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New and previously known species of Oenonidae (Polychaeta: Annelida) from Lizard Island, Great Barrier Reef, Australia

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Abstract

The family Oenonidae consists of Eunicida species with prionognath jaws. Its Australian fauna had been reported to comprise six species belonging to *Arabella, Drilonereis*, and *Oenone*. This study provides descriptions for four new species, redescriptions for three species (two previously recorded and a new record, *Drilonereis* cf. *logani*) and diagnoses for the genera recorded from Australia. Currently, eleven species of oenonids, distributed in three genera, are known for the Australian coast. On Lizard Island, this family shows low abundance (19 specimens collected) and high richness (seven species). Our results suggest that despite the increasing accumulation of information, the biodiversity of the family is still poorly estimated.

Key words: Taxonomy, systematics, new species, *Arabella*, *Drilonereis*, *Oenone*, taxonomic key, coral reef

Introduction

Oenonidae familial status was first recognized by Kinberg (1865), but later contested by Hartman (1944), who considered it a synonym of Lysaretidae. The family is now resurrected and comprises the genera *Oenone*, *Halla* and *Tanaikoa*, previously placed in Lysaretidae (Colbath 1989a), and the genera *Arabella, Biborion, Drilognathus, Drilonereis, Haematocleptes, Labrorostratus*, *Notocirrus*, *Oligognathus* and *Pholadiphila* included in the synonymized Arabellidae (Orensanz,1990). It comprises around 100 described nominal species (Pleijel 2001).

Oenonids have a prionognath maxillary apparatus, a unique feature among recent Eunicida (Orensanz 1990). Some species resemble species of the family Lumbrineridae in general external morphology, but can be distinguished from them by chaetae, jaw apparatus and dorsolateral fold anterior extension of muscularized pharynx (*sensu* Zanol 2010).

The family has a worldwide distribution, occurring from the intertidal zone to abyssal depths, usually in low abundance. Most species live in sand and mud as free-living burrowers. Some are parasites or, at least, have a parasitic phase during their life cycle. Previous records of oenonid species from Australian waters include three species of *Arabella*, two species of *Drilonereis* and one species of *Oenone*. Both species of *Drilonereis* were described from the Australian coast, *D. australiensis* Augener, 1922 and *D. quadrioculata* Hartmann-Schröder, 1979.

The present study is the first to focus on Lizard Island oenonid fauna and includes diagnoses of the recorded genera, *Arabella, Drilonereis* and *Oenone*. Four new species are described, two *Arabella,* one for each of the genera *Drilonereis* and *Oenone*. Newly collected material also allowed us to redescribe one species from each of the recorded genera.

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Material and methods

Specimens were collected through direct sampling of soft substrate, algae and coral rubble in intertidal and subtidal regions. Sampling was carried out during the "International Polychaete Conference 2013 Lizard Island Workshop" in diverse localities in Lizard Island and nearby reefs (Ribas & Hutchings, this volume, Table 1). Specimens were sorted alive, relaxed in 7% $MgCl_2$, photographed before fixation and fixed in 10% formalin or 100% ethanol.

The nineteen specimens collected were examined under stereo and compound microscopes and photographed with cameras attached to those. Total length, length to chaetiger 10, width at this chaetiger and at the widest chaetiger with and without parapodia were measured with ocular micrometer on a stereo microscope. Features analysed in the specimens were: 1) colour pattern; 2) general shape of the body; 3) shape, features and relative size of prostomium and peristomium; 4) mandible and maxillae through ventral dissection; 5) notopodial cirri, pre- and postchaetal lobes; 6) noto-, neuroaciculae and chaetae in four parapodia, representing different parts of the body: anteriormost 10%, first quarter, third quarter and posteriormost 10% of the body (counts based on number of chaetigers); 7) shape of the pygidium and pygidial cirri. Maxillae and mandibles were placed in 2% KOH for a few hours, afterwards plates were manually separated before mounting on a microscope slide.

Diagnoses of genera and species descriptions are based on fixed specimens. In the list of examined material, the number following MI QLD refers to the collecting event (Ribas & Hutchings 2015, *Zootaxa* 4019, Table 1); the number following AM W refers to the registration number in the Australian Museum (AM) polychaete collection and the following number in parentheses refers to the number of specimens in the lot. New species descriptions are based on the holotype. Paratype features are in parentheses when different.

Maxillary plates (Mx) nomenclature and formula follow traditional classification. Plate I is the most posterior, attached to carriers. Numbers increase towards anterior end, V being the most anterior one (Fig. 4B). Number of teeth in the plates are presented in a maxillary formula, which presents the number of teeth on the left plate + the number of teeth on the right one. In distally falcate MxI (Figs 1J, L; 4B), the formula for this plate is presented as (number of teeth at tip of falcate, number of teeth at the base of the plate). In descriptions of *Arabella*, classification of MxI as gracile or robust and II as short or long follows Colbath (1989b) (Fig. 4B, C).

The terminology used for the shape of chaetae in oenonid species, mainly of the genus *Arabella* and *Drilonereis*, varies in the literature (Table 1), as well as the hypotheses of homology about them. Ventralmost chaetae in *Drilonereis* have been considered homologous to subacicular hooks of other families (e.g., Fauchald 1970), hypothesis not supported in other studies (e.g., Orensanz 1990). In *Oenone*, ventralmost hooks are generally accepted as homologous to subacicular hooks (Fauchald 1970; Orensanz 1990; Zanol *et al.* 2014), thus, this is the only hypothesis of homology among chaetae that we follow. We consider that more detailed studies are needed on ventralmost chaetae of *Arabella* and *Drilonereis* before hypotheses of homology should be used. The terminology we use for these chaetae (Table 1), following Colbath (1989b), is based on general morphology and does not comprise hypotheses of homology. In *Arabella*, ventralmost chaeta taper abruptly (Fig. 3L) or gradually to distal guards (Fig. 2E), which are always present. In *Drilonereis*, ventralmost chaeta are acicular spine, which are stout chaeta with simple distal end and no guards (Fig. 7H).

Results

Nineteen oenonid specimens were collected from intertidal to 16 m deep in muddy sand, sand and coral rubble. They belong to seven species, four new to science and three previously described, and to three genera, *Arabella*, *Drilonereis* and *Oenone*.

TABLE 1. Terminology for chaetae of *Arabella* and *Drilonereis* present in the literature.

Data source	*Arabella*				*Drilonereis*	
	Limbate with loose ring of large fibrils (Colbath, 1989b) (Fig. 2D)	Limbate with irregular arrangement of fibrils (Colbath, 1989b) (Fig. 2D)	Ventralmost chaeta tapering **abruptly** to distal guards (Colbath, 1989b) (Fig. 3L)	Ventralmost chaeta tapering **gradually** to distal guards (Colbath, 1989b) (Fig. 2E)	Limbate capillary (Fig. 7G)	Ventralmost chaetae (Fig. 7H)
Present study	Limbate coarsely serrated	Limbate finely serrated	Ventralmost chaeta tapering abruptly to distal guards	Ventralmost chaeta tapering gradually to distal guards	Limbate	Acicular spine
Steiner & Amaral 2009	Limbate with coarsely serrated	Limbate with finely serrated blade	Modified ventral chaeta	Modified ventral chaeta	–	–
Carrera-Parra 2009	Limbate denticulated	Smooth limbate	Hooded acicular chaeta	Limbate	Limbate	Acicular spine
Orensanz 1990	Limbate denticulated, coarse serrations	Smooth edge chaetae	Modified ventral chaeta	Ventral chaeta not modified	–	Acicular neurochaeta
Colbath 1989b	Toothed	Smooth chaetae	Tapering abruptly to distal guards	Tapering gradually to distal guards	–	–
Perkins 1979	Transversely serrated	Winged capillary smooth or lightly serrated	Asymmetrically hooded acicular chaeta	–	–	–
Orensanz 1974	Limbate denticulated coarse teeth	Limbate with small teeth along most of the cutting edge or finely denticulated	Hooded chaeta	Limbate	Limbate	Acicular chaeta
Fauchald 1970	Bilimbate dentated	Bilimbate finely serrated	Hooded ventral chaeta	Limbate	Strongly curved bilimbate	Acicular spine
Pettibone 1963	Limbate curved and strongly denticled at the base of the wing	Limbate	–	Limbate	Limbate	Acicular chaeta or spine
Hartman 1944	Limbate dentate	–	Inferiormost with hooded tip	–	Bilimbate	Acicular spine
Crossland 1924	Capillary denticulated	Capillary plain or finely denticulated	Acicular chaeta with asymmetrical and rudimentary hoods	–	Capillaries	Acicular chaeta
Treadwell 1922	Chaetae with marked denticulation along the margin of the wing	Chaetae with denticulation barely discernible along the margin of the wing	–	–	Bilimbate curved at the end	Acicula
Chamberlin 1919	Bilimbate capillary with projecting teeth or scale	Limbate smooth	Crochet, hooded acicula, stout spines with unsymmetrical membranous guards	–	–	–

Taxonomic account

Family Oenonidae Kinberg, 1865

Genus *Arabella* Grube, 1850

Type-species. *Nereis iricolor* Montagu, 1804

Diagnosis. Prostomium tapering anteriorly, without antennae; eyes, usually, present at posterior margin in number of two or four. Peristomium double ringed, rings clearly or inconspicuously separated. Maxillary carriers long and slender, two dorsal strongly sclerotized and one ventral moderately to poorly sclerotized. Five maxillary plates, shape of plates symmetric or asymmetric; MxI gracile or robust (*sensu* Colbath 1989b; Fig. 4B, C), distally dentate or falcate simple or bifid. Mandibles present, always fully developed. Branchiae absent. Notopodial cirri small papillae. Neuropodia prechaetal lobes usually shorter than postchaetal. Most chaetae limbate, geniculated at some extent, finely or coarsely serrated (Fig. 2D); ventralmost chaeta in median and posterior parapodia taper abruptly (Fig. 3L) or gradually (Fig. 2E) to guards, which are always present; ventralmost chaeta acicular spine absent.

Remarks. Approximately 50 species have been described or placed within *Arabella*. Most descriptions are incomplete, leading to great amount of synonymisation and records of few cosmopolitan species, consequently making it difficult to identify specimens to species level. Large intraspecific variation has been recorded in maxillary features, such as shape of MxI and II (Colbath 1989b). However, the degree of intraspecific polymorphism is still unknown for most species, which poses an additional challenge to species identification.

Cenothrix Chamberlin, 1919 and *Notopsilus* Ehlers, 1868, recognized synonyms of *Arabella*, have been proposed as subgenera (Orensanz 1974). Shapes of MxI and ventralmost chaetae were used to differentiate among these subgenera and the nominal. *Arabella* and *Cenothrix* have MxI distally falcate. In *Notopsilus*, it is distally dentate. Ventralmost chaetae tapering to the guard is gradual in *Arabella* and abrupt in *Cenothrix* and *Notopsilus.* However, *Notopsilus* is not, currently, recognized because some species have both distally falcate and dentate MxI (Colbath 1989b).

Three species of *Arabella* had been previously reported from the Australian coast, *Arabella (Arabella) iricolor* (Montagu, 1804), *A. (Cenothrix) mutans* (Chamberlin, 1919) and *A. (Arabella) longipedata* Monro, 1931 (Hutchings & Yerman 2011). Of these, we only recorded *A. (C.) mutans* and describe two new species to science.

Arabella (A.) iricolor and *A. (C.) mutans* are among the most recorded species for the genus. They are clearly differentiated by ventralmost chaetae tapering to the guard gradual and abrupt (*sensu* Colbath 1989b), which characterize them, respectively, as *Arabella (Arabella)* and *Arabella (Cenothrix)*. *Arabella (A.) iricolor*, described from England, is probably a species complex, which renders the inferred distribution range of this species questionable (Colbath 1989b). *Arabella (A.) longipedata* was described from a Great Barrier Reef specimen with posterior post-chaetal lobe longer than chaetae and around eight chaetae per parapodium, features absent in all specimens analysed in our study.

Traditionally, the main features used in species identification are: 1) ventralmost chaetae tapering abruptly or gradually to guards; 2) absence/presence of ridge on ventralmost chaetae; 3) shape of maxillary plates; 4) relative length of post-chaetal lobe; 5) shape of pygidium and pygidial cirri (Fauchald 1970; Orensanz 1974; Colbath 1989b). However, we did not include the ridge on ventralmost chaetae in our descriptions, because it is difficult to be certain about them using light microscopy. Shape of pygidium and pygidial cirri were useful features, as well as shape of mandible, which is usually poorly described and illustrated.

Arabella (Arabella) pulvinata n. sp.
(Figs 1, 2)

Material examined. Holotype: AM W.44856, MI QLD2438 (1), fixed in formalin, few median chaetigers fixed in ethanol.

Measurements. Table 2.

TABLE 2. Measurements of all specimens examined.

