



***Neosabellides lizae*, a new species of Ampharetidae (Annelida) from Lizard Island, Great Barrier Reef, Australia**

TOM ALVESTAD^{1,2*} & NATALIYA BUDAIEVA^{2,3}

¹Uni Research, Thormøhlensgate 55, N-5020 Bergen, Norway.

²Natural History Collections, University Museum of Bergen, Allègaten 41, 5007 Bergen, Norway.

³P.P. Shirshov Institute of Oceanology, Russian Academy of Sciences, Nakhimovsky pr. 36, 117997 Moscow, Russia.

*Corresponding author: tom.alvestad@uni.no

Abstract

Neosabellides lizae, a new species of Ampharetidae, is described from the intertidal zone off Lizard Island, Great Barrier Reef, Queensland, Australia. The new species is referred to the genus *Neosabellides* based on the shape of the prostomium, three pairs of branchiae, 14 thoracic segments with notopodia, 12 thoracic uncinigerous segments, and the first two pairs of abdominal uncinigers of thoracic type. The new species differs from all known species of *Neosabellides* in having 14 abdominal uncinigerous segments.

Key words: Queensland, intertidal, Polychaeta, juvenile, identification key

Introduction

The genus *Neosabellides* Hessle, 1917 is widely distributed with four species described from the subtidal areas in the Bering Sea (Annenkova 1934), the slope depths of the Bay of Biscay (Fauvel 1909), lower shelf of Antarctica (Ehlers 1913), and from the intertidal zone in Western Australia (Hartmann-Schröder 1981). The genus was erected by Hessle (1917) for worms with faint lobes on the prostomium without glandular ridges, having three pairs of branchiae, papillose buccal tentacles, nephridial papillae on segment 4 and two anal cirri, and lacking paleae or parapodia on segment 3 and notopodial cirri in thoracic parapodia. Hessle (1917) also described rudimentary notopodia in abdomen which we assume were ciliated tufts present above the abdominal neuropodia.

Neosabellides was accepted as a valid genus by Reuscher *et al.* (2009), however the authors argued that most of the diagnostic characters in ampharetid genera had low taxonomical value and could vary within a genus. Jirkov (2011) revised the diagnostic characters in ampharetids and modified the diagnoses of the genera based on nonvariable characters. Following Jirkov (2011), *Neosabellides* possesses prostomium with a transversal groove, not completely splitting it into distinct lobes. It also has two types of neuropodia, the first type with uncini located in a furrow found in thorax and the first two abdominal segments and the second type with uncini located at the margin of a neuropodium found in all remaining abdominal chaetigers.

A new species of Ampharetidae matching the diagnostic characters of the genus *Neosabellides sensu* Jirkov (2011) was found in the vicinity of the Lizard Island Research Station (Queensland, Australia) of the Australian Museum, Sydney during the International Polychaete Workshop conducted in 2013. In the present study we formally describe the newly discovered species utilizing the methods of light and scanning electron microscopy.

Material and methods

The specimens were shoveled at low tide at the intertidal area across the Lizard Island Research Station. The sandy sediments with sea grass were sieved through the 0.5 mm mesh and sorted in trays in the laboratory. Live

specimens were kept in a fridge for several hours, photographed under a dissecting microscope and fixed in 4% buffered formalin. Two specimens were fixed in 95% ethanol for future molecular study. Methyl blue solution was used to reveal potential characteristic staining pattern (Mackie & Pleijel 1995; Alvestad *et al.* 2014). For SEM images, the specimens were dehydrated in a graded ethanol series, critical-point dried, sputter coated with gold and examined with a ZEISS Supra 55VP scanning electron microscope at the Laboratory for Electron Microscopy, University of Bergen. Materials are deposited in the Australian Museum, Sydney (AM). Locality details are listed as in Ribas & Hutchings (2015, *Zootaxa* 4019).

Taxonomic account

Family Ampharetidae Malmgren, 1866

Genus *Neosabellides* Hessle, 1917

Neosabellides lizae n. sp.

Type material. Holotype: AM W.44032, MI QLD 2340 (wet specimen). Paratypes: AM W.44850, MI QLD 2422 (1, 1 on SEM stub); AM W.45179, MI QLD 2440 (2, 1 on SEM stub); AM W.45137, MI QLD 2441 (1).

Other material examined. AM W.45178, MI QLD 2440 (1 used for DNA extraction); AM W.45180, MI QLD 2441 (1 used for DNA extraction).

