



Six new species of the genus *Armandia* Filippi, 1861 (Polychaeta, Opheliidae) from Lizard Island (Great Barrier Reef, Australia)

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Abstract

From the study of the material collected during the Polychaete Workshop held in Lizard Island (Great Barrier Reef, Australia) in August 2013, six species belonging to the genus *Armandia* (Polychaeta, Opheliidae) are newly described. *Armandia bifida* n. sp. is characterised by the bifid shape of the prechaetal lobe in CH1–CH3, *A. dolio* n. sp. by the barrel-shaped anal (=pygidial) tube (=funnel), *A. filibranchia* n. sp. by the extremely long and thin branchiae, *A. laminosa* n. sp. by the foliose shape and large size of the prechaetal lobe in CH1–CH3, *A. paraintermedia* n. sp. by the squared-shaped anal tube and size and shape of anal cirri, and *A. tubulata* n. sp. by the tubular shape of the anal tube. All species are fully described and illustrated, and compared with similar species. Several body characters of taxonomic relevance (e.g., anal tube and parapodia shape) are studied based on SEM micrographs. A key of the *Armandia* species hitherto described or reported in South-East Asia and Australasia is provided based on features of the anal tube.

Key words: Polychaeta, Opheliidae, *Armandia*, coral reef, new species, Australia

Introduction

Opheliid polychaetes are widely distributed across all oceans from the poles to the tropics, and from shallow waters to the abyssal depths (Hartmann-Schröder & Parker 1995). Members of this family are deposit feeders burrowing in different types of sediments (Rouse 2001). In Australia, the taxonomy and diversity of Opheliidae is poorly known and only six genera (i.e., *Armandia* Filippi, 1861, *Euzonus* Grube, 1866, *Lobochesis* Hutchings & Murray, 1984, *Ophelia* Savigny, 1818, *Ophelina* Örsted, 1843 and *Polyopthalmus* Quatrefages, 1850) and 16 species have been reported; most of these species show apparently a limited distribution (Day & Hutchings 1979; Hartmann-Schröder & Parker 1995; Hutchings 2000; Neave & Glasby 2013). The genera *Lobochesis* and *Euzonus* are now considered to belong to *Thoracophelia* Ehlers, 1897 (Blake 2011); the genus *Travisia* Johnson, 1840 was also reported in the area (Day & Hutchings 1979) but is now considered the sister group to the family Scalibregmatidae Malmgren, 1867 (Blake 2000; Paul *et al.* 2010).

The genus *Armandia* is characterized by having an elongated body, ventral groove, conical prostomium with palpode, eyes, a pair of eversible nuchal organs, single and cirriform distally tapered branchiae present from second chaetiger and continuing to posterior end, small and relatively simple parapodia bearing two bundles of capillary chaetae (noto- and neurochaetae), and provided with a prechaetal lobe, which is variable in shape depending on species and situated between both bundles of chaetae, a small spherical projection dorsal to notochaetae—the “dorsal cirrus” in Parapar *et al.* (2011)—and a low lingulate ventral lobe, located immediately ventral to neurochaetae. Furthermore, the pygidium is provided with characteristic anal (=pygidial) tube (=funnel); the shape of this tube is one of the most useful taxonomic features at the species level. All these characters are also present in the genus *Ophelina* (see Neave & Glasby 2013); the only distinguishing character is the presence of segmental lateral eyes between parapodia from anterior chaetigers to posterior end in *Armandia*, which are absent in *Ophelina* (Blake 2000).

Three species of *Armandia* were described from Australia: *A. broomensis* Hartmann-Schröder, 1981, *A. secundariopapillata* Hartmann-Schröder, 1984 and *A. bilobata* Hartmann-Schröder, 1986. Two further species have also been reported: *A. intermedia* Fauvel, 1902 (e.g., Knox & Cameron 1971; Hutchings & Rainer 1979; Hutchings & Murray 1984) and *A. lanceolata* Willey, 1905 (Hartmann-Schröder 1984, as *A. cf. lanceolata*). Augener (1924) and Benham (1950) report *A. maculata* (Webster, 1884) in New Zealand. Stephenson *et al.* (1974) record *Armandia* sp. from Moreton Bay (Queensland, Eastern Australia) but no description was provided. Six additional species were reported or described from Southern Asia and the Indo-Malay archipelago: *A. leptocirris* Grube, 1878, *A. exigua* Kükenthal, 1887, *A. cf. melanura* Gravier, 1905, *A. longicaudata* Caullery, 1944, *A. bipapillata* Hartmann-Schröder, 1974, and *A. andamana* Eibye-Jacobsen, 2002, and a further species from South Western Japan: *A. amakusaensis* Saito, Tamaki & Imajima, 2000.

In August 2013, a workshop on polychaete taxonomy was held at Lizard Island (NE Australia) after the 11th International Polychaete Conference held in Sydney. As a result of the study of the Opheliidae material collected around the island, several new species were found, of which six are described herein and compared with other Australian and Indo-West Pacific species.

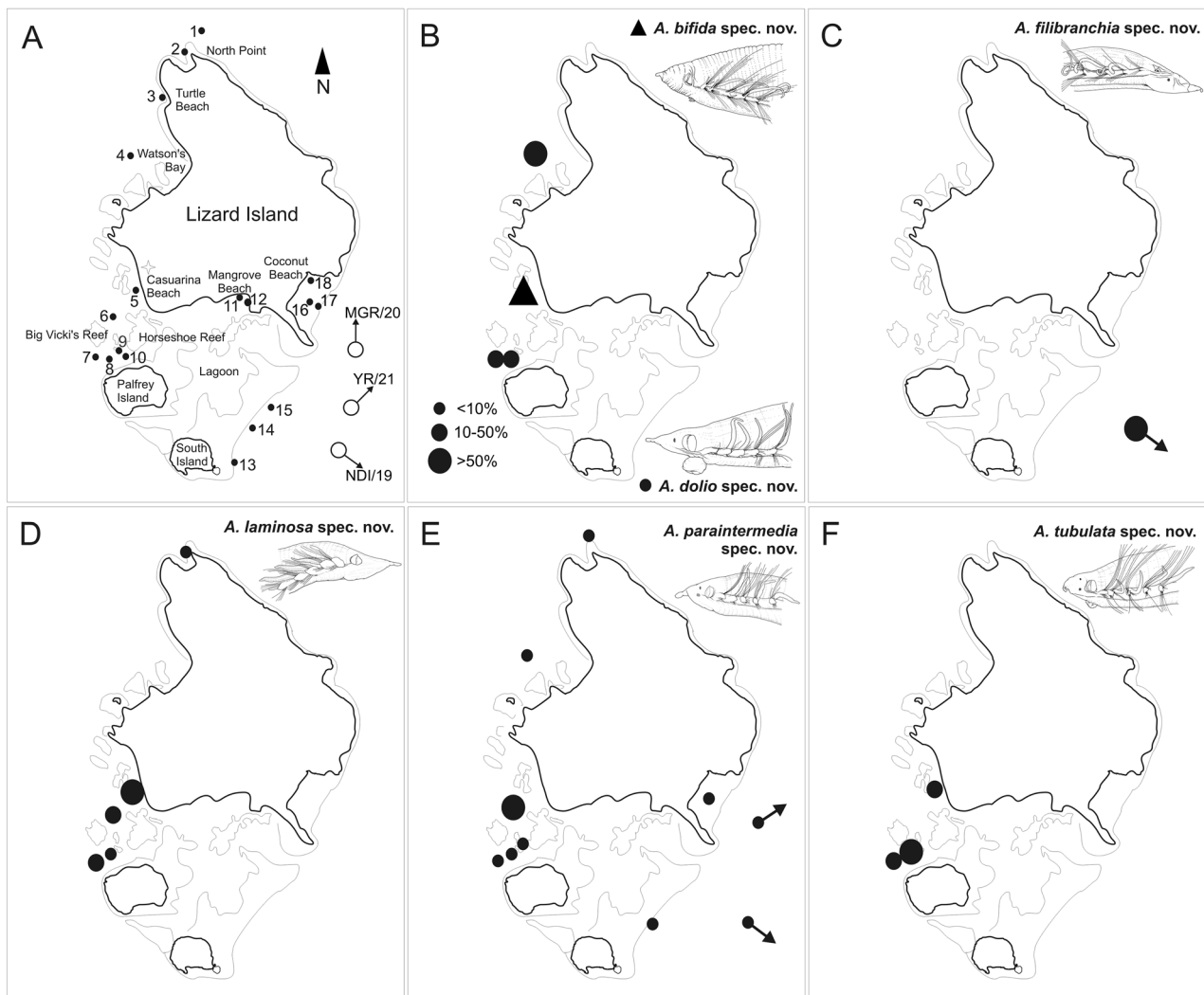


FIGURE 1. Map of the study area showing collecting sites of each species described. Arrows facing to cross-shelf sampling sites: Abbreviations: MGR = MacGillivray Reef, NDI = North Direction Island, YR = Yonge Reef.

Material and methods

This study is based on part of the *Armandia* specimens collected from several intertidal and subtidal locations in the immediate vicinity of Lizard Island (LI) and outer barrier in the Great Barrier Reef Lagoon (NE Australia) in

August 2013. Most of the sampling sites were distributed around LI lagoon and off west coast, which are protected from dominant SE winds (Fig. 1A; Table 2; Ribas & Hutchings (2015, *Zootaxa* 4019).

Sediment samples were taken directly from the bottom by means of snorkelling and SCUBA diving. Part of the material is still under study and additional new species will be formally described elsewhere. Most specimens were fixed in 4% formaldehyde-seawater solution, and preserved in 70% ethanol. Selected specimens were fixed in 95% ethanol for eventual molecular studies. Light microscopy observations and drawings were made using an OLYMPUS SZX9 stereomicroscope and an OLYMPUS BX40 compound microscope. Specimens used for examination with Scanning Electron Microscopy (SEM) were dehydrated in a graded ethanol series, prepared by critical-point drying using CO₂, mounted on aluminium stubs, covered with gold in a BAL-TEC SCD 004 evaporator, and examined and photographed under a JEOL JSM-6400 scanning electron microscope at the Servicios de Apoyo á Investigación (SAI), University of A Coruña-UDC, Spain.

Type material is deposited in the collections of the Australian Museum, Sydney (AM). The list of examined material provided for each species includes the museum registration number and the ID of sampling localities. Locality descriptions, bottom type and depth are listed in Ribas & Hutchings (2015, *Zootaxa* 4019). Number of specimens in each registration is one unless otherwise specified.

Abbreviations used in the text, figures and figure legends:

AT—anal tube; br—branchia; CH—chaetiger; de—dorsal eye; el—postchaetal dorsal elevation of abranchiate chaetiger; lco—parapodial lateral ciliated organ; le—left eye; lg—lateral groove; m—mouth; nuo—nuchal organ; pac—paired anal cirri; pbc—paired basal cirri; pcl—prechaetal lobe; pdc—parapodial dorsal cirrus; pp—palpophore; ps—palpostyle; pvl—parapodial ventral lobe; re—right eye; uac—unpaired anal cirrus; vg—ventral groove; vi—ventral incision of anal tube.

Results

Family Opheliidae Malmgren, 1867

A total of 92 specimens of polychaetes belonging to the genus *Armandia* were studied from 26 samples collected at 21 localities around Lizard Island (Great Barrier Reef, NE Australia) and outer reef (Ribas & Hutchings 2015).

Genus *Armandia* Filippi, 1861

Type species. *Armandia cirrhosa* Filippi, 1861: 219, by monotypy.

Diagnosis. Body elongated, not divided into distinct regions; ventral groove and two lateral grooves from chaetiger 2 to posterior end. Segments annulated. Prostomium conical, sometimes with terminal palpode; subdermal eyespots; a pair of large, eversible nuchal organs. Single and cirriform branchiae from chaetiger 2. Sometimes one or several posterior segments abranchiate. Segmental lateral eyes present between parapodia. Parapodia with prechaetal lobe, ventral lobe and sometimes a dorsal cirrus. Noto- and neuropodial lappets absent. Interramal ciliated organ present sometimes. Noto- and neuropodial small fascicles of simple capillary chaetae. Pygidium with conspicuous expansion—anal (pygidial) tube (funnel)—of variable shape, usually bearing internally attached midventral cirrus, marginal papillae and sometimes a basal pair of papillae.

Diagnosis modified from Uebelacker (1984) and Blake (2000) by introducing a more detailed description of parapodial and anal tube characters, and confirming the presence of a parapodial ciliated sensorial organ in the parapodial prechaetal lobe.

Armandia bifida n. sp.

(Figs 1B, 2A–B, 3, 18B)

Material examined. Two specimens in two samples. Holotype: AM W.44696, MI QLD 2366. Paratype: AM W.44117, MI QLD 2422.

Diagnosis. Parapodia biramous, with prechaetal lobe and ventral lobe; anterior parapodial prechaetal lobe notoriously elongated and symmetrically biramous in chaetigers 1 to 3; following chaetigers lacking dorsal ramus and becoming asymmetrically uniramous towards body end. Anal tube somewhat narrower at base and slightly increasing in width towards distal end, becoming tube-like shape; tube opening slightly laterally compressed, directed postero-ventrally; posterior border provided with 10–12 pairs of short paired cirri and an internal short anal cirrus.