Species	AM number	Condition of specimen	Total number of chaetigers	Total length (mm)	Length to chaetiger 10 (mm)	Width at chaetiger 10 (mm) with parapodia	Width at chaetiger 10 (mm) without parapodia	Widest chaetiger	Width at widest chaetiger (mm) with parapodia	Width at widest chaetiger (mm) without parapodia
Arabella (A.) pulvinata n. sp.	W.44856	Complete, RA, RP	325	85	2.60	1.20	1.00	18	1.75	1.40
Arabella (C.) mutans	W.44798	Complete	167	24	2.56	0.92	0.75	21	1.12	0.90
	W.44855	Complete	190	40	2.60	1.00	0.80	35	1.17	0.90
	W.44892	Complete	241	46	2.75	0.97	0.84	34	1.18	1.00
		Incomplete	86	21	2.44	0.84	0.78	15	1.03	0.94
	W.44908	Complete	211	41	2.28	0.92	0.77	23	1.05	0.82
		Complete	220	49	2.36	0.87	0.75	25	1.05	0.85
		Complete, RP	166	35	2.68	1.12	0.87	19	1.25	1.15
Arabella (C.) robusta n. sp.	W.43916	Complete	~50	5	1.44	0.48	0.44	40	0.60	0.48
	W.44355	Complete	79	15	2.25	0.53	0.45	14	0.57	0.48
Drilonereis cf. *logani*	W.44971	Incomplete	135	21	1.77	0.37	*	17	0.47	*
Drilonereis orensanzi n. sp.	W.44913	Complete, RP	398	90	2.60	0.57	0.50	18	0.65	0.57
	W.44797	Complete	350	105	2.50	0.42	0.37	16	0.55	0.50
	W.44923	Incomplete	144	41	2.85	0.50	*	13	0.52	*
Oenone fulgida	W.44796	Complete	160	71	5.40	3.40	2.50	59	4.10	2.50
	W.44456	Complete	~190	40	3.44	2.25	1.87	43	2.31	1.56
Oenone ventrioculata n. sp.	W.44002	Complete	~120	17	1.80	1.00	0.75	37	1	0.87
	W.44354	Incomplete	34	5.3	1.90	0.80	0.60	?	?	?
Oenone sp. 1	W.44342	Incomplete	44	5	1.1	0.55	0.42	10	0.55	0.42

AM, Australia Museum. RP, regenerating posterior end. RA, regenerating anterior end. *, parapodia minute at this chaetiger. ?, uncertain, specimen incomplete and poorly preserved at posterior region of the fragment.

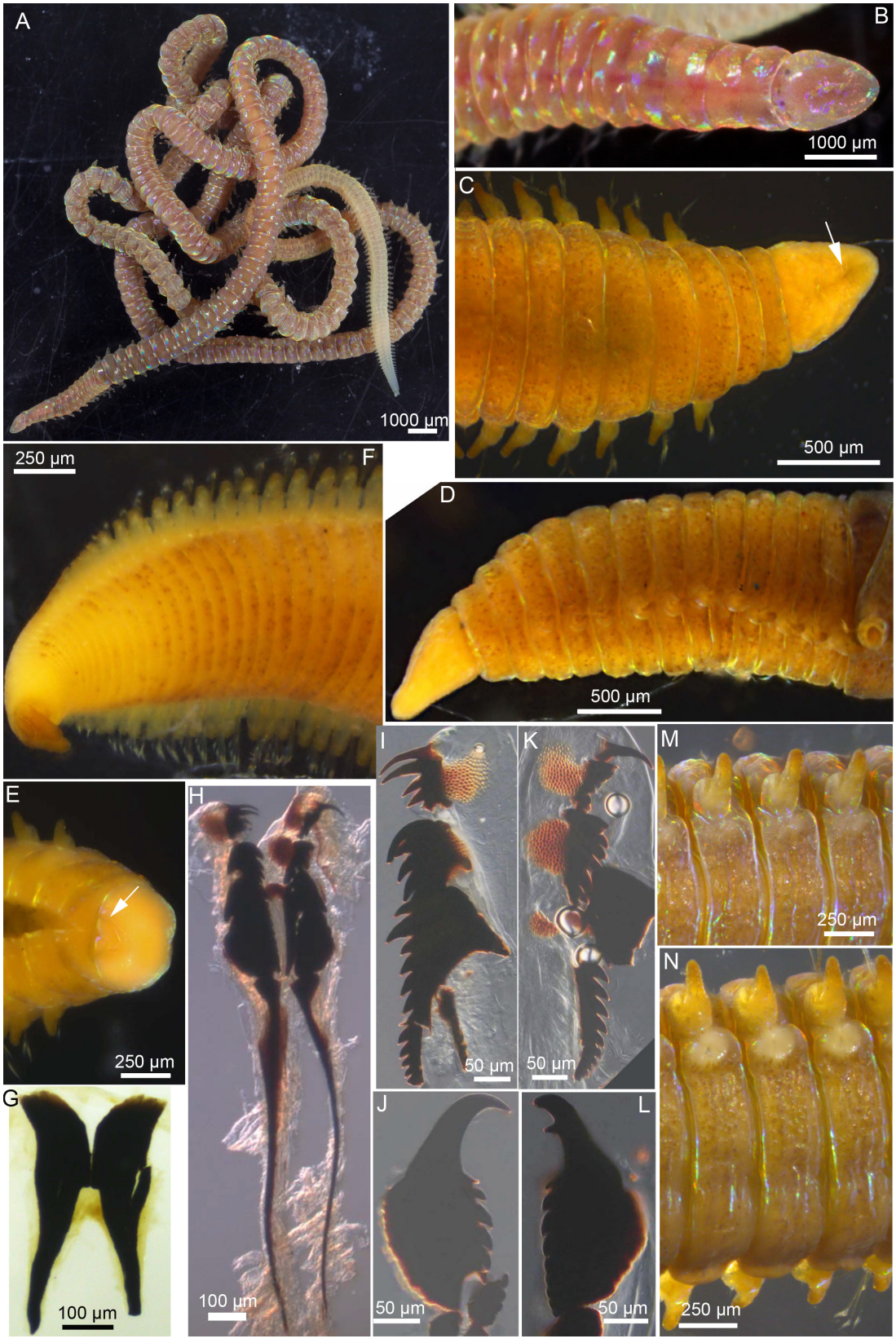

FIGURE 1. *Arabella (A.) pulvinata* n. sp. A. Whole body of live specimen; B. Anterior end of live specimen; C. Anterior end, dorsal view, arrow to median groove; D. Anterior end, lateral view; E. Anterior end, ventral view, arrow to median groove; F. Posterior end, dorsal view; G. Mandibles; H. Maxillae and carriers, dorsal view; I. Left MxII–V, ventral view; J. Left MxI gracile falcate, dorsal view; K. Right MxII–MxV, ventral view; L. Right MxI gracile falcate, dorsal view; M. Ventral pads parapodia 25–27; N. Ventral pads parapodia 94–96. A–N, AM W.44856.

Description. Live specimen whitish with internal red hues due to blood (Fig. 1A, B). Preserved specimen brown; parapodia, anterior and posterior ends lighter, yellowish; distal end of post-chaetal lobe brown (Fig. 1C, D); some chaetigers with discontinuous dark brown pigmentation on dorsal side. Body long, slender, widest region starting at chaetiger 18, remaining of the body about the same width along its whole length, slowly tapering at posterior region (Fig. 1A, F); dorsoventrally rounded, more convex dorsally than ventrally anteriorly.

Prostomium longer, narrower and around 2/3 as deep as peristomium; tapering; posterior deeper than anterior end; dorsally in a slope with median groove from posterior to anterior; ventrally flattened with median groove wider and bearing a projection at posterior end (Fig. 1B–E). Five round eyes in line; 3 median closer to each other than to lateral, smaller and more conspicuous than lateral. Peristomium double ringed, second a little longer, wider and deeper than first (Fig. 1C, D).

Mandibles as far forward as maxillae in pharyngeal bulb while retracted; cutting plates shorter than mandibular carrier, rounded, inner edge shorter than lateral, widest at anteriormost edge (Fig. 1G). Maxillae dorsal carriers widest at anterior end; ventral carrier tapering to fine point, shorter than half the length of dorsal carriers (Fig. 1H). Maxillae with five pairs of plates, asymmetrical considering shape of plates. Both MxI gracile, basally dentate, distally falcate, right bifid. MxII long on both sides (Fig. 1H–L). MxIII and IV with anteriormost teeth longest. Maxillary formula: (1,8) + (2,8), 12 + 12, 6 + 6, 4 + ?, 1 + 1.

Pre-chaetal lobe rounded, as long as chaetal lobe. Post-chaetal tapering to round tips, twice as long as chaetal lobe, decreasing toward posterior end, most posterior a little less than twice as long as chaetal lobe. Notopodial cirri present as small papillae (Fig. 2B) bearing one to three notoaciculae. Nephridiopore surrounded by ventral pad from chaetiger 11–250, anteriormost inconspicuous, conspicuous from chaetiger 65 (Fig. 1M, N).

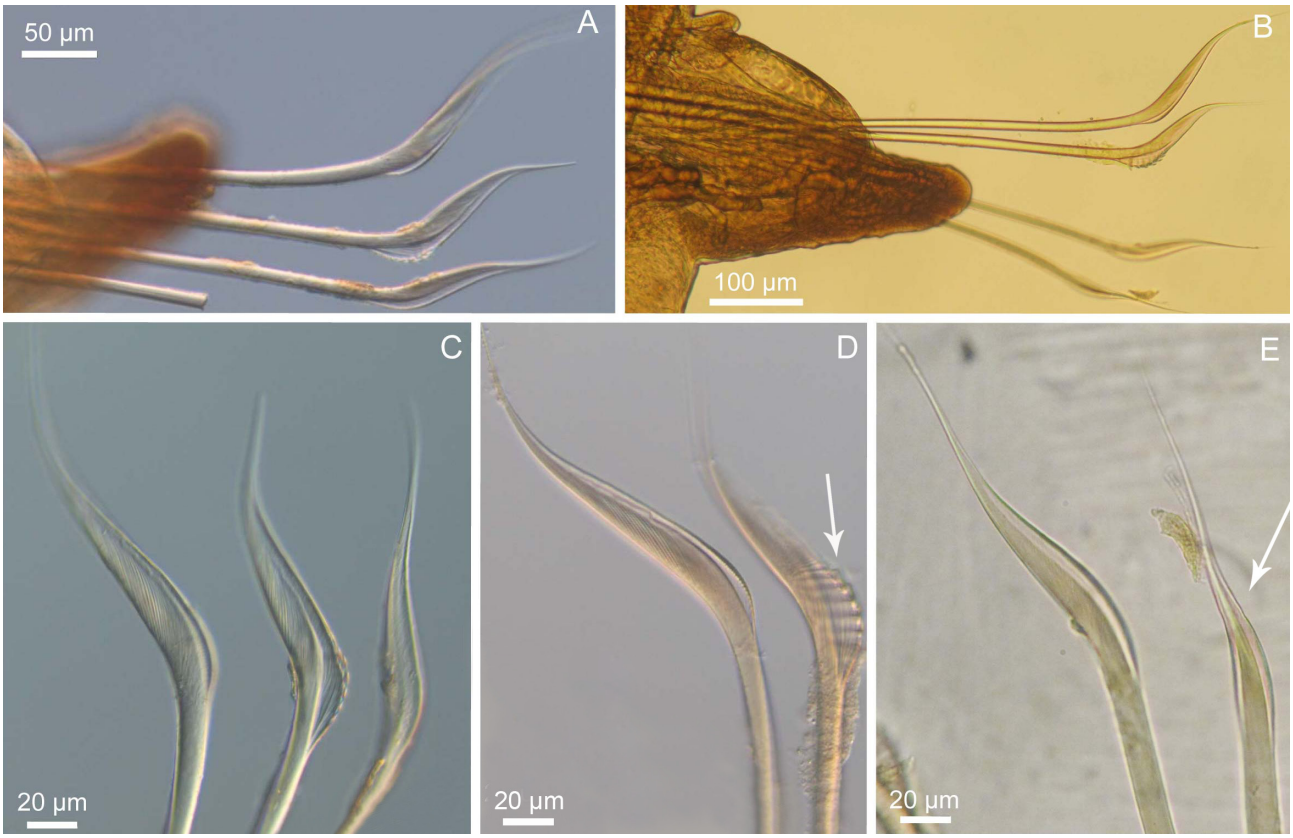

FIGURE 2. *Arabella (A.) pulvinata* n. sp. A. Left parapodium 41; B. Left parapodium 130; C. Bilimbate chaetae, left parapodium 41; D. Bilimbate chaetae, arrow to coarsely serrated, left parapodium 130; E. Bilimbate and ventralmost chaetae tapering gradually to guards (arrow), left parapodium 130. A–E, AM W.44856.

Neuroaciculae mucronate, 4 at most per neuropodia, decreasing in number towards posterior end. Limbate chaetae, decrease in length from dorsal to ventral in all parapodia and in number from anterior to posterior, 6 in anteriormost parapodia (around chaetiger 9), and 4 in median and posterior chaetigers (at least from chaetiger 40)

(Fig. 2A, B). In anteriormost parapodia, dorsalmost limbate chaetae geniculated, 5 more ventral limbate chaetae a little curved. In median and posterior parapodia, 3 dorsalmost limbate chaetae geniculated, first and third finely serrated, second coarsely serrated (6–7 denticles rows); ventralmost chaetae tapering to distal guards gradually (Fig. 2A–E).

Pygidium with a pair of digitiform dorsal and ventral cirri placed laterally; dorsal ones thicker and twice as long as ventral (Fig. 1F).

Remarks. Specimen is regenerating first 11 chaetigers and last 84 chaetigers. The third median eye appears to be a duplication of the left one, thus not the normal condition for the species. The normal number of eyes for the species is, probably, four. Right MxIV broke during mounting.