Comparative material examined. Paratypes of *Neosabellides australiensis* Hartmann-Schröder, 1981, ZMH P-16499 (5), Western Australia, Cervantes, beach, *Posidoina* and fine sand, 24 Oct 1975.

Diagnosis. Prostomium conical with transversal groove, without glandular ridges; three pairs of branchiae in two groups well separated from each other; paleae absent; buccal tentacles covered with ciliae, papillae absent; 14 thoracic segments with notopodia; 12 thoracic segments with neuropodia; 14 abdominal segments with neuropodia, first two pairs of abdominal neuropodia of thoracic type.

Description. Holotype complete specimen 5 mm long and 0.6 mm wide; paratypes ranging from 3 to 5 mm long and about 0.5 mm wide. Live specimens silver grey with metallic hue, branchiae with dark bands (Fig. 1A, B). Preserved specimens uniformly pale yellow. Specimens dyed with methyl blue with dark blue ventral shields (Fig. 1E); anterior part of prostomium blue with unstained oval area behind it (Fig. 1C, D).

Prostomium conical with transversal groove curved laterally, but not completely splitting its frontal margin (Figs 1A–D, 2A); glandular ridges absent. Live specimens with two dark spots, presumably eyes (Figs 1A,B, 2A). Ventral surface of buccal segment with longitudinal folds (Fig. 1C). Buccal tentacles long, covered with cilia, without papillae (Figs 2A, 3D, E). Branchiae in two groups, well separated and connected by low membrane; two outermost branchiae in each group in transversal row, innermost branchia located slightly posteriorly and distinctly connected with first pair of notopodia (Figs 1B, 2A, 3D). Several ciliated tufts between groups of branchiae (Fig. 3D). One pair of nephridial papillae on segment IV, located behind innermost pair of branchiae (Figs 2A, 3D). Paleae absent (Figs 2A, 3C, D).

Thorax and abdomen of similar length; thorax slightly wider than abdomen; abdomen tapering posteriorly (Figs 1A, B; 3A, B). Fourteen thoracic segments with notopodia and capillary chaetae. Last 12 chaetigers of thorax with neuropodia and uncini. Fourteen abdominal uncinigerous segments (Fig. 3B).

Notopodia simple, finger-shaped and up to three times longer than wide (Fig. 4A, B). Thoracic neuropodia rounded to oval (Figs 3C, 4B, C). Anterior two abdominal segments with neuropodia of thoracic type with uncini located in a furrow (Fig. 4F); remaining abdominal uncinigers with enlarged protruding neuropodia with uncini located at parapodial margin (Fig. 5A, D). Dorsal cirri on abdominal neuropodia absent. Ciliated tufts between parapodial rami; in thorax at ventral bases of notopodia (Fig. 4B, D), in abdomen above neuropodia (Figs 4F, 5A, B, D)

Notochaetae as spinulose capillaries (Fig. 4A, B), arranged in double rows; capillaries in anterior row generally thinner and shorter than in posterior row. Thoracic uncini with two vertical rows of 4–5 teeth above rostrum (Fig. 4C). Abdominal uncini with four vertical rows of 3–4 teeth above rostrum (Fig. 5C).

Pygidium with two short lateral cirri; papillae or crenulated area around anus absent (Fig. 3F). Tube unknown.

