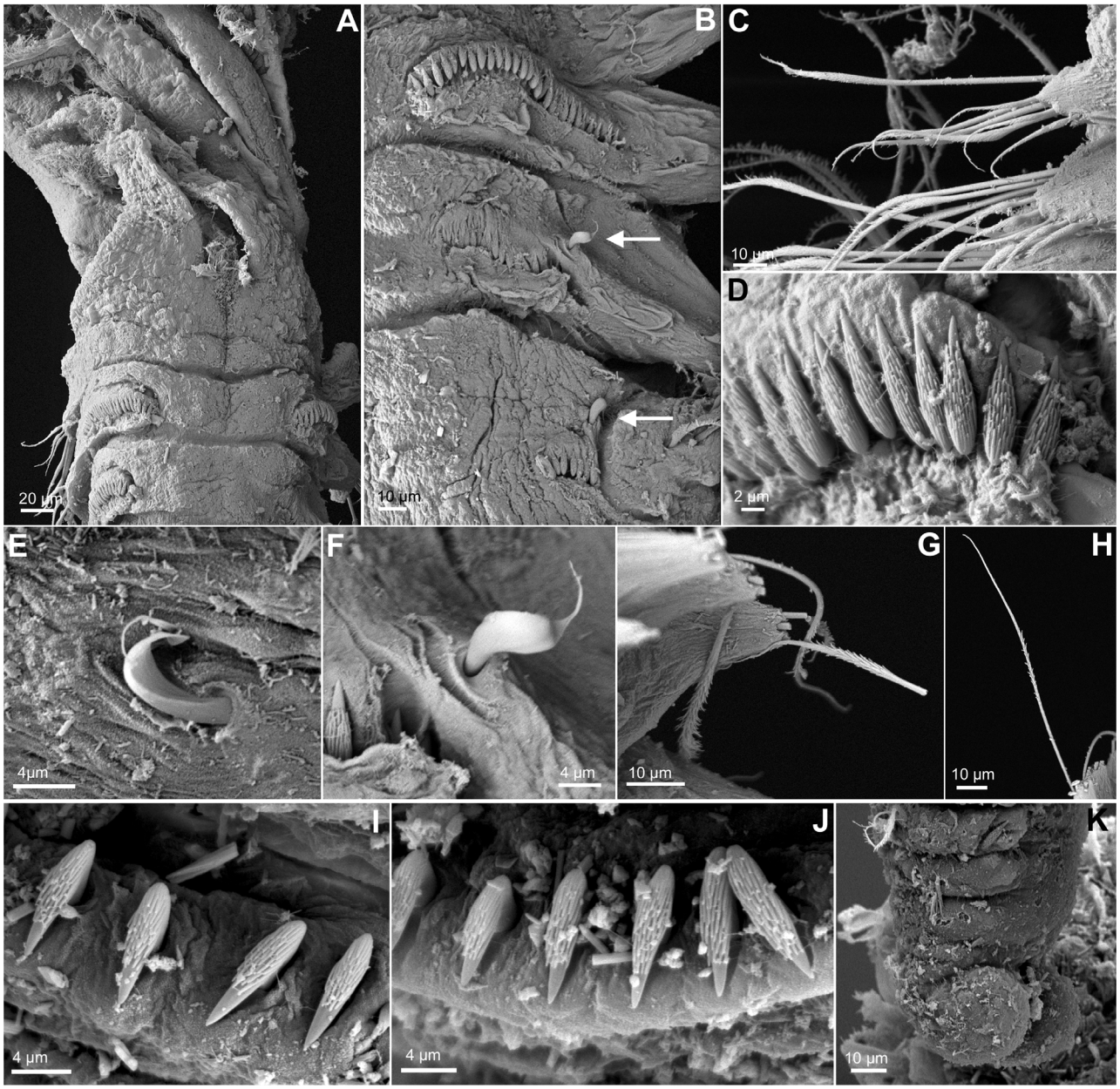

FIGURE 8. *Glomerula pilosetosa,* scanning electron micrographs. A. Anterior thoracic chaetigers and collar, ventral view; B. Neuropodial chaetigers 2–4 with single companion chaetae in chaetigers 3 and 4 (arrows); C. Anterior thoracic notochaetae, superior narrowly-hooded, inferior broadly-hooded; D. Anterior thoracic uncini with several rows of progressively shorter teeth above main fang, over most of its length; E. Companion chaetae, bent; F. Same, erect; G. Anterior abdominal chaetae narrowly-hooded; H. Posterior abdominal chaetae; I. Anterior abdominal uncini with several rows of progressively shorter teeth above main fang, over most of its length; J. Uncini from posterior chaetigers; K. Bilobed pygidium, lateral view.

Remarks. This species is the only extant species in the genus. It is characterised and distinguished from other sabellids by the calcareous tube and chaetae with hoods formed by loose microtubules with plumose appearence, which explains why they have been referred to as spinose chaetae in the original description (Perkins 1991). The

companion chaetae were described as hooked, probably because the ones observed by Perkins (1991) were folded (as in Fig. 8E), but are now shown to be paleate chaetae with almost symmetrical edges (Fig. 8F). Subsequent to its original description, some specimens were collected from Lizard Island in 2005, in order to provide genetic data of the species for deposition in GenBank (Kupriyanova & Rouse 2008). Only known from the type locality.

Habitat. Sheltered zones of reef, under boulders in lagoon, 2–20 m depth.

Type locality. Lizard Island.

Distribution. Australia (Queensland: Lizard Island).

Genus *Jasmineira* Langerhans, 1880

Type species. *Jasmineira caudata Langerhans, 1880*.

Jasmineira gustavoi n. sp.

(Figs 9–10)

Material examined. Queensland, Lizard Island: Holotype: AM W.43875, MI QLD 2333 (in 2 pieces). Paratypes: AM W.47334, MI QLD 2444 (2).

Other material examined. Queensland, Heron Island: AM W.41162, AM W.41171, AM W.41172, North Wistari Reef, 23°27′07″S, 151°52′02″E, coral rubble, 12.5 m, 11 Nov 2009; AM W.39512 (on SEM), AM W.47335, Sykes Reef, 23°25′57″S, 151°02′02″E, coral rubble, 30 m, 14 Nov 2009; AM W.41165, Lamont reef, 23°36′08″S, 152°03′02″E, coral rubble, 15 m, 19 Nov 2009; AM W.41166, First Point, 23°25′56″S, 151°56′02″E, coral rubble, 13 m, 12 Nov 2009; AM W.41169, "Twin Peaks" fore-reef, 23°28′20″S, 151°57′02″E, algae, 13 m, 13 Nov 2009.

Description. Holotype with body 5 mm long, crown 3 mm long, 0.6 mm maximum wide, eight thoracic and 26 abdominal chaetigers. Live specimens are whitish-translucent with orange radiolar crown and bright orange-yellow gut, at least along the thoracic and mid anterior abdominal chaetigers (Fig. 9A–B). Two large, red peristomial eyes present (Fig. 9C). Preserved specimens whitish, opaque, with no pigment in radiolar crown or body, only the peristomial eyes, brown after fixation, remain. Specimens fixed in 100% ethanol and stained with methyl green show pronounced single transverse bands in each segment of the ventral thorax and abdomen, stronger staining on the thoracic ventral shields, with the distal rim of the crenulated collar remaining unstained, as well as the dorsum of the thorax (Fig. 9D–F). Radiolar crown with semicircular lobes each with 10 radioles, with pinnules all similar in length (Figs 9A–C, 10A, D). Four pairs of ventral radiolar appendages. Dorsal and ventral basal flanges absent. Basal membrane reduced, radiolar flanges absent (Fig. 9A–C). Two rows of vacuolated cells supporting radioles basally. Radiolar eyes absent. Dorsal lips rounded, without dorsal radiolar appendages, pinnular appendages absent. Ventral lips and parallel lamellae present, ventral sacs absent. Posterior peristomial ring collar with dorsal margins fused to faecal groove, similar in height all around, with crenulated anterior margin, and ventrally separated by a midventral incision half the length of collar (Figs 9D–E, 10A–D). Narrow glandular ridge around chaetiger 2 (Fig. 9D–E). Thoracic ventral shields not conspicuous (Fig. 9D). Interramal eyespots absent. Collar chaetae narrowly-hooded arranged in oblique rows (Fig. 10E). Following thoracic chaetigers with slightly elevated notopodia narrowly-hooded superior chaetae, paleate inferior chaetae with long mucro and an additional anterior row of bayonet chaetae (Figs 9G, 10F–G). Thoracic neuropodial uncini acicular, with more than five rows of teeth diminishing in size posteriorly, covering half the length of main fang; basal row with three larger teeth (Figs 9H, 10H–I). Companion chaetae absent. Abdominal chaetigers with inconspicuous neuropodia with elongate, narrowly-hooded chaetae (Fig. 10J). Abdominal uncini avicular, elongated, with five rows of similar-sized teeth, occupying half the length of main fang; reduced breast and medium-length handle (Figs 9I–K, 10K). Pre-pygidial abdominal depression absent (Fig. 9A, F). Pygidium conical, with a cirrus as long as five chaetigers, pygidial eyespots not seen (Fig. 9L). Tube not observed.

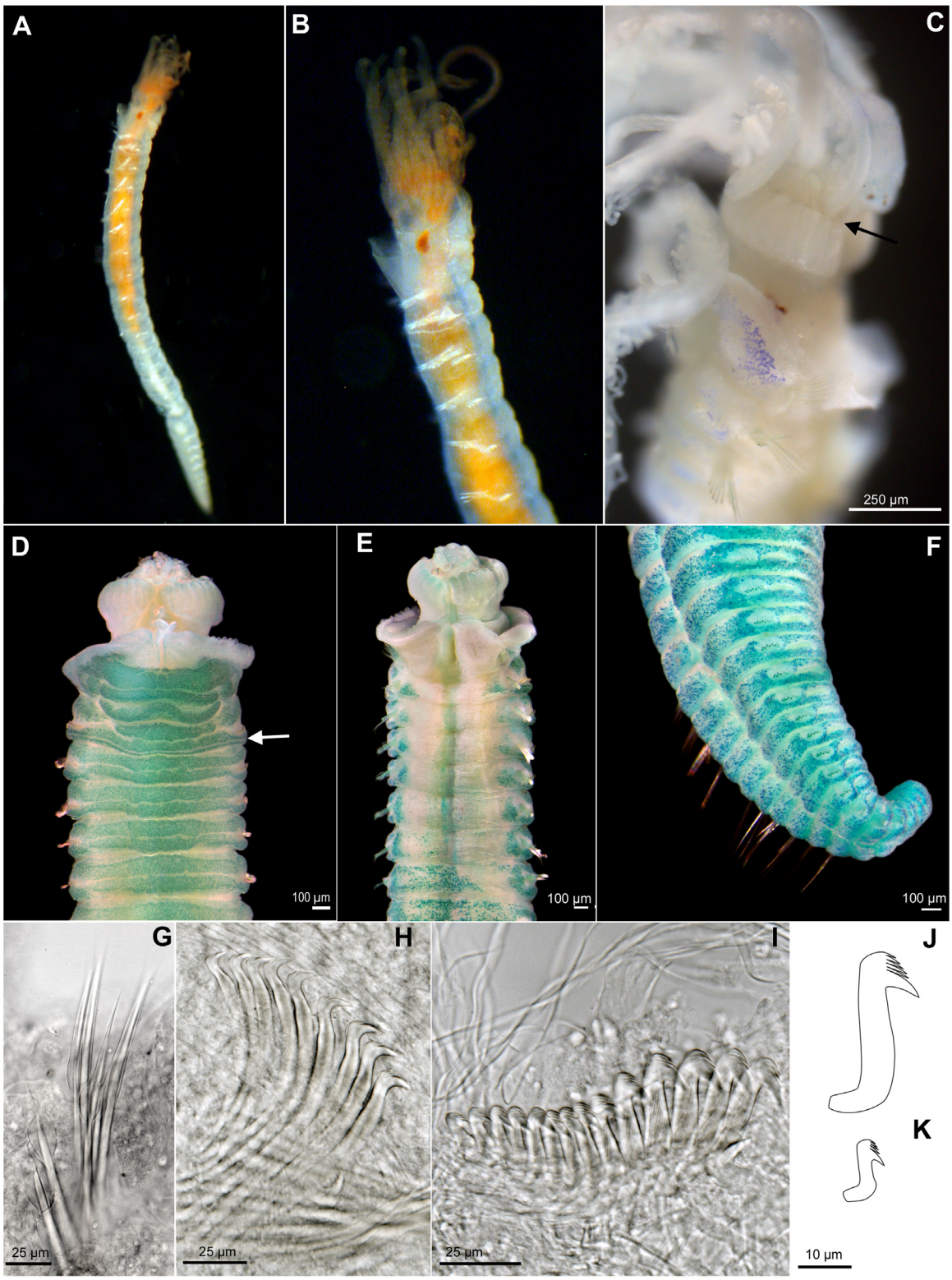

FIGURE 9. *Jasmineira gustavoi* n. sp. A–B. Live specimen. A. Whole individual, lateral view; B. Detail of anterior end, showing conspicuous peristomial eyes; C. Preserved specimen, with a clear abscission plane, where radioles detach deliberately from the base of crown; D–F. Specimen stained with methyl blue; D. Anterior end, ventral view, showing anterior margin of collar incision and transverse divisions of segments, glandular ridge on chaetiger 2 is visible (arrow); E: Same, dorsal view, showing collar margins fused to faecal groove; F. Posterior end, ventrolateral view; G. Thoracic chaetae, superior narrowly-hooded, inferior broadly-hooded; H. Thoracic uncini acicular, with rows of teeth above main fang for half its length; I. Anterior abdominal uncini avicular, with long necks, and with rows of teeth; J. Drawing, anterior abdominal uncinus; K. Drawing, posterior abdominal uncinus. Photographs: D–F by Eunice Wong.

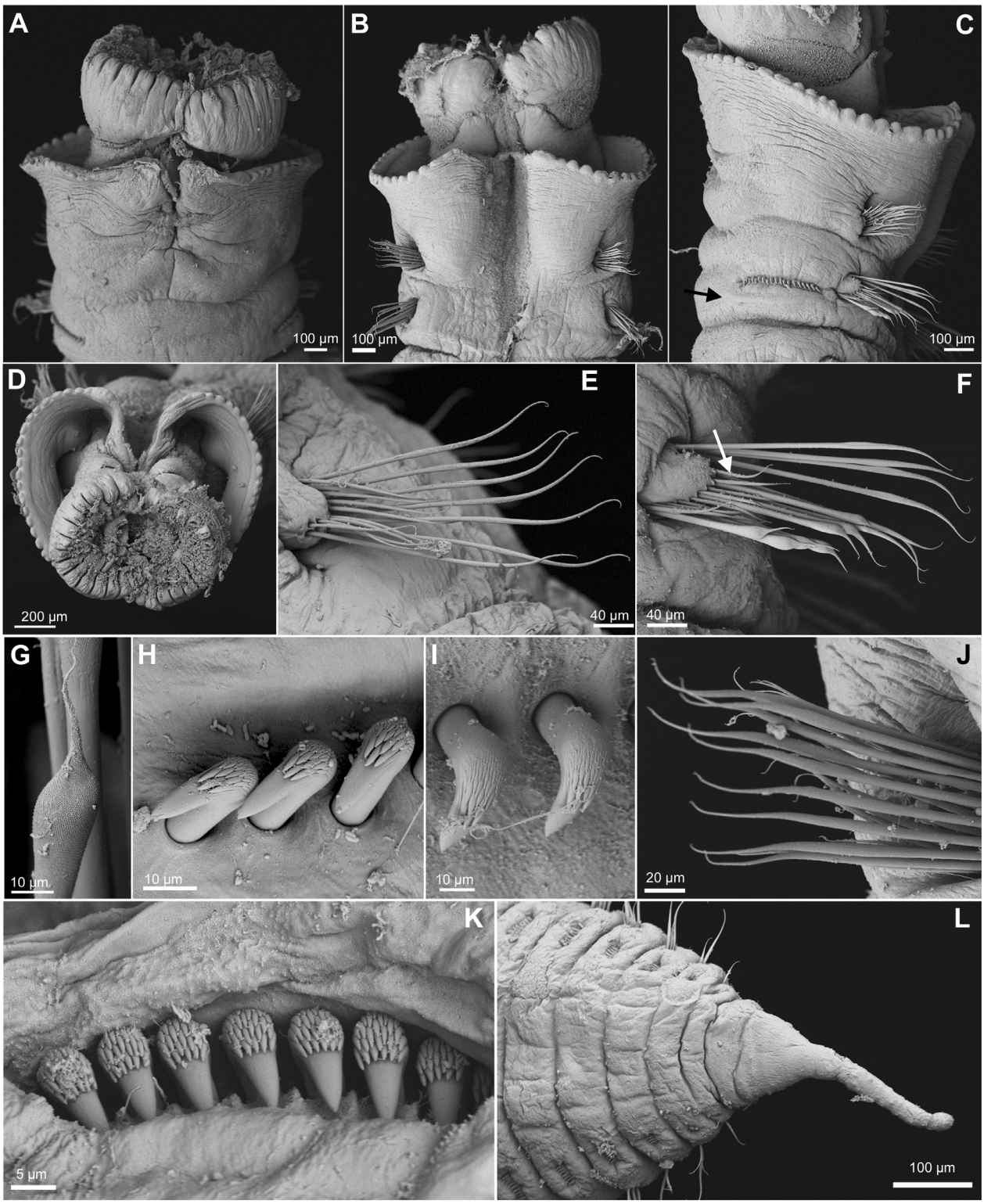

FIGURE 10. *Jasmineira gustavoi* n. sp., scanning electron micrographs. A. Radiolar crown broken at abscission plane and collar with anterior margin crenulated and midventral incision; B. Same, dorsal view, with dorsal collar margins fused to faecal groove; C. Same lateral view, glandular ridge on chaetiger 2 visible (arrow); D. Frontal view of radiolar crown showing the abscission plane and anterior margin of collar crenulated; E. Collar chaetae narrowly hooded; F. Midthoracic parapodium with narrowly-hooded superior chaetae, paleate inferior chaetae with long mucro and an additional anterior row of bayonet chaetae (arrow); G. Detail of inferior thoracic chaeta; H. Thoracic uncini with more than five rows of teeth diminishing in size distally, covering half the length of main fang. I. Same, top view; J. Midabdominal chaetae, narrowly-hooded; K. Midabdominal uncini with five rows of similar-sized teeth, occupying half the length of main fang; L. Posterior abdominal chaetiger and pygidium, with a pygidial cirrus.

TABLE 3. Comparison of morphological features in currently accepted *Jasmineira* species. Modified after Fitzhugh (2002), with information from original descriptions, Banse 1959 and Tovar-Hernández (2007 a, b). (?) indicates doubtful interpretation of atributes; ? unknown.

	Pairs of radioles	Pairs of rad. appendages	Collar lateral incisions	Collar midventral incisions	Collar ventral lappets	Collar anterior margin	Bayonet chaetae	Vascular loops	Abdominal chaetigers	Pygidial cirrus
J. analis Ehlers, 1908	3	3	present	present	elongate	?	?	?	7–15	?
J. bermudensis Hartman, 1965	?	?	absent	absent (?)	absent	?	present	?	31	?
J. bilobata Day, 1973	7	1	absent	present	elongate	smooth	?	?	?	?
J. caeca Ehlers, 1913	25–30	?	absent	absent	absent	?	?	?	15–20	
J. caudata Langerhans, 1880	7–8	?	absent	absent	absent	?	?	?	17–20	present
J. crumenifera Hartmann-Schröder, 1986	12–15	1	absent	present	absent	smooth	?	present (?)	37	present
J. elegans Saint-Joseph, 1894	8–12	4–6	absent	present	low, rounded	smooth	?	?	22–32	?
J. filatovae Levenstein, 1961	15	?	absent	present	?	?	?	?	60	?
J. filiformis Hartman, 1965*	4	?	absent	present	low, rounded	smooth	present	?	10–15	absent
J. kikuchi Nishi *et al.,* 2009	10–12	4–6	absent	present	low, rounded	smooth	present	present	25–34	?
J. labrofusca Fitzhugh, 2002	9–10	7–8	absent	present	absent	smooth	present	present	20	present
J. lobata Fitzhugh, 2002	9	6	absent	present	elongate	smooth	present	present	66	absent
J. macrophthalma Ehlers, 1913	3	?	?	?	?	?	?	?	12	?
J. pacifica Annenkova, 1937	14–16	6-8	absent	present	low, rounded	smooth	?	?	45–49	present
J. princei (McIntosh, 1916)	12–13	3-5	absent	present	elongate	smooth	present	present	48–52	absent
J. reayi (McIntosh, 1916)	?	4	?	?	?	crenulated	present	present	?	?
J. regularis Hartman, 1978	5	?	absent	present	low, rounded	?	?	?	24–28	?
J. schaudinni Augener, 1912**	12-16	?	absent	absent	long, rounded	smooth	present	present	46–67	present
J. gustavoi n. sp.	10	4	absent	present	absent	crenulated	present	reduced	17	present

* Probably not a *Jasmineira*

** Examination of specimens from NTNU University Museum, Trondheim (NTNU VM 23890), identified by P. Knight-Jones.

Variation. All the specimens collected, except for the holotype, had radioles broken off at the abscission plane, near the base of the crown, so the variation in the number of radioles, ventral radiolar appendages and other radiolar structures is awkward to assess, as is the variation of the total length of the specimens. Body length varies from 3–5 mm. Other features as described in holotype.