This is the only species examined here to belong to the subgenera *Arabella*. It differs from all other species of this group by the shape of MxI and MxII and the presence of conspicuous ventral pads surrounding nephridiopores. *Arabella (A.) pulvinata* n. sp. is most similar to *A. (A.) pectinata* Fauchald, 1970. They both share mandibular cutting plates longer than mandibular carriers, bifid and simple MxI and similar shape and number of chaetae per parapodium. In addition, considering that the normal condition for *A. (A.) pulvinata* n. sp. is, probably, four eyes, as discussed under remarks, both species also share the same number of eyes. However, *A. (A.) pectinata* has left MxI bifid and robust, all teeth of MxIII and IV evenly long and ventral maxillary carriers 2/3 as long as dorsal carriers, features that differentiate both species.

Etymology. Name refers to pads at ventral side that surround nephridiopores.

Habitat. Muddy sand, 0.5 m deep, close to mangroves.

Type locality. Lizard Island, Mangrove Beach.

Arabella (Cenothrix) mutans (Chamberlin 1919)

(Figs 3, 4A–E)

Cenothrix mutans Chamberlin, 1919: 330–332.
Arabella mutans.—Crossland 1924: 71; Colbath 1989b: 294–295.

Material examined. AM W.44798, MI QLD2429 (1), fixed in formalin, few median chaetigers fixed in ethanol; AM W.44855, MI QLD2439 (1), fixed in formalin; AM W.44892 (2), fixed in ethanol; AM W.44908 (3), fixed in formalin.

Measurements. Table 2.

Description. Live specimens whitish to yellowish with internal red hues due to blood (Fig. 3A, B). Specimens fixed in formalin yellow to light brown, anterior and posterior ends lighter (Fig. 3C–F); some chaetigers with dark brown discontinuous pigmentation on dorsal side.

Body long, slender, widest at anterior region, remaining part of the body about the same width along its whole length, abruptly tapering at posterior end (Fig. 3B, G); dorsoventrally rounded, dorsal side more convex than ventral.

Prostomium around 2/3 as deep as, narrower to as wide as and longer than peristomium; tapering; posterior deeper than anterior end and constricted in the connection with peristomium; dorsally in a slope with median groove from posterior to anterior; ventrally flattened with median groove wider and bearing a projection at posterior end (Fig. 3C–F). Four eyes evenly spaced (median a little closer) (Fig. 3A). Median eyes a little more anterior or in line with lateral; smaller and more conspicuous than lateral; may be missing or doubled in some specimens. Peristomium double ringed, second ring a little longer, wider and deeper than first (Fig. 3C–F).

Mandibles as far forward as maxillae in pharyngeal bulb while retracted; cutting plates longer than mandibular carrier, rounded, inner edge shorter than lateral (Fig. 4E). Maxillae dorsal carriers widest at anterior end; ventral carrier tapering, 2/3 as long as dorsal carriers (Fig. 4A). Maxillae with five pairs of plates (Fig. 4A, D); shape of plates symmetrical or asymmetrical. MxI and II polymorphic. 1) MxI gracile, basally dentate, distally falcate; MxII long on both sides (Fig. 4B). 2) One side MxI gracile, basally dentate, distally falcate, MxII long; opposite side MxI robust, completely dentate, distally bifid (most distal tooth inconspicuous), MxII short (Fig. 4A, C). Maxillary formula symmetric (n=2): (1,6(7)) + (1,6), 12 + 15(13), 7(4) + 6, 5(4) + 5(4), 1 + 1. Maxillary formula asymmetric (MxI left gracile + right robust dentate; n=4): (1,7) + 9, 12(11) + 7, 5(6) + 4, 4 + 4, 1 + 1. Maxillary formula asymmetric (MxI left robust dentate + right gracile; n=1): 9 + (1,5), 7 + 10, 5 + 5, 5 + 4, 1 + 1.

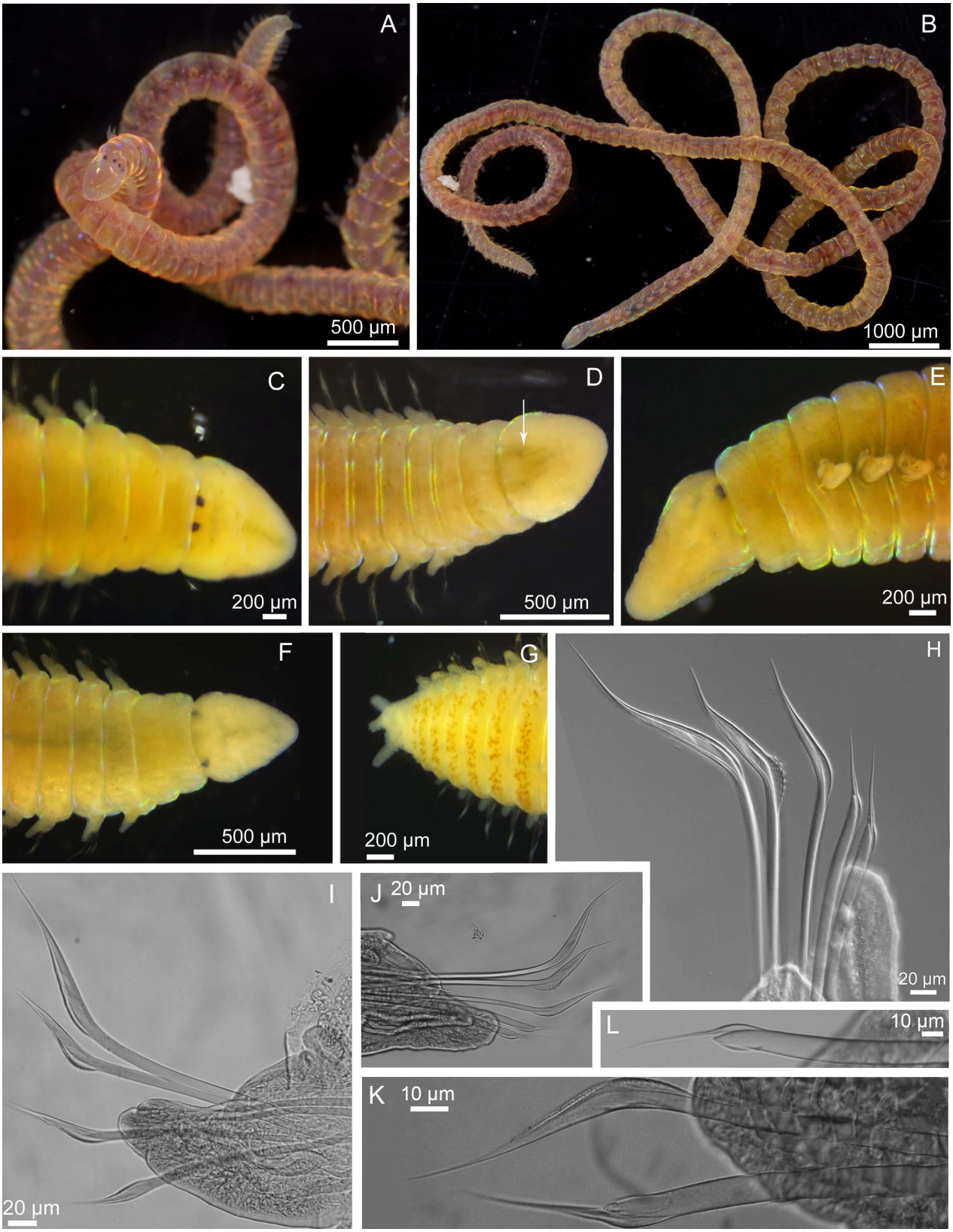

FIGURE 3. *Arabella (C.) mutans* (Chamberlin, 1919). A. Anterior end of live specimen; B. Whole body of live specimen; C. Anterior end, dorsal view, lateral eyes hidden below anterior peristomial fold; D. Anterior end, ventral view, arrow to median groove; E. Anterior end, lateral view; F. Anterior end, dorsal view; G. Posterior end, dorsal view; H. Limbate and ventralmost chaetae tapering abruptly to guards, parapodium 26; I. Right parapodium 5, anterior view; J. Left parapodium 26, anterior view; K. Limbate and ventralmost chaetae tapering abruptly to guards, parapodium 49; L. Ventralmost chaetae tapering abruptly to guards, parapodium 78. A–E, G, H, J, AM W.44855; F, K, AM W.44798; I, L, AM W.44908.

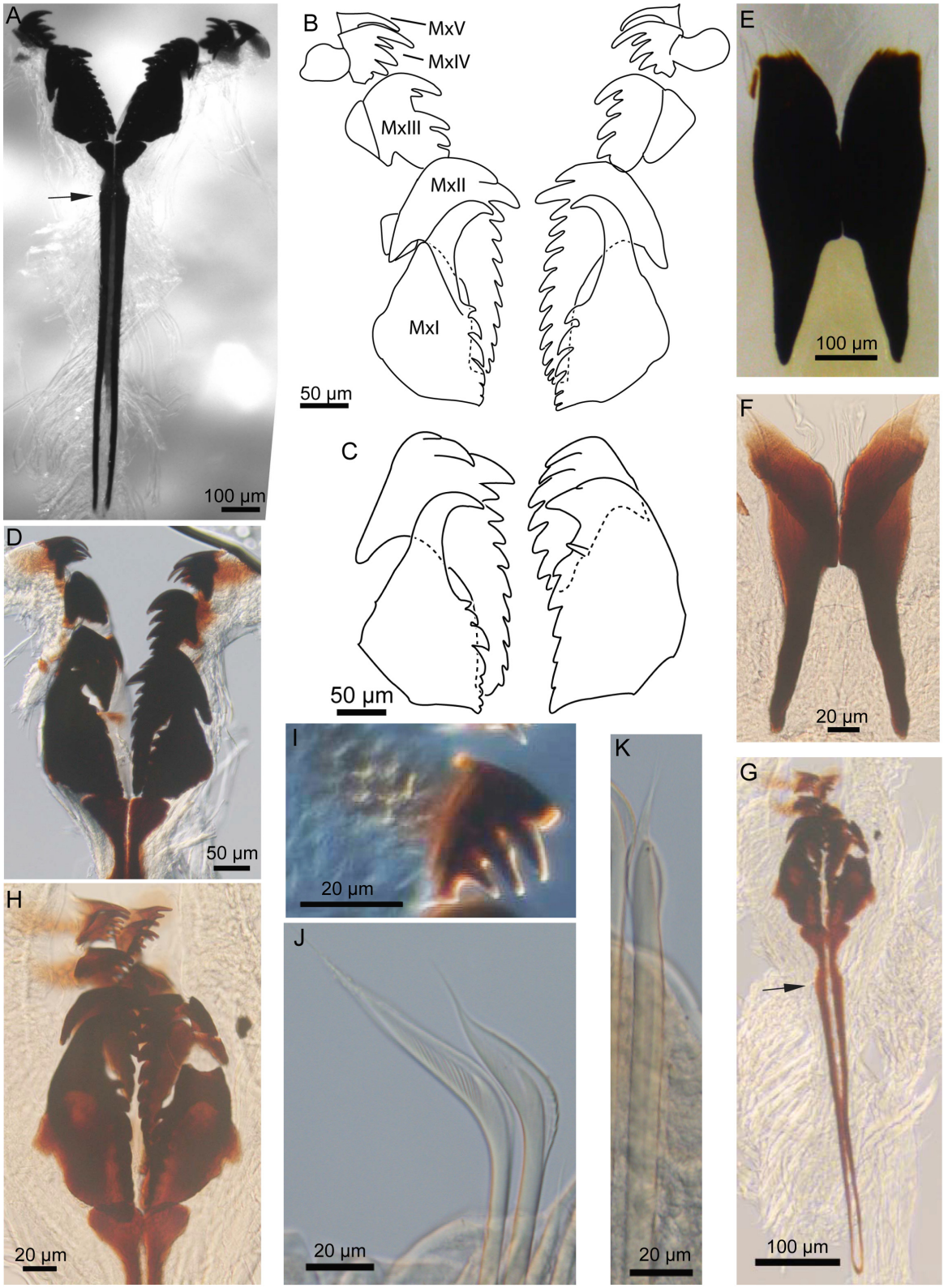

FIGURE 4. A–E, *Arabella (C.) mutans* (Chamberlin, 1919); F–K, *Arabella (C.) robusta* n. sp. A. Maxillae and carriers, dorsal view, left MxIV and MxV broke during mounting, arrow at beginning of the furcula; B. Maxillae, both MxI gracile falcate and MxII long, left MxIII missing third tooth, dorsal view; C. Left MxI gracile falcate and MxII long, right MxI robust dentate and MxII short, dorsal view; D. Maxillae, dorsal view; E. Mandibles, ventral view. F. Mandibles; G. Maxillae and carriers, right MxI and MxII broke during mounting, dorsal view, arrow at beginning of the furcula; H. Maxillae, right MxI and MxII broke during mounting, dorsal view; I. Right MxIII, anteriormost tooth broke during mounting, ventral view; J. Bilimbate chaetae, right parapodium 20; K. Ventralmost chaetae tapering abruptly to guards, right parapodium 40. A, C, AM W.44908; B, E, AM W.44855; D, AM W.44798; F–H, J, K, AM W.44355; I, AM W.43916. Mx = maxillary plate.

Pre-chaetal lobe rounded, as long as chaetal lobe. Post-chaetal tapering to round tips, twice as long as chaetal lobe. Notopodial cirri present as small papillae bearing one to two notoaciculae.