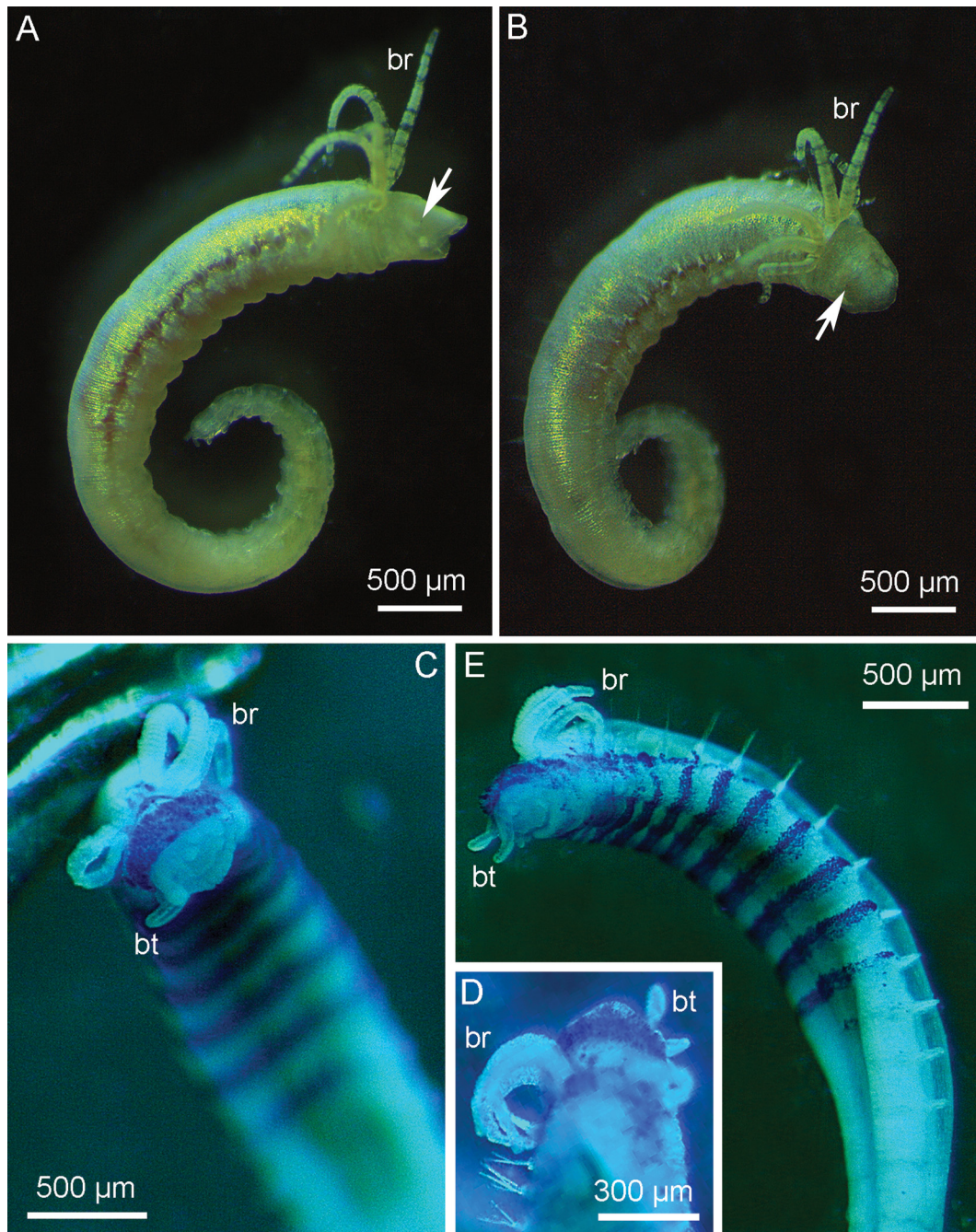


FIGURE 1. *Neosabellides lizae* n. sp., holotype, AM W.44032. A. Habitus, lateral view, live animal; B. Habitus, dorso-lateral view, live animal; C. Frontal view, fixed and stained with methyl blue; D. Anterior part, dorsal view, fixed and stained with methyl blue; E. Latero-ventral view, fixed and stained with methyl blue. Abbreviations: br = branchiae, bt = buccal tentacles. Arrows indicate the position of eyes in live specimens.

Remarks. *Neosabellides lizae* n. sp. closely resembles *N. australiensis*, but can be distinguished by having a pair of eyes on the prostomium, having 14 rather than 16 abdominal uncinigerous segments and being half the size. Branchiae in the two species arranged in slightly different ways, in *N. lizae* n. sp. the outermost and middle branchiae in each group lie in a transversal row with innermost branchia slightly posteriorly; in *N. australiensis* the middle branchia in each group located slightly anteriorly to other two (Fig. 2). In addition, we did not find tubes or tube fragments while collecting the new species, which suggests that they may be very fragile. On the contrary, Hartmann-Schröder (1981) reported *N. australiensis* having sturdy parchment-like tubes covered with *Posidonia* leaves and other debris, which we also observed in the studied paratypes. The new species differs from all other

known species of *Neosabellides* in having 14 rather than 12 or 19–20 abdominal uncinigerous segments. It can also be distinguished from *N. litoralis* Annenkova, 1934 in having three rather than four pairs of branchiae; from *N. elongatus* (Ehlers, 1912) and *N. oceanica* (Fauvel, 1909) in lacking papillae on the buccal tentacles (Tab. 1).