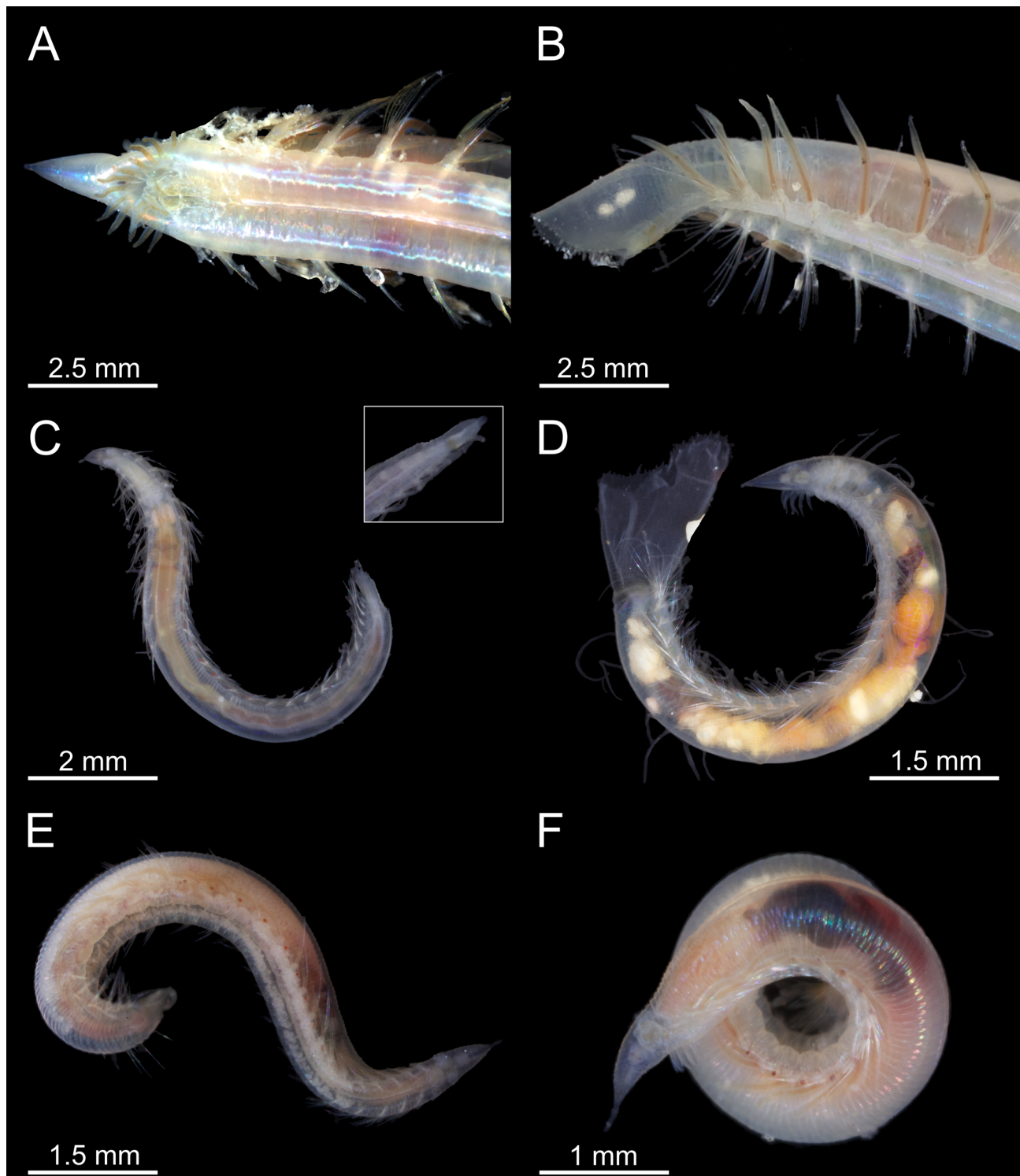


FIGURE 2. Macro photographic images of live specimens. (A–B) *Armandia bifida* n. sp. (paratype AM W.44696): A. Anterior end, ventral view; B. Posterior end, ventrolateral view; C. *Armandia dolio* n. sp. (paratype AM W.45399), ventrolateral view (insert: detail of anal tube); D. *Armandia filibranchia* n. sp. (paratype AM W.44115), lateral view; (E–F) *Armandia laminosa* n. sp. (paratype AM W.44546): E. Ventrolateral view; F. Lateral view of coiled specimen.

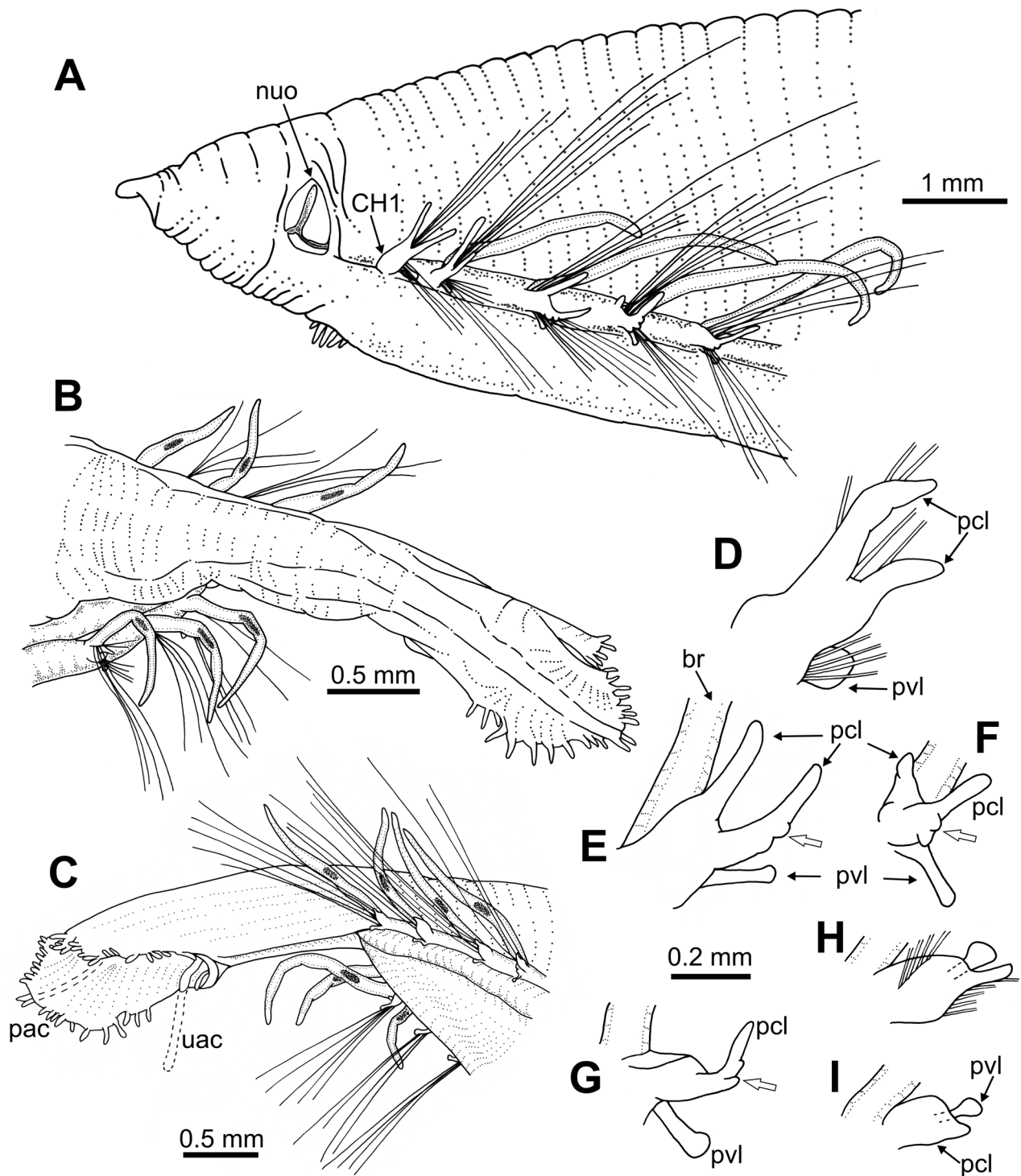


FIGURE 3. *Armandia bifida* n. sp. (holotype AM W.44696). A. Anterior end, left side, lateral view; B. Posterior end, dorsal view; C. Posterior end, right side, lateroventral view; (D–I) Parapodia, left side: D. CH1, lateral view; E. CH3, lateral view; F. CH4, dorsolateral view; G. CH6, lateral view; H. CH36, dorsal view; I. CH38, dorsal view. White arrows pointing notches of prechaetal lobes ventral ramus. Dotted line in C showing potential contour of unpaired anal cirrus (broken in this specimen) according to that preserved in paratype W.44117. Proximal part of chaetae only illustrated in D and H.

Description. Based on holotype. Specimen complete, 29.0 mm long and 2.5 mm wide, with 39 chaetigers. Body slender, slightly tapering towards anterior and posterior ends. Prostomium conical (Figs 2A, 3A) excluding palpode, longer than wide; palpode very short. A pair of small red eyes deeply embedded in prostomium. One pair

of ring-shaped nuchal organs (Fig. 3A); pharynx eversible (Fig. 2A) provided with several oral tentacles. Branchiae present from CH2 to last body chaetiger (CH39), long, not decreasing in length towards posterior chaetigers, not meeting middorsally (Figs 2A–B, 3A–C); branchiae of last chaetigers with brown spots at midlength/distal third. Parapodia biramous, with prechaetal lobe and ventral lobe on each parapodium. Anterior parapodial prechaetal lobe notoriously elongated and symmetrically biramous in CH1–CH3 (Fig. 3A, D–E); following chaetigers lacking dorsal ramus and becoming asymmetrically uniramous towards body end (Fig. 3F–I). Ventral ramus of prechaetal lobe with two conspicuous notches in CH2–CH6 (Fig. 3E–G). Elongated ventral lobe in all chaetigers; dorsal cirrus not present. Simple capillary chaetae in two bundles; notochaetae slightly longer than neurochaetae, of same length in all chaetigers and about as long as branchiae. Lateral eyespots anterior to parapodia on 11 chaetigers (CH7–CH17), orange, horizontally oval; eyespots of CH7 and CH15–CH17 much smaller than others. Anal tube somewhat narrower at base and slightly increasing in width towards distal end, becoming tube-like shape (Figs 2B, 3B–C), as long as last 5–6 chaetigers. Anal tube opening slightly laterally compressed, directed postero-ventrally, appearing obliquely truncate in lateral view (Fig. 3C). Posterior border provided with 10–12 pairs of short paired cirri, about 1/10 as long as anal tube, and an internal, unpaired anal cirrus, short and thin, not easily visible through tube wall (Fig. 3C). Pair of short basal cirri not observed.

Remarks. *Armandia bifida* n. sp. is characterised by: 1) the large body size and the large number of chaetigers (39); 2) the bifid shape of the prechaetal lobe in CH1–CH3; 3) the presence of branchiae from CH2 to the last chaetiger, and 4) the distinct tubular, distally-truncated shape of the anal tube. The photograph of the paratype AM W.44696 (Fig. 2A–B) when still alive shows the pharynx extruded with at least 12 oral tentacles of same length in a continuous series. Once the specimen was fixed, only three tentacles could be seen externally. Gallardo (1967) illustrates the oral tentacles of *A. leptocirris* (Grube, 1878) and *A. longicaudata* (Caullery, 1944) found at the Nha Trang Bay, South Vietnam. That paper was also unique in providing a key for opheliids mostly based on the shape and number of the afore-mentioned tentacles instead of using the shape of the anal tube (Gallardo 1967). However, the usefulness of oral tentacles as discriminating character at the species level is doubtful because either needs the observation of live specimens or dissection of fixed material. On the other hand, the paratype AM W.44696 also shows the same number of chaetigers (39), bears brown spots on branchiae in the last segments and the lateral eyes have the same distribution as in the holotype. The specimen bears an internal long unpaired anal cirrus which seems to have been lost in the holotype (dotted line in Fig. 3C).

Armandia bifida n. sp. is similar to *Armandia longicaudata* (Caullery, 1944, as *Ammotrypane*) from Java (Figs 17G, 18B), and later reported in South Vietnam (Gallardo 1967), South Africa (Fig. 17H) (Day 1967) and the Solomon Islands (Gibbs 1971) (Fig. 18B). This species shares with *A. bifida* n. sp. the presence of an elongated prechaetal lobe, which is about as long as the branchiae in the specimens from East Indies (Caullery 1944, Fig. 35A) and slightly shorter than those from South Africa (Day 1967, Fig. 25.2.a); this lobe is, however, not bifid as occurs in *A. bifida* n. sp. The anal tube is longer in Caullery's specimens (Caullery 1944, Fig. 35B) than in South Africa specimens (Day 1967, Fig. 25.2.c), which is, in turn, similar to that of *A. bifida* n. sp. The original description of *A. longicaudata* (Fig. 17G) mentions paired anal cirri similar to those of *A. bifida* n. sp. while in *A. longicaudata sensu* Day (Fig. 17H) they are much larger. Therefore, we suspect that South African specimens may correspond to a different, still undescribed species.

Etymology. The epithet *bifida* (L.) refers to the conspicuous bifid shape of the prechaetal lobes of the first three chaetigers.

Habitat / Distribution. Intertidal (0–1.5 m) in sandy bottoms off Casuarina beach, in front of Lizard Island Research Station (LIRS) (Fig. 1B).

***Armandia dolio* n. sp.**
(Figs 1B, 2C, 4–5, 18B)

Material examined. Eight specimens in four samples. Holotype: AM W.44241, MI QLD 2373. Paratypes: AM W.43898, MI QLD 2333 (2); AM W.47320, MI QLD 2373 (2); AM W.47321, MI QLD 2373, on SEM stub; AM W.45399, MI QLD 2440; AM W.44557, MI QLD 2330, in EtOH.

Diagnosis. Parapodia biramous, with prechaetal lobe and ventral lobe; prechaetal lobe symmetrical, with a notch giving distal border a bilobed appearance. Anal tube barrel-shaped, straight at base, increasing width at midline and tapering again towards distal end; anal tube opening directed posteriorly, not laterally compressed;

posterior border provided with 10 pairs of short paired anal cirri of different length, about 1/5 as long as anal tube length; internal unpaired anal cirrus and pair of basal cirri present.

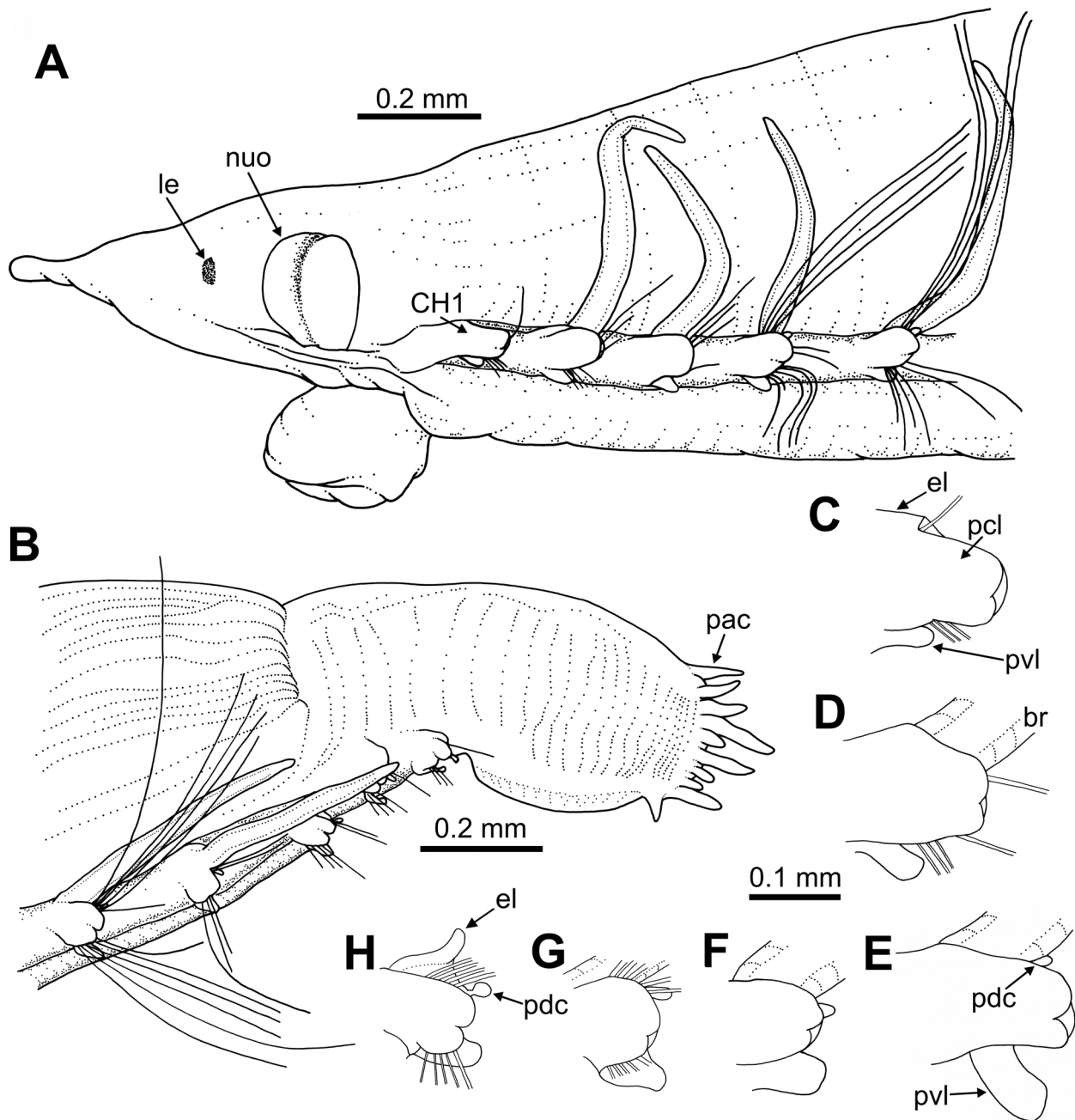


FIGURE 4. *Armandia dolio* n. sp. (holotype; AM W.44241). A. Anterior end, lateral view; B. Posterior end, lateral view; (CH) Parapodia, left side, lateral view: C. CH1; D. CH2; E. CH6; F. CH19; G. CH25; H. CH27. Proximal part of chaetae only illustrated in C–D and G–H.