Neuroaciculae mucronate, 2–3 in most neuropodia, 1 in posterior ones. Chaetae length and limbate chaetae geniculation decrease from dorsal to ventral in all parapodia (Fig. 3H–J). Limbate chaetae decrease in number from anterior to posterior end (4–2); most finely serrated, second dorsal coarsely serrated (9–4 denticles rows, decreasing towards posterior end; Fig. 3H), except in anteriormost chaetigers. In anteriormost chaetigers, ventralmost chaetae limbate. Ventralmost chaeta tapering to distal guards abruptly present in all chaetigers except anteriormost ones, distally tapering to blunt end, guards mucronate, 1 in most parapodia, but some with 2 (Fig. 3H, K–L).

Pygidium two lateral lobes bearing dorsal and ventral digitiform cirri placed laterally (Fig. 3G); dorsal cirri about as long as to 1/3 (twice as long as) longer than ventral cirri.

Variation. Specimens may be more or less round in cross section, a characteristic that varies along the body. The widest region of the body is variable, but always anterior. The most conspicuous variations among examined specimens are the shape of MxI and II and number of median eyes. Maxillary plates I and II are, respectively, gracile and long on left side and robust dentate and short on the right side in most specimens (n=4). Two specimens have MxI gracile and MxII long on both sides. One (W.44908) has MxI robust dentate and MxII short on the left side and MxI gracile and MxII long on the right side, similar to that described for the type. Two median eyes are present in most specimens, but one or both may be missing and one may be duplicated. In sample W.44908, one specimen is missing the right median eye and the other has a third one posterior to it. Specimen W.44798 is missing both, presenting only two lateral eyes. This specimen also differs from the others in having: up to four geniculated limbate chaetae and always just one ventralmost chaeta tapering to distal guards abruptly in median chaetigers; and only four rows of denticles in coarsely serrated limbate.

Remarks. Relative length of peristomium rings varies in live specimen. The most different specimen (W.44798) was the only one collected in Mangrove Beach. All other ones came from Casuarina Beach.

The intraspecific variation of maxillae and poor species description led to the identification of this species as circumtropical. The presence of ventralmost chaetae tapering to distal guards abruptly is commonly used as the main diagnostic characteristic, although it is not restricted to this species and characterizes the subgenus *Cenothrix* (Fauchald 1970; Orensanz 1974; Colbath 1989b). Currently, the species is characterized by: 1) polymorphic MxI and II; 2) robust MxI dentate, when present; 3) ventralmost chaetae tapering to distal guards abruptly; 4) post-chaetal lobe shorter than chaetae and 5) four pygidial cirri (Colbath 1989b). The type specimen is from Eastern Island. It has maxillae similar to those observed in W.44798, MxI robust dentate distally bifid and MxII short on the left side, MxI gracile and MxII long on the right side (Chamberlin 1919) and eyes under anterior peristomial fold, not illustrated in the original description (Perkins 1979). At least part of the unusual intraspecific variation described for this species appears to be real. Specimens from the same locality may differ only in the shape of the maxillary plates (Colbath 1989b), as observed here. In order to clearly understand the range of intraspecific variation, further studies using morphological and molecular tools are necessary.

Habitat. Sand, intertidal to 0.5 m deep.

Distribution. Tropical Pacific Ocean.

***Arabella (Cenothrix) robusta* n. sp.**
(Figs 4F–K, 5, 6)

Material examined. Holotype: AM W.44355, MI QLD2371 (1), fixed in formalin, few posterior chaetigers fixed in ethanol. Paratype: AM W.43916, MI QLD2331 (1), fixed in ethanol.

Measurements. Table 2.

Description. Live specimens whitish with orange (dark) spots regularly distributed on dorsal side; on prostomium, between median and lateral eyes; on peristomium, a pair on anterior and posterior margins and a median on the posterior margin of both rings; on chaetigers, a pair on anterior and posterior margins and a median on posterior margin (Fig. 5B, C). Specimen fixed in ethanol beige with same pigmentation pattern of live specimens (Fig. 5D). Specimen fixed in formalin beige with dark brown spots scattered around (Fig. 5E).

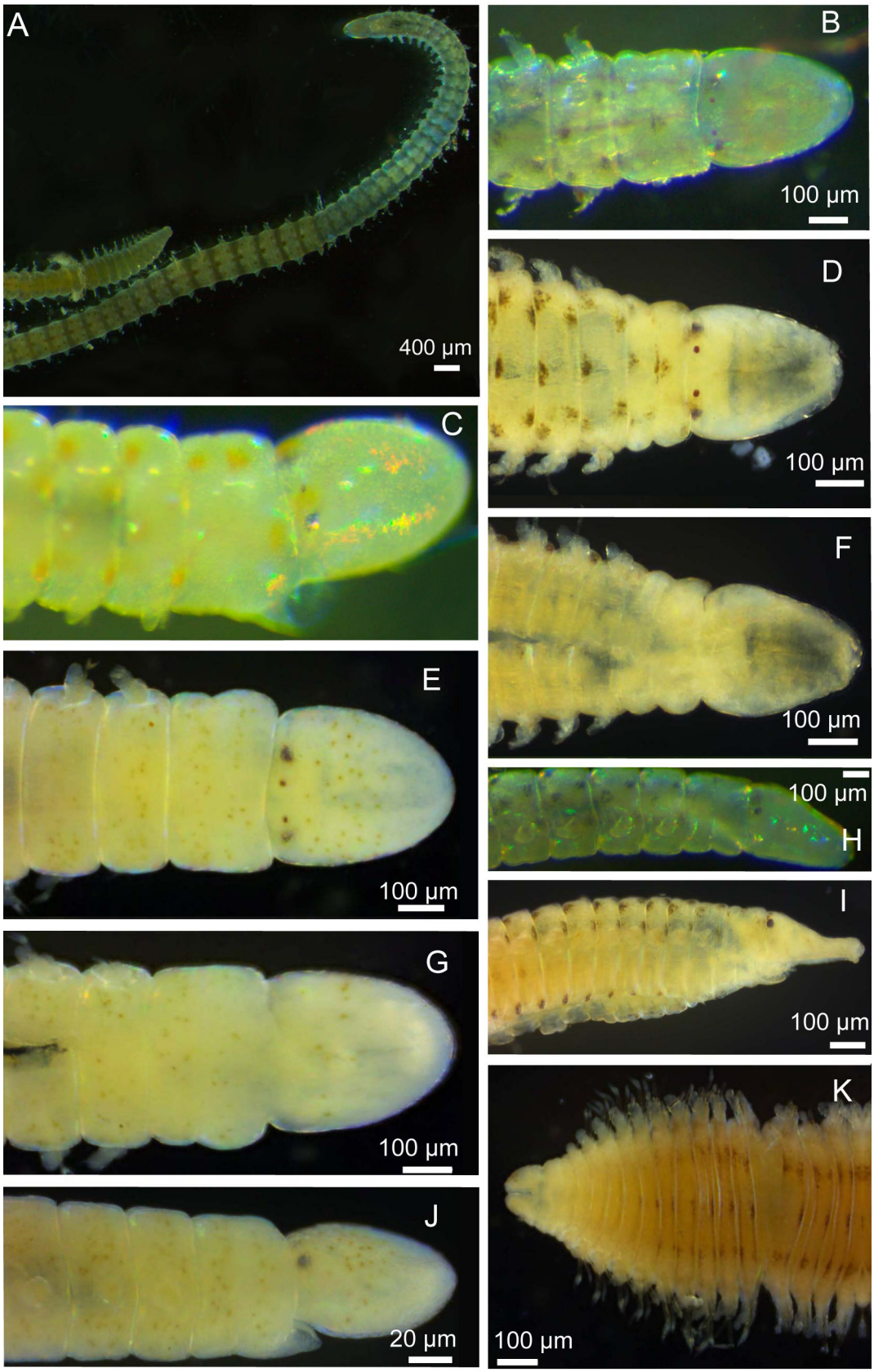

FIGURE 5. *Arabella (C.) robusta* n. sp. A. Whole body of live specimen; B, C. Anterior end of live specimens, dorsal view; D, E. Anterior end, dorsal view; F, G. Anterior end, ventral view; H. Anterior end of live specimen, lateral view; I, J. Anterior end, lateral view; K. Posterior end, dorsal view. A, B, D, F, H, I, K, AM W.43916; C, E, G, J, AM W.44355.

Body long, slender, widest at anterior region (chaetiger 13–19), evenly tapering towards posterior end of the body (Fig. 5A); dorsoventrally rounded, more convex dorsally than ventrally at anterior end (Fig. 5H). Prostomium as wide as, as deep as and longer than peristomium; tapering with rounded lateral margins (triangular); dorsally flat; ventrally round (Fig. 5D–J). Four round eyes in line, median closer to lateral than to each other; median smaller than lateral (Fig. 5D, E). Peristomium double ringed, division between segments inconspicuous dorsally, first ring a little longer than second (Fig. 5D, E).

Mandibles as far forward as maxillae in pharyngeal bulb while retracted; cutting plates about as long as mandibular carriers, diverging at anterior margin, inner edge shorter than lateral (Fig. 4F). Maxillae dorsal carriers widest at anterior end, connected at posterior end, ventral carrier not observed (Fig. 4G). Maxillae with five pairs of plates, asymmetric (Fig. 4G–I). Left side MxI robust distally falcate and Mx II short, right side MxI gracile distally falcate and MxII long (Fig. 4H). Maxillary formula: (1,10 (7)) + (1,7), 6 + 12 (10), 5 + 5 (4), 5 + 5, 2 + 2.

Pre-chaetal lobe rounded, as long as chaetal lobe. Post-chaetal tapering to round tips, more than twice as long as chaetal lobe anteriorly, digitiform and twice as long as chaetal lobe posteriorly. Notopodial cirri present as small papillae, with at least 1 notoacicula.

Neuroaciculae mucronate, 1–2 per neuropodia. Chaetae length and limbate chaetae geniculation decrease from dorsal to ventral in all parapodia. All chaetae robust in median and posterior chaetigers, thick in relation to parapodia (Fig. 4J–K, 6B). Limbate chaetae decrease in number from anterior to posterior end (3–2); most finely serrated, second dorsal coarsely serrated (7–5 denticles rows, decreasing towards posterior end; Fig. 4J). In anteriormost chaetigers, ventralmost chaetae limbate. Ventralmost chaeta tapering to distal guards abruptly present in all chaetigers except anteriormost ones, distally tapering to blunt end, guards mucronate, 1 per parapodium (Fig. 4K, 6A, B).

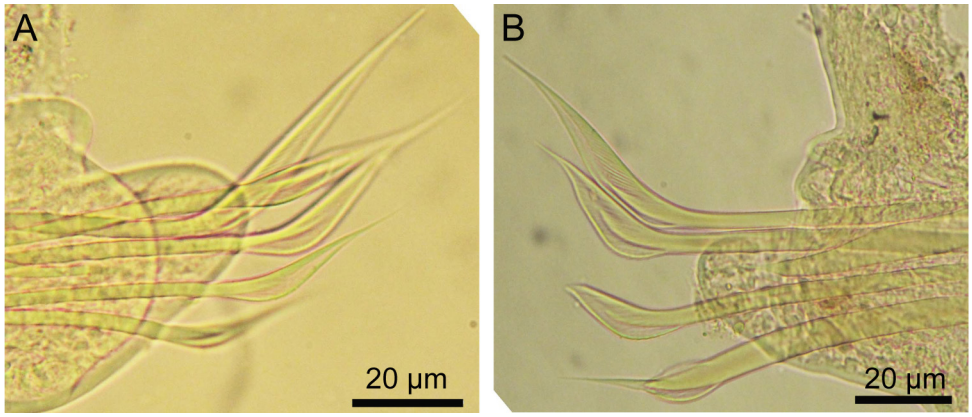

FIGURE 6. *Arabella (C.) robusta* n. sp. A. AM W.44355, right parapodium 3, posterior view; B. AM W.43916, right parapodium 45, anterior view.

Pygidium two swollen pads lacking cirri (Fig. 5K).

Variation. Live specimens differ in the colour of pigmentation, which may be orange or black. The pigmentation is retained in specimens fixed in ethanol. In specimens fixed in formalin, the wide orange spots of pigmentation were replaced by scattered small brown spots. Shape and depth of prostomium varied from round to tapering; proximal end about as deep as or deeper than distal end. Pharynx is slightly everted in the holotype, making the peristomium seem a little longer ventrally than dorsally.

Remarks. The flat body of the paratype may be an artefact of the fixation in ethanol. MxI and II showed no variation among examined specimens.

The robust chaetae and MxV with two teeth are unique features in this species. *Arabella (Cenothrix) atlantica* Crossland, 1924 and *Arabella (Cenothrix) monroi* Colbath, 1989b are the most similar to *A. (C.) robusta* n. sp. They share features of the prostomium and peristomium; chaetae, except for the number, which is smaller in *A. (C.) robusta* n. sp.; and similar maxillary plates and formula, except for MxV, which has just one tooth in *A. (C.) atlantica* and *A. (C.) monroi*. *Arabella (C.) monroi* and *A. (C.) robusta* n. sp. also share the swollen pygidial pads and the lack of pygidial cirri. Features of the pygidium are not known for *A. (C.) atlantica* (Colbath 1989b).

Etymology. Name refers to robust chaetae, limbate and ventralmost chaetae tapering to distal guards abruptly thicker in relation to parapodia than in other species.