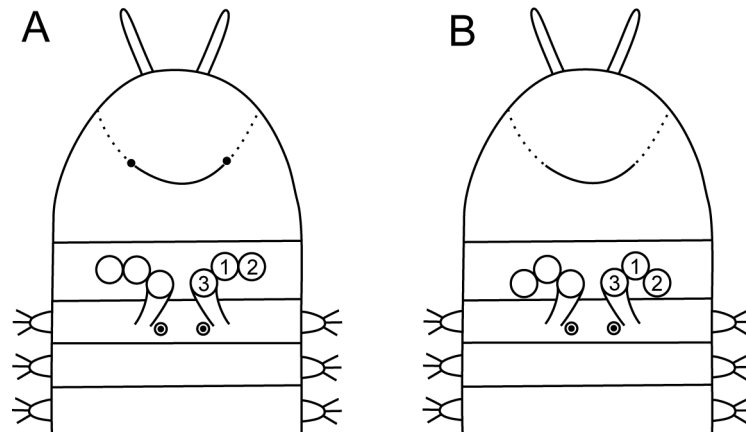


FIGURE 2. Schematic drawing of head and anterior end of body of *Neosabellides lizae* n. sp. (A) and *Neosabellides australiensis* (B) indicating placement and origin of branchiae, and position of paired nephridial papillae on segment IV.

TABLE 1. Comparison of all valid species of the genus *Neosabellides*.

Characters	Species				
	<i>N. australiensis</i> Hartmann-Schröder, 1981	<i>N. elongatus</i> (Ehlers, 1912)	<i>N. litoralis</i> Annenkova, 1934	<i>N. oceanica</i> (Fauvel, 1909)	<i>N. lizae</i> n. sp.
Length	8.1 mm	22 mm	3–5 mm	10 mm	3–5 mm
Pigmentation	Black dots on lateral sides of prostomium and the first segments	Uniformly brownish-yellow or completely colorless, lateral dots (?eyes) on prostomium	?	?	Live specimens silver grey with metallic hue, branchiae with dark bands; fixed specimens uniformly yellow
Eyes	Absent	1 pair	1 pair	?	1 pair
Buccal tentacles	? Ciliated (not smooth), papillae absent	Papillose with long papillae	?	Papillose	Ciliated, papillae absent
Branchiae	3 pairs in 2 groups, well separated; middle branchia in each group located slightly anteriorly to other two	3 pairs	4 pairs in 2 groups close together	3 pairs	3 pairs in 2 groups, well separated; outermost and middle branchiae in each group lie in a transversal row with innermost branchia slightly posteriorly
Abdominal segments	16	19–20	12	12	14
Rudimentary notopodia in abdomen	Absent	?	Absent	On first 2 abdominal segments	Absent

.....continued on next page

TABLE 1. (Continued)

Characters	Species				
	<i>N. australiensis</i> Hartmann-Schröder, 1981	<i>N. elongatus</i> (Ehlers, 1912)	<i>N. litoralis</i> Annenkova, 1934	<i>N. oceanica</i> (Fauvel, 1909)	<i>N. lizae</i> n. sp.
Dorsal cirri on abdominal neuropodia	Absent	?Absent*	Present, small	Absent	Absent
Thoracic uncini	2 vertical rows with 4–5 teeth	2 rows with 4 teeth	2 rows with 4–5 teeth	Teeth in 2 rows, alternate each other	2 vertical rows with 4–5 teeth
Abdominal uncini	3 vertical rows with 4–5 teeth	3 rows with 5 teeth	3 rows with 5–6 teeth	Teeth in 2 rows, opposite each other	4 vertical rows with 3–4 teeth
Pygidium	2 short triangular anal cirri, crenulated area around anus, distinct papillae absent	2 elongated anal cirri, few papillae around the anus	?	2 anal cirri	2 short anal cirri, papillae absent
Tube	Parchment-like covered with detritus and <i>Posidonia</i> leaves remains	?	Composed of shell fragments and echinoderm skeleton elements	Brownish with thick walls	?
Distribution	Western Australia, Cervantes, intertidal	Antarctica, Kaiser Wilhelm II Land, 385 m	Bering Sea, Bering Island, subtidal	Bay of Biscay, 1743 m	East of Australia, Great Barrier Reef, Lizard Island, intertidal

*Following the description by Hessle (1917) *N. elongatus* has small dorsal cirri on the last 17 abdominal neuropodia.

The smallest three specimens examined (3 mm long) had only 13 thoracic segments with notopodia and 13 abdominal uncinigerous segments (Fig. 3A, C). In these specimens capillary chaetae and notopodia were absent in 14th parapodia (Fig. 4F), while in larger specimens 14th parapodia bore both noto- and neuropodia (Fig. 4E). We suggest that these specimens were juveniles lacking the definitive set of segments characteristic for all species from the genus *Neosabellides*. All specimens longer than 3 mm showed the presence of 14 thoracic and 14 abdominal segments.