Remarks. Of the 17 species of *Jasmineira* considered as valid up to date (Table 3), 12 are characterised by possessing a posterior peristomial ring incised midventrally (for two additional species this information is unknown), but of these, only four lack ventral lappets on the ventral margins of collar (for two species this information is unknown), and only one of them has been described with a crenulated anterior margin of the collar, *Jasmineira reayi* (McIntosh, 1916), described from Ireland. *Jasmineira gustavoi* n. sp. and *J. reayi* are distinguished by several morphological attributes: *J. reayi* was described as possessing inferior thoracic chaetae with medium-sized mucro (Tovar-Hernández 2007b), whereas the new species has a very long mucro compared with other described *Jasmineira* species (e.g. Fitzhugh 2002), and *J. reayi* bears three rows of teeth over main fang on thoracic uncini whereas this new species bears around five. Other diagnostic features, such as the presence of a pygidial cirrus, could not be compared between the two species as the description of *J. reayi* lacks these details.

Etymology. This graceful species is dedicated to Gustavo Capa. He participated in the fieldwork as part of the Lizard Island Polychaete Workshop 2013 and was of good help in the laboratory despite his six years of age. Sabellids are, because of their beauty, his preferred polychaetes and yellow his favourite colour.

Habitat. Muddy sand, sand and *Halophila* seagrass, from 9 to 24 m depth.

Type locality. Lizard Island.

Distribution. Australia (Queensland: Lizard and Heron Islands).

Genus *Megalomma* Johansson, 1925

Type species. *Amphitrite vesiculosa* Montagu, 1815.

Megalomma cf. *acrophthalmos* (Grube, 1878)

(Fig. 11A–C)

Sabella acrophthalmos Grube, 1878: 258–259.
Megalomma acrophthalmos.—Knight-Jones 1997: 316, fig 2A–L; Tovar-Hernández & Carrera-Parra 2011: 15–17, fig 2A–L.
Non *Megalomma* cf. *acrophthalmos*.—Capa & Murray 2009: 208, figs 4C–D, 5B, 6.

Material examined. AM W.44206, MI QLD 2370.

Description of material examined. Incomplete specimen; eight thoracic and numerous abdominal chaetigers. Live specimens not studied. Preserved specimens with a few reddish spots on the radiolar crown (Fig. 11A), body without pigment, white. Radiolar crown with semicircular basal lobes. Dorsal and ventral basal flanges absent. Basal membrane absent. Radioles with smooth outer margins. Six to eight rows of vacuolated cells supporting radioles basally. Radiolar eyes apparently absent; two dorsal most radioles with unpigmented subdistal expansions. Dorsal lips with long radiolar appendages, one pair of pinnular appendages. Ventral lips and parallel lamellae present, ventral sacs absent. Caruncle present, rounded and with transverse rows of cilia. Posterior peristomial ring collar up to the base or radiolar crown, with dorsal margins fused to faecal groove, and forming two flanking spatulate dorsal flaps (Fig. 11C); ventral lappets separated by a midventral incision (Fig. 11B). Thoracic ventral shields separated from thoracic tori by a small gap (Fig. 11B). Interramal eyes absent. Collar chaetae elongate, narrowly-hooded, in two oblique rows. Following thoracic chaetiger with conical notopodia; superior thoracic chaetae elongate narrowly-hooded; inferior broadly-hooded (type B). Thoracic uncini with several rows of similar-sized teeth over main fang, covering slightly over half its length, with well developed breast and medium-sized handle. Companion chaetae with dentate appearance on proximal half of hood, distally asymmetrical. Abdominal neuropodia as low elevations with elongate, broadly-hooded chaetae arranged in rows. Notopodial abdominal uncini similar to the thoracic but with shorter handle. Pygidium not studied. Tube unknown.

Remarks. This specimen is characterised by having ventral shields separated from neuropodial tori by a narrow gap, long and slender inferior thoracic chaetae (type B), thoracic uncini with medium-length handles, a collar with dorsal margins fused to faecal groove, conspicuous and spatulate dorsal lappets, and a ciliated caruncle.

All these features agree with the recent description of *Megalomma acrophthalmos* (Grube, 1878) by Tovar-Hernández & Carrera-Parra (2011), except that *M. acrophthalmos* typically possesses subdistal compound eyes on most radioles, apparently absent in this specimen. Regeneration of the distal end of radioles is speculated, supported by the observation of enlarged knobby structures on both dorsalmost radioles. It is also different, however, to the specimens from Western Australia reported by Capa & Murray (2009) as *M.* cf. *acrophthalmos*, which have a short keel-like structure between the dorsal lips, unlike the ciliated caruncle present on this specimen and *M. acrophthalmos*. Thus we are tentatively assigning the specimen to *M. acrophthalmos* until more undamaged material is found. If this identification is confirmed it would represent the first record for the species in Australia. *Megalomma acrophthalmos* was grouped together with other species sharing the presence of a collar with dorsal margins fused to faecal groove, pockets present and eyes in most radioles, into "Group 1A" of Knight-Jones (1997) (Capa & Murray 2009), a group recovered as a monophyletic clade by Capa & Murray (2009) but not by Tovar-Hernández & Carrera-Parra (2011).

Habitat. Dead coral rubble, in shallow subtidal depths (6–9 m).

Type locality. Philippines.

Distribution. Philippines, Australia (Queensland: Lizard Island).

Megalomma interrupta Capa & Murray, 2009

(Fig. 11D–F)

Megalomma interrupta Capa & Murray, 2009: 210–212, figs 2J–L, 4E–F, 5B, 7, 8.

Material examined. Queensland, Lizard Island: AM W.35859, North Point, 14°40′ S, 145°28′ E, coral block washings, 3.5 m, 4 Dec 1974; AM W.35490, off Station Beach, 14°41′S, 145°27′E, dead *Pocillopora*, 3 m, 6 Jan 1975; AM W.35491 (3, 1 on SEM), south headland of Turtle Beach, 14°39'S, 145°27'E, dead branching coral, 3 m, 27 Aug 1976; AM W.35492, off Granite Bluff, 14°39'S, 145°27'E, thin plates dead coral, 6 m, 31 Aug 1976; AM W.35493 (2), off Coconut Beach, 14°41' S, 145°28'27"E, dead coral covered in *Lithothamnion*, 12 m, 29 Mar 1995; AM W.35494, reef front between Bird and South Islands, 14°41′53″S, 145°27′51″E, dead coral, 13 m, 30 Mar 1995; AM W.35495, off North Point, 14°38′51″S, 145°27′12″E, dead coral with coralline algae, 20 m, 28 Mar 1995; AM W.36483 (2), Bird Islet, front reef, 14°41′48″S, 145°27′51″E, coarse coral rubble, 3 m, 8 Feb 2009; AM W.40857, lagoon, 14°40′S, 145°27′E, 1986; AM W.41101, 14°38′51″S, 145°29′16″E, 7–12 m, 3 Sep 2010; AM W.41102 (2), Lagoon between Palfrey Island and South Island, 14°41′51″S, 145°27′01″E, coarse coral rubble, 2 m, 1 Sep 2010; AM W.41108 (2), High Rock, 14°49′34″S, 145°33′08″E, coarse coral rubble, 6 m, 11 Sep 2010; AM W.41109 (2), North Direction Island, 14°44′43″S, 145°30′18″E, coarse coral rubble, 8 m, 26 Aug 2010; AM W.41112, Watsons Bay, 14°39′26″S, 145°27′03″E, coarse coral rubble, 4.5 m, 28 Aug 2010; AM W.41114, North Point, out from reef edge, 14°39′14″S, 145°27′22″E, coarse coral rubble, 5 m, 17 Apr 2008; AM W.41116, 14°41′00″S, 145°26′29″E, coral rubble, 2 m, 16 Apr 2008; AM W.47231, lagoon, 14°40′S, 145°27′E, 1986; AM W.47339, Coconut Beach, 14°40′53″S, 145°28′21″E, *Halimeda* algae and coral rubble, 2 m, 7 Feb 2009; AM W.44363, MI QLD 2359 (6); AM W.45164, MI QLD 2446; AM W.44215, MI QLD 2359 (8).

Description of material examined. Specimens up to 20 mm long and 5 mm wide with eight thoracic and numerous abdominal chaetigers. Live specimens with radiolar crown with several orange-brown and white transverse bands of different widths. Radiolar eyes orange-brown, in some cases with a white reticule. Body is pale orange, with anterior end covered in white spots (Fig. 11A–C). Collar has a white margin, more conspicuous dorsally and possesses orange spots along the ventral edge of neuropodial tori (Fig. 11F). Preserved specimens lose the white bands on radiolar crown and only the brown ones remain. The white spots on body also fade and the thoracic ventral spots on tori turn brown. Radiolar crown with semicircular lobes. Dorsal and ventral flanges absent. Basal membrane or radiolar flanges absent. About 10 vacuolated cells supporting radioles in cross section at the base. Dorsalmost pair of radioles longer than the rest, each with a large subdistal compound eye almost surrounding the whole radiole (Fig. 11D–E), and with visible ommatidia. Next adjacent 4–5 pairs of radioles without eyes, and two pairs of lateral radioles with small, similarly-sized subdistal eyes. Dorsal lips with medium radiolar appendages, and a pair of dorsal pinnular appendages. Caruncle absent. Ventral lips and parallel lamellae present, ventral sacs inside radiolar lobes. Posterior peristomial ring collar not fused to faecal groove, with dorsolateral indentations on both sides forming inconspicuous pockets and continuing as ridges to the middorsal

faecal groove (Fig. 11E); pointed ventral lappets separated by a midventral incision (Fig. 11F). Glandular ridge absent on anterior chaetigers. Thoracic ventral shields separated from adjacent neuropodial tori by a gap (Fig. 11F). First ventral shield with m-shaped anterior margin. Interramal eyespots absent. Collar chaetae elongate narrowly-hooded in two oblique rows. Following thoracic chaetigers with conical notopodia; with superior elongate narrowly-hooded and inferior broadly-hooded notochaetae (type A). Thoracic neuropodial uncini avicular, with several rows of small similar-sized teeth above main fang, well developed breast and long handle. Companion chaetae with asymmetrical hood, fibrous appearance on proximal half of hood. Abdominal neuropodia as low elevations with elongate, broadly-hooded chaetae arranged in rows. Notopodial abdominal uncini similar to thoracic uncini but with shorter handles. Pygidium as a rounded papilla without pygidial eyes. Pygidial cirrus absent. Tube membranous with large sediment particles (broken shells, coral fragment, foraminiferans, etc.) attached to exposed end (Fig. 11D).

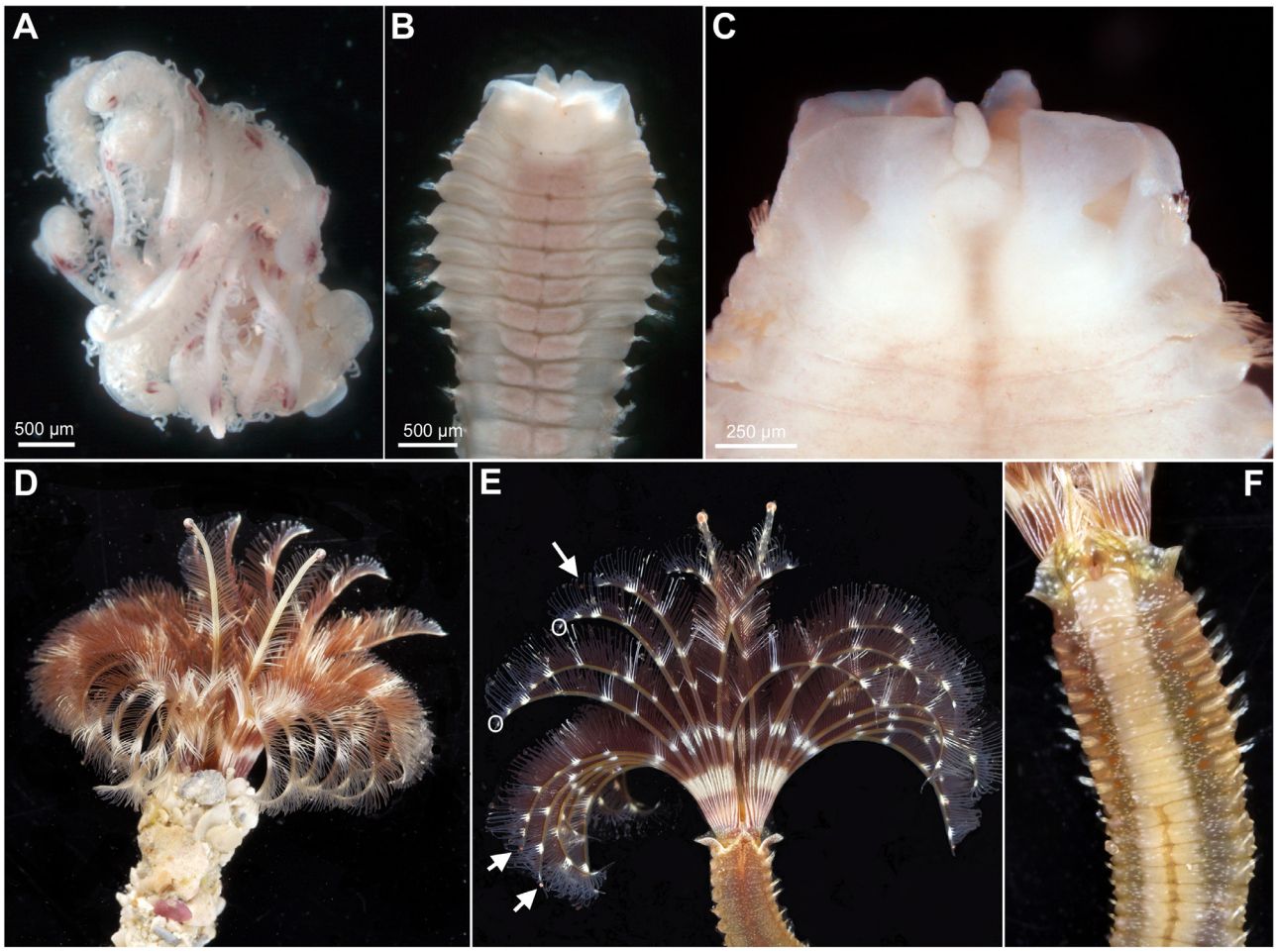

FIGURE 11. *Megalomma* sp. cf. M. *acrophthalmos*. A. Detached radiolar crown, base at bottom of the photograph; B. Thoracic and anterior abdominal chaetigers, ventral view; showing thoracic ventral shields separated from neuropodial tori; C. Dorsal collar margins, with spatulate flaps and medial caruncle; D–F. *Megalomma interrupta*, live specimens; D. Specimen inside its tube, with exposed radiolar crown, dorsalmost pair of compound radiolar eyes stick out vertically; E. Anterior end, dorsal view, with subdistal compound radiolar eyes present (arrows) or absent circles; F. Thoracic and anterior abdominal chaetigers; showing enlarged collar ventral lappets and thoracic ventral shield separated from neuropodial tori. Photographs: D–F by Alexander Semenov.

Remarks. This species is characterized by having inconspicuous dorsal collar pockets, radiolar eyes present in dorsalmost and lateral radioles, with approximately four radioles in between without eyes, radiolar skeleton with approximately 10 cells in cross section, caruncle absent, and inferior thoracic broadly-hooded of type A (Capa & Murray 2009). All other congeners bear radiolar eyes on one or several radioles, and no other species has yet been described in the genus with eyeless intermediate radioles flanked by dorsal and lateral ones bearing compound

distal eyes. *Megalomma interrupta* was allocated by Capa & Murray (2009) to a subgroup of Knight-Jones "Group 2" (1997) due to having collar margins not fused to faecal groove. However, in both cladistic analyses performed to date, this group has been recovered as paraphyletic (Capa & Murray 2009; Tovar-Hernández & Carrera-Parra 2011).

Habitat. Dead coral and coral rubble, 2–20 m.

Type locality. One Tree Island, Queensland.

Distribution. Indonesia (Pasir Sari), Australia (Queensland, tropical Western Australia).

***Megalomma jubata* n. sp.**
(Fig. 12)

Material examined. Queensland, Lizard Island: Holotype, AM W.36495, MacGillivray Reef, 14°39′25"S, 145°29′41″E, coarse coral rubble, 2 m, 21 Feb 2009. Paratypes, AM W.36480 (2), Linnet Reef, Great Barrier Reef, 14°46′50″S, 145°20′58″E, coarse coral rubble, 4 m, 23 Feb 2009; AM W.36481, Coconut Beach, 14°40′53″S, 145°28′21″E, *Halimeda* algae & coral rubble, 2 m, 7 Feb 2009; AM W.41106; AM W.47337, Lagoon between Palfrey Island and South Island, 14°41′51″S, 145°27′01″E, coarse coral rubble, 2 m, 1 Sep 2010; AM W.47338, Watsons Bay, 14°39′26″S, 145°27′03″E, coarse coral rubble, 4.5 m, 28 Aug 2010.

Other material examined. Queensland, Heron Island: AM W.39514.001 (on SEM), Sykes Reef, 23°25′56″S, 152°02′02″E, 15 m, 14 Nov 2009.

Description. Holotype a complete specimen, 23 mm long (crown of 5 mm) and 2.5 mm wide, with seven thoracic chaetigers and numerous abdominal segments; paratypes up to 25 mm long (crown 5 mm), 2.5 mm wide; thorax with 6–11 chaetigers, numerous abdominal chaetigers. Specimens not observed alive. Some preserved specimens with longitudinal bands of pigment on radiolar bases, and three or four faint brown and orange transverse bands of pigment in radioles and pinnules (Fig. 12A–B). The caruncle may also have faint pigment distally. Some specimens pigmented dorsally and ventrally on thorax and collar, with darker pigment patches ventral to neuropodial tori and between neuro- and notopodia. Radiolar crown with semicircular lobes (Fig. 12A–B). Dorsal and ventral flanges absent. Basal membrane or radiolar flanges absent. About 10 vacuolated cells supporting radioles in cross section basally. Dorsalmost pair of radioles longer than the rest, each with a large subdistal compound eye spiralling around radiolar tip; additional pair of eyes on following two dorsalmost radioles, decreasing in size. Dorsal lips with medium-length radiolar appendages (Fig. 12F), three pairs of dorsal pinnular appendages. Caruncle present (Fig. 12C–E, G). Ventral lips and parallel lamellae present, ventral sacs present (Fig. 12D). Posterior peristomial ring collar with dorsal margins fused to faecal groove and forming dorsal pockets at either side and short, rounded dorsal lappets (Fig. 12E); midventral incision separating low ventral lappets (Fig. 12D). Glandular ridge on anterior chaetigers absent. Thoracic ventral shields separated from adjacent neuropodial tori by a gap (Fig. 12C–D). First ventral shield with m-shaped anterior margin. Interramal eyespots absent. Collar chaetae elongate narrowly-hooded in two oblique rows. Following thoracic chaetigers with conical notopodia, with superior elongate narrowly-hooded and inferior broadly-hooded notochaetae (type B, Fig. 12H–I). Thoracic neuropodial uncini avicular, with several rows of small similar-sized teeth above main fang (Fig. 12J), well developed breast and medium-sized handle. Companion chaetae with dentate appearance on proximal half of hood, distally asymmetrical (Fig. 12J). Abdominal neuropodia as low elevations with elongate, broadly-hooded chaetae arranged in rows (Fig. 12K). Notopodial abdominal uncini similar to thoracic uncini but with shorter handles (Fig. 12L). Pygidium rounded with scattered eyespots. Pygidial cirrus absent. Tube membranous and embedded with sand, crushed coral fragments and other small debris.

Variation. Paratypes have 0–5 pairs of compound distal eyes on dorsalmost radioles.

Remarks. *Megalomma jubata* n. sp. is characterised by the presence of a conspicuous caruncle, dorsal collar margins fused to faecal groove forming pockets at either side and with short rounded dorsal lappets, radiolar eyes on 1–5 pairs of dorsalmost radioles, thoracic neuropodial tori separated from ventral shields and inferior thoracic chaetae type B. It would therefore be allocated to the informal "Group 1C" (proposed by Capa & Murray 2009) together with *M. quadrioculatum* (Willey, 1905), that also bears a caruncle. *Megalomma jubata* n. sp. differs from *M. quadrioculatum* in the shape of the inferior thoracic chaetae, which are type B, compared with type A in *M. quadrioculatum*. Other congeners described as having a caruncle, a homoplastic feature (Capa & Murray 2009; Tovar-Hernández & Carrera-Parra 2011) are *M. carunculata* Tovar-Hernández & Salazar-Vallejo, 2008, *M.*

lobiferum (Ehlers, 1887), *M. pigmentum* Reish, 1963, and *M. suspiciens* (Ehlers, 1904). *Megalomma pigmentum* possesses widely separated dorsal collar margins, lacks collar pockets on either side, and bears a single pair of radiolar eyes. *Megalomma suspiciens*, *M. carunculata* and *M. lobiferum* which all have a similar collar morphology to the new species, bear compound eyes in most of the radioles instead of only in a few of the dorsalmost.