Habitat. Coral rubble, 5–9 m deep.

Type locality. Lizard Island, Big Vicki's reef.

Genus *Drilonereis* Claparède, 1870

Type-species. *Lumbriconereis filum* Claparède, 1868

Diagnosis. Prostomium without antennae, usually triangular and dorsoventrally flat with median longitudinal furrow; eyes usually absent. Peristomium double ringed. Maxillary carriers long, two dorsal slender, strongly sclerotized and one ventral wider and shorter, moderately to poorly sclerotized. Four to five maxillary plates, shape of plates usually symmetric; MxI distally falcate, basally smooth or dentate. Mandibles reduced or absent. Notopodial cirri small papillae. Neuropodia prechaetal lobes usually shorter than postchaetal. Most chaetae limbate, ventralmost chaeta acicular spine (Figs 7H, 8M); ventralmost chaeta tapering to guards absent.

Remarks. Around 38 free living or endoparasitic species have been described or placed within *Drilonereis*. Most descriptions are incomplete, leading to a great amount of synonymisation and records of few species worldwide, consequently making it difficult to identify specimens to species level. For practical reasons, species are usually grouped based on the presence and absence of mandible and of teeth on the base of MxI, which may be inconspicuous (Fauchald 1970). Other features used in species identification are: 1) shape of mandible, when present; 2) shape of maxillary plates; 3) relative length acicular spine chaeta in relation to postchaetal lobe. Presence of eyes is usually not considered an informative feature because it changes from juveniles to adults of the same species (Fauchald 1970).

Two species of *Drilonereis* had been previously described from the Australian coast, *D. australiensis* and *D. quadrioculata*. *Drilonereis australiensis* is similar to one of the species analysed here, but they differ in the mandible shape. *Drilonereis quadrioculata* has a distinct round prostomium, four eyes in the peristomium, mandibles absent, no teeth at the base of MxI and MxII with most anterior tooth distinctly longer than the remaining. These features were not observed in the specimens examined here.

Drilonereis cf. *logani* Crossland, 1924

(Fig. 7)

Drilonereis logani Crossland, 1924: 64–70
Drilonereis.—Gallardo 1968: pl. 37; Mohammad 1973: 16–17; Kirkegaard 1995: 52.

Material examined. AM W.44971, MI QLD2440 (1), fixed in formalin, few median chaetigers fixed in ethanol.

Measurements. Table 2.

Description. Live specimens whitish with internal red hues due to blood (Fig. 7A). Specimens fixed in formalin anterior beige (Fig. 7B–D), median region dark brown.

Body long, slender, widest until chaetiger 20, about the same width along the remaining of the fragment (Fig. 7A); dorsoventrally rounded, dorsal side as convex as ventral. Chaetigers longer and narrower towards posterior region, some longer than wide, all with a transverse median groove, appearing to be double ringed.

Prostomium longer, narrower and as half as deep as peristomium; triangular, anteriorly tapering, dorsoventrally flattened; median longitudinal groove present on dorsal and ventral sides, dorsal groove extends to first peristomial ring (Fig. 7B, D). Eyes absent. Peristomium double ringed, first around 1/3 longer than second; longer dorsally than ventrally (Fig. 7B–D). Margin between prostomium and peristomium inconspicuous dorsally (Fig.7B).

Mandibles absent. Maxillae dorsal carrier narrower at anterior end than beginning of the furcula (Fig. 7E); ventral carrier tapering; shorter than half of dorsal carriers. Maxillae with four pairs of plates symmetrical regarding shape and size (Fig. 7E–F). MxI falcate with 4 conspicuous teeth at the base and around 25 minute teeth at the inner surface of the fang (Fig. 7F). Maxillary formula: (1,4) + (1,4) (minute teeth not included), 6 + 7, 1 + 1, 1 + 1.

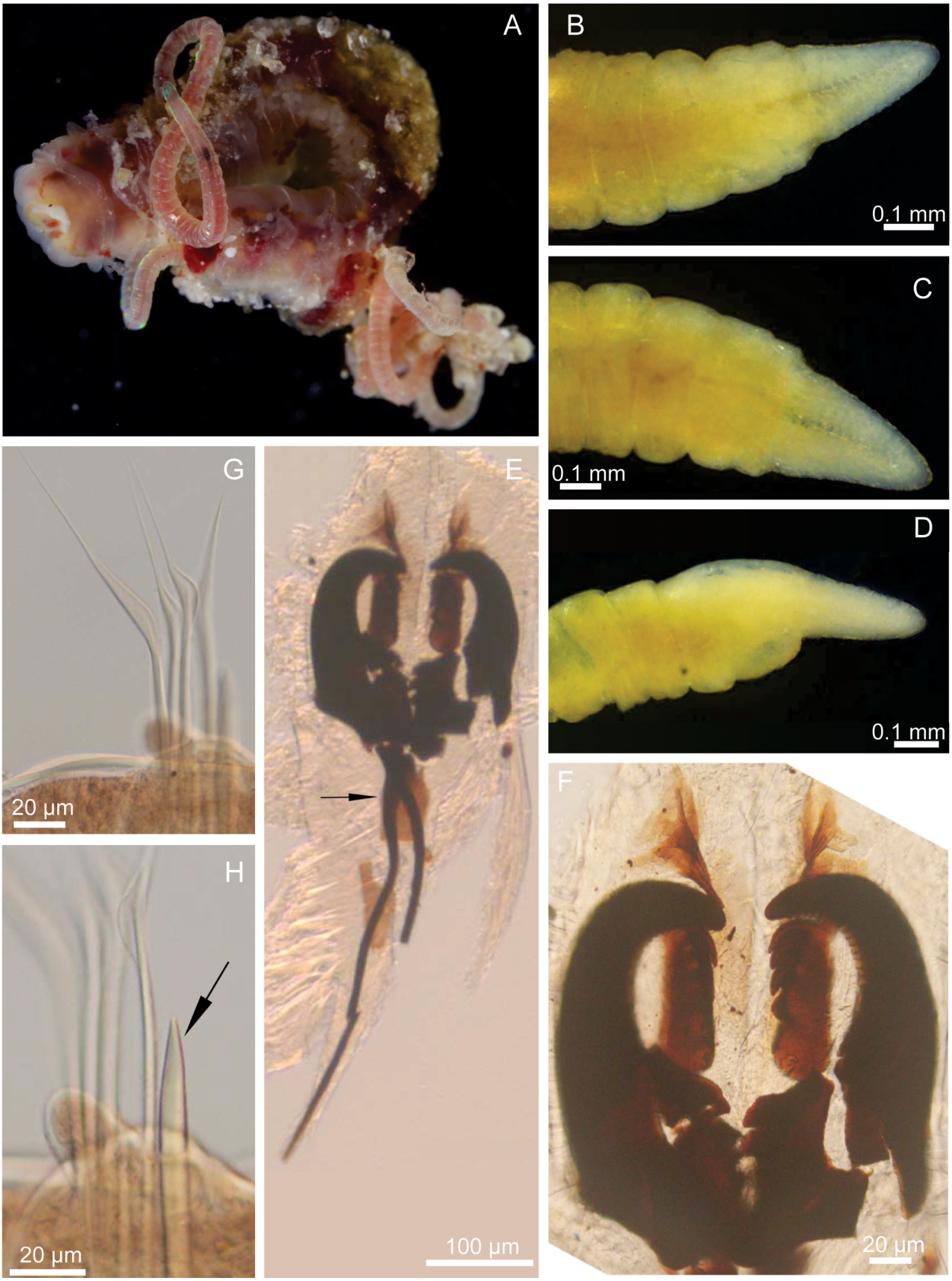

FIGURE 7. *Drilonereis* cf. *logani* Crossland, 1924. A. Whole body of live specimen in host; B. Anterior end, dorsal view; C. Anterior end, ventral view; D. Anterior end, lateral view; E. Maxillae and carriers, MxI, ventral and dorsal carriers broke during mounting, arrow at beginning of the furcula; F. Maxillae, MxI broke during mounting, G. Left parapodium 135; H. Chaeta acicular spine, left parapodium 135. A–H, AM W.44971.

Parapodia absent in 9 anteriormost chaetigers, inconspicuous in anterior region, becoming more conspicuous towards posterior end. Pre-chaetal shorter than chaetal lobe. Post-chaetal tapering to digitiform, twice as long as chaetal lobe.

Notopodial cirri absent. Neuroaciculae 3 present; mucronate. Chaetae present in all chaetigers, but inconspicuous in anteriormost. Limbate capillary present in supra and subacicular position; 3–4 present per neuropodia (Fig. 7G). Acicular spine chaeta equally tapering on both sides or straight on one side and tapering on the other, in neuropodia ventralmost position, longer than post-chaetal lobe (Fig. 7H).

Pygidium not observed.

Remarks. This specimen differs from the original description in the length of the acicular spine chaetae relative to the post-chaetal lobe and shape of maxillae ventral carrier. Acicular spine chaetae are as long as post-chaetal lobe, while they are longer in the specimen examined here. Most chaetae along the body of *D. logani* types were broken (Crossland 1924), thus number, shape and length of chaetae may vary from that described. In one of the types, maxillae ventral carrier tapers anteriorly and posteriorly and has rounded lateral margins, differing from the specimen examined here, which has ventral carrier widest at the anterior end and evenly tapering to a round posterior end. To the best of our knowledge, this is the first record of this species as endoparasite.

The wide distribution of this species as well as the differences between the specimen examined here and the original description may suggest that there is more than one species identified as *D. logani*. However, with the current poor knowledge on the species, on its biology and on morphological characters variation within the genus, we are not confident that the observed differences are enough to describe a new species. Therefore, we identify the specimen as *D*. cf. *logani*. In order to clearly understand the distribution range and intraspecific variation of the species, further studies using morphological and molecular tools are necessary.

Biology. Free-living and endoparasite of polychaetes.

Habitat. Inside an Arenicolidae gen. sp. collected in sand mud sediment, 14 m deep.

Distribution. Coral Sea, Ocean Pacific off Australia and New Zealand, Persian Gulf, Red Sea, South China Sea, West Indian Ocean.

***Drilonereis orensanzi* n. sp.**
(Fig. 8)

Material examined. Holotype: AM W.44913, MI QLD2429 (1), fixed in formalin few median chaetigers fixed in ethanol. Paratypes: AM W.44797 (1), fixed in formalin; AM W.44923 (1), fixed in formalin few median chaetigers fixed in ethanol.

Measurements. Table 2.

Description. Live specimens whitish to yellowish with internal red hues due to blood (Fig. 8A). Specimens fixed in formalin dark brown with lighter (yellowish to white) anterior and posterior ends (Fig. 8B–E).

Body long, slender, about the same width along its whole length slowly tapering towards posterior end (Fig. 8A, E); dorsoventrally rounded, dorsal side as convex as ventral. Chaetigers becoming longer and narrower towards posterior region, some longer than wide, all with a transverse median groove, appearing to be double ringed.

Prostomium as long as to longer, about as wide and as half as deep as peristomium; proximal end deeper than distal; triangular, anteriorly tapering, dorsoventrally flattened; median longitudinal groove present on dorsal and ventral sides, dorsal groove extends to anterior peristomial ring (Fig. 8B–D). Eyes absent. Peristomium double ringed, first twice as long as second, longer dorsally than ventrally (Fig. 8B–D). Margin between prostomium and peristomium inconspicuous dorsally (Fig. 8B).

Mandibles forward to maxillae in pharyngeal bulb while retracted; reduced, subtriangular, round anterior end, plates diverging posteriorly (Fig. 8F). Maxillae dorsal carrier narrower at anterior end than beginning of the furcula; ventral carrier falcate (Fig. 8G). Maxillae with four pairs of plates symmetrical regarding shape and size (Fig. 8G–K). MxI distally falcate with 2–3 inconspicuous teeth at the base (Fig. 8K). MxIV inconspicuous poorly sclerotized (Fig. 8I). Maxillary formula: (1, 2) + (1, 3), 7 (8) + 8 (9), 4 (3) + 5 (3), 2 + 2. Most teeth fang shaped.

Parapodia inconspicuous in anterior region, becoming more conspicuous towards posterior end. Pre-chaetal lobe rounded, becoming longer than chaetal lobe in posterior region. Post-chaetal tapering (digitiform), twice to two and half times as long as chaetal lobe, longest in median to posterior chaetigers. Notopodial cirri absent.