Etymology. The species epithet *lizae* refers both to the Lizard Island, the place where the specimens of the new species were collected, and to the name of authors' daughter Liza.

Type locality. Australia, Queensland, Lizard Island, off Casuarina Beach, in front of the Lizard Island Research Station, 14°40'46"S, 145°26'49"E, intertidal.

Distribution. This species is only known from the Lizard Island, the Great Barrier Reef, Queensland, Australia; intertidal zone.

Key to species of *Neosabellides*

- 1 Four pairs of branchiae *N. litoralis*
- Three pairs of branchiae 2
- 2. (1) Buccal tentacles papillose 3
- Buccal tentacles ciliated 4
- 3. (2) Twelve abdominal segments *N. oceanica*
- At least 19 abdominal segments *N. elongatus*
- 4. (2) Sixteen abdominal segments *N. australiensis*
- Fourteen abdominal segments *N. lizae* n. sp.

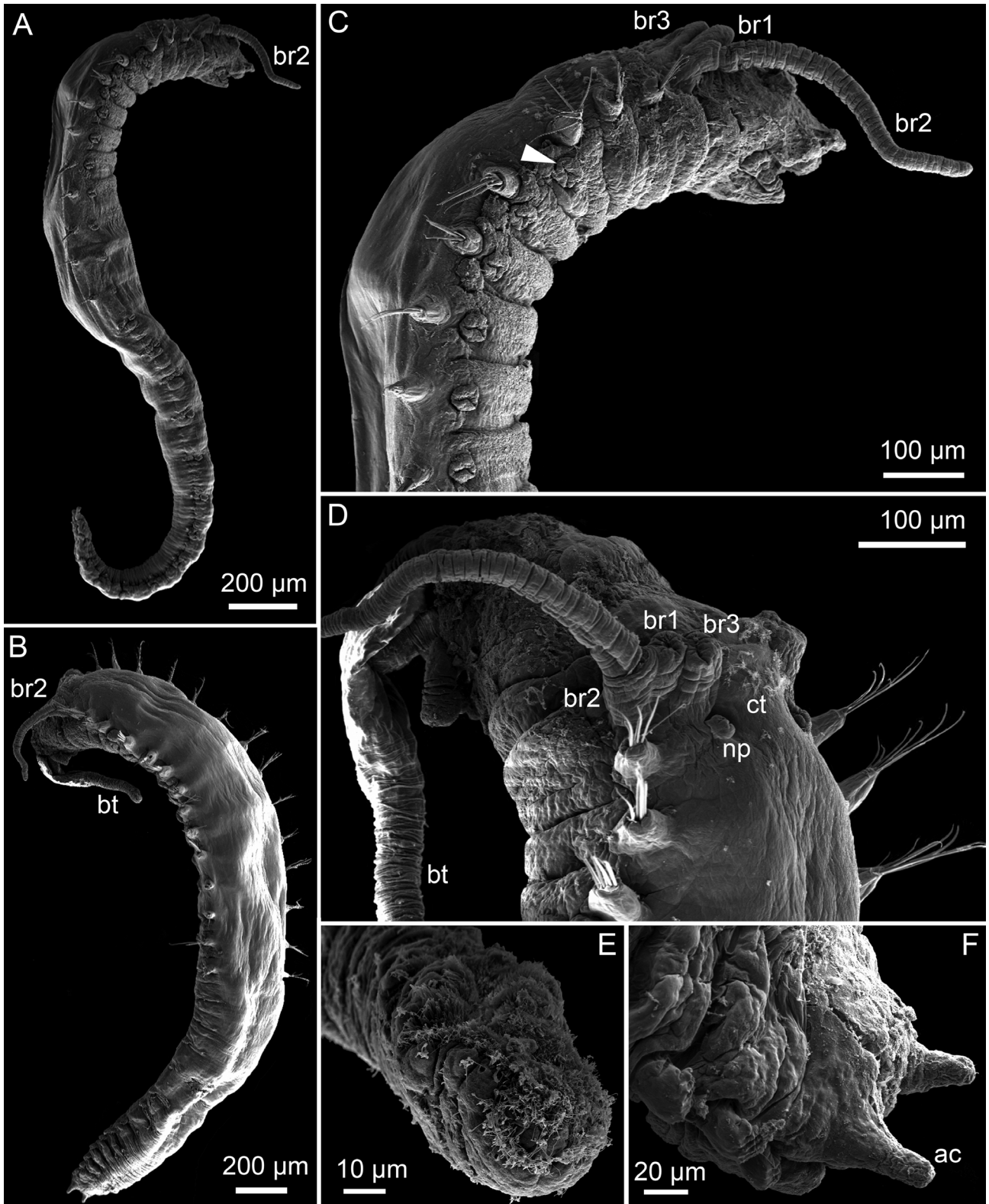


FIGURE 3. *Neosabellides lizae* n. sp., paratype AM W.45179 (A, C); paratype AM W.44850 (B, D–F). A. Habitus, lateral view; B. Habitus, dorsal view; C. Anterior part of body, enlarged from A; D. Anterior part of body, enlarged from B; E. Detail of tip of buccal tentacle; F. Posterior part of body and pygidium, dorsal view. Arrowhead indicates first thoracic neuropodium. Abbreviations: ac = anal cirrus, br1–3 = branchiae, bt = buccal tentacle, ct = ciliated tuft, np = nephridial papilla.