Description. Based on holotype. Specimen complete, 8.0 mm long and 1.0 mm wide, with 29 chaetigers. Body slender, slightly tapering towards anterior and posterior ends. Prostomium conical, palpode short and clavate (Figs 4A, 5A). A pair of small red eyes deeply embedded in prostomium (Fig. 4A). One pair of ring-shaped nuchal organs (Fig. 5A–B); pharynx eversible (Fig. 4A), oral tentacles not seen. Branchiae present from CH2–CH26, long, almost reaching dorsal midline, not decreasing in length in posterior chaetigers. Parapodia biramous, with prechaetal lobe and ventral lobe (Figs 4C–H, 5C–D); dorsal cirrus from CH4. Prechaetal lobe symmetrical, with a notch giving distal border a bilobed appearance (Fig. 4C–H). Lateral eyespots anterior to parapodia on 11 chaetigers (CH7–

CH17); orange, horizontally oval, those of CH7 and CH16–CH17 smaller than others. Simple, very long capillary chaetae in two bundles; notochaetae generally longer than neurochaetae (Fig. 5A, E). Anal tube barrel-shaped, straight at base, increasing width at midline and tapering again towards distal end, as long as last four chaetigers (Figs 4B, 5E–F). Anal tube opening directed posteriorly, not laterally compressed. Posterior border provided with 10 pairs of short paired anal cirri of different length, about 1/5 as long as anal tube length (Figs 4B, 5F); internal unpaired anal cirrus and pair of basal cirri not seen (but present in several paratypes, see below).

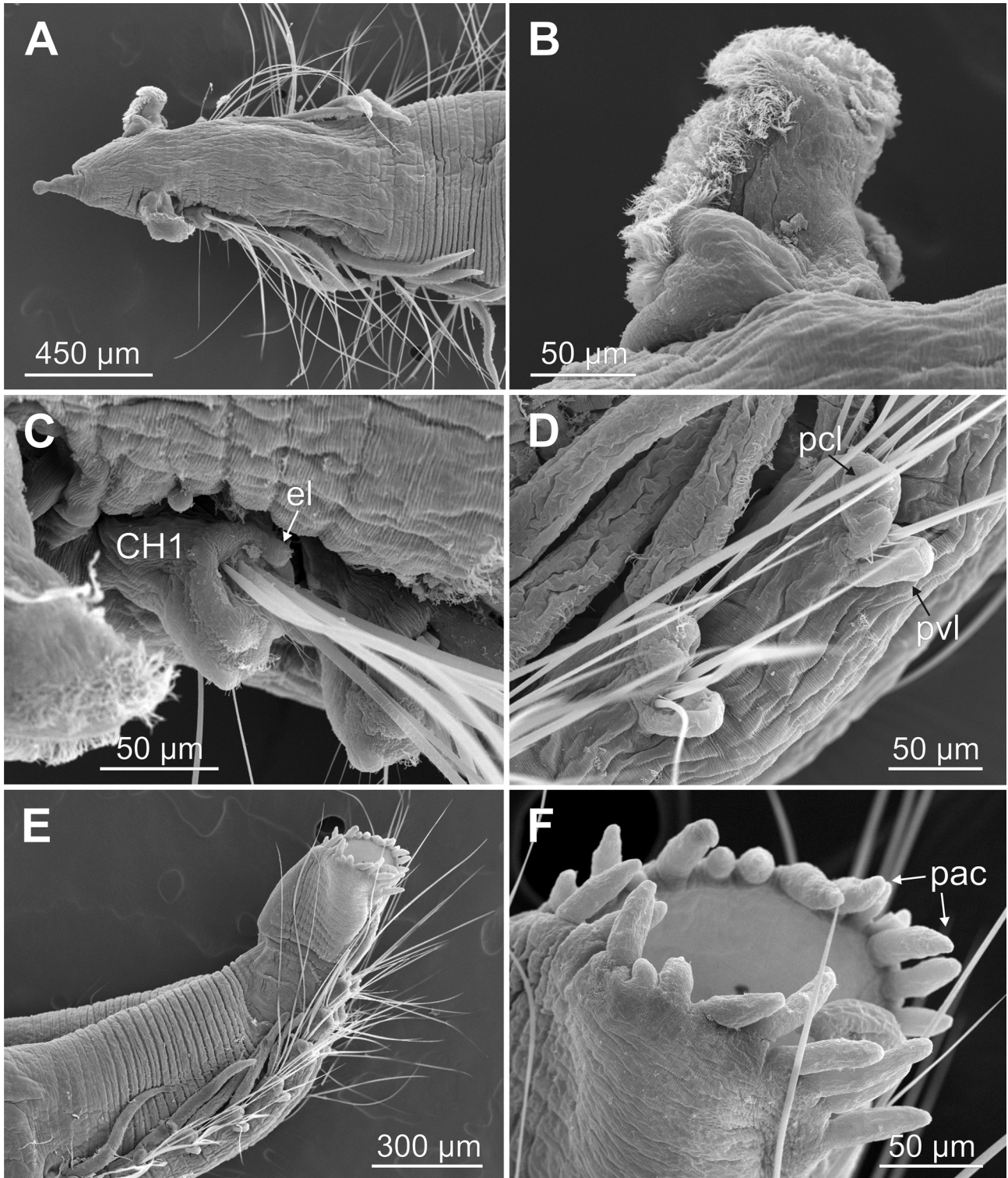


FIGURE 5. *Armandia dolio* n. sp. SEM micrographs (paratype AM W.47321). A. Anterior end, dorsal view; B. Protruded nuchal organ, right side; C. CH1, dorsal view; D. Two posterior chaetigers, left side, lateral view; E. Posterior end, left side, posterolateral view; F. Anal tube opening, detail.

Remarks. The most remarkable diagnostic feature of *Armandia dolio* n. sp. is the unique shape of the anal tube. Observations on live specimens showed that the anal tube seems to be somewhat flexible allowing some degree of variation in its shape, i.e. sometimes looking either inflated or deflated (Fig. 2C). The anal tube of fixed specimens does, however, always show a conspicuous inflated shape (Figs 4B, 5E).

Paratypes measure about 6–10 mm in length and 0.5–0.9 mm in width; these specimens have the same of numbers of chaetigers and the presence of prostomial eyes as the holotype. In contrast, two paratypes (AM W.47320 and AM W.43898) show an unpaired anal cirrus and fewer paired anal cirri (<7). The first chaetiger and the last three ones (CH27–CH29) also lack branchiae and the parapodia show a small dorsal elevation at the level of the postchaetal lobe as well (Fig. 4C, H). Furthermore, the anal tube apparently lacks paired basal cirri.

The closest species to *A. dolio* n. sp. is *A. paraintermedia* n. sp. (see below) according to general body shape but they differ in the shape and features of the anal tube. Thus, *A. dolio* n. sp. has a large, barrel-shaped anal tube while in *A. paraintermedia* n. sp. the paired anal cirri are comparatively longer and larger when compared to the size of the anal tube.

Etymology. The epithet *dolio* (L.) refers to the barrel-shaped anal tube.

Habitat / Distribution. Sublittoral (5–14 m) on muddy sand. Most specimens (87.5%) were collected at Vicki's reef, in front of Palfrey Island and remaining ones at NW of Watson's Bay (Fig. 1B).

Armandia filibranchia n. sp.

(Figs 1C, 2D, 6, 18B)

Material examined. One specimen in one sample. Holotype: AM W.44115, MI QLD 2364.

Diagnosis. Parapodia biramous, with prechaetal lobe and ventral lobe; prechaetal lobe asymmetrical, with short ventrally displaced tip; ventral lobe wide, becoming longer than prechaetal lobe in posterior chaetigers. Branchiae present from chaetiger 2 to last body chaetiger, thin, much longer than chaetae, conspicuously twisted after fixation and not decreasing in length in posterior chaetigers. Anal tube funnel-like; narrow at base, increasing in width at distal end and opening directed postero-dorsally, appearing obliquely truncate in lateral view. Posterior border with numerous (~25) pairs of small paired anal cirri; paired basal cirri and internal unpaired cirrus not observed.

Description. Based on holotype. Specimen complete, 8.0 mm long and 0.8 mm wide, with 29 chaetigers. Body slender, slightly tapering towards anterior end; posterior end wide and truncated. Prostomium conical provided with a pair of small red eyes (Figs 2D, 6A); palpode well developed but short and narrow, weakly clavate (Fig. 6A). One pair of ring-shaped nuchal organs (Fig. 6A); pharynx eversible, provided with about 10 oral tentacles (only observed when alive; Fig. 2D), hidden after fixation. Branchiae present from CH2 to last body chaetiger (CH29), thin, much longer than chaetae (Fig. 2D), conspicuously twisted after fixation (Fig. 6A), not decreasing in length in posterior chaetigers (Fig. 6B). Parapodia biramous, with prechaetal lobe and ventral lobe on each parapodium; dorsal cirrus not seen (Fig. 6C–F). Prechaetal lobe asymmetrical, with short ventrally displaced tip; ventral lobe wide, becoming longer than prechaetal lobe in posterior chaetigers. Lateral eyespots anterior to parapodia on chaetigers CH7–CH17, orange, horizontally oval; those of CH7 and CH15–CH17 smaller than others. Simple capillary chaetae in two bundles; notochaetae generally longer than neurochaetae in posterior chaetigers (Fig. 6B). Anal tube funnel-like; narrow at base, increasing in width at distal end (Figs 2D, 6B). Anal tube opening directed postero-dorsally, appearing obliquely truncate in lateral view. Ventral side as long as about 7 chaetigers, and about twice as long as dorsal side, with V-shaped ventral incision (Fig. 6B). Posterior border with numerous (~25) pairs of small paired anal cirri (Fig. 6B); paired basal cirri and internal unpaired cirrus not observed.

Remarks. This new species is unique within the genus *Armandia* because of the thin and extremely long branchiae, which become conspicuously twisted after fixation. The anal tube is particularly fragile and apparently deciduous because it is lacking in the holotype after fixation; the truncate shape of the posterior end in this only preserved specimen resembles that of *Ophelina*, namely that of *Ophelina abranchiata* Støp-Bowitz, 1948 (see Parapar *et al.* 2011, Fig. 9a). Furthermore, the ecological distribution of *A. filibranchia* n. sp. differs from the other species described herein because it has only been collected on the outer barrier of the GBR.

Etymology. The epithet *filibranchia* (L.) refers to the long and thin parapodial branchiae.

Habitat / Distribution. Only one specimen was collected in sublittoral sand at 9 m depth at North Direction Island (outer reef SE Lizard Island) (Fig. 1C).

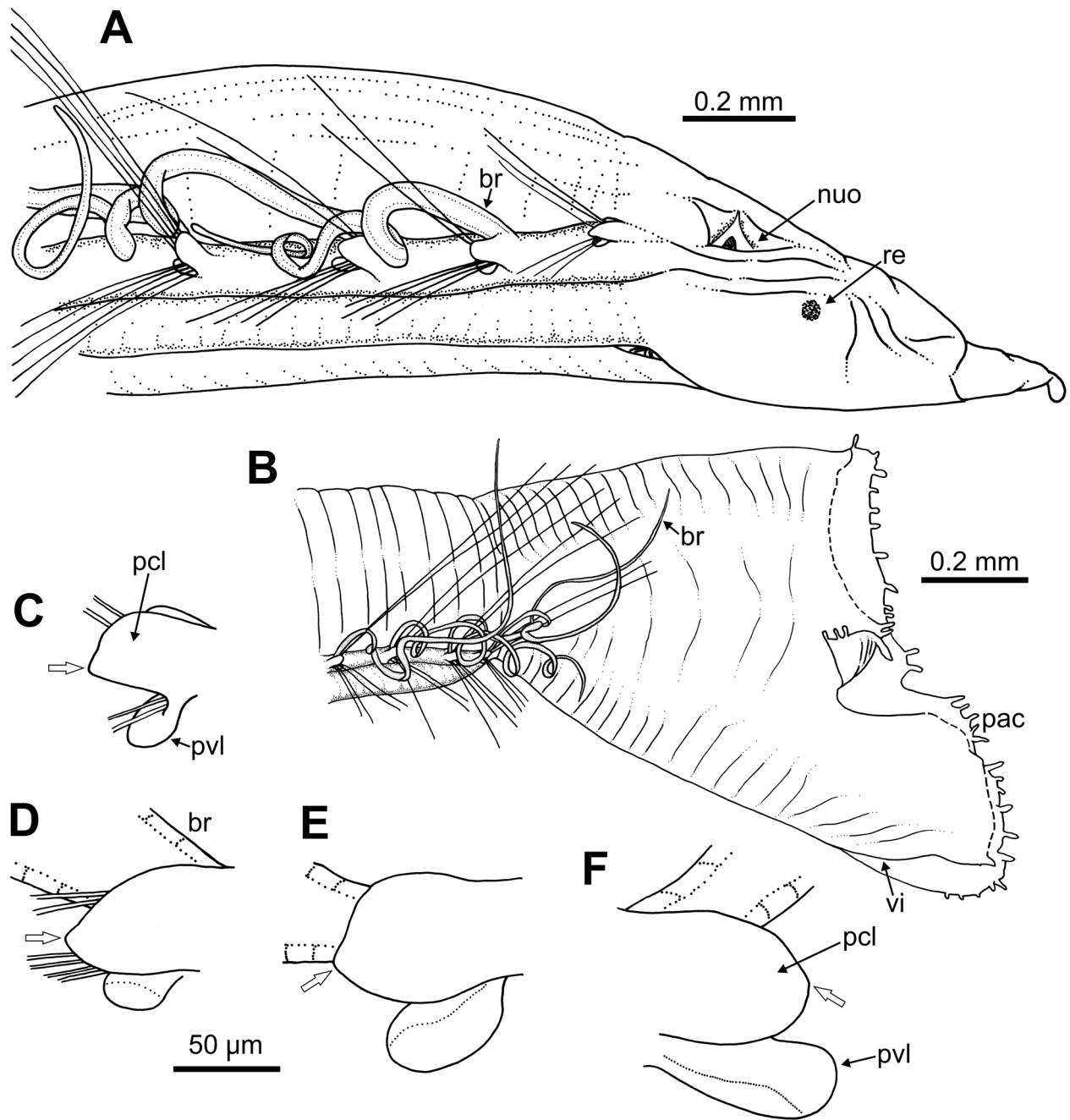


FIGURE 6. *Armandia filibranchia* n. sp. (holotype AM W.44115). A. Anterior end, right side, lateral view; B. Posterior end, left side, lateral view; (C–F) Parapodia, right (C–E) and left (F) side, anterolateral view: C. CH1; D. CH2; E. CH6; F. CH26. White arrows point to prechaetal lobe tip. Pygidial tube drawn from the photograph of the animal alive (now missing). Posterior border of the anal tube highly damaged; discontinuous line denoting part not clearly defined from photograph. Proximal part of chaetae only illustrated in C and D.