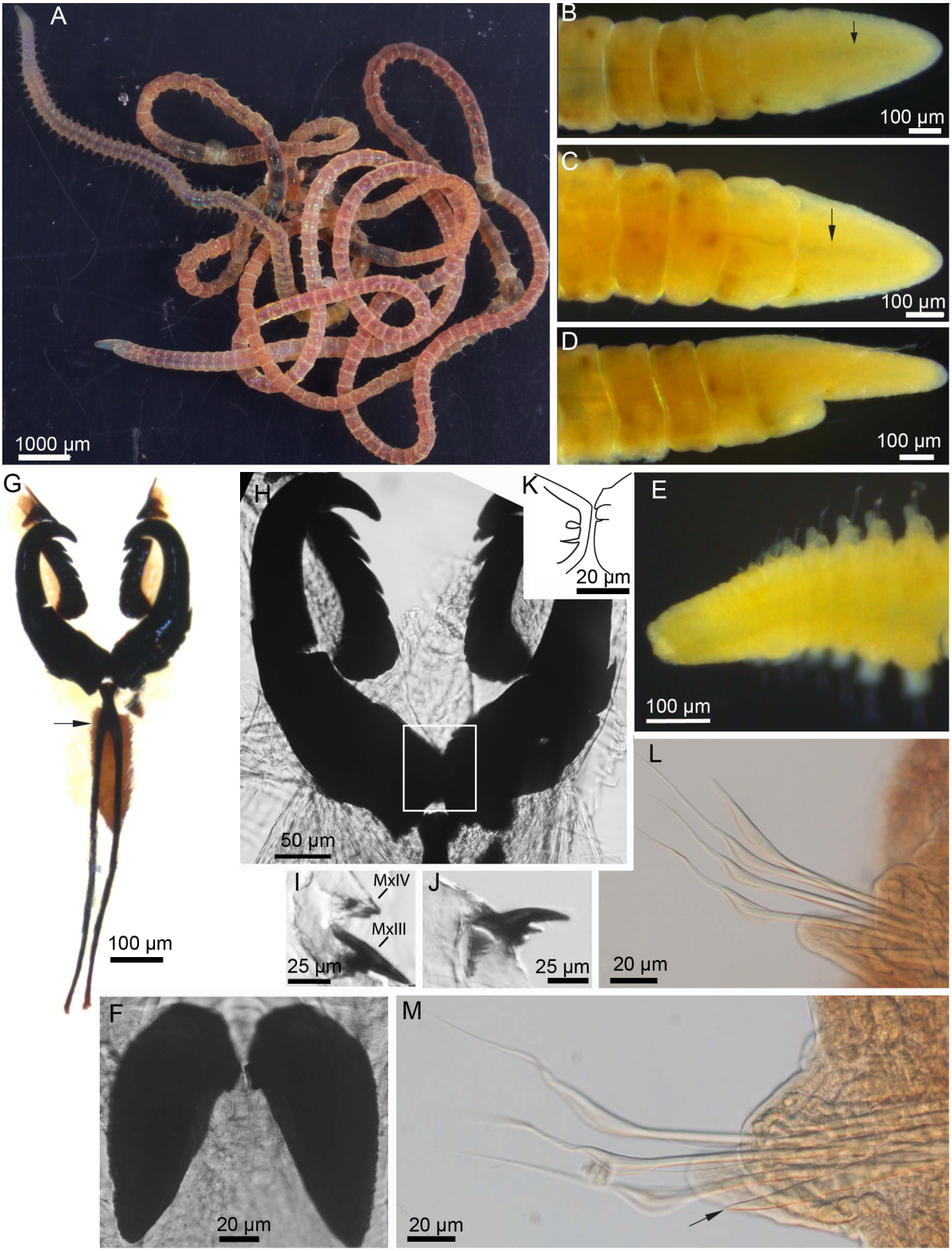

FIGURE 8. *Drilonereis orensanzi* n. sp. A. Whole body of live specimen; B. Anterior end, dorsal view, arrow to median groove; C. Anterior end, ventral view, arrow to median groove; D. Anterior end, lateral view; E. Posterior end, dorsal view; F. Mandibles, ventral view; G. Maxillae and carriers, dorsal view, arrow at beginning of the furcula; H. MxI and II, dorsal view, rectangle highlights region magnified in K; I. Right MxIII and MxIV, ventral view; J. Left MxIII; K. Base of MxI, detail of inconspicuous teeth; L. Right parapodium 34; M. Right parapodium 149, arrow to chaeta acicular spine. A–D, W.44797; E–H, K–N, AM W.44913; I–J, AM W.44923.

Neuroaciculae 2 to 3 present, mucronate. Two to four limbate capillary present in supra and subacicular position, 2–3 in anterior and posterior, 3–4 in most neuropodia (Fig. 8L, M). Acicular spine chaeta straight on one side and tapering on the other, in neuropodia ventralmost position along most of the body, about half as long to as long as post-chaetal lobe (Fig. 8M).

Pygidium with a pair of button shaped structures (Fig. 8E).

Variation. There is little variation among examined specimens. The main variation is the number of teeth in MxII and III.

Remarks. The teeth at the base of MxI are very inconspicuous. Thus, we are not sure about the exact number of teeth. It was not possible to observe MxIV in W44797, since the maxillae broke during mounting. It is not clear if the button shaped structures are the complete pygidial cirri or just remains of those.

Drilonereis orensanzi n. sp. belongs to the group of species with four maxillary plates, MxI basally dentate and reduced mandibles present, which also includes *D. australiensis*, *D. cylindrica* Hartman, 1951, *D. longa* Webster, 1979, *D. pinnata* Treadwell, 1921, *D. robustus* (Moore, 1903) and *D. similis* Treadwell, 1921 (Table 3). Among these, it is most similar to *D. australiensis*, *D. longa* and *D. pinnata*. It shares similar prostomium and peristomium with the first two, mandible shape with *D. longa* and inconspicuous teeth at the base of MxI and two teeth in MxIV with *D. australiensis* and *D. pinnata***.**

However, these three species have contrasting features with those of *D. orensanzi* n. sp. *Drilonereis australiensis* and *D. pinnata* have distinct mandible shape, respectively, single plate mandible similar to an upside down heart of spade and subtriangular mandible with parallel plates and flat anterior end. *Drilonereis longa* has conspicuous teeth at the base of MxI and aciculae chaetae clearly longer than post-chaetal lobe. *Drilonereis pinnata* has conspicuous anterior parapodia, a unique feature among species of the genus. Thus, *D. orensanzi* is differentiated from all other species described for the genus in its unique combination of prostomium, peristomium, maxillae, mandible features as well as of acicular spine chaeta shorter than post chaetal lobe (Table 3).

Etymology. The name is in honour of José María (Lobo) Orensanz, scientist who has published important studies on the systematics of Eunicida.

Habitat. Intertidal sand bottom.

Type locality. Lizard Island, Casuarina Beach.

Genus *Oenone* Savigny in Lamarck, 1818

Type-species. *Aglaura fulgida* Savigny in Lamarck, 1818

Diagnosis. Prostomium round with three antennae under anterior edge of peristomium; at least four eyes present. Peristomium single ringed at least dorsally, notch at anterior edge absent. Dorsal maxillary carriers long and slender, strongly sclerotized. Five maxillary plates, shape of plates symmetric (MxI and MxII with similar shape and size in both sides) or asymmetric (right MxI shorter than left; right MxII longer than left). Mandibles fully developed. Notopodial cirri expanded, usually, foliaceous. Neuropodia prechaetal lobes usually shorter than postchaetal. Most chaetae capillary, subacicular hooks bidentate or mucronate.

Remarks. Ten species have been described or placed within *Oenone*. Currently, only *Oenone fulgida* (Savigny in Lamarck, 1818) is considered valid by most authors, all other species being synonymized with it. Specimens identified as *O. fulgida* have been described as having asymmetric or symmetric maxillae (e.g., Crossland 1924; Imajima 1967). The former is the state observed in the types (Savigny 1820). Such intraspecific variation and wide distribution range are uncommon in other Eunicida species and suggest that many species have been artificially lumped under the name *O. fulgida* (Fauchald 1970).

Halla australis Haswell, 1886 (type locality Port Jackson, Sydney, NSW) and *O. haswelli* Benham, 1915 (type locality Flinders Island and between Newcastle and Port Stephens, NSW) were described from the Australian coast. Both have been synonymized with *O. fulgida* and bear asymmetrical maxillae and right MxI with all teeth similar, as described for the type.

Informative characters for species delimitation are uncertain. *Oenone diphyllidia* Schmarda, 1861 was revalidated based on symmetric maxillae and shape of the teeth of the hook (Carrera-Parra 2009). We use the shape of anteriormost teeth of the right MxI and presence of ventral eyes on the peristomium to justify the species here described.

TABLE 3. Key features of *Drilonereis* species with four maxillary plates, maxillae plate I basally dentate and reduced mandibles present. Information taken from original description, unless otherwise stated.

Species/Features	Type locality	MxI basal teeth	Relative length of first tooth of MxII	Number of teeth MxIII	Number of teeth MxIV	Shape of ventral carrier	Shape of mandible	Number of limbate capillary chaetae per parapodium	Length of acicular spine in relation to postchaetal lobe	Anterior parapodia
D. orensanzi n. sp.	Lizard Island, Australia	2 + 3, inconspicuous (Fig. 8K)	About the same length as anterior teeth (Fig. 8H)	3-4 + 3-5 (Fig. 8I, J)	2 + 2 (Fig. 8I)	Falcate (Fig. 8G)	Subtriangular, round anterior end, plates diverging (Fig. 8F)	2–4 (Fig. 8M, L)	Shorter to as long as (Fig. 8M, L)	Inconspicuous (Fig. 8B)
D. australiensis Augener, 1922	Cape York, Australia	2, inconspicuous	Unknown	3 + 3	2 + 2	Unknown	Upside down heart of spade	Unknown	Unknown	Inconspicuous
D. cylindrica Hartman, 1951	West Florida coast, North Carolina, USA	4 + 6, conspicuous	About the same length as anterior teeth	3 + 4	1 + 1	Subtriangular	Subtriangular, flat anterior end, plates parallel	2–10	Longer	Inconspicuous
D. longa Webster, 1979	Virginia, USA	Vary from 1–5, conspicuous	Longer than anterior teeth	1 + 1	1 + 1	Fusiform[c]	Absent or present, minute diverging. Subtriangular, round anterior end, plates diverging[c]	3(?)	Longer	Inconspicuous
D. pinnata Treadwell, 1921	Bucoo Reef, Tobago, Trinidad Tobago	3 + 2 (?), inconspicuous	About the same length as anterior teeth	4 + 4	2 + 2	Subtriangular	Subtriangular, flat anterior end, plates parallel	Unknown	Unknown	Conspicuous
D. robustus (Moore, 1903)	Japan	6 + 6[a], conspicuous	Longer than anterior teeth [a]	5 + 5 [a]	1+ 1 [a]	Subtriangular [a]	Subtriangular, flat to round anterior end, plates parallel [a]	12–17	Unknown	Unknown
D. similis Treadwell, 1921	Petit Trou Lagoon and Bucoo Reef, Tobago, Trinidad Tobago	3 + 3 (?), conspicuous	Longer than anterior teeth	1 + 1	1 + 1	Fusiform	Crescentic[b]	4(?)	Shorter-longer	Inconspicuous

[a], Hartman, 1942.[b], Hartman, 1951. [c], Treadwell 1921. (?), not clearly stated, information based on illustration. Mx, maxillae plate.

***Oenone fulgida* (Savigny in Lamarck, 1818)**
(Fig. 9)

Aglaura fulgida Savigny in Lamarck, 1818: 326.—Fauvel 1917: 240–254.
Aglaurides fulgida.—Hartman 1944: 185–186.
Oenone fulgida.—Crossland 1924: 86–92; Fauchald 1970: 143–146.

Material examined. AM W.44456, MI QLD 2401 (1), fixed in formalin, few median chaetigers fixed in ethanol and RNA latter; AM W.44796, MI QLD 2424 (1), fixed in formalin.

Measurements. Table 2.

Description. Live specimens yellow to orange, anterior margin of peristomium pulled back exhibiting three antennae, a pair of nuchal organs, a pair of lateral large eyes, and a pair of small median eyes (Fig. 9A, B). Specimens fixed in formalin dark brown to purple, fixed in ethanol yellow; anterior margin of peristomium covering eyes, antennae and nuchal organs, eyes faded (Fig. 9C–E).

Body long, slender, evenly tapering towards anterior and posterior ends, median region widest; dorsoventrally rounded, dorsal side more convex than ventral, at least twice as deep as ventral side at posterior region.

Prostomium longer, about as wide and half as deep as peristomium, proximal end deeper than distal; anteriorly rounded, dorso-ventrally flattened; ventral median groove widening posteriorly, about as long as 3/4 of prostomium (Fig. 9B–E). Three antennae digitiform covered by anterior edge of peristomium in fixed specimens, all about the same length, reaching posterior end of lateral eyes. Two lateral eyes round, appear to bear lens, larger than median eyes; 2–3 median eyes closer to each other than to lateral eyes (Fig. 9B) and under antennae in fixed specimens (Fig. 9D, E). Peristomium single ring, complete anterior edge (Fig. 9C, D).

Mandible cutting plates diverging anteriorly and converging posteriorly, mandible carriers longer than cutting plates (Fig. 9F). Maxillae dorsal carrier beginning of the furcula with lateral projections, wider than anterior end of carrier (Fig. 9G); ventral carrier not observed. Maxillae with five pairs of plates, shape of plates asymmetrical (Fig. 9G–K). Left MxI distally falcate. Right MxI shorter than left one, bearing teeth similar in size (Fig. 9K). Anteriormost tooth of MxII, MxIII and MxIV fang shaped. In right MxII, two anteriormost teeth fang like placed side by side, most lateral one smaller and appears to be an independent plate under superficial observation. Maxillary formula: (1, 7 (6)) +10 (7), 7 (6) + 12 (11), 6 + 7 (6), 5 (4) + 5, 1 + 1.

Pre and post-chaetal lobe longer than chaetal lobe; pre- rounded; post- twice as long as pre-, tapering to round tip in anterior chaetiger becoming narrower towards posterior end (Fig. 9L, M). Notopodial cirri flattened, leaf shape; anterior with wide proximal and distal ends and distinct cylindrical base; median and posterior with tapering ends and less distinct cylindrical bases; narrower towards posterior end (Fig. 9L, M); longest at median chaetiger. Notopodial cirri increasingly longer than post-chaetal lobe towards posterior end.

