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Polynoidae (Annelida) from bathyal and abyssal depths in southern and eastern Australia

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Abstract. We provide a systematic account of the family Polynoidae (Annelida) from deep waters (> 1000 m) around Australia. Specimens were collected during surveys to the Great Australian Bight (2013–2017), east coast of Australia (2017), and southern seamounts off Tasmania (1997–2018). The taxonomic account includes 21 species from 12 genera, with accepted or provisional names, and we further describe nine new species. New species from four subfamilies described here include Arctonoinae: *Parahololepidella mensa* sp. nov.; Lepidastheniinae: *Anotochaetonoe rubermaculata* sp. nov.; Macellicephalinae: *Bruunilla magnantennata* sp. nov., *Bruunilla posteroantennata* sp. nov., and *Polaruschakov investigatoris* sp. nov.; Polynoinae: *Eunoe albacauda* sp. nov., *Eunoe apicolata* sp. nov., *Eunoe benhami* sp. nov., and *Eunoe danmurrayi* sp. nov. An additional 11 operational taxonomic units (OTUs) are represented by incomplete material. One species is given a new status: *Eunoe abyssorum* McIntosh, 1885 *nomen dubium*. One species previously placed in *Bathyedithia* Pettibone, 1976 is given a new combination as *Polaruschakov retierei* (Bonifácio & Menot, 2018) comb. nov. Two species formerly placed in *Lagisca* Malmgren, 1865 are new combinations as *Harmothoe longipalpa* Kirkegaard, 1995 comb. nov. and *Harmothoe torbeni* (Kirkegaard, 1995) comb. nov. *Polyeunoa monroi* Averincev, 1978 is recognised as a valid species distinct from *Parapolyeunoa flynni* (Benham, 1921), rather than a synonym of that species as previously suggested. We provide a phylogenetic analysis based on COI, 16S, 18S and 28S gene fragments placing our new taxa within the family Polynoidae. Molecular results support three monophyletic subfamilies Admetellinae, Macellicephalinae, and Polynoinae. This study provides the first comprehensive review of deep-water polynoids from Australia.

Keywords: Deep sea, scale-worms, Aphroditiformia, Australia
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Introduction

The family Polynoidae Kinberg, 1856 (Annelida) is the most species-rich of the six families of the Aphroditiformia containing around 872 accepted species (Read & Fauchald, 2025). Polynoids, as with other Aphroditiformia, are commonly known as scale-worms due to the presence of scale-like fleshy discs called 'elytra' on the dorsal surface of some species. Currently there is no morphological diagnosis that separates Polynoidae from other Aphroditiformia (Gonzalez *et al*., 2018). The family is widely distributed geographically and ecologically from intertidal to hadal depths, and is one of the dominant epifaunal annelid families recorded at abyssal (> 2000 m) depths (Hutchings, 2000; Paterson *et al*., 2009; Gonzalez *et al*., 2025).

Attempts to understand relationships within the Polynoidae have resulted in up to 20 subfamilies being established (e.g., Hourdez, 2022; Rouse *et al*., 2022; Gonzalez *et al*., 2023a). Currently, eight subfamilies are nominally accepted, plus 11 unplaced genera still considered Polynoidae *incertae sedis* (Read & Fauchald, 2025).

Until recently, knowledge of polynoids from bathyal to abyssal depths in Australian waters was based on limited material from opportunistic deep-sea collections, or from expeditions of broader scope that included a few stations in Australian seas (McIntosh, 1885; Benham, 1921; Augener, 1927; Averincev, 1978; Hanley & Burke, 1991; Kirkegaard, 1995). The most extensive of these studies was the voyage of RV Dmitry Mendeleev around New Zealand and southern Australia in 1976, that reported 24 polynoid species (of which 11 species were new), most of which were collected around New Zealand (Averincev, 1978). Prior to the 2000s, studies had recorded only nine species of Polynoidae from depths exceeding 1,000 m in Australian waters, these species included *Brychionoe karenae* Hanley & Burke, 1991; *Eunoe abyssorum* McIntosh, 1885; *Eunoe ivantsovi* Averincev, 1978; *Eunoe papillaris* Averincev, 1978; *Harmothoe australis* Kirkegaard, 1995; *Lagisca torbeni* Kirkegaard, 1995; *Lepidasthenia australiensis* (Augener, 1927); *Parapolyeunoa flynni* (Benham, 1921); and *Polynoe ascidioides* McIntosh, 1885 (now considered a *nomen dubium*) (Gunton *et al*., 2021).

Commencing in 2013, sampling of benthic invertebrate fauna from bathyal and abyssal depths around Australia increased significantly. Sampling was conducted off the south coast of Australia in the Great Australian Bight (GAB) where six voyages were undertaken by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and partner organisations as part of the GAB Deepwater Marine Program – these voyages occurred between 2013–2017 at sample depths of 138–4,182 m (MacIntosh *et al*., 2018). In addition, the Research Vessel (RV) "Investigator" sampled off southeastern Australia in 2017 at depths of 932–4,800 m (O'Hara *et al*., 2020). A preliminary report on the Polynoidae from the 2017 RV "Investigator" voyage was provided by Gunton *et al*. (2021), however these new collections have not been the subject of a detailed systematic study. Off Australia's west coast (Indian Ocean) systematic benthic studies at depths greater than 1,000 m did not exist prior to 2020. Results from expeditions in 2021/2022 to the area have recently been published (O'Hara 2024), but are not included here, a preliminary report of annelid morphospecies recovered from the cruises is provided in Kupriyanova *et al*. (2024). The aims of the present study were to: 1) provide detailed morphological descriptions, and genetic data where possible, of all polynoid annelids from the bathyal-abyssal surveys of the years 2013–2018 reported on herein, and 2) describe new species where appropriate.

Materials and methods

Sample collection

The bathymetric scope of all samples reported here is ~1,000–4,000 m, consistent with O'Hara *et al*. (2020)'s, Australian deep-water faunal study, and all sampling was from bathyal-abyssal depths off the southern and eastern coasts of Australia. Locations of all bathyal-abyssal Polynoidae, both specimens described in the present study and those recorded in the literature, are shown in Figure 1.

The majority of the specimens were recovered from expeditions during the years 2015–2018, and full collection and locality details can be found in MacIntosh *et al*. (2018) for GAB collections, and O'Hara *et al*. (2020) for south-eastern Australian collections. Collecting methods included beam trawls, box cores, Brenke sledges, and a remotely operated vehicle (ROV) (MacIntosh *et al*., 2018; O'Hara *et al*., 2020). These voyages contributed data towards the management of Australia's system of Marine Parks, previously called Commonwealth Marine Reserves (CMR). Four voyages undertaken to southern seamounts from 1997–2018 have been included where polynoid material was available for examination: RV "Investigator" voyage IN2018-V06 (Williams *et al*., 2024), RV "Southern Surveyor" voyages SS01/2008 (CSIRO *et al*., 2018) and SS01/97 (CSIRO, 2018), and RV "Tangaroa" voyage TAN0308 (Anonymous, 2005). Collections at seamounts were made using the previously mentioned sampling methods and a robust epibenthic sled, the 'Sherman' (Lewis, 2009). At sea, annelid material was sorted on ice and fixed directly in 95% ethanol or 4% formalin.

All annelid specimens collected during the voyages were shipped to and deposited in the collections of the Australian Museum, Sydney (AM); South Australian Museum, Adelaide (non Polynoids); Museums Victoria (formerly National Museum of Victoria, NMV); Natural History Museum, London (NHMUK). Other material included in this study came from the National Museum of Natural History, Smithsonian Institution, Washington DC (USNM); Shirshov Institute of Oceanology, Moscow (IORAS); Zoological Institute, Russian Academy of Sciences, St. Petersburg (ZIN). Numbers listed in brackets in each of the species' "Material examined" sections refer to the number of specimens in that registered lot.

Morphological methods

Descriptions and comparisons between taxa were facilitated using the Delta (Descriptive Language for Taxonomy) suite of programs (Dallwitz & Paine, 2015) as implemented in Java as Open-Delta (Atlas of Living Australia 2014). Microscopy and photography of specimens held at NMV used a Canon® Mark 5D Mark II SLR and Visionary Digital P/L BK P-51 CamLift setup with multifocus images montaged using ZereneStacker (Zerene Systems LLC) software. Smaller specimens and dissected parts

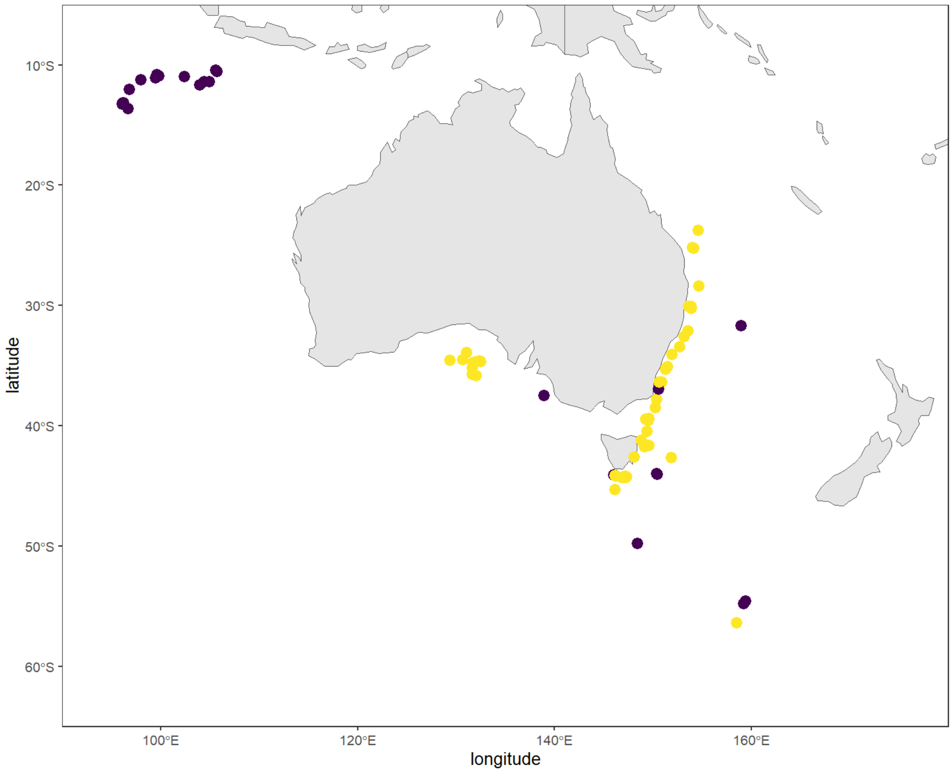

Figure 1. Locations of all Polynoidae from depths exceeding 1,000 m in the Australian region. Occurrences around subantarctic Macquarie Island are included, occurrences around New Zealand are excluded. Yellow dots – original material reported in this study; purple dots – material from previous publications.

were imaged using a Leica® M125 stereomicroscope and Flexcam C3 (Leica Microsystems). Specimens held in the AM were photographed using an Olympus SZX7 microscope fitted with a Michrome 20 Pro digital camera and using Capture 2.3 software (manual stacking); dissected parts were photographed using an Olympus BX53 compound microscope fitted with an Olympus DP74 digital camera and using CellSens Standard software.

A comprehensive review of morphological characters for the Polynoidae is beyond the scope of this study, however some explanation is required for structures where interpretations or terminology differs as follows.

Insertion of lateral antennae. Species within the family Polynoidae have the lateral antennae terminally located on the prostomium or else they are inserted on the ventral surface of the prostomium (in Arctonoinae, Macellicephalinae and Polynoinae as those subfamilies are currently understood) (Read & Fauchald, 2025). In the latter three subfamilies, two states are seen: lateral antennae insertion may either be ventral, or terminoventral. We followed Barnich *et al*. (2017) in distinguishing these states: 1) ventral insertion is where the lateral antennae are distinctly beneath the median antenna ceratophore and not easily seen in dorsal view (typically requiring refocus of microscope); 2) terminoventral insertion refers to the condition in which the ceratophores are visible either side of and only slightly ventral to the median antenna (typically not requiring microscope refocus). These conditions are illustrated in Barnich *et al*. (2017, fig. 1); and 3) the lateral antennae are inserted slightly dorsal to the median antenna ceratophore, apparently occurs only in *Capitulatinoe cupisetis* Hanley & Burke, 1989.

Auxiliary appendages. The auxiliary structures associated with the lateral antennae ceratophores in species of *Admetella* McIntosh, 1885 and *Bathyadmetella* Pettibone, 1967 are here referred to as auxiliary processes but have been called “thin flattened process” (McIntosh, 1885: 124), “antennal scales” (Pettibone, 1967: 2; Wu *et al*., 2024: 7), “leaf-shaped appendices” (Ditlevsen, 1917: 38), “frontal processes” (Ehlers, 1908: 41), “thin triangular processes” (Fauvel, 1932: 27), and “triangular antennular scales” (Levenstein, 1978: 78). They all refer to structures that lie between the lateral antennae bases and the base of the median ceratophore, and may be extended or contracted flap-like processes. They have been compared with the antennal scales occurring in Sigalioninae. We use the term “auxiliary processes” because scale is a widely used informal alternative to elytron in Polynoidae and other members of the suborder Aphroditiformia.

Facial tubercle. The upper lip of the families of Aphroditiformia families typically comprises longitudinal folds or ridges of which the three median ones are often raised or enlarged. A median raised tripartite ridge of this form is frequently termed a facial tubercle, for example in Hanley and Burke (1991), Bonifácio and Menot (2018), and inconsistently in some Pettibone (e.g. 1975, 1976, 1985) publications. This terminology is unfortunate because the tripartite form of the upper lip most commonly seen in Polynoidae is not tuberculate. However, distinctive modifications including obvious tubercles, but also papillae and other forms, do occur in some polynoid taxa (and also in other Aphroditiformia families). We use the term “facial tubercle” for raised tubercles, papillae or other shapes that are present between the upper lip and the anteroventral part of the prostomium, and have been referred to as such by some authors. Further confusion arises since some publications (e.g. Pettibone, 1991: 716; Britayev & Martin, 2006: 4088, 4090; Britayev *et al*., 2014: 30) simply state that the taxon has a "facial tubercle" and unless a figure accompanies the description it is unclear what structure is present. Here we do not consider longitudinal folds or ridges of the upper lip to be a facial tubercle although the median ridge may be raised or slightly inflated (perhaps as a preservation artefact or depending on the extent to which the pharynx is everted).

DNA extraction, amplification and sequencing

Tissue samples were taken from 45 ethanol-fixed Polynoidae specimens (Suppl. Table 1) at Museums Victoria (Melbourne) and the Australian Museum (Sydney). Genomic DNA was extracted using the Bioline Isolate II Genomic DNA kit according to the manufacturer's protocol. PCR amplification of two mitochondrial gene fragments (COI and 16S) and two nuclear gene fragments (18S and 28S) was conducted using the following primers, COI: polyLCO (GAYTATWTTCAACAAATCATAAAGATATTGG) and polyHCO (TAMACTTCWGGGTGACCAAARAATCA) (Carr *et al*., 2011), 16S: 16SarL (CGCCGTTTATCAAAAAC AT) and 16SbrH (CCGGTCTGAACTCAGATCACG) (Palumbi *et al*.. 1996), 28S: Po28F1 (TAAGCGGAGGAAAAGAAAC) and Po28R4 (GTTCACCATCTTTCGGGTCCCAAC) (Struck *et al*., 2006), 18S: Tim A (AMCTGGTTGATCCTGCCAG) and 1100R2 (CGGTATCTGATCGTCTTCGA) (Norén & Jondelius, 1999).

PCR conditions were as follows; COI: an initial denaturation step at 94°C for 1 min, 5 cycles at 94°C for 40 s, 45°C for 40 s, 72°C for 1 min, followed by 35 cycles at 94°C for 40 s, 51°C for 40 s, 72°C for 1 min, with a final extension step at 72°C for 5 min. 16S: an initial denaturation step at 94°C for 3 min, 35 cycles at 94°C for 30 s, 50°C for 30 s, 72°C for 1 min 30 s, with a final extension step at 72°C for 7 min. 18S: an initial denaturation step at 94°C for 3 min 30 s, 40 cycles at 94°C for 30 s, 50°C for 30 s, 72°C for 1 min, with a final extension step at 72°C for 7 min. 28S: an initial denaturation step at 96°C for 4 min, 45 cycles at 94°C for 30 s, 48°C for 30 s, 72°C for 1 min, with a final extension step at 72°C for 4 min. PCR success was detected using gel electrophoresis (1 % agarose gel stained with GelRed® (Biotium TM, San Francisco)) and visualised using a Bio-Rad XR+ Gel Documentation System. Successful PCR products were sent to Macrogen TM, South Korea where they were purified and standard Sanger sequencing was performed.

Sequence Analysis

Overlapping fragments were assembled into consensus sequences and edited using Geneious Prime ® 2024.0.5 (https://www.geneious.com). A BLAST search (Altschul *et al*., 1990) in the GenBank database (https://blast.ncbi.nlm.nih.gov/Blast.cgi) was used to confirm the correct gene regions had been amplified and to check for contamination. New sequences were submitted to GenBank (Suppl. Table 1).

Available COI, 16S, 18S and 28S sequences of species of Polynoidae were downloaded from GenBank; these included 99 terminal taxa (Suppl. Table 1). The outgroup was chosen based on Norlinder *et al*. (2012), and represented by *Laetmonice murrayae* AM W.51581 (Family Aphroditidae) (Suppl. Table 1). Sequences for each gene fragment were aligned using the Geneious Prime plugin, MAFFT 7.0 (Katoh & Standley, 2013). A pairwise genetic distance matrix of the COI sequences was constructed in MEGA 11 (Tamura *et al*. 2021).

A concatenated data set for all four gene fragments (COI, 16S, 18S and 28S) was created in Geneious. Jmodel Test (Darriba *et al*., 2012) was used to find the best model using the Akaike information criteria, the models selected were as follows COI: TPM2uf+I+G, 16S: HKY+G, 18S: TIM2+I+G, 28S: GTR+I+G. Phylogenetic relationships were inferred using both Maximum Likelihood analysis in W-IQ-TREE (Trifinopoulos *et al*., 2016) and Bayesian inference in MrBayes 3.2.7a (Ronquist *et al*., 2012) using the CIPRES Science Gateway (Miller *et al.,* 2010). Maximum Likelihood trees were constructed using 10,000 bootstrap alignments and the Shimodaira–Hasegawa approximate likelihood-ratio test (SH-aLRT) conducted and Ultrafast Bootstrap (UFBoot) values computed. For the Bayesian analysis the TPM2uf and TIM2 substitution models (not supported by MrBayes) for the COI and 18S gene fragments were replaced by the more complex GTR model (Huelsenbeck & Rannala, 2004). The analysis was run for 10,000,000 generations, until the standard deviation of split frequencies was below 0.01 and potential scale reduction factor (PSRF) was 1.0 for all parameters, the first 25% of the generations were discarded as burn-in.

Trees were visualised using Figtree version 1.4.4 (Rambaut, 2018) and edited in Adobe Illustrator.

Results

Molecular analysis

Maximum likelihood analysis and Bayesian inference of the combined dataset of COI, 16S, 18S and 28S gene fragments resulted in trees with similar topologies (Figs 2–3). The Bayesian analysis resulted in a strongly supported clade of Polynoidae (posterior probability (pp) 1).

Three subfamilies within Polynoidae were recovered as monophyletic with high support, these included Polynoinae (pp 0.97, SH-aLRT:100%, UFBoot: 100%), Admetellinae (pp 1, SH-aLRT:100%, UFBoot:100%), and Macellicephalinae (pp 1, SH-aLRT:99.3%, UFBoot:99%). Note that Eulagiscinae was represented by a single specimen from a single taxon (*Bathymoorea lucasi*). Here, Eulagiscinae was recovered as sister to the Macellicephalinae clade with low support (pp 0.82, SH-aLRT:65.2%, UFBoot:41%).

Within the subfamily Macellicephalinae, species belonging to the tribe Lepidonotopodini (*Branchinotogluma-Branchipolynoe-Cladopolynoe-Bathykurila-Levensteiniella*) were recovered as a monophyletic group with strong support (pp 1, SH-aLRT:99.3%, UFBoot:99%). The species *Polaruschakov investigatoris* sp. nov. was genetically distinct from all other Macellicephalinae species, furthermore all species attributed to the genus *Polaruschakov* (*P. investigatoris* sp. nov., *P. omnesae* and *P. lamellae*) formed a well-supported monophyletic clade (pp 0.98, SH-aLRT:86.7%, UFBoot:99%). The two new species of *Bruunilla* (*B. magnantennata* sp. nov., and *B. posteroantennata* sp. nov.) were genetically distinct from all other species of Macellicephalinae and fell within a well-supported clade of all species attributed to the genus *Bruunilla* (pp 1, SH-aLRT:99.6%, UFBoot:100%).

In the Maximum Likelihood analysis, the Macellicephalinae-Eulagiscinae clade was recovered as sister group to a clade containing *Ceuthonoe nezhai* and *Alentiana palinpoda* (SH-aLRT:84.9%, UFBoot:49%). The Macellicephalinae-Eulagiscinae-*Ceuthonoe-Alentiana* group was sister to a large Admetellinae-Polynoinae-*Anotochaetonoe* clade (SH-aLRT:95%, UFBoot:91%). Conversely, in the Bayesian analysis, *Alentiana*-Admetellinae-*Anotochaetonoe-Ceuthonoe*-Lepidasthenia-Polynoinae-Eulagiscinae - Macellicephalinae terminals formed an unresolved five-way polytomy (pp 0.84). Thus, the position of the new species, *Anotochaetonoe rubermaculata* sp. nov., (subfamily Lepidastheniinae), within the Polynoidae differed between the two analyses. In both analyses the new species was genetically distinct from all other taxa.

Within the Polynoinae clade, the four *Eunoe* species described in the present study were recovered as individual monophyletic groups and genetically distinct from all other species, *Eunoe albacauda* sp. nov., (pp 0.99, SH-aLRT:87.7%, UFBoot:96%), *E. benhami* sp. nov., (pp 1, SH-aLRT:99.3%, UFBoot:100%), *E. danmurrayi* sp. nov., (pp 1, SH-aLRT:99.8%, UFBoot:100%) and *E. apicolata* sp. nov., (pp 1, SH-aLRT:88.6%, UFBoot:100%). However, species attributed to the genus *Eunoe* were recovered as polyphyletic.

Sister to the Polynoinae (*Austrolaenilla-Neopolynoe-Malmgrenia-Eunoe-Neopolynoe-Harmothoe-Polyeunoa-Robertianella-Malmgreniella-Bylgides*) was the taxon *Lepidasthenia elegans* (subfamily Lepidastheniinae) supported by high posterior probability and bootstrap values (pp 0.97; SH-aLRT:99.2%, UFBoot:99%). Four species *Lepidasthenia bowerbanki, L. cristatus, L. squamatus* (subfamily Lepidonotinae) and *Lepidasthenia berkleyae* (subfamily Lepidastheniinae) were recovered as basal to all other polynoids.

The COI interspecific genetic distances within Polynoidae ranged between 0.035 (between taxa *Harmothoe torbeni* comb. nov., NMV F271071 and *Harmothoe longipalpa* comb. nov., AM W.51464) to 0.346 (*Levensteiniella undomarginata* and *Bathypolaria* sp. 66) (Murray *et al*., 2025, Suppl. Table 2). The COI intraspecific pairwise genetic distances within *Eunoe albacauda* sp. nov., ranged from 0.000 to 0.003, *E. apicolata* sp. nov., 0.008, *E. benhami* sp. nov., 0.002 to 0.008, *E. danmurrayi* sp. nov., 0.002, and *Harmothoe torbeni* comb. nov., 0.000 to 0.009. *Eunoe albacauda* sp. nov., sequences were most similar to *Neopolynoe acanellae* (uncorrected COI p-distances 0.010 to 0.014, see Murray *et al*., 2025, Suppl. Table 2).

Systematic account

This study revealed the presence of 21 accepted species of bathyal to abyssal Polynoidae from Australian waters, based on the material reported in this study and previous literature. An additional 11 incompletely identified operational taxonomic units (OTUs) were represented by incomplete material. These taxa are treated in the Systematic Account below and are summarised in Table 1.

Order Phyllodocida Dales, 1962

Suborder Aphroditiformia Levinsen, 1883

Family Polynoidae Kinberg, 1856

Subfamily Admetellinae Uschakov, 1977

Admetella McIntosh, 1885

Admetella McIntosh, 1885: 124–125.

Type species. *Admetella longipedata* (McIntosh, 1885).

Diagnosis. Body 49–82 segments. Cephalic peaks absent. Paired auxiliary processes present at the base of the lateral antennae ceratophores: short and subtriangular, or long, digitiform structures. Tentacular sheaths absent. Elytra 19–31 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution on every third segment after segment 23. Notopodia with elongate acicular lobe. Neurochaetae and notochaetae long, flattened, transparent with faint spinous rows. Neurochaetae tips simple, entire. Nephridial papillae on ventral bases of parapodia starting from segments 3–11, small, tapered, or ovate.

Remarks. *Admetella* McIntosh, 1885, together with the *Bathyadmetella* Pettibone, 1967, are the only two genera of the subfamily Admetellinae. These are the only Polynoidae genera with auxiliary processes at the base of the lateral antennae ceratophores; in *Admetella* they can be either short, triangular and scale-like or long, digitiform structures, whereas in the genus *Bathyadmetella* (not recorded in this study) the auxiliary appendages are present both at the base of the lateral antennae ceratophores as well as in the form of long tentacular sheaths (Wu *et al*., 2024:17). Seven nominal species of *Admetella* are currently recognised; they are not commonly collected but occur widely in the Indian, Pacific and Atlantic Oceans at depths of 400–6,000 m (Read & Fauchald, 2025). The diagnosis above is based on Pettibone (1967), but has been recently revised by Wu *et al*. (2024) who also included nephridial papillae in the diagnostic criteria.

Admetella sp.

Fig. 4

Material examined. AM W.51461 (1), AM W.54908 (1), AM W.54909 (2), all from Australia, East Gippsland CMR, IN2017_V03_035, 37° 47.52'S, 150° 22.92'E – 37° 49.068'S, 150° 21.18'E, CSIRO Beam Trawl, 2,338–2,581 m, 25 May 2017.

Description. Three incomplete specimens with size range 26–60 mm long, 3.5–12 mm wide, for 30–57 segments. One complete specimen 75 mm long, 8 mm wide (excluding parapodia) with 64 segments. All specimens damaged, poorly preserved.

Pharynx dark purple, preserved specimens otherwise unpigmented (Fig. 4A). Cephalic peaks absent. Eyes absent, or lacking pigment, as staining with methyl-blue showing some presence (Fig. 4A). Median antenna dorsal. Lateral antennae prostomial location terminal, continuous with

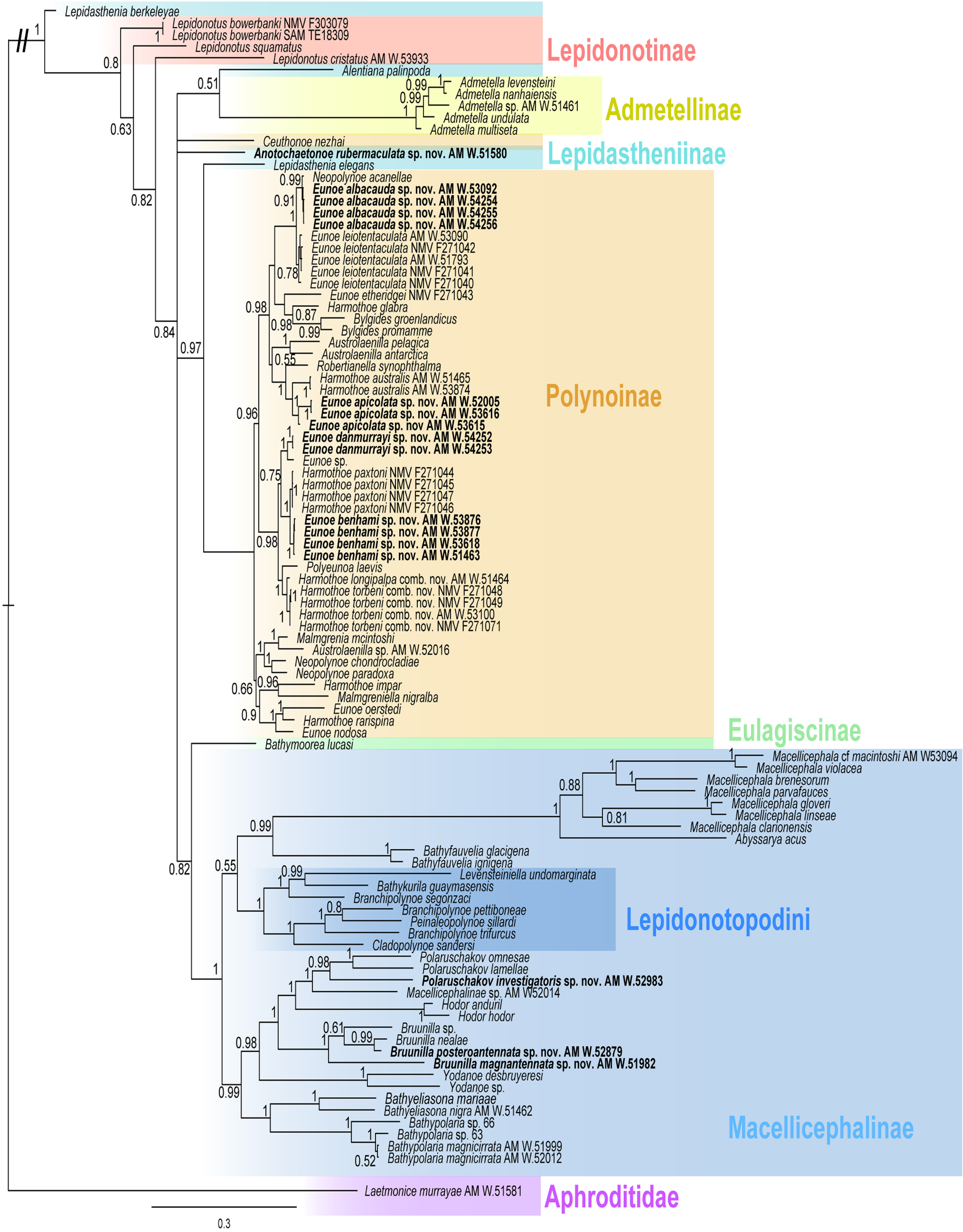

Figure 2. Phylogeny of family Polynoidae obtained from Bayesian analysis of combined dataset of COI, 16S, 18S and 28S constructed using MrBayes run for 10,000,000 generations. Node labels show posterior probabilities. Scale bar represents 0.3 substitutions per site. New species highlighted in bold. Polynoidae subfamilies highlighted with coloured boxes, Admetellinae- yellow, Eulagiscinae – green, Lepidastheniinae – turquoise, Lepidonotinae – red, Macellicephalinae – blue (tribe Lepidonotopodini – dark blue), Polynoinae – orange, and family Aphroditidae – purple.

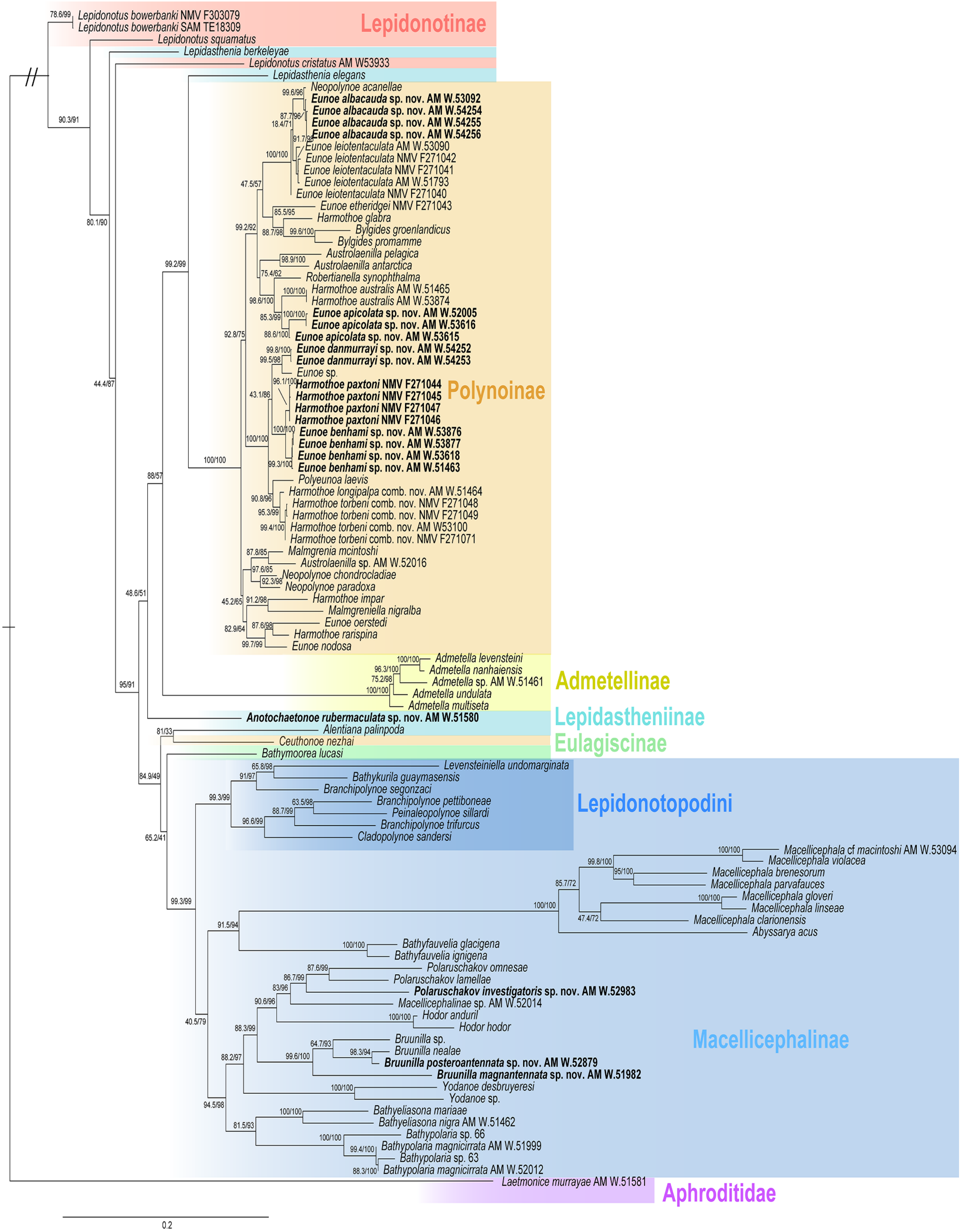

Figure 3. Phylogeny of family Polynoidae obtained from Maximum Likelihood analysis using combined dataset of COI, 16S, 18S and 28S constructed using W-IQ-TREE, with 10,000 bootstrap alignments. Numbers in parentheses indicate SH-aLRT/ UFBoot. Scale bar represents 0.2 substitutions per site. New species highlighted in bold. Polynoidae subfamilies highlighted with coloured boxes, Admetellinae- yellow, Eulagiscinae – green, Lepidastheniinae – turquoise, Lepidonotinae – red, Macellicephalinae – blue (tribe Lepidonotopodini – dark blue), Polynoinae – orange, and family Aphroditidae – purple.

Table 1. Polynoidae reported in the present study.*Australian Records.

Taxon	Depth range (m)*	Global Distribution	Sources*
Admetellinae			
Admetella sp.	402–6,207	Atlantic, Pacific, Southern Oceans	this study
Arctonoinae			
Parabathynoe cf., *brisinga* Pettibone, 1990	1,388	Northern Pacific Ocean, Southern (Subantarctic) Ocean	this study
Parahololepidella mensa sp. nov.	1,375–1,393	Great Australian Bight	this study
Lepidastheniinae			
Anotochaetonoe rubermaculata sp. nov.	99–1,365	Southwestern/ southeastern Australia, Great Australian Bight	this study
Lepidonotinae			
Hololepida sp.	900–1,550	Tasman Sea, southeast Australian seamounts	this study
Macellicephalinae			
Bathybahamas sp.	4,150–4,170	Bass Strait, southeastern Australia	this study
Bathyedithia sp. 1	4,031	Off New South Wales, southeastern Australia	this study
Bathyeliasona nigra (Hartman, 1967)	3,980–4,744	Indian, south Atlantic, Antarctic South Pacific and Southern Oceans	this study
cf. *Bathyfauvelia* sp.	2,247–4,031	Southwest Pacific Ocean (Eastern Australia)	this study
Bathypolaria magnicirrata (Neal, Barnich, Wiklund & Glover, 2012)	2,694–4,010	South Pacific Ocean, Antarctic Ocean	this study
Bruunilla magnantennata sp. nov.	4,005–4,010	Southeastern Pacific Ocean (off Queensland)	this study
Bruunilla posteroantennata sp. nov	2,093–4,031	Coral Sea, southeastern Australia	this study
Macellicephala cf. *macintoshi*	1,051	Off Tasmania, southeastern Australia	this study
Macellicephala spp.	2,247–2,835	Eastern Australia	this study
Polaruschakov investigatoris sp. nov.	4,005–4,010	Eastern Australia (Queensland)	this study
Macellicephalinae gen. *incertae sedis* sp.	4,150–4,170	Bass Strait, Southeastern Australia	this study
Polynoinae			
Austrolaenilla sp.	2,751–4,744	Southeastern Australia	this study
Eunoe albacauda sp. nov.	1,202–1,223	Southern Australia (Tasmania)	this study
Eunoe apicolata sp. nov.	2,665–4,197	Southeastern Australia	this study
Eunoe benhami sp. nov.	595–2,760	Antarctica, Southern Ocean, southeastern Australia	this study
Eunoe danmurrayi sp. nov.	1,202–1,220	Southern Pacific Ocean (Tasmania)	this study
Eunoe leiotentaculata Averincev, 1978	549–1,371	South Pacific Ocean, Southern Ocean	Averincev, 1978; this study
Eunoe sp.	965–1,077	Southern Ocean (Great Australian Bight)	this study
Harmothoe australis Kirkegaard, 1995	913–4,035	South Pacific Ocean, Southern Ocean	Kirkegaard, 1995; this study
Harmothoe longipalpa (Kirkegaard, 1995) comb. nov.	2,692–4,052	South Pacific Ocean (Australia, New Zealand)	Kirkegaard, 1995; this study
Harmothoe paxtoni	1,168–1,820	Southern Ocean – Subantarctic, Australia	Averincev, 1978; this study
Harmothoe torbeni Kirkegaard, 1995 comb. nov.	610–1,342	Southern Ocean (southern Australia, New Zealand)	(Kirkegaard, 1995); this study
Kermadecella magnipalpa (McIntosh, 1885)	153–2,925	South Pacific Ocean	this study
Malmgrenia sp. 1	800–2,213	Southern Ocean, southwest Pacific (southeastern Australia)	this study
Malmgrenia sp. 2	965–1,483	Southern Ocean (Great Australian Bight)	this study
Polyeunoa monroi Averincev, 1978	200–1,223	Southern Ocean (Tasmania, New Zealand, Macquarie Is)	Averincev, 1978, this study
Parapolyeunoa flynni (Benham, 1921)	2,377	Southeastern Australia (southwest Pacific Ocean, Tasmania)	Benham, 1921, this study

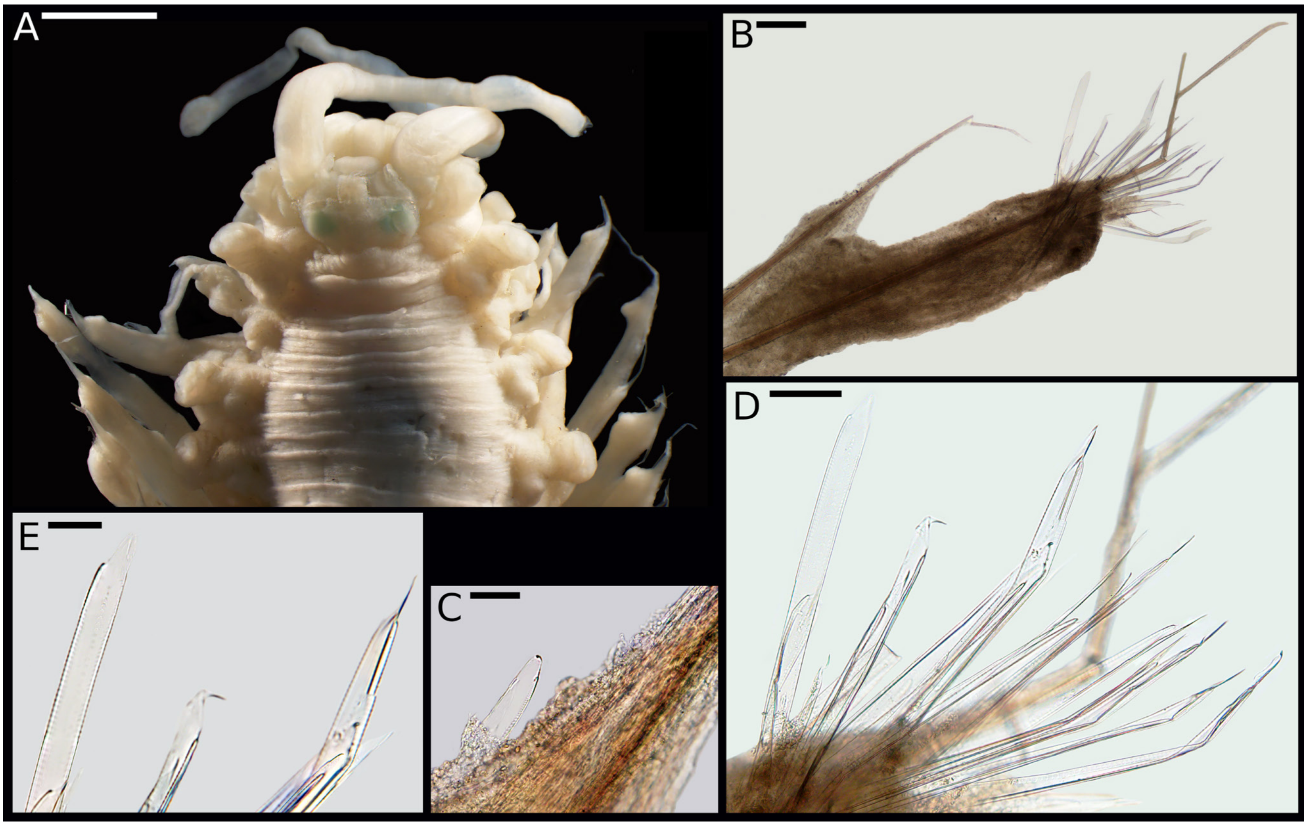

Figure 4. *Admetella* sp., specimen AM W.51461: (A) dorsal view, anterior end with prostomium (showing residual methyl blue staining), lateral antennae and auxiliary antennal processes missing, scale bar is 2 mm; (B) parapodium segment 14 (right side), scale bar is 200 µm; (C) notochaeta segment 14, scale bar is 50 µm; (D) neurochaetae segment 14, scale bar is 100 µm; (E) neurochaetae detail, scale bar is 50 µm.

lateral margin of prostomium. Lateral antennae ceratostyles without papillae. Auxiliary processes (antennal scales) missing from lateral antennae ceratophores due to damage, but vestiges present. Tentaculophores without chaetae, with small pointed acicular lobe between large tentaculophores. Buccal cirri elongate, as long as tentacular cirri; thereafter much shorter than neuropodia. Nuchal fold present.

Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped, cutting edge smooth. Pharynx barrel-shaped without distinct ornamentation, with 21 pairs of terminal papillae, all of which similar. Bulbous facial tubercle present. Upper lip trilobed, ridged (Fig. 4A).

Elytra 25 pairs, missing from all specimens; elytrophores on segments 2, 4, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, and then on every 3rd segment: 26, 29, 32, 35, 38, 41, 44, 47, 50, 53, 56, 59, 62. Dorsal tubercles present on all cirrigerous segments, ridge-like. Nephridial papillae distinct, at least on some median segments, first visible on segment 5, small, elongate.

Aciculae of notopodia and neuropodia do not project clear of epidermis. Dorsal cirri styles smooth. Parapodia sub-biramous, with elongate notopodial and neuropodial lobes, notopodia shorter than neuropodia. Neuropodial prechaetal acicular lobe distally elongate, tapering (Fig. 4B). Neuropodial prechaetal supra-acicular process absent, sub-acicular process present.

Notochaetae present but most missing/broken, similar in form but more slender than neurochaetae. Notochaetae flattened laterally with faint spinous rows along margins, tips short, blunt (Fig. 4C). Neurochaetae tips simple, entire (Fig. 4D–E). Neurochaetae numerous, flattened iridescent transparent with pointed bare tips and faint spinous rows down both margins, tips short, often split laterally, appearing flattened and furcate, and divided into two short triangular flaps.

Distribution and ecology. The four specimens of *Admetella* sp. reported here were collected from off south-eastern Australia at a depth of 2,338–2,581 m.

Remarks. Our specimens are referred to *Admetella* even though the prostomiums are damaged and the paired antennal auxiliary processes are missing (though vestiges remain), since this is the only long-bodied Polynoidae genus in which the median antenna ceratophore is dorsally located on the prostomium and lateral antennae ceratophores are continuous with the lateral margins of the prostomium, as well as possessing notochaetae. *Bathyadmetella* Pettibone, 1967 is also similar to *Admetella* but lacks notochaetae, and possesses paired elongate antennal sheaths as well as paired elongate tentacular sheaths dorsal to lateral antennae which *Admetella* species lack. *Bathynoe* Ditlevsen, 1917, a genus of the subfamily Arctonoinae, is similar in respect of the position of the antennal ceratophores but lacks the paired auxiliary appendages on segment 1, is short-bodied, and has conspicuous mid-dorsal tubercles on each segment.

The specimens were badly damaged but resemble most closely *Admetella longipedata* (McIntosh, 1885) originally described from off Prince Edward Island, Antarctic Ocean in 2,515 m depth. *Admetella longipedata* is recorded widely in the Pacific, Atlantic and Southern Oceans at depths of

402–6,207 m.

Pettibone (1967) synonymised two species of *Admetella* described by Chamberlin (1919) – *A. hastigerens* and *A. dolichopus* – with *A. longipedata* (McIntosh, 1885) and redescribed the latter species from specimens collected not from the type locality, but from Hawaii, Philippine Islands, and Baja California and which had originally been identified as *A. hastigerens*, *A. dolichopus* and *Polynoe mirabilis sensu* Treadwell (1906); but it is unclear which specimens Pettibone was referring to in her re-description of *A. longipedata*. Fauchald (1972) subsequently resurrected *A. hastigerens* by reason of the absence of chaetae on the tentaculophores which he states are present in *A. longipedata* and refers to McIntosh's (1885, fig. 5, plate 14) figure; however, there are no chaetae visible on segment 1 in this figure of the dorsal view of the anterior end of *A. longipedata*, nor is there any mention of their presence in McIntosh's description. Type specimens of *A. hastigerens* (and *A. dolichopus*) both lack notochaetae (or all missing) as reported in their original descriptions by Chamberlin, as is the case in *A. longipedata* syntypes according to McIntosh (1885: 125): "in no instances are any traces of [dorsal] bristles visible". However, in Pettibone's (1967) subsequent redescription of specimens far from the type locality of *A. longipedata* she reports the presence of notochaetae, which our specimens from off southern Australia also possess. Uschakov (1982) also reported *A. longipedata* specimens from the Kuril-Kamchatka Trench as possessing notochaetae similar to those found in Pettibone's specimens and ours. As the type locality for *A. hastigerens* is Panama (off Coiba Island) in 1,063 m depth, and that of *A. longipedata* is east of Prince Edward Island, Antarctic Indian Ocean in 2,515 m depth, the two widely geographically distant locations suggest the possibility of two different species. The records of *A. longipedata* from the Andaman Sea, Pater Noster Island, Indian Ocean and West Indies by Fauvel (1953) are possibly incorrect, so that such specimens in the USNM, identified by Pettibone (1967), would need to be re-examined to establish their true identity. Fauchald and Wilson (2024) examined *A. longipedata* material in 2001, but since Fauchald's subsequent notes and description also refer to non-type specimens from Hawaii deposited in the USNM (i.e. not from the type locality), this may not be a useful description to distinguish the species. The two syntypes are described by McIntosh (1885: 124–125) as "upwards of sixty segments in the one and fifty in the other" and "all the scales are absent, but twenty-four pairs seem to have been present".

Recently, four new species of *Admetella* were described from seamounts in the tropical western Pacific Ocean by Wu *et al*. (2024) and our specimen is genetically distinct from these species (Figs 2–3).

Subfamily Arctonoinae Hanley, 1989

Parabathynoe Pettibone, 1990

Type species. *Parabathynoe brisinga* Pettibone, 1990.

Diagnosis. Body up to 47 segments. Cephalic peaks absent. Eyes present. Median antenna ceratostyle elongate, with subdistal inflated region and slender tip, smooth. Lateral antennae prostomial location ventral to and separate from prostomium; inserted ventrally, distinctly beneath level of median antenna; ceratophores basally separated, not touching; ceratostyles without papillae. Tentaculophores without chaetae. Tentacular cirri elongate, with sharply narrowed tips; without papillae. Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped. Pharynx with nine pairs of terminal papillae, terminal papillae all similar. Upper lip with raised median ridge, facial tubercle absent. Elytra up to 18 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution on every third segment after segment 23. Last elytra on segment 47. Elytra covering body completely. Elytra surface ornamented with conical microtubercles and surface papillae. Dorsal tubercles present on all cirrigerous segments. Ventral cirri lacking, except on segment 2. Neuropodia distally with dense papillae. Dorsal cirri styles elongate, with sharply narrowed tips; densely papillated on one side. Neuropodial prechaetal (acicular) lobe distal shape rounded. Neuropodial prechaetal supra-acicular process absent. Neuropodial postchaetal lobe distally entire. Notochaetae distinctly thicker than neurochaetae. Notochaetae dorsal orientation mainly or wholly dorso-lateral projections from notopodia. Notochaetal spines flattened and knife-like in cross-section, usually with serrations along convex margin. Notochaetae ornamented with faint rows of serrations. Neurochaetae ornamented. Neurochaetae tips simple, entire and bidentate, furcate, indented or notched; short points. Neurochaetae with bidentate tips present. Anus terminal.