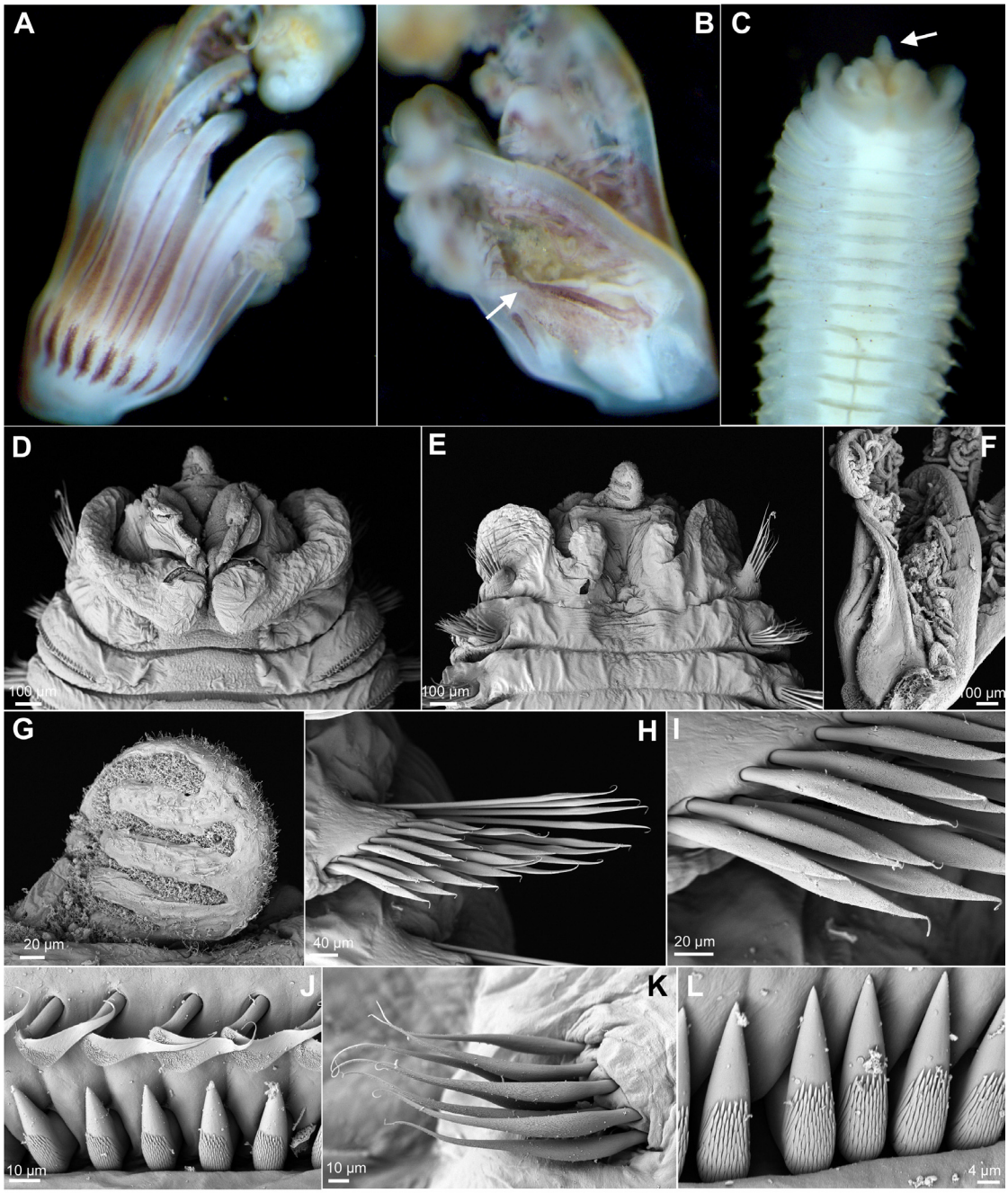

FIGURE 12. *Megalomma jubata* n. sp. A–C, preserved specimens; A. Detached radiolar crown showing pigmentation pattern; B. Half of the radiolar crown, from inside, showing the medium length radiolar appendages (arrow); C. Thorax and anterior abdominal chaetigers, radiolar crown detached leaving an exposed caruncle (arrow); D–L. Scanning electron micrographs; D. Anterior thoracic chaetigers showing the morphology of collar and the exposed caruncle at the back; E. Anterior chaetigers showing collar dorsal margins fused to faecal groove and with pockets at both sides, and a middorsal prostomial caruncle; F. Detail of dorsal lips and radiolar appendages; G. Detail of the rounded caruncle, with four parallel transverse ridges of cilia, anteriorly joined by a longitudinal row of cilia; H. Thoracic notochaetae, superior narrowly-hooded and inferior broadly-hooded type B; I. Detail of broadly-hooded inferior thoracic chaetae; J. Thoracic uncini with several rows of small teeth, all similar in size above main fang; companion chaetae with asymmetrical fibrous hood ; K. Abdominal chaetae narrowly-hooded. L. Abdominal uncini with several rows of small teeth, all similar in size above main fang.

The external morphology of the caruncle of this species is remarkable in comparison with other described *Megalomma* possessing this structure. The cilia are arranged in four parallel transverse ridges joined anteriorly by an additional longitudinal ridge. It resembles, at least superficially, the nuchal organs present in some members of Amphinomidae, a group of annelids not closely related, but with ciliary ridges also located in the along caruncle (see also Tovar-Hernández & Salazar-Vallejo 2008). The function(s) of this structure is unknown, but most probably sensory (Tovar-Hernández & Salazar-Vallejo 2008). Of the other species of *Megalomma* provided with a caruncle, *M. lobiferum* has been shown to have cilia arranged in four longitudinal rows on each anterior posterior and lateral sides of this triangular structure. By contrast, the caruncle of *M. jubata* n. sp. is rounded and bears cilia in a different arrangement.

Etymology. The species name is derived from the Latin word "iuba", alluding to the characteristic rounded crest herein referred to as a caruncle, located dorsally to the mouth, between the dorsal lips.

Habitat. Coral rubble, with sand and *Halimeda* algae, in shallow intertidal to subtidal depths.

Type locality. Lizard Island.

Distribution. Australia (Queensland: Lizard and Heron Islands).

Megalomma sp. cf. *M. kaikourense* Knight-Jones, 1997

(Fig. 13A–D)

Megalomma kaikourense Knight-Jones, 1997: 320–321, fig. 5.

Material examined. AM W.45166, MI QLD 2444 (3).

Description of material examined. Specimens measuring up to 26 mm long and 3 mm wide, with eight thoracic and numerous abdominal chaetigers. Specimens not studied alive. Preserved material pale, some with radioles slightly pigmented with brown or orange (Fig. 13B–D). Radiolar eyes black (Fig. 13B). Body is pale cream, without spots, except for red pygidial eyepots. Radiolar crown with semicircular lobes. Dorsal and ventral flanges absent. Basal membrane and radiolar flanges absent. Six to eight vacuolated cells supporting radioles in cross section, basally. Dorsalmost pair of radioles longer than the rest, each with a large subdistal compound eye almost surrounding the whole radiole (Fig. 13B). Dorsal lips with medium radiolar appendages, dorsal pinnular appendages absent. Caruncle absent. Ventral lips and parallel lamellae present, ventral sacs inside radiolar lobes. Posterior peristomial ring with margins separated by a wide gap, not fused to faecal groove, forming very low dorsal pockets only in some specimens (Fig. 13C *versus* 13D); large triangular ventral lappets separated by a midventral incision (Fig. 13B). Glandular ridge absent on anterior chaetigers. Thoracic ventral shields separated from adjacent neuropodial tori by a gap (Fig. 13B). First ventral shield with M-shaped anterior margin. Interramal eyespots absent. Collar chaetae elongate narrowly-hooded in two oblique rows. Following thoracic chaetigers with conical notopodia, with superior elongate narrowly-hooded and inferior broadly-hooded notochaetae (type B). Thoracic neuropodial uncini avicular, with several rows of small similar-sized teeth above main fang, well developed breast and medium-sized handle. Companion chaetae with asymmetrical hood, and dentate appearance on proximal half of hood. Abdominal neuropodia as low elevations with elongate, broadly-hooded chaetae arranged in rows. Notopodial abdominal uncini similar to thoracic uncini but with shorte handle. Pygidium with a low rim around ventral anus; two red eyespots on each side. Tube mucous with sediment and medium-sized calcareous particles such as shell and coral fragments and foraminiferans.

Remarks. These specimens are characterised by the presence of single radiolar eyes on the dorsalmost pair of radioles, collar dorsal margins not fused to faecal groove but possessing incipient lateral pockets on some specimens, lack of a caruncle, thoracic ventral shields separated from neuropodial tori and broadly-hooded inferior thoracic chaetae (type B). With these features, the specimens belong to "Group 2A" (*sensu* Knight-Jones 1997) and "Group 2A2" (*sensu* Capa & Murray 2009), groups recovered as paraphyletic from cladistic analyses of the genus performed so far (Capa & Murray 2009; Tovar-Hernández & Carrera-Parra 2011). The Lizard Island specimens share the same pigmentation pattern as the type material (Knight-Jones 1997). The specimens described herein differ from those from New Zealand by their size, the ones from Lizard Island being more than twice the length of those in the original description. Other minor differences may be a consequence of size, such as the length of dorsal lappets. The specimens examined herein possess inferior thoracic chaetae slightly more elongated than those drawn by Knight-Jones (1997). It would be ideal to compare further material of similar size to confirm the presence of this species in Australian waters.

Habitat. Sand and seagrass, 24 m depth.
Type locality. Kaikoura, New Zealand.
Distribution. New Zealand, Australia (Queensland: Lizard Island).

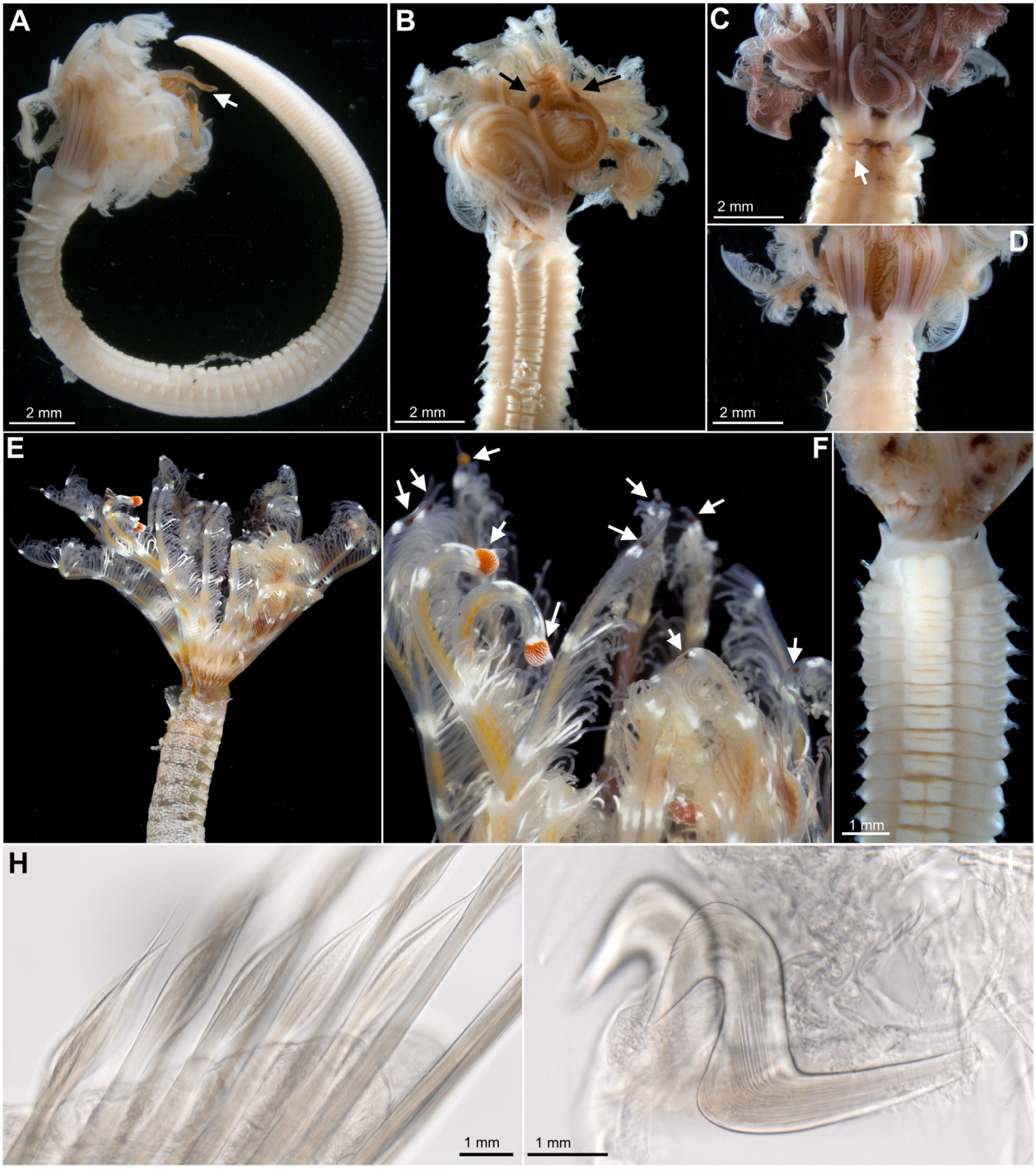

FIGURE 13. A–D. *Megalomma* cf. *kaikourense.* A. Complete specimen, lateral view, with compound subdistal eyes in longest, dorsalmost radioles (one of the eyes is not fully developed, arrow); B. Anterior end, ventral view, with exposed radiolar eyes (arrows), thoracic ventral shields separated from neuropodial tori; C. Specimen with dorsal margins of collar separated, not fused to faecal groove but showing incipient pockets on both sides (arrow); D. Specimens without pockets; E–I. *Megalomma* sp. E-F, live specimen; E. Radiolar crown and thoracic chaetigers, lateral view; F. Detail of radiolar tips, with compound subdistal radiolar eyes present in most radioles (arrows); G. Thoracic and anterior abdominal chaetigers, ventral view, showing the wide gap between ventral shields and thoracic neuropodia; H. Detail of inferior thoracic notochaetae, broadly-hooded type B; I. Thoracic avicular uncini, with several rows of small teeth, all similar in size above main fang, well developed breast and medium-sized handle. Photographs: E, F by Alexander Semenov.

***Megalomma* sp.**
(Fig. 13E–I)

Material examined. AM W.44466, MI QLD 2424.

Description of material examined. Specimen incomplete, over 20 mm long and 3 mm wide. Seven thoracic and numerous abdominal chaetigers. Live specimen with radiolar crown with several orange and white transverse bands of different widths, especially conspicuous in inner margin of radioles and in pinnules (Fig. 13E–F). Dorsalmost radiolar eyes orange, in some cases with a white reticule (Fig. 13F), other smaller eyes brown (Fig. 13F). Body is pale cream, with anterior end covered in white spots (Fig. 13E). Specimens lose pigmentation after fixation, only a few pigmented bands stay on radioles, and are white with dark brown radiolar eyes. Radiolar crown with semicircular lobes (Fig. 13E). Dorsal and ventral flanges absent. Basal membrane or radiolar flanges absent. About six vacuolated cells supporting radioles in cross section at the base. Dorsalmost pair of radioles longer than the rest, each with a large subdistal compound eye almost surrounding the whole radiole, all other radioles with smaller, spherical and similarly-sized subdistal eyes (Fig. 13E–F). Dorsal lips with medium radiolar appendages, dorsal pinnular appendages absent. Caruncle absent. Ventral lips and parallel lamellae present, ventral sacs inside radiolar lobes. Posterior peristomial ring with margins separated by a wide gap, not fused to faecal groove, not forming dorsal pockets (Fig 13E); triangular ventral lappets separated by a midventral incision (Fig. 13G). Glandular ridge absent on anterior chaetigers. Thoracic ventral shields separated from adjacent neuropodial tori by a gap (Fig. 13G). First ventral shield with M-shaped anterior margin (Fig. 13G). Interramal eyespots absent. Collar chaetae elongate narrowly-hooded in two oblique rows. Following thoracic chaetigers with conical notopodia; superior elongate narrowly-hooded and inferior broadly-hooded notochaetae (type B, Fig. 13H). Thoracic neuropodial uncini avicular, with several rows of small teeth, all similar in size above main fang, well developed breast and medium-sized handle (Fig. 13I). Companion chaetae with dentate appearance on proximal half of hood, distally asymmetrical. Abdominal neuropodia as low elevations with elongate, broadly-hooded chaetae arranged in rows. Notopodial abdominal uncini similar to the thoracic but with shorter handle. Pygidium not studied. Tube not observed.

Remarks. This specimen resembles *M. interrupta*, described above, in that the dorsal collar margins are not fused to the faecal groove and ventral shields are separated by a gap from adjacent neuropodial tori. However, unlike *M. interrupta*, it possesses distal eyes on all radioles, all spherical and similar in size, except for the dorsalmost pair, which are larger and surround the radiolar tip almost completely. According to artificial grouping of *Megalomma* species, this species belongs to ″Group 2C″ together with *M. trioculatum* Reish, 1968, described from Marshall Islands and *Megalomma* sp. 2 described from Victoria, Australia (Knight-Jones 1997; Capa & Murray 2009). *Megalomma trioculatum* is distinguished from the specimen described herein by the type of inferior thoracic chaetae, which have abruptly narrowing tips (type A), whereas in this specimen they are progressively tapering (type B) (Capa & Murray 2009). *Megalomma* sp. 2 also differs from this specimen as it only bears radiolar eyes on the two dorsalmost pairs of radioles instead of on all radioles (Capa & Murray 2009).

Habitat. Coral rubble, between 5–12 m depth.

Type locality. Lizard Island.

Distribution. Australia (Queensland: Lizard Island).

Genus *Myxicola* Koch 1847

Type-species. *Terebella infundibulum* Renier, 1804.

***Myxicola nana* n. sp.**
(Figs 14–15)

Material examined. Holotype: AM W.45485, MI QLD 2445 (on SEM).

Description. Holotype 3.5 mm long, 0.4 mm wide. Six thoracic and 30 abdominal chaetigers. Specimen with white crown and light orange body when alive. Red interramal eyespots on abdominal segments. Pigmentation faded on preserved specimen. Radiolar crown with semicircular radiolar lobes fused dorsally bearing six pairs of

radioles (Fig. 14A). Dorsal and ventral basal flanges absent. Basal membrane between radioles along $^{1}/_{3}$–$^{1}/_{4}$ of their length; radioles with narrow radiolar flanges along their length, and long ($^{1}/_{3}$ of their length), digitiform bare tips (Fig. 14A). Two rows of vacuolated cells supporting radioles basally. A pair of subdistal radiolar eyes may be present in at least most radioles. Dorsal lips with short radiolar appendages, pinnular appendages absent; ventral radiolar appendages absent, ventral lips developed, extending dorsoventrally along inner surface of base of radiolar lobes (generic feature); parallel lamellae and ventral sacs absent. Posterior peristomial ring collar absent (Fig. 14A, C–D). Anterior peristomial ring with a rounded ventral lobe (Fig. 14C). Narrow glandular ridge on second chaetiger (Fig. 14C–D). Ventral shields inconspicuous. Interramal eyespots absent in thoracic region. First notopodia with two thin elongate-narrowly hooded chaetae. Following thoracic chaetigers with inconspicuous notopodia with 4–5 narrowly-hooded chaetae arranged in a transverse row anterior to the uncini (Fig. 15A–B). Thoracic neuropodia with acicular uncini with four rows of teeth decreasing in size distally over main fang, covering half its length (Fig. 15C). Companion chaetae absent. Interramal eyespots present in abdomen. Abdominal neurochaetae narrowly-hooded, on inconspicuous neuropodia (Fig. 15D–E). Abdominal notopodial tori forming almost complete cinctures around body (generic feature, Figs 14E–G, 15D–F), with avicular uncini with two rows of 2–3 teeth each over main fang, covering most of main fangs length (Fig. 15D–F), breast and handle absent. Pygidium rounded, eyespots not seen (Fig. 14F–G). Pygidial cirrus absent (Fig. 14F–G). Tube not studied.

Remarks. *Myxicola* is an homogenous genus characterised by radioles that are united for most of their length by a basal membrane, abdominal uncinial tori forming almost complete cinctures, a transparent, gelatinous tube, and an atypical arrangement of dorsal and ventral lips (Fitzhugh 1989, 2003; Capa *et al.* 2011). About 20 species have been described in the genus, the most recent in 1928 (Read 2015), but the number of currently accepted species is approximately six, due to various subsequent synonymisations. Some of these revisions have led to the consideration of *Myxicola infundibulum* (Renier, 1804) as a cosmopolitan species (e.g., Fauvel 1927; Day 1961; Imajima 1968; Hutchings & Glasby 2004; Edgar 2008), and that its presence also in Australia may be due to anthropogenic translocation out of its natural distribution range (Boyd *et al.* 2002; Hutchings & Glasby 2004; Smith & Carlton 2007; Dane 2008).