Chaetae and aciculae decrease in number towards posterior end. Notoaciculae present, at least 3 in anterior and 2 in posterior notocirri. Neuroaciculae 4 to 2 present. Capillary present in supra and subacicular position; decrease in length from dorsal to ventral; anterior neuropodia with 8–14, median 6–7, posterior 5–6 aciculae (Fig. 9L, M). Ventral bidentate subacicular hook starting at chaetiger 45, one to two per neuropodium; proximal teeth laterally directed (Fig. 9N). In median neuropodia with two subacicular hooks, ventralmost may be mucronate (Fig. 9M).

Two pairs of pygidial cirri digitiform placed laterally on pygidium; all the same length, as long as two posteriormost chaetigers (Fig. 9O).

Variation. Both specimens have an unpaired eye posterior to one of the median eyes. It is posterior to the left median eye in the largest specimen and to the right one in the smallest specimen. One of the specimens analysed by Crossland (1924) also has a fifth eye, but its placement is not described.

Remarks. *Oenone fulgida* is currently considered a cosmopolitan species. It has been considered the senior synonym of the other ten species described for the genus or synonymized genera (Fauvel 1917). See remarks of the genus for additional information.

Habitat. Coral rubble, underneath stones and coral.

Distribution. Worldwide.

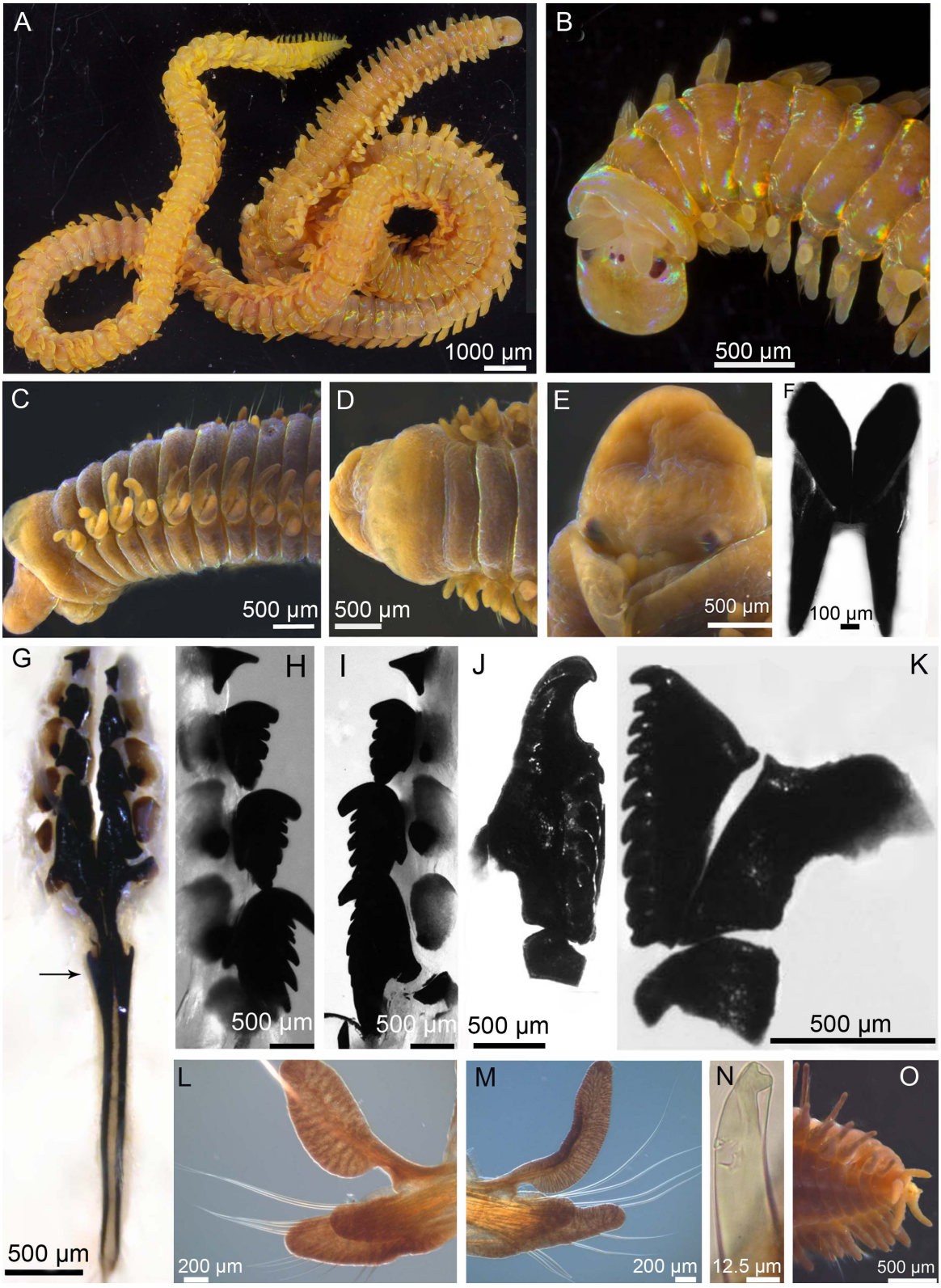

FIGURE 9. *Oenone fulgida* (Savigny in Lamarck 1818). A. Whole body of live specimen; B. Anterior end of live specimen, dorsal view, showing nuchal organs, antennae and eyes; C. Anterior end, lateral view; D. Anterior end, dorsal view, eyes and nuchal organs covered by peristomium fold; E. Anterior end, dorsal view, antennae and lateral eyes; F. Mandibles, ventral view; G. Maxillae and carriers, dorsal view, arrow at beginning of the furcula; H. Left MxII–MxV, dorsal view, most anterior tooth broke during mounting; I. Right MxII–MxV, dorsal view, most anterior tooth broke during mounting; J. Left MxI, dorsal view; K. Right MxI, dorsal view, crack between median and lateral parts due to breakage during mounting; L. Right parapodium 21, anterior view; M. Left parapodium 105, anterior view; N. Bidentate subacicular hook, parapodium 147, ventral view. O. Posterior end, ventrolateral view. A–B, AMW.44456; C–O, AM W.44796.

***Oenone ventrioculata* n. sp.**
(Fig. 10)

Material examined. Holotype: AM W.44002, MI QLD 2341 (1), fixed in ethanol. Paratype: AM W.44354, MI QLD 2371 (1), fixed in formalin, few median chaetigers fixed in ethanol.

Measurements. Table 2.

Description. Live specimens yellow (Fig. 10A–C, G). Specimens fixed in formalin beige, fixed in ethanol yellow (Fig. 10D–F, H). All live specimens have round prostomium and round body (Fig. 10A–B).
Body long, slender, evenly tapering towards anterior and posterior ends, median region widest; dorsoventrally rounded, dorsal side around twice as deep as ventral.

Prostomium longer, about as wide and half as deep as peristomium, proximal end deeper than distal; anteriorly rounded, dorso-ventrally flattened (Fig. 10D–F). All antennae tapering to digitiform covered by anterior edge of peristomium in fixed specimens, about same length, reaching posterior to median eyes (Fig. 10A, D, F). Two pairs of dorsal eyes arranged in line at the posterior region of the prostomium, lateral larger round to elongated, median round; median eyes closer to each other than to lateral eyes (Fig. 10A, D). One pair of ventral eyes at the ventroanterior end of prostomium, smaller than dorsal median eyes (Fig. 10B, E). Peristomium single ring dorsally, double ringed ventrally, anterior dorsal edge complete (Fig. 10A, B).

Mandibles with cutting plates diverging anteriorly and converging posteriorly, bear an inner conspicuous tooth; mandible carriers longer than mandible cutting plates (Fig. 10I). Maxillae dorsal carrier anterior end as wide as beginning of the furcula (Fig. 10J); ventral carrier not observed. Maxillae with five pairs of plates; shape of plates asymmetric (Fig. 10J, K). Left MxI distally falcate. Right MxI shorter than left one, anteriormost tooth fang like, teeth decrease in size from anterior to posterior (Fig. 10K). Anteriormost tooth of left MxII and both MxIII and MxIV fang like. In right MxII, two anteriormost teeth fang shaped placed side by side, most lateral one smaller and appears to be an independent plate under superficial observation. Maxillary formula: (1, 6) + 6 (7), 8 (7) + 9 (7), 6 (5) + 6, 5 (7) + 5, 1 + 1.

Pre and post-chaetal lobe longer than chaetal lobe; pre-chaetal rounded; post-chaetal widest at anterior end, twice as long a pre-chaetal. Notopodial cirri digitiform with narrow base, flattened in anterior chaetigers; around as long as post-chaetal lobe in most of the body, shorter in posterior chaetigers.

Notoaciculae present, at least 1 in anterior and 2 in posterior notocirri. Neuroaciculae 2 to 4 present. Capillary present in supra and subacicular position; decrease in length from dorsal to ventral; decrease in number from anterior to posterior; anterior neuropodia with 6–8, median and posterior 5–2 capillary (Fig. 10L, M). Ventral bidentate subacicular hook starting at chaetiger 21 (14), one in more anterior and two in more posterior neuropodia; proximal teeth laterally directed (Fig. 10M, N).

Pygidium with a pair of dorsal and ventral cirri placed laterally and as long as two posteriormost chaetigers (Fig. 10H). Dorsal cirri digitiform. Ventral cirri wide dorsoventrally, about twice as wide as dorsal.

Variation. In the paratype, the antennae are triangular, reaching beyond the anterior end of the lateral eyes. Lateral eyes vary from rounded to elongated. In elongated eyes, pigments are loosely distributed but more concentrated in an anterior circle similar to lateral round eyes. Median notopodial cirri are shorter than postchaetal lobe, which is almost inconspicuous in poorly preserved median region.

Remarks. Many of the anterior chaetae are broken in the holotype. Therefore, the distribution of bidentate hooks may start earlier than observed.

This species differs from the other *Oenone* species in having the right MxI with an anteriormost tooth larger than the other teeth in the plate and a pair of ventral eyes at the anterior end of the prostomium. Similar MxI has been described for one specimen from Zanzibar Archipelago (Tanzania) identified as *O. fulgida* (Crossland 1924 pp. 88 fig. 108). Shape and placement of antennae in the paratype are similar to those in Haswell (1886) illustration of *Halla australis*. However, proportions and placement of the eyes do not match to what was observed here. Both species also differ in the shape of MxI.

Etymology. Name refers to pair of ventral eyes at the anterior end of the prostomium.

Habitat. Coral rubble, 9–16 m deep.

Type locality. Lizard Island, reef between Bird and South Islands.

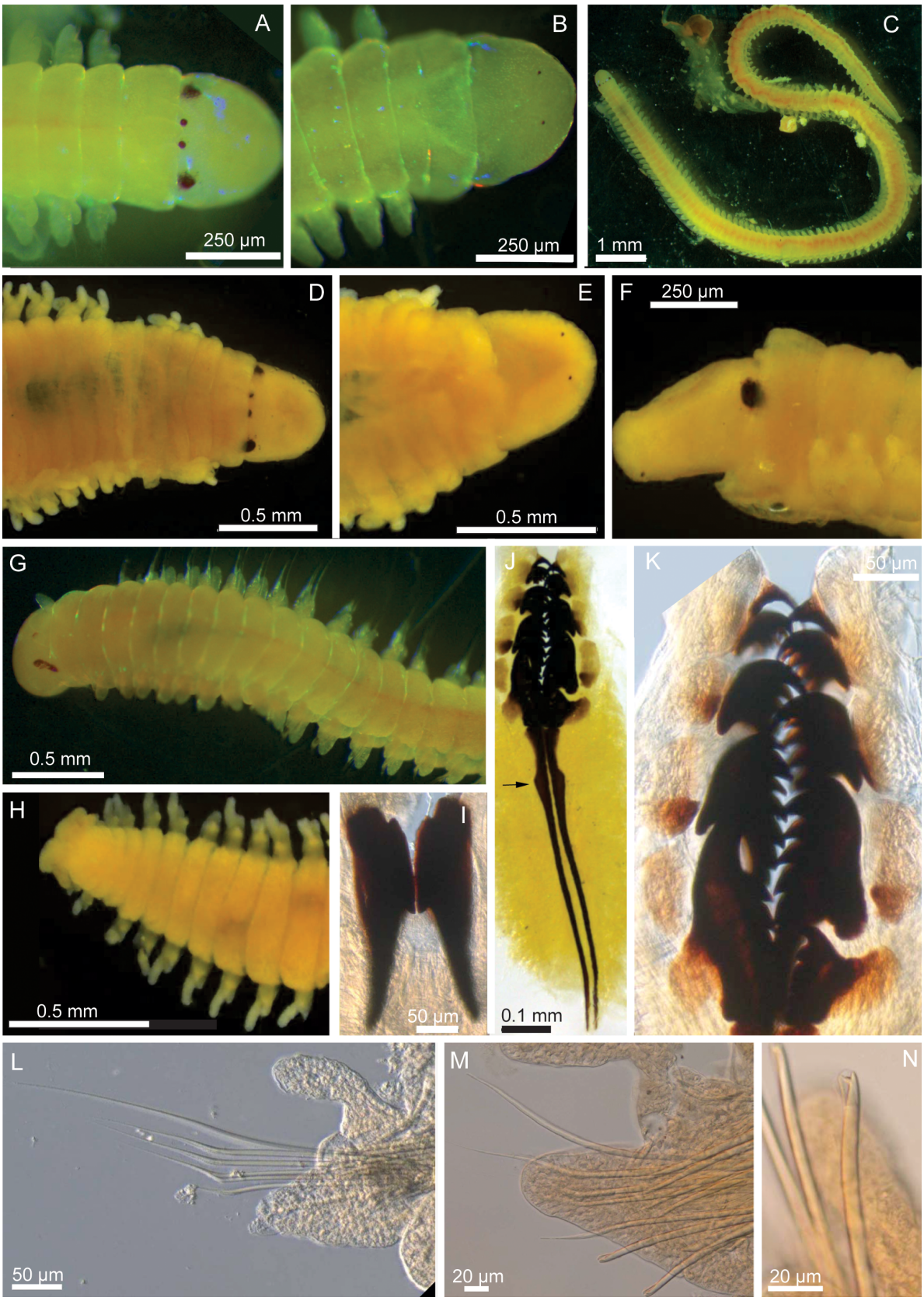

FIGURE 10. *Oenone ventrioculata* n. sp. A, G. Anterior end of live specimens, dorsal view; B. Anterior end of live specimen, ventral view; C. Whole body of live specimen; D. Anterior end, dorsal view; E. Anterior end, ventral view; F. Anterior end, lateral view; H. Posterior end, dorsal view; I. Mandibles, ventral view; J. Maxillae and carriers, arrow at beginning of the furcula; K. Maxillae; L. Right parapodium 17, anterior view; M. Right parapodium 20, anterior view; N. Bidentate subacicular hook, parapodium 31. A–F, H–K, M, AM W.44002; G, L, N, AM W.44354.