***Armandia laminosa* n. sp.**

(Figs 1D, 2E–F, 7–9, 18B)

Material examined. Thirty-seven specimens in ten samples. Holotype: AM W.44702, MI QLD 2421. Paratypes: AM W.43896, MI QLD 2334 (4); AM W.44103, MI QLD 2334; AM W.44109, MI QLD 2340 (8); AM W.44236, MI QLD 2366 (3); AM W.47322, MI QLD 2373 (2); AM W.44296, MI QLD 2373; AM W.44294, MI QLD 2376

(2); AM W.47323, MI QLD 2376 (2 on SEM stub); AM W.44699, MI QLD 2415 (3); AM W.45122, MI QLD 2429 (3); AM W.45127, MI QLD 2432 (3); AM W.47324, MI QLD 2432, in EtOH; AM W.45126, MI QLD 2433; AM W.45129, MI QLD 2433, in EtOH; AM W.45133, MI QLD 2433.

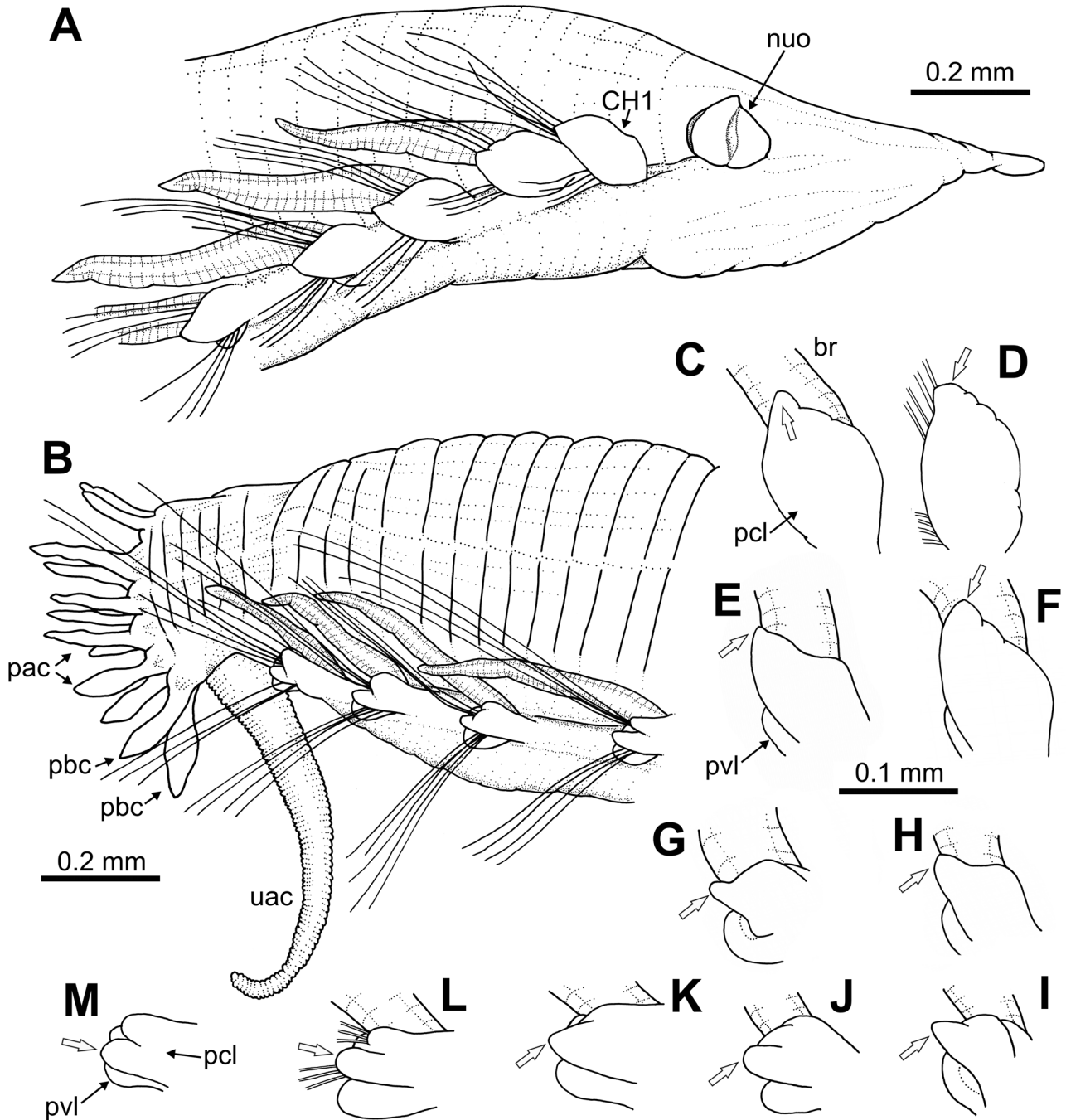


FIGURE 7. *Armandia laminosa* n. sp. (holotype AM W.44702). A. Anterior end, right side, lateral view; B. Posterior end, left side, lateral view; (C–M) Parapodia, right side, anterolateral view: C. CH1; D. CH2; E. CH3; F. CH4; G. CH6; H. CH12; I. CH14; J. CH 19; K. CH24; L. CH25; M. CH27. White arrows point to prechaetal lobe tip. Proximal part of chaetae only illustrated in D and L.

Diagnosis. Parapodia biramous, with prechaetal lobe and ventral lobe on each parapodium; dorsal cirrus not present. Prechaetal lobes highly asymmetrical; wide and foliose from chaetiger 1 to chaetiger 3, then becoming progressively smaller towards last chaetigers; prechaetal lobe tip ventrally displaced; conspicuous bilobed appearance from midbody to last chaetigers. Anal tube square-shaped, as long as last 2 chaetigers; posterior and

ventral margins open, provided with long unpaired anal cirrus, thick at base and distally tapered, projecting outwardly. Posterior border provided with 5–6 pairs of elongate, finger-like, paired anal cirri, almost as long as anal tube, shorter and thinner than pair of clavate basal cirri.

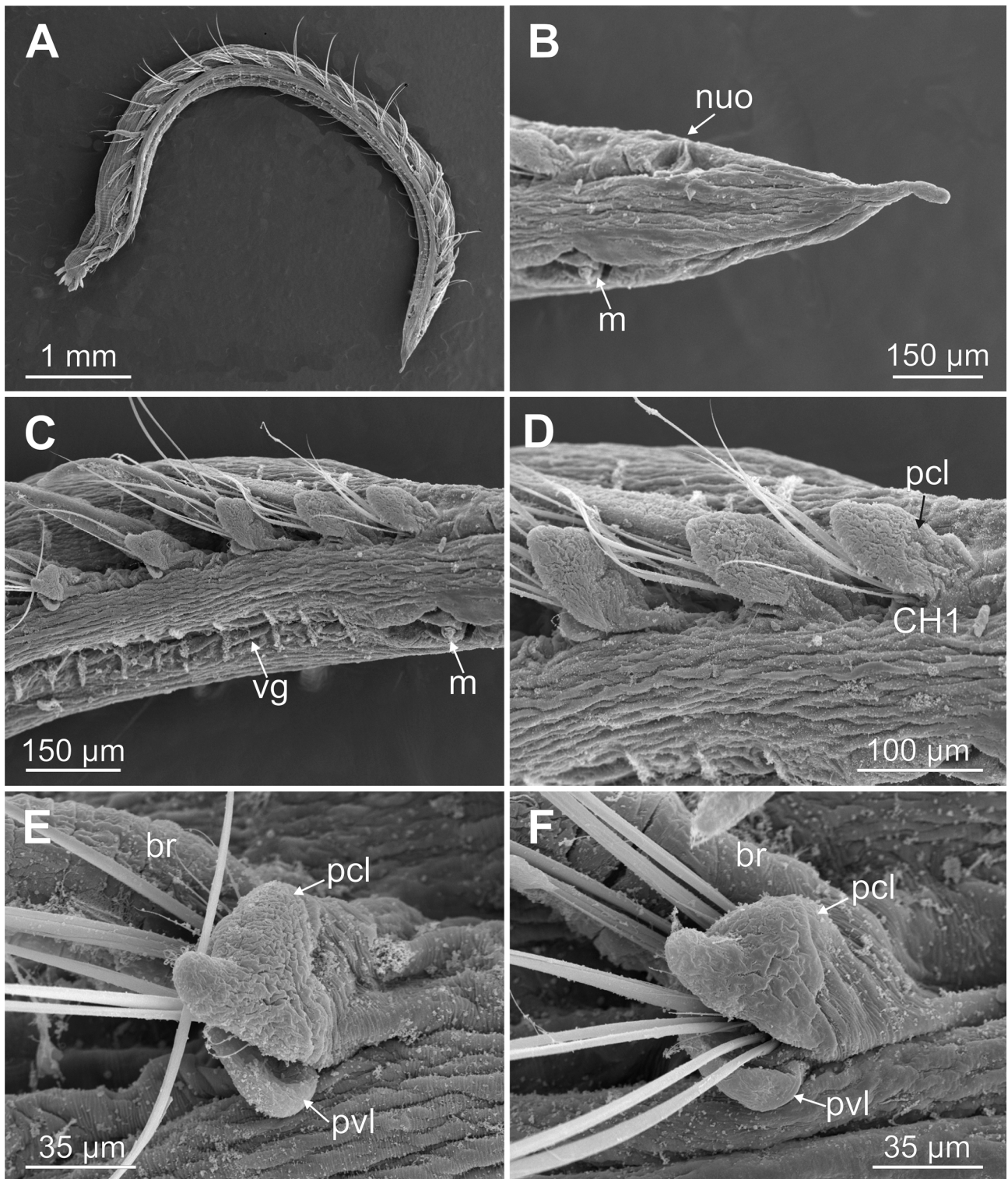


FIGURE 8. *Armandia laminosa* n. sp. SEM micrographs (paratype AM W.47323). A. Complete specimen, general view; B. Anterior end, right side, ventrolateral view; C. Anterior chaetigers, right side, ventrolateral view; D. Detail of CH1–CH3, right side, ventrolateral view; E. CH5, right side, ventroanterior view; F. CH11, right side, ventroanterior view.

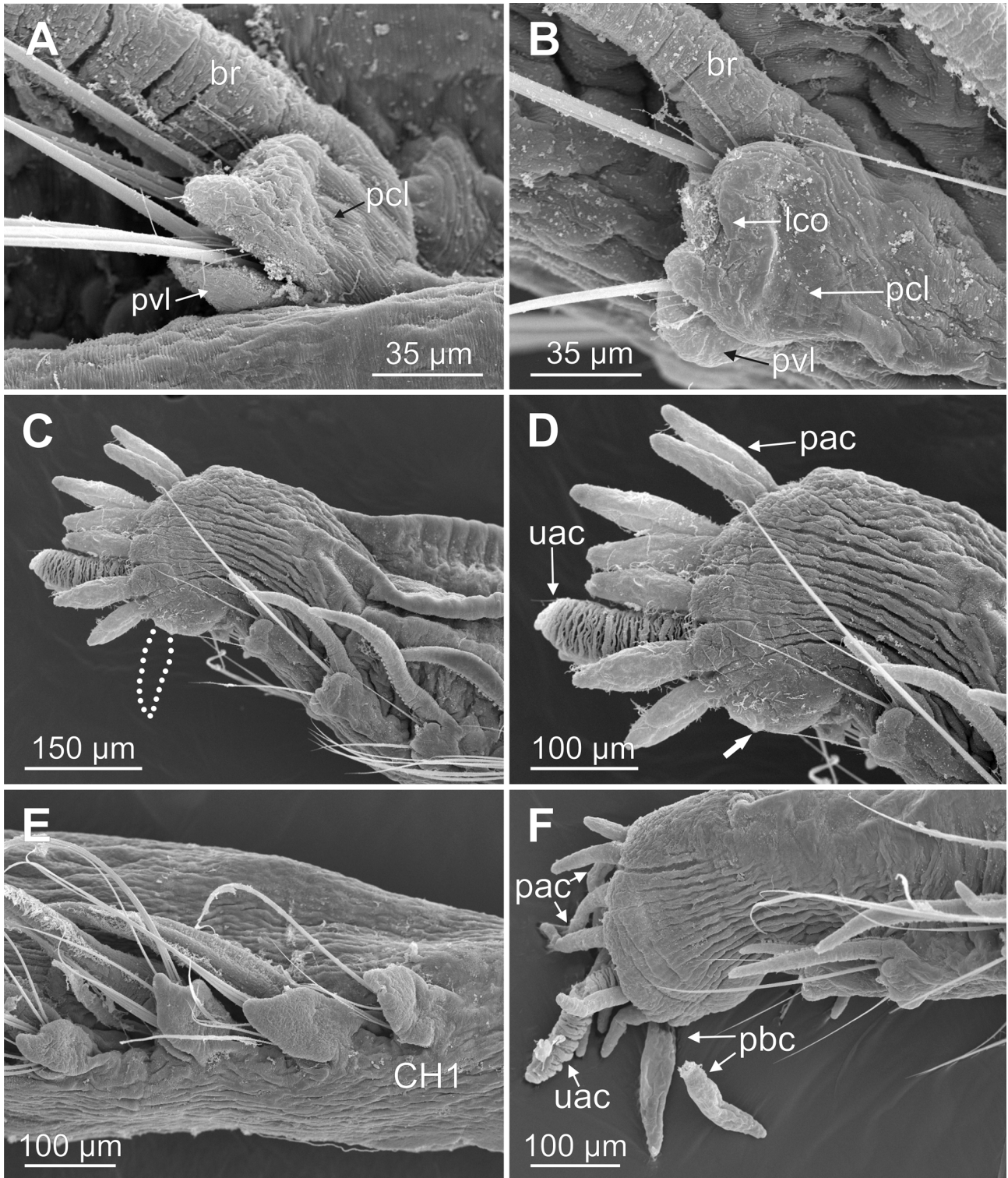


FIGURE 9. *Armandia laminosa* n. sp. SEM micrographs (paratypes AM W.47323). A. CH21, right side, ventroanterior view; B. CH26, right side, ventroanterior view; C. Posterior end, right side, lateral view (dotted line showing approximate shape of missing left paired basal cirri); D. detail of anal tube (arrow marking position of scar of detached left pbc); E. CH1–CH4, right side, lateral view; F. Posterior end, right lateral view.