The single specimen found in Lizard Island is very small compared to other reported *Myxicola* specimens (generally 15–400 mm long), so some of its morphological features could be size-dependant. It exhibits, for example, a short radiolar basal membrane joining the radioles for less than one third of their length instead of for most of the length of the radioles, as in other congeners. This species is also characterised by the presence of radiolar eyes, with a similar arrangement as those described in *M. ommatophora* Grube, 1878, from the Philippines. *Myxicola nana* n. sp. is unique, if compared with other congeners, in the morphology of the abdominal uncini, which have up to six teeth, with an irregular arrangement and which also vary in size even between proximal uncini (Fig. 14F), instead of a single tooth on top of the main fang as reported for most other species (e.g., Grube 1878; Fauvel 1927; Dane 2008; Giangrande *et al.* 2012). However, detailed studies have shown that *M. infundibulum,* at least, has some additional (one to four) smaller flanking teeth in addition to the main tooth (Dane 2008), and it was suggested that the small variation observed between the geographically distant populations studied was size-related (the larger the specimens, the more ′secondary′ teeth they possess). This is obviously not the case for the specimens described herein, which are very small compared to those studied by Dane (2008) and which possess large and more numerous uncinial teeth.

The only *Myxicola* species reported in Australia so far is the apparently introduced *M. infundibulum* and, as mentioned above, this specimen differs from it in several features (e.g., number of thoracic chaetigers, presence of radiolar eyes, uncinial morphology; see also Table 4 for species comparison). In Australia, the genus has only been recorded from South Australia and Victoria, so its presence is a new record for Queensland.

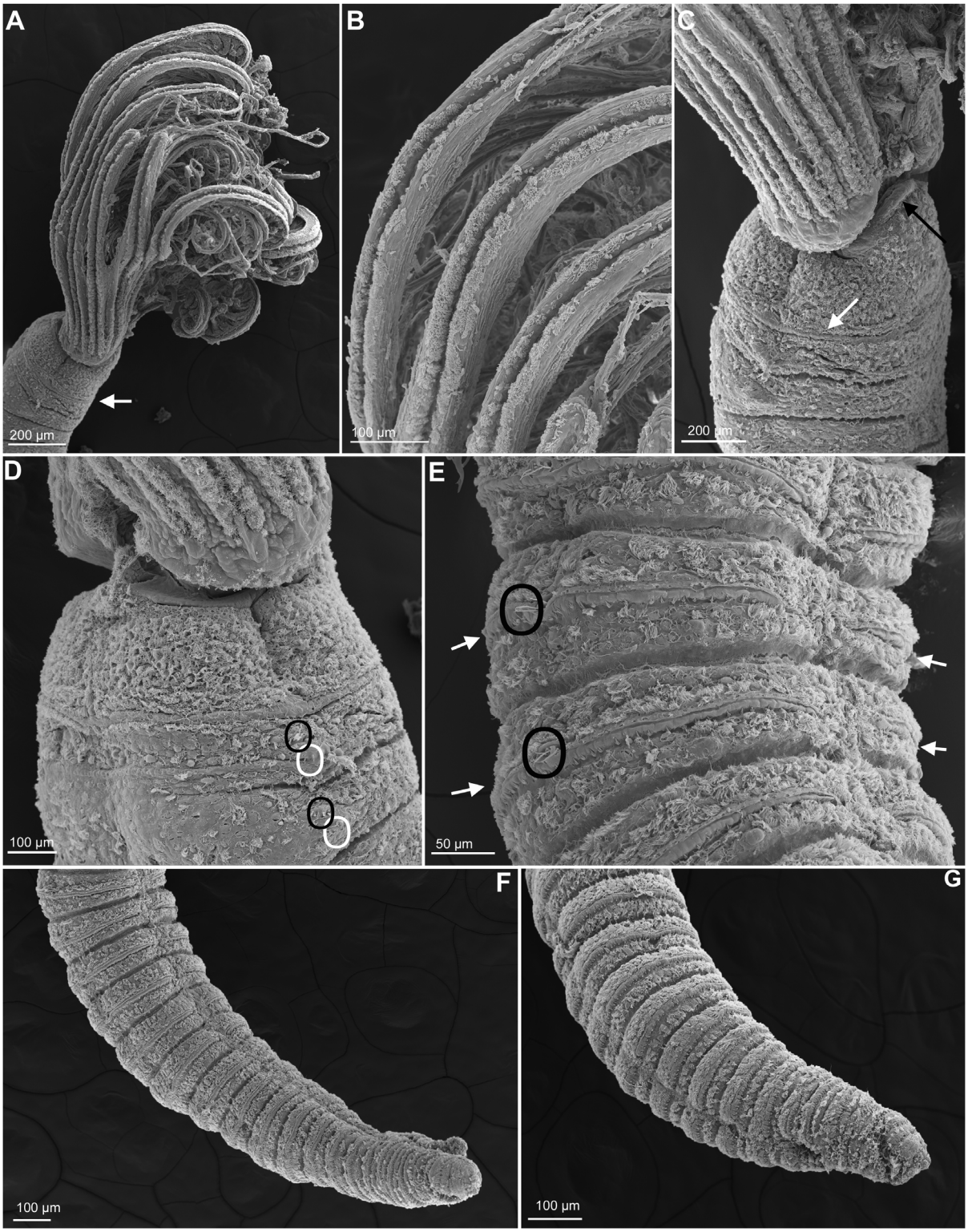

FIGURE 14. *Myxicola nana* n. sp., scanning electron micrographs. A. Anterior end showing radiolar crown and medium-length basal membrane, radiolar flanges and glandular ridge on second chaetiger (arrow); B. Detail of radioles and radiolar flanges; C. Base of radiolar crown and anterior thoracic chaetigers, lateroventral view; glandular ridge (white arrow) and anterior ventral peristomial lobe (black arrow) shown; D. Anterior thoracic chaetigers, dorsal view; notopodial chaetae (black circles) and neuropodial uncini (white circles) are minute; E. Midabdominal chaetigers with notopodial tori encircling the animal (arrows); neuropodial chaetae minute (circles); F. Posterior abdominal chaetigers and pygidium, lateroventral view, G. Same, laterodorsal view.

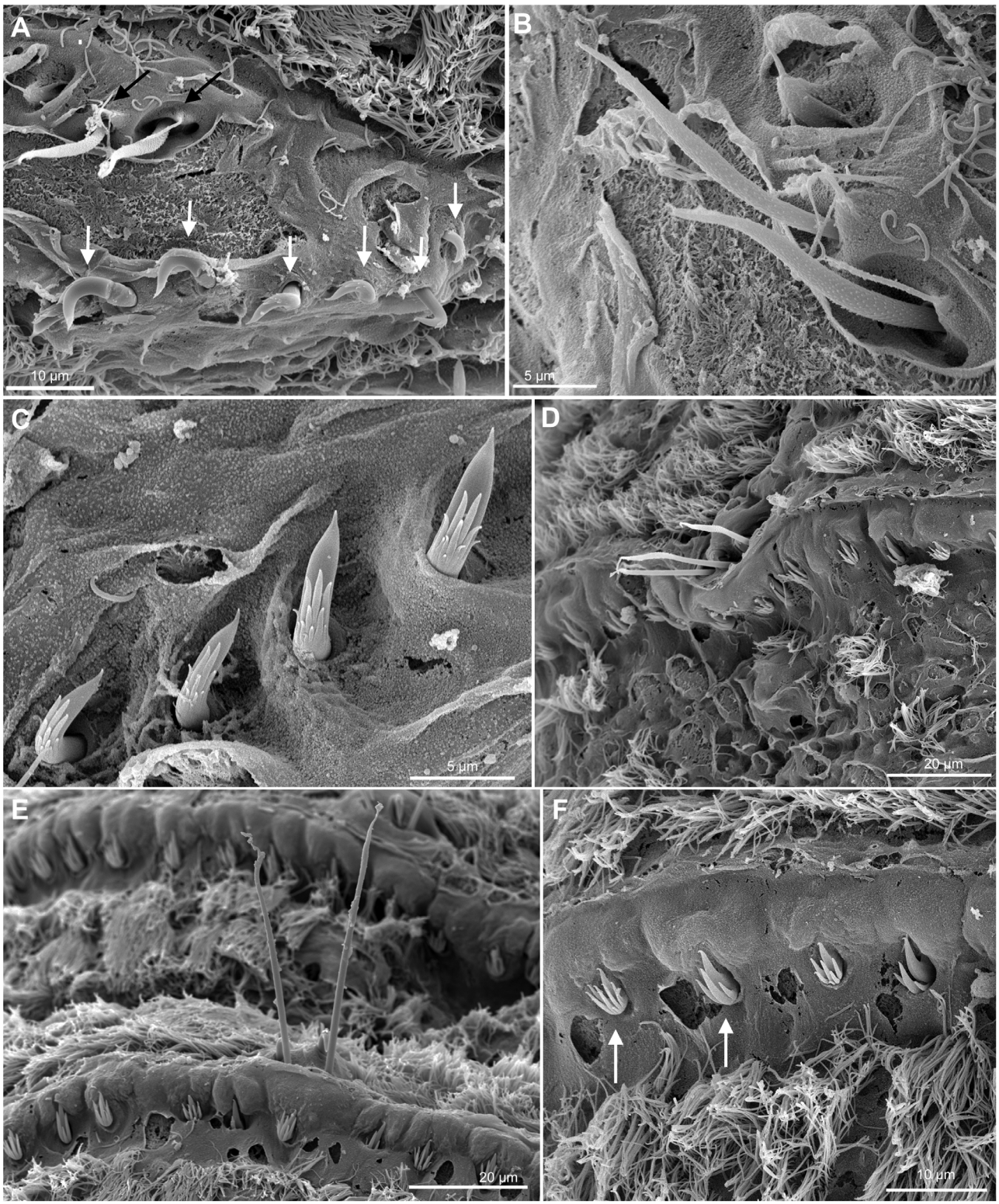

FIGURE 15. *Myxicola nana* n. sp., scanning electron micrographs. A. Anterior thoracic parapodium, with notopodial chaetae (black arrows) and neuropodial uncini (white arrows); B. Thoracic chaetae, narrowly-hooded; C. Thoracic uncini with four rows of teeth dismissing in size distally over main fang, covering half its length; D. Abdominal parapodia with cinctures of glandular tori and uncini and narrowly-hooded neurochaetae; E. Same from posterior view; F. Abdominal uncini each with two rows of 2–3 teeth over main fang (variable within chaetigers, see arrows).

TABLE 4. Comparison of main diagnostic features of some of the better documented species of *Myxicola*

	M. aesthetica	*M. infundibulum*	*M. ommatophora*	*M. nana n. sp.*
Size	up to 40 mm	up to 400 mm	43 mm	3.5 mm
N. thoracic chaetigers	<6	8	8	6
Basal membrane	>¾ length of crown	>¾ length of crown	>¾ length of crown	$^{1}/_{3}$ length of crown
Radiolar eyes	absent	absent	paired, subdistal	paired, subdistal
Anterior ventral lobe	well developed, acute	well developed, acute	low, rounded	low, rounded
Abdominal uncini	? one tooth over main fang	one main tooth and up to four additional small flanking teeth*	? one tooth over main fang	3–6 large teeth over main fang

* In populations from Europe, North America and Australia (Dane 2008)

Etymology. The species epithet refers to the very small size of the specimen described, in comparison to other reported members of this genus, and is derived from the Latin word "nanus" meaning dwarf.

Habitat. Muddy sediment with *Halimeda*, 25 m depth.

Type locality. Lizard Island.

Distribution. Australia (Queensland: Lizard Island).

Genus *Notaulax* Tauber, 1879

Type-species. *Notaulax rectangulata* Levinsen, 1884.

Notaulax sp. 1

(Fig. 16A–G)

Material examined. Queensland, Great Barrier Reef: AM W.36475, Linnet Reef, 14°46′50″S, 145°20′58″E, coarse coral rubble, 4 m, 23 Feb 2009; AM W.36591, North Direction Island, 14°44′35″S, 145°30′51″E, coarse coral rubble, 2–11 m, 17 Feb 2009; AM W.37002, AM W.41374, North Direction Island, 14°44′43″S, 145°30′18″E, coarse coral rubble, 8 m, 26 Aug 2010. Lizard Island: AM W.37000, AM W.37001, south of Mermaid Cove, 14°38′53″S, 145°27′E, coarse coral rubble, 14.5 m, 1 Sep 2010; AM W.37003, AM W.41003, Watsons Bay, 14°39′26″S, 145°27′03″E, coarse coral rubble, 4.5 m, 28 Aug 2010; AM W.37020, MacGillivray Reef, 14°39′23″S, 145°29′31″E, coarse coral rubble, 22 m, 29 Aug 2010; AM W.37024, reef walk to Loomis Beach, 14°41′02″S, 145°27′01″E, sandstone reef, 0.3 m, 7 Sep 2010; AM W.37025, lagoon near east entrance, 14°40′S, 145°28′E, May 2009; AM W.39474 (5), between Bird and South Islands, 14°40′S , 145°28′E, 12 m, dead *Porites* coral blocks, Jan 1987; AM W.40981, south of Mermaid Cove, 14° 38′53″S, 145°27′E, coarse coral rubble, 14.5 m, 1 Sep 2010; AM W.41004 (2), reef walk to Loomis Beach, 14°41′02″S, 145°27′01″E, 0.3 m, 7 Sep 2010; AM W.41005, Turtle Beach, 14°39′08″S, 145°27′04″E, coral rubble, 1 m, 30 Aug 2010; AM W.41401, North Point, 14°38′40″S, 145°27′17″E, 20 m, 31 Aug 2010; AM W.43931, MI QLD 2341; AM W.44213, MI QLD 2359 (2); AM W.45161, MI QLD 2446; AM W.45163, MI QLD 2446 (2); AM W.47745, MI QLD 2446.

Description of material examined. Largest specimen 35 mm long, 1.8 mm wide. Eight thoracic and numerous abdominal chaetigers. Radiolar crown with diverse pigmentation pattern among specimens; with three or four darkly pigmented transverse bands on pinnules and lateral margins of radioles, with dark brown predominating in some specimens and others with lighter pigmentation; pigment absent on outer margins of radioles (Fig. 16A–B, D, F). Thoracic chaetigers light orange, with pigmentation fading towards abdominal segments (Fig. 16A, C–D, F–G). Preserved specimens maintain some colour pattern in the radiolar crown, but pigment along the body fades completely. Radiolar crown with semicircular, thick, stout, elongate branchial lobes fused dorsally near the base of radioles (Fig. 16A, C–D). Dorsal and ventral basal flanges along the branchial lobes.

Basal membrane between radioles along $^{1}/_{3}$ of their length; radioles without distal radiolar flanges, and short bare tips (Fig. 16A–C, G). Four rows of vacuolated cells supporting radioles basally. Around 15–20 ocelli arranged in single or double rows, along radioles for the length of 8–20 pinnular basal insertions (Fig. 16B, E). Dorsal lips long, without radiolar appendages. Ventral lips and parallel lamellae present; ventral sacs absent. Posterior peristomial collar complete, slightly higher ventrally (Fig. 16A, C, G), with a short ventral notch or incision present in some specimens, dorsally entire or notched. Glandular ridge absent on anterior chaetigers. Thoracic ventral shields in contact with adjacent neuropodial tori, first ventral shield with straight anterior margin (Fig. 16A, G). Interramal eyespots absent. Collar chaetae spine-like, arranged in longitudinal, strongly curved rows (Fig. 16C). Following thoracic chaetigers with conical notopodia; superior thoracic chaetae broadly-hooded, inferior paleate, without mucro. Thoracic neuropodia with avicular uncini with tiny teeth above the main fang, covering more than half its length, well developed breast and medium-sized handle. Companion chaetae with asymmetrical hood, and loose fibres on most of hood surface. Abdominal neurochaetae on short, slightly elevated neuropodia, with superior paleate chaetae with long mucro and inferior elongate narrowly-hooded chaetae. Neuropodial uncini similar to thoracic but with teeth covering more than three quarters of main fang. Pygidium incipiently bilobed, eyespots absent. Tube thin and transparent without attached sediment.

Remarks. This species is characterised by the presence of radiolar ocelli in groups of around 20 aligned in single row, sometimes in a double row proximally, approximately the length of 8–10 pinnular basal insertions, and an entire posterior peristomial ring collar, slightly convex ventrally and not incised on anterior ventral margin, but with a dorsal incision. It resembles *N. rectangulata* Levinsen 1884, described from Denmark, and *N. nudicullis* (Krøyer, 1856) from the Virgin Islands, in general number and arrangement of eyes and the shape of collar. Nevertheless, some minor differences have been found indicating the Lizard Island specimens could belong to an undescribed species. Moreover, these two apparently broadly distributed species need revision to clarify species boundaries, probably also including molecular data. A revision of the genus *Notaulax* in Australia (Capa & Murray in prep.) will try to clarify this and other taxonomic issues in the genus.

Habitat. Coral rubble, 6–16 m depth.

Distribution. Australia (Queensland: Lizard Island).

***Notaulax* sp. 2**
(Fig. 16H–J)

Material examined. Queensland, Great Barrier Reef: AM W.41399 (crown), North Direction Island, 14°44′43″S, 145°30′18″E, 8 m, 26 Aug 2010; AM W.41402, Day Reef, 14°28′30″S, 145°32′12″E, 17 m, 5 Sep 2010. Lizard Island: AM W.22570 (15), between Bird and South Islands, 14°40′S, 145°28′E, 12 m, dead *Porites* coral blocks, Jan 1987; AM W.41375, AM W.41400 (crown), MacGillivray Reef, 14°38′53″S, 145°29′12″E, coral rubble, 14 m, 31 Aug 2010; AM W.41397 (2), MacGillivray Reef, 14°39′23″S, 145°29′31″E, 22 m, 29 Aug 2010; AM W.41398, Turtle Beach, 14°39′08″S, 145°27′04″E, 1 m, 30 Aug 2010; AM W.47233 (crown), MacGillivray Reef, 14°39′23″S, 145°29′31″E, coral rubble, 22 m, 29 Aug 2010; AM W.41376, AM W.47394 (2), Watsons Bay, 14°39′26″S, 145°27′03″E, coral rubble, 4.5 m, 28 Aug 2010; AM W.197050 (2), lagoon, drop off between Bird Islet and South Island, 14°42′S, 145°28′E, dead coral rock, 9 m, Apr 1978; AM W.43874, MI QLD 2331; AM W.43943, MI QLD 2356 (crown); AM W.44216, MI QLD 2381 (1 + 2 crowns).

Description of material examined. Longest specimen over 35 mm long, 1.5 mm wide, with 7–8 thoracic and numerous abdominal chaetigers. Radiolar crown with dark and white transverse bands, especially conspicuous on pinnules and lateral margins of radioles (Fig. 16H–I). Radiolar ocelli dark brown (Fig. 16H). Thoracic chaetigers light orange, with pigmentation fading towards abdominal segments (Fig. 16J). Some specimens maintain the colour of the radiolar crown but pigmentation fades after fixation and preservation. Radiolar crown with semicircular, thick, stout elongate branchial lobes (Fig. 16H), fused dorsally near the base of radioles. Dorsal and ventral basal flanges along the branchial lobes. Basal membrane between radioles, along $^{1}/_{3}$ of their length; radioles with narrow distal radiolar flanges, bare tips of medium length (as long as the length on one pinnule) (Fig. 16H). Four rows of vacuolated cells supporting radioles basally. Up to 30 ocelli arranged in a single row along radiole from the margin of basal membrane to distal pinnules. Dorsal lips long, without radiolar appendages. Ventral lips and parallel lamellae present; ventral sacs absent. Posterior peristomial collar complete, higher ventrally, entire or with a small midventral incision, and may be notched middorsally. Glandular ridge absent on anterior chaetigers.

FIGURE 16. A–G. *Notaulax* sp. 1, live specimens. A. Anterior end showing elongate basal radiolar lobes, and anterior margin of collar entire ventrally, and general pigmentation pattern; B. Detail of radioles showing the edge of the basal membrane (white arrows) and the groups of orange ocelli (black arrows); C. Radiolar lobes and anterior thoracic chaetigers, dorsal view, showing arrangement of collar chaetae; D. Anterior end, lateral view; E. Detail of radiolar ocelli; F. Broken specimen, lateral view, showing general pigmentation pattern; G. Detail of anterior end, showing elongate base of radiolar crown, entire ventral collar margin, and ventral shields in contact with neuropodial tori; H–J. *Notaulax* sp. 2; H. Anterior end showing general colour pattern; I. Detail of radioles showing ocelli arrangement on radioles; J. Base of radiolar crown and anterior thoracic chaetigers. Photographs: A, B, D–F by Alexander Semenov.

Thoracic ventral shields in contact with adjacent neuropodial tori, first ventral shield with straight anterior margin (Fig. 16J). Interramal eyespots absent. Collar chaetae arranged in long J- or C-shaped curved rows, spine-like. Following thoracic chaetigers with conical notopodia; superior thoracic chaetae broadly-hooded, inferior paleate, without mucro. Thoracic neuropodia with avicular uncini with tiny teeth above the main fang, covering more than half its length, well developed breast and medium-sized handle. Companion chaetae with asymmetrical hood, and loose fibres on most of hood surface. Abdominal neurochaetae on short, slightly elevated neuropodia, with superior paleate chaetae with long mucro and inferior elongate narrowly-hooded chaetae. Neuropodial uncini similar to thoracic but with teeth covering more than three quarters of main fang. Pygidium a rounded lobe, few red spots may be present ventrolaterally. Tube thick, orange, transparent and chitinous, without attached sediment.