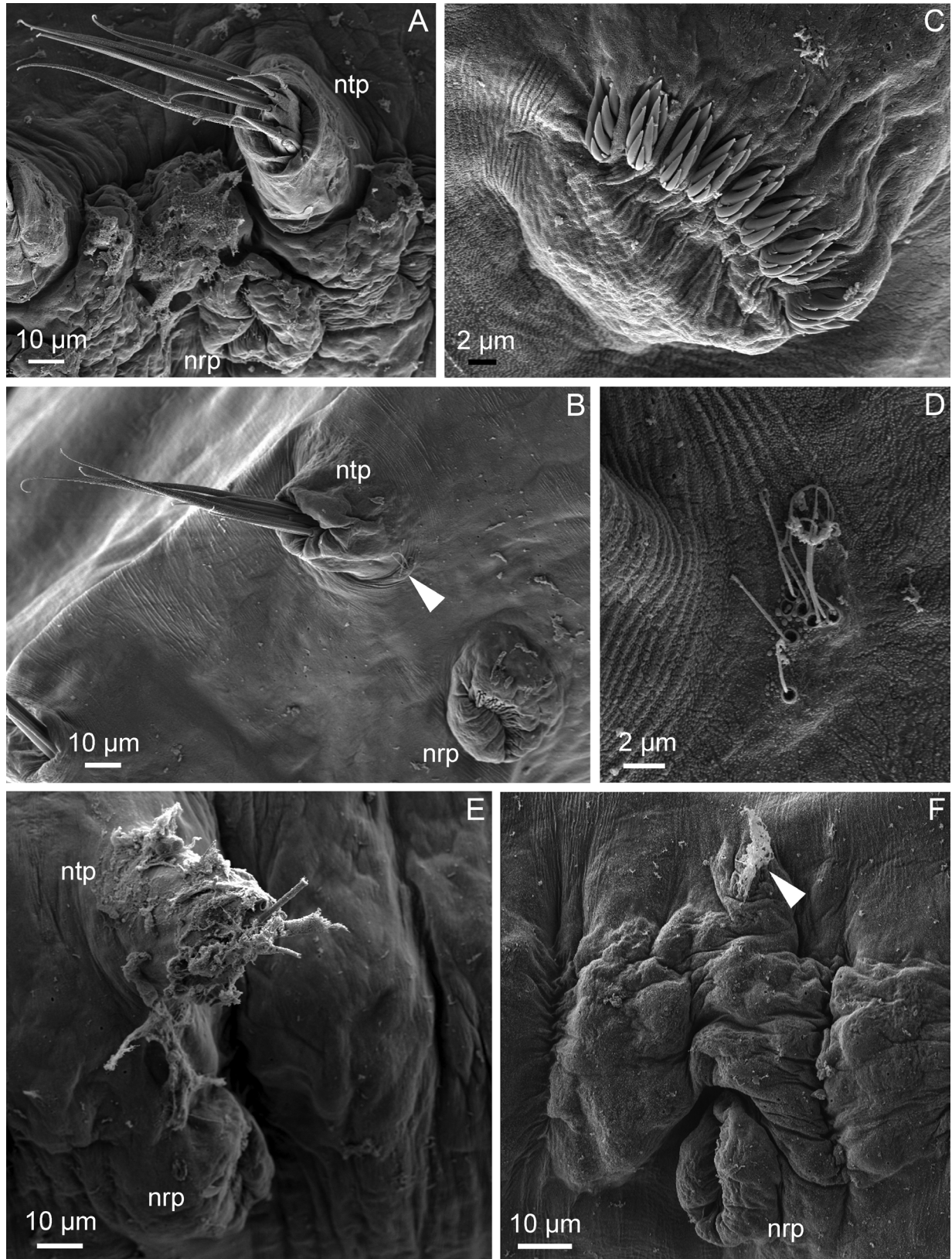


FIGURE 4. *Neosabellides lizae* n. sp., paratype AM W.45179 (A–D, F), paratype AM W.44850 (E). A. Fourth parapodium, notopodium with capillary chaetae; B. Tenth parapodium, notopodium with capillary chaetae, neuropodium with uncini; C. Eleventh parapodium, neuropodium with uncini; D. Twelfth parapodium, ciliated tuft at ventral base of notopodium; E. Fourteenth parapodium of paratype 4 mm long, notopodium with capillary chaetae, neuropodium with uncini; F. Fourteenth parapodium of paratype 3 mm long, notopodium absent, neuropodium with uncini, ciliated tufts. Arrowheads indicate ciliated tufts between parapodial rami. Abbreviations: nrp = neuropodium, ntp = notopodium.