Description. Based on holotype. Specimen complete, 9.0 mm long and 0.8 mm wide, with 27 chaetigers. Body slender, slightly tapering towards anterior end, posterior end truncated (Fig. 8A). Prostomium conical (Figs 2F, 7A), palpode well-developed, large, clavate (Fig. 8B). Eyes not seen. One pair of ring-shaped nuchal organs (Figs

7A, 8B); pharynx eversible, oral tentacles not seen. Branchiae present from CH2 to last body chaetiger (CH27), long, reaching chaetal bundle of next chaetiger, not decreasing in length in posterior chaetigers, not meeting middorsally. Parapodia biramous, with prechaetal lobe and ventral lobe on each parapodium; dorsal cirrus not present. Prechaetal lobes highly asymmetrical; wide and foliose from CH1–CH3, then becoming progressively smaller towards last chaetigers; prechaetal lobe tip ventrally displaced (Figs 7A, C–F, 8C–D, 9E); conspicuous bilobed appearance from midbody to last chaetigers (Figs 7G–M, 8E–F, 9A–B). Lateral eyespots anterior to parapodia on 11 chaetigers (CH7–CH17), orange, horizontally oval; those of CH7 and CH16–CH17 smaller than others. Simple capillary chaetae in two bundles, notochaetae generally longer than neurochaetae. Anal tube square-shaped, about as long as wide (Figs 7B, 9C–D, F); tube as long as last 2 chaetigers; posterior and ventral margins open, provided with long unpaired anal cirrus, thick at base and distally tapered, projecting outwardly (Fig. 7B). Posterior border provided with 5–6 pairs of elongate, finger-like, paired anal cirri, almost as long as anal tube (Figs 7B, 9C–D, F), shorter and thinner than pair of clavate basal cirri (Figs 7B, 9F).

Remarks. *Armandia laminosa* n. sp. is mostly characterised by the large size and the foliose shape of the prechaetal lobe in CH1–CH3 (Figs 7A, C–E, 8D, 9E); this feature is unique among all other species described in Lizard Island and described or reported in Australasia and the South-East Indian region as well. The anal tube is, however, not very distinctive and quite similar to that of *A. paraintermedia* n. sp. described herein, both considering the shape and size of the tube and the size of the anal cirri (compare Figs 7B and 10B). The paired anal cirri and the pair of basal cirri are similar in shape and width being the last ones slightly longer than the former. Paratypes measure 3–10 mm in length with 27–28 chaetigers. They still bear the anal tube and all cirri which suggests that those structures are not easily lost; the anal unpaired cirrus also show a conspicuous hook-like shape when is not broken (Fig. 7B). The length of the palpophore seems highly variable, sometimes as long as the prostomium (paratype AM W.43896). Observations on live specimens revealed that they conspicuously coil themselves when disturbed (Fig. 2E, F).

Etymology. The epithet *laminosa* refers to the foliose shape of the parapodial prechaetal lobes of the first three chaetigers (CH1–CH3).

Habitat / Distribution. All specimens were found in the West coast of Lizard Island, mostly in front of Casuarina Beach (59.5%) and Vicki's Reef (32.4%), from the intertidal to 15 m depth in several types of sediments, mainly in sand but also associated with *Halophila* seagrass (Fig. 1D).

Armandia paraintermedia n. sp.

(Figs 1E, 10–12, 18B)

Material examined: Thirty-seven specimens in sixteen samples. Holotype: AM W.44243, MI QLD 2370. Paratypes: AM W.43901, MI QLD 2337; AM W.44107, MI QLD 2355; AM W.44113, MI QLD 2356; AM W.44112, MI QLD 2360; AM W.47325, MI QLD 2370 (2); AM W.44238, MI QLD 2374; AM W.45131, MI QLD 2379, in EtOH; AM W.44546, MI QLD 2381, in EtOH; AM W.44550, MI QLD 2389; AM W.44556, MI QLD 2397 (3); AM W.45130, MI QLD 2432, in EtOH; AM W.45217, MI QLD 2440 (15); AM W.47326, MI QLD 2440 (2 on SEM stub); AM W.45218, MI QLD 2440 (3 in EtOH); AM W.45409, MI QLD 2444 (2).

Diagnosis. Parapodia biramous, with prechaetal lobe, ventral lobe and small dorsal cirrus on each parapodium; prechaetal lobe asymmetrical provided with a ventrally displaced tip. Anal tube about as long as wide, square-shaped; opening at posterior margin with a long ventral incision, provided with one long internal anal cirrus, thick at base and distally tapered, projecting outwardly; posterior margin provided with 3 pairs of elongate, finger-like, paired anal cirri, almost as long as total anal tube length, thinner than pair of basal cirri.

Description. Based on holotype. Specimen complete, 7.0 mm long and 0.5 mm wide, with 29 chaetigers. Body slender, slightly tapering towards anterior end and truncated at posterior end (Fig. 11A). Prostomium conical provided with a pair of small red eyes and one larger dorsal one (Fig. 10A), palpode well-developed but short (Figs 10A, 11B). One pair of ring-shaped nuchal organs (Fig. 10A); pharynx eversible, oral tentacles not seen (Fig. 11C–E). Branchiae present from CH2–CH26; last three chaetigers (CH27–CH29) abbranchiate; branchiae long surpassing parapodium of following chaetiger (Fig. 11F), slightly decreasing in length and width in CH24–CH26. Parapodia biramous, with prechaetal lobe, ventral lobe and small dorsal cirrus on each parapodium. Prechaetal lobe asymmetrical provided with a ventrally displaced tip present from CH1–CH29 (Figs 10D–I, 12A–C). Lateral eyespots anterior to parapodia on CH7–CH17, orange, circular; those of CH16 and specially CH17 smaller than

others. Simple capillary chaetae in two bundles, notochaetae generally longer than neurochaetae, those of posterior chaetigers very long (Figs 10C, 12D–E). Anal tube about as long as wide, square-shaped (Figs 10B, 12D–E); as long as last 2 chaetigers; opening at posterior margin with a long ventral incision (Fig. 10C), provided with one long internal anal cirrus, thick at base and distally tapered, projecting outwardly (Fig. 10B, not present in holotype). Anal tube posterior margin provided with 3 pairs of elongate, finger-like, paired anal cirri, almost as long as total anal tube length (Figs 10B, 12E–F), thinner than pair of basal cirri (Figs 10B–C, 12E).

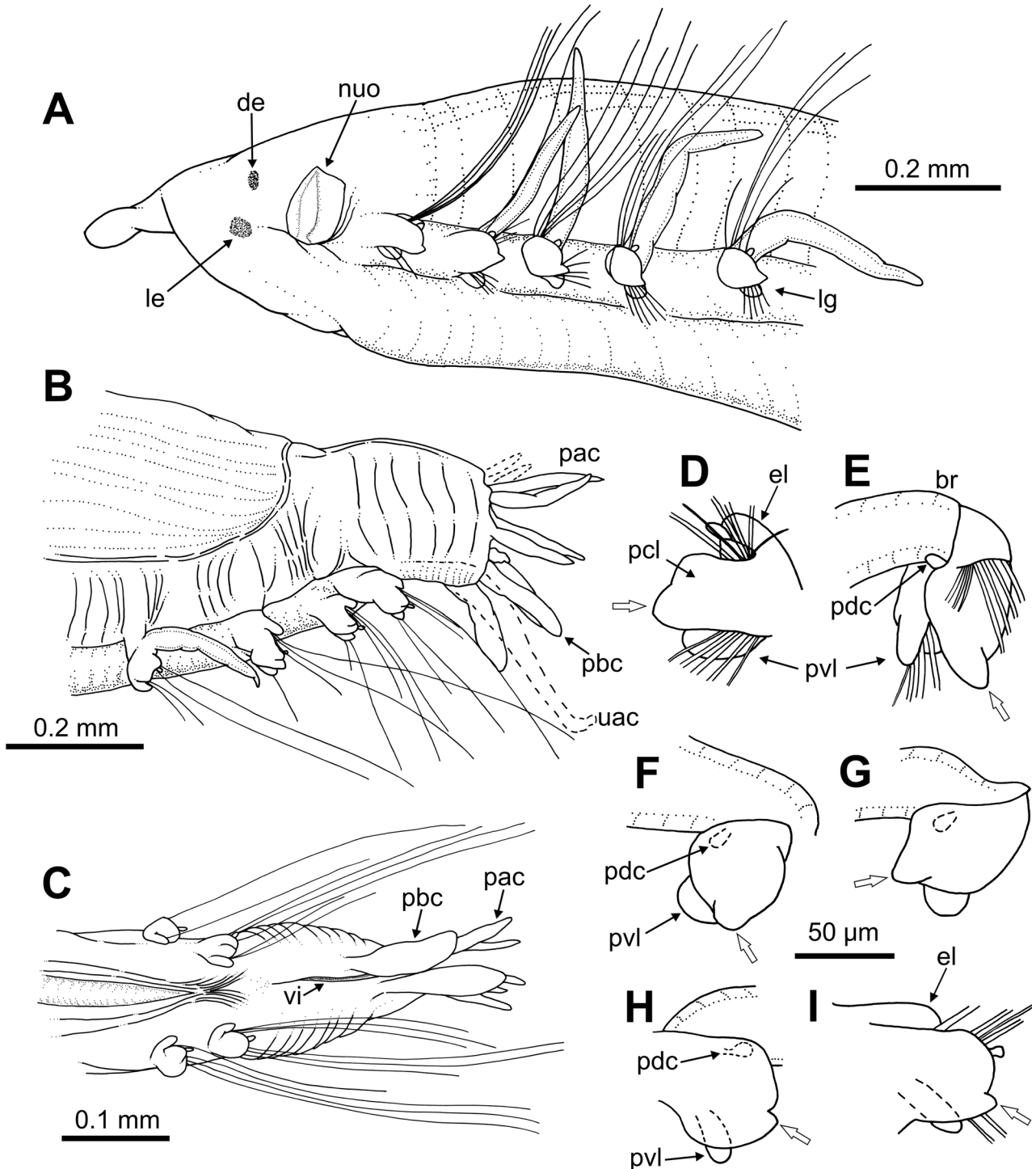


FIGURE 10. *Armandia paraintermedia* n. sp. (holotype AM W.44243). A. Anterior end, left side, lateral view. B. Posterior end, left side, latero-dorsal view. C. Posterior end, ventral view. (D–I) Parapodia, right (D–G) and left (H–I) side: D. CH1, anterolateral view; E. CH2, dorsal view; F. CH5; dorsal view; G. CH8, dorsal view; H. CH26, anterolateral view; I. CH28, anterolateral view. White arrows marking position of prechaetal lobe tip. Dotted line in B depicting approximate shape and position of missing unpaired anal cirrus and extra dorsal paired anal cirri. Proximal part of chaetae only illustrated in D, E and I.

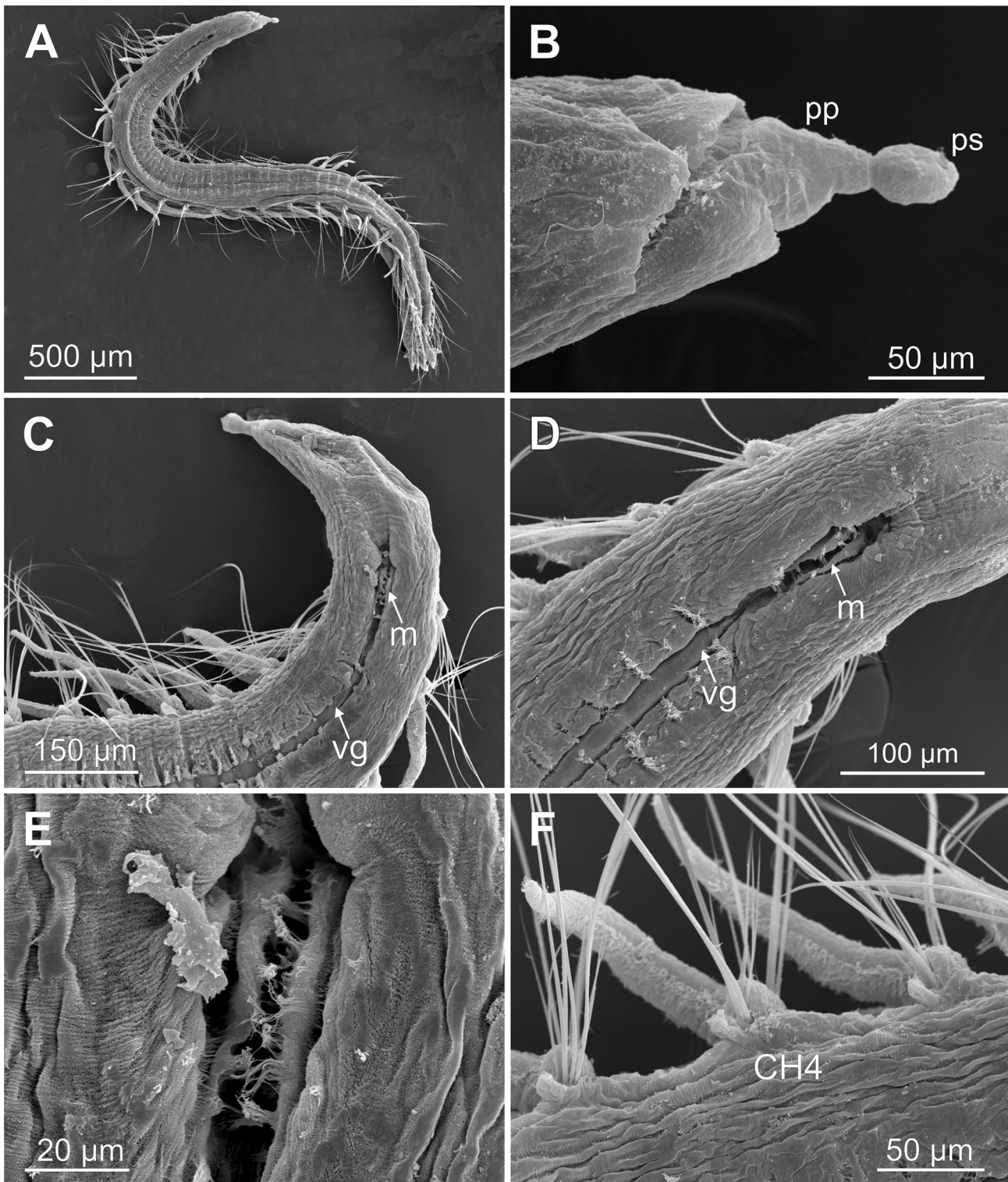


FIGURE 11. *Armandia paraintermedia* n. sp. SEM micrographs (paratype AM W.47326). A. Complete specimen, ventral view; B. Distal end of prostomium, ventral view; C. Anterior end, ventral view; D. Detail of mouth and ventral groove; E. Ciliated oral tentacles inside the mouth; F. CH3–CH5 in ventral view.