Remarks. The material examined shows broad variation in the morphology of the anterior margin of the collar, and some specimens possess an entire collar margin, while others have a small midventral incision and/or a dorsal notch, neither of which extend down to chaetiger 2. Intraspecific variability in collar morphology has been reported for some species, typically with the presence of a midventral incision in juveniles (e.g., Perkins 1984). *Notaulax fuscotaeniata* (Grube, 1874), was originally described from Sri Lanka as having a collar incised ventrally, and radiolar ocelli in a series of about 30 on each side extending from just above palmate membrane to near tips (Perkins 1984), features that are similar to those observed in the specimens described herein. Nevertheless, other details would need to be checked with type material as Grube′s original description is brief, before assigning these specimens to this species or describing it as new.

Habitat. Dead coral and coral rubble, 6–15 m depth.

Type locality. Lizard Island.

Distribution. Australia (Queensland: Lizard Island).

***Notaulax* sp. 3**
(Fig. 17)

Material examined. Queensland, Lizard Island: AM W.30381, east lagoon near Bird Island, 14°42′S, 145°30′E coral rubble, 10 m, 31 Oct 2005; AM W.31848 (2), between First beach and Osprey Island, 14°42′S, 145°30′E, 2 m, 26 Oct 2005; AM W.41373 (crown), 14°38′51″S, 145°29′16″E, 7–12 m, 3 Sep 2010; AM W.197044 (2), lagoon, 14°40′S, 145°27′E, dead coral rock, 12 m, Apr 1978; AM W.43939 , MI QLD 2360; AM W.47341, MI QLD 2419.

Description of material examined. Largest complete specimen (in 3 pieces) ~31 mm long (crown 9 mm), and 2.8 mm wide. Specimens with 8–26 thoracic and numerous abdominal chaetigers. Live specimens with basal lobes of radiolar crown with one dark spot on each side. Radioles with several irregular thin dark bands and paired black spots distally on each radiole (Fig. 17A–B). Thorax darkly pigmented and with a white patch on collar midventrally (Fig. 17C). The number of pigmented segments (1–7) varies among specimens. Abdomen white except for a midventral brownish line more evident in some specimens towards the posterior end. Preserved specimens maintain most of crown pigmentation pattern. Radiolar crown with semicircular thick, stout, elongate branchial lobes (Fig. 17A). Dorsal and ventral basal flanges along the branchial lobes. Basal membrane between radioles, along $^{1}/_{3}$ of their length; radioles with narrow distal radiolar flanges, bare tips of medium length (as long as the length on one pinnule). Four rows of vacuolated cells supporting radiolar basally. Around 20 radiolar ocelli in teardrop-shaped groups on lateral margins of radioles, above the basal membrane, for the length of 5–6 pinnular basal insertions (Fig. 17B). Radioles supported by four rows of vacuolated cells at the base. Dorsal lips long. Posterior peristomial collar with dorsal margins with a dorsal notch and a ventral lobe separated by a short midventral incision. Thoracic ventral shields in contact with neuropodial tori (Fig. 17C). Collar chaetae spine-like, arranged in straight oblique rows, slightly curved in some specimens. Following thoracic chaetigers with conical notopodia, with superior broadly-hooded chaetae and inferior paleate chaetae with inconspicuous mucro. Thoracic neuropodia with uncini with numerous tiny teeth above the main fang, covering more than half its length, well developed breast and medium-sized handle. Companion chaetae with dentate appearance on proximal half of hood, distally asymmetrical. Abdominal notopodia with superior paleate and inferior elongate narrowly-hooded chaetae. Neuropodial uncini similar to thoracic but with teeth covering more than three quarters of main fang. Pygidium rounded with lateral patches of red eyespots. Tube not studied.

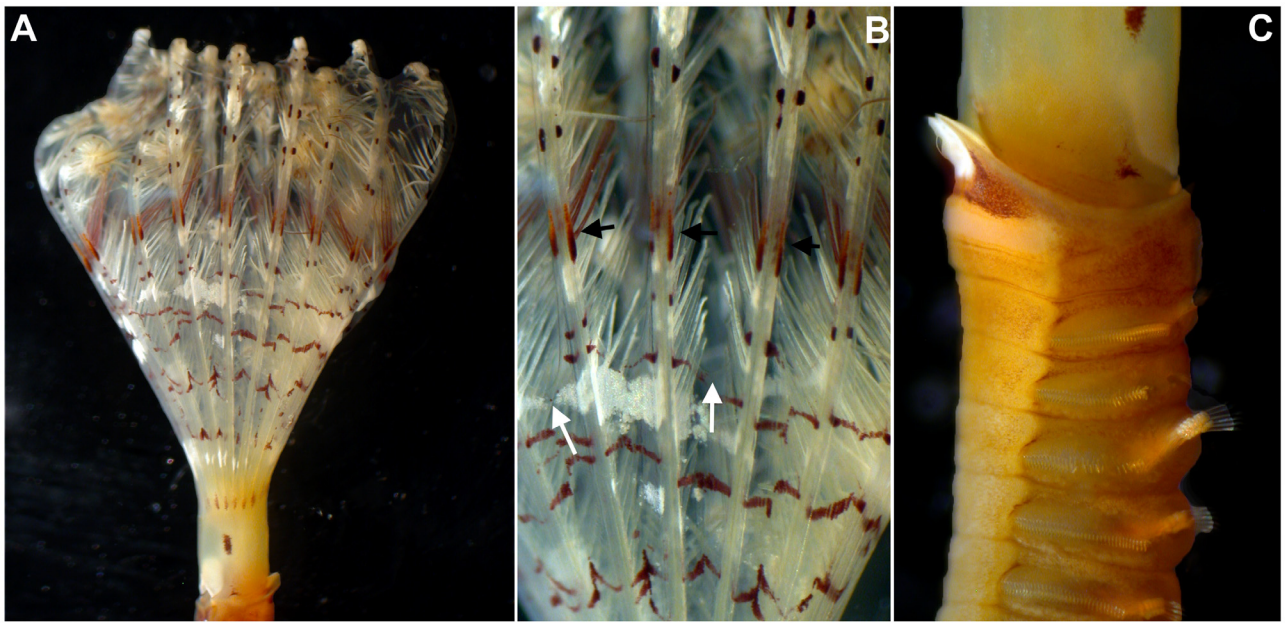

FIGURE 17. *Notaulax* sp. 3, live specimens. A. Radiolar crown showing general colour pattern; B. Detail of radiolar pigmentation, basal membrane edges (white arrows) and radiolar ocelli arranged in compact groups (black arrows); C. Thoracic chaetigers, lateral view, showing collar morphology and chaetal arrangement.

Remarks. This species is characterised by the presence of teardrop-shaped groups of radiolar ocelli, with about 20 in each group, occupying the length of 5–6 pinnular bases, a collar slightly incised ventrally and a particular colour pigmentation in the crown, of thin brown transverse bands proximally and paired spots distally on the radioles. Other congeners described with a ventrally incised collar and oval groups of ocelli include *N. nudicollis* (Krøyer, 1856), from Virgin Islands, *N. alticollis* Grube, 1868, from Red Sea and *N. marenzelleri* (Gravier, 1906), from Red Sea.

Habitat. Dead coral and coral rubble in shallow subtidal water, 2–16 m depth.

Distribution. Australia (Queensland: Lizard Island).

Genus *Paradialychone* Tovar-Hernández, 2008

Type-species. *Chone americana* Day, 1973.

Paradialychone ambigua n. sp.

(Figs 18–19)

Material examined. Queensland, Lizard Island: Holotype: AM W.45165, MI QLD 2444. Paratypes: AM W.44211, MI QLD 2376; AM W.44217, MI QLD 2376 (2, 1 on SEM); AM W.47393, MI QLD 2444 (2, 1 on SEM).

Description. Holotype 5 mm long, 0.3 mm wide, with eight thoracic and 28 abdominal chaetigers. Live specimens with radiolar crown almost transparent with radioles with broad irregular white pigmented bands alternating with thin orange bands, and white radiolar lobes and base (Fig. 18A). Body transparent, with visible yellow gut and bright orange eggs, in gravid females, along the thoracic and midanterior abdominal chaetigers (Fig. 18A). Preserved specimens whitish, opaque, with no pigment in radioles, gut or eggs. Methyl blue stains ethanol-fixed specimens lightly all over body with a darker and not well delimited transverse blue band around the peristomium (Fig. 18B, D–E). Glandular ridge on chaetiger 2 becomes more conspicuous (white) due to pigmentation of anterior thoracic chaetigers (Fig. 18B). Holotype a gravid female. Radiolar crown with semicircular lobes each with five radioles, with long pinnules gradually decreasing in length distally, radioles with long bare filiform tips (Figs 18C, 19A). Dorsal and ventral basal flanges absent (Fig. 19A–B). Basal membrane

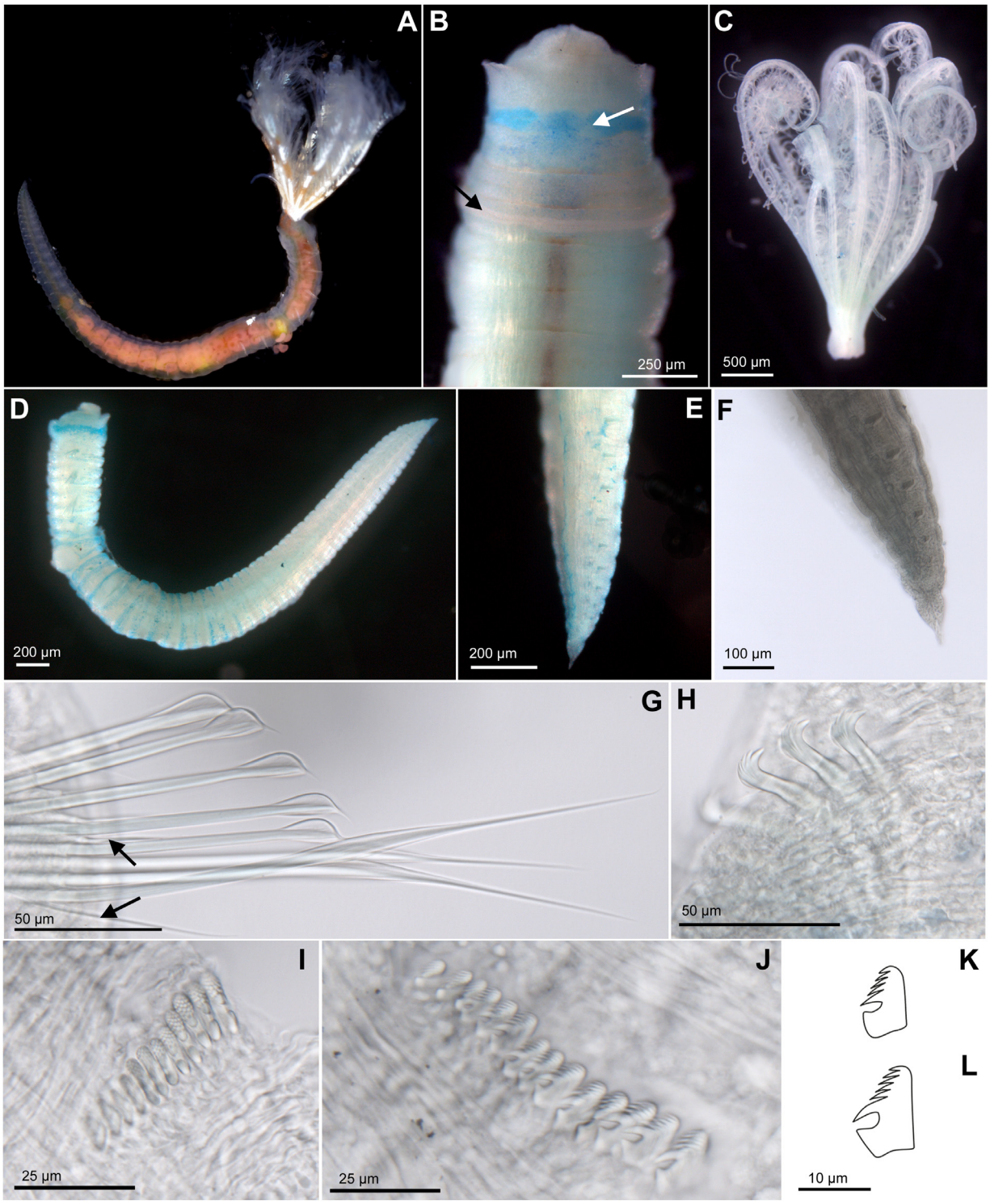

FIGURE 18. *Paradialychone ambigua* n. sp. A. Live specimen, holotype, female filled with eggs; B–E. Preserved specimens stained with methyl blue; B. Anterior end with detached crown showing the first ventral shield (white arrow) and glandular ridge on chaetiger 2 (black arrow); C. Detached radiolar crown; D. Whole specimen, showing staining pattern; E. Posterior abdominal chaetigers and pygidium, with cirrus. F. Detail of pygidium and posterior chaetigers; G. Midthoracic notopodia with superior narrowly-hooded chaetae, inferior paleate chaetae with medium length mucro and bayonet chaetae (arrow); H. Thoracic uncini acicular, with rows of teeth diminishing in size, first larger and medially arranged, covering $^{3}/_{4}$ of the length of main fang; I. Anterior abdominal uncini avicular, with 4–6 rows of similar-sized teeth, occupying $^{1}/_{2}$ the length of main fang; J. Posterior abdominal uncini modified, with main fang surmounted by five rows of almost similar-sized teeth, occupying most of the length of main fang, breast hooked, rectangular, handle absent; K. Drawing, anterior abdominal uncinus; L. Drawing, posterior abdominal uncinus. Photograph A by Alexander Semenov.

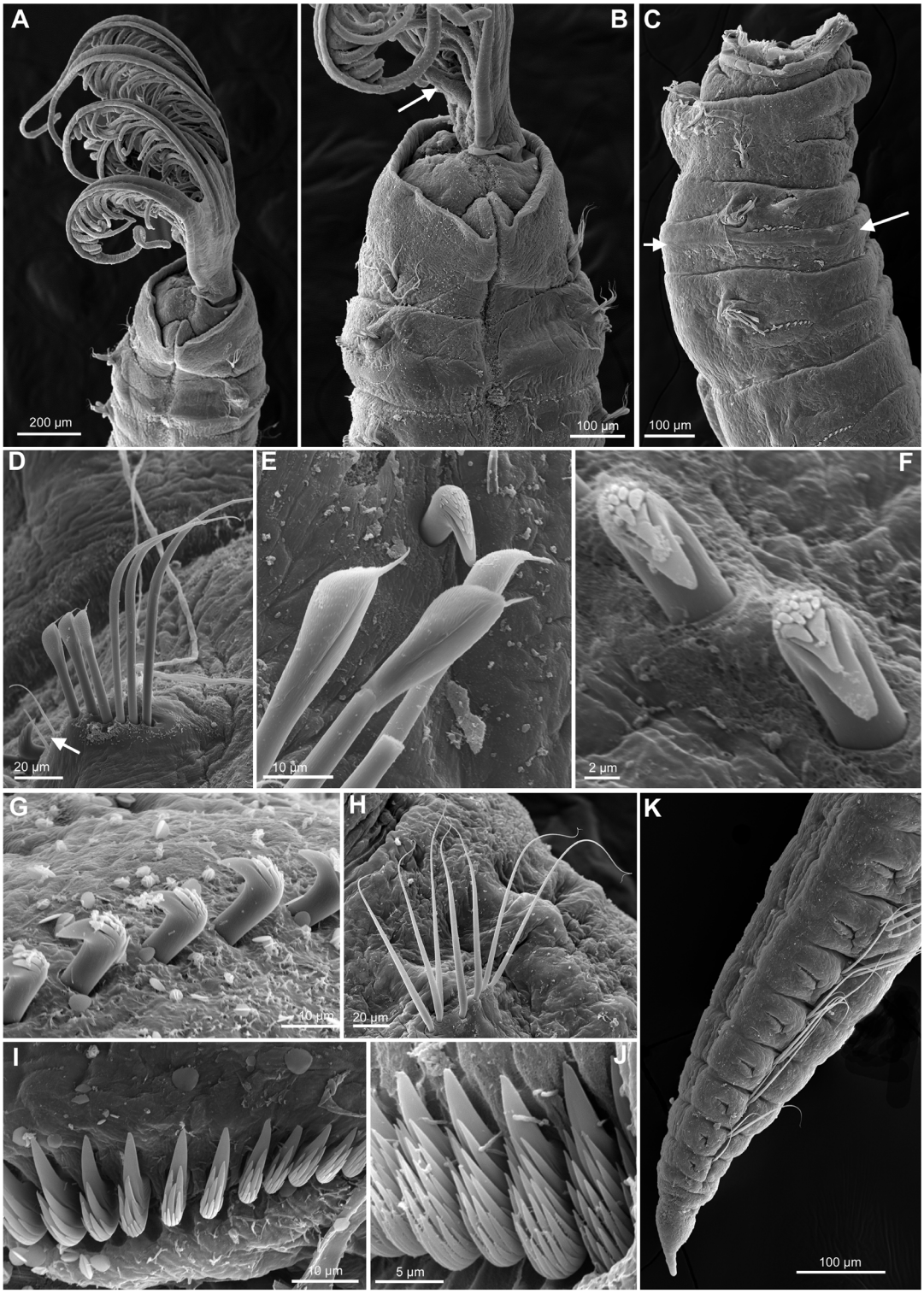

FIGURE 19. *Paradialychone ambigua* n. sp., scanning electron micrographs. A. Anterior end showing half of the crown and anterior thoracic chaetigers; B. Same, shown details of the base of the radiolar lobe, with the dorsal lips and radiolar appendages (arrow), and the collar dorsal margins fused to the faecal groove; C. Anterior end, lateral view, of a specimens with a detached crown; apparent glandular ridge around chaetiger two (arrow); D. Thoracic notopodium with narrowly-hooded superior chaetae, paleate inferior chaetae and an additional bayonet chaetae (arrow); E. Detail of inferior thoracic chaetae, dorsal view and neuropodial uncinus; F. Thoracic uncini with a large medial tooth above main fang and several rows of teeth diminishing in size distally; front view; G. Same, side view; H. Abdominal neurochaetae, narrowly hooded; I. Anterior abdominal uncini with 4–6 rows of similar-sized teeth, occupying $^{1}/_{2}$ the length of main fang; J. Posterior abdominal uncini modified, with main fang surmounted by five regular rows of almost similar-sized teeth, occupying most of the length of main fang; K. Posterior abdominal chaetigers and pygidium, with an incipient cirrus.

extends $^1/_4$ the length of radioles; narrow radiolar flanges to tips of radioles (Figs 18C, 19A–B). Two rows of vacuolated cells supporting radioles basally, not prolonged to radiolar flanges. Radiolar eyes absent. Dorsal lips triangular and erect, only slightly longer than wide (Fig. 19B), without dorsal radiolar appendages; one or two pairs of pinnular appendages. Ventral lips and parallel lamellae present; ventral sacs absent. Anterior peristomial ring lobe triangular, slightly exposed beyond collar. Posterior peristomial ring collar with dorsal margins fused to faecal groove, anterodorsal margins entire and ventral margin slightly higher than dorsal, not incised midventrally (Figs 18B, 19A–C). Narrow glandular ridge all around chaetiger 2 (Figs 18B, D, 19B–C). Thoracic ventral shields not conspicuous; first shield with rounded convex anterior margin (Fig. 17B). Interramal eyespots absent (Fig. 18D). Collar chaetae narrowly-hooded, arranged in oblique rows. Following thoracic chaetigers with slightly elevated notopodia narrowly-hooded superior chaetae, paleate inferior chaetae with medium length mucro and an additional anterior row of bayonet chaetae (Figs 18G, 19D–E). Six to eight thoracic neuropodial uncini acicular, with 5–6 rows of teeth diminishing in size, first larger and medially arranged, covering $^3/_4$ of the length of main fang (Figs 18H, 19F–G). Companion chaetae absent. Abdominal chaetigers with inconspicuous neuropodia with elongate, narrowly-hooded chaetae (Fig. 19H). Anterior abdominal uncini avicular, with 4–6 rows of similar-sized teeth over $^1/_2$ the length of main fang, breast rectangular and handle absent (Figs 18I, K, 19I); posterior abdominal uncini modified, with main fang surmounted by five regular rows of almost similar-sized teeth, occupying most of the length of main fang (Figs 18J, L, 19J), breast rectangular and hooked, handle absent (Fig. 18J). Pre-pygidial depression absent (Figs 18D–F, 19K). Pygidium conical, with incipient cirrus (Figs 18D–F, 19K); pygidial eyespots not seen. Mucous tube, very thin and fragile with some muddy particles attached.