Remarks. The diagnosis above is based on Pettibone (1990). *Parabathynoe* is the only genus of Polynoidae in which the lateral antennae are ventrally inserted, nuchal flap absent, and with papillated ventrum.

Parabathynoe brisinga Pettibone, 1990

Fig. 5

Parabathynoe brisinga Pettibone, 1990: 831, figs 4–5.

Material examined. NMV F242592 (1), NMV F242548 (1), Australia, South Australia, GAB, VSM02SZ site A, RE2017_C01 VSM02_069, 34° 47.846'S, 131° 45.402'E, ROV, 1,338 m, 17 March 2017.

Description. Both specimens in poor condition, 41 segments, 2 mm wide, length range 8–10 mm. Body unpigmented (Fig. 5A). Cephalic peaks absent (Fig. 5B). Eyes present, separated by at least one eye-diameter; anterior and posterior eyes on each side touching each other but distinct. Anterior eyes located in front of widest part of prostomium, orientation dorso-lateral. Posterior eyes located near posterior margin of prostomium, orientation postero-lateral, pigment faded in posterior pair. Median antenna ceratostyle elongate, with subdistal inflated region and slender tip, smooth. Lateral antennae inserted ventrally, distinctly beneath level of median antenna; ceratophores basally separated, not touching. Lateral antennae ceratostyles short, subulate to conical; smooth. Tentaculophores without chaetae, but with tip of acicula visible. Tentacular cirri elongate, with sharply narrowed tips, smooth.

Pharynx jaws and pharynx not observed, specimens too damaged and fragile to dissect. Facial tubercle absent, upper lip with raised median ridge.

Elytrophores 17 pairs; on segments 2, 4, 5 then every

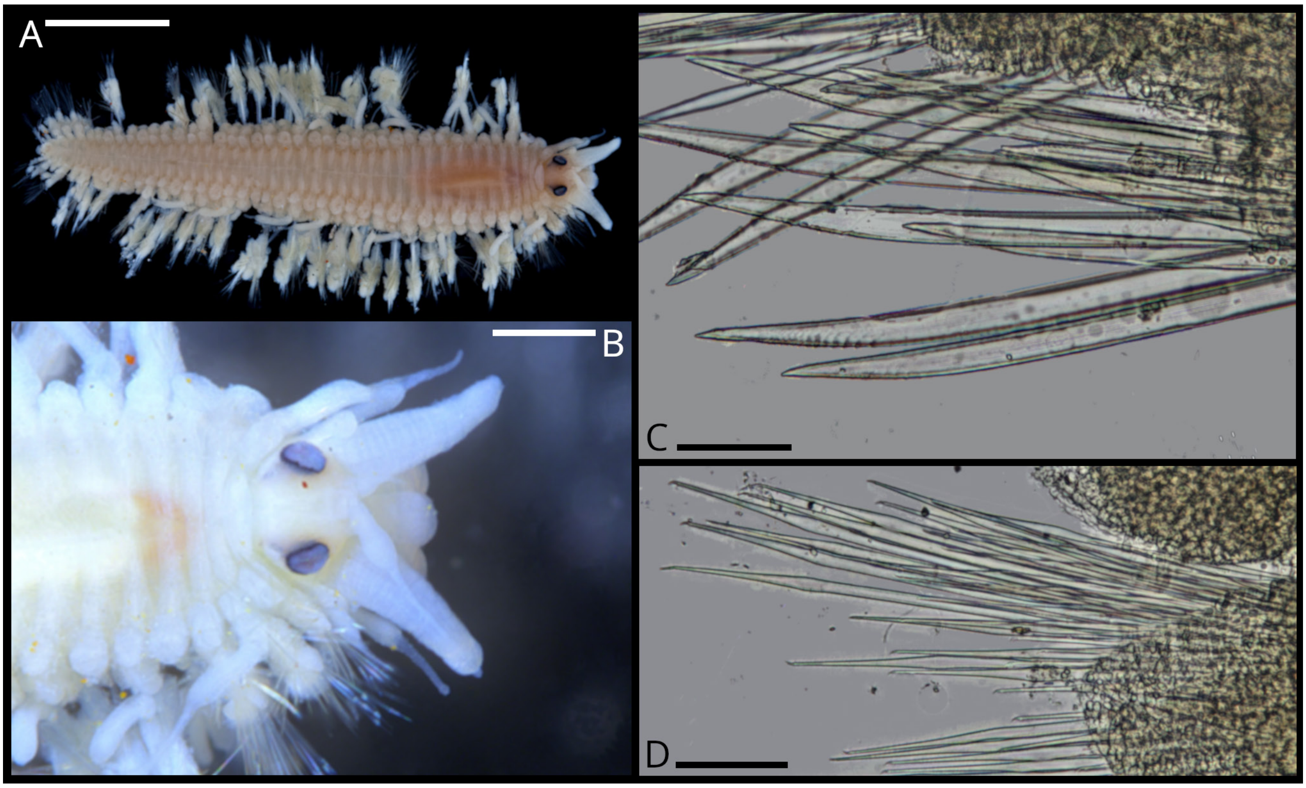

Figure 5. *Parabathynoe brisinga* Pettibone, 1990, specimen NMV F24592: (A) whole body dorsal view, scale bar is 2 mm; (B) prostomium, scale bar is 0.5 mm; (C) notochaetae, scale bar is 100 µm; (D) neurochaetae, scale bar is 100 µm.

second segment, distribution changing posteriorly; distribution on every third segment after segment 23. Last elytrophore on segment 37. Elytra missing from both specimens. Dorsal tubercles present on all cirrigerous segments, nodular. Ventral cirri absent except on segment 2.

Parapodia ventrally with 2 pairs of large round papillae per segment and numerous small papillae. Neuropodia distally with dense papillae. Aciculae of notopodia and neuropodia do not project clear of epidermis. Dorsal cirri styles elongate, with sharply narrowed tips, papillated, more densely papillated on one side.

Neuropodial prechaetal (acicular) lobe distal shape rounded, postchaetal lobe distally entire. Neuropodial prechaetal supra-acicular process absent. Notochaetae distinctly thicker than neurochaetae. Notochaetae dorsal orientation mainly or wholly dorso-lateral projections from notopodia. Notochaetae flattened and knife-like in cross-section, usually with serrations along convex margin (Fig. 5C). Neurochaetae faintly ornamented, with simple and bidentate tips both present (Fig. 5D).

Pygidium terminal. Anus terminal; opening on pygidium posterior to last pair of parapodia.

Distribution and ecology. Southern Ocean - Subantarctic, 1,388 m; Northern Pacific Ocean, 3,356 m. Ecology: commensal, host Echinodermata, brisingid seastar.

Remarks. Both specimens of *Parabathynoe brisinga* Pettibone, 1990 are badly damaged and being formalin-fixed could not be used to generate molecular data. Ventral cirri and parapodial structures are visible on specimen NMV F242592 but not on specimen NMV F242548. The only observable difference between our material and *Parabathynoe brisinga* described by Pettibone (1990) is that our material has 41 segments and 17 pairs of elytrophores compared with 47 segments and 18 pairs of elytrophores seen by Pettibone; this difference is probably due to the smaller size of our specimens (8 –10 mm long compared with Pettibone's (1990) 18 mm holotype). The description and images of chaetae given here are more detailed than those provided by Pettibone (1990).

Parahololepidella Pettibone, 1969

Antipathipolyeunoa Pettibone, 1991: 715–716.

Type species. *Parahololepidella greeffi* (Augener, 1918).

Diagnosis. Body 82–140 segments (or more). Cephalic peaks absent or present. Eyes present. Lateral antennae prostomial location ventral to and separate from prostomium; inserted terminoventrally, almost at same level as median antenna. Tentaculophores with chaetae.

Facial tubercle present as a distinctly conical structure, or absent. Elytra 40–67 pairs; on segments 2, 4, 5 then every second segment to segment 23 then on every third segment until segment 32, then on segment 33 and every second segment. Elytra small, covering parapodia only, surface smooth or with microtubercles. Dorsal tubercles absent (or indistinct). Nephridial papillae distinct, at least on some median segments. Aciculae of notopodia and neuropodia do not project clear of epidermis. Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering (but not very long). Neuropodial prechaetal supra-acicular process absent. Neuropodial sub-acicular process present. Notochaetae thinner than neurochaetae (but still thick). Tips of notochaetal spines with short points. Simple neurochaetae with capillary tips absent. Neurochaetae ornamentation in the form of spines in distinct transverse rows. Neurochaetae tips simple, entire, blunt. Neurochaetae with bidentate tips absent (modified after Pettibone, 1969).

Remarks. The description above is based on Pettibone (1969) but with facial tubercle variability introduced to accommodate *Parahololepidella mensa* sp. nov. *Antipathipolyeunoa* Pettibone, 1991 was synonymised with *Parahololepidella* Pettibone, 1969 by Gonzalez *et al.* (2023b). Besides the characters discussed by Gonzalez *et al.* (2023b) (variable presence of chaetae on the tentacular segment, irregular elytral distribution on posterior segments), species of *Parahololepidella* also differ in respect of the facial tubercle, which is absent in *P. mensa* sp. nov., while a raised facial tubercle is present in both *P. greeffi* (Augener, 1918) and *P. nuttingi* (Pettibone, 1991). *Parahololepidella* now comprises three species, including *P. mensa* sp. nov., described below from the Great Australian Bight in the Southern Ocean and *P. nuttingi* (Pettibone, 1991) from the North Atlantic. Serpetti *et al.* (2017) reported material of *Antipathipolyeunoa* from the Indian Ocean which presumably represents another species of *Parahololepidella* but they did not describe a new species. Species of *Parahololepidella* are associated with antipatharian corals, being found in hollow tubes in the main stems of the coral host (Pettibone 1991; Britayev *et al.*, 2013; Gonzalez *et al.*, 2023b).

The generic diagnosis here records that elytra may be smooth or with microtubercles (*P. mensa* sp. nov., has elytra with microtubercles whereas *P. greeffi* and *P. nuttingi* have smooth elytra) and also that the facial tubercle may be present or absent.

Only two long-bodied genera of Polynoidae have a neuropodial sub-acicular process and numerous pairs of elytra: *Parahololepidella* and *Acholoe* Claparède, 1870. *Acholoe* differs from *Parahololepidella* in having large elytra that cover the dorsum, and in having a supra-acicular process, which is absent in *Parahololepidella*. The three known species of *Parahololepidella* now known are compared in Table 2.

Parahololepidella mensa sp. nov.

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Fig. 6

Arctonoinae sp. 1 [GAB].–MacIntosh *et al.*, 2018; Supp. Appendix II.

Holotype: NMV F242581 Australia: GAB, VSM02SZ site A, RE2017_C01 VSM02_014, 34° 47.949'S, 131° 45.327'E, ROV, 1,393 m, 17 March 2017. **Paratype:** NMV F242582 (1) same data as holotype.

Non-type material. NMV F242583 (4) Australia: GAB, VSM02SZ site A, RE2017_C01 VSM02_037, 34° 47.876'S, 131° 45.342'E, ROV, 1,375 m, 17 March 2017.

Diagnosis. *Parahololepidella mensa* sp. nov. can be distinguished from the other two species in the genus (*P. greeffi* and *P. nuttingi*) by the location of the cephalic peaks in middle of anterior margin, the absence of a facial tubercle and the absence of chaetae on the tentacular segment.

Table 2. Comparison of species of *Parahololepidella* Pettibone, 1969.

Species	Reference	Cephalic peaks insertion	Tentaculophores	Facial tubercle	Dorsal ciliary bands	Elytral ornamentation	Ventral cirri insertion	Neurochaetae
P. greeffi (Augener, 1918)	Britayev *et al.*, 2014	Middle of anterior margin	With chaetae	Present	Absent	Smooth	Near middle of neuropodia	Unidentate and bidentate
P. nuttingi (Pettibone, 1991)	Gonzalez *et al.*, 2023b Pettibone, 1991	Lateral on anterior margin	With chaetae	Present	Present	Smooth	Basally on neuropodia	Unidentate and some with small tooth-like protruberance
P. mensa sp. nov.	This paper	Middle of anterior margin	Achaetous	Absent	Present	Microtubercles and fringe of papillae	Basally on neuropodia	All unidentate

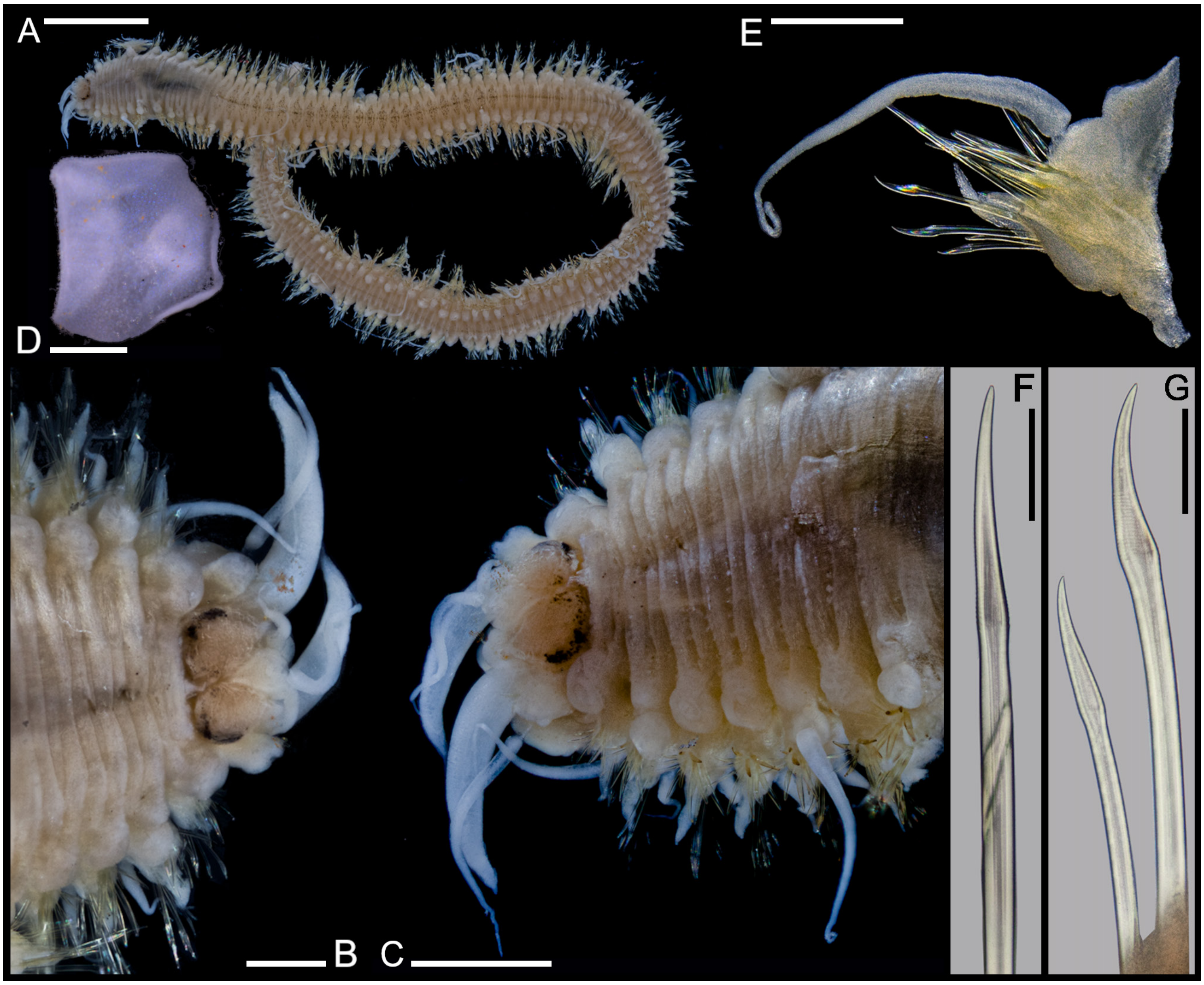

Figure 6. *Parahololepidella mensa* sp. nov., Holotype NMV F242581: (A) dorsal view, whole specimen, scale bar is 4 mm; (B) prostomium, scale bar is 1 mm; (C) anterior end, oblique view, scale bar is 1 mm. *Parahololepidella mensa* sp. nov., NMV F242583: (D) elytron segment 17, scale bar is 0.5 mm. *Parahololepidella mensa* sp. nov., Holotype NMV F242581: (E) parapodium segment 6 LHS, scale bar is 0.5 mm; (F) notochaeta segment 6, scale bar is 100 µm; (G) neurochaetae segment 6, scale bar is 100 µm.

Description. Holotype complete, 112 segments, 43 mm long, 2 mm wide. Prostomium with irregular dark pigmentation on posterior-most region and near lateral margins. Palps, antennae and cirri translucent and unpigmented. Dorsum between paired transverse ciliary band of each segment with faint even pale grey pigmentation. Cephalic peaks present in middle of anterior margin (Fig. 6B–C). Eyes present. Anterior eyes located at widest part of prostomium; orientation lateral, dorso-lateral to dorsal. Posterior eyes located near posterior margin of prostomium; orientation dorsal. Lateral antennae prostomial location ventral to and separate from prostomium; inserted terminoventrally, almost at same level as median antenna; ceratophores basally separated, not touching; at most half as long as width of prostomium; ceratostyles elongate, evenly tapering; ceratostyles without papillae. Tentaculophores without chaetae but with one or two internal aciculae, tips barely projecting from a small lobe anterior to dorsal tentaculophore. Tentacular cirri elongate, evenly tapering; without papillae.

Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped, cutting edge smooth. Facial tubercle absent, upper lip comprising longitudinal folds or ridges; upper lip comprising three or four ridges, median ridge raised.

Elytra all detached, elytrophores on 2, 4, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 26, 29, 32, 34, 36, 38, 40 and on every 2nd segment to the end of the body but some irregular, occasionally on consecutive segments (Fig. 6A). Elytra chalky white, opaque, with even cover of minute microtubercles (Fig. 6D). Dorsal tubercles indistinct. Nephridial papillae distinct, first visible on segment 6.

Aciculae of notopodia and neuropodia project clear of epidermis. Dorsal cirri styles elongate, evenly tapering; without papillae. Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering (Fig. 6E). Neuropodial prechaetal supra-acicular process absent. Neuropodial sub-acicular process present. Neuropodial postchaetal lobe distally entire.

Notochaetae about as thick as neurochaetae. Notochaetae dorsal orientation mainly or wholly dorso-lateral projections from notopodia. Tips of notochaetal spines with short points (Fig. 6F). Notochaetae very short and stout, mostly almost straight, with many rows of very indistinct teeth almost to blunt and almost smooth tips. Simple neurochaetae with capillary tips absent. Neurochaetae ornamentation in the form of spines in distinct transverse rows. Neurochaetae tips simple, entire; blunt. Neurochaetae with bidentate tips absent. Neurochaetae strongly hastate and strongly curved distally with faint rows of teeth only on proximal half of distal section, distally smooth (Fig. 6G).

Pygidium terminal, anal cirri missing.

Variation. Paratype complete but in 6 fragments, 111 segments, 40 mm long, 1.5 mm wide.

Non-type specimens include three that are complete, 34–37 mm long, 95–107 segments, 1.5–2 mm wide. The fourth non-type is an anterior fragment of 36 segments, 12 mm long, 2 mm wide. One elytron attached on paratype, left side of segment 13, and one elytron attached on segment 17 of non-type NMV F242583, both small with marginal folds and covering less than one third of the dorsum. Elytra of paratype and non-types (where complete) on 2, 4, 5, 7, 9, 11, 13, 15,17, 19, 21, 23, 26, 29, 32, 34, 36, 38, 40, 42, alternating to end of body. Elytra chalky white, opaque, with even cover of minute microtubercles (Fig. 6D). Pharynx with nine pairs of terminal papillae (observed on dissected paratype NMV F242582), terminal papillae all similar.

Etymology. The species name is taken from the Latin word 'mensa' meaning 'table' or 'meal'. The word 'commensal' has the same derivation, meaning 'eat from the same table' reflecting the commensal habit of *Parahololepidella mensa* sp. nov. on antipatharian corals.

Distribution and ecology. Southern Australia, Great Australian Bight. Depth 1,375–1,393 m. Ecology commensal on the antipatharian coral *Parantipathes helicosticha* Opresko, 1999.

Remarks. *Parahololepidella mensa* sp. nov. can be distinguished from other species of *Parahololepidella* by the absence of facial tubercle (present in the other two species), the absence of neurochaetae with bidentate tips (*P. greeffi* and *P. nuttingi* both possess a few neurochaetae with small secondary "tooth"), the presence of small, centrally located cephalic peaks (in *P. nuttingi* the cephalic peaks are large, triangular and located laterally on the prostomium) and the absence of chaetae on the tentacular segment. *Parahololepidella mensa* sp. nov. also has much shorter lateral antennae than *P. nuttingi* and elytra with microtubercles whereas the other two species of *Parahololepidella* have smooth elytra. Table 2 provides additional morphological comparisons of the three species now included in *Parahololepidella.*

Parahololepidella mensa sp. nov. is commensal on the antipatharian coral, *Parantipathes* Brook, 1889 while the other two congeners are commensal on another genus of antipatharian corals, *Tanacetipathes* Opresko, 2001 (Gonzalez *et al*., 2023b).

Subfamily Lepidastheniinae

Pettibone, 1989a

Anotochaetonoe Britayev & Martin, 2006

Anotochaetonoe Britayev & Martin, 2006: 4083.

Type species. *Anotochaetonoe michelbhaudi* Britayev and Martin, 2006.

Diagnosis. Body 41–47 segments. Cephalic peaks absent. Eyes present. Anterior eyes located in front of widest part of prostomium; orientation lateral, dorso-lateral to dorsal. Posterior eyes located at least one eye diameter in front of posterior margin; orientation dorsal. Median antenna ceratostyle elongate, evenly tapering, smooth. Lateral antennae prostomial location terminal, continuous with lateral margin of prostomium; at least two times width of prostomium; ceratostyles elongate, evenly tapering; ceratostyles without papillae. Tentaculophores without chaetae. Tentacular cirri elongate, evenly tapering; without papillae.

Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped. Pharynx barrel-shaped without distinct ornamentation, with nine pairs of terminal papillae, all similar. Nuchal flap or fold on anterior margin of segment 2 absent. Elytra up to 20 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution irregular, on every third segment after segment 23 but some on every second. Last elytra on segment 40, or 46. Elytra on segments 2, 4, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 26, 29, 32, 34, 37, 40, 43, 46; large but leaving middle of dorsum uncovered (elytra partially covering dorsum on mid- and posterior segments). Elytra surface ornamented. Elytra macrotubercles absent. Elytra microtubercles present (but few and sparse). Dorsal tubercles absent (or indistinct). Neuropodia margin with papillae along ventral margin (between ventral cirrus and base of neuropodium). Aciculae of notopodia and neuropodia do not project clear of epidermis. Neuropodial prechaetal and postchaetal lobe subequal. Neuropodial prechaetal (acicular) lobe distal shape rounded. Neuropodial prechaetal supra-acicular process absent. Neuropodial postchaetal lobe distally entire. Notochaetae absent. Neurochaetae with spines in longitudinal rows. Neurochaetae with simple tips, and with bidentate tips both present. Pygidium terminal. Anus terminal. Pygidial appendages one pair of subulate or cirriform pygidial cirri.

Remarks. The diagnosis above is based on Britayev and Martin (2006). *Anotochaetonoe* Britayev & Martin, 2006 is unique among Polynoidae genera in having up to 19–20 pairs of elytra, parapodial papillae and bidentate neurochaetae. Prior to this study, *Anotochaetonoe* contained a single species, *A. michelbhaudi* Britayev & Martin, 2006, a commensal in tubes of *Phyllochaetopterus* (Annelida: Chaetopteridae).

Anotochaetonoe rubermaculata sp. nov.

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Fig. 7

Polynoid MoV6642.—MacIntosh *et al*., 2018: Supp. Appendix II.
Lepidasthenia indet. Gunton *et al*., 2021: 107–108, fig. 23B.

Holotype: AM W.51580, Tasman Sea off eastern Australia, Central Eastern CMR, IN2017_V03_080, 30° 5.94'S, 153° 35.76'E – 30° 7.68'S, 153° 34.26'E, CSIRO Four Metre Beam Trawl, 1,257–1,194 m, 5 June 2017. **Paratype:**

NMV F242590 (1), GAB, VSM02SZ site A, RE2017_C01 VSM02_123, 34° 47.856'S, 131° 45.501'E, remotely operated vehicle, 1,365 m, 18 March 2017.

Diagnosis. *Anotochaetonoe rubermaculata* sp. nov. can be distinguished from the only other species in the genus, by the location of the anterior pair of eyes at the widest part of the prostomium, the presence of a facial tubercle, and the tips on the superior neurochaetae, which are blunt, not knob-like.

Description. Holotype incomplete, with at least 46 segments and 19 pairs of elytra, measuring 16 mm long and 3 mm wide (excluding chaetae) (four posterior-most segments dissected off for sequencing). Body pale, mostly without pigment; some few small red-brown spots scattered dorso-laterally on body, some on parapodial lobes and on outer margins of some elytra, on a few dorsal cirri styles and on a tentacular cirrus (Fig. 7A–B). Cephalic peaks absent. Eyes present. Anterior eyes located at widest part of prostomium; orientation lateral, dorso-lateral to dorsal. Posterior eyes orientation dorsal. Eyes small. Lateral antennae prostomial location terminal, continuous with lateral margin of prostomium. Tentaculophores without chaetae. Tentacular cirri elongate, evenly tapering; without papillae.

Jaws comprising two dorsal and two ventral elements, fused medially to appear as single dorsal and ventral elements, distally fang-shaped. Pharynx barrel-shaped without distinct ornamentation, with nine pairs of terminal papillae, terminal papillae all similar. Facial tubercle present, in form of a small rounded flap ventral to antennal ceratophores. Nuchal flap or fold on anterior margin of segment 2 absent.

Elytra 19 pairs (specimen incomplete); on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution irregular, on every third segment after segment 23 but some on every second. Last elytra on segment 40, or 41. Elytra on left side on segments 2, 4, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 26, 29, 32, 34, 37, 40, and on right side on segments 2, 4, 5, 7, 9, 11, 13, 17, 19, 21, 22, 24, 27, 30, 33, 35, 38, and 41 (irregular mostly after segment 21 on right side, on either consecutive, every second or every third segment, with right side probably aberrant); large but leaving middle of dorsum uncovered (elytra of middle and posterior body not covering mid-dorsum). Elytra surface ornamented. Elytra macrotubercles absent. Elytra microtubercles present (sparse, scattered). Elytra with small red-brown pigment spots as inclusions near outer and posterior margins (on some elytra; Fig. 7C–D). Dorsal tubercles absent (or indistinct). Nephridial papillae distinct, at least on some median segments; first visible on segment 19.

Neuropodia with papillae along the ventral margin (Fig. 7E), present in a row of 4–8 extending from base of neuropodium to ventral cirrus, without tufts of cilia (Fig. 7F). Aciculae of notopodia and neuropodia do not project clear of epidermis. Dorsal cirri styles elongate, evenly tapering. Neuropodial prechaetal and postchaetal lobe subequal. Neuropodial prechaetal (acicular) lobe distal shape rounded.

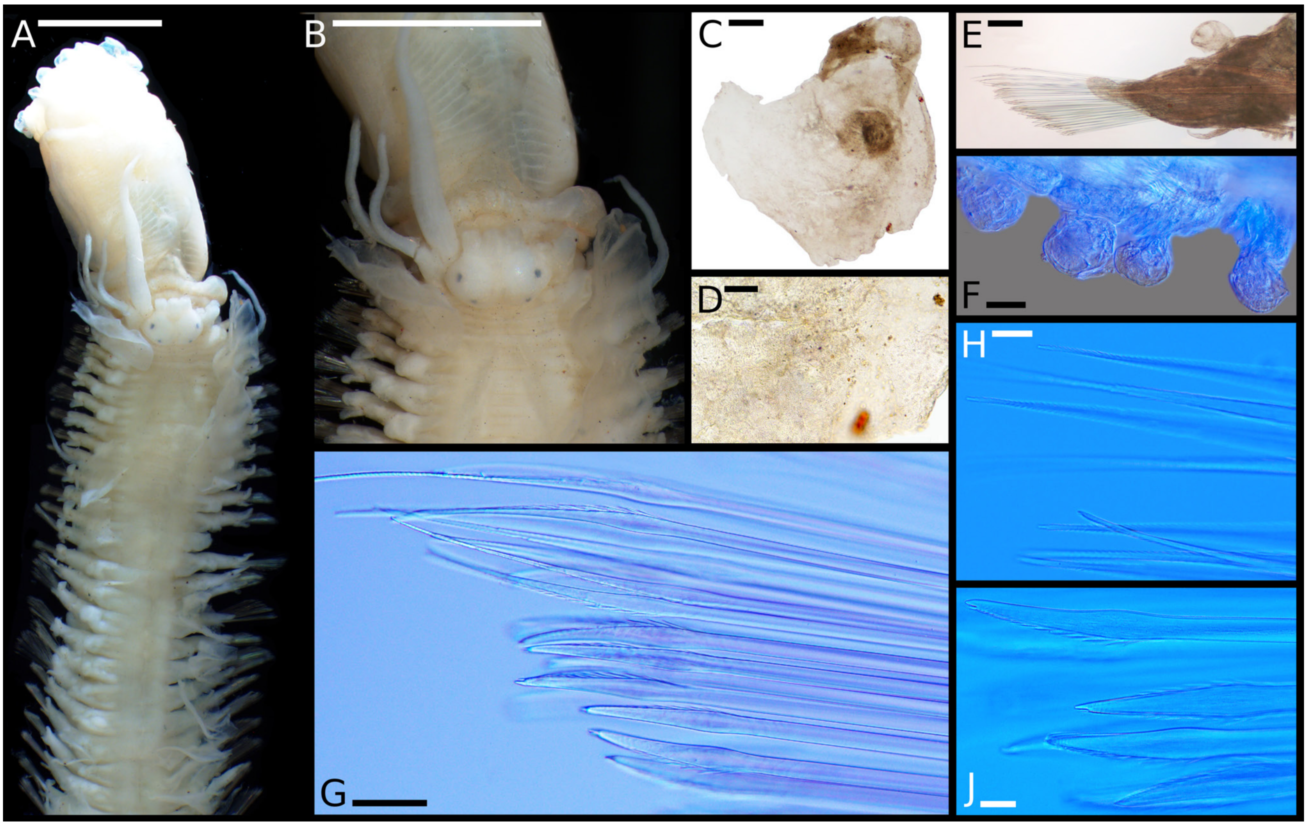

Figure 7. *Anotochaetonoe rubermaculata* sp. nov., Holotype AM W.51580: (A) whole body, dorsal view, scale bar is 2 mm; (B) anterior end, dorsal view, scale bar is 2 mm; (C) elytron from middle segment, dorsal view, scale bar is 0.2 mm; (D) elytra, dorsal surface detail, scale bar is 0.05 mm; (E) parapodium segment 13, scale bar is 0.2 mm; (F) ventral neuropodial papillae, scale bar is 0.02 mm; (G) neurochaetae, parapodium segment 33, scale bar is 0.05 mm; (H) dorsal neurochaetae, parapodium segment 33, scale bar is 0.02 mm; (J) ventral neurochaetae, parapodium segment 33, scale bar is 0.02 mm.

Neuropodial prechaetal supra-acicular process absent. Neuropodial postchaetal lobe distally entire.

Notochaetae absent. Neurochaetae slender and of two types: long, thinner ones with spinous rows and fine blunt tips (Fig. 7G–H); additional wider, falcigerous ones with bidentate tips and spinous rows subdistally on inflated region (Fig. 7J).

Variation. Paratype complete, 45 segments, 13 mm long (excluding the everted pharynx), 2 mm wide, unpigmented, red-brown spots (present on holotype) not visible. Pharynx fully everted, with 9 pairs of terminal papillae similar in size, jaws pale brown, as for the holotype, margins smooth, not dentate. Elytra absent except for those with an "e" after the elytrophore number in the following sequences. Elytrophores on right side on segments 2, 4, 5e, 7, 9, 11, 13, 17, 19, 21, 23, 26, 29, 32, 34, 37. 40, 43e; on right side on segments 2, 4, 5e, 7, 9e, 11, 13, 17, 19, 21, 23, 26, 29, 31, 33, 35. 38, then uncertain. Elytra unpigmented with sparse microtubercles. Neuropodial lobes with 4–6 papillae on ventral margin on anterior segments, decreasing to 3–4 and less distinct on posterior segments. Nephridial papillae present from segment 18, initially half-length of those on 19 and subsequent segments.

Etymology. The species name is derived from the Latin "ruber" meaning "reddish" and "macula" meaning "spot", and refers to the distinct small red-brown spots scattered on parapodia, elytra and cirri of most specimens.

Distribution and ecology. Southern Australia, Great Australian Bight and south-eastern Australia. Depth 1,194–1,365 m.

Remarks. These specimens agree with the generic diagnosis for *Anotochaetonoe* Britayev & Martin, 2006, including the irregular distribution of elytra after segment 23, the presence of a row of parapodial papillae next to the ventral cirri, and the presence of bidentate neurochaetae compared with genera *Lepidasthenia* Malmgren, 1867; *Telolepidasthenia* Augener *in* Pettibone, 1970; and *Alentiana* Hartman, 1942, all of which have unidentate neurochaetae. There has been only one species of *Anotochaetonoe* described prior to this study, *A. michelbhaudii* Britayev & Martin, 2006, from the Atlantic Ocean, off Republic of Congo, Africa, in 70–180 m depth, associated with chaetopterid tubes, and also more recently reported from Gulf of Cadiz, off the Iberian Peninsula, in 228 m depth, associated with an onuphid tube (Ravara *et al*. 2016). Our holotype came from off northern NSW, in 1,194 m depth, from a sample that included the onuphid *Hyalinoecia abranchiata* Lechapt, 1997 (Gunton *et al*. 2021), and is therefore from a geographically distant oceanic basin. The paratype was also collected from over 1,000 m depth. The new species differs from *A. michelbhaudii* by a number of minor features: *A. rubermaculata* lacks knob-like tips on the superior neurochaetae, which are blunt only; micropapillae are absent from elytra which also lack light brown pigmentation arranged in polygonal units in anterior part of elytra; small red-brown pigment spots are present, scattered on parapodia, elytra and cirri; ventral parapodial papillae lack ciliation; and much smaller eyes than *A. michelbhaudi*.

Subfamily Lepidonotinae Willey, 1902

Hololepida Moore, 1905

Hololepida Moore, 1905: 541.

Type species. *Hololepida magna* Moore, 1905.

Diagnosis. Body long, with numerous segments (about 60–120). Cephalic peaks absent. Eyes present. Lateral antennae prostomial location terminal, continuous with lateral margin of prostomium. Nuchal flap or fold on anterior margin of segment two present. Elytra 52–79 pairs, covering body completely. Dorsal tubercles present on all cirrigerous segments. Dorsal cirri styles elongate, evenly tapering, or elongate, subdistally inflated, or elongate, with sharply narrowed tips. Neuropodia tapering, neuropodial prechaetal supra-acicular process absent. Notochaetae thinner than neurochaetae. Neurochaetae of two types: with capillary tips bearing numerous fine spines in a double row, and spines with knife-like subdistal inflation and bifid tips. (Modified after Imajima, 1997, see Remarks below and Remarks for *Hololepida* sp.).

Remarks. Day (1967: 44) referred *Hololepida australis* Monro, 1936 to *Alentia* Malmgren, 1865 and provided an emended diagnosis of *Alentia* "to include *Hololepida* Moore, 1905". Fauchald (1977) and Imajima (1997) have retained *Hololepida* and *Alentia* as valid genera. Barnich and Fiege (2003: 80) provided an emended diagnosis for *Alentia* which they restrict to short-bodied species with about 45 segments and 18 pairs of elytra. For these reasons Day's (1967) treatment is not accepted here and all long-bodied forms are accepted in *Hololepida* which now includes five species including *Hololepida australis* Monro, 1936. *Hololepida* can be distinguished from all other polynoid genera by being long-bodied with terminally inserted lateral antennae, nuchal flap, numerous pairs of elytra, neuropodia distally elongate and tapering, and having neurochaetae with capillary tips. No species of *Hololepida* has a neuropodial prechaetal supra-acicular process and we have modified the diagnosis of Imajima (1997) accordingly.

Hololepida sp.

Fig. 8

Material examined. AM W.27341 (2), 82.9 km SSE of SE Cape, 'Sister 1' seamount, SS01/97_15, 44° 16.2'S, 147° 17.4'E, Epibenthic Sled, 1,100–1,122 m, 23 January 1997; AM W.27342, (1) 85.8 km SSE of SE Cape, 'B1' seamount, SS01/97_43, 44° 18.6'S, 147° 16.2'E, Epibenthic Sled, 1,150 m, 28 January 1997; AM W.27343 (1), 83.2 km SSE of SE Cape, 'Dory Hill' seamount, SS01/97_49, 44° 19.2'S 147° 7.2'E, Epibenthic Sled, 1,280–1,400 m, 29 January 1997; AM W.27344 (2), 85.4 km SSE of SE Cape, 'U' seamount, SS01/97_34, 44° 19.8'S, 147° 10.2'E, Epibenthic Sled, 1,083 m, 27 January 1997; AM W.29155 (1), 65.1 km SSE of SE Cape, 'Andys' seamount, SS01/97_57, 44° 10.8'S, 146° 59.4'E, Epibenthic Sled, 900–1,100 m, 29 January 1997.

Description. Specimens up to 58 mm in length, 12 mm wide (excluding chaetae), for 57 segments, only one complete with regenerating tail, most specimens incomplete and missing

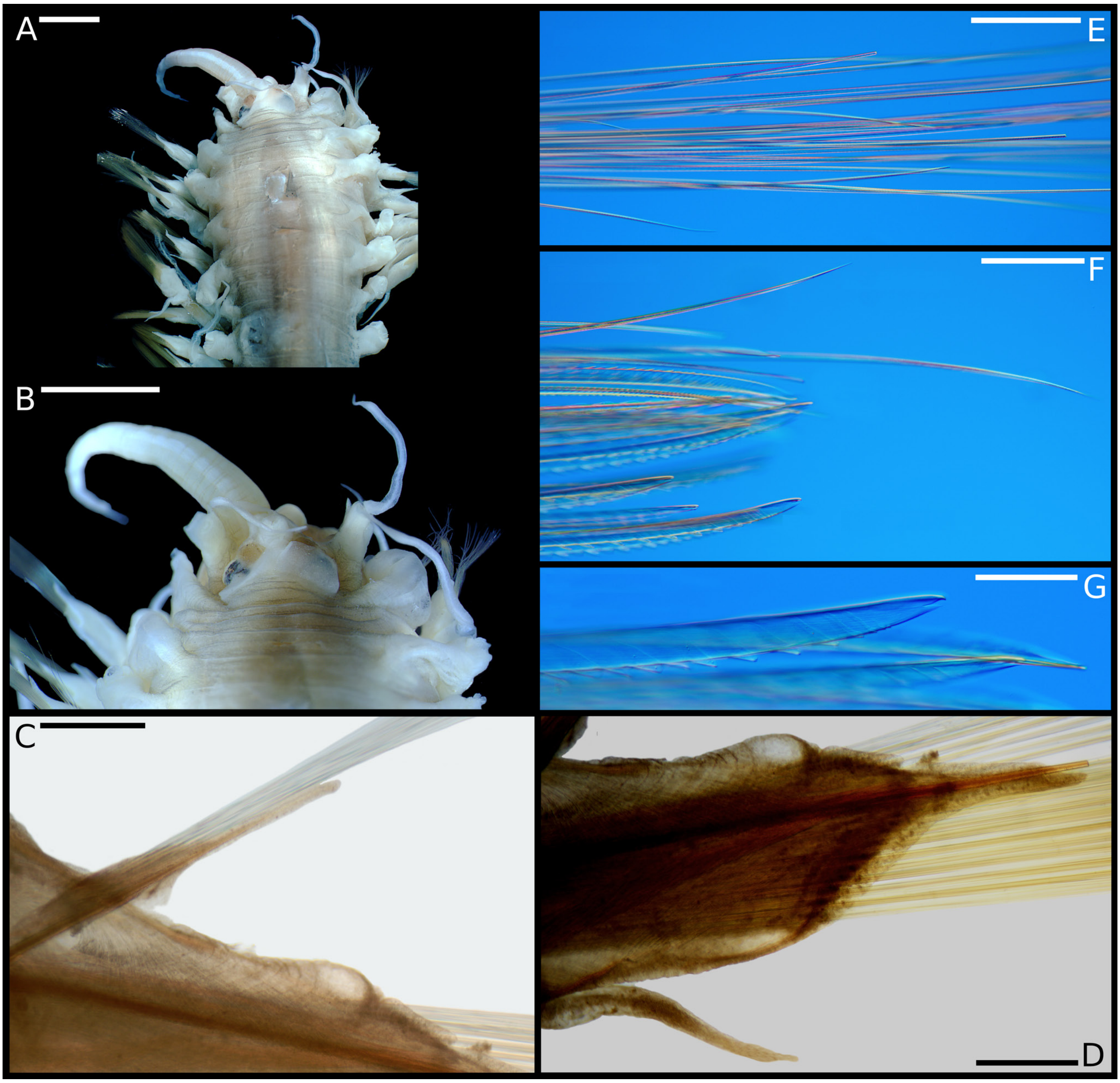

Figure 8. *Hololepida* sp. specimen AM W.27344: (A) dorsal view, anterior body, scale bar is 2 mm; (B) dorsal view of anterior end featuring prostomium, scale bar is 2 mm; (C) parapodium segment 14 (showing notopodium, ventral cirrus), scale bar is 0.5 mm; (D) parapodium segment 14 (showing neuropodium), scale bar is 0.5 mm; (E) notochaetae segment 14, scale bar is 0.2 mm; (F) dorsal neurochaetae segment 14, scale bar is 0.2 mm; (G) ventral neurochaetae segment 14, scale bar is 0.1 mm.

posterior segments. All specimens missing elytra.

Prostomium with red-brown/orange pigment, dorsum dark grey/brown (Fig. 8A). Cephalic peaks absent. Prostomium wider than long. Two pairs of large eyes present, anterior and posterior eyes on each side touching each other, anterior eyes situated at widest part of prostomium, oriented anterolaterally, posterior pair oriented dorsally, both pairs black with large white lenses. Median antenna ceratophore large, style evenly tapering, smooth, arising slightly posterodorsal to lateral antennae. Lateral antennae inserted terminoventrally, ceratophores separated but touching basally and meeting in midline, ceratostyles elongate, evenly tapering, smooth. Tentaculophores without chaetae; tentacular cirri elongate, evenly tapering, smooth. (Fig. 8B). Facial tubercle present as conical projecting structure. Upper lip ridged with large median lobe. Nuchal flap present on anterior margin of segment two, partially covering eyes (Fig. 8B). Dorsum with two ciliary bands per segment. Notochaetae on segments 2–3 absent.

At least 29 pairs of elytrophores on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution on every third segment after segment 23, on regenerating tail on almost every segment from segment 38. Last elytrophore on segment 53. Dorsal tubercles present on all cirrigerous segments, as folded structure, or indistinct. Nephridial papillae distinct, from segment 6.

Dorsal cirri cirrophores inflated, long, wider than styles; styles elongate, smooth, subdistally inflated with narrow tips. Buccal cirri elongate, as long as ventral tentacular cirri, attached on large cirrophore, basally on segment 2. Ventral cirri thereafter attached mid-neuropodium, on segments 3–6 longer than neuropodia, gradually becoming shorter than neuropodia towards posterior end. Notopodia reduced, present as elongate lobe basally on anterodorsal surface of neuropodium (Fig. 8C). Neuropodial lobe elongate, larger, prechaetal (acicular) lobe distal shape elongate, tapering (Fig. 8D). Neuropodial with short digitiform papilla located subdistally at about midpoint of tapering part of dorsal neuropodial margin (Fig. 8D). Neuropodial postchaetal lobe distally entire. Notopodial and neuropodial aciculae project clear of epidermis (Fig. 8D).

Notochaetae distinctly thinner than neurochaetae (Fig. 8E). Notochaetae fine, appear smooth but under high magnification minutely spinulose/denticulate along one side, with capillary tips, present from segment 4. Neurochaetae of 2 types: some in supra-acicular fascicle much thinner, finely spinulose with capillary tips (Fig. 8F; appearing smooth and with most tips broken off, thus appearing blunt), others in supra-acicular fascicle and sub-acicular fascicle broad, bidentate, with distal tooth curved, secondary tooth straight, with transverse curved rows of spines (pocket-like) on distal half of shaft (Fig. 8F–G).

Pygidium terminal, anus terminal.

Distribution and ecology. Southeast Tasmanian seamounts (Australia). Depth 900–1,400 m.

Remarks. The specimens described above have a very short digitiform papilla at about the midpoint of the tapering part of the dorsal neuropodial margin (Fig. 8D). This papilla is of a different form and in a different position to the neuropodial prechaetal supra-acicular process seen in many genera of Polynoidae - that process is always terminal and elongate. We consider the dorsal digitiform papilla on the specimens described above to be not homologous with a neuropodial prechaetal supra-acicular process.

There are currently five species described in *Hololepida*. Many of the original descriptions lack certain details, such as the presence or absence of a neuropodial supra-acicular process and/or the degree of separation of the lateral antennae ceratophores. The specimens described above are similar to *Hololepida oculata* Hartman, 1967, *H. australis* Monro, 1936, and *H. japonica* Imajima 1997, and appear to have a combination of their characters. The presence of confluent eyes, a conical and projecting facial tubercle, lateral antennae inserted terminally on the prostomial lobes and the presence of smooth capillary notochaetae are indicative of *H. australis*, whereas the presence of lateral antennae bases that touch basally, as well as notopodial capillary chaetae with minute denticulations suggest their similarity with *H. oculata* and also *H. japonica*. Hartman's (1967) original description of *H. oculata* lacks many details and the species is only known from one specimen recorded from the Pacific Antarctic Ridge in the Southern Ocean at 549 m. Until better preserved specimens with the full complement of body segments and corresponding elytra are found, and also the type specimens of *H. oculata* and *H. japonica* are examined and more details are elucidated, we cannot refer these specimens to any described *Hololepida* species. Specimens were originally fixed in 5–10% formalin and were therefore unsuitable for genetic analysis.

Subfamily Macellicephalinae Hartmann-Schröder, 1971

Bathybahamas Pettibone, 1985

Type species. *Bathybahamas charlenae* Pettibone, 1985.

Diagnosis. Body 18 segments. Cephalic peaks absent (but anterior margin of prostomium with points about where lateral antennae would be located if present). Pigmented eyes absent. Median antenna dorsal; ceratostyle smooth. Lateral antennae absent. Tentaculophores without chaetae, with prominent acicular process. Tentacular cirri elongate, evenly tapering; without papillae. Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped. Pharynx with seven pairs of terminal papillae, all similar. Nephridial papillae distinct, elongate, at least on some median segments; first visible on segment six; last visible on segment 15. Elytra eight pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly. Last elytra on segment 15. Dorsal tubercles present on all cirrigerous segments. Dorsal cirri styles elongate, with sharply narrowed tips. Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process absent. Notochaetae distinctly thicker than neurochaetae. Notochaetae dorsal orientation mainly or wholly dorso-lateral projections from notopodia. Notochaetal spines with ornamentation with teeth along one margin. Simple neurochaetae with capillary tips present. Neurochaetae tips simple, entire. Neurochaetae with bidentate tips absent.

Remarks. The diagnosis above is based on Pettibone (1985). *Bathybahamas* includes a single short-bodied species with 18 segments and eight pairs of elytra, *Bathybahamas charlenae* Pettibone, 1985, described from the North Atlantic Ocean off the Bahamas at a depth of 2,066 m. A second incompletely known species from south-eastern Australia apparently belonging in *Bathybahamas* is discussed below.

Bathybahamas sp.

Fig. 9

Material examined. AM W.52623 (3), Bass Strait, IN2017_V03_031, 39° 25.32'S, 149° 36.24'E – 39° 23.46'S, 149° 35.82'E, Brenke Epibenthic Sledge, 4,150–4,170 m, 23 May 2017; AM W.53276 (1), Bass Strait, IN2017_V03_031, 39° 25.32'S, 149° 36.24'E – 39° 23.46'S, 149° 35.82'E, Brenke Epibenthic Sledge, 4,150–4,170 m, 23 May 2017.

Description. Body 18 segments. Four specimens ranging in length 3.5–6 mm, width 1–2 mm; smaller specimens with only 14–17 segments. Cephalic peaks absent (Fig. 9A–B). Pigmented eyes absent. Median antenna dorsal, inserted posteromedially in prostomial notch; ceratostyles elongate, evenly tapering, smooth. Lateral antennae absent. Tentaculophores without chaetae (but with strongly projecting acicular lobe).