Remarks. Examination of paratypes shows some variability for several characters. Lateral eyes are present from CH7 to CH15–CH17, being smaller the first and the last 1–2. The chaetae from the last three chaetigers appear more deciduous than others. The number of papillae on the anal tube ranges from 1–3 pairs in small specimens (4 mm in length) to 11 pairs in larger specimens (8 mm). The pair of basal cirri may be short and

therefore difficult to distinguish from the other cirri (Fig. 12D–F). The eversible pharynx has digitiform protuberances which bear abundant ciliature and projects beyond the border of the mouth (Fig. 11D–E). The branchiae are present from CH2 to CH27, showing two abbranchiate chaetigers rather than three. In abbranchiate chaetigers, there is a small dorsal elevation in the postchaetal lobe in the same place where the branchia are present in branchiate chaetigers (Fig. 10 D, I), similarly as it happens in *A. dolio* n. sp.

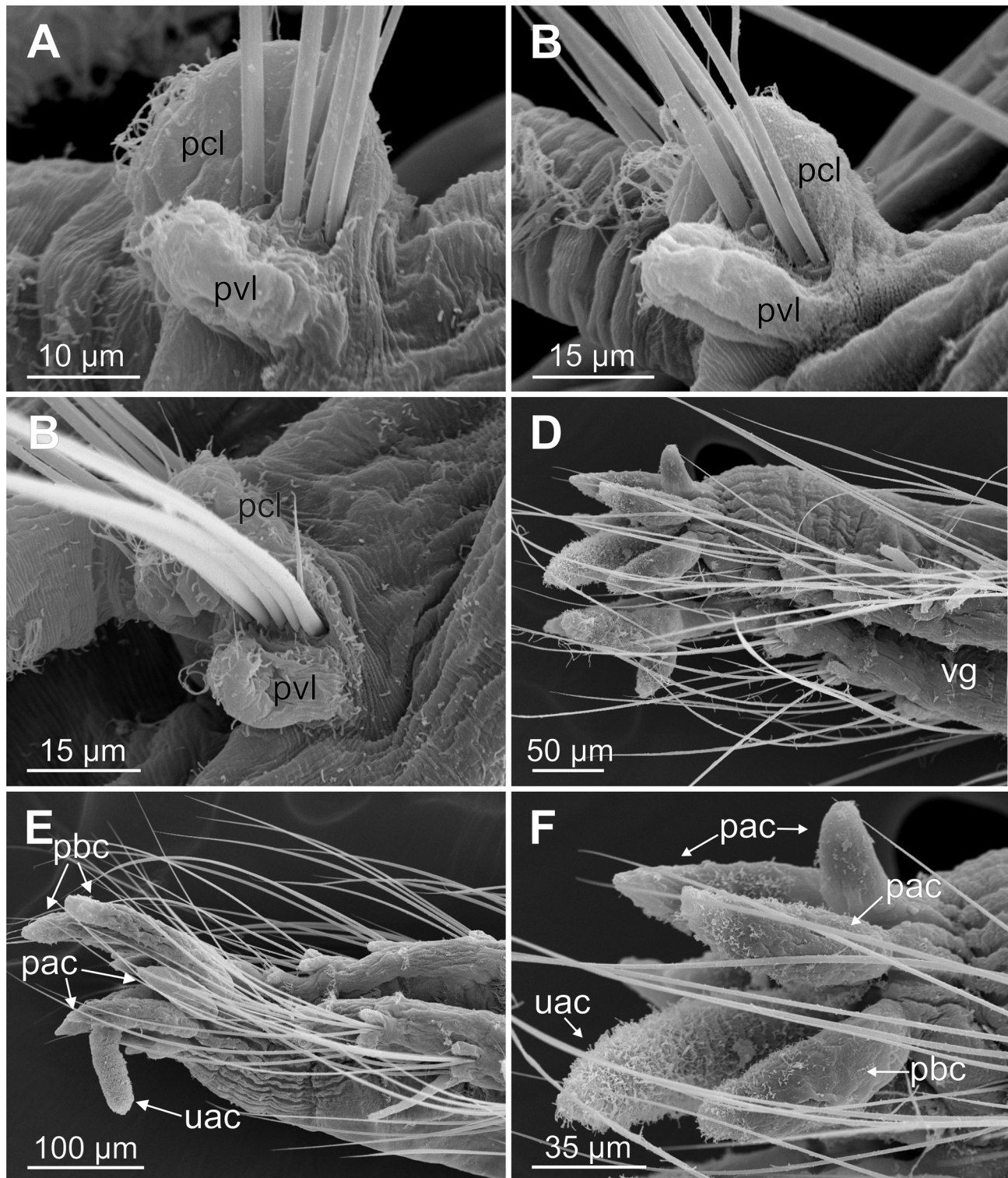


FIGURE 12. *Armandia paraintermedia* n. sp. SEM micrographs (paratype AM W.47326). A. CH6; B. CH9; C. CH19; D. Posterior end, right side, ventrolateral view; E. Posterior end, left side, ventrolateral view; F. Detail of anal tube marginal papillae.

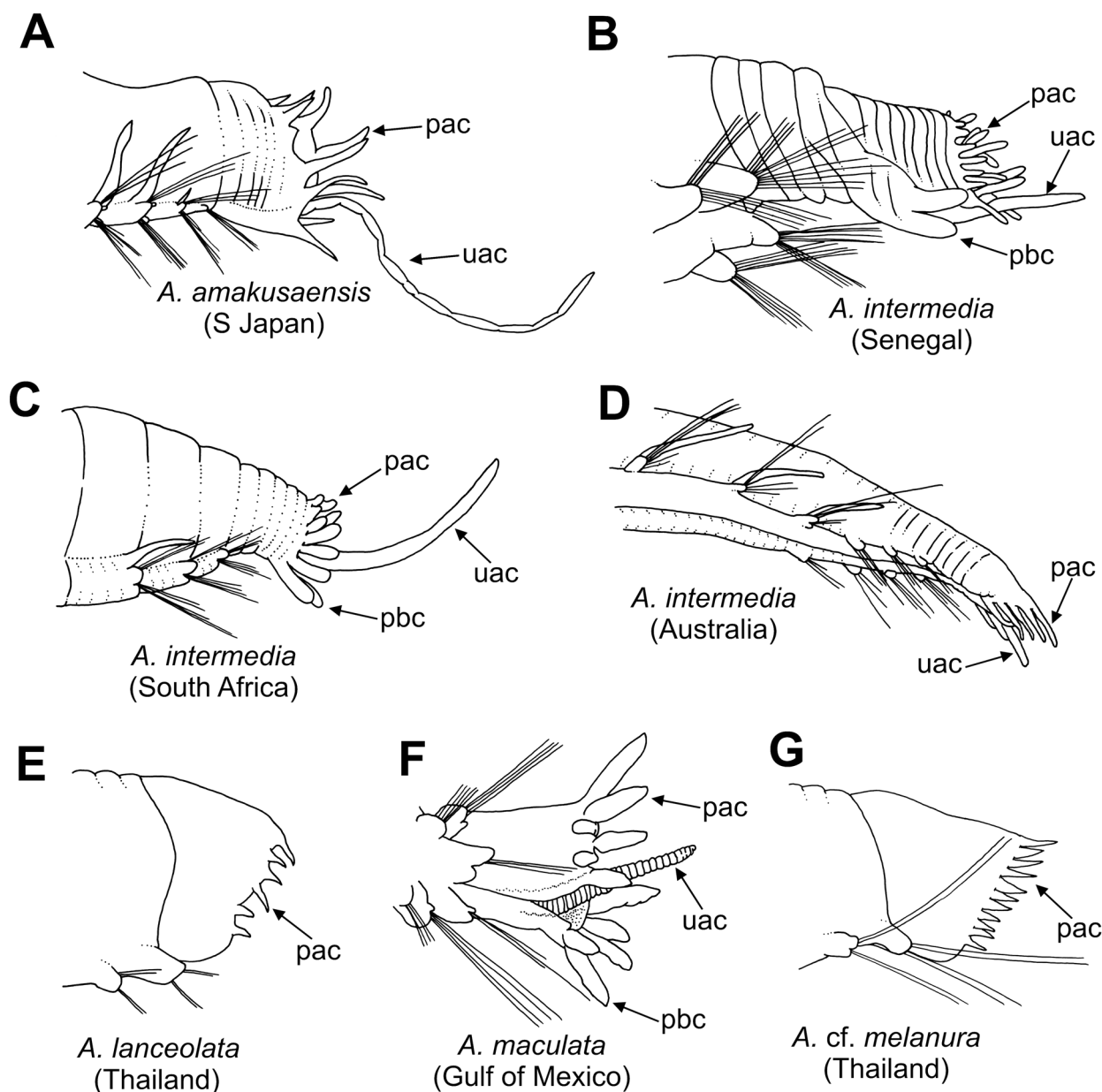


FIGURE 13. Posterior body region of species of *Armandia* similar to *A. paraintermedia* (all redrawn from originals). Organized alphabetically and by date; type locality or collecting site between brackets (see text). A. *A. amakusaensis* (in Saito *et al.* 2000); B. *A. intermedia* (in Fauvel 1902); C. *A. intermedia* (in Day 1967); D. *A. intermedia* (in Hutchings 2000); E. *A. lanceolata* (in Eibye-Jacobsen 2002); F. *A. maculata* (in Uebelacker 1984); G. *A. cf. melanura* (in Eibye-Jacobsen 2002).

The shape and size of the anal tube of *Armandia paraintermedia* n. sp. (Fig. 10B) is similar to that of other species of *Armandia* (Figs 13, 17A, C); some of these species have been reported in Australia but their type localities are far away such as it happens for *A. intermedia* Fauvel, 1902 (Fig. 13B) and *A. maculata* Webster, 1884 (Fig. 13F). Other related species from SE Asia are *A. cf. melanura* Gravier, 1905 (Fig. 13G), *A. amakusaensis* (Fig. 13A) and *A. lanceolata* Willey, 1905 (Fig. 13E). *Armandia intermedia* was described by Fauvel (1902) from West Africa and later reported in South Africa (Day 1967; Fig. 13C) and Australia (Hutchings 2000; Fig. 13D); this species bears an anal tube similar to that of *A. paraintermedia* n. sp. which has paired cirri, one pair of basal cirri and ventral unpaired cirrus (“2 grosses papilles ventrales courtes, séparées par une longue papille impaire, médiane, ventrale”; Fauvel 1902). *Armandia intermedia* differs, however, from *A. paraintermedia* n. sp. by having the last three chaetigers which are abranchiata instead of two, lateral eyes in 13 chaetigers (CH7–CH19) instead of

11 (CH7–CH17) and a constant number of paired cirri (9 pairs) instead of 1–11 pairs. Specimens from South Africa as described by Day (1967) have 27–29 chaetigers, branchiae start in CH2, the last 23 chaetigers are abbranchiate, lateral eyes are present in 12 chaetigers (CH7–CH18), the unpaired anal cirrus is comparatively longer (see Fig. 13C) and shows a high degree of variability in the number of paired anal cirri (10–20; “dorsal clavate papillae” *sensu* Day (1967)). Day (1967) does not mention the presence of the pair of ventral cirri but they seem to be present according to the drawing provided in that paper (Day 1967, Fig. 25.2.g; see also Fig. 13C).

Armandia maculata was described from Bermuda (Webster 1884) (Fig. 18A) and later reported in New Zealand by Augener (1924) and Benham (1950) (Fig. 18B). The drawing of specimens of the Gulf of Mexico provided by Uebelacker (1984) (Fig. 13F) shows an anal tube similar to those of *A. paraintermedia* n. sp. and *A. intermedia*; the drawing and the description show, however, little detail about paired anal cirri (“0–28 digitiform to filiform marginal papillae”; Uebelacker 1984) and therefore this does not allow reliable comparisons among these species. Nevertheless, *A. maculata* seems to differ by having the three last chaetigers which are abbranchiate (CH27–CH29) and fewer lateral eyes (CH13–CH17), a larger size (19–22.1 mm in length and 2–2.6 mm in width vs. 7.0 mm and 0.5 mm respectively in *A. paraintermedia* n. sp.). In conclusion, the reports of *A. intermedia* in Australia (Fig. 13D) and those of *A. maculata* in New Zealand may either refer to *A. paraintermedia* n. sp. or to a new species.

Saito *et al.* (2000) describe *A. amakusaensis* from the South of Japan (Figs 13A, 18A) and compared it to *A. intermedia* and *A. leptocirris* Grube, 1878 from the Philippines (Fig. 17F). *Armandia paraintermedia* n. sp. is similar to *A. amakusaensis* but they differ in the length and shape of the unpaired ventral anal cirrus; this cirrus is quite long and provided with numerous constrictions in *A. amakusaensis*. Furthermore, the paired anal and basal cirri are also much thinner in the former species (Fig. 13A; Saito *et al.* 2000, Fig. 3i–k). On the other hand, *A. leptocirris* mostly differs from *A. paraintermedia* n. sp. and *A. intermedia* in the shape and size of the anal tube, and the shape of the body and appearance of the unpaired ventral cirrus as well.

Finally, Eibye-Jacobsen (2002) reports two species from the Andaman Sea (Fig. 18B), namely *A. cf. melanura* Gravier, 1905 (Fig. 13G), originally described from the Red Sea (Fig. 18A) and *A. lanceolata* Willey, 1905, from the Sri Lankan coast (Fig. 18A); the latter was also reported by Hartmann-Schröder (1984) as *A. cf. lanceolata* from Western Australia and Gibbs (1971) from the Solomon Islands. Both species have an anal tube which is similar to that of *A. paraintermedia* n. sp., but they have paired anal cirri which are much shorter and lack the pair of basal ventral cirri and an unpaired ventral cirrus.

Etymology. The name of the new species refers to its morphological similarity to *Armandia intermedia* Fauvel, 1902 from West Africa (see Remarks below).

Habitat / Distribution. *Armandia paraintermedia* n. sp. was the most abundant and widespread opheliid at Lizard Island, and was found both all around LI (89.2%) and outer sites (10.8%) (Fig. 1E). Present from the intertidal to 24 m depth on a wide variety of bottom types (sand, coral rubble, calcareous algae, sponges and coral sand).

***Armandia tubulata* n. sp.**

(Figs 1F, 14–16, 18B)

Material examined. Seven specimens in three samples. Holotype: AM W.47327, MI QLD 2370. Paratypes: AM W.47328, MI QLD 2337; AM W.47329, MI QLD 2340; AM W.47330, MI QLD 2370 (3); AM W.47331, MI QLD 2370, on SEM stub.

Diagnosis. Parapodia biramous, with prechaetal lobe, ventral lobe and dorsal cirrus on each parapodium; prechaetal lobe short and asymmetrical, with a ventrally displaced tip. Anal tube long and narrow, tube-like. Tube opening directed postero-ventrally, appearing obliquely truncate in lateral view; not laterally compressed; posterior border provided with 6 pairs of finger-like anal cirri of about 1/5 as long as dorsal tube length; paired basal cirri and internal unpaired anal cirrus.