Variation. Paratypes up to 8 mm long, including a 2 mm crown, and 0.3 wide. Paratypes have five or six radioles on each radiolar lobe. The number of thoracic chaetigers in examined specimens is eight and number of abdominal chaetigers varies between 25 and 32. The holotype is a gravid female with eggs in inferior thoracic and most abdominal chaetigers.

Remarks. The present species shares several of the diagnostic features typically attributed to *Chone* Krøyer, 1856, *Dialychone* Claparède, 1870 and *Paradialychone*, according to Tovar-Hernandez's (2008) revision of the group. The placement of this new taxon into one of them, based on external morphology, is ambivalent and will remain uncertain until new evidence (most likely molecular) is found. *Paradialychone ambigua* n. sp. shares with other members of *Paradialychone* the presence of a short radiolar membrane, elongated dorsal lips (also shared with *Chone* and *Dialychone*), dorsal pinnular appendages (also shared with *Chone*), pinnules similar in length along radioles, thoracic uncini with teeth occupying $^3/_4$ of the length of main fang and with a proximal larger tooth surmounted by rows of smaller teeth, and the presence of modified posterior abdominal uncini with teeth covering $^3/_4$ of main fang (Table 5). Nevertheless, it does not possess some of the features defined as typical of species of *Paradialychone*, that are contrarily present in the other genera. For example, similarly to other *Chone*, *Paradialychone ambigua* n. sp. does not have a pre-pygidial depression, but unlike *Chone*, it does possess modified uncini in the posterior abdominal segments (Table 5). Moreover, in anterior abdominal chaetigers the uncini teeth decrease in size distally (unlike members of *Paradialychone* or *Chone*) occupying about one half the length of main fang, similar to the pattern found in *Dialychone* (Table 5).

This species is therefore characterised by its unique combination of features, highlighted by the dentition of the uncini of anterior abdominal chaetigers, lacking a single proximal tooth larger than the rest over the main fang and instead having rows of teeth decreasing in size distally.

A similar species present in Australian waters is *Dialychone australiensis* (Hartmann-Schröder, 1979), described from Western Australia, but it differs from *P. ambigua* n. sp. in the presence of a simple pre-pygidial depression (absent in the new species) and the dentition of the anterior abdominal uncini with similar-sized teeth instead of rows of teeth decreasing in size distally. New record of the genus for Australia.

Etymology. The name of this species, from the Latin word "ambigua", refers to the ambiguity of its generic placement due to the mixed combination of morphological traits.

Habitat. Sand with mangrove detritus or seagrass, in depths of 0.5–24 m.

Type locality. Lizard Island.

Distribution. Australia (Queensland: Lizard Island).

TABLE 5. Diagnostic features for *Chone*, *Dialychone*, *Paradialychone* and the new species

	Chone	*Dialychone*	*Paradialychone*	*Paradialychone ambigua n. sp.*
Basal membrane	long	short-long	long	short
Dorsal lips	broadly rounded	elongated	elongated	elongated
Dorsal pinnular appendages	present	absent	present	present
Pinnules	longest at mid radiole	longest at mid radiole	equal in length	equal in length
Anterior peristomial ring	entire, triangular or digitiform	triangular or bilobed	triangular or bilobed	triangular
Glandular ridge on ch. 2	narrow	narrow, broad dorsally or ventrally, with vertical projections, or hypertrophied	narrow or broad laterally	narrow
Thoracic uncini dentition	over ¼ of main fang; medial tooth of basal row enlarged	over ½ of main fang; teeth decreasing in size gradually	over $^3/_4$ of main fang; medial tooth of basal row enlarged	over $^3/_4$ of main fang; medial tooth of basal row enlarged
Anterior abdominal uncini dentition	around ¼ of main fang; few rows of small teeth	around ½ of main fang; teeth of nearly uniform size	around ½ of main fang; medial tooth of basal row enlarged	around ½ of main fang; teeth decreasing in size distally
Posterior abdominal uncini	similar to anterior	modified uncini with hooked breast, dentition covering $^3/_4$ of main fang	modified uncini with hooked breast, dentition covering $^3/_4$ of main fang	modified uncini with hooked breast, dentition covering $^3/_4$ of main fang
Pre-pygidial depression	absent	simple	simple	absent

Genus *Parasabella* Bush, 1905

Type-species. *Parasabella media* Bush, 1905.

Parasabella aberrans (Augener, 1926)

(Fig. 20A–C)

Sabella aberrans Augener, 1926: 245–253, fig. 18.
Sabella porifera.—Augener 1914: 106–109 (in part).
Demonax aberrans.—Knight-Jones & Perkins 1998: 404.
Parasabella aberrans.—Tovar-Hernández & Harris 2010: 14; Capa & Murray 2015.

Material examined. Queensland, Lizard Island, AM W.197045, 14°40′S 145°27′E, Apr 1977; NTM W.023122 (2), patch reef near lagoon entrance, 14°41′20″S, 145°28′12″E, 2 m, 1 Apr 2008; AM W.43880, MI QLD 2331; AM W.43941, MI QLD 2358; AM W.47743, MI QLD 2354; AM W.45162, MI QLD 2446.

Comparative material examined. Holotype of *Sabella aberrans* Augener 1926, ZMUC–POL–2115, Little Barrier Island, New Zealand, 55 m, 29 Dec 1914, Dr Th. Mortensen Pacific Expedition.

Description of material examined. Up to 35 mm long and 3 mm wide, 5–8 thoracic and numerous abdominal chaetigers. Live specimens examined completely white (Fig. 20A–B) or showing some brown scattered spots on crown and white spots on body (Fig. 20C). Preserved specimens with variable colour pattern, some show pigment spots present along longitudinal axis of radioles and groups of pigmented pinnules and brown thorax (pigment absent from ventral shields and neuropodial tori). Spots between neuro- and notopodial rami, superficially resembling interramal eyespots, present in some specimens.

FIGURE 20. A–C. *Parasabella aberrans*. A–B. Live specimens; A. Anterior end, ventral view; B. Same, dorsal view, showing the fleshy swelling with a transverse ridge on first two chaetigers (arrow); C. Preserved specimens, showing a detail of the dorsal swelling, divided in two by a longitudinal incision; D–F. *Parasabella* sp. cf. *P. japonica* live specimens; D. Anterior end, side view; E. Radiolar crown, side view; F. Anterior chaetigers with detached radiolar crown; conspicuous ventral shields separated from neuropodial tori; G–J. *Perkinsiana anodina*, preserved specimens; G. Anterior end, lateral view. H. Same, dorsal view, showing collar margins separated dorsally; I. Specimen stained with methyl blue, anterior chaetigers, with detached crown, showing the length of thorax (arrow), and the stained ventral shields separated from neuropodial tori; J. Anterior chaetigers showing collar ventral lappets and well developed ventral sacs.

Radiolar crown with semicircular lobes or slightly involuted ventrally (Fig. 20A). Dorsal and ventral flanges absent (Fig. 20A–B). Basal membrane absent (Fig. 20A–B). Radioles with smooth outer margins, without flanges. Around 14–20 vacuolated cells in cross section at base supporting the radioles (Fig. 20A–B). Radiolar eyes absent. Dorsal lips with long radiolar appendages and 0–2 dorsal pinnular appendages. Ventral lips and parallel lamellae present; ventral sacs absent. Posterior peristomial ring collar separated by a wide gap, with broad ventral lappets

separated by a midventral incision (Fig. 20A–C). Fleshy swelling with a transverse ridge, occupying the dorsum of first two chaetigers, forming either two posterior-facing sinuses or pockets separated by the faecal groove or continuous across faecal groove forming one large posterior-facing pocket (autapomorphy for the species, Fig. 20B–C). Thoracic ventral shields in contact with adjacent neuropodial tori (Fig. 20A); first one with anterior margin m-shaped. Interramal eyespots absent. Collar chaetae elongate, narrowly-hooded in two oblique rows. Notopodia as conical lobes; superior thoracic notochaetae elongate, narrowly-hooded, inferior group with two rows of shorter broadly-hooded chaetae of type B. Uncini with around 10 rows of similar-sized teeth above main fang covering more than half its length, well developed breast and medium length handles. Companion chaetae with enlarged subdistal end with dentate appearance, and with thin distal mucro compressed laterally. Abdominal neuropodial chaetae narrowly-hooded in both anterior and posterior rows. Abdominal uncini with around 10 rows of similar-sized teeth above main fang covering more than half its length, well developed breast and short handles. Pygidium with rounded rim around ventral anus, with scattered eyespots present on both sides, only visible in some specimens. Pygidial cirrus absent. Tube not studied.

Remarks. This species is easily distinguished from other congeners by the fleshy swellings on the dorsum of the first two chaetigers (Augener 1926; Capa & Murray 2015).

Habitat. Natural and artificial hard subtrates, intertidal to 80 m depth (see Capa & Murray 2015, for more information on the ecology and distribution of this species).

Type locality. Little Barrier Island, New Zealand.

Distribution. New Zealand, Australia (Queensland, New South Wales, South Australia, Western Australia).

Parasabella sp. cf. *P. japonica* (Moore & Bush, 1904)

(Fig. 20D–F)

Sabella japonica Moore & Bush, 1904: 157–159, pl. XL, figs 1–2, pl. Xii, figs 39, 40.— Imajima & Hartman 1964: 363.
Parasabella japonica.—Tovar-Hernández & Harris 2010: 15.
Parasabella sp. cf. *P. japonica.*—Capa & Murray 2015.

Material examined. Queensland, Lizard Island: AM W.46995, Lagoon, 14°41′14″S, 145°27′18″E, coral rubble, 1 m, Aug. 2010.

Other material examined. Queensland, Heron Island: AM W.46993, channel, 23°27′15″S, 151°55′E, coral rubble, 30 m, Nov. 2009; AM W.37063, First Point, 23°25′56″S, 151°56′02″E, coral rubble, 13 m, Nov. 2009; AM W.37039, canyons, 23°27′21″S, 151°55′02″E, coral rubble, 10 m, Nov. 2009; AM W.37038, Harrys canyons, 23°28′23″S, 151°57′02″E, coral rubble, 15 m, Nov 2009; AM W.37062, Sykes Reef, 23°25′56″S, 152°02′02″E, coral rubble, 15 m, Nov 2009.

Description of material examined. Up to 13 mm long, 2.5 mm wide, with eight thoracic and numerous abdominal chaetigers. Live specimens show bright colour pattern and a broad variation of colour pigments, the dominant colour in some being red, and in others, white (Fig. 20D–E); white and yellow spots are scattered along the body, especially in thoracic segments (Fig. 20D, F). Preserved specimens with no pigmentation or only a few reddish spots on the radiolar crown. Radiolar crown with semicircular basal lobes. Dorsal and ventral basal flanges absent. Basal membrane absent. Radioles with smooth outer margins, without flanges (only incipient in juveniles). Six to eight rows of vacuolated cells supporting radioles basally. Radiolar eyes absent. Dorsal lips with long radiolar appendages, one pair of pinnular appendage. Ventral lips and parallel lamellae present, ventral sacs absent. Posterior peristomial ring collar up to the base or radiolar crown, with dorsal margins separated by a wide gap (Fig. 20F), ventral lappets separated by a midventral incision (Fig. 20D). Thoracic ventral shields separated from thoracic tori by a gap (Fig. 20D). Interramal eyes absent. Collar chaetae elongate, narrowly-hooded, in two oblique rows. Following thoracic chaetiger with conical notopodia; superior thoracic chaetae elongate narrowly-hooded; inferior broadly-hooded (type B). Thoracic uncini with 8–10 rows of teeth over main fang, covering slightly over half its length, with well developed breast and long handle. Companion chaetae with enlarged subdistal end with dentate appearance, and with thin distal mucro compressed laterally. Abdominal neurochaetae narrowly-hooded. Abdominal uncini with around seven rows of teeth over the main fang covering half its length, well developed breast and a short handle. Pygidium as a rim with a ventral anus and several red eyespots present on both sides. Pygidial cirrus absent. Tube unknown.

Remarks. *Parasabella japonica*, and the specimens studied herein, are characterised by having ventral shields

separated from tori by a wide gap, long and slender inferior thoracic chaetae (type B), thoracic uncini with long handles, and a collar with conspicuous and pointed ventral lappets (Moore & Bush 1904; Capa & Murray 2015). These combined features are unique to this species when compared with other species reported from Australia (Capa & Murray 2015).

Habitat. Dead coral rubble in association with sponges, bryozoans and algae, and in coarse sand, 1–30 m depth.

Type locality. Suruga Bay, Japan.

Distribution. Japan, Australia (Western Australia, Northern Territory, Queensland, New South Wales, Tasmania, South Australia) and New Zealand (to be confirmed).

Genus *Perkinsiana* Knight-Jones, 1983

Type-species. *Sabella rubra* Langerhans, 1880.

Perkinsiana anodina Capa, 2007

(Fig. 20G–J)

Perkinsiana anodina Capa, 2007: 549–551, figs 4J, K, 6, 7A–G.

Material examined. Queensland, Lizard Island: AM W.41049 (3), south of Mermaid Cove, 14°38′53″S, 145°27′E, coral rubble, 1 Sep 2010; AM W.41051 (2), AM W.41057, MacGillivray Reef, 14°39′23″S, 145°29′31″E, coral rubble, 22 m, 29 Aug 2010; AM W.41056 (7), south of Mermaid Cove, 14°38′53″S, 145°27′E, coral rubble, 14.5 m, 1 Sep 2010; AM W.47332, MI QLD 2359; AM W.43940, MI QLD 2359; AM W.44364, MI QLD 2354 (8).

Description of material examined. All specimens studied incomplete, missing posterior ends; up to 6.0 mm long and 0.8 mm wide, with up to 22 thoracic and numerous abdominal chaetigers. Specimens not studied alive. Preserved specimens have cream coloured body and crown, with no pigmentation; only peristomial eyes pigmented in red (Fig. 20G–H, J). Specimens stained with methyl blue show conspicuous ventral shields both in thoracic and abdominal chaetigers (Fig. 20I). Radiolar crown with semicircular basal lobes, radioles increasing in length dorsally. Dorsal and ventral basal flanges absent. Basal membrane reduced. Radioles with smooth margin, flanges absent. Four rows of vacuolated cells supporting the radioles basally. Radiolar eyes absent. Dorsal lips with medium-length dorsal radiolar appendages; one pair of dorsal pinnular appendages, similar in length and shape to radiolar appendages. Ventral lips rectangular and prominent, parallel lamellae present, large ventral sacs inside the crown (Fig. 20J). Posterior peristomial ring collar with dorsal margins separated by a wide gap; dorsolateral collar margins smooth, without notches, enlarged ventrally into two large ventral lappets separated by a midventral incision (Fig. 20G–J). Glandular ridge absent on anterior chaetigers. Thoracic ventral shields separated from uncinial tori by wide gap (Fig. 20I–J). First ventral shield with straight anterior margin. Interramal eyespots absent. Collar chaetae elongate narrowly-hooded arranged in two oblique rows. Following thoracic chaetigers with slightly elevated notopodia with superior narrowly-hooded chaetae and inferior paleate chaetae. Thoracic neuropodial tori with avicular uncini with many rows of small teeth occupying half the length of main fang, with reduced breast and long handle. Companion chaetae with an almost symmetrical teardrop-shaped hood with fibrous appearance on proximal half. Abdominal chaetigers with reduced neuropodia, with broadly-hooded chaetae arranged in transverse rows. Abdominal uncini with about 15 rows of small teeth covering $^{2}/_{3}$ of length of main fang, well developed breast and medium-length handle. Posterior chaetigers and pygidium missing in all specimens. Tube thin, mucous with some embedded fine sand.

Remarks. *Perkinsiana anodina* is distinguished from other congeners by a unique combination of characters: dorsal radiolar and pinnular appendages approximately the length of two thoracic chaetigers, thoracic tori and ventral shields separated by a wide gap, first chaetiger similar in length to the remaining thoracic segments, oblique collar with large and subtriangular ventral lappets, and thoracic uncini with handle twice the length of the distance between breast and main fang, with long neck and small breast (Capa 2007). This species can be differentiated from the other species of *Perkinsiana* present in Australian waters, *P. longa* Capa, 2007, as *P. anodina* lacks an elongate first chaetiger, long dorsal radiolar appendages and the pigmented peristomium characteristic of *P. longa*

(Capa 2007). This species is not common and only eight specimens are known so far from Australia, so these records double the number of collected specimens. First record for Queensland.

Habitat. Dead coral, sand nearby coral reefs and fouling fauna in artificial substrates, 5–10 m depth.

Type locality. Angel Island, Dampier Archipelago, Western Australia.

Distribution. Australia (Western Australia, Northern Territory, Queensland).

Genus *Pseudobranchiomma* Jones, 1962

Type-species. *Pseudobranchiomma emersoni* Jones, 1962.

Pseudobranchiomma sp. 1

(Fig. 21A–B)

Material examined. Queensland, Great Barrier Reef: AM W.40930 (1), North Direction Island, 14°44′43″S, 145°30′18″E, fine coral rubble, 1 m, 26 Aug 2010.

Description of material examined. Specimen measuring 13 mm long and 1 mm wide, with seven thoracic and more than 18 abdominal segments (Fig. 21A). Live specimen with radiolar lobes pigmented in red with bright yellow radiolar tips (Fig. 21A–B). Body light orange, interramal eyespots conspicuous on both thoracic and abdominal chaetigers. Preserved specimen retains the pigmented radiolar lobes, though faded to dark purple; preserved body pale with distinct interramal eyespots. Radiolar crown with basal lobes slightly involuted ventrally; dorsal and ventral basal flanges absent. Basal membrane reduced. Radiolar flanges inconspicuous, lacking serrations. Four rows of vacuolated cells supporting radioles basally, not extended into radiolar flanges. Radiolar eyes absent. Dorsal lips with medium length dorsal radiolar appendages; dorsal pinnular appendages absent. Ventral lips and parallel lamellae present, with prominent ventral sacs directed outside of the branchial crown. Collar with dorsal margins separated by a wide gap, lateral margins smooth and large ventral lappets separated by a midventral incision. Glandular ridge absent on anterior chaetigers. Anterior four thoracic ventral shields separated from adjacent tori by a gap, posterior thoracic shields in contact with tori; first ventral shield with m-shaped anterior margin. Interramal eyes conspicuous (Fig. 21C–D). Posterior peristomial ring collar with narrowly-hooded chaetae arranged in oblique rows. Following thoracic chaetigers with conical notopodia; superior thoracic chaetae elongate narrowly-hooded, inferior chaetae spine-like. Neuropodial uncini avicular, with 2–3 rows of teeth above main fang, well developed breast and short handle. Companion chaetae absent. Abdominal chaetigers with short conical neuropodia, with narrowly-hooded superior chaetae and spine-like inferior chaetae. Notopodial uncini similar to thoracic. Pygidium conical, with eyespots on both sides. Peristomial cirrus absent. Tube unknown.

Remarks. This species seems to be undescribed and will be dealt with in a revision of the genus in Australia (Capa & Murray in prep). It is characterised by the absence of radiolar flanges, the absence of radiolar eyes, the collar margins separated by a wide gap and its colour pattern. This species belongs to *Pseudobranchiomma* "Group C" (according to Knight-Jones & Giangrande 2003). Other species included in this group are *P. punctata* Treadwell, 1906, *P. longa* Kinberg, 1867, *P. minima* Nogueira & Knight-Jones, 2002, *P. perkinsi* Knight-Jones & Giangrande, 2003 and *P. tarantoensis* Knight-Jones & Giangrande, 2003. They differ from the specimen found at Lizard island due the presence of radiolar eyes (typical of *P. longa* and *P. perkinsi*), the presence of collar margins fused to faecal groove (like *P. punctata*) or the pigmentation pattern, with conspicuous spots in *P. minima* and *P. tarantoensis* (Knight-Jones & Giangrande 2003).

Habitat. Fine coral rubble, 1 m depth.

Distribution. Australia (Queensland: Lizard Island).

Pseudobranchiomma sp. 2

(Fig. 21C–D)

Material examined. Queensland, Great Barrier Reef: AM W.41160, Reef 14-141, south of South Direction Island, 14°42′31″S, 145°31′53″E, coral rubble, 15 m, 26 Aug 2010; AM W.47333, North Direction Island, south deep reef slope, 14°45′04″S, 145°30′45″E, 6–28 m, 4 Sep 2010. Lizard Island: AM W.36978, MacGillivray Reef, deep reef slope, 14°39′25″S, 145°28′22″E, coral rubble, 30 m, 4 Sep 2010; AM W.43938, MI QLD 2360 (>25); AM W. 47698, MI QLD 2424.

FIGURE 21. A–B. *Pseudobranchiomma* sp. 1, live specimen. A. Whole individual, ventral view, showing the bright colour pattern; B. Anterior end and radiolar crown, ventral view; C–D. *Pseudobranchiomma* sp. 2, preserved specimens; C. Radiolar crown and anterior thoracic chaetigers, lateral view; D. Detail of base of crown with diagonal collar and conspicuous interramal eyespots; E–G. *Pseudopotamilla* cf. *reniformis.* E. Live specimen, anterior end, lateral view; F. Same, dorsal view showing compound radiolar eye morphology and arrangement; G. Same, ventral view, showing the dorsoventral decrease in length of radioles.