Elytra eight pairs, all missing; elytrophores on segments 2, 4, 5 then on every second segment. Last elytra on segment 15. Dorsal tubercles present on all cirrigerous segments; present

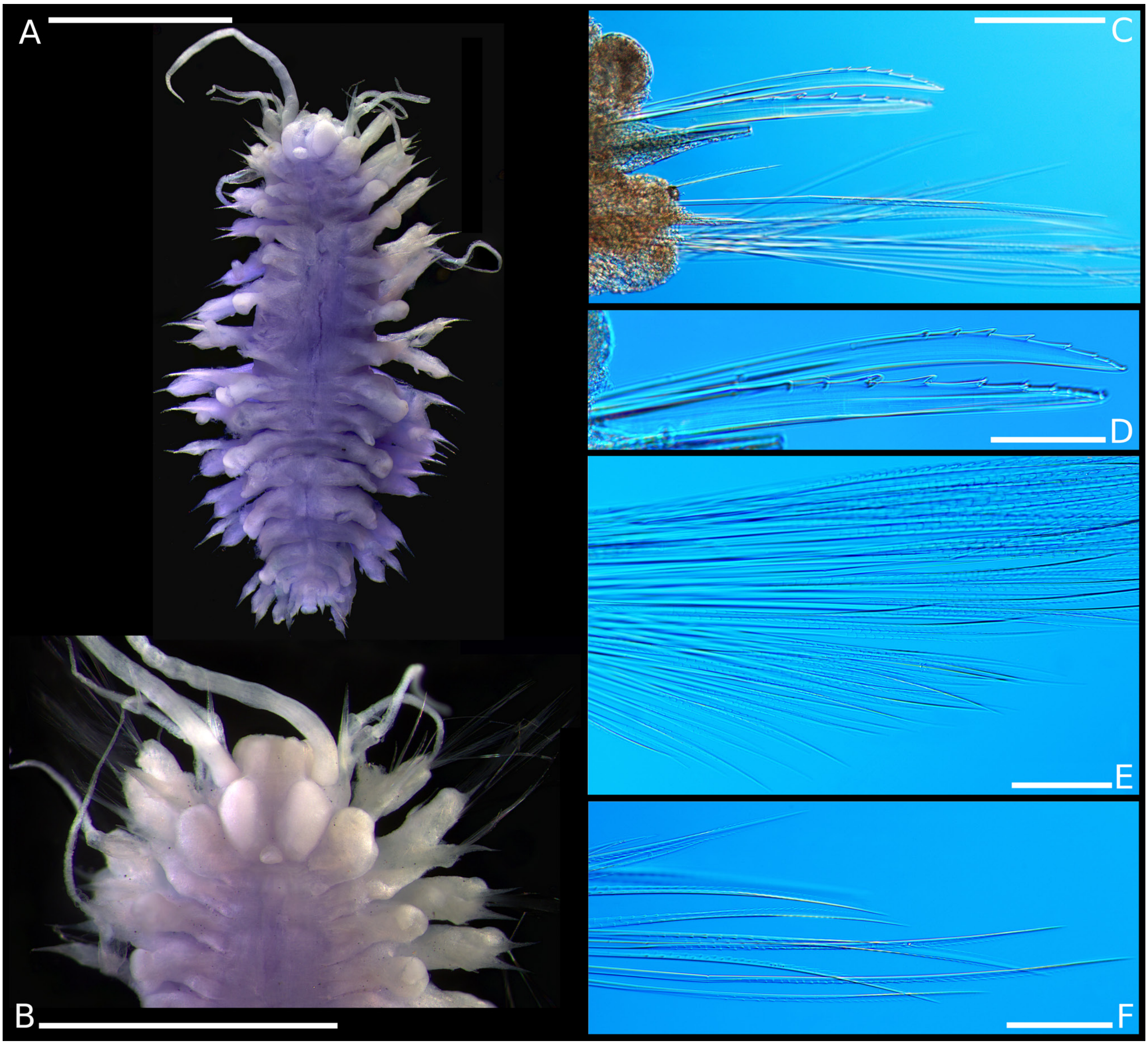

Figure 9. *Bathybahamas* sp., specimen AM W.52623: (A) dorsal view, whole body, stained with methyl blue, scale bar is 2 mm; (C) parapodium segment 8, scale bar is 0.1 mm.; (D) notochaetae, scale bar is 0.1 mm; (E) neurochaetae, scale bar is 0.1 mm; (F) detail of neurochaetae, scale bar is 0.1 mm. *Bathybahamas* sp., specimen AM W.53276: (B) dorsal view, anterior end, stained with methyl blue, scale bar is 2 mm.

on non-elytrigerous segments from segment 3 as small rounded structures, becoming short, cirriform from segment six, arising dorsally from base of notopodia. Nephridial papillae distinct, at least on some median segments; first visible on segment 10; last visible on segment 12.

Aciculae of notopodia and neuropodia do not project clear of epidermis. Parapodia with noto- and neuropodia subequal in length. Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering (Fig. 9C). Neuropodial prechaetal supra-acicular process absent. Notochaetae present (but mostly broken).

Notochaetae distinctly thicker than neurochaetae (Fig. 9D). Notochaetae dorsal orientation mainly or wholly dorso-lateral projections from notopodia. Notochaetal spines with ornamentation with teeth along one margin. Notochaetae mostly missing or broken off, robust, stouter than neurochaetae, with rows of large serrations along one lateral margin. Neurochaetae tips simple, entire (Fig. 9E–F). Neurochaetae with bidentate tips absent. Neurochaetae with distal part flattened and serrated along both lateral margins.

Distribution and ecology. South-eastern Australia. Depth 4,031–4,170 m.

Remarks. This species is referred to *Bathybahamas* Pettibone, 1985 because of the number of segments (18) and pairs of elytra (8), absence of lateral antennae, tentaculophores lacking chaetae but with a projecting acicular process and short, cirriform dorsal tubercles on the non-elytrigerous segments. However, the specimens differ from *B. charlenae* in having larger notopodia (subequal in length to neuropodia, while *B. charlenae* possess notopodia shorter than neuropodia). *Bathybahamas* sp. also lacks neurochaetae with capillary tips, which are present in *B. charlenae*. Our specimens are too damaged and fragile to attempt to dissect out jaws and pharynx to determine the number of pharyngeal papillae (in *Bathybahamas*, seven pairs) and jaw type (in *Bathybahamas*, two non-dentate pairs). If additional material is discovered allowing description of a new species, the current diagnosis of *Bathybahamas* will have to be emended to accommodate species in which neurochaetae lack capillary tips.

Bathybahamas sp. differs from other polynoid genera with eight pairs elytra and lacking lateral antennae as follows: *Bathyeliasona* Pettibone, 1976 has chaetae on the tentacular segment, frontal filaments are present, prostomium anterior margin comprises a pair of acute anterior projections/cephalic peaks; *Bathypolaria* Levenstein, 1981 has a distinctive ventral keel at the posterior end; *Bathyvitiazia* Pettibone, 1976 has median antenna anteriorly located and segment 2 complete and visible dorsally; *Bruunilla* Hartman, 1971 has ventrum with a pair of tapering wing-like structures projecting laterally; *Macellicephaloides* Uschakov, 1955 has ventrum with a deep pit on segment two covered by a large flap attached to segment three; *Yodanoe* Bonifácio & Menot, 2018 has the prostomium anterior margin comprising a pair of acute anterior projections/cephalic peaks, median antenna anteriorly located and segment two complete and visible dorsally, neurochaetae spatulate and flattened.

Molecular sequencing was unsuccessful.

Bathyedithia Pettibone, 1976

Type species. *Bathyedithia berkeleyi* (Levenstein, 1971).

Diagnosis. Body 25–26 segments. Prostomium frontal margin rounded or with subtriangular projections, discrete cephalic peaks absent. Pigmented eyes absent. Median antenna absent. Lateral antennae and frontal filaments absent. Tentaculophores without chaetae. Facial tubercle absent. Tentacular cirri elongate, with sharply narrowed tips; without papillae. Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped, cutting edge dentate. Pharynx with nine pairs of terminal papillae. Elytra 9–10 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly. Last elytra on segment 17. Dorsal tubercles present on segment six only. Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process absent. Notochaetae thinner than neurochaetae, dorsal orientation mainly or wholly dorso-lateral projections from the notopodia. Neurochaetae with capillary tips absent. Neurochaetae shaft spatulate, flattened or depressed; ornamentation with rows of spines along both margins, tips simple, entire, neurochaetae with bidentate tips absent.

Remarks. The above diagnosis is based on the changed conception of *Bathyedithia* adopted herein. The previously accepted definition of *Bathyedithia* by Bonifácio and Menot (2018) encompassed taxa with 25 or 26 segments, 9 or 10 pairs of elytra, dorsal tubercles either absent or present on segment six only, suggesting that the current members of *Bathyedithia* do not comprise a monophyletic group. The genus comprises three species but only *Bathyedithia retierei* Bonifácio & Menot, 2018 has molecular sequence data.

The molecular analysis of Bonifácio and Menot (2018, fig. 2) placed *Bathyedithia retierei* within a clade containing three *Polaruschakov* species and one species from the monotypic genus *Nu*, as sister taxon to the clade including *Hodor* species. No molecular data for other *Bathyedithia* species were available and Bonifácio and Menot (2018) chose to base their generic assignment on their phylogeny based on morphological data (Bonifácio & Menot 2018, fig. 3) which discounted number of terminal pharyngeal papillae (seven pairs in *Polaruschakov* species including *P. retierei* n. comb., and nine pairs in *Bathyedithia* species) in favour of jaw dentition (jaws smooth in *Polaruschakov* species versus dentate in *P. retierei* n. comb., and in *Bathyedithia* species). However, our literature survey shows that jaw dentition does vary within genera of Polynoidae (for example among species belonging to the genera *Bathykermadeca* Pettibone, 1976; *Bathypolaria* Levenstein, 1981; *Branchinotogluma* Pettibone, 1985; *Branchipolynoe* Pettibone, 1984; *Lepidonotopodium* Pettibone, 1983; and *Levensteiniella* Pettibone, 1985). Number of pairs of terminal pharyngeal papillae, in contrast, is typically consistent within genera established on other characters (Pettibone, 1976).

For the above reasons, and on the basis of the compelling molecular data of Bonifácio and Menot (2018) we remove *B. retierei* Bonifácio & Menot, 2018 from *Bathyedithia* to *Polaruschakov* new combination. *Bathyedithia* now contains two species, *Bathyedithia berkeleyi* (Levenstein, 1971) and *B. tuberculata* Levenstein, 1981 plus *Bathyedithia* sp. described below; the emended generic diagnosis above is based on data from those three taxa. Molecular sequence data are not available for any species of *Bathyedithia* as now defined.

As redefined here, *Bathyedithia* is most similar to *Nu* Bonifácio & Menot, 2018 – both genera are short-bodied and have 9–10 pairs of elytra, the median antenna is absent, but notochaetae are present in *Bathyedithia* and absent in *Nu*.

Bathyedithia sp.

Fig. 10

Bathyedithia sp. —Gunton *et al*., 2021: 101.

Material examined. AM W.51970 (1), Bass Strait, IN2017_V03_031, 39° 25.32'S, 149° 36.24'E – 39° 23.46'S, 149° 35.82'E, Brenke Epibenthic Sledge, 4,150–4,170 m, 23 May 2017.

Description. Body 23 segments. Single specimen ~7 mm long, 3 mm wide (excluding parapodia). Cephalic peaks absent (Fig. 10A). Pigmented eyes absent. Median antenna absent. Lateral antennae absent. Frontal filaments absent. Facial tubercle absent. Tentaculophores without chaetae. Tentacular cirri elongate, evenly tapering; without papillae.

Jaws (examined via ventral incision) comprising two dorsal and two ventral elements, all elements independent, fang-shaped, cutting edge dentate with 4–5 teeth. Pharynx not everted, too fragile to dissect out, therefore pharyngeal papillae not observed.

Elytrophores 10 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly. Last elytrophore on segment 19. Elytra missing from specimen. Dorsal tubercles present on all cirrigerous segments; reduced, conical. Nephridial papillae indistinct, not observable, perhaps due to the damaged specimen.

Parapodia subbiramous, notopodia reduced, much shorter than neuropodia (Fig. 10B). Aciculae of notopodia and

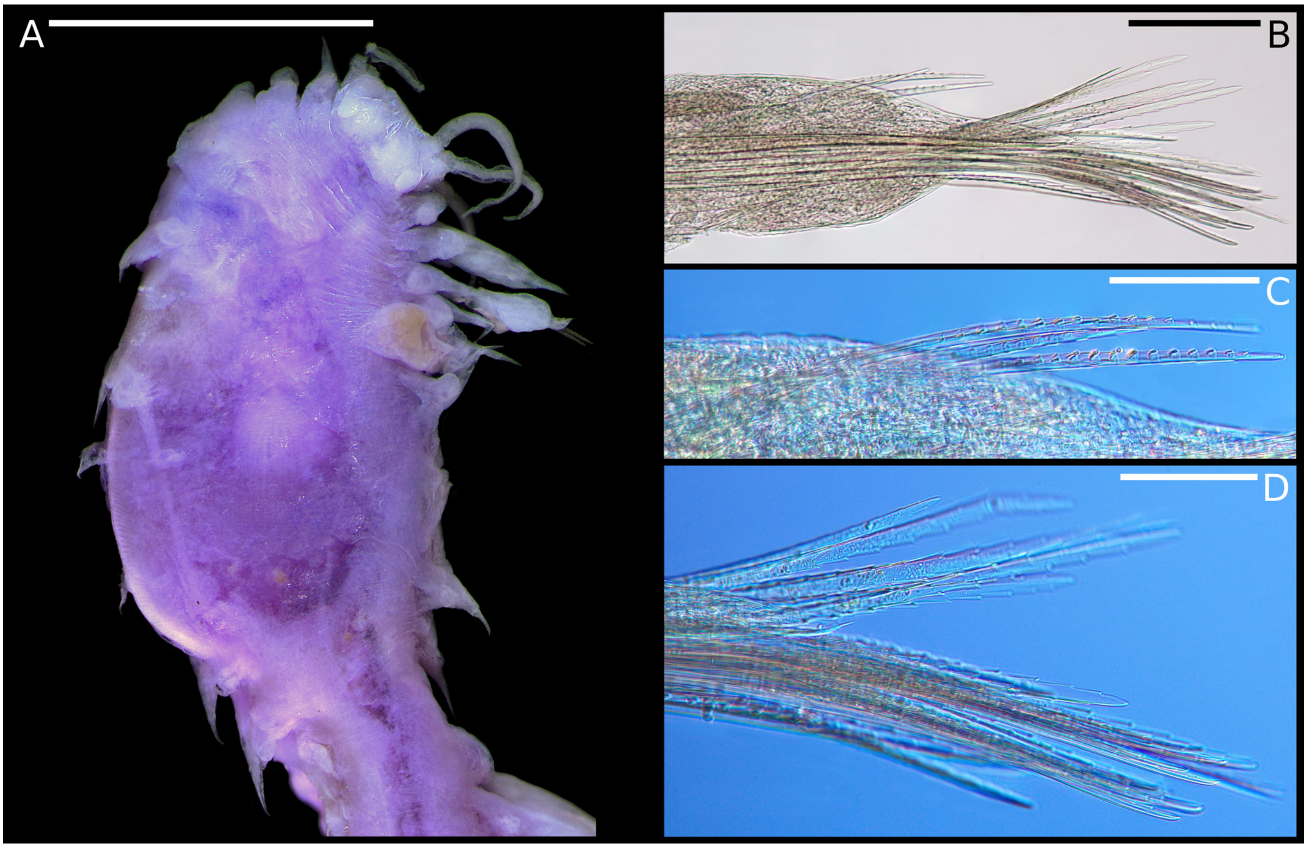

Figure 10. *Bathyedithia* sp., specimen AM W.51970: (A) anterior end, stained with methyl blue, scale bar is 2 mm; (B) parapodium segment 2, scale bar is 0.2 mm; (C) notochaetae, segment 2, scale bar is 0.1 mm; (D) neurochaetae, segment 2, scale bar is 0.1 mm.

neuropodia do not project clear of epidermis. Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process absent. Neuropodial postchaetal lobe distally entire.

Notochaetae thinner than neurochaetae, dorsal orientation mainly or wholly dorso-lateral projections from the notopodia. Notochaetae mostly missing, (present on notopodium 2), notochaetae of one type, short, slightly curved, about 3–4 or fewer per notopodium, each with two rows of spines on convex margin, spines relatively widely-spaced, continuing to tip although final two or three spines often much reduced, tips bare, rounded to blunt (Fig. 10C). Neurochaetae shaft spatulate, flattened or depressed; ornamentation with a row of spines along both margins (typically neurochaetae flattened to concave) (Fig. 10D). Neurochaetae tips simple, pointed.

Distribution and ecology. East of Flinders Island, southeastern Australia. Depth 4,150–4,170 m.

Remarks. The specimen is damaged and fragile, with most notochaetae and all elytra missing. Two genera, *Bathyedithia* and *Polaruschakov*, share the characters which distinguish our specimen (10 pairs of elytra, median and lateral antennae absent) from other genera of Macellicephalinae. Both genera also have similar neurochaetae which are flattened and serrated on both margins, and possess seven to nine pairs of pharyngeal terminal papillae (Pettibone, 1976), but we have been unable to observe the latter character on our single fragile and damaged specimen. On the basis of the presence of dentate lateral margins of the jaws (which are absent from *Polaruschakov* species) this specimen is apparently allied to *Bathyedithia*, and we therefore refer to this specimen as *Bathyedithia* sp. Molecular sequencing was unsuccessful. See Remarks (above) for the generic diagnosis of *Bathyedithia*.

Bathyeliasona Pettibone, 1976

Type species. *Bathyeliasona abyssicola* (Fauvel, 1913).

Diagnosis. Body 17–18 segments. Cephalic peaks absent. Pigmented eyes absent. Median antenna ceratostyle smooth. Lateral antennae absent. Frontal filaments present. Tentaculophores with chaetae. Tentacular cirri without papillae. Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped. Pharynx with nine pairs of terminal papillae. Nephridial papillae small or few sometimes enlarged, or absent (*Bathyeliasona mariaae* Bonifácio & Menot, 2018). Elytra eight pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly. Last elytra on segment 15. Notochaetae thinner than neurochaetae, or stouter than neurochaetae (*B. mariaae* Bonifácio & Menot, 2018). Neurochaetae shaft strongly flattened with a broad knife-like blade. Neurochaetae tips simple, entire. Neurochaetae with bidentate tips absent.

Remarks. The diagnosis is based on Pettibone (1976). *Bathyeliasona* Pettibone, 1976 comprises four described species which can be distinguished from other polynoid genera by having eight pairs of elytra; tentaculophores with chaetae; lateral antennae absent; frontal filaments present; prostomium anterior margin comprising a pair of acute anterior projections. The species of the genus occur widely in the Atlantic, Pacific and Indian oceans, from depths of 2,500–8,000 m.

Bathyeliasona nigra (Hartman, 1967)

Fig. 11

Herdmanella nigra Hartman 1967: 25.

Macellicephala (*Macellicephala*) *nigra*.—Hartmann-Schroeder 1974: 76.

Bathyeliasona nigra.—Pettibone 1976: 30.—Kirkegaard 1994: 475.—Kirkegaard 1995: 20.

Material examined. Australia. AM W.51462 (2), off Newcastle, IN2017_V03_065, 33° 26.46'S, 152° 42.12'E – 33° 26.1'S, 152° 39.9'E, CSIRO Four Metre Beam Trawl, 4,280–4,173 m, 30 May 2017; AM W.51983 (1), Central Eastern CMR, IN2017_V03_089, 30° 15.798'S, 153° 51.522'E – 30° 17.358'S, 153° 50.628'E, Brenke Epibenthic Sledge, 4,436–4,414 m, 6 June 2017; AM W.51998 (1), Jervis CMR, IN2017_V03_054, 35° 7.008'S, 151° 28.38'E – 35° 5.952'S, 151° 27.282'E, Brenke Epibenthic Sledge, 4,026–3,881 m, 28 May 2017; AM W.52017 (1), East Gippsland CMR, IN2017_V03_033, 38° 31.26'S, 150° 12.78'E – 38° 29.88'S, 150° 12.42'E, Brenke Epibenthic Sledge, 4,107–4,064 m, 24 May 2017; AM W.54824 (1), off Bermagui, IN2017_V03_042, 36° 23.118'S, 150° 51.78'E – 36° 26.01'S, 150° 51.792'E, Brenke Epibenthic Sledge, 4,744–4,716 m, 26 May 2017; AM W.52216 (1), Jervis CMR, Brenke Epibenthic Sledge, IN2017_V03, 35° 07' 00" S, 151° 28' 23" E, 3,881–4,026 m, 28 May 2017; AM W.54841 (2), Jervis CMR, IN2017_V03_053, 35° 6.84'S, 151° 28.14'E – 35° 5.04'S, 151° 26.46'E, CSIRO Four Metre Beam Trawl, 3,952–4,011 m, 28 May 2017; AM W.54842 (2), Hunter CMR, IN2017_V03_078, 32° 8.28'S, 153° 31.62'E – 32° 10.92'S, 153° 31.44'E, CSIRO Four Metre Beam Trawl, 3,980–4,029 m, 4 June 2017; AM W.54843 (9), off Newcastle, IN2017_V03_065, 33° 26.46'S, 152° 42.12'E – 33° 26.1'S, 152° 39.9'E, CSIRO Four Metre Beam Trawl, 4,280–4,173 m, 30 May 2017; NMV F242587 (2), GAB, OR21, IN2017_C01_ 175, 35° 48.888'S, 132° 1.272'E – 35° 51.096'S, 131° 58.614'E, CSIRO Four Metre Beam Trawl, 3,930–4,250 m, 15 April 2017; NMV F242588 (1), GAB, OR21, IN2017_C01_178, 35° 42.948'S, 131° 39.378'E – 35° 44.496'S, 131° 42.396'E, CSIRO Four Metre Beam Trawl, 3,817–3,950 m, 16 April 2017; NMV F242589 (1), GAB, OR11Area07, IN2017_C01_192, 34° 32.994'S, 129° 24.18'E – 34° 35.357'S, 129° 25.057'E, CSIRO Four Metre Beam Trawl, 3,780–3,807 m, 20 April 2017.

Other material. Holotype USNM 55481 (examined by Fauchald & Wilson, 2024), South Sandwich Islands, 58° 55.02'S, 27° 13.02'W, 2,575–2,553 m, 8 May 1963.

Description. Body 18 segments. Body with slate-black pigmentation (Fig. 11A). Cephalic peaks absent. Pigmented eyes absent. Median antenna ceratostyle elongate, evenly tapering, papillate. Lateral antennae absent. Frontal filaments present, wide at base, subulate (Fig. 11B). Tentaculophores with chaetae. Tentacular cirri elongate, with sharply narrowed tips; without papillae. Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped, cutting edge smooth. Pharynx barrel-shaped without distinct ornamentation, with nine pairs of terminal papillae, all similar.

Elytra eight pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly. Last elytra on segment 15. Dorsal tubercles absent (or indistinct). Dorsal cirri styles papillated. Enlarged nephridial papillae present on segments 10–12.

Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering (Fig. 11C). Neuropodial prechaetal supra-acicular process absent. Neuropodial postchaetal lobe distally entire.

Notochaetae about as thick as neurochaetae. Notochaetae dorsal orientation mainly or wholly dorso-lateral projections from notopodia. Notochaetae with numerous spinous rows along shaft and blunt, bare tips (Fig. 11D). Simple neurochaetae with capillary tips absent. Neurochaetae shaft strongly flattened with a broad knife-like blade, serrated along both margins, superior ones wider and longer than inferior ones (Fig. 11E–F). Neurochaetae tips simple, blunt. Neurochaetae with bidentate tips absent.

Pygidium terminal. Dorsum immediately anterior to pygidium similar to that of other segments. Anus dorsal. Pygidial appendages one pair of triangular to egg-shaped lobes, free to base.

Distribution and ecology. Indian, Pacific and Antarctic Oceans. Southern and eastern Australia, from the Great Australian Bight to off northern NSW, Australia. Depth 2,553–4,744 m.

Remarks. *Bathyeliasona nigra* can be distinguished from other members of the genus by having notochaetae about as thick as neurochaetae, enlarged nephridial papillae on segments 10–12, and tentacular cirri smooth, lacking papillae. *Bathyeliasona nigra* occurs widely in the Indian, Pacific and Atlantic Oceans, from depths of 2,500–5,000 m. We deposited the first sequences of *B. nigra* to GenBank (Supplementary Table 1).

Bathyfauvelia Pettibone, 1976

Type species. *Bathyfauvelia affinis* (Fauvel, 1914).

Diagnosis. Body 19–21 segments. Cephalic peaks absent. Pigmented eyes absent. Median antenna ceratostyle smooth. Lateral antennae absent. Frontal filaments present. Tentaculophores with chaetae. Tentacular cirri without papillae. Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped. Pharynx with nine pairs of terminal papillae. Nephridial papillae indistinct, not observable. Elytra nine pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly. Last elytra on segment 17. Dorsal tubercles present on all cirrigerous segments. Neurochaetae shaft spatulate, flattened or depressed. Neurochaetae tips simple, entire. Neurochaetae with bidentate tips absent.

Remarks. The above diagnosis of *Bathyfauvelia* Pettibone, 1976 follows Bonifácio and Menot (2018) who added two species to the genus. *Bathyfauvelia* now includes four species distributed in the Arctic, Atlantic and Pacific Oceans as well as the Java Trench in the Indian Ocean and with a bathymetric range of 2,380–6,350 m.

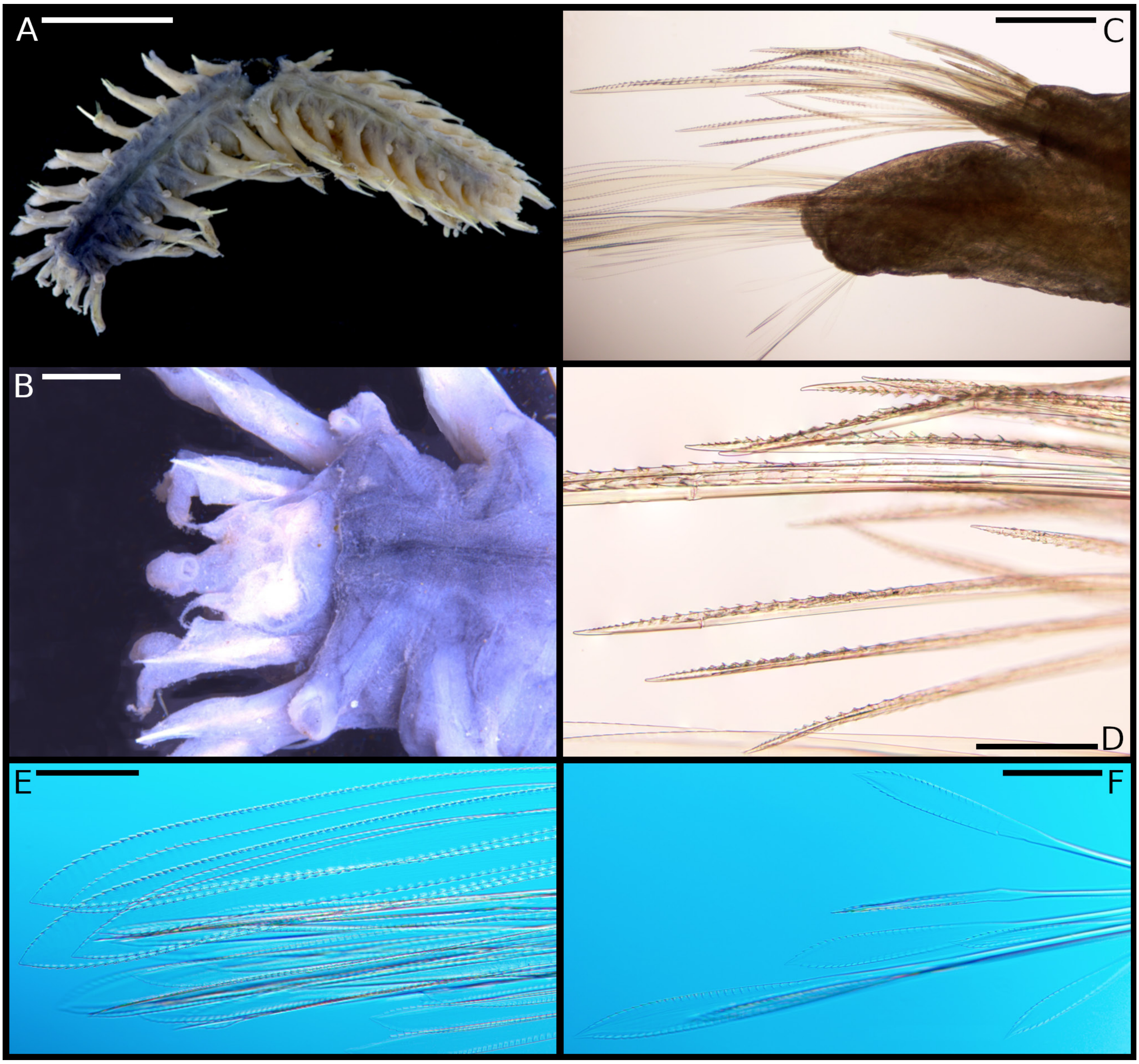

Figure 11. *Bathyeliasona nigra* (Hartman, 1967) specimen NMV F242589: (A), whole animal, dorsal view, scale bar is 10 mm; (B) prostomium, scale bar is 2 mm. Specimen AM W.52216: (C) parapodium segment, 7 scale bar is 0.5 mm; (D) notochaetae segment 7, scale bar is 0.2 mm; (E) dorsal neurochaetae segment 7, scale bar is 0.2 mm; (F) ventral neurochaetae segment 7, scale bar is 0.2 mm.

cf. *Bathyfauvelia* sp.

Fig. 12

Material examined. Australia. AM W.51976 (1), Hunter CMR, IN2017_V03_079, 32° 7.848'S, 153° 31.638'E – 32° 9.756'S, 153° 31.416'E, Brenke Epibenthic Sledge, 4,031–4,031 m, 4 June 2017; AM W.51978 (1), off Byron Bay, IN2017_V03_098, 28° 22.278'S, 154° 38.832'E – 28° 23.328'S, 154° 36.738'E, Brenke Epibenthic Sledge, 3,811–3,754 m, 8 June 2017; AM W.52142 (1), off Fraser Island, IN2017_V03_110, 25° 13.188'S, 154° 9.612'E – 25° 15.63'S, 154° 12'E, Brenke Epibenthic Sledge, 4,005–4,010 m, 11 June 2017; AM W.53333 (1), off Fraser Island, IN2017_V03_119, 25° 12.36'S, 153° 59.46'E – 25° 10.68'S, 153° 58.74'E, Brenke Epibenthic Sledge, 2,247–2,369 m, 12 June 2017.

Description. Four damaged specimens, one of them complete with 18 segments, others damaged posteriorly; up to 8mm long, 2 mm wide (excluding parapodia) (Fig. 12A, AM W.51978). Prostomium bilobed; cephalic peaks absent; frontal filaments present as short digitiform extensions on anterolateral margins of prostomial lobes. Short median antennal ceratophore present in median notch between prostomial lobe, style missing; lateral antennae absent. Palps thick, smooth, abruptly tapering to narrow tips. Pigmented eyes absent. Upper lip ridged, indistinctly trilobed. Facial tubercle absent. Tentacular segment with elongate, projecting acicular lobe, achaetous or with one or two chaetae; tentacular cirri styles tapering, papillate. Buccal cirri smooth, tapering, shorter than tentacular cirri, similar in length to following ventral cirri. Dorsal cirri present on all non-elytrigerous segments, with elongate cirrophores, styles long, tapering, papillate (Fig. 12B).

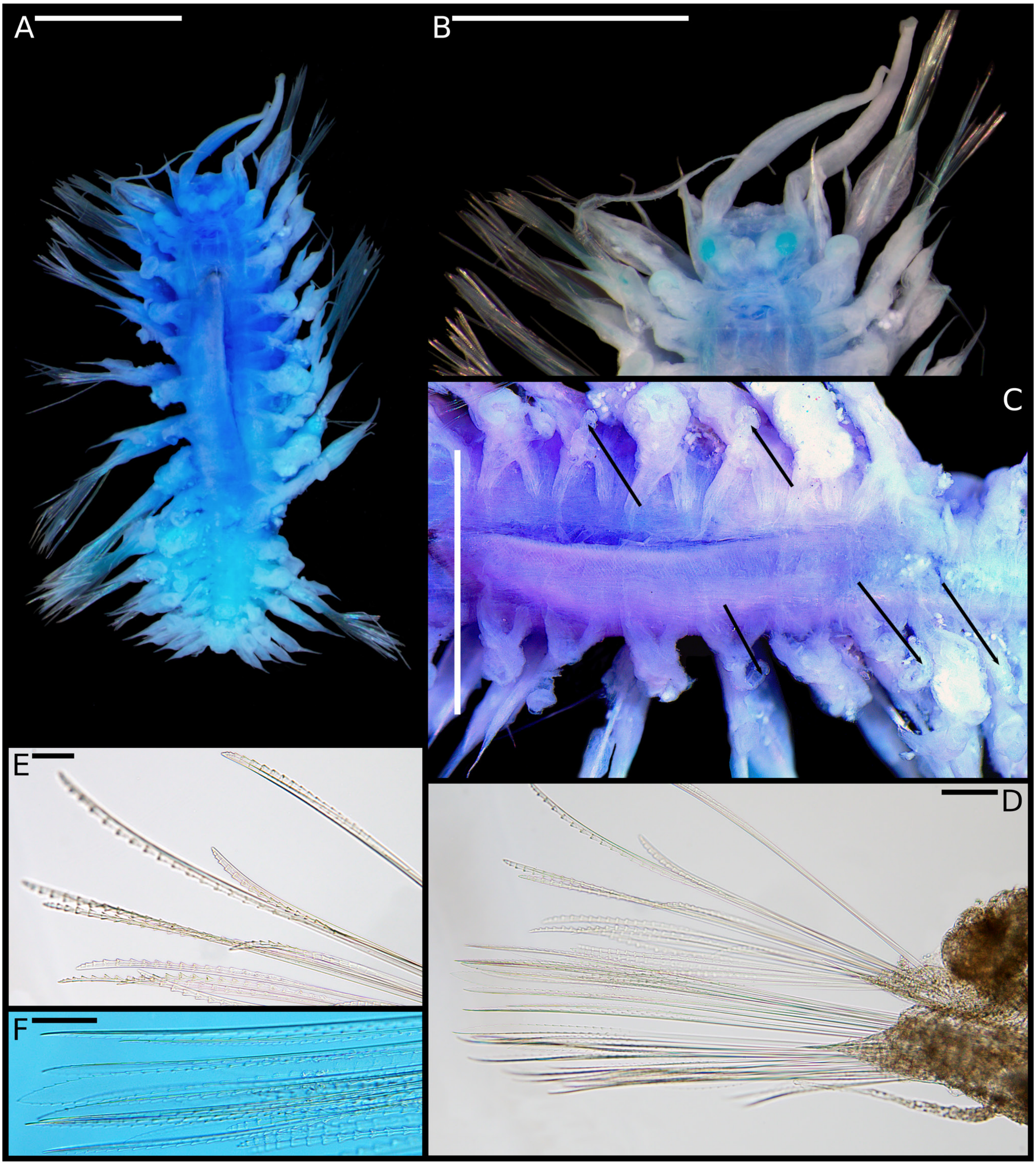

Figure 12. cf. *Bathyfauvelia* sp., specimen AM W.51978: (A) dorsal view whole specimen (stained with methyl blue), scale bar is 2 mm; (B) anterior end dorsal view (stained with methyl blue), scale bar is 2 mm; (C) dorsal view of segments showing branchiae-like dorsal tubercles (black and white arrows), scale bar is 2 mm. cf. *Bathyfauvelia* sp., specimen AM W.52142: (D) parapodium segment 6, posterior view, scale bar is 0.1 mm; (E) notochaetae, scale bar is 0.05 mm; (F) neurochaetae, scale bar is 0.05 mm.

Jaws present, serrated, with four to five lateral teeth, (dissected from AM W.53333), number of pharyngeal papillae not observed.

All elytra missing; nine pairs of large elytrophores present on segments 2, 4, 5, 7, 9, 11, 13, 15, 17 (Fig. 12A). Dorsal tubercles present as curved or involute cirriform branchial-like structures on non-elytrigerous segments from segment 6, arising dorsally from base of notopodia (Fig. 12C). Nephridial papillae observed on segments 12 to 15.

Parapodia biramous, anterior parapodia with subequal elongate noto- and neuropodia, mid-body to posterior parapodia with notopodia shorter than neuropodia, lobes extended, elongate, aciculae not projecting clear of epidermis (Fig. 12D, specimen AM W.52142).

Notochaetae present, most missing, similar thickness to neurochaetae, with short transverse spinous rows along convex margin (Fig. 12E). Neurochaetae long, distally flattened to concave, serrated along both lateral margins (Fig. 12F).

Ventral keel absent posteriorly.

Distribution and ecology. Off eastern Australia, from New South Wales to Queensland. Depths of 2,247–4,031 m.

Remarks. This species is tentatively referred to *Bathyfauvelia* Pettibone, 1976 because of the number of segments (up to 21), number of pairs of elytra (nine), absence of lateral antennae, presence of frontal filaments, tentaculophores with a projecting acicular process, serrated jaws, and short cirriform dorsal tubercles on non-elytrigerous segments. It does not conform completely to the generic diagnosis by Bonifácio and Menot (2018), due to the absence of chaetae on the tentacular segment on some specimens (though present on smaller specimens), and the presence of anterior parapodia with subequal noto- and neuropodia. Molecular sequencing of tissue from two specimens was unsuccessful, thus comparison with GenBank DNA sequences for the only two registered species of *Bathyfauvelia* - *Bathyfauvelia glacigena* Bonifácio & Menot, 2018 and *B. ignigena* Bonifácio & Menot, 2018 was not possible. However, morphologically, the presence of cirriform branchial-like structures from segment six, as well as nine pairs of elytrophores, indicates these specimens' affinity to the genus *Bathyfauvelia*. Other Macellicephalinae genera that also possess cirriform or digitiform dorsal tubercles are *Bathycatalina* Pettibone, 1976, *Bathybahamas* Pettibone, 1985, *Vampiropolynoe* Marcus & Hourdez, 2002 and *Yodanoe* Bonifácio & Menot, 2018. However, these genera differ from *Bathyfauvelia* by either the number of segments (*Bathycatalina* has up to 24; *Vampiropolynoe* has up to 45, *Yodanoe* has up to 17), and/or the number of elytra (*Bathycatalina* has 12 pairs, *Bathybahamas* has eight pairs, *Vampiropolynoe* has 10 pairs), and/or the development of the notopodia compared with the neuropodia, with notopodia shorter than neuropodia in *Yodanoe*, *Vampiropolynoe*, and reportedly *Bathyfauvelia* (Bonifácio & Menot, 2018), though subequal in *Bathycatalina*, *Bathybahamas*, as well as the presence of two types of neurochaetae (in *Yodanoe*, *Bathybahamas*, *Vampiropolynoe*) and the presence of serrated jaws (smooth in *Bathybahamas*, with a small secondary tooth in *Yodanoe*, absent in *Vampiropolynoe*, unobserved for *Bathycatalina*).

The largest complete specimen described herein strongly resembles the specimen ascribed to *B. affinis* (Fauvel, 1914) by Pettibone (1976, fig. 22) collected from the North Atlantic Ocean, north of Jan Mayen Island, and included in her re-description of that species. However, the Jan Mayen Island specimen differed noticeably from the holotype of *B. affinis*, which Pettibone also described in the same paper (type locality off Madeira, North Atlantic), due to the presence of conical cephalic peaks, rather than frontal filaments, extended tentacular acicular lobes, and the subequal noto- and neuropodial lobes. It is highly possible that they represent two different species. Our larger specimen also differs from the illustrated Jan Mayen specimen, as it has 18, not 19 segments in total. Our specimens differ from the other more recently described species of *Bathyfauvelia* – *B. glacigena* Bonifácio & Menot, 2018 and *B. ignigena* Bonifácio & Menot, 2018 – by the lack of chaetae on the tentacular segment, the subequal length of notopodia and neuropodia, the cirriform dorsal tubercles (compared with lamelliform in the other two nominal species) and the presence of only one type of neurochaetae (albeit with longer and shorter lengths). We tentatively assign the specimens to *Bathyfauvelia sensu* Bonifácio & Menot, 2018, due to these differences. Two of the smaller specimens are likely juveniles of the same species as AM W.51978. The specimens may represent yet another undescribed Macellicephalinae genus because of the combination of characters such as lack of lateral antennae, 18 segments, nine pairs of elytra, subequal noto- and neuropodia in anterior segments, the presence of cirriform involute dorsal tubercles, presence of cephalic peaks, lack of frontal filaments, a single type of neurochaetae, and chaetae present or absent from tentacular segment.

Bathypolaria Levenstein, 1981

Austropolaria Neal, Barnich, Wiklund & Glover, 2012 *fide* Kolbasova *et al*., 2020.

Type species. *Bathypolaria carinata* Levenstein, 1981.

Diagnosis. Body 15 segments. Cephalic peaks absent. Pigmented eyes absent. Median antenna dorsal; ceratostyle smooth. Lateral antennae absent. Tentaculophores without chaetae. Tentacular cirri elongate, evenly tapering; without papillae. Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped, cutting edge smooth. Pharynx with seven pairs of terminal papillae, all similar. Nephridial papillae distinct, at least on some median segments; first visible on segment six; last visible on segment 12.

Elytra eight to nine pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly. Last elytra on segment 15, or 17. Dorsal tubercles present on all cirrigerous segments. Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process absent. Neuropodial postchaetal lobe bilobed. Notochaetae dorsal orientation mainly or wholly dorso-lateral projections from notopodia. Notochaetal spines in cross-section flattened and knife-like, usually with serrations along the convex margin. Notochaetal spines with ornamentation with teeth along one margin. Neurochaetae shaft spatulate, flattened or depressed. Neurochaetae tips simple, entire; blunt. Neurochaetae with bidentate tips absent.

Remarks. Kolbasova *et al*. (2020) showed after molecular analysis that the monotypic genus *Austropolaria* is a junior synonym of *Bathypolaria*, and emended the generic diagnosis for *Bathypolaria* to include a variable range of segments (13–20) and elytrophores (seven to nine). Many Macellicephalinae genera and species have been erected by authors who assumed such morphological characters were fixed for a given species, but if the result of Kolbasova *et al*. (2020) is replicated for other taxa, many Macellicephalinae taxa, particularly monotypic genera, may need to be revised.

Bathypolaria magnicirrata (Neal, Barnich, Wiklund & Glover, 2012)

Austropolaria magnicirrata Neal, Barnich, Wiklund & Glover, 2012: 83–87, figs 2–4.

Material examined. AM W.51999 (3), off Bermagui, IN2017_V03_045, 36° 21.618'S, 150° 38.61'E – 36° 19.392'S, 150° 39.012'E, Brenke Epibenthic Sledge, 2,835–2,739 m, 27 May 2017; AM W.52012 (4), Bass Strait, IN2017_V03_023, 39° 27.72'S, 149° 16.62'E – 39° 27.9'S, 149° 14.76'E, Brenke Epibenthic Sledge, 2,774–2,694 m, 22 May 2017; AM W.53499 (1), Bass Strait, IN2017_V03_023, 39° 27.72'S, 149° 16.62'E – 39° 27.9'S, 149° 14.76'E, Brenke Epibenthic Sledge, 2,774–2,694 m, 22 May 2017; AM W.53500 (1), off K'gari (formerly Fraser Island), IN2017_V03_110, 25° 13.188'S, 154° 9.612'E – 25° 15.63'S, 154° 12'E, Brenke Epibenthic Sledge, 4,005–4,010 m, 11 June 2017.

Description. Body 18–19 segments. Nine specimens, length range 5–11 mm, width 1–2.5 mm (excluding parapodia), for 18–19 segments. Preserved specimens with everted pharynx light brown, elsewhere unpigmented. Cephalic peaks absent. Pigmented eyes absent. Median antenna dorsal; ceratostyles elongate, evenly tapering (length twice width of prostomium); ceratostyle smooth. Lateral antennae absent. Frontal filaments absent. Tentaculophores without chaetae. Tentacular cirri elongate, evenly tapering; without papillae (ventral pair three to four times longer than dorsal). Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped (amber-coloured), cutting edge smooth. Pharynx barrel-shaped without distinct ornamentation, with seven pairs of terminal papillae, all similar.

Elytra nine pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly. Last elytra on segment 17. Elytra missing on all examined specimens. Dorsal tubercles absent (or indistinct). Nephridial papillae indistinct, not observable.

Aciculae of notopodia and neuropodia do not project clear of epidermis. Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process absent. Neuropodial postchaetal lobe bilobed.

Notochaetae distinctly thicker than neurochaetae. Notochaetae dorsal orientation mainly or wholly dorso-lateral projections from notopodia. Notochaetal spines in cross-section flattened and knife-like, usually with serrations along the convex margin. Notochaetal spines with ornamentation with teeth along one margin. Tips of notochaetal spines with short points. Notochaetae stout, flattened, wide chaetae with fine serrations along convex margin, tips pointed, unidentate. Neurochaetae shaft spatulate, flattened or depressed; ornamentation in the form of spines in distinct transverse rows. Neurochaetae tips simple, entire; blunt. Neurochaetae with bidentate tips absent. Neurochaetae flattened to concave, and with fine serrations along both margins.

Anus dorsal.

Distribution and ecology. South Pacific or Antarctic Ocean. Amundsen Sea, Antarctica and off southeastern Australia. Australia. Depth 1,126–4,010 m. In the region of the Amundsen Sea, *Bathypolaria magnicirrata* was absent from shallow (500 m) stations and only occurred in the deeper basin thought to be the result of erosion by subglacial meltwater (Neal *et al*., 2012).

Remarks. *Austropolaria* was originally a monotypic genus, described for *A. magnicirrata* Neal, Barnich, Wiklund & Glover, 2012 from 1,000–1,500 m in the Amundsen Sea of the Antarctic region (Neal *et al*. 2012). Our specimens from 2,694–4,010 m in southeastern Australia agree closely with the original description, including that the pharynx has seven pairs of terminal papillae, nine pairs of reduced elytrophores, large dorsal cirrophores, and a posterior ventral keel.

Bruunilla Hartman, 1971

Type species. *Bruunilla natalensis* Hartman, 1971.

Diagnosis. Body 17–18 segments. Cephalic peaks absent. Pigmented eyes absent. Median antenna ceratostyle elongate, evenly tapering, smooth. Lateral antennae absent. Frontal filaments present, or absent. Tentaculophores without chaetae. Tentacular cirri without papillae. Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped, cutting edge dentate. Pharynx paired terminal papillae present (number unknown). Lower lip with a pair of tapering wing-like structures projecting laterally and connecting to segment three. Elytra eight pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly. Last elytra on segment 15. Dorsal tubercles absent (or indistinct). Nephridial papillae indistinct, not observable. Aciculae of notopodia and neuropodia do not project clear of epidermis. Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process absent, or present. Notochaetae thinner than neurochaetae. Notochaetal spines with ornamentation with teeth along two margins. Notochaetae few, distally flattened to concave. Simple neurochaetae with capillary tips absent. Neurochaetae shaft ornamentation with a row of spines along both margins. Neurochaetae numerous, distally flattened to concave. Anus dorsal.

Remarks. *Bruunilla* Hartman, 1971 was described for *B. natalensis* from abyssal depths in the Indian Ocean. Pettibone (1979) redescribed *B. natalensis* and recognised the genus as a polynoid. The generic diagnosis was emended and a second species was described from the abyssal Pacific Ocean by Bonifácio and Menot (2018); these authors also reported additional genetic diversity representing an additional distinct but undescribed species in the Pacific Ocean. Although the placement of *Bruunilla* within the polychaetes was originally unclear, intact specimens are readily recognised due to the large paired wing-like structures covering the ventrum of the first three segments.

The generic diagnosis above is based on Bonifácio and Menot (2018). With the two new species described below, *Bruunilla* now includes four described species.

Bruunilla magnantennata sp. nov.

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Fig. 13

Bruunilla sp.—Gunton *et al*., 2021:102–103 (in part).

Holotype: AM W.51982 (1), Coral Sea, off K’gari (formerly Fraser Island), eastern Australia, IN2017_V03_110, 25° 13.188'S, 154° 9.612'E – 25° 15.63'S, 154° 12'E, Brenke Epibenthic Sledge, 4,005–4,010 m, 11 June 2017. **Paratype:** AM W.53260 (1), same sample as holotype.

Diagnosis. *Bruunilla magnantennata* sp. nov., can be distinguished from the other three congeners by having 18 segments, widest part of prostomium anterior to middle, median antenna inserted at front of prostomium, frontal filaments present and nephridial papillae first visible on segment 10.

Description. Body 18 segments. Holotype 6 mm long, 1.2 mm wide (excluding parapodia) with 18 segments (including pygidium), segments 11–13 removed for sequencing. Cephalic peaks absent. Pigmented eyes absent. Median antenna anterior, at front of prostomium. Lateral antennae absent. Frontal filaments present (Fig. 13A). Tentaculophores without chaetae. Pharynx undissected, jaws and pharyngeal papillae not observed. Facial tubercle absent. Upper lip with two low lobes. Lower lip with a pair of tapering lobe-like lamellate structures projecting laterally and connecting to segment three, lamellae mostly longitudinal along entire length (Fig. 13B).

Elytra eight pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly. Last elytra on segment 15. Elytra all missing on both specimens. Dorsal tubercles absent (or indistinct). Nephridial papillae distinct, at least on some median segments; first visible on segment 10; last visible on segment 11, indistinct on other segments.

Aciculae of notopodia and neuropodia do not project clear of epidermis (Fig. 13C).

Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process absent. Neuropodial postchaetal lobe distally entire (Fig. 13C).

Notochaetae few, thinner than neurochaetae (Fig. 13C). Notochaetal spines in cross-section flattened and spatulate with serrations along both margins. Notochaetal spines with ornamentation with teeth along two margins. Notochaetae distally flattened to concave with serrations along both margins, tips pointed (Fig. 13D). Neurochaetae shaft ornamentation with a row of spines along both margins, tips simple, entire with short points. Neurochaetae with bidentate tips absent. Neurochaetae distally flattened to concave with serrations along both margins, tips pointed (Fig. 13E).

Anus dorsal. Pygidium small, rounded.