Description. Based on holotype. Specimen complete, 11.0 mm long and 1.0 mm wide, with 29 chaetigers. Body slender, slightly tapering towards anterior end and truncated at posterior end. Prostomium conical, provided with a pair of lateral, small red eyes and a dorsal one (Fig. 14A); palpode well-developed but short and narrow, twisted (Figs 14A, 15A). One pair of ring-shaped nuchal organs (Fig. 15B); pharynx eversible (Fig. 14A), oral tentacles not seen (but present in paratypes; Fig. 15C). Branchiae present from CH2–CH26; last three chaetigers (CH27–CH29) abbranchiate; branchiae short, slightly surpassing parapodium of following chaetiger, not decreasing

in length in posterior chaetigers. Parapodia biramous, with prechaetal lobe, ventral lobe and dorsal cirrus on each parapodium (Figs 14D–I, 15E–F, 16A–D). Prechaetal lobe short and asymmetrical, with a ventrally displaced tip. Lateral eyespots anterior to parapodia on CH7–CH17, orange, horizontally oval; those of CH7 and CH15–CH17 smaller than others. Simple capillary chaetae in two bundles, notochaetae generally longer than neurochaetae. Anal tube long and narrow, tube-like, of same width along its length (Figs 14B, 16E–F). Anal tube opening directed postero-ventrally, appearing obliquely truncate in lateral view; not laterally compressed; ventrally as long as about 2 chaetigers, dorsally as long as about 3 chaetigers (Figs 14C, 16E). Posterior border provided with 6 pairs of finger-like anal cirri of about 1/5 as long as dorsal tube length (Fig. 14B); paired basal cirri and internal, unpaired anal cirrus not observed (but present in one paratype, see below).

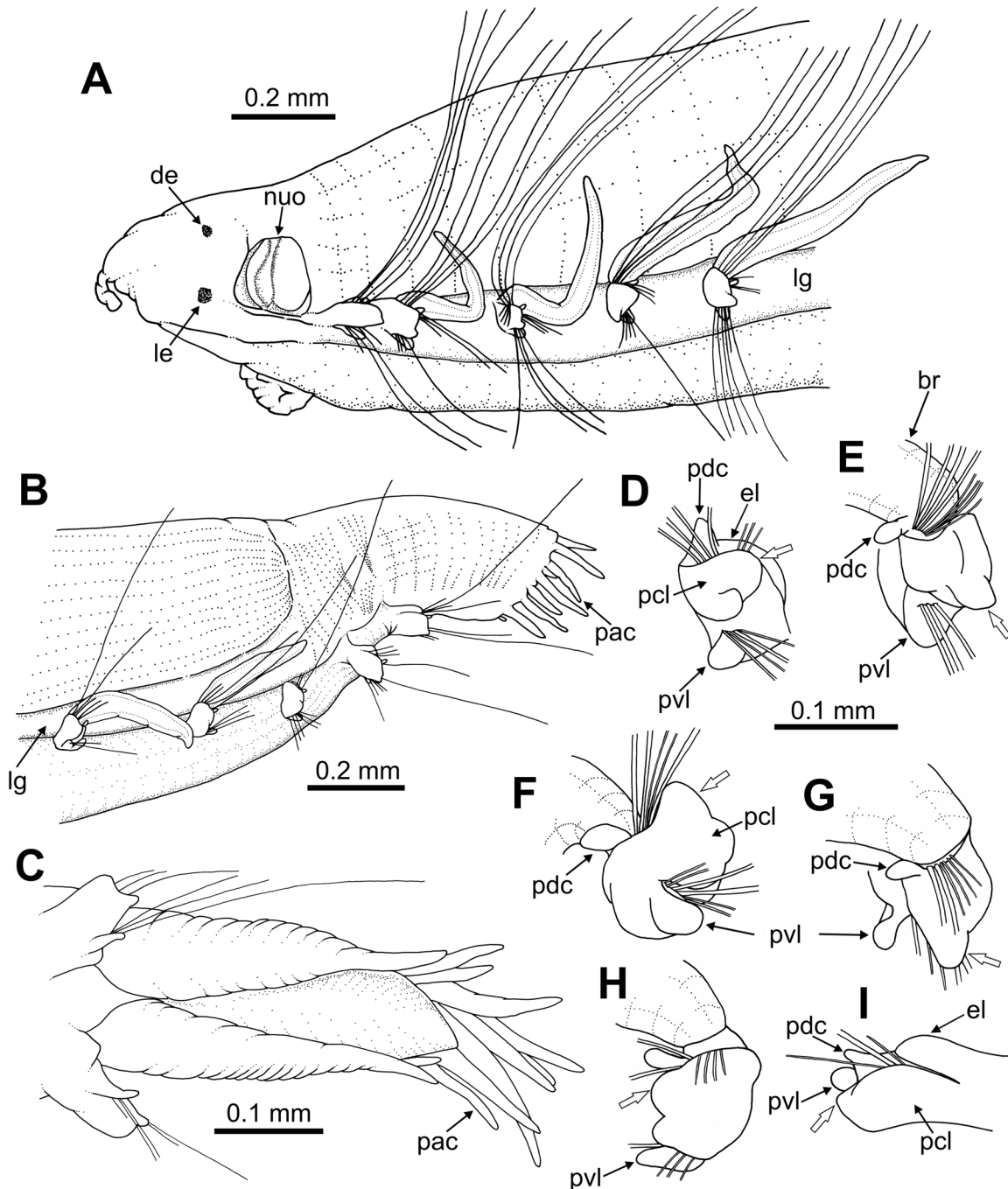


FIGURE 14. *Armandia tubulata* n. sp. (holotype AM W.47331). A. Anterior end, left side, lateral view; B. Posterior end, left side, latero-dorsal view; C. Posterior end, ventral view. (D–I) Parapodia, right side: D. CH1, lateral view; E. CH2, lateral view; F. CH3, lateral view; G. CH9, dorsal view; H. CH21, anterior view; I. CH29, dorsal view. White arrow marking position of prechaetal lobe tip.

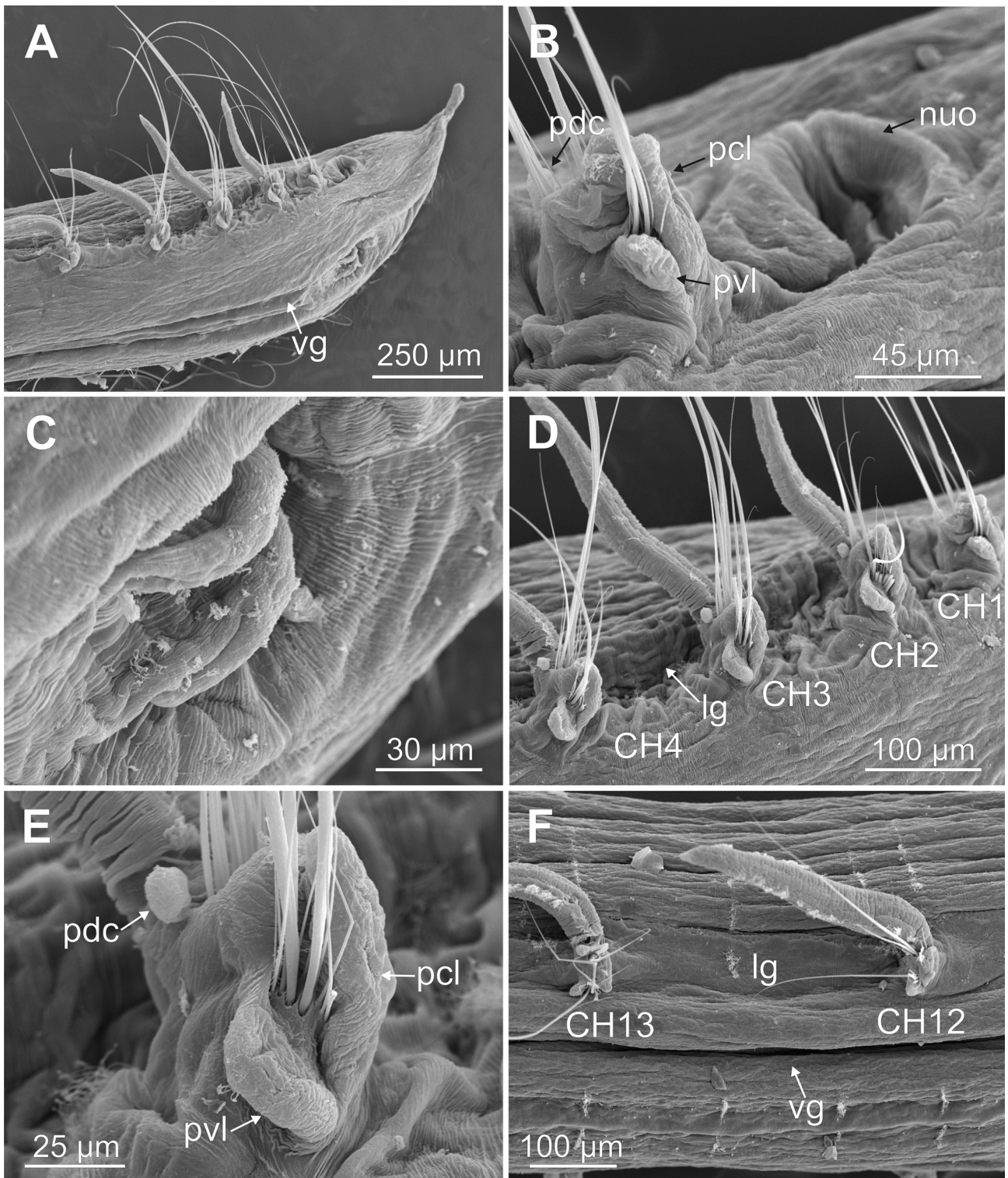


FIGURE 15. *Armandia tubulata* n. sp. SEM micrographs (paratype AM W.47331). A. Anterior end, left side, lateroventral view; B. Detail of nuchal organ and CH1; C. Detail of oral tentacles protruding from mouth; D. CH1–CH4, left lateroventral view; E. CH3, frontal view; F. CH12–CH13, lateral view.

Remarks. The shape of the anal tube of *A. tubulata* n. sp. resembles that of *A. leptocirris* Grube, 1878 and *A. andamana* Eibye-Jacobsen (2002). *Armandia leptocirris* was described from the Philippine Islands, and later reported in Sri Lanka (Willey 1905), the Solomon Islands (Gibbs 1971) and South Africa (Day 1967, Fig. 25.2.h, as *A. leptocirrus*). The drawing of *A. leptocirris* presented by Day (1971) (Fig. 17F) shows an anal tube long and

obliquely truncated in lateral view, quite similar to that of *A. tubulata*. Nevertheless, in *A. leptocirris* the anal tube is opened postero-dorsally instead of postero-ventrally. *Armandia andamana* has not been reported since it was described by Eibye-Jacobsen (2002). This species is similar to *A. longicaudata* but it lacks an unpaired anal cirrus which is present instead in *A. longicaudata* and *A. tubulata* n. sp.

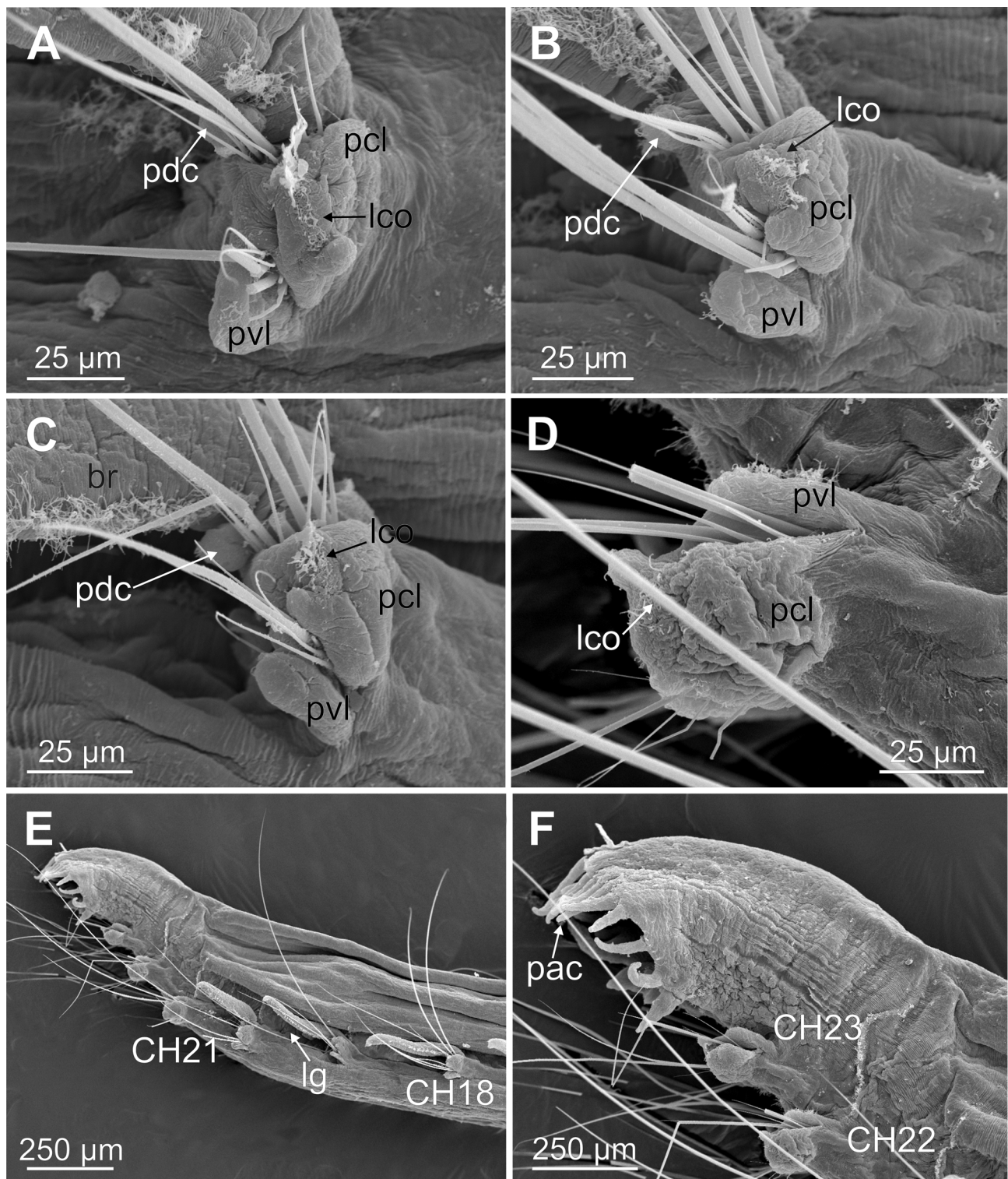


FIGURE 16. *Armandia tubulata* n. sp. SEM images (paratype AM W.47331). (A–D) Parapodia, lateral view: A. CH12; B. CH20; C. CH23; D. CH26; E. Posterior end, right side, lateral view; F. Detail of anal tube, left side, laterodorsal view.