Description of material examined. Specimens range from 3–18 mm long, 0.2–0.5 mm wide, with six or seven thoracic and numerous abdominal segments. Preserved specimens with radiolar crown with purple pigment in basal membrane, and four or five transverse irregular purple and orange bands along radioles (Fig. 21C–D). Posterior peristomial collar purple coloured. Body pale with small dark purple pigment spots sparsely distributed (Fig. 21C–D). Interramal eye spots distinct on thorax and abdomen (Fig. 21C–D). Radiolar crown with basal lobes slightly involuted ventrally; dorsal and ventral basal flanges absent. Basal membrane reduced. Radioles with serrated radiolar flanges; 3–6 serrations along radioles. Six rows of vacuolated cells supporting radioles basally, not extended into radiolar flanges. Radiolar eyes absent. Dorsal lips with medium length dorsal radiolar appendages; dorsal pinnular appendages absent. Ventral lips and parallel lamellae present, with prominent ventral sacs directed outside the branchial crown. Collar with dorsal margins separated by a wide gap, lateral margins smooth and large ventral lappets separated by a midventral incision. Glandular ridge absent on anterior chaetigers. Anterior thoracic ventral shields separated from adjacent tori by a gap, posterior thoracic shields in contact with tori; first ventral shield with m-shaped anterior margin. Interramal eyes conspicuous (Fig. 21C–D). Posterior peristomial ring collar with narrowly-hooded chaetae arranged in oblique rows. Following thoracic chaetigers with conical notopodia;

superior thoracic chaetae elongate narrowly-hooded, inferior chaetae spine-like. Neuropodial uncini avicular, with three rows of teeth above main fang, well developed breast and short handle. Companion chaetae absent. Abdominal chaetigers with short conical neuropodia, with narrowly-hooded superior chaetae and spine-like inferior chaetae. Abdominal notopodial uncini similar to thoracic. Pygidium bilobed, with eyespots on both sides. Pygidial cirrus absent. Tube unknown.

Remarks. *Pseudobranchiomma* sp. 2 is characterised by 3–6 conspicuous serrations along its radiolar flanges, the absence of radiolar eyes and its colour pattern. This species belongs to *Pseudobranchiomma* "Group A" (according to Knight-Jones & Giangrande 2003) since it bears radiolar serrations distributed evenly along the entire length of the radioles, or at least for most of their length. This species resembles *Pseudobranchiomma schizogenica* Tovar-Hernández & Dean, 2014, described from the Gulf of California, Eastern Pacific, in the colour pattern, the presence of serrated radiolar flanges along radioles, the absence of radiolar eyes, the shape of the collar — with lateral collar margins oblique and covering the anterior peristomial ring — and the conspicuous interramal eyespots. However, some observed differences include the number of serrations along the flanges, 3–6 in specimens described herein and 6–11 in *P. schizogenica*, as well as the shape of the radiolar serrations, step-like in the Australian specimens and circular in cross-section in *P. schizogenica* (Tovar-Hernández & Dean 2014). Moreover, this American species possesses a basal membrane as long as $^{1}/_{4}$ of the radioles, while it is only incipient in the Australian congeners.

Habitat. Coral rubble, 6–30 m depth.

Distribution. Australia (Queensland: Lizard Island).

Genus *Pseudopotamilla* Bush, 1905

Type-species. *Amphitrite reniformis* Brugière, 1789.

Pseudopotamilla sp. cf. *P. reniformis* (Brugière, 1789)

(Fig. 21E–G)

Amphitrite reniformis Brugière, 1789: 57.
Pseudopotamilla reniformis.—Bush 1905: 203; Moore 1905: 359; Hartman 1945: 47; Jirkov 2001: 551, figs 1–6.
Potamilla reniformis.—Mclntosh 1922: 232; Fauvel 1927: 309, figs 107a–1; Pettibone 1954: 336, fig. 380u ; Day 1967: 764, figs 37.3a–f; 1973: 126; Hartmann-Schröder 1971: 506, figs 174A–H.
Pseudopotamilla sp. A.—Capa 2007: 556–559, figs 11I–P, 12G–J, 13.
Pseudopotamilla sp. B.—Capa 2007: 559–562, figs 12K–N, 14.

Material examined. Queensland, Lizard Island: AM W.41158, AM W.41159, Watsons Bay, 14°39′26″S, 145°27′03″E, coral rubble, 4.5 m, 28 Aug 2010; AM W.44368, MI QLD 2406; AM W.44369, AM W.44457, AM W.44458, AM W. 44459, MI QLD 2392.

Description of material examined. Specimens up to 20 mm long, 1 mm wide, 8–12 thoracic and numerous abdominal chaetigers. Pigmentation among specimens varies, with some almost unpigmented, some with base of radiolar crown and anterior chaetigers darkly pigmented, and others with radioles distally pigmented in orange or light brown (Fig. 21E–G). Radiolar eyes vary from orange to dark purple. Preserved specimens maintain the colour pattern with some purple pigment faded into dark brown (Fig. 21F–G). Radiolar crown with semicircular lobes and radioles decreasing in length dorsoventrally. Dorsal basal flanges thin, with straight margin, ventral flanges well developed, subquadrangular (Fig. 21G). Basal membrane reduced. Radioles with smooth margins, flanges absent. Nine to twelve vacuolated cells in cross section supporting radioles basally. Circular compound radiolar eyes in a single row along the outer margin of radioles numbering up to six in some dorsal radioles and decreasing in number to lateral radioles; absent in dorsalmost and ventral ones (Fig. 21E–G). Dorsal lips with medium length dorsal radiolar appendages. One pair of pinnular appendages shorter than radiolar appendages. Ventral lips and parallel lamellae present; ventral sacs inside the crown. Posterior peristomial collar with dorsal margins fused to faecal groove, with low rounded notches and pockets on each side; lateral margin of collar oblique, increasing in length ventrally to ventral lappets, separated by a short midventral incision (Fig. 21F–G). Glandular ridge absent on anterior chaetigers. Ventral shields separated from tori by wide gap, with midsegment transverse groove; first one

with M-shaped anterior margin (Fig. 21G). Interramal eyespots absent. Collar chaetae elongate broadly-hooded chaetae. Following thoracic chaetigers with short conical notopodia with superior elongate narrowly-hooded chaetae and inferior paleate chaetae. Thoracic neuropodial uncini avicular, with over 20 rows of small teeth over main fang, occupying more than half its length; narrow breast and long handle. Companion chaetae with asymmetrical hood, with dentate appearance along most of its length. Abdominal chaetigers with slightly elevated neuropodia with broadly-hooded chaetae. Abdominal uncini avicular, with more than 20 rows of small teeth over main fang, number of rows of teeth increase in posterior chaetigers, occupying $^{3}/_{4}$ of length of main fang, with narrow breast and short handle. Pygidium bilobed with lateral eyespots on both sides. Tube chitinous with some sand attached at the anterior end in some specimens.

Remarks. Two species of *Pseudopotamilla*, very similar to *P. reniformis*, have been described from Australia, *Pseudopotamilla* sp. A and sp. B, only distinguished by their colour pattern. There is no other evidence to split these specimens until molecular analyses are performed, and differences with the commonly reported *P. reniformis,* originally described from Iceland but also reported in many biographical regions around the world (e.g., Chughtai & Knight-Jones 1988; Jirkov 2001; Müller 2004; Kolbasova *et al.* 2014), have yet to be found. Therefore, the species herein is referred to as *Pseudopotamilla* sp. cf. *P. reniformis*. Members of this species are distinguished from other Australian congeners in the number and shape of eyes. While *P. monoculata* has a single ovoid compound eye per radiole, *P. reniformis* bears several eyes aligned in a longitudinal row, generally more abundant in the more dorsal radioles.

Habitat. Generally associated with hard substrates such as rocks and boulders, but also with coral rubble and dead coral. Appears to be capable of boring into calcium carbonate substrates such as shells, limestone or coral (Chughtai & Knight-Jones 1988; Capa 2007).

Type locality. Iceland.

Distribution. North Atlantic (Eastern European and Mediterranean, American coasts), Arctic (Barents and White Seas), Caribbean, North Pacific (Bering and Japan Seas), Australia (Western Australia, Queensland, New South Wales, Victoria).

Genus *Sabellastarte* Krøyer, 1856

Type-species. *Sabella indica* Savigny, 1822.

Sabellastarte sp.

(Fig. 22A–D)

Material examined. Queensland, Lizard Island: AM W.44361, AM W.44362, AM W.44462 (juvenile), AM W.44463, MI QLD 2401.

Other material examined. AM W.9168, Heron Island, 23°26′S, 151°54′E, under coral slab, 8 m, 28 Jul 1976, identified as *Sabellastarte pectoralis* (Quatrefages, 1866) by P. Knight-Jones.

Description of material examined. Specimens up to 2.5 mm long, 1.1 mm wide, with eight thoracic and numerous abdominal chaetigers. Live specimens possess orange radiolar crowns with several thin irregular brown transverse bands on rachis and pinnules (Fig. 22A). Preserved specimens lose orange pigment and are brownish with darker bands on the radiolar crown. Body with small scattered brown spots, conspicuous interramal eyes on thoracic and abdominal chaetigers and, in some specimens, additional spots on dorsal and ventral edges of parapodia (Fig. 22C). Radiolar crown with lobes spiralling with up to one whorl and involuted ventrally. Dorsal basal flanges rounded, ventral basal flanges absent. Basal membrane vestigial, radioles of some specimens interdigitating and giving appearance of two rows (Fig. 22A). Radioles with smooth margins, flanges absent. Eight vacuolated cells in cross-section supporting radioles basally. Radiolar eyes absent. Dorsal lips with long radiolar appendages; one pair of pinnular appendages. Ventral lips and parallel lamellae present; ventral sacs inside the crown. Posterior peristomial ring collar with dorsal margins fused to faecal groove, with shallow curved notches and pockets on each side; ventral lappets short and rounded, separated by a midventral incision. Glandular ridge on anterior chaetigers absent. Ventral shields in contact with neuropodial tori; first one with anterior margin M-shaped. Interramal eyespots present in thorax and abdominal segments. Collar chaetae elongate narrowly-hooded,

in oblique rows. Following thoracic chaetigers with conical notopodia with superior elongated narrowly-hooded chaetae and inferior spine-like chaetae. Thoracic neuropodial uncini avicular, with about 8 rows of small similarly-sized teeth over main fang, covering half its length, well developed breast and short handle. Companion chaetae absent. Abdominal chaetigers with conical neuropodia, with superior elongated narrowly-hooded chaetae and inferior spine-like chaetae, in a C-shaped arrangement. Abdominal notopodial uncini similar to thoracic. Pygidium bilobed with lateral eyespots. Pygidial cirrus absent. Tube with a thick layer of fine sand attached in the exposed anterior end.

Remarks. A recent revision of *Sabellastarte* aiming to establish species boundaries for members of this genus by combining morphological and molecular data (Capa *et al.* 2010), provided evidence that although there is a continuous distribution of *Sabellastarte* along the coast of Australia, at least three species are present, and only one of them, *Sabellastarte australiensis* (Haswell, 1884), has been formally described. Morphological differences between these species are difficult to establish, because intraspecific and interspecific variation overlap. Moreover, that study included no specimens collected from the Great Barrier Reef, so it is uncertain if the Lizard Island specimens belong to the northern lineage, so far reported only from the Northern Territory, or to the New South Wales–southern Queensland lineage (most probably described as *Sabellastarte australiensis*) or to a different one altogether. Knight-Jones & Mackie (1998) reported *Sabellastarte pectoralis* (Quatrefages, 1866), a species originally described from Mauritius, from Heron Island (AM W.9168), the only *Sabellastarte* specimens cited so far from the Great Barrier Reef. Diagnostic features of *S. pectoralis*, as for other congeners, remain obscure, and assigning the specimens described herein to this species is risky.

Habitat. Under stones and coral rubble on reef crest at shallow depths.

Distribution. Unknown, since the Australian species of *Sabellastarte* are not well defined.

Genus *Sabellomma* Nogueira, Fitzhugh & Silva-Rossi, 2010

Type-species. *Parasabella minuta* Treadwell, 1941.

Sabellomma cupoculata Capa & Murray, 2015
(Fig. 22E–F)

Sabellomma cupoculata Capa & Murray, 2015: 152–155, fig. 22.

Material examined. Queensland, Lizard Island: Holotype: AM W.47193, High Rock, 14°49′34″S, 145°33′08″E, coral rubble, 20.1 m, 11 Sep 2010. Paratypes: AM W.47192, same as holotype; AM W.47191 (4), MacGillivray Reef, 14°39′23″S, 145°29′31″E, coral rubble, 22 m, 29 Aug 2010.

Other material examined. Queensland, Lizard Island: AM W.39545, off North Head, 14°38′44″S, 145°27′12″E, 12 m, 14 Apr 2008; AM W.37061, MacGillivray Reef, 14°39′23″S, 145°29′31″E, coral rubble, 22 m, 29 Aug 2010; AM W.37029 (2), AM W.37030, High Rock, 14°49′34″S, 145°33′08″E, coral rubble, 20.1 m, 11 Sep 2010; AM W.37057, MacGillivray Reef, deep reef slope, 14°39′25″S, 145°28′22″E, coral rubble, 30 m, 4 Sep 2010; AM W.43934, MI QLD 2351; AM W.44120, AM W.44121 (4), MI QLD 2359.

Description of material examined. Specimens up to 37mm long and 3.5 mm wide. Five to eight thoracic and numerous abdominal chaetigers. Live specimens with a colourful radiolar crown with a brownish base and brown, white and purple transverse bands arranged irregularly across radioles and pinnules. Pigment fades in preserved specimens and some only retain the brown pigment in crown and thorax, with or without white spots (Fig. 22E–F). Radiolar crown with semicircular basal lobes slightly involuted dorsally. Dorsal and ventral basal flanges absent. Six rows of vacuolated cells support the radioles basally. Radiolar flanges absent (Fig. 22F). Cup-shaped radiolar eyes irregularly arranged along side margins of all radioles, except distally (Fig. 22E–F). Dorsal lips with medium radiolar appendages; and one pinnular appendage fused to each dorsal lip, free for about $^{1}/_{2}$ its length. Ventral lips and parallel lamellae present, ventral sacs absent. Posterior peristomial ring collar with dorsal margins separated by a wide gap, and low rounded ventral lappets separated by a midventral incision. Glandular ridge on anterior chaetigers absent. Thoracic ventral shields in contact with neuropodial tori; first ventral shield with indentation in anterior margin and m-shaped. Collar chaetae elongate, narrowly-hooded. Notopodia conical with chaetae arranged

in longitudinal rows. Superior thoracic notochaetae elongate, broadly-hooded; inferior ones broadly-hooded chaetae with abruptly tapering distal tip (type A), with hoods 1.5 times the width of the shaft and as long as 4–5 times its maximum width. Thoracic uncini with 5–6 rows of teeth over main fang, covering just half its length, with well developed breast and short handle. Companion chaetae subdistally enlarged, hood with fibrous appearance, and with thin distal mucro flattened transversely and narrowing abruptly, tapering to a long fine point. Abdominal neurochaetae narrowly-hooded. Abdominal uncini with 5–6 rows of teeth large teeth over main fang covering half its length, with breast less defined and handle shorter than thoracic uncini. Pygidium as a rim around a ventral anus, with eyespots on both sides. Pygidial cirrus absent. Tube thin, flexible, and semitranslucent with some fine sediment particles attached.

Remarks. *Sabellomma cupoculata* resembles the other three congeners, all described from the Western Atlantic, in the presence of irregularly distributed lensed eyes on outer margins of radioles, and the presence of companion chaetae with flattened transversely distal mucro. *Sabellomma cupoculata* is distinguished, however, by the form of the companion chaetae with very thin mucros, radioles that are supported by six vacuolated cells in *S. cupoculata* but four in the other three species, the absence of ventral sacs and the pigmentation pattern (none of the previously described species have bright purple bands in the crown when alive).

Habitat. Coral rubble, coarse sand, under boulders and live corals, between 3–30 m depth.

Type locality. Lizard Island.

Distribution. Tropical Australia, from northern Western Australia to southern Queensland.

Genus *Stylomma* Knight-Jones, 1997

Type-species. *Sabella palmata* Quatrefages, 1866.

Stylomma palmatum (Quatrefages, 1866)

(Fig. 22G–J)

Sabella palmata Quatrefages, 1866: 453.
Sabella monophthalma Augener, 1922: 35.
Stylomma palmatum.—Knight-Jones 1997: 322; Knight-Jones & Perkins 1998: 451–452, figs. 29, 31A–B; Capa 2008: 321–324, figs 10A–D, 11.

Material examined. Queensland, Lizard Island: AM W.41156, AM W.36455, AM W.36456, Watsons Bay, 14°39′26″S, 145°27′03″E, coral rubble, 4.5 m, 28 Aug 2010.

Other material examined. Queensland, Heron Island: AM W.41154, AM W.41155, lagoon, 23°26′30″S, 151°54′02″E, coral rubble, 1–15 m, 19 Nov 2010.

Description of material examined. Largest complete specimen 43 mm long (including crown of 13 mm length), 2.5 mm wide, with 8 thoracic and >100 abdominal chaetigers. Live specimens are mainly white, with the base of the radiolar crown bright white with conspicuous brown markings. Radioles have longitudinal dark lines basally, and transverse bands on radioles and pinnules on the distal $^{2}/_{3}$rds of their length (Fig. 22G–H, J). Body without colour pigment. (Fig. 22G, I). Interramal eyespots are present in both thorax and abdomen. Preserved specimens maintain same pigmentation pattern. Radiolar crown rigid, with long semicircular basal lobes, with rounded and long dorsal basal flanges joined dorsally with a "press-stud" structure (Fig. 22G, J). Radioles with smooth radiolar flanges, broader distally; basal membrane present. Distal compound radiolar eye on each radiole, over a stalk, all similar in size. Numerous small vacuolated cells (over 20) support each radiole basally, with other smaller ones extending into and supporting flanges at the distal end. Dorsal lips with long pointed radiolar appendage; pinnular appendages absent. Ventral lips and parallel lamellae present, ventral sacs inside crown. Posterior peristomial ring collar with dorsal margins separated by a wide gap, oblique lateral margins increasing in length ventrally, ventral lappets separated by a midventral incision (Fig. 22G, I). Glandular ridge on anterior chaetigers absent. Thoracic ventral shields in contact with neuropodial tori, or separated by a small gap (Fig. 22I). Collar chaetae arranged in two short oblique rows, superior row with elongate narrowly-hooded chaetae and inferior row with spine-like chaetae. Thoracic notopodia conical, with chaetae arranged in longitudinal bundles; superior thoracic chaetae elongate narrowly-hooded, inferior spine-like. Thoracic uncini with over 10 rows of

FIGURE 22. A–D. *Sabellastarte* sp. A. Live specimens with radiolar crown exposed outside the tube; B. Dorsal view, showing collar dorsal margins fused to faecal groove forming pockets at either side (white arrow); radiolar lobes with dorsal basal flanges (black arrow); C. Same, lateral view, showing the pigmentation pattern, including the interramal eyespots (white arrow) and the arrangement in a C shape row of inferior abdominal chaetae (black arrows); D. Juvenile showing a different pigmentation pattern to adults; E–F. *Sabellomma cupoculata*. A. Incomplete specimen, showing pigmentation pattern and rows of ocelli along radiolar margins (arrows); F. Detail of radioles and ocelli (arrows); G–J. *Stylomma palmatum*, live specimen; G. Anterior end showing the rigid radiolar crown with elongated basal lobes; H. Detail of radiolar tip with unpaired subdistal stalked compound eyes (arrow); I. Anterior abdominal chaetigers, with anterior collar margin incised midventrally and thoracic tori almost in contact with ventral shields; J. Detail of basal lobes, dorsally, showing the flanges joined dorsally with a press stud structure (arrow).

minute teeth above main fang, covering half its length. Companion chaetae with dentate appearance on proximal half of hood, distally asymmetrical. Abdominal neuropodia conical, lacking superior abdominal chaetae, inferior abdominal chaetae spine-like, arranged in a C-shaped to a spiral arrangement. Abdominal uncini similar to thoracic, but with slightly larger teeth above main fang. Pygidium a raised lobed rim with some lateral patches of pigment. Pygidial eyes and pygidial cirrus absent. Tube not studied.

Remarks. This species is easily distinguished from any other sabellid by the presence of single distal stalked eyes on all radioles, autapomorphy of the species. Moreover, it also has a distinctive pigmentation pattern as well as a robust and rigid radiolar crown with the two lobes joined by a press-stud structure. First record for Lizard Island.

Habitat. Dead coral and coral rubble.

Type locality. Kilinailau Islands, Micronesia.

Distribution. French Polynesia, Papua New Guinea, Queensland (Cape York, Lizard Island).

Genus *Terebrasabella* Fitzhugh & Rouse, 1999

Type-species. *Terebrasabella heterouncinata* Fitzhugh and Rouse, 1999.

Terebrasabella fitzhughi Murray & Rouse, 2007

(Fig. 23A–D)

Terebrasabella fitzhughi Murray & Rouse, 2007: 57–61¸ figs 5–8.

Material examined. Queensland, Outer Yonge Reef, Great Barrier Reef: AM W.29465, 14°36′S, 145°38′E, rock and coral rubble with encrusting pink coralline algae, 9m, 21 Jan 1977; AM W.29466, 14°36′S, 145°28′E, coral rubble from bommie, covered in *Lithothamnion* and other algae, 30 m, 25 Jan 1977.

