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Four new species of Fauveliopsidae (Annelida, Sedentaria) from the Gulf of Thailand

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Abstract

Four new species of Fauveliopsidae, *Fauveliopsis pladang* **sp. nov.**, *Laubieriopsis tantawan* **sp. nov.**, *Riseriopsis chaba* **sp. nov.**, and *R. plahmuk* **sp. nov.**, are described from the Gulf of Thailand from sediments at 50–80 m water depth. *Fauveliopsis pladang* **sp. nov.**, can be distinguished from other species by having 41 chaetigers; anterior parapodia with two acicula chaetae per bundle; in median and posterior segments 1 aciculum and 1 capillary per bundle. *Laubieriopsis tantawan* **sp. nov.**, differs from all other species in the genus by having 27–43 chaetigers, body annulate; 2 acicula per bundle in anterior parapodia; in median and posterior parapodia with 1 aciculum and 1 capillary per bundle. *Riseriopsis chaba* **sp. nov.**, can be distinguished from other species by having 34 chaetigers; anterior parapodia with 2 acicula per bundle; median and posterior notopodia with one aciculum and one capillary per bundle; median neuropodia with 1 aciculum and 2 capillaries per bundle; posterior neuropodia with 1–2 acicula and 1 capillary per bundle. *Riseriopsis plahmuk* **sp. nov.**, can be distinguished from other species by having 2–4 acicula per bundle along anterior segments; median segments with 1–2 acicula and 1–2 capillaries per bundle; and posterior parapodia with 1–6 acicula and 1–5 capillaries per bundle. Genetic data, sequencing of the cytochrome oxidase subunit I (COI) of *L. tantawan* **sp. nov.**, and *R. plahmuk* **sp. nov.**, are reported. Update keys for identifying species of *Fauveliopsis*, *Laubieriopsis* and *Riseriopsis* are also provided.

Key words: COI, *Fauveliopsis*, *Laubieriopsis, Riseriopsis*, taxonomy

Introduction

In Thailand, members of Fauveliopsidae are scarce and the taxonomy of the family is poorly known. There are no taxonomic published accounts about fauveliopsids from Thai waters, either from the Andaman Sea or the Gulf of Thailand. This is the first taxonomic study of Fauveliopsidae from Thailand.

During a series of research projects for monitoring offshore petroleum concession areas in the Gulf of Thailand, in 50–80 m water depth, during the last 12 years, few specimens of Fauveliopsidae have been collected. Nevertheless, the specimens found have been shown to belong to four different species, all undescribed, and even though two of them are based upon a single specimen, they are different enough from other species that they are herein described.

Fauveliopsidae Hartman, 1971 includes small benthic polychaetes, whose bodies have interramal papillae and are detritus-feeders (Blake & Petersen 2000; Levenstein 1970; Magalhães *et al*. 2014; Zhadan & Atroshchenko 2012). They are widespread in most ocean basins (Salazar-Vallejo *et al*. 2019), and most species are restricted to

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deep sea environments (Jimi *et al*. 2020; Thiel *et al.* 2011; Zhadan & Atroshchenko 2012). They usually live in mollusc shells, foraminifera tests, or in their own tubes (Blake & Petersen 2000; Petersen 2000; Zhadan & Salazar-Vallejo 2019). Few of them are found in sediments at depths above 100 m (Katzmann & Laubier 1974; Núñez *et al.* 1997; Riser 1987; Zhadan & Atroshchenko 2012).

Currently there are three genera of Fauveliopsidae: *Fauveliopsis* McIntosh, 1922, *Laubieriopsis* Petersen, 2000, and *Riseriopsis* Salazar-Vallejo, Zhadan & Rizzo, 2019 (Read & Fauchald 2025a). According to Salazar-Vallejo *et al.* (2019), *Fauveliopsis* was divided into two groups based on the number of chaetae per bundle on the body: Group I: All parapodia with the same number of chaetae per bundle, and Group II: Some parapodia with different number of chaetae per bundle (Table 1).