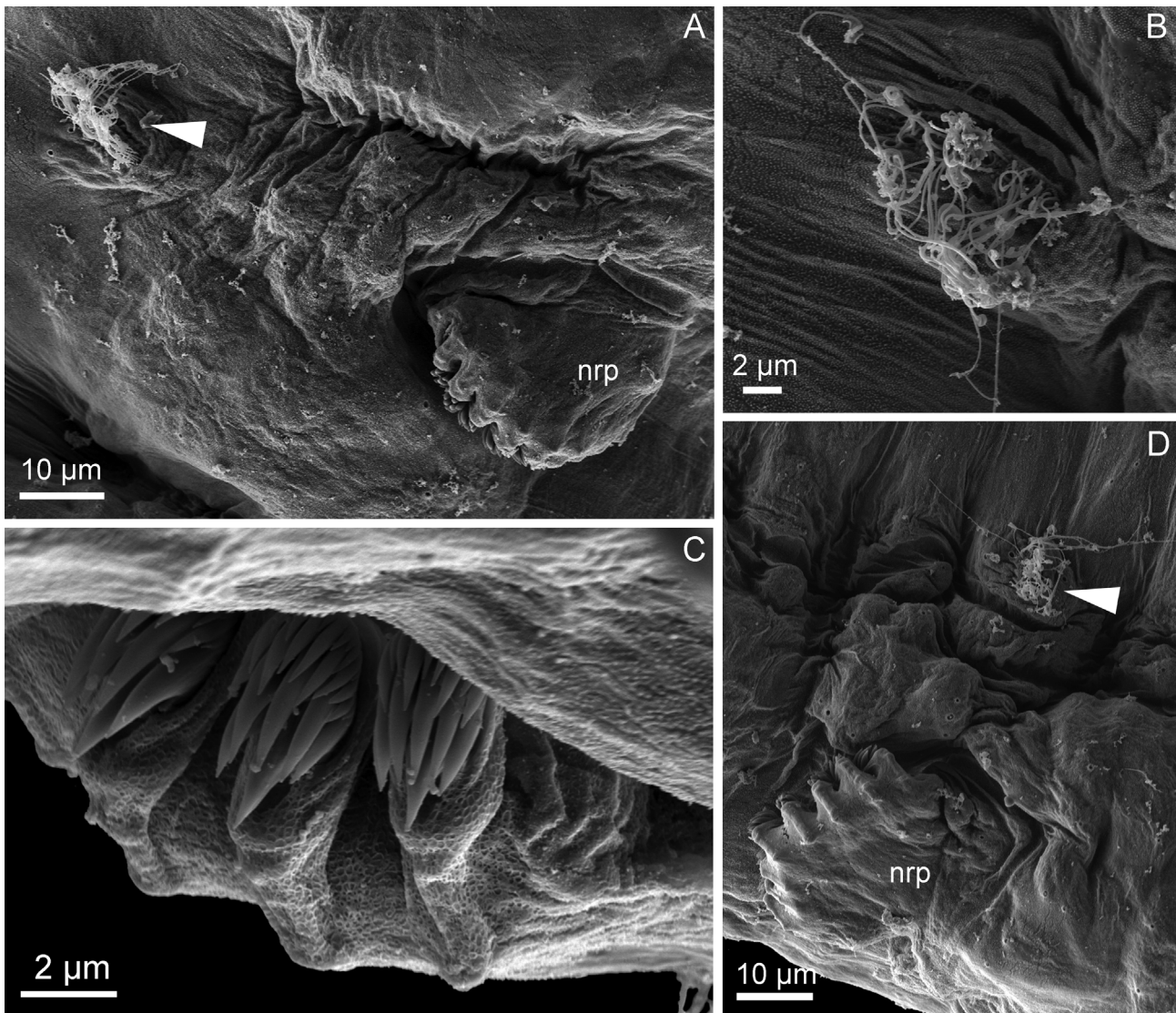


FIGURE 5. *Neosabellides lizae* n. sp., paratype AM W.45179. A. Sixteenth parapodium, neuropodium with uncini; B. Seventeenth parapodium, ciliated tuft; C. Twenty-fourth parapodium, uncini; D. Twentieth parapodium, neuropodium with uncini. Arrowheads indicate ciliated tufts between parapodial rami. Abbreviations: nrp = neuropodium.

Acknowledgments

The study was funded by Lizard Island Reef Research Foundation grant to Pat Hutchings, Anne Hoggett, and Elena Kupriyanova. The material was collected during the Polychaete Workshop held in Lizard Island, 2013 (permit number G12/35718.1 issued by the Great Barrier Reef Marine Park Authority). We are grateful to Anne Hoggett and Lyle Vail for hosting the workshop. We thank the staff at the Laboratory for Electron Microscopy, UiB for assistance with SEM. Travel of NB to Australia was supported by the Russian Foundation for Basic Research (grants 12-05-33049 and 13-04-01332).

References

- Alvestad, T., Kongrud, J.A. & Kongshavn, K. (2014) *Ampharete undecima*, a new deep-sea ampharetid (Annelida, Polychaeta) from the Norwegian Sea. *Memoirs of Museum Victoria*, 71, 11–19.
- Annenkova, N.P. (1934) Kurze Übersicht der Polychaeten der Litoralzone der Bering-Insel (Kommador-Inseln) nebst Beschreibung neuer Arten. *Zoologischer Anzeiger*, 106 (12), 322–331.

- Ehlers, E. (1913) Die Polychaeten-Sammlungen der deutschen Südpolar- Expedition, 1901-1903. *Deutsche Südpolar- Expedition 1901–1903 im Auftrage des Reichsamtes des innern herausgegeben von Erich von Drygalski Leiter Expedition*, 13 (4), 397–598, plates XXVI–XLVI.