Variation. Paratype 4 mm long, 1 mm wide (excluding parapodia), with 18 segments (including pygidium). Specimen also has small prostomium, but with two large median antenna ceratophores (aberrant) in U-shaped notch between prostomial lobes, arising from between the middle of the prostomial lobes, styles missing; anterior margins of prostomial lobes with minute frontal filaments. Upper lip

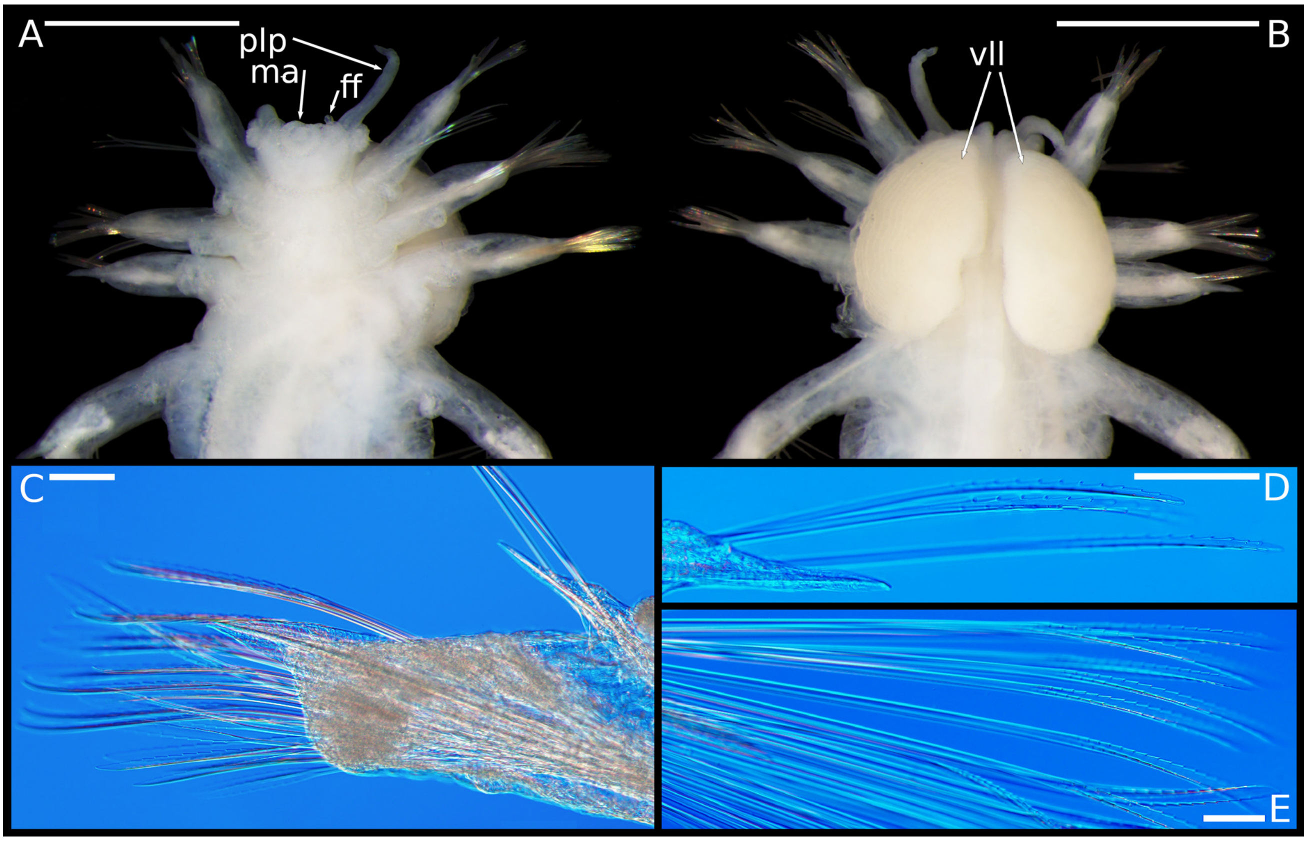

Figure 13. *Bruunilla magnantennata* sp. nov., Holotype AM W.51982: (A) dorsal view, anterior end, scale bar is 1 mm; (B) ventral view, anterior end, scale bar is 1 mm; (C) parapodium, scale bar is 0.1 mm; (D) notochaetae, scale bar is 0.1 mm; (E) neurochaetae, scale bar is 0.1 mm. Abbreviations: plp = palp; ma = median antenna; ff = frontal filament; vll = ventral lamellate lobes.

with two small low lobes. Dorsal cirri, tentacular cirri and antennal style(s) all missing; some ventral cirri present; buccal cirrophore scar large, located basally on neuropodia, subsequent ventral cirri evenly tapering, long, smooth, attached subdistally anteriorly then medially from mid-body segments (segment nine). Parapodia longer than body width. Neuropodia ventrally with small raised ciliated patches in a line from body to distal end of neuropodium. Posterior end somewhat damaged, but elongate papillae appear to be absent/missing from posterior neuropodia. Chaetae similar to those of holotype.

Etymology. The species name '*magnantennata*' is derived from Latin, and refers to the enlarged median antennal ceratophore on the prostomium.

Distribution and ecology. South Pacific Ocean. Australia, Qld, off K'gari (formerly Fraser Island). Depth 4,005–4,010 m.

Remarks. This species is similar to *Bruunilla posteroantennata* sp. nov., except that the latter species possess fewer body segments – 18 compared with 17 – the prostomium is much smaller, and with a large protruding bulbous median antenna ceratophore (albeit with style missing) arising from between the middle of lobes of prostomium (not small and arising posteriorly as in *B. posteroantennata*); ventral cirri attached medially in mid to posterior segments; a lower lip that has two small low lobes (not trilobed as in *Bruunilla posteroantennata* sp. nov.) and the mostly longitudinal folding of the ventral lamellate lobes. This species also differs from *B. nealae* Bonifácio and Menot, 2018 by the lack of elongate neuropodial papillae on segments 11–14, the form and position on the prostomium of the median antennal ceratophore, the longitudinal folding of the ventral lamellate lobes, as well as the more medially arising ventral cirri. Bonifácio and Menot (2018) did not illustrate the elongate neuropodial papilla of *B. nealae* but described it as inserted in upper part of neuropodia lobe; it is not clear if this papilla is homologous with the neuropodial supra-acicular process found in many Polynoidae species, but it is absent in both new species of *Bruunilla* described here. Our molecular results indicate that *Bruunilla magnantennata* sp. nov., is genetically distinct from other species of *Bruunilla* (Figs 2–3).

Bruunilla posteroantennata sp. nov.

urn:lsid:zoobank.org:act:4104B48E-01A9-4879-934E-20E32AF0F01D

Fig. 14

Bruunilla sp.—Gunton *et al*., 2021: 102–103 (in part).

Holotype: AM W.52879, Coral Sea off eastern Australia, Coral Sea CMR, IN2017_V03_134, 23° 45.018'S, 154° 34.308'E – 23° 46.434'S, 154° 32.784'E, Brenke Epibenthic Sledge, 2,093–2,156 m, 14 June 2017. **Paratype:** AM W.52001 (1), Hunter CMR, IN2017_V03_079, 32° 7.848'S, 153° 31.638'E – 32° 9.756'S, 153° 31.416'E, Brenke Epibenthic Sledge, 4,031–4,031 m, 4 June 2017.

Diagnosis. *Bruunilla posteroantennata* sp. nov., can be distinguished from the other three congeners by having 17 segments, widest part of prostomium anterior to middle, median antenna inserted dorsally and nephridial papillae first visible on segment nine.

Description. Body 17 segments. Holotype 3mm long, 1mm wide (excluding parapodia) with 17 segments (including pygidium). Cephalic peaks absent. Pigmented eyes absent. Median antenna dorsal. Lateral antennae absent. Frontal filaments present (Fig. 14A). Tentaculophores without chaetae. Tentacular cirri elongate, evenly tapering; without papillae (slender, tapering, longer than palps). Pharynx undissected, jaws and pharyngeal papillae not observed. Facial tubercle absent. Upper lip trilobed. Lower lip with a pair of tapering lobe-like structures projecting laterally, rounded posteriorly and laterally, fused to ventrum from lower lip to segment 2–3, lobes divided medially and extending to segment 3–4, lamellae of both lobes longitudinal on anterior third, then lamellae mostly horizontal to posterior of lobes (Fig. 14B).

Elytra all missing on both specimens. Eight pairs of elytrophores; on segments 2, 4, 5 then every second segment, distribution changing posteriorly. Last elytrophore on segment 15. Dorsal tubercles absent (or indistinct). Nephridial papillae distinct, at least on some median segments; first visible on segment nine; last visible on segment 10, indistinct on other segments.

Dorsal cirri styles smooth, slender, tapering evenly, as long as neuropodia, cirrophores short. Ventral cirri smooth, tapering evenly, arising subdistally on anterior segments, then from mid to posterior segments arising near middle of neuropodia; ventral cirri of segment two (buccal cirri) longer than subsequent ventral cirri.

Aciculae of notopodia and neuropodia do not project clear of epidermis (Fig. 14C).

Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process absent (Fig. 14C). Neuropodial postchaetal lobe distally entire.

Notochaetae thinner than neurochaetae (Fig. 14C). Notochaetal spines in cross-section flattened and spatulate with serrations along both margins. Notochaetal spines with ornamentation with teeth along two margins. Notochaetae distally flattened to concave with serrations along both margins (Fig. 14D). Neurochaetae shaft ornamentation with a row of spines along both margins; tips simple, entire; short points. Neurochaetae with bidentate tips absent. Neurochaetae distally flattened to concave with serrations along both margins (Fig. 14E).

Anus dorsal. Pygidium small, rounded.

Variation. Paratype AM W.52001 with 17 segments, 4mm long, 1 mm wide (excluding parapodia), damaged posteriorly. Elytra all missing, eight pairs of elytrophores. Median antenna ceratophore small, inserted posteriorly in anterior notch. Ovoid frontal filament present on one side, other presumed missing. Pair of large lamellate lobes present ventrally, extending from lower lip to segment four, lateral and posterior margins rounded. Ventral cirri inserted near middle of neuropodia; buccal cirri longer than subsequent ventral cirri; dorsal cirri similar to holotype. Chaetae missing from posterior parapodia, rest similar in form to holotype.

Etymology. The species name is derived from Latin, and refers to the posteriorly placed location on the prostomium of the median antenna.

Distribution and ecology. Coral Sea and southeastern Australia. Depth 2,093–4,031 m.

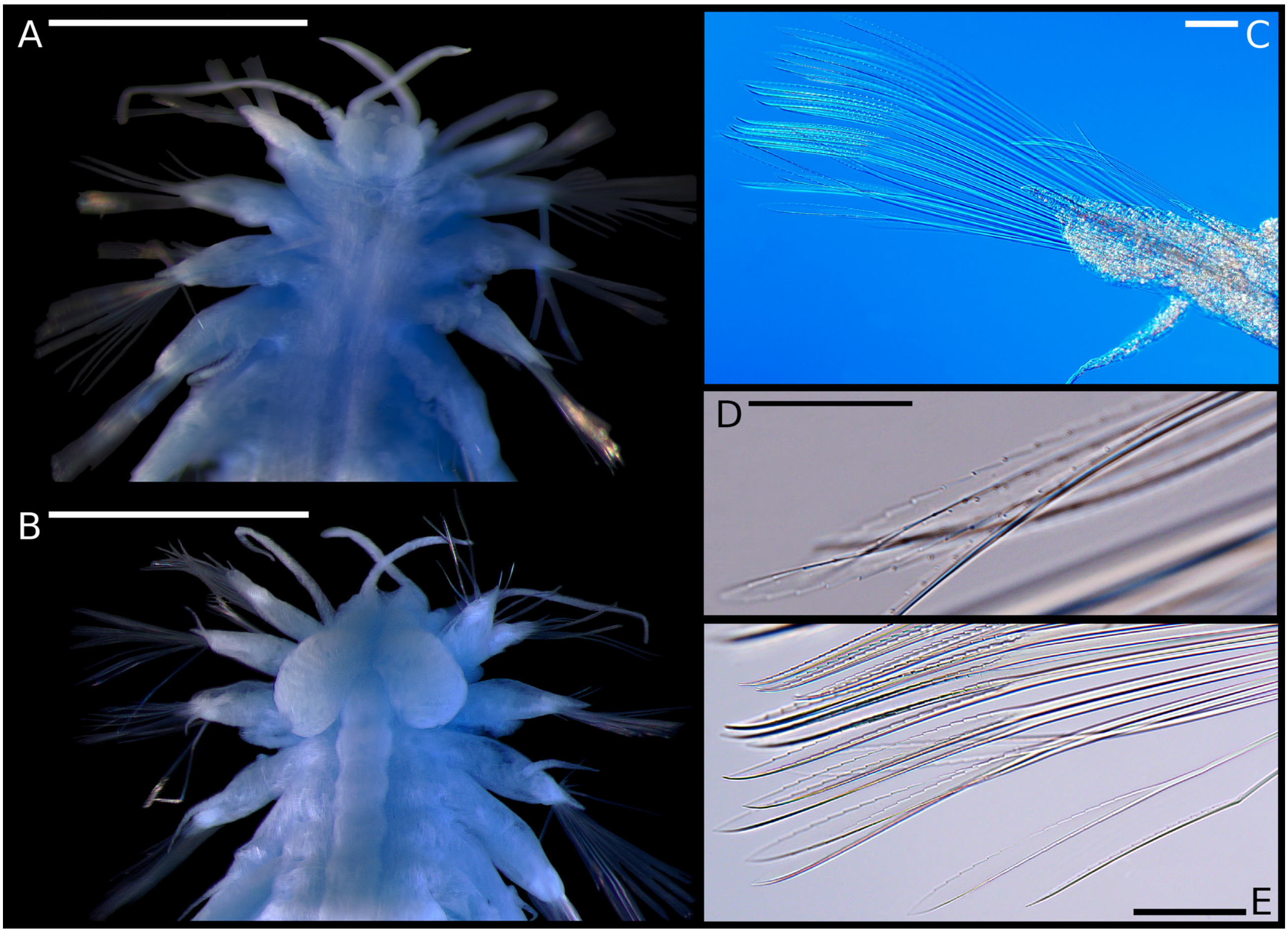

Figure 14. *Bruunilla posteroantennata* sp. nov., Holotype AM W.52879: (A) dorsal view, anterior body (stained with methyl blue), scale bar is 1 mm; (B) ventral view, anterior body (stained with methyl blue), scale bar is 1 mm. *Bruunilla posteroantennata* sp. nov., specimen AM W.52001: (C) parapodium, scale bar is 0.1 mm; (D) notochaetae, scale bar is 0.05 mm; (E) neurochaetae, scale bar is 0.1 mm.

Remarks. Morphological differences between *Bruunilla posteroantennata* sp. nov., and *B. nealae* Bonifácio & Menot 2018, include the median antenna inserted more posteriorly on prostomium; ventral cirri inserted mid-neuropodium (reportedly subdistal in *B. nealae*); and the lack of elongate neuropodial papillae on segments 11–14 (present in *B. nealae*). This species is also morphologically dissimilar to the type species for the genus, *B. natalensis* Hartman 1971, which possesses ventral wing-like structures that are tapered laterally and posteriorly (not rounded) and lacks frontal filaments. It also differs from *Bruunilla magnantennata* sp. nov., by the form and position on the prostomium of the median antenna (small and posteriorly placed compared with large and anteriorly placed in *B. magnantennata* sp. nov.); a trilobed lower lip (compared with two low lobes); and the different orientation of the folding of ventral lamellate lobes (mostly horizontal in this species compared with mostly longitudinal in *B. magnantennata* sp. nov.). Our molecular results indicate that *Bruunilla posteroantennata* sp. nov., is genetically distinct from other species of *Bruunilla* (Figs 2–3).

Macellicephala McIntosh, 1885

Oligolepis Levinsen, 1886 (*fide* Wiren, 1901).
Sinantenna Hartmann-Schröder, 1974 new synonym (but following comment of Pettibone, 1976: 80).

Type species. *Macellicephala mirabilis* (McIntosh, 1885).

Diagnosis. Body 18 segments. Cephalic peaks absent. Pigmented eyes absent. Median antenna dorsal; ceratostyle smooth. Lateral antennae absent. Frontal filaments present or absent. Tentaculophores without chaetae. Tentacular cirri without papillae. Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped, with smooth margins. Pharynx with nine pairs of terminal papillae. Nephridial papillae distinct, at least on some median segments, usually larger and bulbous on segments 10, 11 and 12. Dorsal tubercles present or absent. Elytra nine pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly. Last elytra on segment 17. Aciculae of notopodia project clear of epidermis. Dorsal cirri styles elongate, evenly tapering, or elongate, subdistally inflated, or elongate, with sharply narrowed tips. Notochaetae distinctly thicker than neurochaetae. Neurochaetae tips simple, entire. Neurochaetae with bidentate tips absent.

Remarks. *Macellicephala* comprises 26 species (Read & Fauchald, 2025) including eight described recently (Bonifácio & Menot, 2018; Neal *et al.*, 2018). Only 12 specimens in the present study were referable to *Macellicephala*, but all were damaged and not identifiable to species.

Macellicephala cf. *macintoshi*

Fig. 15

Material examined. AM W.53094 (1), East Maatsuyker flat, IN2018_V06_074, 44° 13.218'S, 146° 14.778'E – 44° 13.35'S, 146° 14.292'E, CSIRO Four Metre Beam Trawl, 1,501 m, 3 December 2018.

Description. Body 18 segments. Complete specimen, 20 mm long, 4 mm wide (excluding parapodia). Body robust, with dark purple pigmentation dorsally and ventrally (Fig. 15A–B). Cephalic peaks absent. Pigmented eyes absent. Median antenna dorsal. Lateral antennae absent. Small slender frontal filaments present. Tentaculophores without chaetae. Tentacular cirri elongate, evenly tapering (similar in length to palps); without papillae (Fig. 15B). Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped, cutting edge smooth. Facial tubercle present as three inflated pads between upper lip and prostomium. Upper lip comprising longitudinal folds or ridges. Single white ridge per segment present ventrally, running from ventral side of neuropodia to midline of ventrum (Fig. 15A–B).

Elytrophores nine pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly. Last elytra on segment 17. Elytra all missing. Dorsal tubercles present on all cirrigerous segments; small conical to digitiform projections (Fig. 15A). Nephridial papillae distinct, at least on some median segments; first visible on segment five; last visible on segment 12, prominent on segments 10, 11, 12, inconspicuous on other segments.

Aciculae of notopodia and neuropodia do not project clear of epidermis.

Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process absent (Fig. 15C).

Notochaetae distinctly thicker than neurochaetae. Notochaetal spines with ornamentation in form of fine teeth in distinct transverse rows. Notochaetae few, with faint transverse striations and blunt tips (Fig. 15D); most notochaetae missing. Neurochaetae tips simple, entire; blunt. Neurochaetae with bidentate tips absent. Neurochaetae more

Figure 15. *Macellicephala* cf. *macintoshi*, specimen AM W.53094: (A) anterior end, dorsal view, scale bar is 2mm; (B) prostomium and first few segments, scale bar is 1mm; (C) parapodium segment 9 right side, anterior view, scale bar is 0.1mm; (D) notochaetae detail, segment 9 right side, scale bar is 0.025mm; (E) neurochaetae detail, segment 9 right side, scale bar is 0.05mm.

numerous than notochaetae, long, flattened to concave, with faint transverse serrations along one margin, tapering to pointed tips which appear slightly curved/hooked when viewed from side (Fig. 15E).

Distribution and ecology. Seamount off southern Tasmania, Australia. Depth 1,501 m.

Remarks. This specimen most resembles *M. macintoshi* Neal, Brasier & Wiklund 2018, described from southern Africa collected at 540–900 m depth and which was originally identified as *Polynoe* (*Macellicephala*) *mirabilis* by McIntosh (1905).

Although this species resembles our specimen due to its dorsal purple colouration, and features such as a trilobed facial tubercle, medially-inserted short, slender frontal filaments and conical dorsal tubercles, there are a few differences such as neurochaetae with faint serrations on both margins tapering to pointed tips (our specimen has faint serrations along one side only) and smooth copper-coloured notochaetae (our specimen has faint serrations). Currently there are no sequences available in GenBank for *M. macintoshi* so comparison with our specimen is not possible. There is also resemblance to *M. australis* Wu & Wang, 1987, described from the "Southern Ocean", but that species possesses neurochaetae that distally taper abruptly to slightly hooked tips whereas our specimen's neurochaetae are evenly tapered and tips are pointed, appearing slightly curved/hooked only when viewed laterally. The frontal filaments of *M. australis* are 'minute, indistinct' (Wu & Wang, 1987), whereas our specimen possesses small papilla-like frontal filaments; and *M. australis* also lacks dorsal tubercles. There are no sequences available in GenBank for *M. australis*, for comparative purposes.

Other species are distinguished from this specimen as follows: *M. clarionensis* Bonifácio & Menot, 2018, described from equatorial eastern Pacific Ocean, possesses neurochaetae with minutely bidentate tips; *M. parvafauces* Bonifácio & Menot, 2018, also described from equatorial eastern Pacific Ocean, possesses very small jaws and lacks strong purple-coloured pigment, even when live; *M. patersoni* Neal, Brasier & Wiklund, 2018 described from Pine Island Bay, Amundsen Sea, Southern Ocean, lacks dorsal tubercles, and possesses neurochaetae with bidentate tips; *M. brenesorum* Neal, Brasier & Wiklund, 2018, also described from Pine Island Bay, Amundsen Sea, Southern Ocean, has distinct, slender frontal filaments (not papilla-like), dorsal tubercles as distinct conical mounds (not digitiform), ventral cirri that are 'short' (not extremely short), and neurochaetae with serrations along both sides and pointed tips (not curved/hooked). *Macellicephala violacea* (Levinsen, 1886), originally described from the Arctic (Kara Sea) at 90 m, was redescribed by Pettibone (1976) from several non-type specimens (which Neal *et al*., 2018 considered to be different species) and must be considered for comparison, as features strongly resemble those of our specimen. However, according to Pettibone (1976) the type could not be located, and Neal *et al*. (2018) advise that a revision is required for the species. The only sequence of *M. violacea* available in GenBank came from a specimen collected from the North Atlantic Ocean (SW mid-Atlantic Ridge) in 2,619 m (Shields *et al*., 2013), whose identity was not corroborated by morphological description. However, owing to the vastly different geographical locality and some small differences such as smaller frontal filaments ("extraordinarily small filiform antennae" according to Levinsen), smooth notochaetae and the lack of a trilobed facial tubercle (although this latter was considered by Pettibone to be present, her illustration – fig.3, p13 – shows this structure as the upper lip), our specimen is most likely not *M. violacea*. Phylogenetic analysis also confirms that *Macellicephala* cf. *macintoshi* was distinct from *M. violacea* (Figs 2–3) and genetic distance (COI uncorrected p-distance) between *M.* cf. *macintoshi* and *M. violacea* was 0.132 (Murray *et al*., 2025, Suppl. Table 2). Because of the similarity with, but small differences from, *M. macintoshi*, we are tentative with this identification.

Macellicephalinae gen. *incertae sedis* sp.

Fig. 16

Macellicephalinae sp. 5 Gunton *et al*., 2021: 109–110, fig. 23C.

Material examined. AM W.52014 (1), Hunter CMR, IN2017_V03_079, 32° 7.848'S, 153° 31.638'E – 32° 9.756'S, 153° 31.416'E, Brenke Epibenthic Sledge, 4,031–4,031 m, 4 June 2017.

Description. Body 26 segments, 33 mm long, 13 mm wide (including parapodia) (Fig. 16A). Cephalic peaks absent. Pigmented eyes absent. Median antenna absent (staining revealed no scar indicating median antenna may have broken off). Lateral antennae absent. Tentaculophores without chaetae. (Fig. 16B). Tentacular cirri without papillae.

Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped, cutting edge dentate (4–5 teeth per jaw). Pharynx not everted, but jaws observed after small dissection. Facial tubercle absent, upper lip comprising longitudinal folds or ridges. Buccal cirri slightly shorter than tentacular cirri but longer and more stout than ventral cirri on following segments, becoming small and filiform from segment three to posterior segments, inserted medially on neuropodia. Dorsal cirri present from segment three on all non-elytrigerous segments, styles long, longer than parapodia.

Elytra nine pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly. Last elytra on segment 17. Elytra large but leaving middle of dorsum uncovered. Elytra surface smooth. Elytra macrotubercles absent. Elytra margins ornamented. Elytra marginal papillae absent, or present (present on first pair, absent on sixth pair, others unknown). Marginal papillae digitiform, simple. Elytra present on segment two, elongate-reniform, covering dorsum, with some dark pigment spots and small marginal papillae; a single large elytra present on segment 11, thin, translucent, round to oval, without pigment or marginal papillae, not covering dorsum. All other elytra missing. Dorsal tubercles present on non-elytrigerous segments, as small raised nodules, except on segments 6, 8, and 10 which are large flattened papillate structures (possibly a reproductive state) (Fig.16A). Nephridial papillae distinct, at least on some median segments; first visible on segment 10.

Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering (Fig. 16D). Neuropodial prechaetal supra-acicular process absent. Neuropodial postchaetal lobe distally entire.

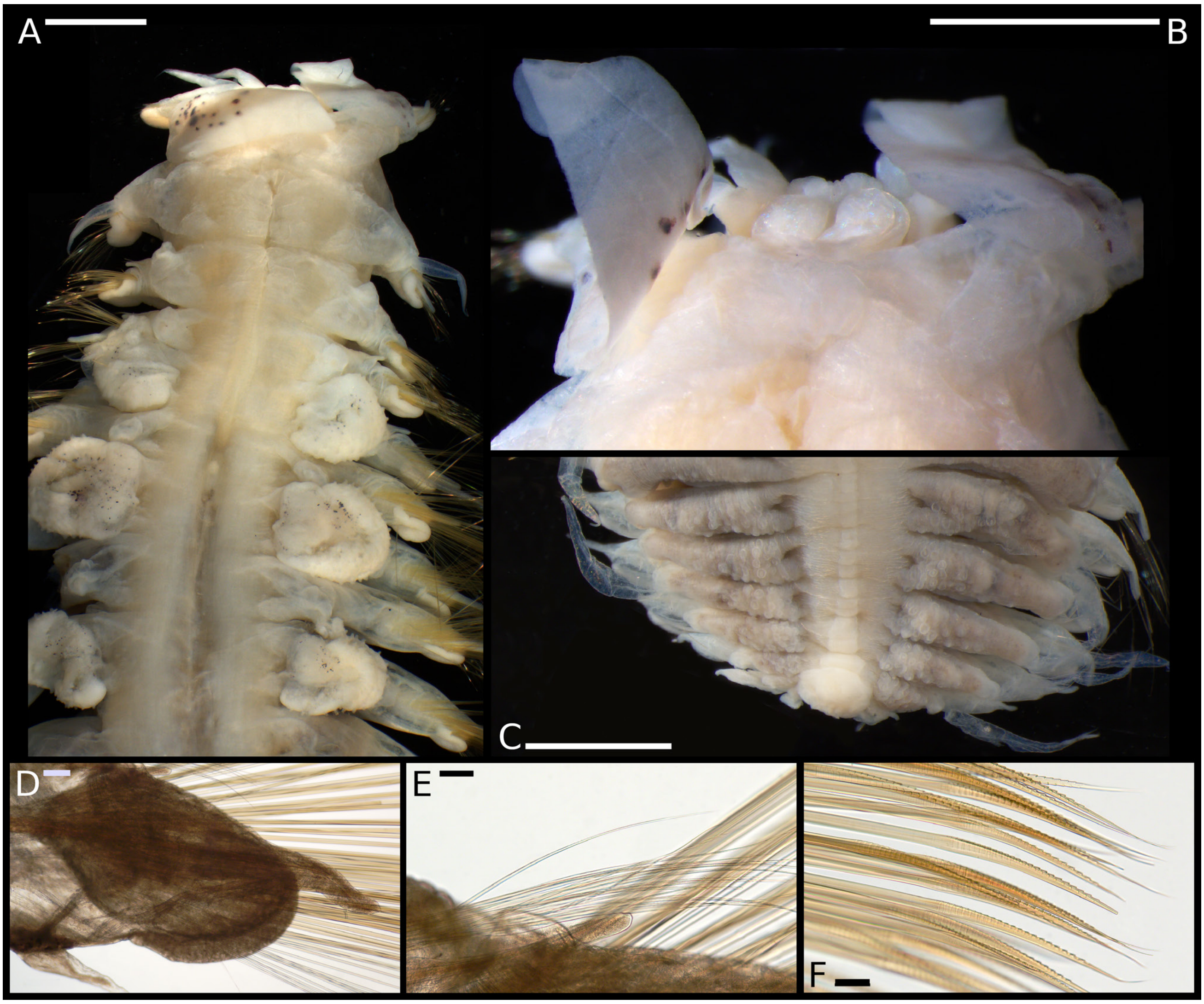

Figure 16. Macellicephalinae gen. *incertae sedis* sp., specimen AM W.52014: (A) dorsal view of whole specimen, scale bar is 2 mm; (B) dorsal view of anterior end, elytra peeled back to reveal prostomium, scale bar is 2 mm; (C) dorsal view, posterior end, scale bar is 2 mm; (D) anterior view, parapodium segment 9, scale bar is 0.2 mm; (E) notochaetae segment 9, scale bar is 0.1 mm; (F) neurochaetae segment 9, scale bar is 0.1 mm.

Notochaetae thinner than neurochaetae. Notochaetal spines with capillary tips present (Fig. 16E). Notochaetal spines with ornamentation in the form of fine teeth in distinct transverse rows. Tips of notochaetal spines with extended narrowly tapering tips. Notochaetae with faint transverse spinous rows and long capillary tips. Simple neurochaetae with capillary tips present. Neurochaetae shaft spatulate, flattened or depressed; ornamentation with a row of spines along both margins (typically neurochaetae flattened). Neurochaetae tips simple, entire; elongate with fine pointed tips (Fig. 16F). Neurochaetae with bidentate tips absent. Neurochaetae golden, concave to flattened with transverse rows of spines along two sides, starting from middle bulge along chaeta, tips long, capillary.

Posteriorly, notopodia with multiple rounded papillae on dorsal surface (Fig. 16C). Anus dorsal. Pygidium rounded (Fig. 16C).

Distribution and ecology. Australia, off New South Wales. Depth 4,031 m.

Remarks. Due to the absence of lateral antennae, this specimen is assigned to Macellicephalinae, and appears to belong to the group of genera also lacking a median antenna (Anantennata clade of Bonifácio & Menot, 2018) which includes species of *Bruunilla* Hartman, 1971; *Hodor* Bonifácio & Menot, 2018; *Nu* Bonifácio & Menot, 2018; *Polaruschakov* Pettibone, 1976; *Diplaconotum* Loshamn, 1981; *Bathymariana* Levenstein, 1978; *Bathymiranda* Levenstein, 1981; *Bathycanadia* Levenstein, 1981; and *Bathyedithia* Pettibone, 1976. It does not correspond closely to any of these genera but appears to be allied to *Bathyedithia*, because of such features as serrated jaws (*Polaruschakov*, *Diplaconotum*, *Bathymiranda*, and *Bathycanadia* possess smooth jaws), nine pairs of elytrophores (*Bathymariana* has 11 pairs), presence of notochaetae (absent in *Nu*), similar unmodified neurochaetae on all segments (they are modified on segments 3–7 in *Hodor*), achaetous tentacular segment (compared with *Bathymiranda*), and lack of neuropodial papillae (compared with *Diplaconotum*). In this paper we emended the generic diagnosis for *Bathyedithia*, after moving *Bathyedithia retierei* Bonifácio & Menot, 2018 to *Polaruschakov*. Because we cannot determine the number of pairs of pharyngeal papillae, and because of dissimilarities with features of *Bathyedithia* and *Polaruschakov* such as chaetal form and the presence of large dorsal structures on segments six, eight and 10, we are tentative about the determination of this single specimen.

Our molecular data place this taxon as sister to *Polaruschakov* species (Figs 2–3), however, better preserved specimens and more taxa sampled will be required to determine if a new genus is justified to accommodate this taxon.

Polaruschakov Pettibone, 1976

Type species. *Polaruschakov polaris* (Uschakov, 1957).

Diagnosis. Body 15–25 segments. Cephalic peaks absent. Pigmented eyes absent. Median antenna absent. Lateral antennae absent. Frontal filaments absent. Tentaculophores without chaetae. Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped. Pharynx with seven pairs of terminal papillae, all similar. Facial tubercle absent (except *P. polaris* (Uschakov, 1957) in which unconfirmed). Dorsum of segment six with a pair of conspicuous elongate flattened scale-like structures present, or absent as in *P. retierei* (Bonifácio & Menot, 2018). Elytra 9–10 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly. Last elytra on segment 17, or 19. Notopodia reduced, much shorter than neuropodia, both with elongate acicular lobe; tips of aciculae not emergent from lobes. Notochaetae slender, thinner than neurochaetae, with faint spinous rows on convex margin, few in number. Neurochaetae shaft spatulate, flattened or depressed; ornamentation with a row of spines along both margins (typically neurochaetae flattened). Neurochaetae tips simple, entire. Neurochaetae with bidentate tips absent.

Remarks. The above diagnosis is based on the seven species recognised in *Polaruschakov* herein.

Polaruschakov investigatoris sp. nov.

urn:lsid:zoobank.org:act:3874EE1F-B74C-440F-92A3-E0FC291A03A6

Fig. 17

Polaruschakov sp. Gunton *et al*., 2021: 110–111, fig. 23D (in part).

Holotype: AM W.52983, Coral Sea, off K’gari (formerly Fraser Island), eastern Australia, IN2017_V03_110, 25° 13.188'S, 154° 9.612'E – 25° 15.63'S, 154° 12'E, Brenke Epibenthic Sledge, 4,005–4,010 m, 11 June 2017. **Paratypes:** AM W.54451 (14); AM W.53878 (1); AM W.54248 (1) all from the same sample.

Diagnosis. *Polaruschakov investigatoris* sp. nov., can be diagnosed from the other species in the genus by having nine pairs of elytra, segment one not visible dorsally and a thick, flattened and oval, scale-like structure located between the dorsum and base of cirrophore on segment six.

Description. Body 15–24 segments. Holotype originally with 24 segments and nine pairs of elytrophores (two midbody segments removed for sequencing, remaining anterior part with 10 segments and five elytrophores, posterior part with 12 segments and three elytrophores, Fig. 17A–B). Holotype (and some paratypes) with dark pigmented areas dorsally at bases of parapodia of segment six, otherwise unpigmented. Cephalic peaks absent (Fig. 17A). Pigmented eyes absent. Median antenna absent. Lateral antennae absent. Frontal filaments absent. Tentaculophores without chaetae. Tentacular cirri elongate, evenly tapering (as long as palps); without papillae (Fig. 17A). Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped, cutting edge smooth. Pharynx not everted and not dissected, jaws and distal papillae not observed in holotype. Facial tubercle absent, upper lip not ridged. Dorsum of segment six with a pair of conspicuous oval, thick, flattened, scale-like structures present (Fig. 17A).

Elytra nine pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly. Last elytra on segment 17. Elytra present on segments two and four, remaining elytra missing on holotype missing, elytrophores small present on segments 2, 4, 5, 7, 9, 11, 13, 15, 17. Elytra small, thin, transparent, wrinkled, fragile. Dorsal tubercles absent (or indistinct). Nephridial papillae indistinct, not observable.

Aciculae of notopodia and neuropodia project clear of epidermis (Fig. 17C). Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process absent (Fig. 17C). Neuropodial postchaetal lobe distally entire.

Notochaetae thinner than neurochaetae. Notochaetae two to six per notopodium, with many short spinous rows and blunt points (Fig. 17D). Neurochaetae shaft spatulate, flattened or depressed; ornamentation with a row of spines along both margins (typically neurochaetae flattened). Neurochaetae tips simple, entire; short points. Neurochaetae with bidentate tips absent. Neurochaetae numerous, long, flattened to concave, serrated along both margins, some with pointed tips and some with blunt tips (Fig. 17E).

Pygidium terminal. Anus terminal. Posterior-most three to four segments reduced, pygidium rounded, anal cirri missing or absent (Fig. 17B).

Variation. Paratypes of various sizes with 15–20 segments, long palps, and some with oval, thick, flattened, scale-like structures (with or without pigment) dorsally at bases of parapodia of segment six. Paratypes with two pairs of smooth, non-dentate jaws present, terminal papillae not observed.

Etymology. This species is named after the CSIRO RV ‘Investigator’ as the specimens were collected aboard this ship during the 2017 “Sampling the Abyss” voyage.

Distribution and ecology. Australia, Queensland, off K’gari (formerly Fraser Island). Depth 4,005–4,010 m.

Remarks. These specimens agree with the emended genus diagnosis by Bonifácio and Menot (2018) for *Polaruschakov* Pettibone, 1976, because of the absence of all antennae combined with non-dentate jaws (or with a single small secondary marginal tooth) and the presence of flattened, thick, scale-like structures on segment six. The five species in this genus have only been reported from deep Arctic waters, off the Mediterranean (Pettibone, 1976) and in abyssal waters of the equatorial eastern Pacific Ocean off Mexico (Bonifácio & Menot, 2018).

The new species exhibits small morphological differences from the five congeners (Read & Fauchald, 2025): *P. polaris*

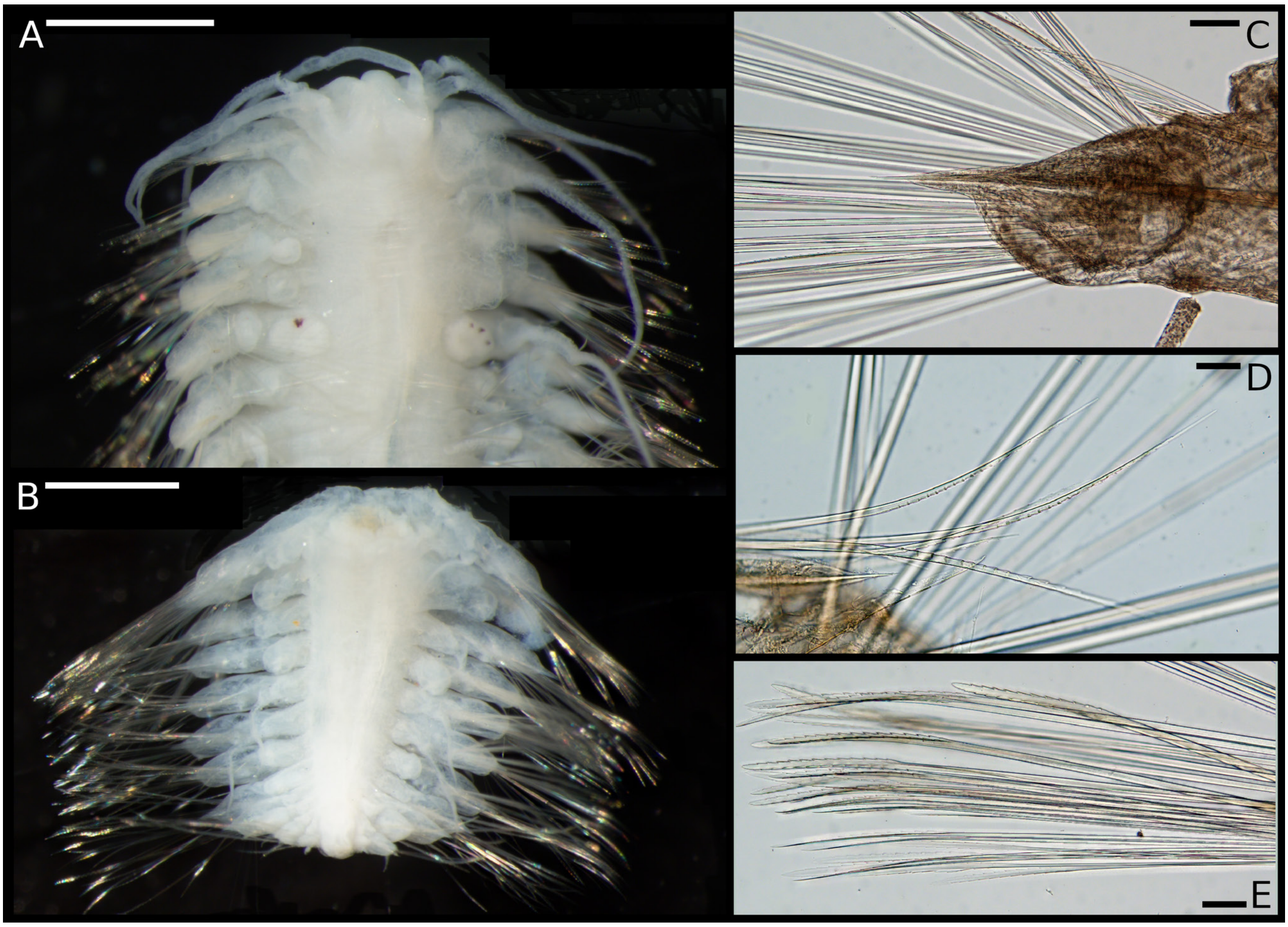

Figure 17. *Polaruschakov investigatoris* sp. nov., Holotype AM W.52983: (A) anterior dorsal view, scale bar is 1 mm; (B) posterior dorsal view, scale bar is 1 mm; (C) parapodium segment 15, scale bar is 0.1 mm; (D) notochaetae, scale bar is 0.05 mm; (E) neurochaetae, scale bar is 0.1 mm.

(Uschakov, 1957); *P. reyssi* Pettibone, 1976; *P. lamellae* Bonifácio & Menot, 2018, *P. limaae* Bonifácio & Menot, 2018; and *P. omnesae* Bonifácio & Menot, 2018. It bears most resemblance to *P. polaris* because of the similar number of segments, the similar number of notochaetae per parapodium, and shape of prostomium, but differs due to the presence of two different types of neurochaetae (blunt and pointed, compared to blunt-tipped only in *P. polaris*). Also, because *P. polaris* has only been recorded from Arctic waters, it is unlikely to be the same as our new species due to the large geographic distance between them. *Polaruschakov limaae* (from the equatorial Eastern Pacific Ocean) has two types of neurochaetae, but differs from *P. investigatoris* sp. nov. by the shape of the prostomium (short and conical anteriorly), the very much reduced notopodia, fewer notochaetae (one or two), and the presence of a ventral pygidial papilla. *Polaruschakov investigatoris* sp. nov., differs from *P. reyssi* (from the Mediterranean) which has notochaetae with capillary tips, and from *P. omnesae* (from the equatorial Eastern Pacific Ocean) which has conical prostomial lobes, short palps and tentacular cirri (reaching only to segment three), few notochaetae (1–3 per parapodium), and neurochaetae with pointed tips only. The new species shares two kinds of neurochaetae with *P. lamellae* (from the equatorial Eastern Pacific Ocean) but differs from it by the lack of lamelliform dorsal tubercles on elytrigerous segments. The presence or absence of large flattened, thickened, scale-like structures dorsally on segment six, which some of these specimens exhibit, is now considered a possible reproductive feature, according to Bonifácio and Menot (2018), as presence or absence ("without pattern") may occur in "other taxa belonging to the Anantennata clade". Also, the number of segments in *Polaruschakov* appears to vary with size (age), and very small specimens may only possess as few as 15 segments (Bonifácio & Menot, 2018: 60; A. Murray *pers. obs.*). Table 3 shows a comparison of the distinguishing features of all seven species.

Polaruschakov investigatoris sp. nov., is genetically distinct from all other species of *Polaruschakov* (Figs 2–3). Genetic distance (COI uncorrected p-distance) between *P. investigatoris* sp. nov., and *P. lamellae* taxa was 0.213, and for *P. investigatoris* sp. nov., and *P. omnesae* it was 0.225 (Murray *et al*., 2025, Suppl. Table 2). This is the first record of a *Polaruschakov* species from the southern hemisphere.

Subfamily Polynoinae Kinberg, 1856

Austrolaenilla Bergström, 1916

Austrolaenilla Bergström, 1916: 291.

Table 3. Comparison of species of *Polaruschakov* Pettibone, 1976. Data from original descriptions and Pettibone (1976).

Species	Jaw cutting edge	Segment 1	Segment 6 dorsal structures	Dorsal tubercles	Elytra pairs	Notopodia
Polaruschakov investigatoris sp. nov.	smooth	not visible dorsally	flat, thickened, oval, scale-like	indistinct	9	conical, tapering
Polaruschakov lamellae Bonifácio & Menot, 2018	additional small secondary tooth	not visible dorsally	flattened scale-like	present, lamelliform	10	conical, tapering
Polaruschakov limaae Bonifácio & Menot, 2018	unknown	not visible dorsally	inflated and roughly circular	absent	9	conical, tapering
Polaruschakov omnesae Bonifácio & Menot, 2018	additional small secondary tooth	not visible dorsally	absent	absent	9	conical, tapering
Polaruschakov polaris (Uschakov, 1957)	smooth	visible dorsally	flat, thickened, elongate, scale-like	present, poorly developed	9	conical, tapering
Polaruschakov retierei (Bonifácio & Menot, 2018) comb. nov.	dentate	not visible dorsally	unmodified	absent	10	short rounded lobe
Polaruschakov reyssi Pettibone, 1976	smooth	visible dorsally	flat, thickened, elongate, scale-like	absent	9	conical, tapering

Type species. *Austrolaenilla antarctica* Bergström, 1916.

Diagnosis. Body 40–43 segments. Cephalic peaks present or absent. Median antenna ceratostyle papillate. Lateral antennae prostomial location ventral to and separate from prostomium; inserted ventrally, distinctly beneath level of median antenna; ceratophores basally separated, not touching; ceratostyles with slender papillae. Tentaculophores with chaetae. Tentacular cirri with slender papillae. Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped. Nephridial papillae distinct, at least on some median segments. Elytra 15 or 16 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution on every third segment after segment 23. Last elytra on segment 32 or 35. Elytra continuing for length of body, or almost (a short tail section may be uncovered) or leaving posterior third or more of body without elytra. Elytra margins entire, or ornamented. Elytra marginal papillae absent, or present. Dorsal tubercles present on all cirrigerous segments. Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process present. Neuropodial postchaetal lobe distally entire. Notochaetae distinctly thicker than neurochaetae. Notochaetal spines with penicillate tips absent, or present. Neurochaetae with penicillate (hairy) tips present. Neurochaetae with simple or bidentate tips simple or both.

Remarks. Members of *Austrolaenilla* are short bodied species with fewer than 50 segments and 15 or 16 pairs of elytra. The neurochaetae are distinctive, with hairy tips and may be either unidentate or bidentate. Notochaetae are more variable, and only *A. setobarba* (Monro, 1930) has notochaetae with penicillate tips. The genus includes 10 species known from depths from about 20 m to over 5,000 m in the Atlantic and Southern Oceans. Monro (1929: 164) considered *Austrolaenilla* to be a synonym of *Antinoe* Kinberg, 1856 but this decision has not been followed by recent workers.

Austrolaenilla sp.

Fig. 18

Material examined. Australia. AM W.52016 (1), off Bermagui, IN2017_V03_042, 36° 23.118'S, 150° 51.78'E – 36° 26.01'S, 150° 51.792'E, Brenke Epibenthic Sledge, 4,744–4,716 m, 26 May 2017; AM W.52215 (1), Freycinet CMR, IN2017_V03_004, 41° 43.83'S, 149° 7.182'E – 41° 47.478'S, 149° 9.348'E, CSIRO Four Metre Beam Trawl, 2,820–2,751 m, 18 May 2017.

Description. Body 30–35 segments. AM W.52215: 7 mm long, 3 mm wide excluding chaetae, 35 segments, 15 pairs elytrophores; AM W.52016: 1.5 cm long, 0.5 cm wide excluding chaetae, 30 segments. Preserved specimens with transverse red-brown pigment on dorsum of every segment (Fig. 18A). Cephalic peaks absent or indistinct. Eyes present; anterior and posterior eyes on each side separated from each other. Anterior eyes at widest part of prostomium; orientation lateral, dorso-lateral to dorsal (situated mediodorsally and level with widest part of prostomium). Posterior eyes near posterior margin of prostomium; orientation dorsal. Eyes very small, both pairs similar in size. Lateral antennae

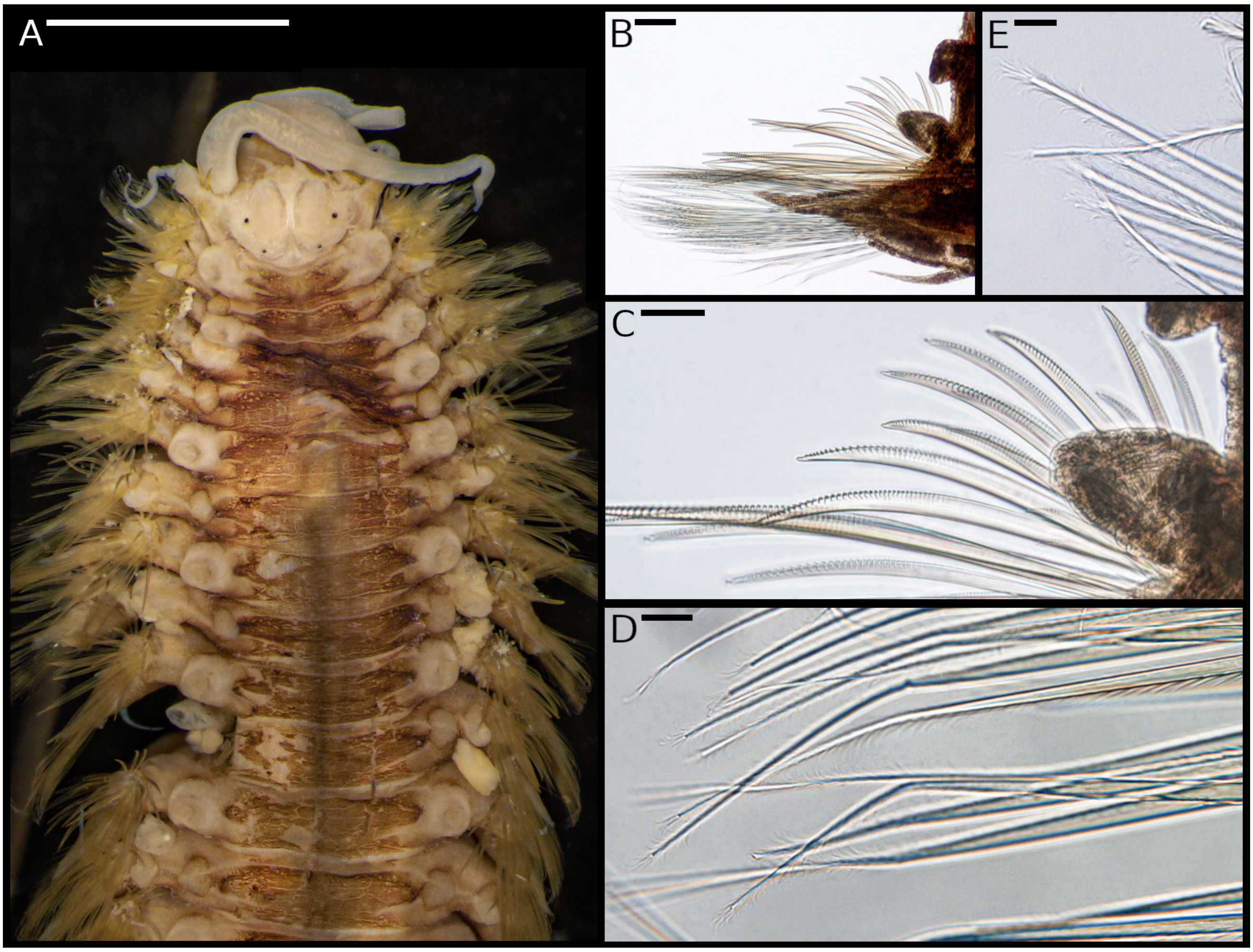

Figure 18. *Austrolaenilla* sp., specimen AM W.52215: (A) anterior body dorsal view, scale bar is 2 mm; (B) parapodium segment 12 left side, scale bar is 0.2 mm; (C) notochaetae detail, scale bar is 0.1 mm; (D) neurochaetae detail, scale bar is 0.02 mm; (E) neurochaetae tips detail, scale bar is 0.01 mm.

prostomial location ventral to and separate from prostomium; inserted ventrally, distinctly beneath level of median antenna; at most half as long as width of prostomium; ceratostyles elongate, evenly tapering; ceratostyles with slender papillae. Tentaculophores with two to five stout chaetae and pointed acicular lobe. Tentacular cirri elongate, evenly tapering; with slender papillae (Fig. 18A). Jaws and pharynx not visible. Facial tubercle absent, upper lip with tripartite lobe.