The paratypes of *A. tubulata* n. sp. measure 9–11 mm in length, and show that the size and the number of chaetigers are constant. One paratype (AM W.47329) has an internal unpaired ventral cirrus. The branchiae are lacking in the last three chaetigers; those and the first chaetiger show a small dorsal elevation in the postchaetal lobe, as it happens in *A. dolio* n. sp. and *A. paraintermedia* n. sp. (Fig. 14D, I).

Etymology. The epithet *tubulata* (L.) refers to the tubular shape of the anal tube.

Habitat / Distribution. A sublittoral species only found in SW LI coast, and almost restricted to Vicki's Reef sampling sites (85.7%) (Fig. 1F). Found from 1 to 10 m depth on different bottom types (dead coral rubble, fine sand and calcareous algae).

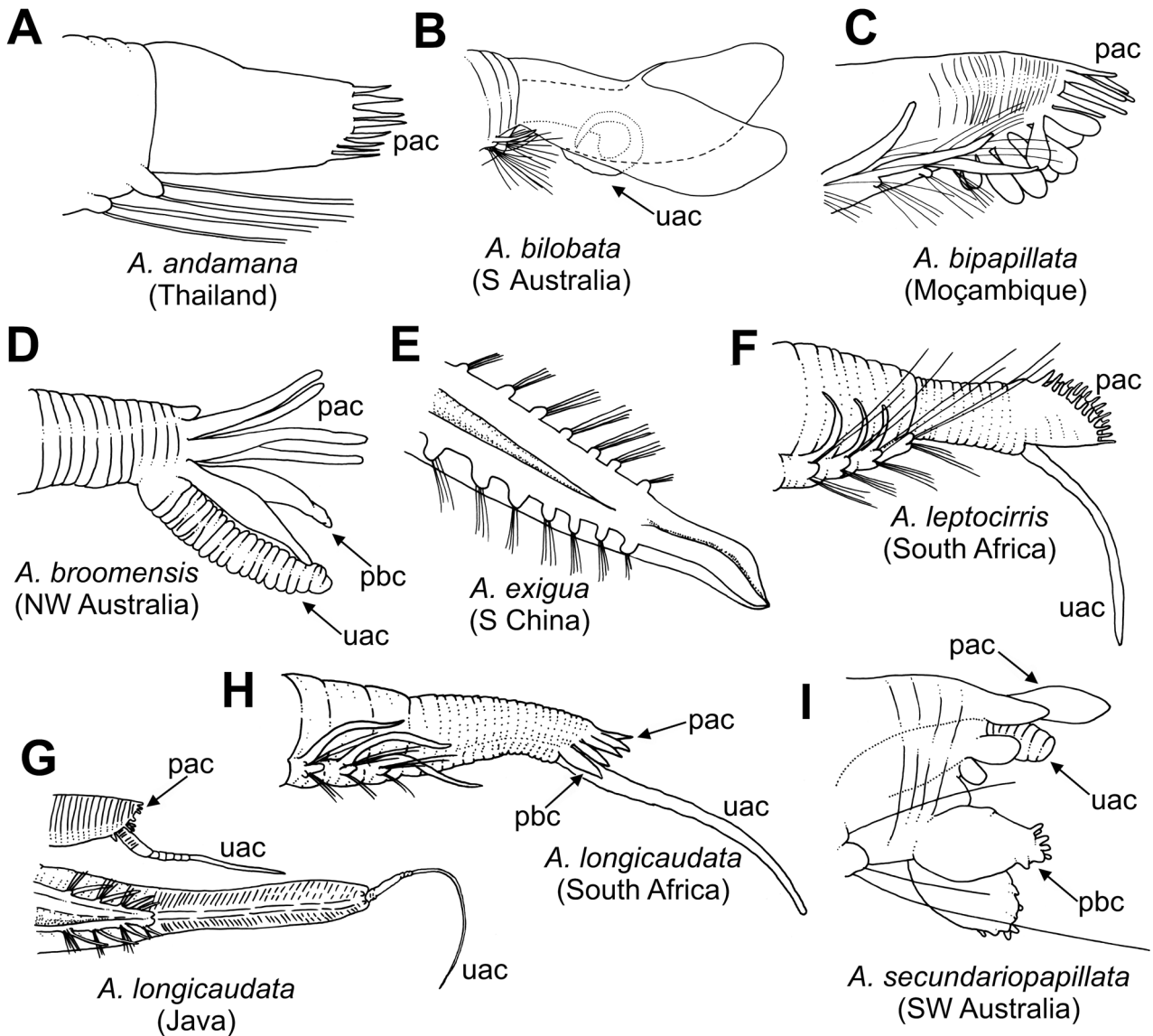


FIGURE 17. Posterior body region of species of *Armandia* described or reported in the South East Asia and Australia, all redrawn from original; type locality or collecting site between brackets (see text). Organized alphabetically and by date. A. *A. andamana* (in Eiby-Jacobsen 2002); B. *A. bilobata* (in Hartmann-Schröder 1986); C. *A. bipapillata* (in Hartmann-Schröder 1974); D. *A. broomensis* (in Hartmann-Schröder 1979); E. *A. exigua* (in Kukenthal 1887); F. *A. leptocirris* (in Day 1967); G. *A. longicaudata* (in Caullery 1944); H. *A. longicaudata* (in Day 1967); I. *A. secundariopapillata* (in Hartmann-Schröder 1984).

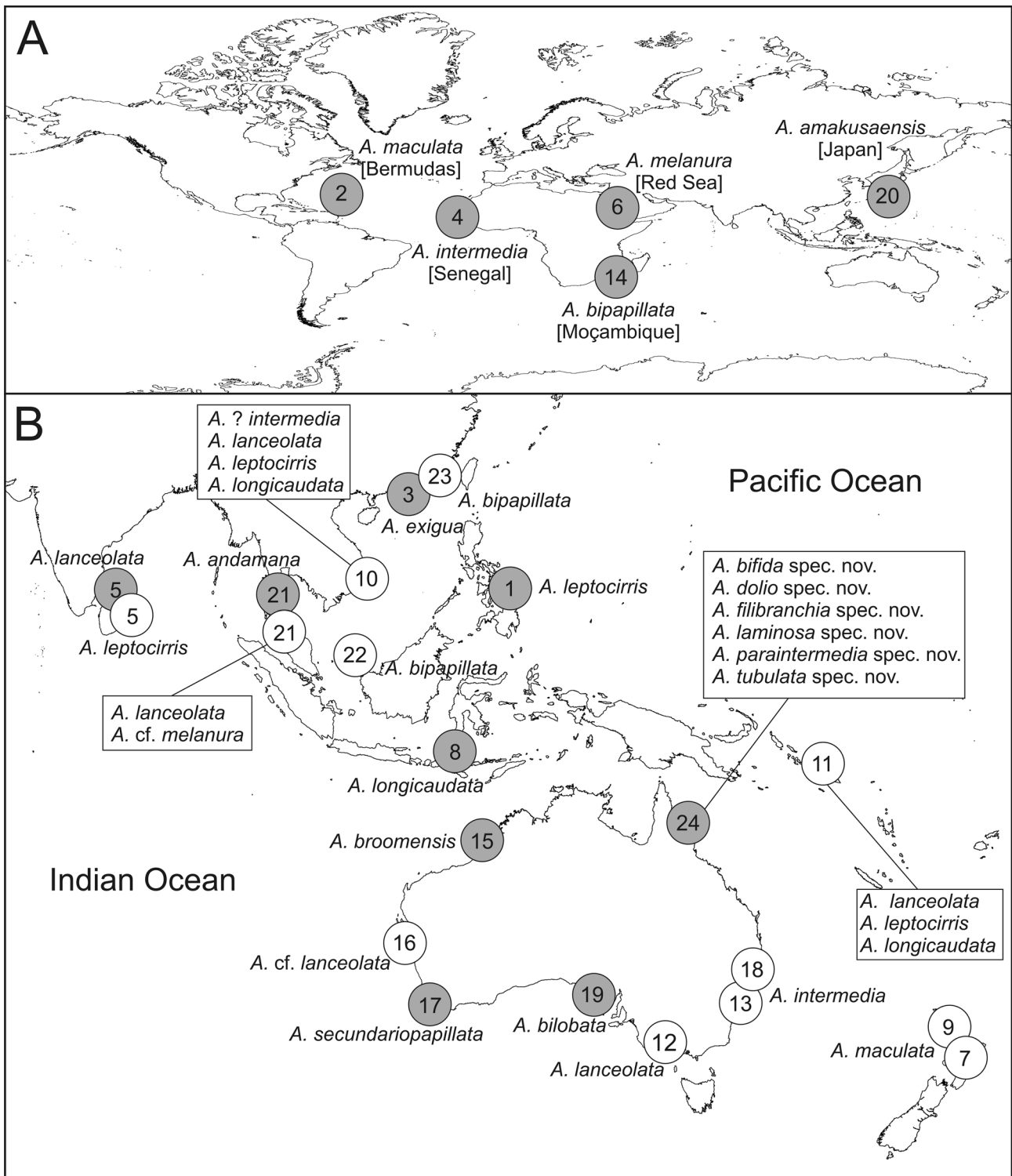


FIGURE 18. A. World map showing type localities of several *Armandia* species reported from East Asia and Australasia. B. Map showing records of *Armandia* species described (grey circles) or reported (white circles) in East Asia and Australasia. 1. Grube (1878); 2. Webster (1884); 3. Kükenthal (1887); 4. Fauvel (1902); 5. Willey (1905); 6. Gravier (1905); 7. Augener (1924); 8. Caullery (1944); 9. Benham (1950); 10. Gallardo (1967); 11. Gibbs (1971); 12. Knox & Cameron (1971); 13. Hutchings & Rainer (1979); 14. Hartmann-Schröder (1974); 15. Hartmann-Schröder (1979); 16. Hartmann-Schröder (1981); 17. Hartmann-Schröder (1984); 18. Hutchings & Murray (1984); 19. Hartmann-Schröder (1986); 20. Saito *et al.* (2000); 21. Eibye-Jacobsen (2002); 22. Al-Hakim & Glasby (2004); 23. Morton & Bamber (2008); 24. This study.

Key to Australasian, Southern Asia and Indo-Malay archipelago species of *Armandia*

In other genera of the Opheliidae, such as *Ophelina*, the use of the anal tube as taxonomic character should be taken with caution (Parapar *et al.* 2011) because it seems to be highly deciduous. On the contrary, most of the specimens of *Armandia* studied in this paper have the anal tube still attached after sampling and fixation, including preparation for SEM examination. The exception to this pattern was the only specimen of *A. filibranchia* n. sp., which has lost the anal tube after fixation. Some identification keys such as that provided by Gallardo (1967) who separated species of *Armandia* according to the oral tentacles; this is, however, not useful because in fixed specimens the tentacles are usually retracted into the buccal cavity.

The key provided here contains the six new species from NE Australia plus all other species previously described or reported in Southern Asia and the Indo-Malay archipelago. The type locality of the nominal species is indicated between brackets.

1. AT without papillae at posterior margin 2
- AT with papillae at posterior margin 3
2. (1) Distal end of AT opened dorsally and ventrally forming two wide lobes (Fig. 17B)
..... *A. bilobata* Hartmann-Schröder, 1986 [S Australia]
- Distal end of AT not as such, obliquely truncated, not forming lobes (Fig. 17E) *A. exigua* Kükenthal, 1887 [S China]
3. (1) AT maximum length shorter than width at base 4
- AT maximum length longer than width at base 5
- AT maximum length of similar length than width at base 11
4. (3) AT papillae of same length (Fig. 13E) *A. lanceolata* Willey, 1905 [Sri Lanka]
- Basal pair of AT papillae larger than marginal ones (Fig. 17I)
..... *A. secundariopapillata* Hartmann-Schröder, 1984 [SW Australia]
5. (3) AT 1.5–2 times longer than wide 6
- AT 3–4 times longer than wide 8
6. (5) AT wider at base (Fig. 17A, C) 7
- AT wider at distal end, funnel-shaped (Fig. 6B) *A. filibranchia* n. sp.
- AT wider at mid-length, barrel-shaped (Fig. 4B) *A. dolio* n. sp.
- AT of same width along its length, tube-like (Fig. 14B) *A. tubulata* n. sp.
7. (6) All marginal papillae of same length (Fig. 17A) *A. andamana* Eibye-Jacobsen, 2002 [Thailand]
- Dorsal marginal papillae thinner than ventral ones (Fig. 17C) *A. bipapillata* Hartmann-Schröder, 1974 [Moçambique]
8. (5) Anal paired papillae of about half tube length (Fig. 17D) *A. broomensis* Hartmann-Schröder, 1979 [NW Australia]
- Anal paired papillae much less than half of tube length. 9
9. (8) Prechaetal lobe of anterior parapodia prolonged and bifid (Fig. 3A) *A. bifida* n. sp.
- Prechaetal lobe of anterior parapodia of a different shape 10
10. (9) AT ventrally opened at mid-length (Fig. 17F) *A. leptocirris* (Grube, 1878) [Philippines]
- AT not ventrally opened at mid-length (Fig. 17H) *A. longicaudata* Caullery, 1944 [Java]
11. (3) Marginal papillae of similar length than AT maximum length 12
- Marginal papillae shorter than AT maximum length 15
12. (11) CH1 to CH3 prechaetal lobes foliose (Fig. 7A) *A. laminosa* n. sp.
- CH1 to CH3 prechaetal lobes similar to following 13
13. (12) Unpaired internal anal cirrus very long with constrictions; paired cirri thin and pointed (Fig. 13A)
..... *A. amakusaensis* Saito, Tamaki & Imajima, 2000 [S Japan]
- Unpaired internal cirrus of same length as AT without constrictions 14
14. (13) Paired basal cirri present and thick (Fig. 10B–C) *A. paraintermedia* n. sp.
- Paired basal cirri absent (Fig. 13F) *A. maculata* (Webster, 1884) [Caribbean Sea]
15. (11) Paired basal cirri absent (Fig. 13G) *A. cf. melanura* Gravier, 1905 [Red Sea]
- Paired basal cirri present (Fig. 13B) *A. intermedia* Fauvel, 1903 [Senegal]

Acknowledgements

Authors wish to thank Pat Hutchings and Elena Kupriyanova (AM, Sydney) for organizing the Polychaete Workshop held at Lizard Island Research Station (LIRS), a facility of the Australian Museum on the Great Barrier Reef. This Workshop was supported by the Lizard Island Reef Research Foundation. Special thanks to Anne Hoggett and Lyle Vail (Co-Directors of the LIRS) for greatly facilitating this workshop and their friendship. Thanks are also due to Alexander Semenov (Sasha) for the macro photographs of the specimens included in Figure 2 and to all colleagues which took part on this workshop for their continuous help providing many opheliid

specimens from their diving and snorkeling sampling. Thanks are also due to Ada Castro (SAIN, UDC) who assisted with the preparation of specimens and use of the SEM, Karin Meißner and Antje Fischer (Forschungsinstitute und Naturmuseen Senckenberg) for providing useful literature, Noela Sánchez for providing the map used in Figure 18 and to P. Hutchings and one anonymous referee for constructive comments on the manuscript.

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