- Fauvel, P. (1909) Deuxième note préliminaire sur les Polychètes provenant des campagnes de l'Hirondelle et de la Princesse-Alice, ou déposées dans la Musée Océanographique de Monaco. *Bulletin de l'Institut océanographique*, 142, 1–76.
- Hartmann-Schröder, G. (1981) Zur Kenntnis des Eulitorals der australischen Küsten unter besonderer Berücksichtigung der Polychaeten und Ostracoden. Teil 6. Die Polychaeten der tropisch-subtropischen Westküste Australiens (zwischen Exmouth im Norden und Cervantes im Süden). *Mitteilungen aus dem Hamburgischen zoologischen Museum und Institut*, 78, 19–96.
- Hessle, C. (1917) Zur Kenntnis der terebellomorphen Polychaeten. *Zoologiska bidrag från Uppsala*, 5, 39–258.
- Jirkov, I.A. (2011) Discussion of taxonomic characters and classification of Ampharetidae (Polychaeta). *Italian Journal of Zoology*, 78 (S1), 78–94.
<http://dx.doi.org/10.1080/11250003.2011.617216>
- Malmgren, A.J. (1866) Nordiska Hafs-Annulater. *Öfversigt af Königlich Vetenskapsakademiens förhandlingar, Stockholm*, 22, 355–410.
- Mackie, A.S.Y. & Pleijel, F. (1995) A review of the *Melinna cristata*-species group (Polychaeta: Ampharetidae) in the northeastern Atlantic. *Mitteilungen aus dem Hamburgischen zoologischen Museum und Institut*, 92, 103–124.
- Reuscher, M., Fiege, D. & Wehe, T. (2009) Four new species of Ampharetidae (Annelida: Polychaeta) from Pacific hot vents and cold seeps, with a key and synoptic table of characters for all genera. *Zootaxa*, 2191, 1–40.
- Ribas, J. & Hutchings, P. (2015) Lizard Island Polychaete Workshop: sampling sites and a checklist of polychaetes. *Zootaxa*, 4019 (1), 7–34.
<http://dx.doi.org/10.11646/zootaxa.4019.1.4>