Elytrophores 14–15 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution on every third segment after segment 23. Last elytrophore on segment 32. Elytra all missing. Dorsal tubercles present on all cirrigerous segments (Fig. 18A).

Aciculae of notopodia and neuropodia do not project clear of epidermis. Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process present. Neuropodial postchaetal lobe distally entire (Fig. 18B).

Notochaetae distinctly thicker than neurochaetae (Fig. 18B). Notochaetae dorsal orientation mainly or wholly dorso-lateral projections from notopodia. Notochaetae with transverse rows of spines on convex side, tips with short points (Fig. 18C). Neurochaetae with tips penicillate (hairy) present (Fig. 18D–E). Neurochaetae tips simple, entire; elongate with blunt or capillary tips. Neurochaetae with bidentate tips absent. Neurochaetae all long, fine capillaries, with rows of long slender spines longer than width of neurochaeta, and more distally, terminating in a tuft of long fine hairs, some with capillary and some with blunt tips (Fig. 18D–E). No other types of neurochaetae present.

Distribution and ecology. Off southeastern Australia. Depth 2,751–4,744 m.

Remarks. The small size of the specimens (30–35 segments, compared with 40+ segments for other *Austrolaenilla* species) indicates that they may be juvenile, but the identification is based on the diagnostic features for the genus: the presence of neurochaetae more slender than notochaetae, and with capillary tips that terminate distally in tufts of fine hairs, which these specimens possess. There are ten currently valid *Austrolaenilla* species (Read & Fauchald, 2025), some of which have been described and reported from southern Antarctic and New Zealand waters, but we did not attempt a more specific identification due to the small and probably juvenile nature of the specimens.

16S and 18S sequences deposited on GenBank (Suppl. Table 1) may allow further description of this species when additional material is obtained.

Eunoe Malmgren, 1865

Eunoe Malmgren, 1865: 61.

Type species. *Eunoe nodosa* (M. Sars, 1861) (type by subsequent designation).

Diagnosis. Body 35–50 segments. Cephalic peaks absent, or present. Eyes present. Anterior eyes located at widest part of prostomium; orientation lateral, dorso-lateral to dorsal. Posterior eyes located near posterior margin of prostomium; orientation dorsal. Lateral antennae prostomial location ventral to and separate from prostomium; inserted ventrally, distinctly beneath level of median antenna. Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped. Nephridial papillae distinct, at least on some median segments; first visible on segment six. Elytra 15 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution on every third segment after segment 23. Last elytra on segment 32. Elytra covering body completely. Dorsal tubercles present on all cirrigerous segments. Aciculae of notopodia and neuropodia project clear of epidermis. Dorsal cirri styles elongate, evenly tapering, or elongate, subdistally inflated, or elongate, with sharply narrowed tips; without papillae, or papillated. Neuropodial prechaetal supra-acicular process present (usually). Notochaetae distinctly thicker than neurochaetae. Notochaetae longest notochaetae shorter than longest neurochaetae. Neurochaetae ornamentation in the form of spines in distinct transverse rows. Neurochaetae tips simple, entire. Neurochaetae with bidentate tips absent.

Remarks. Absence of bidentate neurochaetae in *Eunoe* is the only character separating it from *Harmothoe*. Our molecular analysis (Figs 2–3) and further remarks below (see section Generic assignments in the Discussion) gives no confidence that these two genera are natural groups.

Eunoe is the dominant genus of Polynoidae thus far collected from bathyal-abyssal depths in Australian waters. We are aware of about 576 Polynoidae specimens determined to species from depths over 1,000 m in the Australian region and included in this study (Hutchings & Yerman, 2010). Of those, 302 (~50%) belong to *Eunoe* as presently understood. *Eunoe* is correspondingly species-rich – nine species of *Eunoe*, more than for any other genus, are among the 39 species-level taxa (species and OTUs) currently known from these depths.

Eunoe abyssorum McIntosh, 1885

nomen dubium new status

Eunoe abyssorum Mcintosh, 1885: 73.

Additional material not seen. Holotype NHMUK 1885.12.1.50, south of Australia, Challenger 160, 42° 42'S, 134° 10'E, 4,754 m, 13 March 1874.

Remarks. *Eunoe abyssorum* was described from a single damaged specimen which had dried out, and all elytra are missing (McIntosh, 1885; Fauchald and Wilson, 2024). The original description contains no information to distinguish this specimen from any other *Eunoe* species, thus *E. abyssorum* McIntosh, 1885 is here designated *nomen dubium* (Mones, 1989).

Eunoe albacauda sp. nov.

urn:lsid:zoobank.org:act:57E95EFF-7492-4A4B-85EF-EA2D2FE4F624

Fig. 19

Holotype: AM W.53092, Tasman Sea off eastern Australia, St Helens flat, IN2018_V06_184, 41° 12.198'S 148° 47.118'E–41° 11.682'S 148° 45.858'E, CSIRO Four Metre Beam Trawl, 1,188–1,127 m, 17 December 2018. **Paratypes:** AM W.51790 (35), AM W.54254 (1), AM W.54255 (1), AM W.54256 (1), AM W.54257 (1) all from same sample as the holotype.

Non-type material. AM W.51783 (14), AM W.53093 (1), both from Maatsuyker Flat, IN2018_V06_070, 44° 9.43'S 146° 10.27'E, CSIRO Four Metre Beam Trawl, 1,218–1,223 m, 3 December 2018.

Diagnosis. *Eunoe albacauda* sp. nov., can be distinguished from all other species of *Eunoe* by having cephalic peaks, lateral antennal ceratostyles smooth, and papillae on the dorsal surface and margins of the elytra.

Description. Body 40–72 segments. Holotype with 40 segments (two midbody segments removed for sequencing), 22 mm long, 7 mm wide excluding chaetae. Holotype (and one Paratype) photographed at time of collection, showing strong purple pigmentation dorsally and ventrally, and white posterior section (Fig. 19A–B). Body with faded violet-brown pigmentation dorsally and ventrally; nine posterior segments unpigmented (Fig. 19A–B, J). Pigmentation present on antennal ceratostyles and parapodia. Cephalic peaks present; in middle of anterior margin. Eyes present, large. Anterior eyes located at widest part of prostomium. Posterior eyes orientation dorsal. Median antenna ceratostyle elongate, evenly tapering but with distal end distinctly narrowed, smooth. Lateral antennae prostomial location ventral to and separate from prostomium; inserted ventrally, distinctly beneath level of median antenna; ceratophores basally separated, not touching; ceratostyles without papillae. Tentaculophores without chaetae. Tentacular cirri without papillae (Fig. 19C). Pharynx barrel-shaped without distinct ornamentation, with nine pairs of terminal papillae; description based on paratype AM W.51790, pharynx of holotype not everted and not dissected. Facial tubercle absent, upper lip comprising longitudinal folds or ridges.

Elytra 15 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution on every third segment after segment 23. Last elytra on segment 32. Elytra leaving posterior third or more of body without elytra (in large specimens), large but leaving middle of dorsum uncovered. Elytra surface ornamented (Fig. 19D–E). Elytra macrotubercles absent. Elytra microtubercles present. Elytra papillae on dorsal surface present; slender, digitiform; arrangement scattered irregularly. Elytra margins ornamented. Elytra marginal papillae present, digitiform, simple; few, scattered. Elytra opaque to semi-translucent, white or pale violet with pearly lustre (Fig. 19A). Dorsal tubercles present on all cirrigerous segments; indistinct on posterior-most segments. Nephridial papillae indistinct, not observable.

Aciculae of notopodia and neuropodia project clear of epidermis. Dorsal cirri styles elongate, with sharply narrowed tips; without papillae. Neuropodial prechaetal

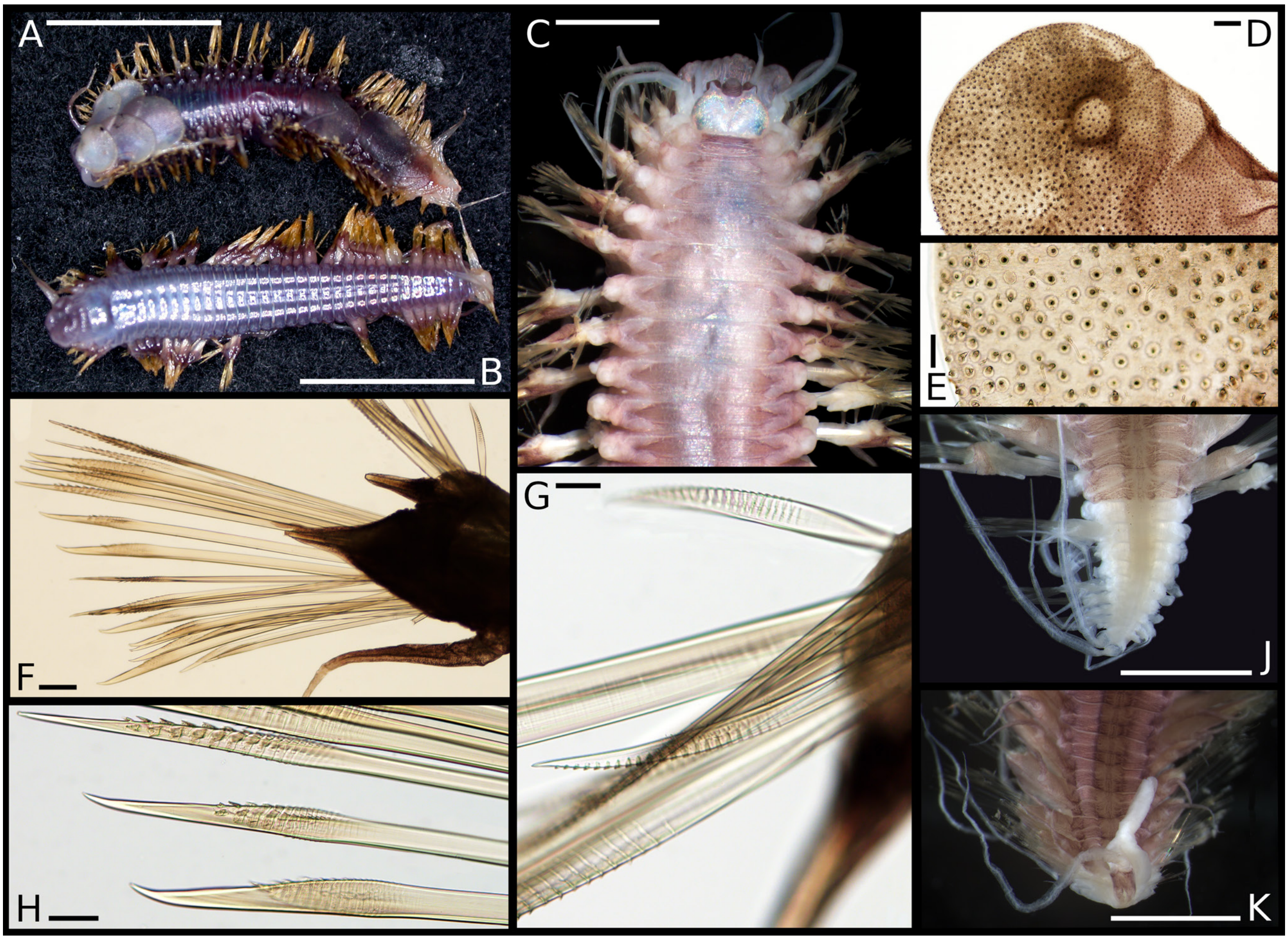

Figure 19. *Eunoe albacauda* sp. nov.: (A) fresh specimen, dorsal view (AM W.54257, Paratype), scale bar is 10 mm; (B) fresh specimen, ventral view (AM W.53092, Holotype) scale bar is 10 mm. *Eunoe albacauda* sp. nov., Holotype AM W.53092: (C) anterior end, dorsal view, scale bar is 2 mm; (D) elytron, surface view, scale bar is 0.2 mm; (E) elytron, microtubercles, macrotubercles and papillae, scale bar is 0.1 mm; (F) parapodium segment 15, scale bar is 0.2 mm; (G) notochaetae, segment 15, scale bar is 0.1 mm; (H) neurochaetae, segment 15, scale bar is 0.1 mm; (J) posterior segments, ventral view, 2 pygidial cirri, scale bar is 0.2 mm. *Eunoe albacauda* sp. nov., Paratype AM W.54256: (K) posterior segments, ventral view, 1 pygidial cirrus and 1 anal flap, scale bar is 0.2 mm.

(acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process present. Neuropodial supra-acicular process digitiform, forming a papilla distinct from neuropodial lobe (Fig. 19F). Neuropodial postchaetal lobe distally entire.

Notochaetae about as thick as neurochaetae. Notochaetae maximum of 10 per bundle. Notochaetae with numerous transverse rows of short spines and pointed bare tips (Fig. 19G). Neurochaetae ornamentation as spines in distinct transverse rows. Neurochaetae tips simple, entire; short points. Neurochaetae with bidentate tips absent. Neurochaetae ornamentation as coarse spines in distinct transverse rows, present distally from shaft swelling. Neurochaetae long tips bare, simple, unidentate, slightly curved (Fig. 19H).

Pygidium terminal. Anus dorsal. Pygidial appendages one pair of subulate or cirriform pygidial cirri.

Variation. Paratypes display pigmentation on cephalic peaks and prostomium, and dark violet-brown pigment dorsally and ventrally; some have a violet/brown-pigmented anal segment. The number of unpigmented posterior segments (white) varies between five and 10. Tentaculophores may have up to two chaetae per side. Pygidial appendages are also highly variable - some specimens have a single long cirrus with an anal flap/funnel arising ventrally from pygidial segment (Fig. 19K), or two long pygidial cirri (Fig. 19J). Pygidium often with purple pigment.

The non-type specimens from Flat Maatsuyker, Tasmania, have up to 72 segments and may either lack pigment, or have up to 25 posteriormost segments without pigment.

Etymology. The species name is derived from the Latin words for "white tail", and refers to the lack of pigment in posterior segments.

Distribution and ecology. Off southern Australia, Tasmania. Depth 1,218–1,223 m.

Remarks. Some specimens cannot easily be morphologically distinguished from those of *Eunoe leiotentaculata* Averincev, 1978 if they lack the characteristic "white-tail", as observed in some longer specimens from the Tasmanian Flat Maatsuyker. If elytra are present then the characteristic crescent-shaped pigment pattern on those of *E. leiotentaculata* may help to distinguish it from the new species. *Eunoe albacauda* sp. nov., differs from other *Eunoe* spp. by a combination of characters such as the presence of large eyes, the lack of papillae on antennae and cirri, the form of ornamentation (papillae and microtubercles) and "pearly" lustre of the elytra, the ornamentation and form of the tips of the neurochaetae, as well as posterior unpigmented body segments. The specimens also resemble *Neopolynoe acanellae* (Verrill, 1882), recorded from the northern Atlantic Ocean at depths of 42–2,250 m and associated with soft corals and sponges (Pettibone, 1963:36; Bock *et al*., 2010: 58). The new species differs from it by the shorter body length (only 40–75 segments) and the distinctive body and elytral colouration.

Sequences of *Eunoe albacauda* sp. nov. were most similar to sequences of *Neopolynoe acanellae* (COI uncorrected p-distances 0.010–0.014, Murray *et al*., 2025, Suppl. Table 2) collected from the Cantabric Sea, Spain, around 1,500 m depth (Taboada *et al*., 2020) .

Eunoe apicolata sp. nov.

urn:lsid:zoobank.org:act:FB79FB12-E0BB-4F73-8DF9-5F7C47775903

Fig. 20

Eunoe sp. 3 Gunton *et al*., 2021: 104–105.
Eunoe cf. *abyssorum* Gunton *et al*., 2021: 103, fig. 22D (part).

Holotype: AM W.53615, Tasman Sea off eastern Australia, Jervis CMR, IN2017_V03_053, 35° 6.84'S, 151° 28.14'E – 35° 5.04'S, 151° 26.46'E, CSIRO Four Metre Beam Trawl, 3,952–4,011 m, 28 May 2017. **Paratypes:** AM W.52005 (21), Bass Strait, IN2017_V03_031, 39° 25.32'S, 149° 36.24'E – 39° 23.46'S, 149° 35.82'E, Brenke Epibenthic Sledge, 4,150–4,170 m, 23 May 2017; AM W.52015 (10), Flinders CMR, IN2017_V03_016, 40° 27.78'S, 149° 24.9'E – 40° 27.672'S, 149° 21.84'E, Brenke Epibenthic Sledge, 4,129–4,131 m, 21 May 2017; AM W.53616 (1), Freycinet CMR, IN2017_V03_006, 41° 37.533'S, 149° 33.09'E – 41° 41.352'S, 149° 35.058'E, CSIRO Four Metre Beam Trawl, 4,022–4,052 m, 18 May 2017; AM W.53617 (2), Bass Strait, IN2017_V03_030, 39° 33.12'S, 149° 33.18'E – 39° 29.76'S, 149° 35.88'E, CSIRO Four Metre Beam Trawl, 4,197–4,133 m, 23 May 2017.

Non-type material: AM W.51969 (1), Freycinet CMR, IN2017_V03_009, 41° 37.56'S, 149° 33.6'E – 41° 39.72'S, 149° 34.44'E, Brenke Epibenthic Sledge, 4,021–4,035 m, 19 May 2017; AM W.51977 (2), Bass Strait, IN2017_V03_031, 39° 25.32'S, 149° 36.24'E – 39° 23.46'S, 149° 35.82'E, Brenke Epibenthic Sledge, 4,150–4,170 m, 23 May 2017; AM W.52011 (1), Jervis CMR, IN2017_V03_054, 35° 7.008'S 151° 28.38'E – 35° 5.952'S, 151° 27.282'E, Brenke Epibenthic Sledge, 4,026–3,881 m, 28 May 2017; AM W.53619 (1), Jervis CMR, IN2017_V03_055, 35° 20.112'S, 151° 15.558'E – 35° 20.04'S, 151° 13.11'E, Brenke Epibenthic Sledge, 2,667–2,665 m, 28 May 2017.

Additional comparative material. AM E.6309, holotype of *Harmothoe* (*Eunoa*) *etheridgei* [original spelling] after Benham, 1915, off Gabo Island, 37° 34.2'S 149° 55.2'E, 366 m.

Diagnosis. *Eunoe apicolata* sp. nov., can be diagnosed from all other species of *Eunoe* by having cephalic peaks, lateral antennae ceratostyles with papillae, elytra with dorsal papillae and lacking macrotubercles.

Description. Holotype complete in two parts, 38 segments, 35 mm long, 8 mm wide (excluding chaetae). Prostomium faintly violet-pigmented (Fig. 20A, paratype) (more strongly pigmented in other specimens). Cephalic peaks present; close to or in continuation of lateral margin of prostomium. Eyes absent, or present. Anterior eyes located at widest part of prostomium; orientation lateral, dorso-lateral to dorsal. Posterior eyes orientation dorsal. Median antenna ceratostyle papillate (paratypes; missing from holotype). Lateral antennae prostomial location ventral to and separate from prostomium; inserted ventrally, distinctly beneath level of median antenna; about equal to width of prostomium; ceratostyles with slender papillae (paratypes; missing from holotype). Tentaculophores achaetous on holotype and with large acicular lobe. Tentacular cirri with slender papillae. Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped. Facial tubercle absent, upper lip comprising longitudinal folds or ridges.

Elytra 15 pairs; single elytron present only on holotype, on segment seven; elytrophores on 2, 4, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 26, 29, 32, distribution changing posteriorly; distribution on every third segment after segment 23. Last elytra on segment 32. Elytra continuing for body length, or almost (a short tail section sometimes uncovered). Elytra surface ornamented. Elytra macrotubercles absent. Elytra microtubercles present. Elytra papillae on dorsal surface present; slender, digitiform; arrangement concentrated near lateral and/or posterior margin. Elytra margins ornamented. Elytra marginal papillae present, few, scattered, digitiform, simple. Elytra conical microtubercles include some sharply pointed and curved distally (Fig. 20B–D). Dorsal tubercles present on all cirrigerous segments. Nephridial papillae distinct, at least on some median segments; first visible on segment 5–6, continue to end of body.

Dorsal cirri styles sparsely papillated. Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process present (Fig. 20E). Neuropodial postchaetal lobe distally entire.

Notochaetae distinctly thicker than neurochaetae (and shorter). Notochaetae dorsal orientation mainly held erect above body (but not joining mid-dorsally). Notochaetae curved with pointed tips and numerous spinous rows along convex side of shaft (Fig. 20F). Neurochaetae ornamentation as spines in distinct transverse rows. Neurochaetae tips simple, entire; short points. Neurochaetae with bidentate tips absent. Neurochaetae long, slender with slightly spatulate or flattened, broad, long, bare unidentate tips and swollen blades bearing many rows of short stout spines in alternating double longitudinal rows - tips appear sharply pointed and slightly curved in side profile (Fig. 20G); tips of neurochaetae in smaller specimens more acute.

Variation. The number of body segments varies from 25 to 38. Tentaculophores with zero to two stout curved chaetae. Some small (juvenile) specimens are present with 16–20 segments only; these possess the broad-tipped neurochaetae, but also display brown pigment spots on prostomium and on anterior dorsum and ventrum, without overall violet pigmentation.

Etymology. The species name *apicolata* is derived from Latin words meaning "broad-tipped", and refers to the distal shape of neurochaetae.

Figure 20. *Eunoe apicolata* sp. nov., Paratype AM W.53616: (A) anterior end dorsal view, scale bar is 2 mm. *Eunoe apicolata* sp. nov., Holotype AM W.53615: (B) elytron 4, scale bar is 0.2 mm; (C) elytron margin detail, scale bar is 0.1 mm; (D) elytron microtubercles detail, scale bar is 0.05 mm; (E) parapodium segment 16, scale bar is 0.2 mm; (F) notochaetae detail, scale bar is 0.1 mm; (G) neurochaetae detail, scale bar is 0.1 mm.

Distribution and ecology. Off southeastern Australia. Depth 3,881–4,744 m.

Remarks. These specimens do not fully agree with any descriptions of the 46 valid species of *Eunoe*, in particular most of those reported from southern Australian, New Zealand and Antarctic waters, i.e., *E. opalina* McIntosh, 1885; *E. abyssorum* McIntosh, 1885; *E. leiotentaculata* Averincev, 1978; *E. papillaris* Averincev, 1978; *E. ivantsovi* Averincev, 1978; *E. iphionoides* McIntosh, 1885; and *E. campbellica* Averincev, 1978. There are differences such as elytral ornamentation and form of the neurochaetae. The new species differs from *E. benhami* sp. nov., by the presence of short, conical lateral antennae, notochaetae thicker than neurochaetae, and neurochaetae with rows of large spines and broad flattened tips. The most similar species to *Eunoe apicolata* sp. nov., is *E. etheridgei* Benham, 1915, with which our specimens share features such as papillate antennal and dorsal cirri styles, ornamentation of notochaetae, and notochaetae thicker than neurochaetae, but which differs from descriptions of *E. etheridgei* by the ornamentation of elytra (*E. etheridgei* possesses ‘conical tubercles’, a marginal fringe of long papillae and long ‘finger-shaped papillae’ near the posterior margin of the elytra – these last two are features which these specimens lack), the presence of minute papillae on long palps and the broad, almost flattened shape of the neurochaetae tips. *Eunoe etheridgei* Benham, 1915 was recorded from Bass Strait at only 360 m.

Phylogenetic analysis recovered *E. apicolata* sp. nov. in a clade with *Harmothoe australis* (Figs 2–3), yet COI sequences of *E. apicolata* sp. nov. were most similar to *Austrolaenilla antarctica* sequences (COI uncorrected p-distance 0.160–0.163) (Murray *et al*., 2025, Suppl. Table 2) collected from Elephant Island, Antarctica, at 1,500 m depth (Neal *et al*., 2014).

Eunoe benhami **sp. nov.**

urn:lsid:zoobank.org:act:C6DDA02E-8A12-4AE9-87C4-0A0E246CB641

Figs 21–22

Eunoe abyssorum— Benham, 1921, pp. 42–43, Pl. 6, figs 30–35; — Benham, 1927, p. 72.

Non *Eunoe abyssorum*— Knox & Cameron, 1998, p. 23, figs 32–34.

Holotype: AM W.744, Southern Ocean off Antarctica, Station 11 Australasian Antarctic Expedition Summer Cruise 1913-1914, 64° 44'S, 97° 28'E, 655 m, 31 January 1914. **Paratypes:** AM W.53614 (2), Station 10, Australasian Antarctic Expedition Summer Cruise 1913-1914, 65° 6'S, 96° 13'E, 595 m, 29 January 1914.

Non-type material. AM W.51463 (4), Bass Strait, IN2017_V03_022, 39° 27.72'S, 149° 16.56'E – 39° 27.9'S, 149° 14.52'E, CSIRO Four Metre Beam Trawl, 2,760–2,692 m, 22 May 2017; AM W.53613 (1), Bass Strait, IN2017_V03_022, 39° 27.72'S, 149° 16.56'E – 39° 27.9'S, 149° 14.52'E, CSIRO Four Metre Beam Trawl, 2,760–2,692 m, 22 May 2017; AM W.53618 (1), Bass Strait, IN2017_V03_022, 39° 27.72'S, 149° 16.56'E – 39° 27.9'S, 149° 14.52'E, CSIRO Four Metre Beam Trawl, 2,760–2,692 m, 22 May 2017; AM W.53858 (2), Jervis CMR, IN2017_V03_056, 35° 19.98'S, 151° 15.48'E–35° 19.92'S, 151° 12.84'E, CSIRO Four Metre Beam Trawl, 2,650–2,636 m, 29 May 2017; AM W.53859 (1), Jervis CMR, IN2017_V03_056, 35° 19.98'S, 151° 15.48'E–35° 19.92'S, 151° 12.84'E, CSIRO Four Metre Beam Trawl, 2,650–2,636 m, 29 May 2017; AM W.53876 (1), Bass Strait, IN2017_V03_022, 39° 27.72'S, 149° 16.56'E – 39° 27.9'S, 149° 14.52'E, CSIRO Four Metre Beam Trawl, 2,760–2,692 m, 22 May 2017; AM W.53877 (1), Bass Strait, IN2017_V03_022, 39° 27.72'S, 149° 16.56'E – 39° 27.9'S, 149° 14.52'E, CSIRO Four Metre Beam Trawl, 2,760–2,692 m, 22 May 2017.

Diagnosis. *Eunoe benhami* sp. nov., can be diagnosed from all other species of *Eunoe* by being short bodied (fewer than 50 segments), cephalic peaks positioned close to lateral margin of prostomium, elytra with macrotubercles absent and microtubercles present, nuchal flap absent and buccal cirrus about as long as ventral tentacular cirrus.

Description. Holotype 36 segments, 20 mm long, 8 mm wide excluding chaetae. Cephalic peaks present; close to or in continuation of lateral margin of prostomium. Eyes present, subdermal; anterior and posterior eyes on each side clearly separated from each other (but close together). Anterior eyes located at widest part of prostomium; orientation lateral, dorso-lateral to dorsal. Posterior eyes located at least one eye diameter in front of posterior margin; orientation dorsal. Lateral antennae prostomial location ventral to and separate from prostomium; inserted ventrally, distinctly beneath level of median antenna; ceratostyles elongate, with sharply narrowed tips; ceratostyles without papillae. Tentaculophores without chaetae. Tentacular cirri elongate, with sharply narrowed tips; without papillae (Fig. 21A).

Elytra 15 pairs; on segments 2, 4, 5 then every second

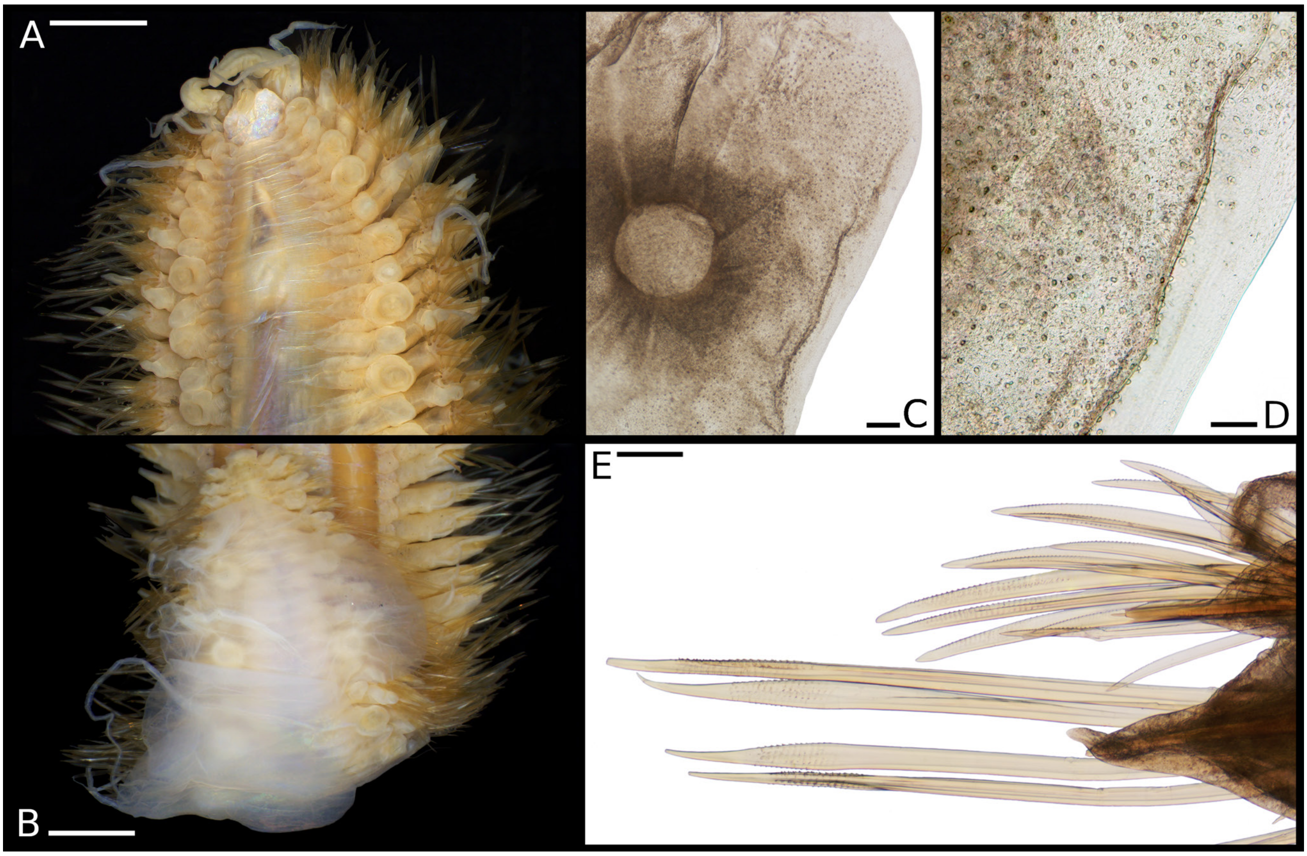

Figure 21. *Eunoe benhami* sp. nov., Holotype AM W.744: (A) dorsal view, anterior end, scale bar is 2 mm; (B) dorsal view, posterior end, scale bar is 2 mm; (C) elytron, segment 18, scale bar is 0.2 mm; (D) elytron microtubercles, scale bar is 0.05 mm; (E) parapodium, notochaetae, neurochaetae, segment 18, scale bar is 0.2 mm.

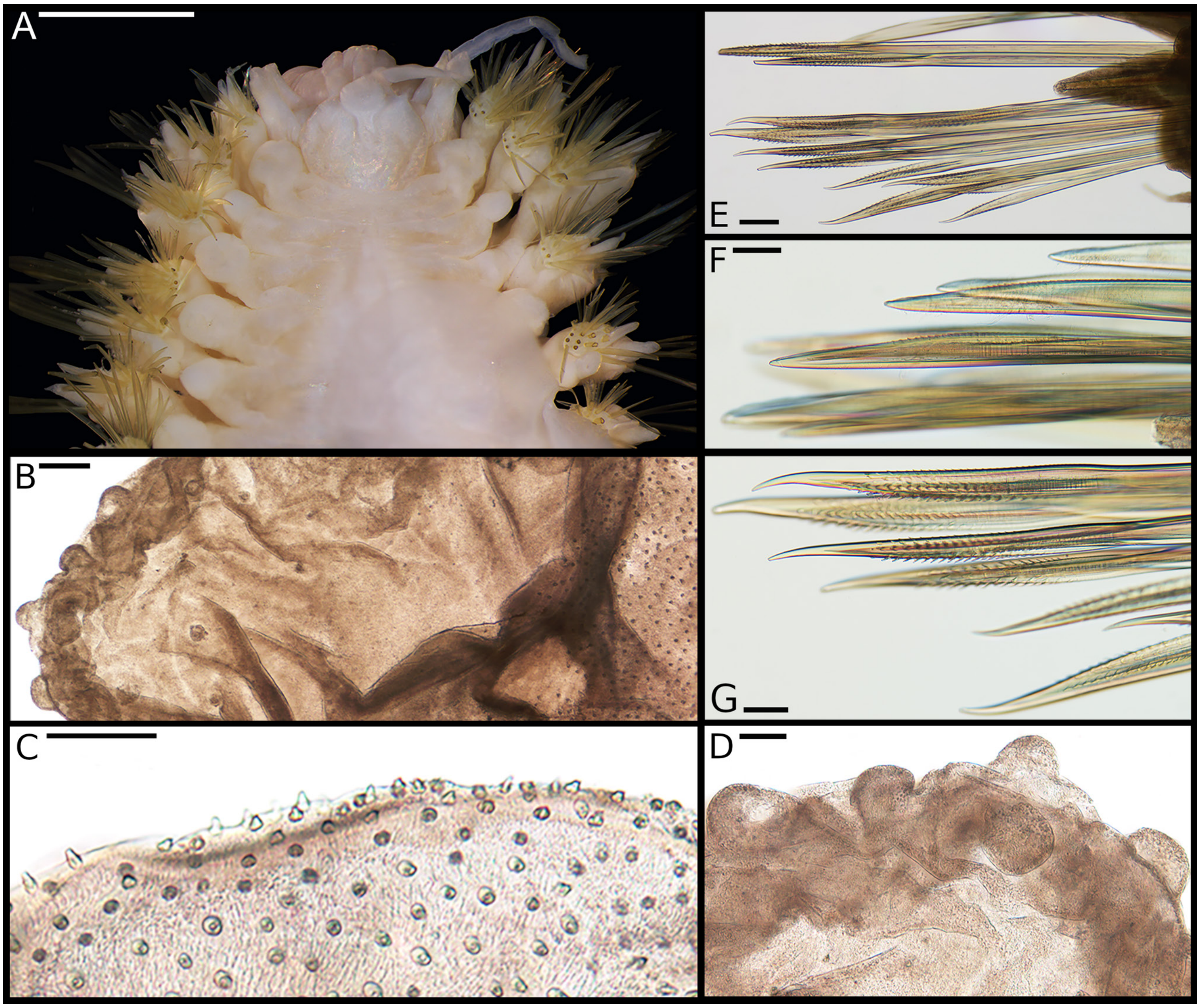

Figure 22. *Eunoe benhami* sp. nov., specimen AM W.51463: (A) dorsal view, anterior end, scale bar is 2 mm; (B) anterior elytron, scale bar is 0.2 mm; (C) anterior elytron microtubercles, scale bar is 0.1 mm; (D) posterior elytron, scale bar is 0.1 mm; (E) neuropodium, segment 19, scale bar is 0.2 mm; (F) notochaetae, scale bar is 0.1 mm; (G) neurochaetae, scale bar is 0.1 mm.

segment, distribution changing posteriorly; distribution on every third segment after segment 23. Last elytra on segment 32. Elytra surface ornamented. Elytra macrotubercles absent. Elytra microtubercles present; conical, tapering from broad bases (some are distally rounded). Elytra of holotype on segments 21, 23, 26 and 29 only, fragile, pale and opaque (Fig. 21B–C), with minute microtubercles around anterior and external margins, without papillae or fimbriae; microtubercles conical to rounded distally (Fig. 21D). Dorsal tubercles present on all cirrigerous segments. Nephridial papillae indistinct (in the holotype).

Aciculae of notopodia and neuropodia project clear of epidermis. Dorsal cirri styles elongate, evenly tapering; without papillae. Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process present. Neuropodial supra-acicular process digitiform, forming a papilla distinct from neuropodial lobe (Fig. 21E). Neuropodial postchaetal lobe distally entire.

Notochaetae about as thick as neurochaetae. Notochaetae about 20 maximum in the holotype, distally blunt and shafts tapering evenly with many rows of subdistal spines (Fig. 21E). Neurochaetae ornamentation as spines in distinct transverse rows. Neurochaetae tips simple, entire (Fig. 21E). Neurochaetae with bidentate tips absent. Neurochaetae fewer than notochaetae, up to eight per neuropodium, with long, slightly curved bare unidentate tip, and subdistal faint rows of short spines.

Variation. Paratypes AM W.53614 (2) with 32–36 body segments, for 15–29 mm long, 5–9 mm wide; largest one incomplete and missing only a few posterior segments. All elytra missing from both paratype specimens and some segments have also been removed, perhaps by W. B. Benham.

The more recently collected non-type material from Bass Strait, > 2000 m depth, includes specimens with 40+ segments, the largest 36 mm long, 9 mm wide (excluding chaetae). Some specimens originally exhibited violet colouration on the prostomium, but which faded after some time in ethanol. When palps were present (often missing) they were long, smooth reaching back to segment seven. These specimens also show some variability: eyes, if present, are subdermal and not obvious (Fig. 22A); 0–1 chaetae may be present on the tentacular segment. Elytra are fragile and thin, often degraded on posterior and external margins (Fig. 22B, D). Elytra with microtubercles (some sharply conical) are present on anterior and lateral areas and margin, papillae and macrotubercles are absent (Fig. 22B–C). Notochaetae and neurochaetae are similar to those of type specimens (Fig. 22E–G).

Etymology. Named after W. B. Benham, who collected the original type specimens in 1914 and identified the specimens as *Eunoe abyssorum* McIntosh, 1885.

Distribution and ecology. Southern Ocean. Australia. Depth 595–2,760 m.

Remarks. The type specimens are those cited by Benham (1921) and identified as by him as *E. abyssorum* McIntosh, 1885. In his description of these specimens he states that the lateral antennae "bear a few microscopic hairs", however we observed no papillae on the lateral antennae (nor on tentacular cirri or dorsal cirri) which are all smooth; the ventral purple pigment has also faded completely, as have the eyes on the larger of the two paratype specimens.

Benham also states that neurochaetae are "rather stouter than the largest of lower ones in the notopod", however, we observed that noto- and neurochaetae were of similar thickness, and just a few of the inferior notochaetae that were smaller and thinner than the neurochaetae (Figs. 21F, 22E). Because the type of *E. abyssorum* is in poor condition (dried out and lacking elytra; McIntosh, 1885), elsewhere in this paper we designate *E. abyssorum* McIntosh 1885 *nomen dubium*. Rather than cause possible further confusion by confirming these specimens as the same species as McIntosh's, we have erected a new species for Benham's specimens which he considered as the same species despite the obvious deficiencies of the existing type specimen.

The specimens from Bass Strait and off southern NSW have the same elytral ornamentation and chaetal morphology as Benham's specimens (see Fig. 22F–G) and we consider these specimens to belong to the same species.

Eunoe benhami sp. nov., can be distinguished from other members of the genus using diagnosis above. Among bathyal and abyssal Polynoidae, *Eunoe benhami* sp. nov., is most likely to be confused with *Harmothoe paxtoni* Averincev, 1978 but lacks soft elytral mounds characteristic of *H. paxtoni* (Fig. 28C) and lacks bidentate neurochaetae. We discuss the close relationships between species of *Eunoe* and *Harmothoe* in the section Generic assignments under the Discussion in this paper.

Eunoe benhami sp. nov., is similar to *E. papillaris* Averincev, 1978 but the latter species differs in having an anterior pair of eyes located posterior to the widest part of the prostomium and possessing large soft mamilliform "papillae" on the posterior half of elytra.

Sequences of *Eunoe benhami* sp. nov. were most similar to *Harmothoe paxtoni* sequenced in this study (uncorrected COI p-distances 0.038 to 0.041) (Murray *et al*., 2025, Suppl. Table 2).

Eunoe danmurrayi sp. nov.

urn:lsid:zoobank.org:act:B2832494-77EF-426E-A250-86F664FCF149

Fig. 23

Holotype: AM W.54531, Tasman Sea off eastern Australia, St Helens flat, IN2018_V06_184, 41° 12.198'S, 148° 47.118'E – 41° 11.682'S, 148° 45.858'E, CSIRO Four Metre Beam Trawl, 1,188–1,127 m, 17 December 2018. **Paratypes:** AM W.53101 (1), AM W53875 (3), AM W.54252 (1), AM W.54253 (1) all from the same sample as the holotype.

Diagnosis. *Eunoe danmurrayi* sp. nov., can be distinguished from all species of *Eunoe* by the combination of characters: the prostomium which is wider than long, cephalic peaks close to or in continuation of lateral margin of prostomium, smooth lateral antennae ceratostyles and absence of elytral macrotubercles.

Description. Holotype 41 segments, 23 mm long, 7 mm wide (excluding chaetae); with parasitic copepod bearing eggs strings, attached on dorsal surface of segment 20 (Fig. 23B). Body with dark iridescent pigmentation dorsally and ventrally; each segment dorsally with two thin white transverse lines near anterior margin (Fig. 23A–B). Prostomium, palps, and antennal ceratophores with faint dark pigmentation. Cephalic peaks present; close to or in continuation of lateral margin of prostomium. Eyes present. Anterior eyes located at widest part of prostomium; orientation lateral, dorso-lateral to dorsal. Posterior eyes orientation dorsal. Eyes unequal in size, posterior pair smaller. Lateral antennae prostomial location ventral to and separate from prostomium; inserted ventrally, distinctly beneath level of median antenna (Fig. 23A); ceratophores basally separated, not touching; about equal to width of prostomium; ceratostyles elongate, evenly tapering; ceratostyles without papillae. Tentaculophores without chaetae in holotype. Tentacular cirri elongate, evenly tapering; without papillae. Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped, cutting edge smooth. Pharynx barrel-shaped without distinct ornamentation, with nine pairs of terminal papillae; description based on paratype AM W.54252, holotype not dissected.

Elytra 15 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution on every third segment after segment 23. Last elytra on segment 32. Elytra continuing for the length of the body, or almost (a short tail section may sometimes be uncovered), large but leaving middle of dorsum uncovered. Elytra surface ornamented (Fig. 23C). Elytra macrotubercles absent. Elytra microtubercles present. Elytra margins entire. Elytra opaque, thin, fragile, with small rounded microtubercles in large patch covering anterior, middle and proximal lateral region; papillae absent from surface and margins of elytra (Fig. 23C–D). Dorsal tubercles present on all cirrigerous segments; bulbous or nodular (large); almost as large as elytrophores (Fig. 23B). Nephridial papillae indistinct, not observable.

Aciculae of notopodia and neuropodia project clear of epidermis (Fig. 23E–F). Dorsal cirri styles elongate, evenly tapering; without papillae. Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process present, tapering, seemingly a

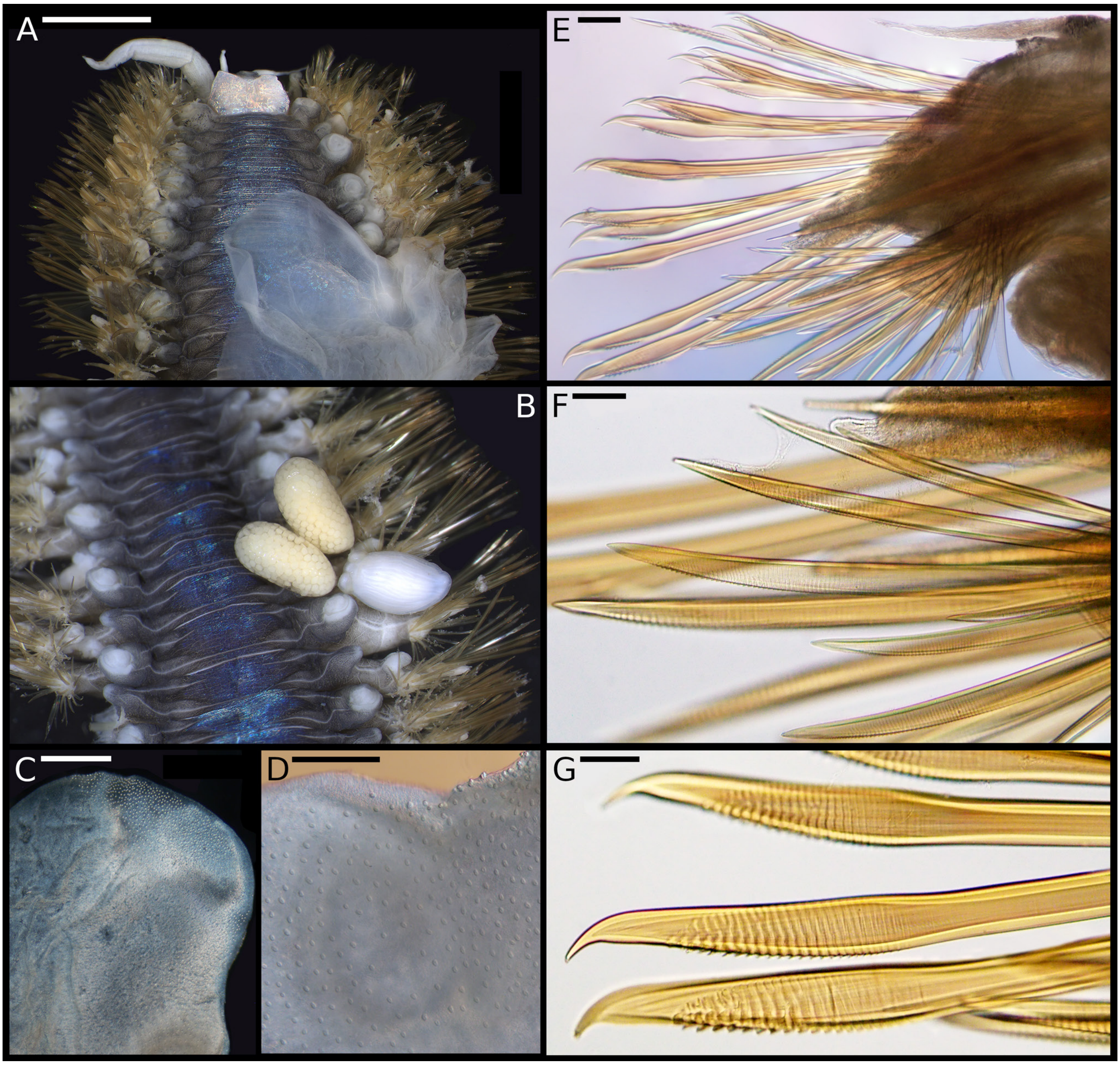

Figure 23. *Eunoe danmurrayi* sp. nov., Holotype AM W.54531: (A) anterior end, dorsal view, scale bar is 2 mm; (B) mid-body dorsal view with copepod parasite, (no scale); (C) elytron, dorsal surface view, scale bar is 0.5 mm; (D) elytron microtubercles, scale bar is 0.2 mm; (E) parapodium segment 9, scale bar is 0.2 mm; (F) notochaetae, segment 9, scale bar is 0.1 mm; (G) neurochaetae, segment 9, scale bar is 0.1 mm.

continuous extension of neuropodium (Fig. 23F).