There are 15 valid species of *Fauveliopsis*: *F. adriatica* Katzmann & Laubier, 1974; *F. antri* Jimi *in* Jimi *et al*., 2020; *F. armata* Fauchald & Hancock, 1981; *F. brattegardi* Fauchald, 1972; *F. brevipodus* Hartman, 1971; *F. brevis* Hartman, 1965; *F. challengeriae* McIntosh, 1922; *F. glabra* Hartman, 1960; *F. jameoaquensis* Núñez in Núñez *et al*., 1997; *F. levensteinae* Salazar-Vallejo, Zhadan & Rizzo, 2019; *F. magalhaesi* Salazar-Vallejo, Zhadan & Rizzo, 2019; *F. magna* Fauchald & Hancock, 1981; *F. olgae* Hartmann-Schröder, 1983; *F. rugosa* Fauchald, 1972; and *F. scabra* Hartman & Fauchald, 1971 (Read & Fauchald 2025b). After including *F. pladang* **sp. nov.,** there will be 16 species.

Laubieriopsis consists of nine valid species: *L. arenicola* Riser, 1987 from New Zealand, *L. blakei* Salazar-Vallejo, Zhadan & Rizzo, 2019 from the Southeastern Pacific Ocean, *L. brevis* Hartman, 1965 from the Western Atlantic, *L. cabiochi* Amoureux, 1982 from the Eastern Atlantic, *L. fauchaldi* Katzmann & Laubier, 1974 from the Mediterranean Sea, *L. hartmanae* Levenstein, 1970 from the Northwestern Pacific to the Eastern Pacific, *L. norvegica* Zhadan & Atroshchenko, 2012 from the Northeastern Atlantic, *L. petersenae* Magalhães, Bailey-Brock & Rizzo, 2014 from Hawaii, and *L. soyoae* Jimi *in* Jimi *et al*., 2020 from off Mikura Island, south of Tokyo, Japan (Read & Fauchald 2025c). When *L. tantawan* **sp. nov.**, a new species herein is included, the genus will have 10 species. Most of them (eight species) are abyssal species reported at depths between 135–5,858 m. Only two species were found in sediments shallower than 100 m: *L. arenicola* and *L. tantawan* **sp. nov.**, (50–80 m depth).

Riseriopsis consists of three species: *R. arabica* Hartman, 1976 from Arabian Sea, *R. confusa* Thiel, Purschke & Böggemann, 2011 from Angola and Guinea Basins, and *R. santosae* Salazar-Vallejo, Zhadan & Rizzo, 2019 from off Rio de Janeiro, Brazil (Read & Fauchald 2025d). When the two new species herein described are included, the genus will have five species.

The aim of this study was to describe four new species of the family Fauveliopsidae from the Gulf of Thailand. Updated keys to identify species in *Fauveliopsis*, *Laubieriopsis* and *Riseriopsis* species are also included. Genetic data, the cytochrome oxidase subunit I (COI) sequences are provided for two species, *L. tantawan* **sp. nov.**, and *R. plahmuk* **sp. nov.**, and this is the first genetic assessment of *Laubieriopsis* and *Riseriopsis* for understanding nucleotide diversity and improving our taxonomic knowledge of this family in Thailand.

Materials and methods

Materials were collected from two main research programs in offshore petroleum concession areas in the Gulf of Thailand (Fig. 1). First program was based upon various projects known as "Long-term environmental monitoring at the offshore oil production area in the Gulf of Thailand", conducted from 2009–2021, targeted to assess benthic diversity in several stations in offshore oil concession areas. Specimens were collected with a Van Veen grab (0.04 m^2) by Marine Ecosearch Management Company and Tetra Tech Inc., in sediments at 50–80 m water depths between 2009 to 2021 (8°22'53"–10°46'59"N, 100°48'03"–102°05'25"E). The second program was RTR (Rigs to Reefs) Project. Specimens were collected with a Van Veen grab (0.01 m^2) by Coral Reefs and Benthos Research Unit (PSU) and Marine Ecosearch Management Company, at depths ranging from 70 to 74 m during 26 June to 14 July 2024 (7°44'30"–7°56'6"N, 101°53'12"–102°02'42"E).