Other material examined. Tasmania: Holotype: AM W.29467, Eaglehawk Neck, 43°01′S, 147°55′E, inside spirorbid tubes attached to rock, intertidal, 3 Apr 1995. Paratypes: AM W.29468, AM W.29469 (2 on SEM), from same sample.

Description of material examined. Specimens up to 2.6 mm long and 0.5 mm wide, with eight thoracic and three abdominal chaetigers. Only preserved specimens studied, and all white. Anterior half of body slender, elongate and posterior abdomen slightly expanded, sac-like, external segmentation indistinct (generic features only shared with *Caobangia* Giard, 1893, within Sabellidae). Radiolar lobes semicircular, with two pairs of radioles with up to eight pinnules and filamentous distal ends. Ventral basal flanges present, dorsal basal flanges absent. Basal membrane, radiolar flanges and radiolar eyespots absent. Two rows of vacuolated cells support radioles basally. Dorsal lips with short radiolar appendages. Ventral lips, ventral sacs and parallel lamellae absent. Posterior peristomial ring collar indistinct dorsally, with elongate ventral lappets separated by a wide midventral incision (Fig. 23A–B). Glandular ridge on anterior chaetigers absent. Poorly developed ventral shields on chaetigers 1–5, 7–8 and 9–11. Collar chaetae broadly-hooded. Following thoracic notochaetae arranged in transverse rows on inconspicuous notopodia, broadly-hooded. Neuropodial uncini of chaetigers 2–6 acicular, with similar-sized teeth over the main fang, vestigial breast and long handle (Fig. 23C). Neuropodia of chaetigers 7–8 with numerous rasp-shaped avicular uncini with five or more rows of small teeth over the main fang, well developed breast and long handle (Fig. 23D). Companion chaetae present on chaetigers 2–6, with asymmetrical hood, with fibrous appearance for half hood length except marginally (Fig. 23D). Abdominal neurochaetae narrowly-hooded. Abdominal notopodial uncini acicular, similar to those in chaetigers 2–6. Pygidium inconspicuous, anus opening dorsally. Pygidial eyespots absent. Pygidial cirri absent. Tube a mucilaginous sheath, lining burrow inside dead coral.

Remarks. Of the three species of *Terebrasabella* described to date, *T. fitzhughi* is the only one with homodont teeth on uncini (i.e. similar-sized teeth on a crest above main fang). The other species described from Lizard Island, *T. hutchingsae*, is distinguished from *T. fitzhughi* by the presence of "palmate" uncini on chaetiger 2, while the type species, *T. heterouncinata* from South Africa, has crested uncini but with different-sized teeth above the main fang (Murray & Rouse 2007).

Habitat. Rocks and coral rubble from intertidal to 30 m depth. Not abundant.

Type locality. Eaglehawk Neck, Tasmania.

Distribution. Australia (Tasmania: Eaglehawk Neck; Queensland: Great Barrier Reef).

***Terebrasabella hutchingsae* Murray & Rouse, 2007**
(Fig. 23E–G)

Terebrasabella hutchingsae Murray & Rouse, 2007: 53–56, figs 1–4.

Material examined. Queensland. Holotype: AM W.29451, Outer Yonge Reef, northeast of Lizard Island, 14°36′S, 145°38′E, rock and coral rubble covered with pink coralline algae and encrusting sponges, 21 Jan 1977, 9 m. Paratypes: AM W.29452, AM W.29453, AM W.29454, AM W.29455 (2), all from same locality, date, depth and habitat as holotype; AM W.29456 (17), AM W.29457 (3), AM W.29458 (2), AM W.29459 (2), AM W.29460 (3 on SEM), AM W.29461, AM W.29462 (2), AM W.29463, all from Outer Yonge Reef, Great Barrier Reef, 14°36′S, 145°38′E, rock and coral rubble, 21 Jan 1977, 9–10 m.

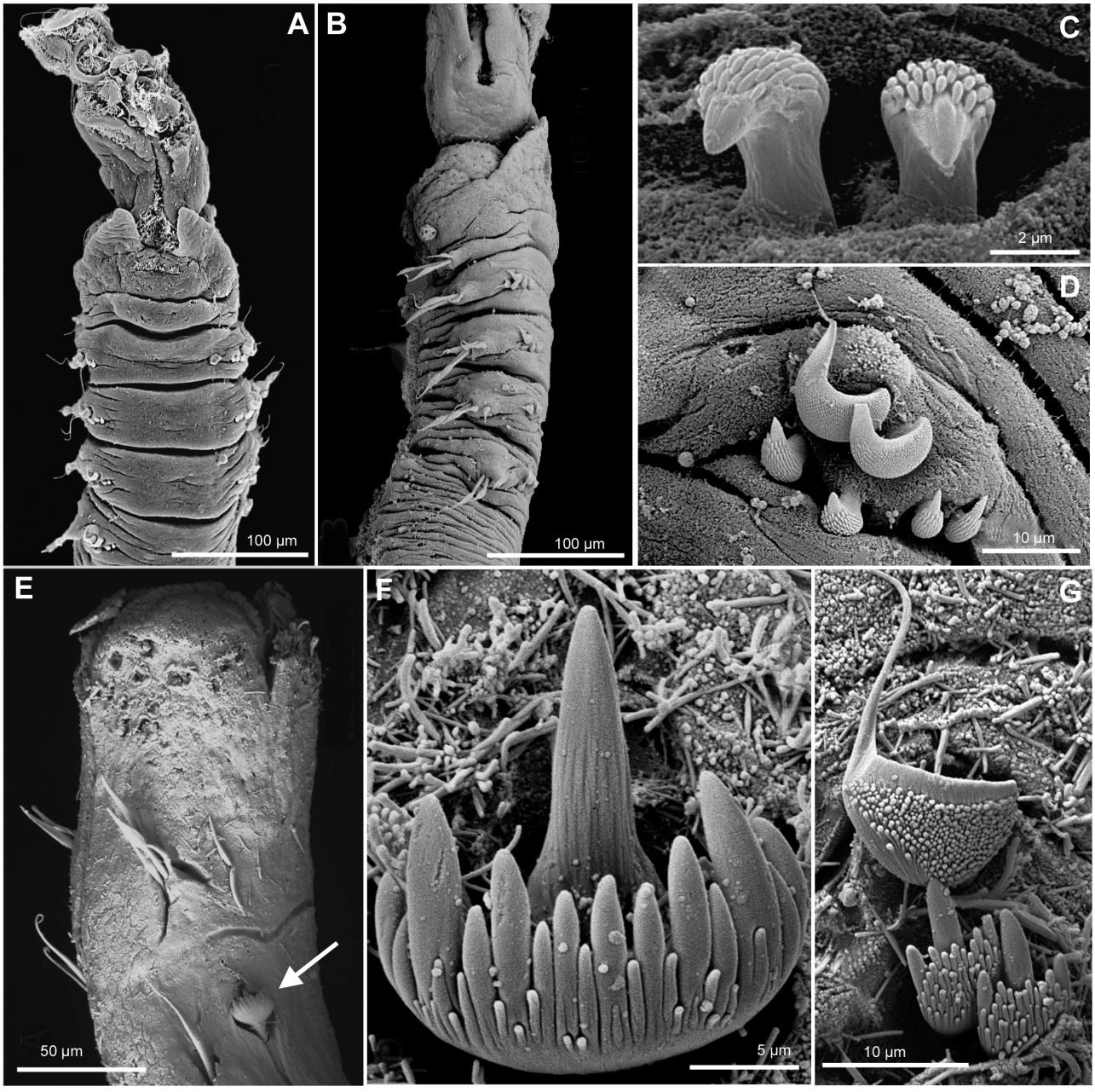

FIGURE 23. A–D. *Terebrasabella fitzhughi*, scanning electron micrographs; A. Anterior end, ventral view, showing the ventral margins of collar separated by a narrow gap; B. Same, lateral view; C. Thoracic neuropodial uncini, chaetiger 3, with several rows of teeth above the main fang; D. Neuropodium chaetiger 3, showing the uncini and the companion chaetae with bent hoods, with proximal fibres; E–G. *Terebrasabella hutchingsae*; E. Anterior chaetigers, lateral view, showing "palmate" uncinus from chaetiger 2 (arrow); F. Detail of "palmate" uncinus; G. Uncini and companion chaetae, with bent hood and proximal fibers, chaetiger 2.

Description of material examined. Specimens up to 4 mm long and 0.5 mm wide with eight thoracic and three abdominal chaetigers. Only preserved specimens studied — all white after preservation. Anterior half of body slender, elongate and posterior abdomen slightly expanded, sac-like, external segmentation indistinct (generic features only shared with *Caobangia* Giard, 1893 within Sabellidae). Radiolar lobes semicircular, with two pairs of radioles with up to eight pinnules and filamentous distal ends. Ventral basal flanges present, dorsal basal flanges absent. Basal membrane, radiolar flanges and radiolar eyespots absent. Two rows of vacuolated cells support the radioles near the base. Dorsal lips with short radiolar appendages. Ventral lips, ventral sacs and parallel lamellae absent. Posterior peristomial ring collar vestigial, fused dorsally to faecal groove and with small (Fig. 23E), rounded ventral lappets separated by a midventral incision. Glandular ridge on anterior chaetigers absent. Poorly developed ventral shields on chaetigers 1–5, 7–8 and 9–11. Collar chaetae broadly-hooded. Following thoracic notochaetae arranged in transverse rows on inconspicuous notopodia, broadly-hooded. Neuropodial uncini of second chaetiger acicular "palmate" uncini, with different-sized teeth arranged in a semicircle over main fang, underdeveloped breast and long handle (Fig. 23F). Neuropodia of chaetigers 3–6 with acicular uncini with two larger teeth surmounted by smaller teeth over the main fang (Fig. 23G). Neuropodia of chaetigers of 7–8 with numerous rasp-shaped avicular uncini with five rows of small teeth over the main fang, well developed breast and long handle. Companion chaetae present on chaetiger 3–6, with dentate appearance at proximal half of hood, distally asymmetrical (Fig. 23G). Abdominal neurochaetae narrowly-hooded. Abdominal notopodial uncini "palmate", similar to those in chaetiger 2, but smaller. Pygidium inconspicuous, anus dorsal. Pygidial eyespots absent. Pygidial cirri absent. Tube a mucilaginous sheath, lining burrow inside dead coral.

Remarks. *Terebrasabella hutchingsae* is the only species in the genus bearing "palmate" uncini, found in neuropodia of chaetiger 2 and abdominal notopodia. The other two species in the genus lack this type of uncini.

Habitat. Rock and coral rubble at 9–10 m. Not abundant.

Type Locality. Lizard Island.

Distribution. Australia (Queensland: Outer Yonge Reef, northeast of Lizard Island).

Discussion and conclusions

Lizard Island has been the object of numerous diversity surveys since the foundation of the Lizard Island Research Station in 1973. Some of these field trips were planned with the purpose of collecting a broad representation of the polychaetes in the archipelago, as in the case of three CReefs surveys (part of the Census of Marine Life programme, 2009–2011) or the recently held Lizard Island Polychaete Workshop (2013). In these aforementioned surveys, at least, the collecting effort has been comprehensive. Over 15 specialists joined efforts during two or three weeks on each survey, collecting samples from different habitats in coral reefs, with a main goal: examining the diversity present in this hotspot of the Great Barrier Reef.

Sabellids are generally considered as common in coral reef environments (Rouse 2000; Goldberg 2013). Many species (e.g., members of the genera *Chone*, *Euchone*, *Jasmineira*, *Paradialychone*, *Perkinsiana*—see Capa 2007; Tovar-Hernández 2008; Capa *et al.* 2014) seem to inhabit sediment bottoms but there are several taxa that live attached to hard substrates or occupy crevices and holes in dead coral rubble or rock (e.g., members of the genera *Bispira*, *Branchiomma, Glomerula*, *Pseudobranchiomma, Sabellastarte*—see Fitzsimons 1965, Perkins 1991, Bybee *et al.* 2006, Capa *et al.*, 2013) and others that are even able to penetrate into the calcareous coral structure (e.g., members of the genera *Megalomma*, *Notaulax*, *Perkinsiana* and *Pseudopotamilla*—see Chughtai & Knight-Jones 1988; Nishi & Nishimira 1999; Fonseca *et al.* 2006).

As the Lizard Island Research Station is a facility belonging to the Australian Museum, many of the polychaete specimens collected over the years in the archipelago are housed in the museum′s Marine Invertebrate Collections. Consequently this institution was the main source of preserved specimens for the present study.

This taxonomic account is not definitive. There are indications that the sabellid diversity in Lizard Island is still underestimated. Some species such as *Terebrasabella hutchingsae* and *T. fitzhughi* have not been found since their original description (Murray & Rouse 2007), and their inclusion in the present account is based on that original material. Other sabellids appear to be uncommon, with only a few specimens found so far (see Table 6), an indication that other additional rare species may be found after increasing the sampling effort in the area. There are, for example, other species reported along the Great Barrier Reef in locations with similar environmental conditions

(e.g., also well studied One Tree or Heron Islands) which have not been recorded in the present study, but could well be present in the Lizard Island Archipelago (see species reported in Rouse 1990; Hartman-Schröder 1991; Knight-Jones & Mackie 2003; Capa 2007; Capa & Murray 2009). Moreover, some genera need taxonomic revision and/or species delimitation analyses before further taxonomic conclusions can be made. This is the case with some of the specimens of *Branchiomma, Megalomma*, *Notaulax*, *Parasabella*, *Pseudobranchiomma*, and *Pseudopotamilla* that have not been provided with species names herein.

TABLE 6. Sabellidae studied in the present taxonomic account, number of specimens examined and previous records.

Taxa	Distribution	Records	Number of specimens
Amphiglena Claparède, 1864		first record for Queensland	
Amphiglena maiteae Capa & Rouse, 2007	NSW, QLD	first record for Queensland	2
Bispira Krøyer, 1856			
Bispira manicata (Grube, 1878)	IndoPacific	first record for Lizard Island	4
Bispira porifera (Grube, 1878)	IndoPacific	first record for Lizard Island	1
Bispira serrata Capa, 2008	WA, QLD	first record for Lizard Island	3
Branchiomma Kölliker, 1858			
Branchiomma bairdi (McIntosh, 1885)	Caribbean*	first record for Lizard Island	7
Branchiomma sp.	?		58
Euchone Malmgren, 1866		new record for Queensland	
Euchone danieloi n. sp.	endemic LI	new species	5
Euchone glennoi n. sp.	endemic LI	new species	3
Glomerula Nielsen, 1931			
Glomerula piloseta (Perkins, 1991)	endemic LI	Perkins 1991	>11
Jasmineira Langerhans, 1880			
Jasmineira gustavoi n. sp.	endemic LI	new species	11
Megalomma Johansson, 1925			
Megalomma sp. cf. *M. acrophthalmos* (Grube, 1878)	Philippines, QLD	first record for Australia	1
Megalomma interrupta Capa & Murray, 2009	Indonesia, WA, QLD	Capa & Murray 2009	30
Megalomma jubata n. sp.	endemic LI	new species	8
Megalomma sp. cf. *M. kaikourense Knight-Jones, 1997*	NZ, Australia	first record for Australia	3
Megalomma sp.	endemic LI		1
Myxicola Koch, 1847		first record for Queensland	
Myxicola nana n. sp.	endemic LI	new species	1
Notaulax Tauber, 1879			
Notaulax sp. 1	endemic LI	potential new species	27
Notaulax sp. 2	endemic LI	potential new species	32
Notaulax sp. 3	endemic LI	potential new species	8
Paradialychone Tovar-Hernández, 2008		first record for Australia	
Paradialychone ambigua n. sp.	endemic LI	new species	5
Parasabella Bush, 1905			

.....continued on next page

TABLE 6. (Continued)

Taxa	Distribution	Records	Number of specimens
Parasabella aberrans (Augener, 1926)	NZ, Australia	Capa & Murray, 2015	7
Parasabella sp. cf. *P. japonica* (moore And Bush, 1905)	Japan, Australia, NZ?	Capa & Murray, 2015	1
Perkinsiana Knight-Jones, 1983			
Perkinsiana anodina Capa, 2007	WA, NT, QLD	first record for Queensland	23
Pseudobranchiomma Jones, 1962			
Pseudobranchiomma sp. 1	endemic LI	potential new species	1
Pseudobranchiomma sp. 2	endemic LI	potential new species	>29
Pseudopotamilla Bush, 1905			
Pseudopotamilla sp. cf. *P. reniformis* (Brugière, 1789)	cosmopolitan?	Capa 2007 (as *Pseudopotamilla* sp. B)	5
Sabellastarte Krøyer, 1856			
Sabellastarte sp.			4
Sabellomma Nogueira, Fitzhugh and Silva-Rossi, 2010			
Sabellomma cupoculata Capa & Murray, 2015, submitted	WA, NT, QLD	Capa & Murray, 2015	19
Stylomma Knight-Jones, 1997			
Stylomma palmatum (Quatrefages, 1866)	South Western Pacific	first record for Lizard Island	5
Terebrasabella Fitzhugh & Rouse, 1999			
Terebrasabella fitzhughi Murray & Rouse 2007	endemic LI	Murray & Rouse 2007	2
Terebrasabella hutchingsae Murray & Rouse 2007 Rouse	endemic LI	Murray & Rouse 2007	37

* Originally described from the Caribbean but reported as introduced in several other bioregions (see remarks of the species)

The low numbers of individuals included in the present study may reflect the high number of specimens discarded or misidentified. Sabellids are very delicate and radiolar crowns are easily detached from the body. This process can occur deliberately, as has been documented in members of *Fabrisabella* Hartman, 1969, *Jasmineira, Myxicola and Sabella* Linnaeus, 1767 (Berrill 1931; Okada 1934; Kennedy & Kryvi 1980; Cochrane 2003; Tovar-Hernández 2008), but also unintentionally, as a consequence of poor preservation or handling of the worms after collection. This often results in the separation of crown and body that may then not be reliably matched together, making the identification to species difficult or impossible. Damage of specimens is particularly common when they are inhabitants of coral rubble, and need to be extracted by methods that involve acid to dissolve the calcareous substrate or a hammer and a chisel to fragment the substrate (e.g., Kiene & Hutchings 1994). In fact, several of the species reported herein as rare, were observed to be common underwater and often found in dense aggregations on both live and dead coral (e.g., species of *Pseudobranchiomma*, *Pseudopotamilla* and *Megalomma,* pers. obs.).

Another reason for the low number of specimens accrued is that sabellids are elusive. Some species live in tubes that can be three times longer than the animals, may be buried in the sediment or located inside a hard substrate crevice, and animals can withdraw into their tubes rapidly (Capa *et al.* 2014). Some bigger sabellids, such as *Sabellastarte* and *Bispira* species, whose exposed radiolar crowns are commonly seen underwater, are extremely difficult to get hold of and to extract, another reason why their abundance may be underrepresented in this study.

Despite the low numbers of specimens, the diversity of species reported for Lizard Island in particular (and

consequently for the Great Barrier Reef) has been increased after the present study (Perkins 1991; Murray & Rouse 2007; Capa & Murray 2009) by 650%. Some of the highlighted findings include newly described species. As summarised in Table 6, almost half the sabellid species (48%) reported herein are currently considered endemic for Lizard Island, 10% are present in other localities along the tropical Australia coastline, 10% have been reported from the South Western Pacific. Only two species (6%) are present in both tropical and temperate waters along the Australian coasts and also in New Zealand and a similar proportion (6%) present a broader Indo-Pacific distribution range. *Pseudopotamilla reniformis* may be a complex of sibling species (Capa 2007), but is for the time being considered as potentially cosmopolitan. In this framework, the relevance of the finding of the introduced species *Branchiomma bairdi* in Lizard Island is highlighted. This species was originally described originally from the Caribbean (McIntosh 1885) and recently reported in the Gulf of California, the Mediterranean, the Canary Islands and Portugal (Çinar 2009; Tovar-Hernández *et al.* 2009a, b, 2011; Zenetos *et al.* 2010; Giangrande *et al.* 2012; Arias *et al.* 2013; Ramalhosa *et al.* 2014) but had also previously been reported in Heron Island, Queensland (Capa *et al.* 2013). Although it is considered as an occasional species in Australia (and probably should be considered as introduced at this point), densities measured of populations outside the natural distribution range reach up to 18000 ind/m^2 in the Gulf of California (Tovar-Hernández *et al*. 2014). It is a simultaneous hermaphrodite (Tovar-Hernández *et al.* 2009a), but can also reproduce asexually throughout the year (Tovar-Hernández *et al.* 2011), explaining the high densities reported under specific conditions and its consideration as a pest.

Taxonomy is a tool for understanding the basic components of biodiversity, which is necessary to make effective decisions about conservation and sustainable use of biodiversity itself, and also to plan sound environmental management and development policies. This taxonomic knowledge becomes even more relevant when it refers to one of the hotspots of the world′s biodiversity and one of the largest marine protected areas — the Great Barrier Reef Marine Park. Evidence of the presence of non-native species in this archipelago also highlights the need for periodic surveys to detect suspected translocations and unusual increased densities which may require control.

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