Notochaetae about as thick as neurochaetae. Notochaetae maximum of 25 per bundle. Notochaetae with numerous transverse rows of short spines on distal third of shaft, and pointed bare tips (Fig. 23E–F). Neurochaetae ornamentation as spines in distinct transverse rows. Neurochaetae tips simple, entire; elongate with fine pointed tips. Neurochaetae with bidentate tips absent. Neurochaetae with up to 20 neurochaetae per bundle. Neurochaetae ornamentation as coarse spines in distinct transverse rows distal to swelling on distal third of shaft. Neurochaetae with long bare tips, simple, unidentate, falcigerous (strongly curved) (Fig. 23E, G).

Pygidium terminal. Anus dorsal.

Variation. Paratypes: smallest (AM W.53101) is 11 mm long, 4 mm wide for 37 segments; this specimen also has neuropodial supracicular process throughout length of body as a short digitiform lobe. Paratypes with zero to one chaetae on tentaculophores.

Etymology. Named in memory of Daniel Murray, the brother of the first author, who died during the writing of this publication.

Distribution and ecology. South Pacific Ocean, off southeastern Australia. Depth 1,202–1,220 m.

Remarks. Distinguishing *Eunoe* species is challenging, but *E. danmurrayi* sp. nov., can be separated from congeners using the diagnosis above. Among bathyal-abyssal *Eunoe* species, *E. danmurrayi* sp. nov., can be differentiated by a combination of features – the dark iridescent pigmented body, the lack of elytral macrotubercles and papillae (in contrast to *Eunoe leiotentaculata*, *E. ivantsovi*, *E. papillaris*, *E. opalina*, *E. iphionoides*, and *E. etheridgei*) and the lack of papillate antennae, tentacular cirri and dorsal cirri (in contrast to *Eunoe campbellica*, *E. iphionoides*, *E. opalina*, *E. papillaris*, *E. etheridgei*, and *E. apicolata* sp. nov.) as well as the robust ornamentation and strongly curved falcigerous tips of the neurochaetae (in contrast to *E. apicolata* sp. nov., *E. benhami* sp. nov., and *E. albacauda* sp. nov.).

Sequences of *Eunoe danmurrayi* sp. nov., were most similar to *Eunoe* sp. from 1,343 m in the southwest Indian Ocean (Serpetti et al. 2017) (uncorrected COI p-distance of 0.06) (Murray *et al*., 2025; Suppl. Table 2).

Eunoe leiotentaculata Averincev, 1978

Fig. 24

Eunoe leiotentaculata Averincev, 1978: 61.

Harmothoe GAB4 MacIntosh *et al*., 2018: Supp. Appendix II.

Arctonoinae GAB2 MacIntosh *et al*., 2018: Supp. Appendix II.

Material examined. NMV F109561 (1), Lord Howe Plateau, TAN0308_089, 34° 12.183'S, 162° 41.183'E, 748–763 m, 26 May 2003; NMV F109562 (1), North Norfolk Ridge, TAN0308_033, 28° 29.367'S, 167° 47.15'E, 1,116–1,056 m, 16 May 2003; AM W.51793 (100), St Helens flat, IN2018_V06_184, 41° 12.198'S, 148° 47.118'E – 41° 11.682'S, 148° 45.858'E, CSIRO Four Metre Beam Trawl, 1,188–1,127 m, 17 December 2018; AM W.53090 (50). St Helens flat, IN2018_V06_184, 41° 12.198'S, 148° 47.118'E –41° 11.682'S, 148° 45.858'E, CSIRO Four Metre Beam Trawl, 1,188–1,127 m, 17 December 2018; AM W.53091 (20), Punch's Hill, IN2018_V06_157, 44° 10.728'S, 147° 11.64'E – 44° 10.572'S, 147° 11.832'E, CSIRO Four Metre Beam Trawl, 1,054 m, 13 December 2018; NMV F166438 (50), Southern Ocean, south of Tasmania, Tasman 1000 site, SS02/2007_41, 44° 3.95'S, 146° 14.033'E – 44° 4.417'S, 146° 13.416'E, Sherman sled, 800–880 m, 5 April 2007; NMV F166485 (4), St. Helens, East Hill, SS03/2008_139, 41° 14.583'S, 148° 49.55'E, Sherman sled, 1,170–1,380 m, March 2008; NMV F242584 (1), GAB, VSM02SZ site A, RE2017_C01 VSM02_100, 34° 47.874'S, 131° 45.36'E, ROV, 1,371 m, 18 March 2017; NMV F242585 (1), GAB, VSM02SZ site A, RE2017_C01 VSM02_100, 34° 47.874'S, 131° 45.36'E, ROV, 1,371 m, 18 March 2017; NMV F242900 (5), North Sister, TN228 J2-384-002, 44° 15.803'S, 147° 14.246'E, coral grab, 952–952 m, 19 December 2008; NMV F242917 (3), Tasman Fracture Zone, TN228 J2-392-011, 45° 18.024'S, 146° 7.231'E, bio grab, 2,213 m, 10 January 2009; NMV F242922 (1), Hill offshore of St. Helens, TN228 J2-389-010, 41° 14.43'S, 148° 49.361'E, bio grab, 1,261 m, 1 January 2009; NMV F271040 (1), GAB, VSM03Area22, IN2015_C01_114, 34° 42.33'S, 132° 31.856'E – 34° 41.656'S, 132° 32.834'E, Beam Trawl, 995–980 m, 24 November 2015; NMV F271041 (1), GAB, Transect 3, IN2015_C02_196, 33° 55.368'S, 131° 3.606'E, Beam Trawl, 1,020 m, 9 December 2015; NMV F271042, GAB, Transect 3, IN2015_C02_196, 33° 55.368'S, 131° 3.606'E, Beam Trawl, 1,020 m, 9 December 2015.

Other material. Holotype. ZIN 1/43278 (examined by Fauchald & Wilson, 2024), South of New Zealand, RV "Dmitry Mendeleev" 16.1276, 48° 25'S 171° 42'E, Otter Trawl, TINRO, 1,100-1,200 m, 14 January 1976.

Description. Body 41–55 segments. Palps and median antenna violet. Cephalic peaks present; in middle of anterior margin. Eyes present, large, separated by at least one eye-diameter; anterior and posterior eyes on each side clearly separated from each other. Anterior eyes located in front of widest part of prostomium; orientation lateral, dorso-lateral to dorsal. Posterior eyes orientation postero-lateral. Median antenna ceratostyle elongate, evenly tapering but with distal end distinctly narrowed, smooth. Lateral antennae prostomial location ventral to and separate from prostomium; inserted ventrally, distinctly beneath level of median antenna; ceratophores basally separated, not touching; ceratostyles elongate, evenly tapering; ceratostyles without papillae. Tentaculophores usually without chaetae (two specimens with one to two chaetae on one side only). Tentacular cirri elongate, evenly tapering; without papillae (Fig. 24A–B). Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped. Pharynx barrel-shaped without distinct ornamentation, with nine pairs of terminal papillae (based on MV F242584).

Elytra 15 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution on every third segment after segment 23. Last elytra on segment 32, leaving posterior third or more of body without elytra. Dorsal extent of elytra is variable, in specimens with pharynx retracted some dorsum exposed between the elytra, however in specimens with pharynx everted dorsum more or less completely covered. Elytra surface ornamented. Elytra macrotubercles absent. Elytra microtubercles present. Elytra semi-translucent, white, with white encrustations (Fig. 24A–B). Dorsal tubercles present on all cirrigerous segments; bulbous or nodular.

Aciculae of notopodia project clear of epidermis (based on MV specimens), in neuropodia project clear of epidermis (based on MV specimens, Fig. 24C). Dorsal cirri styles without papillae. Neuropodial prechaetal (acicular) lobe distally elongate, tapering. Neuropodial prechaetal supra-acicular process present. Neuropodial supra-acicular process tapering, seemingly a continuous extension of the neuropodium. Neuropodial postchaetal lobe distally entire (Fig. 24C).

Notochaetae about as thick as neurochaetae. Notochaetae dorsal orientation mainly held erect above body. Notochaetae with long, pointed, simple tips and subdistal transverse rows of spines. Simple neurochaetae with capillary tips absent. Neurochaetae ornamentation as spines in distinct transverse rows. Neurochaetae tips simple, entire; acute, slightly curved (Fig. 24D–E). Neurochaetae with bidentate tips absent.

Pygidium terminal. Dorsum immediately anterior to pygidium similar to that of other segments. Anus terminal.

Distribution and ecology. South Pacific Ocean, Australia and New Zealand. Depth 549–1,371 m.

Remarks. *Eunoe leiotentaculata*, originally described from south of New Zealand at 1,100–1,200 m (Averincev, 1878) is now recorded widely in the south Pacific-New Zealand-southern Australia area at depths of 549–1,371 m. *Eunoe leiotentaculata* can be separated from other species in this study by the following distinct characters: long dorsal cirri, extended bare tip region of the neurochaetae and often

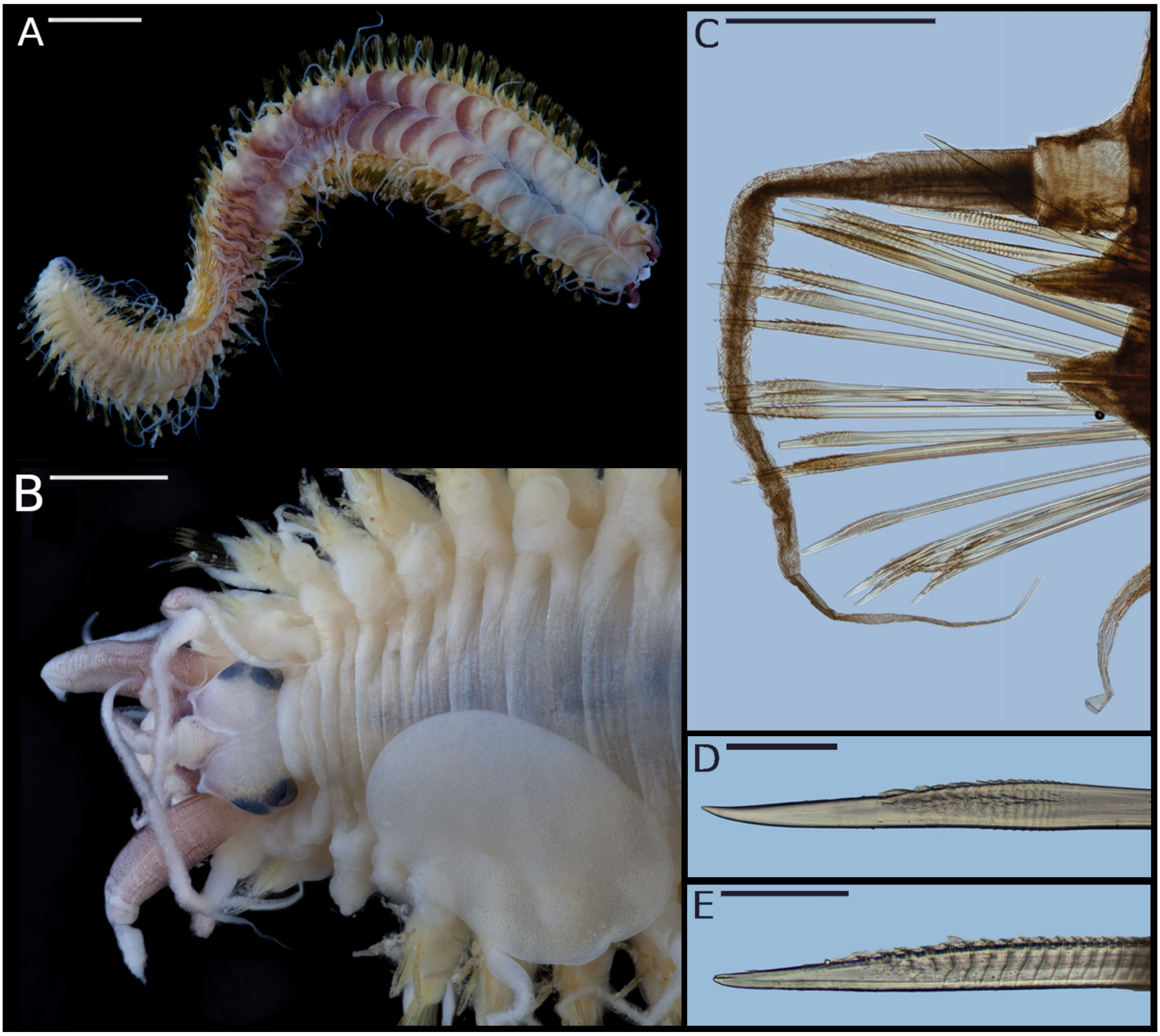

Figure 24. *Eunoe leiotentaculata* Averincev, 1978, specimen NMV F242900: (A) dorsal view, whole specimen, scale bar is 2 mm; (B) prostomium anterior view, scale bar is 0.5 mm; (C) parapodium, mid-body, scale bar is 0.25 mm; (D) notochaeta segment 14, scale bar is 0.1 mm; (E) neurochaeta segment 14, scale bar is 0.1 mm.

distinctive mauve pigmentation in a band on the posterior margin of the elytra are distinctive characters for recognition, although these characters are not all seen in all specimens.

Eunoe sp.

Fig. 25

Malmgrenia sp. 1 GAB MacIntosh *et al*., 2018: Supp. Appendix II (in part).
Harmothoe MoV7324 Museums Victoria OTU database.

Material examined. NMV F271080 (1), GAB, Transect 5, IN2015_C02_131, 35° 8.373'S, 134° 6.29'E, Beam Trawl, 965–1,077 m, 5 December 2015.

Description. One specimen, complete in two fragments, in total 49 segments, 29 mm long, 3 mm wide. Cephalic peaks present; in middle of anterior margin. Eyes present. Anterior eyes located at widest part of prostomium; orientation lateral, dorso-lateral to dorsal. Posterior eyes located near posterior margin of prostomium; orientation dorsal. Lateral antennae prostomial location ventral to and separate from prostomium; inserted ventrally, distinctly beneath level of median antenna; about equal to width of prostomium; ceratostyles elongate, evenly tapering; ceratostyles without papillae. Tentaculophores with chaetae (Fig. 25A–B). Nuchal fold present dorsally on segment two (although not clearly seen in Fig. 25).

Elytrophores 15 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution on every third segment after segment 23. Last elytra on segment 32. First elytron remaining (detached, covered with extraneous sediment and detritus), elytrophores on 2, 4, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 26, 29, 32. Elytra surface ornamented. Elytra macrotubercles absent. Elytra microtubercles present. Elytra with dense cover of golden microtubercles. Dorsal tubercles present on all cirrigerous segments.

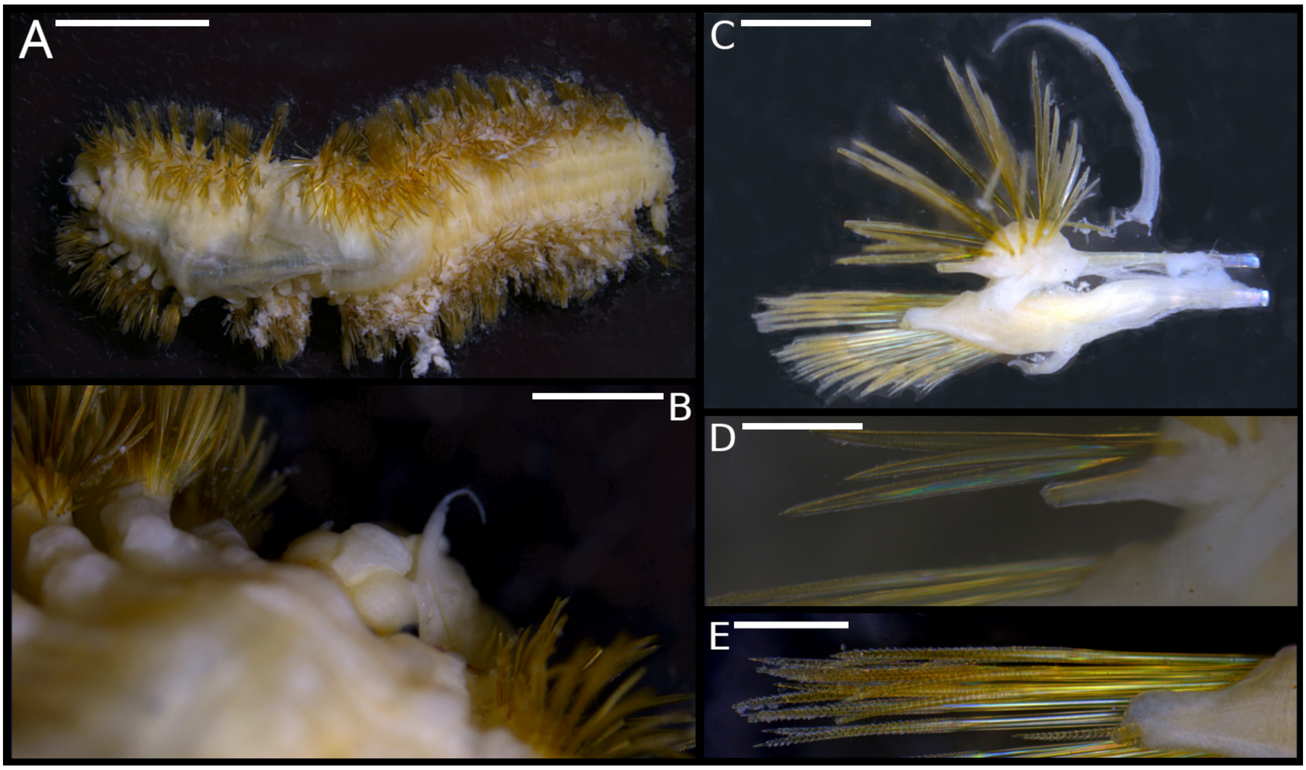

Figure 25. *Eunoe* sp., specimen NMV F271080: (A) whole animal dorsal view, scale bar is 5 mm; (B) prostomium, scale bar is 1 mm; (C) parapodium segment 12, scale bar is 1 mm; (D) notochaetae segment 12, scale bar is 0.2 mm; (E) neurochaetae, scale bar is 0.2 mm.

Aciculae of notopodia and neuropodia project clear of epidermis. Dorsal cirri styles elongate, evenly tapering; papillated (but papillae small and sparse). Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process absent. Neuropodial postchaetal lobe distally entire (Fig. 25C).

Notochaetae about as thick as neurochaetae, with rows of spines in transverse rows continuing almost to the tip (Fig. 25D). Neurochaetae ornamentation as spines in distinct transverse rows continuing almost to tip. Neurochaetae tips simple, entire; short points (Fig. 25E). Neurochaetae with bidentate tips absent.

Distribution and ecology. Southern Ocean, Great Australian Bight. Depth 965–1,077 m.

Remarks. This specimen can be separated from all other Australian bathyal-abyssal polynoids by the presence of a nuchal flap and cephalic peaks. The nuchal flap, although distinct, is much smaller and fold-like than in most Polynoinae species. Among other Polynoinae species this specimen appears most similar to *Eunoe macrophthalma* McIntosh, 1924, from the North Atlantic and *E. subfumida* (Grube, 1878) from the North Pacific. The specimen was not sampled for molecular analysis.

Harmothoe Kinberg, 1856

Harmothoe Kinberg, 1856: 386.
Tricosmochaeta Morgera, 1918: 9–10.
Andresia Prenant, 1924 *fide* Barnich & Fiege, 2009a: 6, 20–21.
Lagisca Malmgren, 1865: 65 *fide* Barnich & Fiege, 2009a: 6, 20–21.

Type species. *Harmothoe spinosa* Kinberg, 1856 (type by subsequent designation).

Diagnosis. Body 35–48 segments (in exceptional cases a few more, e.g. *H. ornatus* (Hartman, 1967)). Cephalic peaks present. Eyes present. Posterior eyes located near posterior margin of prostomium. Lateral antennae prostomial location ventral to and separate from prostomium; inserted ventrally, distinctly beneath level of median antenna. Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped. Nephridial papillae distinct, at least on some median segments; first visible on segment 5, or 6. Elytra 15 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution on every third segment after segment 23. Last elytra on segment 32. Dorsal tubercles present on all cirrigerous segments. Aciculae of notopodia and neuropodia project clear of epidermis. Dorsal cirri styles elongate, evenly tapering, or subdistally inflated, or with sharply narrowed tips, without papillae, or papillated (in most species). Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process present. Notochaetae distinctly thicker than neurochaetae (usually). Notochaetae dorsal orientation mainly held erect above body, or mainly or wholly dorso-lateral projections from notopodia. Notochaetae longest notochaetae shorter than longest neurochaetae. Neurochaetae simple tips present or absent, neurochaetae with bidentate tips present.

Remarks. The distinction between *Lagisca* and *Harmothoe* relies largely on the presence of a posterior section of 10–15 segments or more lacking elytra (in *Lagisca*) whereas this extended posterior section is absent in *Harmothoe* species. Whether this is a valid taxonomic character has been disputed in recent studies – it has been suggested that species referable to *Lagisca* are simply very large individuals of *Harmothoe* species which have grown additional posterior segments (Barnich & Fiege 2000). Pettibone (1953) synonymised the type species of *Lagisca*, *L. rarispina* (Sars, 1861), with *Harmothoe extenuata* (Grube, 1840). Salazar-Silva (2006) considered *Lagisca* a valid taxon but Barnich *et al.* (2006) moved several species from *Lagisca* to *Harmothoe* and further doubted the validity of *Lagisca*. Subsequently Barnich and Fiege (2009a, p.6) synonymised *Lagisca* with *Harmothoe*. Herein, several large specimens of *Harmothoe longipalpa* comb. nov., *H. paxtoni* and *H. torbeni* comb. nov., also had additional posterior segments lacking elytra, consistent with the interpretation of Barnich and Fiege (2000, 2009a), so we also consider *Lagisca* to be a synonym of *Harmothoe*.

Harmothoe australis Kirkegaard, 1995

Fig. 26

Harmothoe sp. 3 MacIntosh *et al*., 2018: Supp. Appendix II.
Harmothoe sp. 5 Gunton *et al*., 2021: 105–107, fig 23.

Material examined. AM W.51465 (1), Central Eastern CMR, IN2017_V03_086, 30° 5.862'S, 153° 53.922'E – 30° 7.158'S, 153° 52.47'E, CSIRO Four Metre Beam Trawl, 2,429–2,518 m, 5 June 2017; AM W.51971 (1), Freycinet CMR, IN2017_V03_011, 41° 43.242'S, 149° 7.512'E, Biological Box Corer, 2,793 m, 19 May 2017; AM W.51972 (1), Freycinet CMR, IN2017_V03_011, 41° 43.242'S 149° 7.512'E, Biological Box Corer, 2,793 m, 19 May 2017; AM W51973 (1), Jervis CMR, IN2017_V03_055, 35° 20.112'S, 151° 15.558'E – 35° 20.04'S, 151° 13.11'E, Brenke Epibenthic Sledge, 2,667–2,665 m, 28 May 2017; AM W.52006 (1), off Bermagui, IN2017_V03_045, 36° 21.618'S, 150° 38.61'E – 36° 19.392'S, 150° 39.012'E, Brenke Epibenthic Sledge, 2,835–2,739 m, 27 May 2017; AM W.54535 (1), East Gippsland CMR, IN2017_V03_040, 37° 48.9'S, 150° 22.398'E – 37°49.062'S, 150°21.348'E, Brenke Epibenthic Sledge, 2,746–2,600 m, 25 May 2017; AM W.52101 (1), Hunter CMR, IN2017_V03_076, 32° 34.632'S, 153° 9.642'E – 32° 36.78'S, 153° 8.928'E, Brenke Epibenthic Sledge, 2,534–2,480 m, 3 June 2017; AM W.52581 (1), Jervis CMR, IN2017_V03_055, 35° 20.112'S, 151° 15.558'E – 35° 20.04'S, 151° 13.11'E, Brenke Epibenthic Sledge, 2,667–2,665 m, 28 May 2017; AM W.53874 (2), Hunter CMR, IN2017_V03_070, 32° 34.5'S, 153° 9.702'E – 32° 37.899'S, 153° 8.52'E, CSIRO Four Metre Beam Trawl, 2,595–2,474 m, 3 June 2017; NMV F166490 (2), Huon seamounts, SS01/2008_11, 44° 16.817'S, 147° 8.267'E, Sherman sled, 1,260 m, 14 January 2008; NMV F242916 (4), Seamount A1, TN228 J2-382-016, 44° 19.78'S, 146° 53.23'E, 1,305 m, 15 December 2008; NMV F303108 (1), GAB, SZ04Area17, IN2015_C01_054, 35° 12.107'S, 131° 37.759'E – 35° 14.233'S, 131° 40.56'E, Beam Trawl, 1,913–1,843 m, 9 November 2015.

Description. Body 32–40 segments. Uniform grey/brown pigment on anterior dorsum, some specimens with a few dark grey spots on posterior prostomium. Cephalic peaks present; close to or in continuation of lateral margin of prostomium. Eyes present. Anterior eyes located in front of widest part of prostomium; orientation lateral, dorso-lateral to dorsal. Posterior eyes located near posterior margin of prostomium; orientation dorsal. Lateral antennae prostomial location ventral to and separate from prostomium; inserted ventrally, distinctly beneath level of median antenna; ceratophores basally separated, not touching; at most half as long as width of prostomium; ceratostyles elongate, evenly tapering (distinctly narrowed basally where the styles meet ceratophore); ceratostyles with slender papillae. Tentaculophores with chaetae. Tentacular cirri elongate, evenly tapering; with slender papillae (Fig. 26A–B).

Elytra 15 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution on every third segment after segment 23. Last elytra on segment 32. Elytra surface ornamented. Elytra macrotubercles present; form hemispherical, or spherical, globular or club-shaped. Elytra microtubercles present. Elytra papillae on dorsal surface present; slender, digitiform; arrangement grouped in clusters, or concentrated near lateral and/or posterior margin. Elytra microtubercles ranging from small cones in anterior region to cylinders with numerous points like a crown in mid and posterior regions, and large inflated cylindrical to globular macrotubercles with small projections, present on lateral and posterior sections of elytra, short papillae present on posterior surface and lateral edges (Fig. 26C–D). Dorsal tubercles present on all cirrigerous segments. Nephridial papillae distinct, at least on some median segments; first visible on segment six.

Aciculae of notopodia project clear of epidermis, in neuropodia do not project clear of epidermis. Dorsal cirri styles papillated (with very fine papillae, sparsely distributed). Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process present. Neuropodial supra-acicular process digitiform, forming a papilla distinct from neuropodial lobe (Fig. 26E).

Notochaetae distinctly thicker than neurochaetae (Fig. 26E). Notochaetae dorsal orientation mainly held erect above the body. Notochaetal spines with ornamentation as fine teeth in distinct transverse rows (Fig. 26F). Neurochaetae with bidentate tips present (Fig. 26G).

Distribution and ecology. Southern Australia. Depth 913–4,035 m.

Remarks. *Harmothoe australis* is the only bathyal-abyssal polynoid from the Australian region with soft papillae on the elytral dorsal surface (as opposed to hard micro- or macrotubercles) and with neuropodial supra-acicular process present. Originally described from the Great Australian Bight from 1,320–1,340 m, *H. australis* is now recorded widely along the southern coast of Australia at 913–4,035 m. Kirkegaard's (1995) description of the elytra conflicts with his figure. He states: "Elytra without marginal or surface papillae but with small tubercles on lateral part and a few larger globular tubercles on posterior part of the surface" (Kirkegaard, 1995: 12, fig. 6d). However, the holotype has only a few elytra remaining and two of the paratypes have none; Kirkegaard (1995) provides no information on the third paratype. We suggest that intraspecific variability in ornamentation of elytra is sufficient to explain the discrepancy, even on a single individual (if, for example, Kirkegaard's (1995) fig. 6d is of a posterior elytron it would be expected to show reduced ornamentation). The neurochaetae "Some neurosetae are unidentate and others have a small secondary thin tooth beneath the main fang"

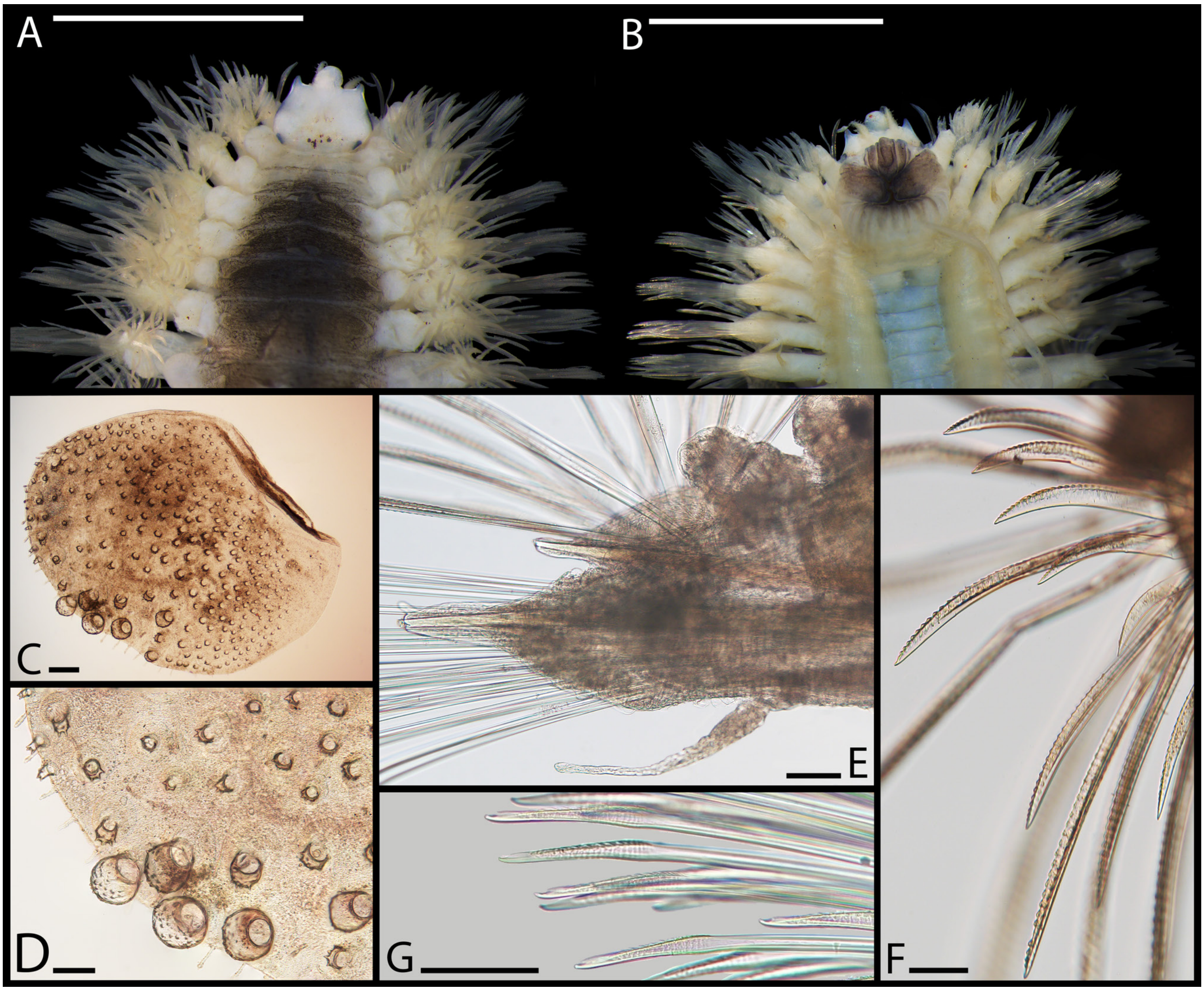

Figure 26. *Harmothoe australis* Kirkegaard, 1995, specimen AM W.51465: (A) anterior end, dorsal view, scale bar is 2 mm; (B) anterior end, ventral view, scale bar is 2 mm; (C) elytron, scale bar is 0.2 mm; (D) elytron macrotubercles and microtubercles, scale bar is 0.1 mm; (E) parapodium segment 21, left side, scale bar is 0.1 mm; (F) notochaetae, scale bar is 0.1 mm; (G) specimen AM W.52581 neurochaetae, scale bar is 0.1 mm.

(Kirkegaard, 1995:13, fig. 6c) are indeed distinctive (Fig. 26G).

A single COI sequence was obtained, therefore intraspecific genetic distance is unavailable. The sequence of *H. australis* was most similar to *E. apicolata* sp. nov. (AM W. 53616) (COI uncorrected p-distance 0.145) (Murray *et al*., 2025, Suppl. Table 2).

Harmothoe longipalpa (Kirkegaard, 1995) comb. nov.

Fig. 27

Lagisca longipalpa Kirkegaard, 1995: 16, fig.8.
Eunoe cf. *opalina* Gunton *et al*., 2021: 104, fig. 22E.

Material examined. AM W.51464 (1), Freycinet CMR, IN2017_V03_006, 41° 37.533'S, 149° 33.09'E – 41° 41.352'S, 149° 35.058'E, CSIRO Four Metre Beam Trawl, 4,022–4,052 m, 18 May 2017; AM W.52217 (1), Bass Strait, IN2017_V03_022, 39° 27.72'S, 149° 16.56'E – 39° 27.9'S, 149° 14.52'E, CSIRO Four Metre Beam Trawl, 2,760–2,692 m, 22 May 2017.

Description. Body 38–42 segments. Specimens from IN2017_V03 with some faint small brown pigment spots on prostomium and dorsum. Cephalic peaks present, in middle of anterior margin. Eyes present, separated by at least one eye-diameter; anterior and posterior eyes on each side clearly separated from each other. Anterior eyes located in front of widest part of prostomium; orientation lateral, dorso-lateral to dorsal. Posterior eyes located at least one eye diameter in front of posterior margin; orientation dorsal. Median antenna ceratostyle elongate, evenly tapering, papillate. Lateral antennae prostomial location ventral to and separate from prostomium; inserted ventrally, distinctly beneath level of median antenna; ceratophores basally separated, not touching; ceratostyles elongate, evenly tapering; ceratostyles with slender papillae. Tentaculophores with chaetae (Fig. 27A). Tentacular cirri elongate, with sharply narrowed tips; with slender papillae.

Elytra 15 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution on

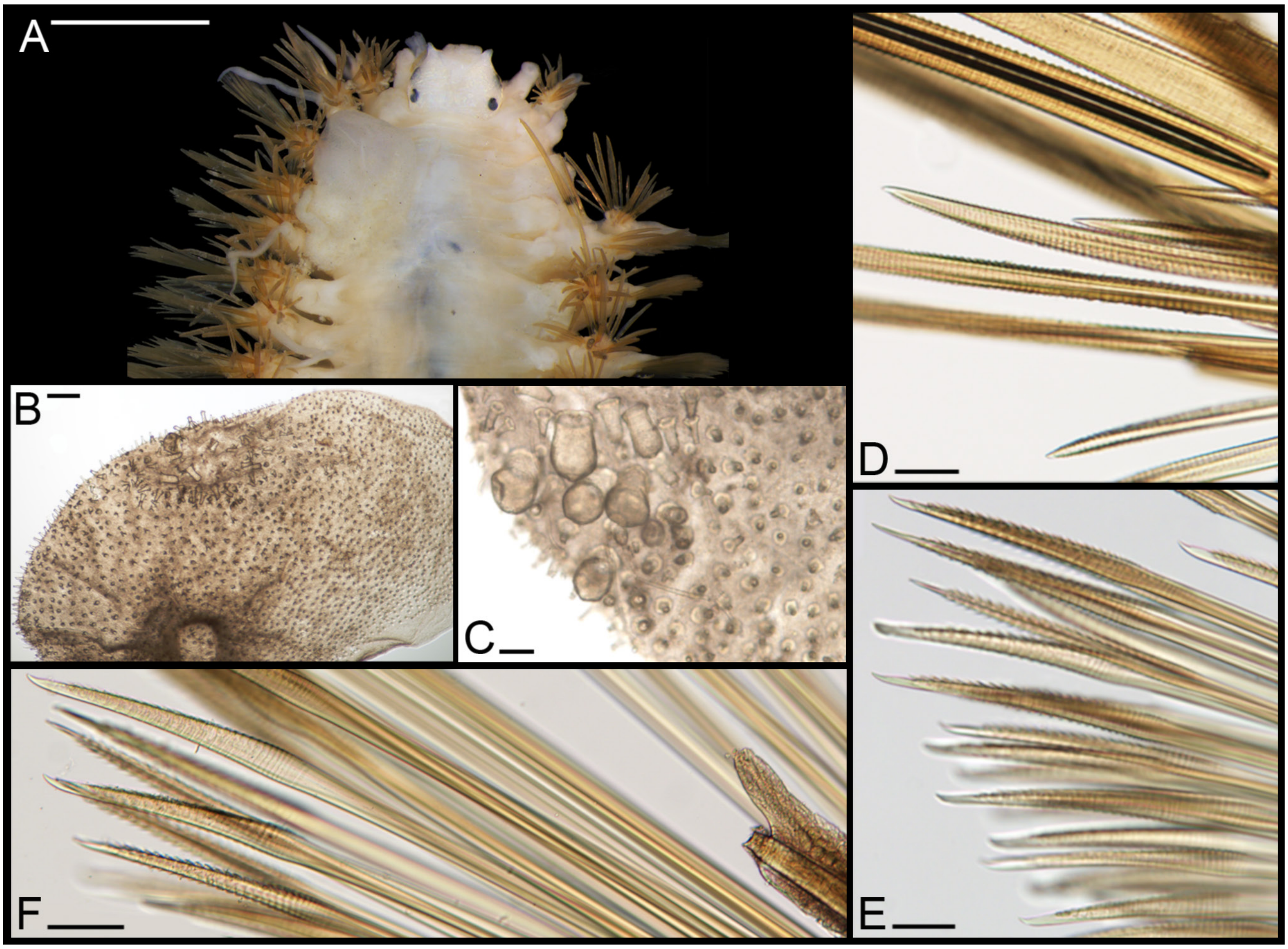

Figure 27. *Harmothoe longipalpa* (Kirkegaard, 1995) comb. nov., specimen AM W.51464: (A) anterior end, dorsal view, scale bar is 2 mm; (B) elytron, scale bar is 0.2 mm; (C) elytron macrotubercles and microtubercles, scale bar is 0.1 mm; (D) notochaetae, scale bar is 0.1 mm; (E) neurochaetae, scale bar is 0.1 mm; (F) neuropodium 20, neurochaetae, scale bar is 0.1 mm.

every third segment after segment 23. Last elytra on segment 32, leaving posterior third or more of body without elytra (six to ten posterior-most segments not covered by elytra), covering body completely. Elytra surface ornamented. Elytra macrotubercles present; macrotubercles not large, but much larger and fewer in number than microtubercles, also confined to a small middle-posterior region; shape spine-like, conical or with simple conical tips, or cylindrical, columnar. Elytra microtubercles present, either short, rounded or cylindrical with truncated flattened tips. Patch of a few larger inflated, distally round, cylindrical and bell-shaped macrotubercles of various sizes near posterior margin; with even cover of closely spaced micropapillae thus of velvety appearance (Fig. 27B–C). Elytra margins ornamented. Elytra marginal papillae present, digitiform, simple, few, scattered, longer papillae present internally on posterior section. Dorsal tubercles present on all cirrigerous segments. Nephridial papillae distinct, at least on some median segments; first visible on segment five or six.

Aciculae of notopodia and neuropodia project clear of epidermis. Dorsal cirri styles papillated (with sparse fine papillae). Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process present. Neuropodial supra-acicular process digitiform, forming a papilla distinct from neuropodial lobe (Fig. 27F). Neuropodial postchaetal lobe distally entire.

Notochaetae distinctly thicker than neurochaetae. Notochaetae dorsal orientation mainly held erect above the body. Notochaetae stout, all spinous, with many rows of spines right up to the blunt tip (Fig. 27D). Simple neurochaetae with capillary tips absent. Neurochaetae ornamentation in the form of spines in distinct transverse rows. Neurochaetae mostly with simple, falcigerous tips, and fine spinous rows on swollen blades, some with slight swelling subdistally, and a few bidentate neurochaetae also present, with a fine secondary tooth which may be worn and indistinct (Fig. 27E–F).

Distribution and ecology. Off south-eastern Australia, and New Zealand. Depth 2,692–4,052 m.

Remarks. These specimens most resemble *Lagisca longipalpa* Kirkegaard, 1995, because of the combination of mostly unidentate neurochaetae, the form of spination of noto- and neurochaetae, presence of papillae on antennae, tentacular and dorsal cirri, presence of notochaetae on tentaculophores, and the forms of elytral ornamentation (marginal and surface papillae, conical and cylindrical tubercles with truncate tips and a few larger inflated bell-shaped macrotubercles). Some neurochaetae are indistinctly bidentate with a raised area appearing like an abraded secondary tooth (Kirkegaard, 1995, fig. 8d; our Fig. 27E–F). The palps are not as long as those of Kirkegaard's specimens however, and he describes them as smooth, which may be due to the very small size and sparseness of these papillae, only visible under high magnification with low-incident light. Polynoidae species are frequently described with smooth palps although in our experience no polynoid lacks palpal papillae entirely although papillae are frequently very small and sparse. Other differences can probably be put down to Kirkegaard's incomplete description and figures. His parapodium figure is unclear, nor is this structure described in the text; his text does describe small cephalic peaks but these are not visible in his figure 8a. Other similar species are *H. crosetensis* (McIntosh, 1885) and *Lagisca antarctica* McIntosh, 1885, but the former differs from this species due to the lack of posterior patch of elytral macrotubercles, while *L. antarctica* lacks the longer cylindrical tubercles with crown-like tips of the present species. Bidentate neurochaetae are not numerous and the secondary tooth is often indistinct, thus the species can be readily confused with species belonging to the genus *Eunoe*, however it is distinguished by the form of the neuropodial tips – neither strongly unidentate nor strongly falcate as in most *Eunoe* species.

We refer this species to *Harmothoe* as *Harmothoe longipalpa* comb. nov., since only the largest specimen may have up to 10 posterior segments lacking elytra among material that otherwise fits *Harmothoe*. We do not consider this a sufficient basis for recognising a genus distinct from *Harmothoe* for this species. Our specimens are consistent with the conclusion of other authors (Pettibone, 1953, 1963; Tebble & Chambers, 1982; Chambers & Muir, 1997; Barnich & Fiege, 2000, 2006, 2009a) in that specimens of "*Lagisca*" appear to be large examples of species that would otherwise be placed in the genus *Harmothoe* and that *Lagisca* Malmgren, 1865 should be considered a junior synonym of *Harmothoe* Kinberg, 1856.

Harmothoe longipalpa has been previously recorded only from southwest New Zealand waters in 3,580 m depth but is now known more widely at abyssal depths off southeastern Australia.

Harmothoe paxtoni Averincev, 1978

Figs 28–29

Harmothoe paxtoni Averincev 1978: 55, fig. 2.
Harmothoe GAB2 MacIntosh *et al*., 2018: Supp. Appendix II.

Material examined. Australia, GAB: NMV F271044 (1), VSM02Area16, IN2015_C01_108, 34° 43.9'S, 131° 50.522'E – 34° 42.538'S, 131° 51.829'E, Beam Trawl, 1,342–1,319 m, 22 November 2015; NMV F271045 (1), VSM02Area16, IN2015_C01_108, 34° 43.9'S, 131° 50.522'E – 34° 42.538'S, 131° 51.829'E, Beam Trawl, 1,342–1,319 m, 22 November 2015; NMV F271046 (1), VSM02Area16, IN2015_C01_108, 34° 43.9'S, 131° 50.522'E – 34° 42.538'S, 131° 51.829'E, Beam Trawl, 1,342–1,319 m, 22 November 2015; NMV F271047 (1), VSM02Area16, IN2015_C01_108, 34° 43.9'S, 131° 50.522'E – 34° 42.538'S, 131° 51.829'E, Beam Trawl, 1,342–1,319 m, 22 November 2015; NMV F271090 (1), VSM02Area16, IN2015_C01_099, 34° 46.507'S, 131° 43.879'E – 34° 47.926'S, 131° 44.69'E, Beam Trawl, 1,323–1,340 m, 21 November 2015.

Other material. Holotype. ZIN 1/43269 (1, incomplete posteriorly, missing probably just a few segments, examined by Fauchald & Wilson, 2024), SW of Tasmania, "Dmitry Mendeleev" Stn. 1347, 44° 6.7'S 145° 59.9'E, Sigsbee Trawl, 1,800–1,820 m, 21 February 1976.

Description. Body 37 segments. Prostomium and/or dorsum somewhat purplish on Great Australian Bight specimens (Fig. 28A). Cephalic peaks present; close to or in continuation of lateral margin of prostomium. Eyes absent. Median antenna ceratostyle elongate, evenly tapering but with distal end distinctly narrowed, papillate. Lateral antennae prostomial location ventral to and separate from prostomium; inserted ventrally, distinctly beneath level of median antenna; ceratophores basally separated, not touching; ceratostyles elongate, evenly tapering, or elongate, with sharply narrowed tips; ceratostyles with slender papillae. Tentaculophores with chaetae. Tentacular cirri elongate, with sharply narrowed tips; with slender papillae (Fig. 28B).

Elytra 15 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution on every third segment after segment 23. Last elytra on segment 32. Elytra covering body completely. Elytra surface ornamented. Elytra macrotubercles present; form spine-like, conical or with simple conical tips, or hemispherical. Elytra microtubercles present. Elytra papillae on dorsal surface present; slender, digitiform. Elytra mounds present. Elytra white (unpigmented), with posterior half with 12–20 large macrotubercles longer than wide and with rounded tips (Fig. 28C), some with very small terminal papilla as figured by Averincev (1978) (based on GAB material). Dorsal tubercles present on all cirrigerous segments. Nephridial papillae distinct, at least on some median segments.

Dorsal cirri styles elongate, with sharply narrowed tips; with sparse small papillae (Fig. 29A–B). Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process absent. Neuropodial postchaetal lobe distally entire. Ventral cirri without papillae (Fig. 29C).

Notochaetae distinctly thicker than neurochaetae. Notochaetae dorsal orientation mainly held erect above body. Notochaetae with rows of fine spines, short bare tips (Fig. 29D). Simple neurochaetae with capillary tips absent. Most neurochaetae unidentate, in ventral and median positions (Fig. 29E), a few bidentate neurochaetae in dorsal positions with fine secondary tooth.

Pygidium terminal. Dorsum immediately anterior to pygidium similar to that of other segments. Anus terminal. Pygidial appendages one pair of subulate or cirriform pygidial cirri.

Distribution and ecology. Southern Ocean, Australia. Depth 1,168–1,820 m. Commensal; host Echinodermata; both GAB specimens commensal on *Benthopecten munidae* Clark, 1969; no host association mentioned in Averincev, 1978.

Remarks. *Harmothoe paxtoni* Averincev, 1978 was described from off the southern tip of Tasmania from 1,800 m (Averincev, 1978). The specimens reported here, from 1,168–1,342 m in the Great Australian Bight, are the first record of the species since the original description. Averincev (1978) did not note host association, but the new material reported here was commensal in ambulacral grooves of

Figure 28. *Harmothoe paxtoni* Averincev, 1978, specimen NMV F271045: (A) whole animal, dorsal view, scale bar is 2 mm; (B) prostomium, scale bar is 1mm; (C) posterior elytron *in situ*, scale bar is 1 mm.

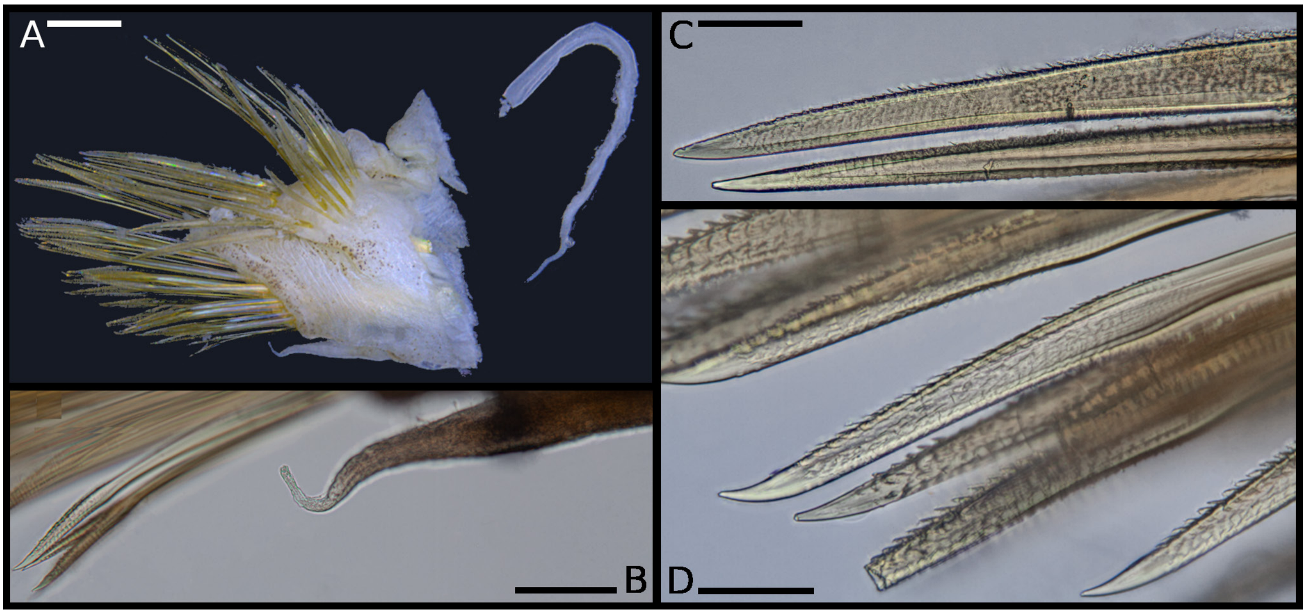

Figure 29. *Harmothoe paxtoni* Averincev, 1978, specimen NMV F271045: (A) parapodium segment 10, anterior view, scale bar is 0.5 mm; (B) dorsal cirrus detail, scale bar is 0.25 mm; (C) ventral cirrus detail, segment 10 anterior view, scale bar is 0.2 mm; (D) notochaetae segment 10, scale bar is 0.1 mm; (E) neurochaetae segment 10, scale bar is 0.1 mm.

the asteroid *Benthopecten munidae* Clark, 1969. *Eunoe bathydomus* (Ditlevsen, 1917) from the North Atlantic is similar morphologically and genetically and is commensal on several species of Holothuroidea. *Harmothoe paxtoni* can be distinguished from other Australian bathyal and abyssal *Harmothoe* species in this study by the large elytral macrotubercles, absence of eyes and absence of neuropodial prechaetal supra-acicular process.