The collected samples were sieved in the field with 0.5 mm mesh screens. Later, sediments collected were placed in water, then this was sieved with sieved with a 300 µm filter bag. Sediments retained were separately fixed with a 10% formalin solution in sea water. In the laboratory samples were washed with freshwater and transferred to 70% ethanol. A few specimens collected in September 2021and 2024 were fixed in 95% ethanol for molecular studies (see below).

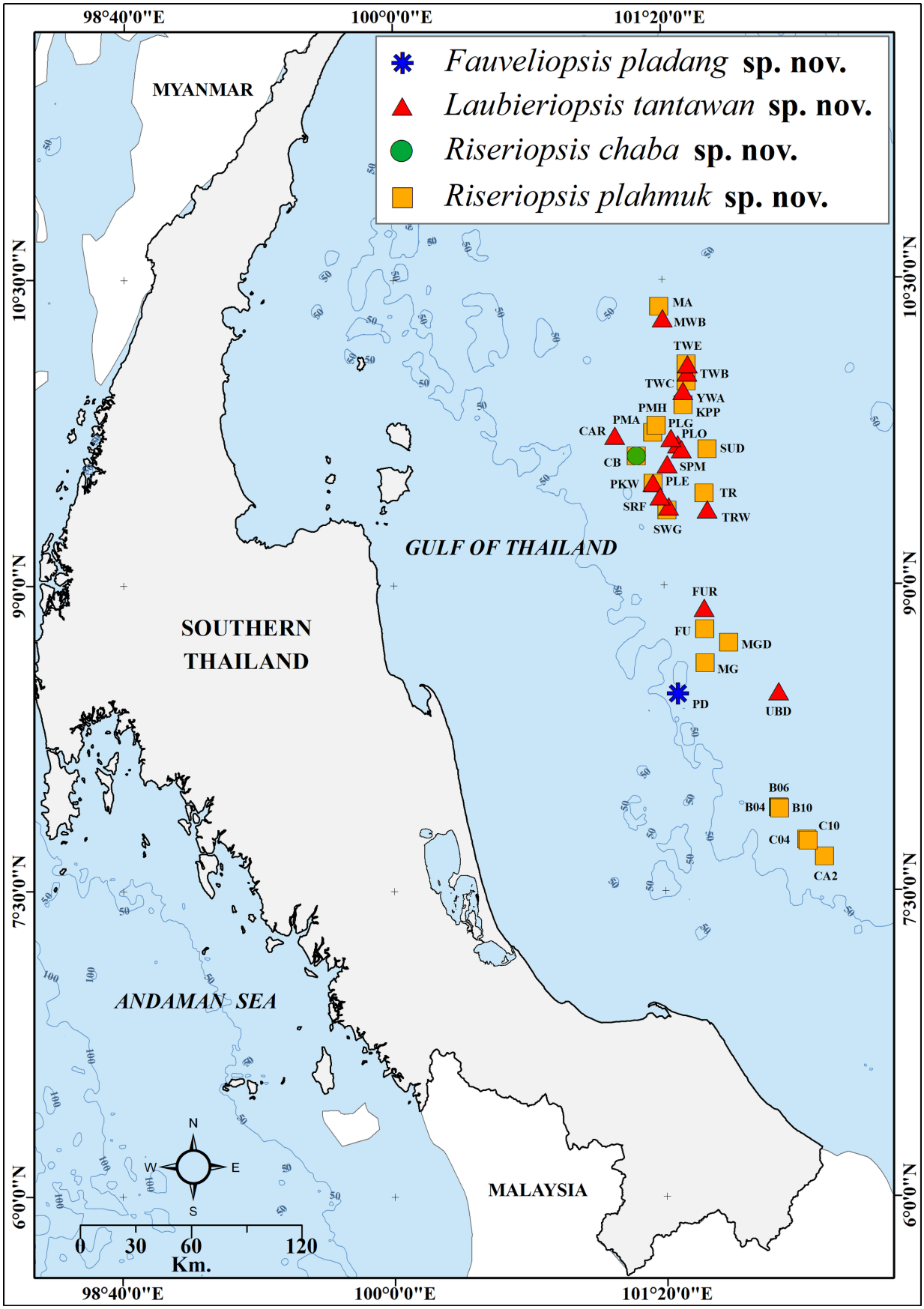

FIGURE 1. Sampling sites in the Gulf of Thailand, showing stations where *Fauveliopsis pladang* **sp. nov.** (asterisk), *Laubieriopsis tantawan* **sp. nov.** (triangles), *Riseriopsi chaba* **sp. nov.** (circle), and *R. plahmuk* **sp. nov.** (squares), were collected.

Morphological observations

Polychaetes were sorted into taxonomic groups using a stereomicroscope, and specimens of the proposed new species were dissected and examined under the compound light microscope. Photographs and measurements of specimens were taken using a stereo microscope (Olympus SZX16) and a compound microscope (Leica DM1000) with a digital camera (DP74). Stacks of multifocal shots were merged into a single photograph using Helicon Focus (https://www.heliconsoft.com). Specimens were temporarily stained with Methyl green or Shirlastain-A for observing the parapodia, chaetae and genital papilla on the body.

Some specimens of the new species were examined with Scanning Electron Microscopy (SEM). They were dehydrated in 100% ethanol before being critical-point dried (POLARON CPD7501 Critical Point Drier) and mounted onto SEM stubs, and then coated with gold (LEICA EM ACE600). SEM photographs were taken with a JEOL JSM-5800LV microscope and a Field Emission Scanning Electron Microscope (Apreo, FEI). Whole specimen of *F. pladang* **sp. nov.**, and *R. chaba* **sp. nov.