***Oenone* sp. 1**
(Fig. 11)

Material examined. AM W.44342, MI QLD 2359 (1), fixed in formalin.

Measurements. Table 2.

Description. Specimen fixed in formalin beige (Fig. 11A–C).

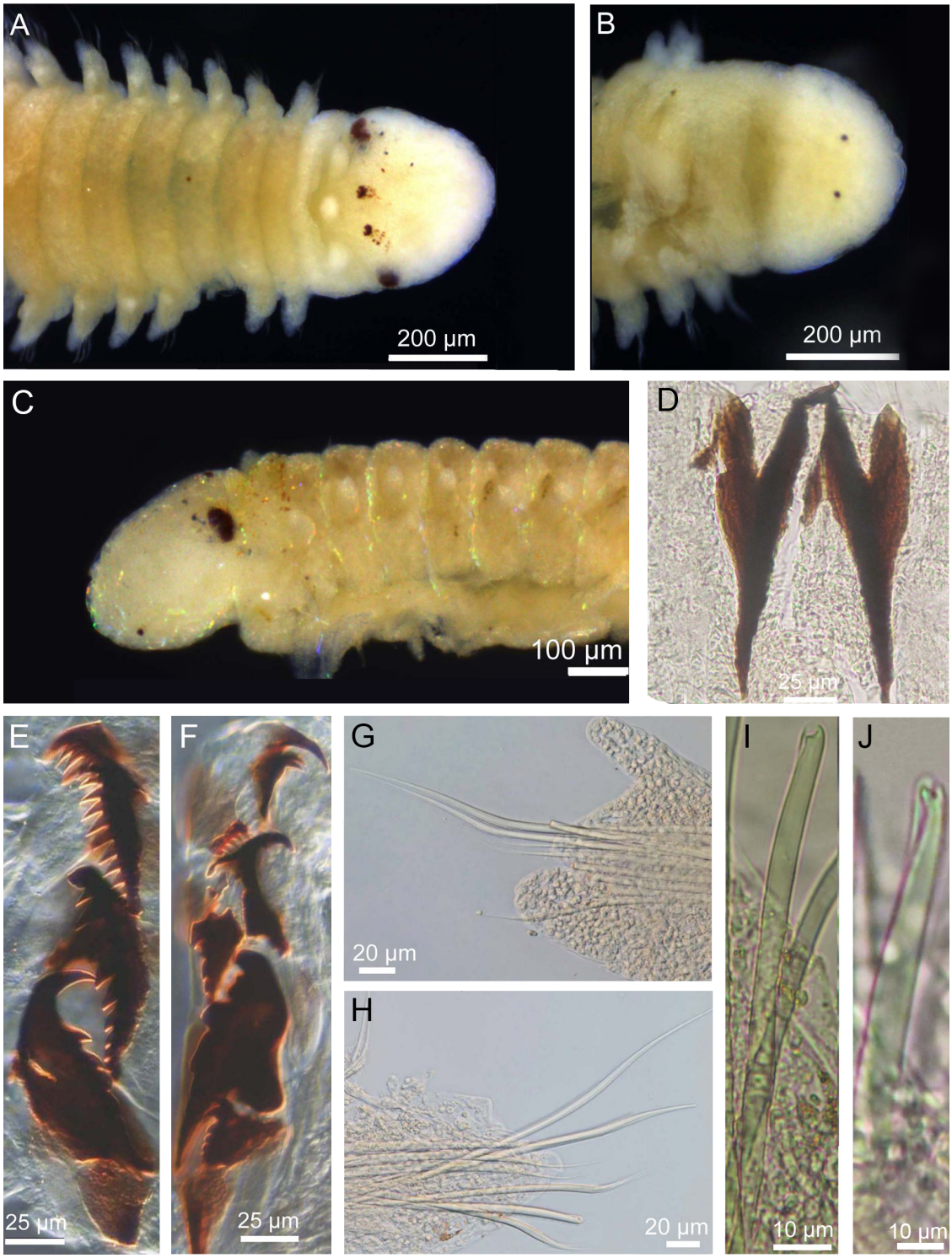

FIGURE 11. *Oenone* sp. 1. A. Anterior end, dorsal view; B. Anterior end, ventral view; C. Anterior end, lateral view; D. Mandibles, ventral view; E. Right MxI–MxV; F. Left MxI–MxV, MxII– MxIV broke during mounting; G. Right parapodium 8; H. Left parapodium 19; I. Bidentate subacicular hook, parapodium 19; J. Bidentate subacicular hook, parapodium 40. A–J, AM W.44342.

Body evenly tapering towards posterior end, anteriormost 15 chaetigers widest; dorsoventrally rounded.

Prostomium longer, as wide and as deep as peristomium; anteriorly rounded, dorso-ventrally inflated (Fig. 11A–C). All antennae digitiform not covered by anterior edge of peristomium in fixed specimens, evenly spaced, about same length, reaching posterior to eyes. Two pairs of dorsal eyes arranged in line at the posterior region of the prostomium, lateral larger bean shaped, median round with pigments scattered around it; median eyes closer to each other than to lateral eyes (Fig. 11A). One pair of ventral eyes at the ventroanterior end of prostomium, smaller than dorsal median eyes (Fig. 11B). Peristomium single ring, dorsally shorter than ventrally (Fig. 11A).

Mandibles cutting plates bifid, inner portion evenly tapering, lateral portion tapering abruptly at distal end (Fig. 11D). Maxillae carriers broke during mounting. Maxillae with five pairs of plates; shape of plates asymmetric (Fig. 11E, F). Left MxI distally falcate. Right MxI shorter than left one, two anteriormost teeth fang like, teeth decrease in size from anterior to posterior. Anteriormost tooth of MxII, MxIII and MxIV fang like. Maxillary formula: (1, 8) + 6, 10 + 11, 14 + 10, 11 + 9, 1 + 1.

Pre-chaetal lobe shorter and post-chaetal longer than chaetal lobe; post-chaetal 1.5 times as long chaetal lobe, tapering to round distal end, widest at anterior end. Chaetal lobe pointed to round. Notopodial cirri digitiform; shorter than post-chaetal lobe (Fig. 11G); best developed at anterior chaetigers, by the end of fragment cirri are inconspicuous.

Notoaciculae present; at least 3 in anterior and 2 in posterior notocirri. Neuroaciculae 2 to 4 present. Capillary present in supra and subacicular position; decrease in length from dorsal to ventral; decrease in number from anterior to posterior; anterior neuropodia with 6–8, median and posterior 5–2 capillary (Fig. 11G, H). Ventral bidentate subacicular hook (Fig. 11I, J) starting at chaetiger 11, one in more anterior and two in more posterior neuropodia; both teeth directed distally.

Pygidium not observed.

Remarks. *Oenone* sp. 1 shares striking unique similarities with *Halla sulfurea* Langerhans 1880, described from a specimen from Madeira Island (North Atlantic Ocean), such as placement of antennae and eyes, ventral eyes and shape of mandible. However, *H. sulfurea* can be distinguished from *Oenone* sp. 1 by the presence of a doubled ringed peristomium, digitiform and longer antennae, round lateral eyes, right MxI short with no anterior fang shaped teeth and minute teeth in MxIV.

We identified our specimen as *Oenone* based in its single peristomial ring and the lack of anterior peristomial notch, which contrast with *Halla* species that have a double ringed peristomium and an anterior peristomial notch. *Halla sulfurea* is also distinguished from other *Halla* species in the presence of ventral eyes and lack anterior peristomium notch. This led Crossland (1924) to question its validity. We question here its generic identification.

The shared unique features between *Oenone* sp. 1 and *H. sulfurea*, including their small size, may be due to the fact that both are, probably, juveniles. Our knowledge on the development of *Oenone* and *Halla* species is poor. Thus, we prefer not to take any further conclusion and to be conservative, leaving the Lizard Island specimen unidentified for now.

Habitat. Coral rubble, 6–12 m deep.

Key to genera recorded from the Australian coast*:

1 Prostomium round with three antennae (Fig. 9B, E). Peristomium single ringed . . . . . *Oenone*
– Prostomium lacking antennae. Peristomium double ringed 2
2. (1) Ventralmost chaeta acicular spine (Fig. 7H). MxI distally falcate, basally smooth or dentate (Figs 7F, 8G). . . . . *Drilonereis*
– Acicula spine chaeta absent. Ventralmost chaeta in median and posterior chaetigers tapering abruptly (Fig. 3L) or gradually (Fig. 2E) to guards. MxI distally falcate (Fig. 4B, H) or dentate (Fig. 4C), gracile (Fig. 4B) or robust (Fig. 4C, H) . . . *Arabella*

Key to species of *Arabella* recorded from the Australian coast*:

1 Ventralmost chaeta in median and posterior chaetigers tapering abruptly to guards (Fig. 3L). Subgenus *Cenothrix* 2
– Ventralmost chaeta in median and posterior chaetigers tapering gradually to guards (Fig. 2E). Subgenus *Arabella* 3
2. (1) Chaetae robust in median and posterior chaetigers (Fig. 4J–K, 6B). MxI robust or gracile distally falcate MxV with two teeth (Fig. 4H) . . . . . *A. (C.) robusta* n. sp.
– Chaetae not robust in median and posterior chaetigers (Fig. 3I, J). MxI and MxII polymorphic. MxI robust dentate or gracile

distally falcate (Fig. 4B, C). MxV single tooth. . . . . *A. (C.) mutans* (Chamberlin, 1919)

3. (1) MxI gracile, basally dentate and distally falcate on both sides, right bifid (Fig. 1J, L). MxII long on both sides (Fig. 1I, K). Conspicuous ventral pads surrounding nephridiopores (Fig. 1N). . . . . *A. (A.) pulvinata* n. sp.

– Left MxI robust, MxII short. Right MI gracile, MxII long 4

4. (3) Posterior post-chaetal lobe longer than chaetae . . . . . *A. (A.) longipedata* Monro, 1931

– Posterior post-chaetal lobe shorter than chaetae . . . . . *A. (A.) iricolor* (Montagu, 1804)- probably, a complex of species, as it is currently recognized (Colbath 1989b).

Key to species of *Drilonereis* recorded from the Australian coast*:

1 MxI basally smooth. . . . . *D. quadrioculata* Hartmann-Schröder, 1979

– MxI basally dentate, teeth conspicuous or inconspicuous (Figs 7F, 8K) 2

2. (1) Mandible absent . . . . . *D.* cf. *logani* Crossland, 1924

– Mandible present, reduced 3

3. (2) Single plate mandible similar to an upside down heart of spade . . . . . *D. australiensis* Augener, 1922

– Two plate subtriangular mandible, round anterior end, plates diverging posteriorly (Fig. 8F) . . . . . *D. orensanzi* n. sp.

Key to species of *Oenone* recorded from the Australian coast*:

1 Shape of MxI symmetric or asymmetric. Short MxI bears teeth similar in size (Fig. 9K). Ventral prostomial eyes absent . . . . . *O. fulgida* (Savigny in Lamarck, 1818)

– Shape of MxI asymmetric. Right MxI short bears anteriormost tooth fang like, teeth decrease in size from anterior to posterior (Fig. 10K). Ventral prostomial eyes present (Fig. 10B, E) . . . . . *O. ventrioculata* n. sp.

*These keys comprise genera and species recorded from Australia to date. However, the biodiversity of oenonids is poorly known. Thus, other genera and species, not yet recorded, are probably present along the Australian coast.

Conclusion

Eleven species of Oenonidae distributed in three genera are known for the Australian coast. Five of them are reported or described here for the first time. At Lizard Island, this family shows low abundance (19 specimens collected) and high richness (seven species). Our results suggest that despite the increasing accumulation of information, the biodiversity of the family is still poorly estimated.

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