COI intraspecific p-distance for *Harmothoe paxtoni* was 0.000 (Murray *et al*., 2025, Suppl. Table 2). The most genetically similar species was *E. benhami* sp. nov. (see Remarks for *E. benhami* sp. nov.).

Harmothoe torbeni (Kirkegaard, 1995) comb. nov.

Figs 30–31

Lagisca torbeni Kirkegaard 1995: 16, fig. 9.
Harmothoe GAB1 MacIntosh *et al*., 2018: Supp. Appendix II.

Material examined. AM W.53100 (14), St Helens flat, IN2018_V06_184, 41° 12.198'S, 148° 47.118'E – 41° 11.682'S, 148° 45.858'E, CSIRO Four Metre Beam Trawl, 1,188–1,127 m, 17 December 2018; AM W.54534 (4), St Helens flat, IN2018_V06_184, 41° 12.198'S, 148° 47.118'E – 41° 11.682'S, 148° 45.858'E, CSIRO Four Metre Beam Trawl, 1,188–1,127 m, 17 December 2018; NMV F271048 (1), GAB, VSM02Area16, IN2015_C01_108, 34° 43.9'S, 131° 50.522'E – 34° 42.538'S, 131° 51.829'E, Beam Trawl, 1,342–1,319 m, 22 November 2015; NMV F271049 (1), GAB, SZ03Area22, IN2015_C01_117, 34° 40.458'S, 132° 28.764'E – 34° 39.618'S, 132° 27.276'E, Beam Trawl, 1,017–1,014 m, 24 November 2015; NMV F271071 (1), GAB, SZ03Area22, IN2015_C01_110, 34° 37.763'S, 132° 21.366'E – 34° 38.29'S, 132° 23.165'E, Beam Trawl, 1,029–1,014 m, 23 November 2015; NMV F271072 (1), GAB, VSM03Area22, IN2015_C01_114, 34° 42.33'S, 132° 31.856'E – 34° 41.656'S, 132° 32.834'E, Beam Trawl, 995–980 m, 24 November 2015; NMV F271092 (8), GAB, VSM03Area22, IN2015_C01_114, 34° 42.33'S, 132° 31.856'E – 34° 41.656'S, 132° 32.834'E, Beam Trawl, 995–980 m, 24 November 2015.

Description. Body 37–45 segments. Dorsum with uniform dark pigmentation interrupted by pale lines due to two unpigmented transverse ciliary bands per segment (Fig. 30A). Cephalic peaks present; close to or as continuation of lateral margin of prostomium. Eyes present; separated by at least one eye-diameter; anterior and posterior eyes on each side clearly separated from each other. Anterior eyes located in front of widest part of prostomium; orientation lateral, dorso-lateral to dorsal. Posterior eyes orientation dorsal (Fig. 30B). Lateral antennae prostomial location ventral to and separate from prostomium; inserted ventrally, distinctly beneath level of median antenna; ceratostyles elongate, evenly tapering; ceratostyles with slender papillae (Fig. 30C). Tentaculophores with chaetae. Tentacular cirri elongate, evenly tapering; with slender papillae (Fig. 30D). Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped. Pharynx barrel-shaped without distinct ornamentation, with 9 pairs of terminal papillae, terminal papillae all similar.

Elytra 15 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution on every third segment after segment 23. Last elytra on segment 32. Elytra covering body completely. Elytra surface ornamented. Elytra macrotubercles present; form spine-like, conical or with simple conical tips, or spherical, globular or club-shaped; surface with spines or teeth. Elytra microtubercles present. Elytra margins ornamented. Elytra marginal papillae present (Fig. 31A).

Dorsal cirri styles papillated (Fig. 31C). Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process present, slender and short (Fig. 31B). Ventral cirri styles with scattered papillae (sparse and fine) dispersed all over.

Notochaetae about as thick as neurochaetae (Fig. 31B). Notochaetae dorsal orientation mainly held erect above the body. Notochaetae with transverse rows of robust short spines (Fig. 31D). Simple neurochaetae with capillary tips absent. Neurochaetae of three kinds present: supraacicular long neurochaetae, with two rows of subdistal long spines and narrow bare simple tips; subacicular neurochaetae more numerous, bidentate with very fine secondary tooth (often worn) in dorsal positions; in ventral positions with two rows of slightly shorter subdistal spines and lacking secondary tooth (Fig. 31E).

Distribution and ecology. Off southern Australia and New Zealand. Depth 610–1,342 m.

Remarks. In assigning *Lagisca torbeni* to *Harmothoe torbeni* n. comb., we follow Barnich and Fiege (2009a) and other authors who suggested that *Lagisca* is invalid and based on large specimens which have added posterior segments during growth but are otherwise referable to *Harmothoe*. Herein, see Remarks for the genus account for *Harmothoe*, and Remarks for *H. longipalpa* above.

The description here completes and clarifies characters that were unclear or not stated in the original description, including pharynx and jaws which were not visible to Kirkegaard. Kirkegaard (1995: 16) states "Neuropodia with a long digitiform process", but his figure 9 does not show a supra-acicular process. However, as our figure shows, a supra-acicular process is present, but it is small and would be easily missed. Kirkegaard states that "Antennae, tentacular cirri and parapodial cirri with small thin papillae" which we could not initially reconcile with our new material from the Great Australian Bight which appeared to lack papillae on all appendages. However, at high magnification it is true that as Kirkegaard states, very thin and small papillae are present, although sparse, on all intact antennae, tentacular cirri and parapodial cirri on our specimens. These fine papillae can only be observed under stereo microscopes at high magnification with low-incident angle light. Note also that Kirkegaard (1995, fig. 9) only shows lateral antennae and tentacular cirri with papillae; dorsal and ventral cirri (drawn much larger) have no papillae but they are present in our specimens.

Our material agrees closely with the description of Kirkegaard (1995). Among bathyal-abyssal Polynoidae from southern and eastern Australia, *Harmothoe torbeni* is readily recognisable by the elytra with hard tubercles and long dense papillae on posterior and lateral regions, the prominent dorsally-directed bundles of stout notochaetae and the small but distinct cephalic peaks.

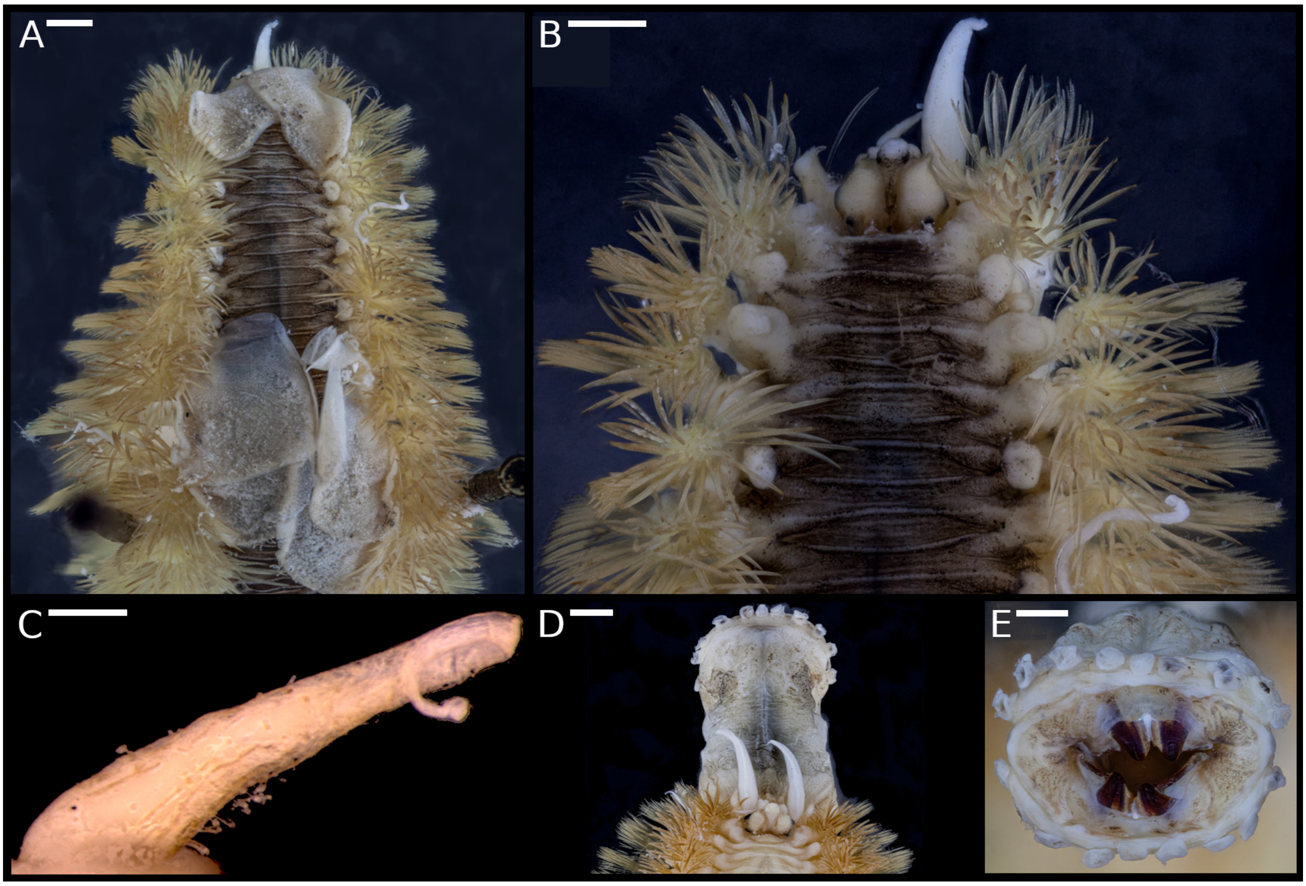

Figure 30. *Harmothoe torbeni* (Kirkegaard, 1995) comb. nov., multiple specimens NMV F271092: (A) anterior end, dorsal view with elytron attached, scale bar is 1 mm; (B) anterior end, dorsal view with elytron removed, scale bar is 1 mm; (C) detail of antennae, scale bar is 0.1 mm; (D) dorsal view of prostomium and pharynx, scale bar is 0.125 mm; (E) detail of pharynx, papillae, and jaws, scale bar is 0.5 mm.

COI intraspecific p-distance for *Harmothoe torbeni* comb. nov., was 0.000 to 0.009. The most genetically similar species was *H. longipalpa* comb. nov., with uncorrected COI p-distances 0.035 to 0.043. (Murray *et al*., 2025; Suppl. Table 2).

Kermadecella Darboux, 1899

Kermadecella Darboux, 1899: 95.

Type species. *Kermadecella magnipalpa* (McIntosh, 1885) (type by original designation).

Diagnosis. Body up to 36 segments. Males and females differ in number of segments and pairs of elytra. Cephalic peaks present. Eyes present. Lateral antennae inserted ventrally, distinctly beneath level of median antenna; ceratophores basally separated, not touching; ceratostyles without papillae. Tentaculophores with or without chaetae. Tentacular cirri elongate, subdistally inflated; without papillae. Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped. Nephridial papillae distinct, at least on some median segments. Elytra 13–16 pairs; on segments 2, 4, 5 then every second segment, until 23, then on every third segment (in males). Last pair on segment 23 or 26 in females, on 32 in males. Dorsal tubercles indistinct rounded mounds on cirrigerous segments. Dorsal cirri styles elongate, with sharply narrowed tips, alternately long and short in males, the short dorsal cirri (inserted on segments 6, 10) basally inflated, basal inflation lacking in the long dorsal cirri, and in all dorsal cirri in females. Neuropodial prechaetal (acicular) lobe distal shape rounded. Neuropodial prechaetal supra-acicular process present. Neuropodial postchaetal lobe distally entire. Notochaetae distinctly thicker than neurochaetae. Notochaetae dorsal orientation mainly held erect above the body. Simple neurochaetae with capillary tips absent. Neurochaetae with bidentate tips present. Pygidium terminal. Dorsum immediately anterior to pygidium similar to that of other segments. Anus dorsal; opening on pygidium medial to last pair of parapodia.

Remarks. *Kermadecella* was erected by Darboux (1899) based on sexually dimorphic specimens found in the only included species, *Harmothoe magnipalpa* McIntosh, 1885: females with short, oval bodies up to about 26 segments, males longer-bodied with up to 32 segments and dorsal cirri alternating in length, the shorter cirri being basally inflated. Aside from these differences and the large palps alluded to in McIntosh's species name, *Kermadecella* and *Harmothoe* cannot be separated.

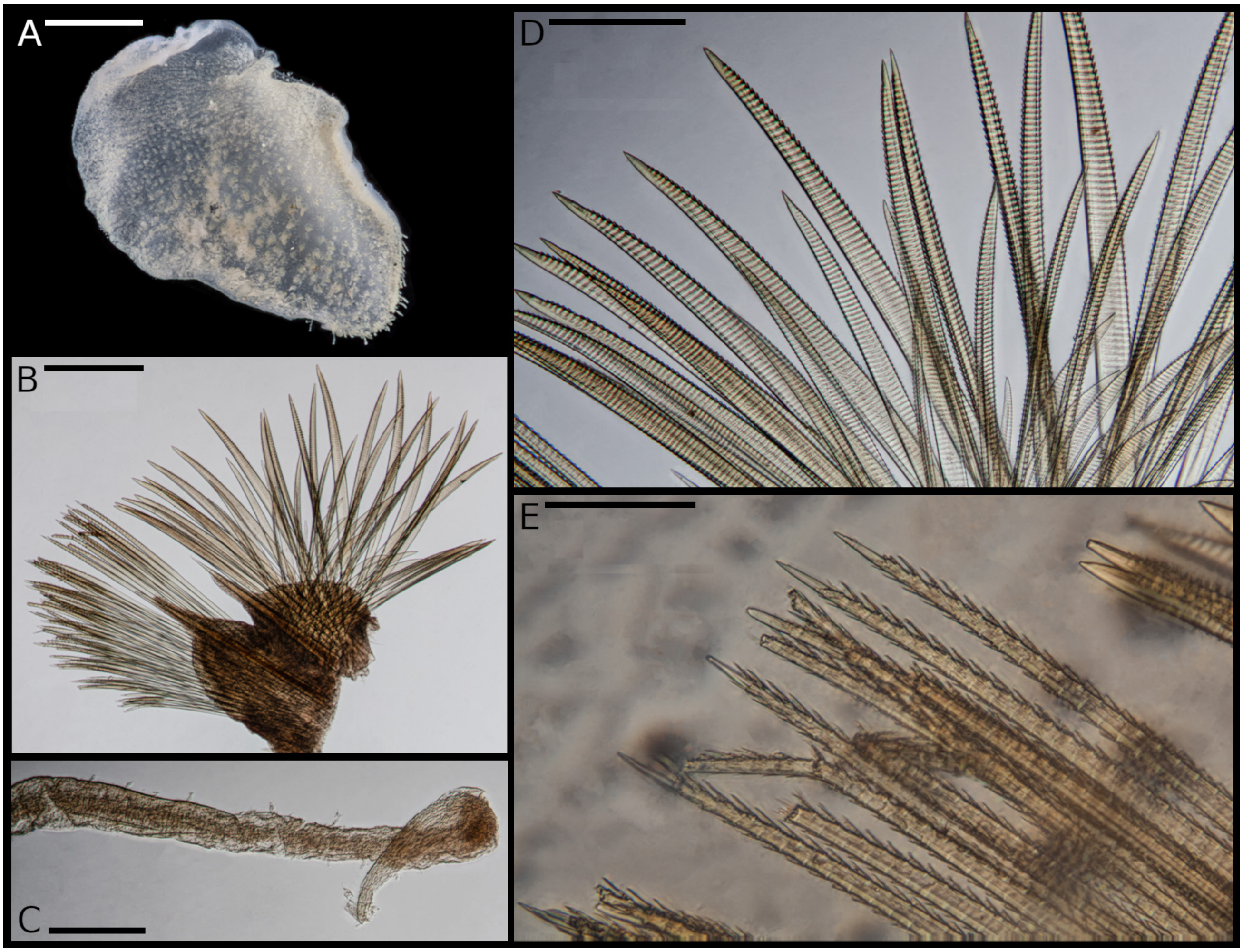

Figure 31. *Harmothoe torbeni* (Kirkegaard, 1995) comb. nov., multiple specimens NMV F271092: (A) detached elytron, unknown segment, scale bar is 1 mm; (B) anterior view of parapodium from segment 7, scale bar is 0.5 mm; (C) detail of detached dorsal cirrus from unknown segment, scale bar is 0.25 mm; (D) notochaetae segment 7, scale bar is 0.25 mm; (E) neurochaetae segment 7, scale bar is 0.125 mm.

Kermadecella magnipalpa

(McIntosh, 1885)

Figs 32–33

Polynoe magnipalpa McIntosh, 1885: 118–119 pp., Pl.13 fig. 6, Pl.14, figs 1,6, Pl.18, fig. 5, Pl. 10A, figs 5–6.
Kermadecella magnipalpa.— Darboux, 1899: 95.
Kermadecella magnipalpa.—Hartman 1966: 175.

Material examined. AM W.19644 (many specimens), Tasman Sea, Taupo Seamount, 33° 20.4'S, 156° 7.2'E, 342 m, 7 October 1982; AM W.203659 (4), Taupo Seamount, Tasman Sea, 33° 10.4'S, 156° 6.1'E, 153 m, 7 October 1982; AM W.203660 (1), Taupo Seamount, 33° 6.2'S, 156° 9.3'E, 164 m, 7 October 1982; AM W.21801 (11, some males), Taupo Seamount, Tasman Sea, 33° 13.8'S, 156° 8.5'E, 137 m, 3 November 1976; AM W.22487 (2 females). Southeastern Australia, east of Port Hacking, 34° 4.8'S, 151° 55.8'E, Isaacs Kidd midwater trawl, 1,200–2,925 m, 23 March 1971.

Description. Females. Body 24 segments. Two specimens, small, somewhat damaged but complete, both with 24 segments, 5 mm long, 2–3 mm wide (including chaetae). No pigmentation. Small cephalic peaks present. Eyes present. Anterior eyes located at widest part of prostomium; orientation lateral, dorso-lateral to dorsal. Posterior eyes orientation dorsal. Median antenna ceratostyle elongate, evenly tapering, smooth. Lateral antennae prostomial location ventral to and separate from prostomium; inserted ventrally, distinctly beneath level of median antenna; at most half as long as width of prostomium; ceratostyles elongate, evenly tapering; ceratostyles without papillae. Tentaculophores with chaetae (stout, 2–4) (Fig. 32A). Tentacular cirri without papillae.

Elytra 12–13 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly. Last elytra on segment 23, or 26. Both Tasman Sea female specimens possess 24 segments with 12 pairs of elytra, last pair on segment 23, whereas type material females possess up to 26 segments with 13 pairs of elytra, last pair on segment 26. Elytra covering body completely. Elytra surface ornamented. Elytra macrotubercles present, shape spine-like, conical or with simple conical tips (Fig. 32E). Elytra microtubercles present (Fig. 32F). Elytral papillae on dorsal surface present, slender, digitiform, scattered irregularly. Elytra margins ornamented. Elytra marginal papillae present, digitiform, simple, few, scattered (Fig. 32E). First three pairs of elytra sclerotised, with rims thin and folded on posterior

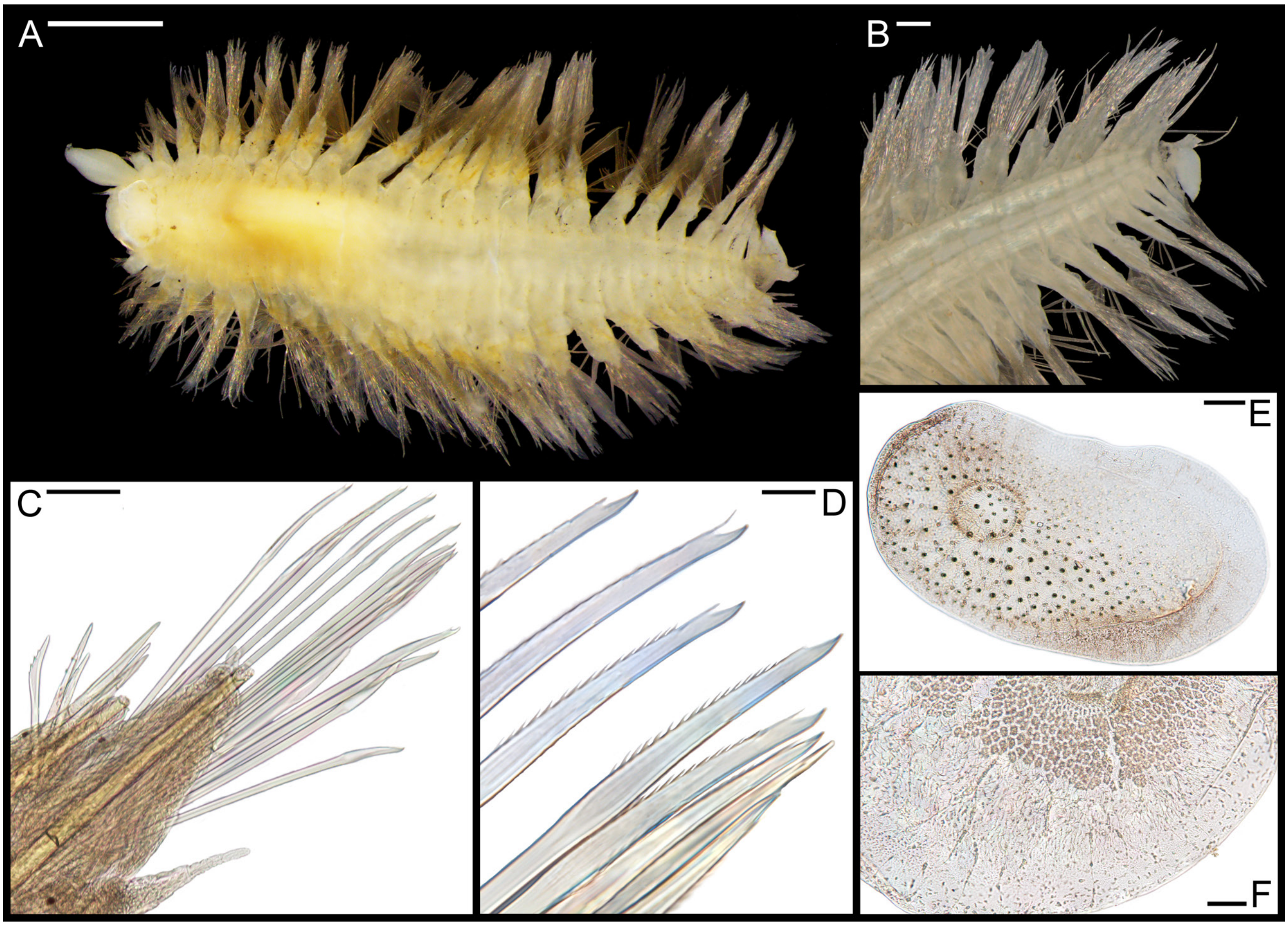

Figure 32. *Kermadecella magnipalpa* (McIntosh, 1885) female, specimen AM W.22487: (A) whole animal, dorsal view, scale bar is 1 mm; (B) posterior end, ventral view, scale bar is 0.5 mm; (C) parapodium, mid-body segment, scale bar is 0.1 mm; (D) neurochaetae, mid-body segment, scale bar is 0.02 mm; (E) elytron, anterior segment, scale bar is 0.1 mm; (F) detail of elytron, posterior segment, scale bar is 0.05 mm.

margin (not sclerotised), with pointed cones or spine-like macrotubercles; with soft scattered papillae, few marginal papillae on external posterior edge; more posterior elytra thin with fine microtubercles only. Dorsal tubercles absent (or indistinct, mound-like).

Aciculae in neuropodia project clear of epidermis. Neuropodial prechaetal (acicular) lobe distal shape rounded. Neuropodial prechaetal supra-acicular process present. Neuropodial postchaetal lobe distally entire.

Notochaetae distinctly thicker than neurochaetae. Notochaetae of two types: more dorsal ones curved with transverse rows of spines, more ventral ones long, straight with less distinct rows of spines and blunt tips (Fig. 32C). with bidentate tips present. Neurochaetae long, medially dilated, with faint transverse rows of spines distal to medial swelling, bidentate tips, secondary tooth very fine, some dorsal neurochaetae long and more slender than ventral ones (Fig. 32C–D); some tips appear entire but potentially an artefact of mounted view.

Pygidium terminal. Anus dorsal. Pygidial appendages one pair of triangular to leaf-shaped lobes, free to base (Fig. 32B).

Males. Body 34 segments. Up to 8 mm long, 3 mm wide (including chaetae). Some specimens with small brown pigment spots on dorsum, prostomium and ventrum. Cephalic peaks absent. Eyes present. Anterior eyes located at widest part of prostomium; orientation lateral, dorso-lateral to dorsal. Posterior eyes orientation dorsal (Fig. 33A–B). Median antenna ceratostyle elongate, evenly tapering, smooth. Lateral antennae prostomial location ventral to and separate from prostomium; inserted ventrally, distinctly beneath level of median antenna; at most half as long as width of prostomium; ceratostyles elongate, evenly tapering; ceratostyles without papillae. Tentaculophores with zero to one chaetae. Tentacular cirri without papillae. Jaws comprising two dorsal and two ventral elements, fused medially to appear as single dorsal and ventral elements, distally fang-shaped, cutting edge smooth. Pharynx barrel-shaped without distinct ornamentation, with 9 pairs of terminal papillae, terminal papillae all similar.

Elytra 15–16 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly. Last elytra on segment 32. Elytra covering body completely. Elytra surface ornamented. Elytra macrotubercles present, shape spine-like, conical or with simple conical tips (Fig. 33G). Elytra microtubercles present. Elytral papillae present on dorsal surface, slender, digitiform, scattered irregularly (Fig. 33G). Elytra margins ornamented. Elytra marginal papillae present, digitiform, simple, few, scattered. Elytra up to 15 pairs (some missing) on segments 2, 4, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23. first three pairs of elytra sclerotised, with rims thin and folded on posterior margin (not sclerotised), and with more

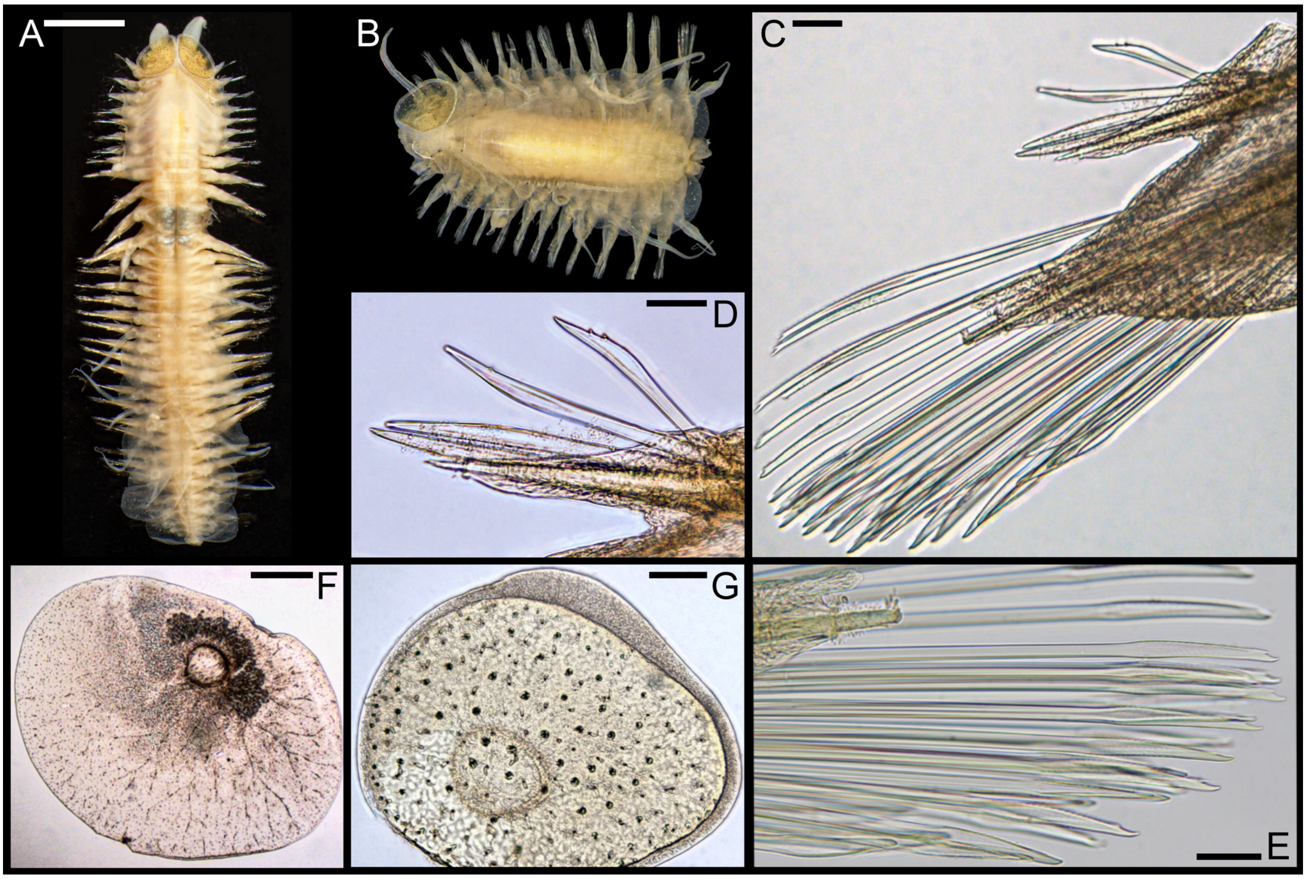

Figure 33. *Kermadecella magnipalpa* (McIntosh, 1885) male, AM W.21801, 2 specimens: (A) whole animal, dorsal view, scale bar is 1 mm; (B) anterior end; (C) parapodium, segment 13, scale bar is 0.05 mm; (D) notochaetae, scale bar is 0.04 mm; (E) neurochaetae, scale bar is 0.05 mm; (F) elytron, posterior segment, scale bar is 0.2 mm; (G) elytron, anterior segment, scale bar is 0.125 mm.

obvious macro/micro tubercles - pointed cones (spine-like), with soft scattered papillae, few marginal papillae on external posterior edge (Fig. 33A–B, G); more posterior elytra thin with fine microtubercles only (Fig. 33A, F). Dorsal tubercles absent (or indistinct). Nephridial papillae distinct, at least on some median segments; first visible on segment 5.

Aciculae in neuropodia project clear of epidermis (Fig. 33C, E). Neuropodial prechaetal (acicular) lobe distal shape rounded. Neuropodial prechaetal supra-acicular process present (Fig. 33C, E). Neuropodial postchaetal lobe distally entire.

Notochaetae distinctly thicker than neurochaetae. Notochaetae of two types: more dorsal ones curved with transverse rows of spines, more ventral ones long, straight with less distinct rows of spines and blunt tips (Fig. 33D). Neurochaetae tips bidentate (Fig. 33E).

Pygidium terminal. Anus dorsal. Pygidial appendages one pair of subulate or cirriform pygidial cirri.

Distribution and ecology. South Pacific Ocean. Depth 137–2,925 m.

Remarks. The descriptions above, based on AM material, agree with NHM-UK type material (Fauchald & Wilson, 2024) except that in the Tasman Sea specimens reported here, only females with 24 segments and 12 pairs of elytra were observed (last elytra pair on segment 23), whereas in the type specimens there are females with 13 pairs of elytra and up to 26 segments (last elytra pair on segment 26). Also, Fauchald and Wilson (2024) noted for females: "tentaculophores without chaetae" whereas females from the Tasman Sea have two to four stout chaetae on segment one. Fauchald and Wilson (2024) also described dorsal tubercles present on all non-elytrigerous segments, whereas they are indistinct in Tasman Sea specimens.

Other differences between the sexes are that the alternating short dorsal cirri (inserted on segments six, ten) are basally inflated only in males, the pygidial appendages are triangular to leaf-shaped in females but cirriform to subulate in males and the buccal cirri are half as long as ventral tentacular cirri in females but are equal in length to the ventral tentacular cirri in males.

Specimens were originally fixed in 5–10% formalin and were therefore unsuitable for molecular analysis.

Malmgrenia McIntosh, 1874

Malmgrenia McIntosh, 1874: 273.
Monoclea Costa, 1862 *fide* McIntosh, 1900: 342.
Parmenis Malmgren, 1867: 11.

Type species. *Malmgrenia andreapolis* McIntosh, 1874 (type by subsequent designation).

Diagnosis. Body 32–46 segments. Cephalic peaks absent. Eyes present. Anterior eyes located in front of widest part of prostomium; orientation lateral, dorso-lateral to dorsal. Posterior eyes located near posterior margin of prostomium; orientation dorsal. Lateral antennae prostomial location ventral to and separate from prostomium; inserted terminoventrally, almost at same level as median antenna. Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped. Elytra 15 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution on every third segment after segment 23. Last elytra on segment 32. Elytra covering body completely. Elytra margins entire, or ornamented. Dorsal tubercles present on all cirrigerous segments. Aciculae of notopodia and neuropodia project clear of epidermis. Dorsal cirri styles elongate, with sharply narrowed tips. Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process absent, or present. Neuropodial sub-acicular process absent, or present. Notochaetal spines with capillary tips absent, or present. Notochaetal spines with tips simple, entire. Tips of notochaetal spines with short points, or with extended narrowly tapering tips. Notochaetae stout with rows of spines and blunt or pointed tip, or tapering to blunt or pointed tip. Neurochaetae ornamentation as spines in distinct transverse rows (only distally). Neurochaetae with tips simple, entire, or bidentate, furcate, indented or notched; blunt, or short points. Neurochaetae with bidentate tips absent, or present. Neurochaetae when unidentate with pointed or knob-like tip.

This diagnosis is based on Jourde *et al*. (2015).

Remarks. There is some confusion about which of the genus names *Malmgrenia* McIntosh, 1874 and *Malmgreniella* Hartman, 1967 should be conserved, and which species they should include (Barnich & Fiege, 2001; Muir & Chambers, 2008), however we follow Jourde *et al*. (2015) and Read and Fauchald (2015): "Following ICZN Opinion (2009), which ruled that the usage of the generic name *Malmgrenia* McIntosh, 1874 is to be conserved, at least the north-east Atlantic and Mediterranean species should now be attributed to this genus". Jourde *et al*. (2015) key and table the relevant species, but do not give a formal synonymy listing. These combinations have been updated in WoRMS, with the remainder of *Malmgreniella* unchanged in WoRMS pending a taxonomic treatment of them or a published formal synonymy of *Malmgreniella* (or type species *M. dicirra* Hartman, 1967). In the absence of a review of all species referred to *Malmgrenia* and *Malmgreniella*, in the interests of stability we follow previous workers as cited above and treat *Malmgrenia* as the applicable genus name for species in our region. Future studies may show that this group contains more than one monophyletic grouping of species, in which case *Malmgreniella* is an available name.

Malmgrenia sp. 1

Fig. 34

Arctonoinae GAB3 MacIntosh *et al*., 2018: Supp. Appendix II.

Malmgrenia MoV7323 Museums Victoria OTU database.

Material examined. Australia, GAB: NMV F242586 (1), NMV F271089 (1), VSM02SZ site A, RE2017_C01 VSM02_038, 34° 47.843'S, 131° 45.34'E, ROV, 1,350 m, 17 March 2017.

Description. Body 30–50 segments. Largest specimen (entire) 37 mm long, 50 segments, 4.5 mm wide excluding parapodia. Smaller specimen (entire but more damaged, many parapodia detaching from body) 30 segments, 16 mm long, 2 mm wide excluding parapodia. Unpigmented. Cephalic peaks absent. Eyes present; separated by at least one eye-diameter; anterior and posterior eyes on each side clearly separated from each other. Anterior eyes located in front of widest part of prostomium; orientation lateral, dorso-lateral to dorsal (and slightly anteriorly directed). Posterior eyes located near posterior margin of prostomium; orientation dorsal. Median antenna ceratostyle elongate, evenly tapering, smooth. Lateral antennae prostomial location ventral to and separate from prostomium; inserted terminoventrally, almost at same level as median antenna; ceratophores basally separated, not touching; ceratostyles without papillae. Tentaculophores with chaetae (3–4 prominent curved chaetae). Tentacular cirri elongate, evenly tapering; without papillae (Fig. 34A–B). Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped. Facial tubercle present, form a distinctly conical structure.

Elytra 14 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution on every third segment after segment 23. Last elytra on segment 31. Elytra of large specimen on 2, 4, 5, 7, 9, 11, 13, 15, 18, 20, 22, 25, 28, 31; of small specimen on 2, 4, 5, 7, 9, 11, 13, 15, 18, 20, 22, 25 then uncertain; leaving posterior third or more of body without elytra, large but leaving middle of dorsum uncovered. Elytra surface ornamented. Elytra macrotubercles absent. Elytra microtubercles present (Fig. 34C). Dorsal tubercles present on all cirrigerous segments. Nephridial papillae distinct, at least on some median segments; first visible on segment six.

Aciculae of notopodia and neuropodia do not project clear of epidermis. Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process present. Neuropodial supra-acicular process tapering, seeming to be a continuous extension of the neuropodium (Fig. 34D).

Notochaetae about as thick as neurochaetae. Notochaetae dorsal orientation mainly or wholly dorso-lateral projections from the notopodia. Tips of notochaetal spines with short points. Notochaetae several short spines in dorsal-most position have rows of spines continuing to the tips; two to four stouter spines twice as long, with bare tips (Fig. 34E). Simple neurochaetae with capillary tips absent. Neurochaetae ornamentation as spines in distinct transverse rows. Neurochaetae tips simple, entire; blunt. Neurochaetae with bidentate tips absent. Neurochaetae about as stout as largest notochaetae, falcate, with rows of spines and a long bare slightly bent tip (none are notched or bidentate) (Fig. 34F).

Distribution and ecology. Australia, Great Australian Bight. Depth 1,350 m. Commensal; host Cnidaria: Alcyonacea sp.1.

Remarks. The following combination of characters places this species in *Malmgrenia*: 15 pairs of elytra; cephalic peaks absent; lateral antennae terminoventrally inserted; neuropodial prechaetal supra-acicular process present; bidentate neurochaetae absent. The two specimens described above appear to represent an undescribed species of *Malmgrenia* but the material is too incomplete for description. Both specimens are damaged and the larger specimen has a developmental asymmetry with an additional parapodium on the left side only between segments 15 and

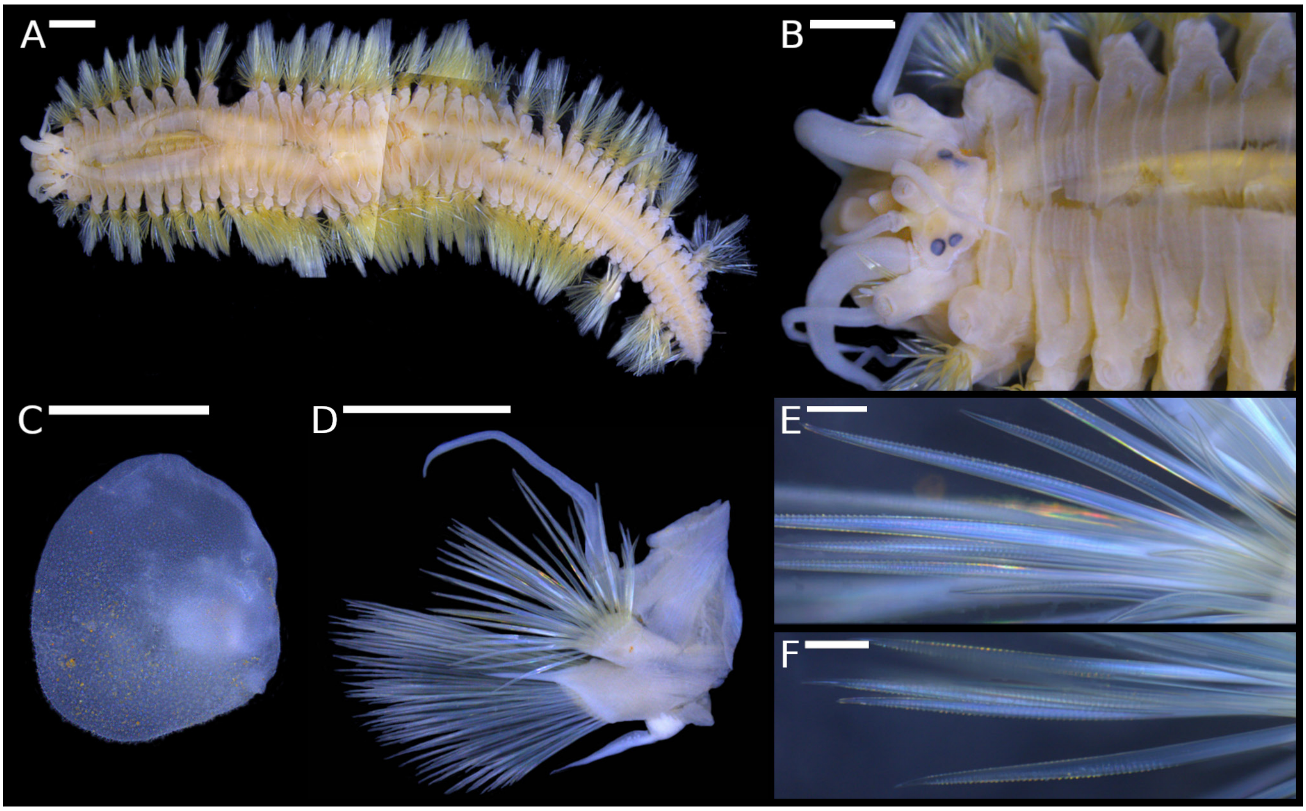

Figure 34. *Malmgrenia* sp. 1 specimen NMV F242586: (A) whole animal dorsal view, scale bar is 2 mm; (B) prostomium, scale bar is 1 mm. Specimen NMV F271089: (C) elytron, specimen, scale bar is 2 mm. Specimen NMV F242586: (D) parapodium, segment 10 anterior view, scale bar is 2 mm; (E) notochaetae, scale bar is 0.5 mm; (F) neurochaetae, ventral position, scale bar is 0.5 mm.

18 (Fig. 34A). Nevertheless, if confirmed by discovery of better material, the arrangement of elytra on segments 2, 4, 5, 7, 9, 11, 13, 15, 18, 20, 22, 25, 28, and with last elytra on 31 is to our knowledge unique in the Polynoidae.

Malmgrenia sp. 2

Fig. 35

Malmgrenia sp. 1 [GAB] MacIntosh *et al.*, 2018: Supp. Appendix II (in part).
Malmgrenia MoV7122 Museums Victoria OTU database.

Material examined. Australia: GAB, NMV F271079 (1), Transect 2, IN2015_C02_281, 34° 31.606'S, 130° 40.115'E, Beam Trawl, 1,483–1,473 m, 5 December 2015.

Description. One specimen, nearly entire anterior fragment: 26 segments, 24 mm long, 3 mm wide. Cephalic peaks absent. Eyes present; separated by at least one eye-diameter; anterior and posterior eyes on each side clearly separated from each other. Anterior eyes located at widest part of prostomium; orientation lateral, dorso-lateral to dorsal. Posterior eyes located near posterior margin of prostomium; orientation dorsal. Lateral antennae prostomial location ventral to and separate from prostomium; inserted ventrally, distinctly beneath level of median antenna; ceratophores basally separated, not touching; ceratostyles elongate, with sharply narrowed tips; ceratostyles with slender papillae (small and sparse). Tentaculophores with chaetae. Tentacular cirri elongate, with sharply narrowed tips; with slender papillae (inconspicuous, fine and sparse) (Fig. 35A). Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped, cutting edge smooth. Nuchal flap or fold on anterior margin of segment two present; margin entire, lacking marginal papillae (Fig. 35A).

Elytra 15 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution on every third segment after segment 23. Elytra complement incomplete posteriorly as specimen with only 26 segments. Elytra covering body completely. Elytra surface ornamented. Elytra macrotubercles absent. Elytra microtubercles present. Elytra margins entire. Elytra with dense cover of micropapillae (extending close to margin but none truly marginal) and also golden microtubercles (Fig. 35B). Elytra covered with extraneous sediment and detritus. Dorsal tubercles present on all cirrigerous segments. Nephridial papillae distinct, at least on some median segments; first visible on segment six.

Aciculae of notopodia and neuropodia project clear of epidermis. Dorsal cirri styles elongate, with sharply narrowed tips; papillated (Fig. 35C). Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process present. Neuropodial supra-acicular process digitiform, forming a papilla distinct from neuropodial lobe. Neuropodial postchaetal lobe distally entire (Fig. 35D).

Notochaetae about as thick as neurochaetae. Notochaetae dorsal orientation mainly or wholly dorso-lateral projections from the notopodia. Notochaetae almost straight, spines much shorter than those of neurochaetae (Fig. 35E). Simple

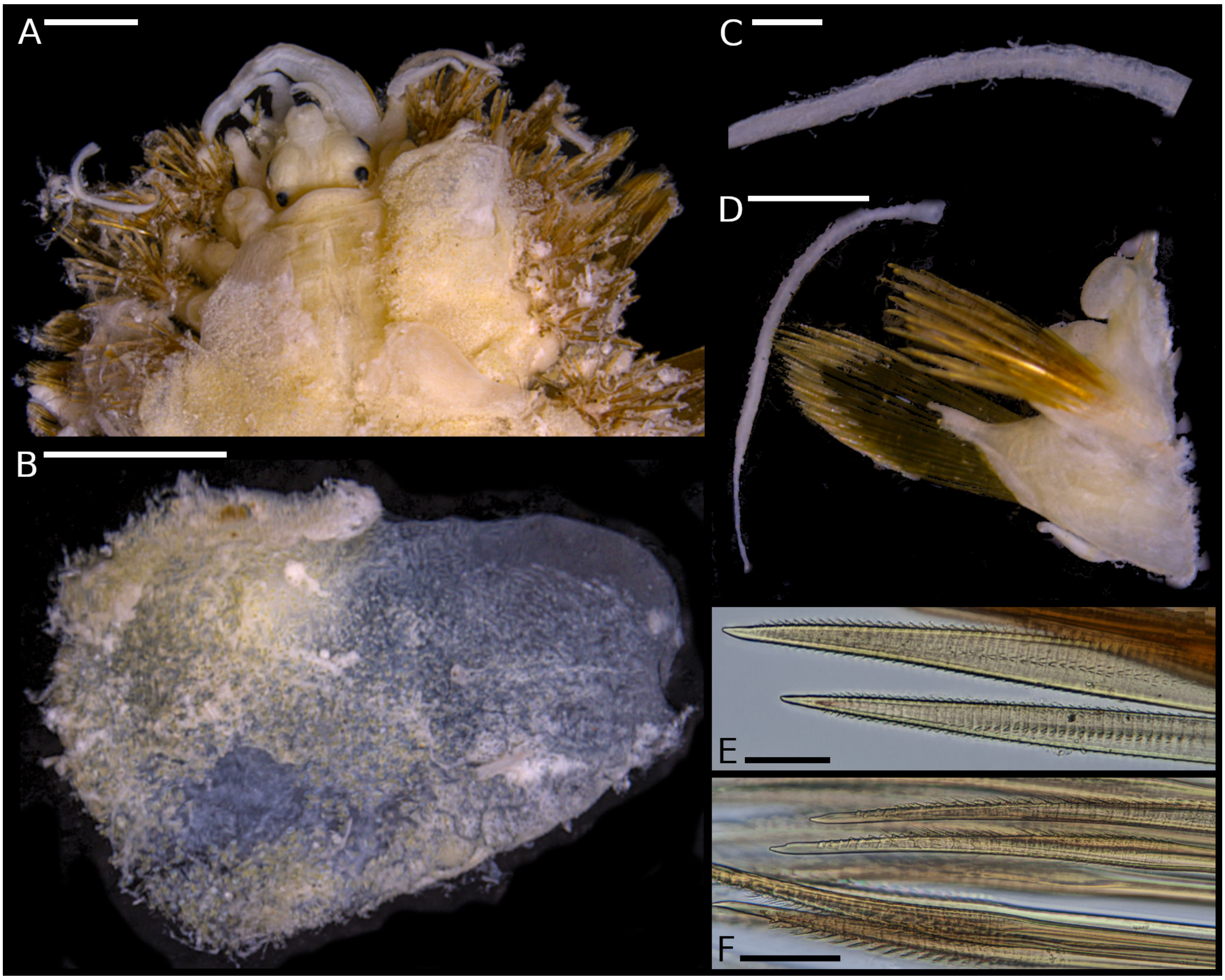

Figure 35. *Malmgrenia* sp. 2, specimen NMV F271079: (A) prostomium, scale bar is 1 mm; (B) elytron, segment 9, scale bar is 1 mm; (C) dorsal cirrus detail, segment 10 right side, scale bar is 0.02 mm; (D) parapodium, segment 10 right side, scale bar is 1 mm; (E) notochaetae, segment 10 right side, scale bar is 0.1 mm; (F) neurochaetae, segment 10 right side, scale bar is 0.1 mm.

neurochaetae with capillary tips absent. Neurochaetae ornamentation in the form of spines in distinct transverse rows. Neurochaetae tips simple, entire and bidentate, furcate, indented or notched; blunt. Neurochaetae with bidentate tips present. Neurochaetae with long spines, at least half as long as the diameter of the chaetae at widest point, reducing near tip to low serrations and with only the distal-most extremity lacking ornamentation. Tips of neurochaetae in dorsal positions unidentate, many of those in ventral positions bidentate with indistinct (perhaps worn) secondary tooth (Fig. 35F).

Distribution and ecology. Southern Ocean, Great Australian Bight. Depth 965–1,483 m.

Remarks. *Malmgrenia* sp. 2 is readily distinguished from all other bathyal-abyssal Australian Polynoidae by having a low nuchal flap, bidentate neurochaetae and supra-acicular neuropodial process. Among species of *Malmgrenia* and similar genera, *Malmgrenia* sp. 2 is closest to *M. andreapolis* McIntosh, 1874 from the northeast Atlantic (both with papillate lateral antennae, nuchal flap, supra-acicular neuropodial process, bidentate neurochaetae). However, our specimen apparently differs in the form of the neurochaetae which have less conspicuous secondary teeth (although perhaps are worn) in our specimen and in pigmentation, which is lacking in our specimen. We are reluctant to describe our single specimen as a new species without further material.

Parapolyeunoa Barnich, Gambi & Fiege, 2012

Parapolyeunoa Barnich, Gambi & Fiege 2012: 31.

Type species. *Parapolyeunoa flynni* (Benham, 1921) (type by original designation).

Diagnosis. Body 60–63 segments. Cephalic peaks present. Eyes present. Anterior eyes orientation lateral, dorso-lateral to dorsal. Posterior eyes orientation dorsal. Median antenna ceratostyle elongate, evenly tapering, smooth. Lateral antennae prostomial location ventral to and separate from prostomium; inserted ventrally, distinctly beneath level of median antenna; ceratostyles elongate, evenly tapering;

ceratostyles without papillae. Tentaculophores without chaetae. Tentacular cirri elongate, evenly tapering; without papillae. Pharynx with nine pairs of terminal papillae (based on *Polyeunoa monroi* Averincev, 1978). Elytra 16–27 pairs (or more); on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution on every third segment after segment 23; covering body completely. Elytra surface smooth. Aciculae of notopodia and neuropodia project clear of epidermis. Dorsal cirri styles elongate, with sharply narrowed tips. Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process present. Notochaetae about as thick as neurochaetae. Notochaetae dorsal orientation mainly or wholly dorso-lateral projections from the notopodia. Simple neurochaetae with capillary tips absent. Neurochaetae ornamentation as spines in distinct transverse rows. Neurochaetae tips bidentate, furcate, indented or notched. Neurochaetae with bidentate tips present. Pygidium terminal. Dorsum immediately anterior to pygidium similar to that of other segments. Anus dorsal; opening on pygidium medial to last pair of parapodia. Pygidial appendages one pair of subulate or cirriform pygidial cirri.

Remarks. The above description is based on Barnich *et al*. (2012). *Parapolyeunoa* Barnich, Gambi & Fiege, 2012 is monotypic, erected to accommodate *Hololepidella flynni* Benham, 1921, and can be distinguished from all other Polynoidae genera by the long body (more than 50 segments and 16–27 pairs of elytra), presence of neuropodial prechaetal supra-acicular process and distinct cephalic peaks.

Parapolyeunoa flynni (Benham, 1921)

Fig. 36, Table 4

Hololepidella flynni Benham 1921, pp. 33–35, Pl. 5, figs 14–20.

Polyeunoa flynni. —Pettibone 1969: 48.

Parapolyeunoa flynni. —Barnich *et al*., 2012, pp. 31–34, figs 3A–J (part).

Non *Polyeunoa monroi* Averincev 1978: 65.

Syntypes: AM W.743 (4), Tasmania, off Maria Island, 42° 37' S, 148° 05' E, 1912, presented by Australasian Antarctic Expedition Publication Committee, coll. by Prof. T.T. Flynn, 2,377 m, deposited by Benham via W. Haswell.

Description. Four specimens, two complete, body 27–40 mm long, 2–4 mm wide (excluding parapodia), with 61–63 segments. Pigmentation absent from preserved specimens. Prostomium bilobed, wider than long, small distinct cephalic peaks present (Fig. 36A). Palps smooth, evenly tapering, short, reaching only to segment three. Median antenna ceratophore large, inserted anteriorly between prostomial lobes, slightly longer than lobes, all styles missing (but longer than palps and twice length of lateral antennae, according to original description). Lateral antennae inserted ventral to prostomial lobes and median antenna, styles long, smooth, evenly tapering, length about twice width of prostomium (two thirds length of palps). Two pairs of large eyes, anterior pair dorsolaterally oriented at widest part of prostomium, posterior pair dorsally oriented near posterior margin of prostomium. Tentaculophores achaetous, with large ceratophores and smooth, evenly tapering cirrostyles, styles as long as palps, longer than lateral antennae. Buccal cirri of similar length to ventral tentacular cirri. Subsequent ventral cirri evenly tapering to fine tips, smooth, shorter than buccal cirri, subequal to neuropodial lobe in length (Fig. 36C). Jaws and pharyngeal papillae unseen, pharynx undissected. Facial tubercle absent. Upper lip ridged.

Elytra more than 15 pairs; up to 26 pairs of elytrophores (some elytra missing on all specimens) on segments, 2, 4, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 26, 29, 32, 35, thereafter irregularly distributed, elytra surface with a few microtubercles near anterior margin, opaque, without pigment (Fig. 36A–B). Dorsal tubercles present on non-elytrigerous segments, bulbous, similar to elytrophores. Two ciliary bands present dorsally on each segment (Fig. 36A). Nephridial papillae distinct, at least on some median segments; first visible on segment 6.

Dorsal cirri with cylindrical cirrophores, styles smooth, evenly tapering, longer than parapodia. Parapodia biramous, noto-and neuropodia with prominent acicular lobes, tips of aciculae emergent from lobes. Neuropodia with short digitiform supra-acicular process (Fig. 36C, segment 22). Notochaetae as stout as neurochaetae, with faint rows of spines and blunt tips (Fig 36D). Neurochaetae more numerous, with rows of small spines distally and bidentate tips, secondary tooth smaller, distinct (Fig. 36E).

Anus terminal. Pygidial cirri missing or absent.

Distribution and ecology. Off southeastern Australia. Depth 2,377 m. Off Antarctica from South Georgia to the Ross Sea; Off the east coast of New Zealand and southeastern Australia. Depth 595–2,668 m. A frequent association with hydrocorals (*Errina* sp.) and octocorals (Primnoidae, ?*Thouarella* sp.) was reported by Barnich *et al*. (2012).

Remarks. The type material of *Hololepidella flynni* Benham, 1921, then thought to be in the Otago Museum, New Zealand, was unavailable to Barnich *et al*. (2012) when they designated that species as type of the new genus *Parapolyeunoa* Barnich, Gambi & Fiege, 2012. Subsequently, we have located Benham's types in the Australian Museum and this redescription is based on that material. The type specimens agree with the original description except for the elytra which were described as "smooth" by Benham, whereas we observed microtubercles (albeit in a small sparse patch).

Elytral microtubercles were also reported by Averincev (1978) in specimens which he described as *Polyeunoa monroi* (originally recorded as a variety of *Polyeunoa laevis* McIntosh, 1885 in Averincev 1972) and which Barnich *et al*. (2012) synonymised with *Parapolyeunoa flynni*. However, differences between *P. flynni* and *P. monroi* suggest that they are separate species, such as the greater number of elytra (up to 26 pairs in *P. flynni* and only 15–16 pairs in *P. monroi*), the presence of a neuropodial supra-acicular process (absent in *P. monroi*), the longer length of the ventral cirrus in *P. flynni* and the solely bidentate neurochaetae (compared with the mostly unidentate neurochaetae of *P. monroi*). The type specimens of *P. monroi* have apparently been lost by Averincev (Fauchald & Wilson, 2024). Thus, we are resurrecting *Polyeunoa monroi* Averincev, 1978 as a species distinct from *Parapolyeunoa flynni* (Benham, 1921). Table 4 shows a comparison of features of *P. flynni* and *P. monroi*, as well as two other similar species.

Barnich *et al*.'s (2012) records from off Antarctica from

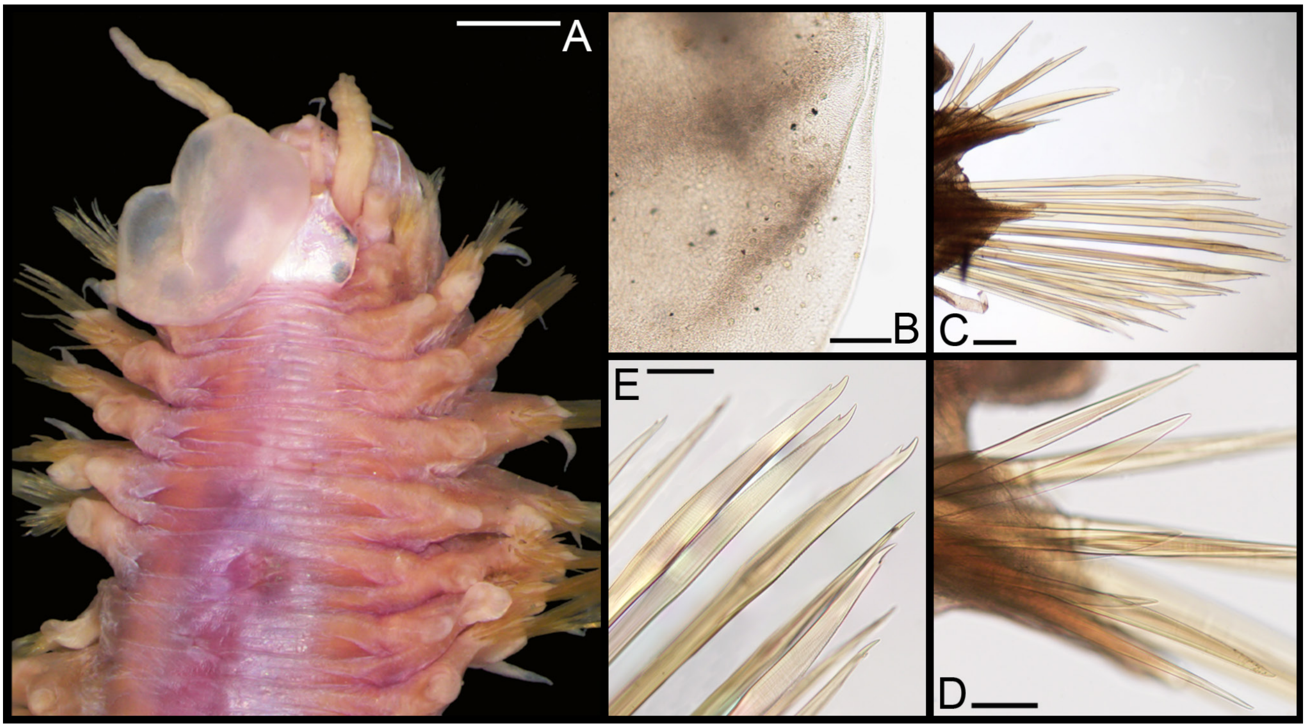

Figure 36. *Parapolyeunoa flynni* (Benham, 1921), syntypes AM W.743, specimen "A": (A) dorsal view, anterior end and elytra, scale bar is 1 mm; (B) elytron detail, scale bar is 0.1 mm; (C) parapodium, segment 23, scale bar is 0.2 mm; (D) notochaetae, scale bar is 0.1 mm; (E) neurochaetae, scale bar is 0.1 mm.

South Georgia to the Ross Sea (as *P. flynni*) may not be that same species due the presence of only smooth elytra. Their distribution records from off the southeast coast of New Zealand are most probably Averincev's 1978 record of *P. monroi*.

Polyeunoa McIntosh, 1885

Polyeunoa McIntosh, 1885: 76.
Polyeunoe [auct. misspelling].

Type species. *Polyeunoa laevis* McIntosh 1885.

Diagnosis. Body 53–74 segments. Cephalic peaks absent, or present. Eyes present. Median antenna ceratostyle smooth. Lateral antennae prostomial location ventral to and separate from prostomium; inserted ventrally, distinctly beneath level of median antenna; ceratostyles without papillae. Tentaculophores without chaetae. Tentacular cirri elongate, with sharply narrowed tips; without papillae. Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped. Pharynx with nine pairs of terminal papillae, all similar. Elytra 15–32 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution on every third segment after segment 23; leaving posterior third or more of body without elytra, large but leaving middle of dorsum uncovered. Dorsal tubercles present on all cirrigerous segments. Aciculae of notopodia and neuropodia project clear of epidermis. Dorsal cirri styles elongate, with sharply narrowed tips. Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. Neuropodial prechaetal supra-acicular process absent. Neuropodial postchaetal lobe distally entire. Notochaetae about as thick as neurochaetae. Tips of notochaetal spines with short points. Simple neurochaetae with capillary tips absent. Neurochaetae ornamentation as spines in distinct transverse rows. Neurochaetae tips simple, entire, or bidentate, furcate, indented or notched, blunt. Neurochaetae with bidentate tips absent, or present. Pygidial appendages one pair of subulate or cirriform pygidial cirri.

This diagnosis is based on Barnich *et al*. (2012).

Remarks. The genus *Polyeunoa* is only distinguished from other long-bodied polynoids by a combination of characters: poorly-developed or absent cephalic peaks, a prominent digitiform acicular notopodial lobe, the absence of capillary-tipped notochaetae and the lack of a neuropodial supra-acicular process. However, the number of pairs of elytra appears to be highly variable, although always 15 or greater (Barnich *et al*., 2012; Bogantes *et al*., 2020). The fact that the type species of the genus, *Polyeunoa laevis* MacIntosh, 1885, exhibits much morphological variability, particularly in the number of elytra (15 or more pairs), may be problematic, as other genera have been distinguished on a fixed number of pairs of elytra such as *Tottonpolynoe* Pettibone, 1991 (with 16 pairs). Recent studies have suggested that the type species of the genus may be a species complex (Barnich *et al*., 2012; Bogantes *et al*., 2020), and molecular studies have been undertaken showing several cryptic lineages (Alvaro *et al*., 2014; Serpetti et al., 2017; Bogantes *et al*., 2020; Cowart *et al*., 2022). The genus *Tottonpolynoe* was erected by Pettibone (1991) for a species that she distinguished from *Polyeunoa* only by an extra pair of elytra (16 not 15). However, our examination of many specimens of long-bodied polynoid genera such as *Neopolynoe*, *Parapolyeunoa*, *Hololepidella* and *Polyeunoa*, has revealed that the number of segments and elytra are variable within a species, and number of pairs of elytra is not fixed and may lie within a range of 15 or more.

Table 4. Comparison of *Parapolyeunoa flynni*, *Polyeunoa monroi sensu* Averincev 1972, *Polyeunoa laevis*, *Tottonpolynoe symantipatharia* and *Polyeunoa monroi* (this study).

Taxon	*Parapolyeunoa flynni*	*Polyeunoa monroi*	*P. monroi*	*Tottonpolynoe symantipatharia*	*Polyeunoa laevis*
Source	AM type specimens; this paper	Averincev 1972, 1978 (types lost according to Fauchald & Wilson 2024)	AM specimens; this paper	Pettibone 1991	Barnich *et al*. 2012
Number of elytra pairs	up to 26	15 (or more?)	15-16	16	15 or more
Neuropodial supra-acicular process	short digitiform	absent	absent	absent	absent
Neurochaetae tips	bidentate	unidentate bare slightly curved tips	unidentate, long tips, "slightly hooked" secondary tooth	unidentate, long bare some with abraded	mostly unidentate,
Length of midbody ventral cirri	as long as neuropodia	as long as neuropodia	as long as neuropodia neuropodia	as long as neuropodia	almost as long as
Elytral ornamentation	small patch of microtubercles	small patch of microtubercles	small patch of microtubercles	small patch of microtubercles	smooth (some with a few papillae)
Cephalic peaks	present	present	present	present	indistinct (variable)
Facial tubercle	absent	—	absent	absent	—
Tentaculophores: chaetae	achaetous	achaetous	achaetous	achaetous	achaetous
Notopodial length compared with neuropodial length	subequal subequal (from Averincev (1972) fig. XIV.3)	slightly shorter or (from Barnich *et al*., 2012; fig.1C)	subequal	subequal	slightly shorter
Notochaetae thickness compared with neurochaetae thickness	as stout as neurochaetae	as stout as neurochaetae neurochaetae	as stout as, or slightly thicker than,	as stout as neurochaetae	as stout as neurochaetae

Polyeunoa monroi Averincev, 1978

Fig. 37, Table 4

Polyeunoa monroi Averincev, 1978: 65; — 1972: 134–135, figs 14.1–3 (in part).
Polyeunoa laevis.— Monro, 1936: 102–103 (part); —Knox, 1960: 95, figs 27–29.

Material examined. Australia, Tasmania: AM W.54904 (5), Maatsuyker Flat, 44°09'26" S, 146°10'16" E, IN2018_V06_070, 1,218–1,223 m, 3 Dec 2018; AM W.54452 (3), St Helens flat, 41°12' 31" S, 148° 47' 48" E, IN2018_V06_184, 1,202–1,221 m, 17 December 2018.

Additional material for comparison. Type material of *Hololepidella flynni* Benham, 1921: AM W.743 (4 syntypes), Tasmania, off Maria Island, 42°37'S, 148°05' E, 1912, presented by Australasian Antarctic Expedition Publication Committee, coll. by Prof. T.T. Flynn, 2,377 m, deposited by Benham via W. Haswell.

Description. Complete specimens up to 72 segments, up to 32 mm long for 6 mm wide (excluding chaetae). Prostomium with small cephalic peaks, positioned in middle of anterior margin of prostomium. Eyes present, anterior ones larger than posterior ones, widely separated, anterior ones positioned at widest part of prostomium, oriented anterolaterally, posterior ones dorsolaterally. Lateral antennae long tapering, smooth, without papillae, longer than width of prostomium. Median antennae ceratophore large, (styles missing from all specimens). Palps appear smooth. Tentaculophores achaetous; tentacular styles all missing (Fig. 37A–B). Jaws comprising two dorsal and two ventral elements, all elements independent, fang-shaped, cutting edge smooth. Pharynx with nine pairs of terminal papillae, all similar. Facial tubercle absent.

Elytra 15–16 pairs; on segments 2, 4, 5 then every second segment, distribution changing posteriorly; distribution on every third segment after segment 23; leaving posterior third or more of body without elytra, large but leaving middle of dorsum uncovered. Elytra surface mostly smooth but with small patch of microtubercles near anterior margin, papillae absent (Fig. 37C). Dorsal tubercles present on all cirrigerous segments, nodular. Nephridial papillae distinct, start segment 6 and continue to end of body.

Aciculae of notopodia and neuropodia project clear of epidermis. Dorsal cirri styles elongate, with sharply narrowed tips. Ventral cirri long, reaching beyond neuropodia. Notopodia and neuropodia subequal in length. Neuropodial prechaetal (acicular) lobe distal shape elongate, tapering. aciculae projecting clear of tips; neuropodial supra-acicular process absent (Fig. 37D).

Notochaetae slightly thicker than neurochaetae; notochaetae up to 14 per fascicle, almost smooth, with faint rows of spines and sharply pointed tips, somewhat flat, and with a central canal (Fig. 37E). Neurochaetae with unidentate, curved, long bare tips, with many rows of spines, and a short subdistal swelling; more inferior neurochaetae have more straight tips (Fig. 37F). Neurochaetae with bidentate tips absent.

Distribution and ecology. Off southeastern Australia (Tasmanian seamounts), off New Zealand and Macquarie Island (Knox, 1960; Averincev, 1972, 1978; Pettibone, 1991). Depths of 200–1,223 m, often found associated with gorgonians.

Remarks. These specimens agree well with the original description of *Polyeunoa monroi* Averincev, 1978, the

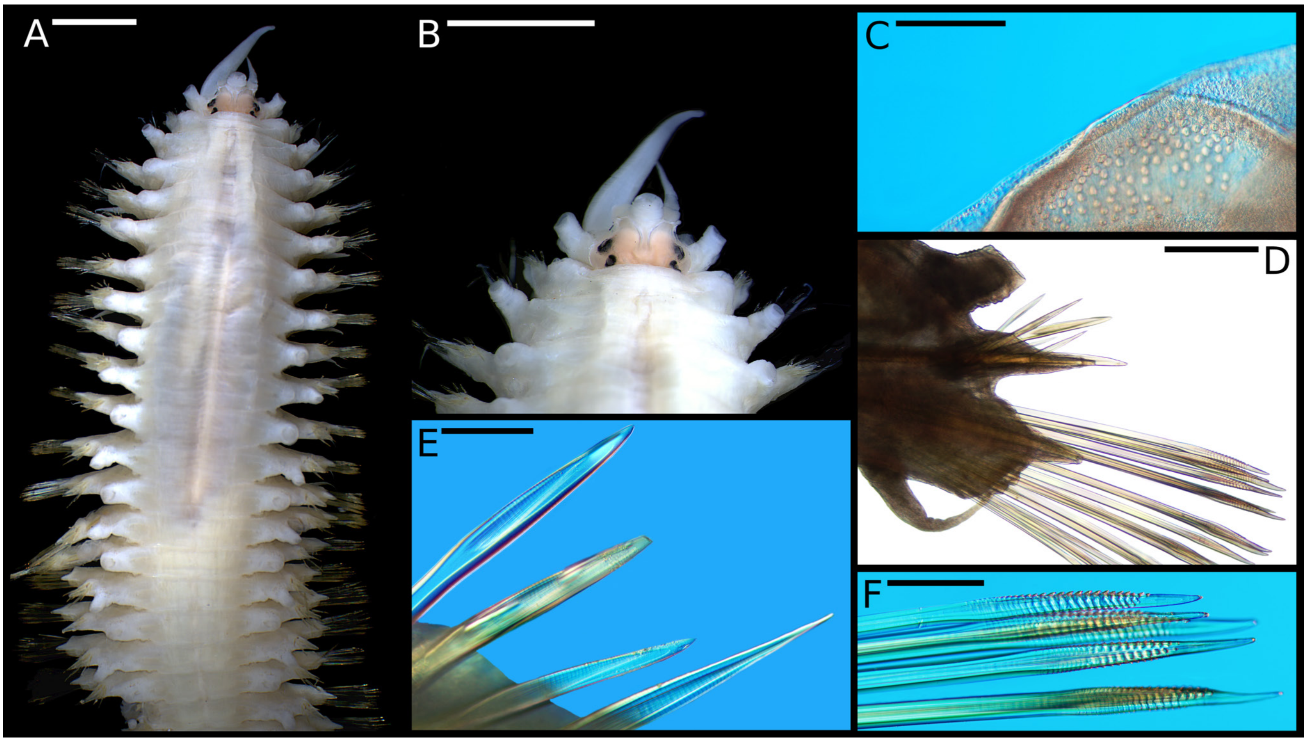

Figure 37. *Polyeunoa monroi* Averincev, 1978, specimen AM W.54904: (A) dorsal view, anterior body, scale bar 2 mm; (B) anterior end and prostomium, dorsal view, scale bar 2 mm; (C) anterior margin of elytron and microtubercles, from mid-body segment, scale bar is 0.2 mm; (D) parapodium, segment 20 left side, scale bar is 0.5 mm; (E) notochaetae, scale bar is 0.1 mm; (F) neurochaetae, scale bar is 0.2mm.

types of which are lost according to Fauchald and Wilson (2024). They were collected off southeast Tasmania and New Zealand as reported by Averincev (1972, 1978) for *P. monroi*. This species was originally described and illustrated by Averincev (1972) as one of two "varieties" of *Polyeunoa laevis* McIntosh, 1885 (see translation by E. Kupriyanova, Appendix 1). Barnich *et al*. (2012) more recently reported *P. monroi* as a junior synonym of *Parapolyeunoa flynni* (Benham, 1921). After examining the type specimens of *P. flynni*, we found there are distinct differences between *P. flynni* and our specimens, such as the greater number of elytra (up to 26, compared with 15–16 in our specimens), the presence of a short digitiform neuropodial supra-acicular process (absent in our specimens), bidentate neurochaetae (unidentate only in our specimens) and short ventral cirri (as long as the neuropodia in our specimens). Both species, however, possess elytra that have a small patch of microtubercles near the anterior margin, and distinct cephalic peaks, both features of *P. monroi* that also distinguish it from *P. laevis* McIntosh, 1885 (which has smooth elytra and indistinct or absent cephalic peaks) and which are prominent features on our specimens. Barnich *et al*. (2012) did not examine the types of either *Parapolyeunoa flynni* or *Polyeunoa monroi*, although they synonymised the two species, and erected a new genus for *Parapolyeunoa flynni* based on differences such as the presence of a neuropodial supra-acicular process, the length of the ventral cirri, and the presence of cephalic peaks. This latter character we now consider shared by both genera.

We found that *Parapolyeunoa flynni* and *Polyeunoa monroi* are different due to the reasons above and hereby resurrect *P. monroi* Averincev, 1978. We also suspect that *Tottonpolynoe symantipatharia* Pettibone, 1991 from off New Zealand and Macquarie Island and living on antipatharian and gorgonian corals, may also be synonymous with *P. monroi*, as Pettibone's description agrees completely with the original description (as well as our specimens) of *P. monroi*, but until the types of *Tottonpolynoe symantipatharia* can be examined we cannot assume their synonymy. Table 4 shows a comparison of morphological features of the four species under discussion.

Discussion

Australian bathyal-abyssal polynoid fauna

In this study we report material from 79 separate collecting events in Australian waters at bathyal and abyssal depths that have resulted in 576 specimens and 31 species/OTUs. We describe nine polynoid species from four subfamilies, *Parahololepidella mensa* sp. nov. (Arctonoinae), *Anotochaetonoe rubermaculata* sp. nov. (Lepidastheniinae), *Bruunilla magnantennata* sp. nov., *B. posteroantennata* sp. nov., *Polaruschakov investigatoris* sp. nov. (Macellicephalinae), *Eunoe albacauda* sp. nov., *E. apicolata* sp. nov., *E. benhami* sp. nov. and *E. danmurrayi* sp. nov. (Polynoinae) using both morphological and molecular data. Furthermore, we have generated sequences for species where no genetic data were previously available, for example, *Bathyeliasona nigra*.

We found representatives from six Polynoidae subfamilies (Admetellinae, Arctonoinae, Lepidastheniinae, Lepidonotinae, Macellicephalinae and Polynoinae) in our material collected from southern and eastern Australia, but no samples were collected from the north or west of Australia (Fig. 1). Recently, four new species of *Laetmonice* (family Aphroditidae) were described from bathyal and abyssal depths in the Australian Indian Ocean Territories northwest of Australia (Flaxman & Kupriyanova, 2024), highlighting the unknown annelid diversity in this region. Thus, our knowledge of deep-sea Polynoidae around the entirety of Australia remains incomplete, and more representatives from polynoid subfamilies are likely to be discovered.

Two subfamilies, Macellicephalinae (*sensu* Bonifácio & Menot 2018) and Polynoinae dominate our material with 10 and 16 species/OTUs respectively. More than half of the material we report herein was collected at depths shallower than 2,000 m. It is at these shallower depths that the two most abundant and species-rich genera, *Eunoe* and *Harmothoe* (Polynoinae), were generally collected. Of these two genera, only four species were collected at depths exceeding ~2,000 m in our study: *E. apicolata* sp. nov., (2,665–4,197 m), *E. benhami* sp. nov., (595–2,760 m), *H. australis* Kirkegaard, 1995 (913–4,035 m) and *H. longipalpa* (Kirkegaard, 1995) comb. nov., (2,692–4,052 m).

In our samples from depths exceeding 2,000 m, Macellicephalinae dominate, which is congruent with other studies on deep-water polynoids, *e.g.,* the global analysis of abyssal and hadal polynoids in Gonzalez *et al.* (2025), Pettibone's (1976) revision of *Macellicephala*, and studies from the Clarion-Clipperton Fracture Zone in the abyssal Pacific Ocean (Bonifácio & Menot, 2018; Bonifácio *et al*., 2020). In all these studies from depths of 4,000 m or deeper, Macellicephalinae dominate and Polynoinae are less significant, agreeing with our findings.

Polynoid species recognition

Our morphological and molecular studies were conducted independently, with molecular results providing a test for our original notions of species based on morphology. We found a high degree of concordance between our morphological OTUs and the subsequent molecular results. In particular, taxa characterised partly on the basis of distinctive pigmentation (*Eunoe albacauda* sp. nov., *E. danmurrayi* sp. nov.) were confirmed by the genetic analysis (Figs 2–3). Indeed, where genetic data was available COI intra-specific p-distances for our new species were less than 0.009. This highlights the reliability of the morphological characters used here for delineation of polynoid species. These findings of consensus between molecular and morphological data are consistent with other studies of Polynoidae (Brasier *et al*., 2016; Bonifacio & Menot, 2018) and of other polychaete families (Carr *et al*., 2011; Teixeira *et al*., 2023; Flaxman & Kupriyanova, 2024).

Generic assignments

Distinguishing the polynoinae genera *Eunoe* (15 pairs of elytra, few post-elytral segments, lacking bidentate neurochaetae), *Harmothoe* (15 pairs of elytra, few post-elytral segments, bidentate neurochaetae present), and *Lagisca* (15 pairs of elytra, 10–15 post-elytral segments, bidentate neurochaetae present) is problematic, with no agreement on definitions let alone monophyly (Pettibone, 1953; Barnich & Fiege, 2000, 2009a, 2009b; Salazar-Silva, 2006). We followed Barnich and Fiege (2000, 2009a) in continuing to refer species from *Lagisca* to *Harmothoe*. We propose *Harmothoe longipalpa* comb. nov., and *H. torbeni* comb. nov., for those two former species of *Lagisca*.

The distinction between *Eunoe* (neurochaetae all unidentate) and *Harmothoe* (some or all neurochaetae bidentate) now appears arbitrary. Our molecular analysis (Figs 2–3) gives no support to either as monophyletic genera. Our sampling of taxa and selection of genetic markers, are insufficient to make formal synonymies. Thus, we consider the *Eunoe* and *Harmothoe* as presently defined to be artificial groupings of species – convenient for identification purposes but which are unlikely to be monophyletic.

Monophyly of Polynoidae subfamilies

Three of the six Polynoidae subfamilies used in our genetic analysis were recovered as monophyletic. The monophyletic Admetellinae is also supported by the study of Wu *et al.* (2024), where the authors used 13 mitochondrial protein-coding genes and 12S, 16S, 18S, 28S rRNA, and ITS1–ITS2 genes with both Maximum Likelihood and Bayesian Inference which resulted in a well-supported (BP/PP = 100/100) clade of six species of *Admetella*. For the Eulagiscinae, only *Bathymoorea lucasi* was available for our genetic analysis, thus little inference can be made, indeed Gonzalez *et al*. (2023a) noted that this subfamily lacked genetic coverage and genomic sampling was vital.

Macellicephalinae was recovered as monophyletic with high support, this is congruent with the transcriptome analyses of Gonzalez *et al*. (2023a) and the mitogenome study (including 31 mitogenomes) of Hiley *et al*. (2024). In our Maximum Likelihood analysis, the tribe Lepidonotopodini was recovered as a sister group to all other Macellicephalinae, this result is similar to that of Hiley *et al*. (2024). Using next generation sequencing, Hiley *et al*. (2024) recovered species of Lepidonotopodinae within the Macellicephalinae clade, thus the authors suggested to synonymise the former subfamily Lepidonotopodinae with Macellicephalinae, and to erect the tribe, Lepidonotopodini which contains species inhabiting deep-sea chemosynthetic-based ecosystems.

Polynoinae was also recovered as monophyletic as in multiple molecular studies on the group (Bonifácio & Menot 2018; Gonzalez *et al*., 2018, 2023a; Neal *et al*., 2018; Taboada *et al*., 2019; Hatch *et al*., 2020). However, *Ceuthonoe nezhai* Wang, Zhou and Wang, 2021 was not recovered within the Polynoinae clade. When *C. nezhai* was described using morphology and genetic data (COI, 16S, 18S, and 28S), the authors placed the new species in Polynoinae, yet, in their genetic analysis the species was not nested within the main Polynoinae clade (Wang *et al*., 2021a). Thus, the placement of this genus remains uncertain.

The subfamilies Lepidastheniinae and Lepidonotinae were not recovered as monophyletic. Lepidastheniinae was recovered as polyphyletic, agreeing with results of Wang *et al*. (2021b). Wang *et al*. (2021b) used only three Lepidastheniinae in their genetic analysis and although *Lepidasthenia elegans* and *Halosydnella australis* fell within a clade of Lepidonotinae, the third taxon, *Alentiana palinpoda,* was recovered outside the clade. The new Lepidastheniinae species described here, *Anotochaetonoe rubermaculata* sp. nov., was placed within Lepidastheniinae according to morphology, however, our genetic analysis recovered this taxon apart from other Lepidastheniinae taxa. The subfamily Lepidonotinae was also recovered as non-monophyletic, which is congruent with the results of Taboada *et al*. (2019), where the authors used four gene fragments (COI, 16S, 18S, and 28S), and Wang *et al*. (2021b)'s study. Further sampling and additional genetic markers are needed to address the validity of Lepidastheniinae and Lepidonotinae.

It is important to note that our phylogenetic analyses based on four gene fragments (COI, 16S, 18S and 28S) were intended to determine if our new species were genetically distinct from all other known polynoids. The deeper relationships between the Polynoidae subfamilies are better understood using next-generation sequencing analyses such as those of Hiley *et al.* (2024) and Gonzalez *et al*. (2023a). Indeed, a full taxonomic revision of the entire family Polynoidae using morphological and molecular data is urgently needed (Gonzalez *et al*., 2025; Rouse *et al*., 2022), but with such a species-rich family (around 880 species) this will require a concerted and coordinated effort of numerous researchers and multiple institutions.

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Appendix 1

Description of *Polyeunoa laevis* McIntosh, 1885 from Averincev (1972: 134) translation by Dr E. Kupriyanova:

"*Polyeunoa laevis* McIntosh, 1885 (Table XIV)

Uschakov, 1962: 175–177; Hartman, 1946: 42, pl. 12, figs. 5–7; 1967c: 38–39 (*Polyeunoa laevis* + *Polyeunoa rhombigera*).

Material. "Ob" RV Stn 18 (3), 23 (2), 28 (2), 44A (1), 46 (5), 115 (3), 159 (2), 164 (6), 185 (1), 187 (11), 191 (1), 198 (2), 199 (3), 202 (21), 232 (5), 282 (4), Ɓ (11), 335 (8), 370 (1), 377 (21), 460 (1), 480 (5), 668 (1), Г (2), 671 (2), Ж (1); "Boyky" RV — stn З (4), 67 (1); Scuba stn Ɓ (5), Г (7), E, samples 84 (1) and 87 (4).

This species is very common in the material of both this expedition & others, and is described in detail in many other papers. However detailed studies showed significant within-species variability which often makes identification of individuals problematic.

Most of our specimens don't differ from the type material described by McIntosh (1885), whose material showed a large number body segments (up to 100); small number of notopodial chaetae – no more than 2–5 (Table 14, 8); smooth elytra irregularly positioned after segment 32 (Table 14, 7). A careful study of elytra under high magnification shows small finger-like papillae, scattered on the posterior margin of elytra (this fact hasn't been recorded before).

In most of our specimens, neurochaetae are mostly unidentate and only 1–3 chaetae per fascicle show an additional tooth (bidentate) (Table 14, 4). Probably these bidentate chaetae are typical for this species but are not as numerous as the unidentate ones. In her recent work, Hartman (1967c) distinguishes *P. laevis* McIntosh from *P. rhombigera* (Ehlers) because in her opinion, the former lacks bidentate neurochaetae. However, as already mentioned, this character is not reliable to separate these species. Based on our material, we can confirm reports of some authors that in some specimens there are present poorly developed cephalic peaks. We can't correlate the presence of this character with any others.

It is quite interesting that we found a distinctive population of 21 specimens at Station 377. All these specimens differed from the main form by 3 characters: well-developed cephalic peaks (Table 14, 2); numerous notopodial chaetae (up to 10–12) (Table 14, 3) and the presence of microtubercles on the posterior marginal area (resembles very much the elytra of *Harmothoe magellanica*; Table 14, 1). A similar form of *P. laevis* was recorded by Monro (1936), but he didn't pay much attention to it, he just mentions the presence of these characters in his population. Should new additional material be found we probably should separate these specimens into a subspecies or even a full species.

Ecological data. Depth 20–2,000 m; sediment – silt with pebbles and rocks, sometimes boulders; temperature – from 0.9 to -2°C (predominantly below zero). There are some reports that this species inhabits gorgonarians. In the literature it has been reported in depths down to 2,450 m.

Distribution. Sturge Island and Scott Island, Antarctic coast from Victoria Land on the west to Princess Ragnhild coast in the east. – Antarctic coast, Antarctic peninsula, south Shetland Islands, South Orkney Islands, South Sandwich Islands, South Georgia, Bouvet Island, Prince Edward Island, Falkland Islands, Patagonia, Tierra del Fuego, Magellanic Strait. Also reported from South Africa (Day, 1967) and to the east from the south island of New Zealand (Knox, 1960c)."

Supplementary Table 1. GenBank accession numbers, museum registration numbers and gene fragments used in the present study, references for sequences from earlier studies. (—) no data available.

Taxon name	Voucher number	GenBank Accession Number COI	16S	18S	28S	Reference
Subfamily Admetellinae						
Admetella levensteini	MBM286807	PQ221480	PQ221480	PQ211133	PQ211133	Wu *et al.*, 2024
Admetella multiseta	MBM286065	PQ221478	PQ221478	PQ211131	PQ211131	Wu *et al.*, 2024
Admetella nanhaiensis	MBM286808	PQ221483	PQ221483	PQ211136	PQ211136	Wu *et al.*, 2024
Admetella sp.	AM W.51461	PQ360816	PQ368171	PX048979	PQ368245	This study
Admetella undulata	MBM286809	PQ221482	PQ221482	PQ211135	PQ211135	Wu *et al.*, 2024
Subfamily Eulagiscinae						
Bathymoorea lucasi	MNHN-IA-TYPE 1822	MH233266	MH233165	MH233223	—	Bonifácio & Menot, 2018
Subfamily Lepidastheniinae						
Alentiana palinpoda	B6317500003	MW374288	MW397208	MW397195	—	Wang *et al.*, 2021a
Anotochaetonoe rubermaculata sp. nov.	AM W.51580	PQ360817	PQ368172	PX048980	PQ368239	This study
Lepidasthenia berkeleyae	BIOUG<CAN>:BAMPOL0272	HM473443	—	—	—	Carr *et al.*, unpublished
Lepidasthenia elegans	SMNH118973	JN852933	JN852901	JN852832	JN852863	Norlinder *et al.*, 2012
Subfamily Lepidonotinae						
Lepidonotus bowerbanki	NMV F303079	PQ360848	PQ368211	—	PQ368241	This study
Lepidonotus bowerbanki	SAM TE18309	PQ360849	PQ368212	—	PQ368240	This study
Lepidonotus cristatus	AM W.53933	PQ360850	PQ368213	—	PQ368244	This study
Lepidonotus squamatus	SMNH118975 (not COI)	AY894316	JN852903	AY176290	JN852865	COI: Struck *et al.*, 2005. 16S, 28S: Norlinder *et al.*, 2012. 18S: Worsaae *et al.*, 2005
Subfamily Macellicephalinae						
Abyssarya acus	MNHN-IA-TYPE 1812	MH233279	MH233182	MH233232	—	Bonifácio & Menot, 2018
Bathyeliasona mariaae	MNHN-IA-TYPE 1816	MH233260	MH233197	MH233243	—	Bonifácio & Menot, 2018
Bathyeliasona nigra	AM W.51462	PQ360818	PQ368174	PX048982	PQ368243	This study
Bathyfauvelia glacigena	IFR636-5-4	MH233272	MH233186	MH233236	—	Bonifácio & Menot, 2018
Bathyfauvelia ignigena	IFR694	MH233264	MH233202	—	—	Bonifácio &Menot, 2018
Bathypolaria magnicirrata	AM W.51999	—	PQ368175	PX048983	PQ368242	This study
Bathypolaria magnicirrata	AM W.52012	—	PQ368176	—	—	This study
Bathypolaria sp.63	MNHN-IA-PNT 63	MH233281	MH233151	MH233206	—	Bonifácio & Menot, 2018
Bathypolaria sp.66	MNHN-IA-PNT 66	MH233268	MH233175	MH233227	—	Bonifácio & Menot 2018
Bruunilla magnantennata sp. nov.	AM W.51982	—	PQ368177	—	—	This study
Bruunilla nealae	MNHN-IA-TYPE 1824	—	MH233158	MH233216	—	Bonifácio & Menot 2018
Bruunilla posteroantennata sp. nov.	AM W.52879	—	PQ368178	—	—	This study
Bruunilla sp.	MNHN-IA-PNT 72	MH233263	MH233201	MH233247	—	Bonifácio & Menot, 2018

Supplementary Table 1. *Continued...*

Supplementary Table 1. *Continued.*

Taxon name	Voucher number	GenBank Accession Number COI	16S	18S	28S	Reference
Hodor anduril	MNHN-IA-TYPE 1827	MH233258	MH233190	MH233239	—	Bonifácio & Menot, 2018
Hodor hodor	MNHN-IA-TYPE 1825	MH233257	MH233189	MH233238	—	Bonifácio & Menot, 2018
Macellicephala brenesorum	NHMUK:2018.830	MG905047	MG905035	MG905041	—	Neal *et al*., 2018
Macellicephala clarionensis	MNHN-IA-TYPE 1829	MH233270	MH233184	MH233234	—	Bonifácio & Menot, 2018
Macellicephala gloveri	NHMUK:2018.211	KX867447	KX867371	MG905042	—	Neal *et al*., 2018
Macellicephala linseae	—	KX867448	KX867378	MG905043	—	Neal *et al*., 2018
Macellicephala cf. *macintoshi*	AM W.53094	PQ360851	PQ368214	PX049008	PQ368246	This study
Macellicephala parvafauces	MNHN-IA-TYPE 1830	MH233275	MH233173	MH233225	—	Bonifácio & Menot, 2018
Macellicephala violacea	NHMUK:2012.12	JX119016	MG905038	MG905046	—	COI: Shields *et al*., 2013; 16S, 18S: Neal *et al*., 2018
Macellicephalinae sp.	AM W.52014	—	PQ368215	PX049009	PQ368249	This study
Polaruschakov investigatoris sp. nov.	AM W.52983	PQ360853	PQ368216	—	—	This study
Polaruschakov lamellae	MNHN-IA-TYPE 1837	MH233250	MH233150	MH233205	—	Bonifácio & Menot, 2018
Polaruschakov omnesae	MNHN-IA-TYPE 1842	MH233254	MH233164	—	—	Bonifácio & Menot, 2018
Yodanoe desbruyeresi	MNHN-IA-TYPE 1843	MH233251	MH233156	—	—	Bonifácio & Menot, 2018
Yodanoe sp.	MNHN-IA-PNT 73	MH233273	MH233195	—	—	Bonifácio & Menot, 2018
Tribe Lepidonotopodinae						
Bathykurila guaymasensis	MNHN-IA-PNT 71	MH233265	MH233203	MH233248	—	Bonifácio & Menot, 2018
Branchipolynoe pettiboneae	—	KY753825	KY753825	KY753840	KY753840	Zhang *et al*., 2018
Branchipolynoe trifurcus	SIO:BIC:A13183	MW646933	MW654558	MW654529	—	Hatch *et al*., 2020
Branchipolynoe segonzaci	MBM286042	MK357906	MK211418	MK211412	—	Wu *et al*., 2019
Cladopolynoe sandersi	SMNH118960	JN852923	JN852889	JN852821	JN852851	Norlinder *et al*., 2012
Peinaleopolynoe sillardi	MNHN:IA 2010-399	MH115414	MH127421	—	—	Hatch *et al*., 2020
Levensteiniella undomarginata	—	MG799385	MG799376	MG799379	MG799381	Zhang *et al*., 2018
Subfamily Polynoinae						
Austrolaenilla antarctica	NHMUK:2014.21	KJ676620	KJ676606	—	—	Neal *et al*., 2014
Austrolaenilla pelagica	NHMUK:2014.26	KJ676632	KJ676607	—	—	Neal *et al*., 2014
Austrolaenilla sp.	AM W.52016	—	PQ368173	PX048981	—	This study
Bylgides groenlandicus	CCPOL307	HQ024272	—	—	—	Carr *et al*., 2011
Bylgides promamme	NUNAV-0268	HQ024273	—	—	—	Carr *et al*., 2011
Ceuthonoe nezhai	RSIO35623	MW064265	MW063141	—	—	Wang *et al*., 2021b
Eunoe albacauda sp. nov.	AM W.53092	PQ360819	PQ368179	PX048984	PQ368229	This study
Eunoe albacauda sp. nov.	AM W.54254	PQ360820	PQ368180	PX048985	PQ368232	This study
Eunoe albacauda sp. nov.	AM W.54255	PQ360821	PQ368181	PX048986	PQ368230	This study
Eunoe albacauda sp. nov.	AM W.54256	PQ360822	PQ368182	PX048987	PQ368231	This study

Supplementary Table 1. *Continued...*

Supplementary Table 1. *Continued.*

Taxon name	Voucher number	GenBank Accession Number COI	 16S	 18S	 28S	Reference
Eunoe apicolata sp. nov.	AM W.53616	PQ360823	PQ368183	—	—	This study
Eunoe apicolata sp. nov.	AM W.52005	PQ360824	PQ368184	PX048988	PQ368238	This study
Eunoe apicolata sp. nov.	AM W.53615	—	PQ368185	—	—	This study
Eunoe benhami sp. nov.	AM W.53618	PQ360825	PQ368186	PX048990	PQ368221	This study
Eunoe benhami sp. nov.	AM W.53876	PQ360826	PQ368187	PX048991	PQ368222	This study
Eunoe benhami sp. nov.	AM W.51463	PQ360827	PQ368188	PX048989	PQ368220	This study
Eunoe benhami sp. nov.	AM W.53877	PQ360828	PQ368189	PX048992	PQ368223	This study
Eunoe danmurrayi sp. nov.	AM W.54252	PQ360829	PQ368190	PX048993	—	This study
Eunoe danmurrayi sp. nov.	AM W.54253	PQ360830	PQ368191	PX048994	PQ368224	This study
Eunoe etheridgei	NMV F271043	PQ360831	PQ368192	PX048995	—	This study
Eunoe leiotentaculata	AM W.51793	PQ360832	PQ368193	PX048996	PQ368236	This study
Eunoe leiotentaculata	AM W.53090	PQ360833	PQ368194	PX048997	PQ368233	This study
Eunoe leiotentaculata	NMV F271040	—	PQ368195	—	—	This study
Eunoe leiotentaculata	NMV F271041	PQ360834	PQ368196	PX048998	PQ368235	This study
Eunoe leiotentaculata	NMV F271042	PQ360835	PQ368197	PX048999	PQ368234	This study
Eunoe nodosa	SMNH118963	JN852926	JN852892	JN852824	JN852854	Norlinder *et al*., 2012
Eunoe oerstedi	HUNTSPOL0386	HQ024020	—	—	—	Carr *et al*., 2011
Eunoe sp.	JC66_496_S001	KU738214	KU738168	KU738183	KU738201	Serpetti *et al*., 2017
Harmothoe australis	AM W.51465	PQ360836	PQ368198	PX049000	PQ368237	This study
Harmothoe australis	AM W.53874	—	PQ368199	—	—	This study
Harmothoe glabra	SMNH118967	JN852929	JN852896	JN852828	JN852858	Norlinder *et al*., 2012
Harmothoe impar	SMNH118968	JN852930	JN852897	JN852829	JN852859	Norlinder *et al*., 2012
Harmothoe longipalpa comb. nov.	AM W.51464	PQ360837	PQ368200	PX049001	PQ368227	This study
Harmothoe paxtoni	NMV F271045	PQ360838	PQ368201	PX049003	PQ368217	This study
Harmothoe paxtoni	NMV F271046	PQ360839	PQ368202	PX049004	PQ368218	This study
Harmothoe paxtoni	NMV F271047	PQ360840	PQ368203	PX049005	PQ368219	This study
Harmothoe paxtoni	NMV F271044	PQ360841	PQ368204	PX049002	PQ368228	This study
Harmothoe torbeni comb. nov.	AM W.53100	PQ360842	PQ368205	PX049006	PQ368225	This study
Harmothoe torbeni comb. nov.	NMV F271048	PQ360843	PQ368206	PX049007	PQ368226	This study
Harmothoe torbeni comb. nov.	NMV F271049	PQ360844	PQ368207	—	—	This study
Harmothoe torbeni comb. nov.	NMV F271071	PQ360845	PQ368208	—	—	This study
Harmothoe rarispina	—	KY823497	KY823482	KY657611	KY657624	Gonzalez *et al*., 2017
Malmgreniella nigralba	BIOUG<CAN>:BAMPOL0034	HM473462	—	—	—	Carr *et al.*, 2011
Malmgreniella mcintoshi	SMNH118976	JN852935	JN852904	JN852834	JN852866	Norlinder *et al*., 2012
Neopolynoe acanellae	—	MN656103	MN653091	MN653050	MN653123	Taboada *et al*., 2020
Neopolynoe chondrocladiae	—	MN656126	MN653092	MN653051	MN653124	Taboada *et al*., 2020

Supplementary Table 1. *Continued...*

Supplementary Table 1. *Continued.*

		GenBank Accession Number				
Taxon name	Voucher number	COI	16S	18S	28S	Reference
Neopolynoe paradoxa	SMNH118978	JN852937	JN852906	JN852836	JN852868	Norlinder *et al*., 2012
Polyeunoa laevis	JC66_477_S001	KU738212	KU738162	KU738176	KU738193	Serpetti *et al*., 2017
Robertianella synophthalma	—	MN656132	MN653122	MN653053	MN653126	Taboada *et al*., 2019
Family: Aphroditidae *(outgroup)*						
Laetmonice murrayae	AM W.51581	PQ360847	PQ368210	PX056280	PQ368247	This study