**, were photographed with a Leica MICA WideFocal livecell (a Leica MICA MICROHUB). Illumination (Power, Effective) using a UV laser wavelength 405 nm, 54.2% (5.418%) and a green-yellow wavelength, 561 nm, 70.2% (7.019%) with Z-Stack mode. Then process with lightning adaptive for shape image and project photograph into a 2D image.

The taxonomic descriptions of the new species are based on morphology and measurements of the holotype and information about variability found in paratypes. Confirmation of the taxonomic status of the new species was based on the revision and compilation of the diagnostic characteristics from all recognized species of genera *Fauveliopsis*, *Laubieriopsis*, and *Riseriopsis*. For comparative purposes tables with the main diagnostic characters of the new species and closely-related species were prepared (Table 1–2).

TABLE 1. Groups of *Fauveliopsis* species with different number of chaetae per bundle along median regions.

Species	Number of chaetae per bundle in posterior chaetigers
A. Median region with 2 chaetae per bundle	
F. adriatica Katzmann & Laubier, 1974	8 neurochaetae per bundle
F. levensteinae Salazar-Vallejo, Zhadan & Rizzo, 2019	2–3 acicula and 1 capillary per bundle
F. magna Fauchald & Hancock, 1981	5–6 neurochaetae per bundle
F. magalhaesi Salazar-Vallejo, Zhadan & Rizzo, 2019	2–6 neurochaetae per bundle
F. pladang **sp. nov.**	1 aciculum and 1 capillary per bundle
B. Median region with ≥3 chaetae per bundle	
F. glabra Hartman, 1960	2–3 acicula and 2–3 capillaries per bundle
F. olgae Hartmann-Schröder, 1983	3–4 acicula and 3–4 capillaries per bundle
F. scabra Hartman & Fauchald, 1971	1–3 acicula and 1–3 capillaries per bundle

TABLE 2. *Riseriopsis* species with brownish–golden chaetae in posterior chaetigers (Ac: acicula, Ca: capillaries).

Species/characters	Total chaetigers	Anterior chaetigers	Posterior chaetigers	Reference
R. arabica Hartman, 1976	49–87	1 Ac/1 Ca	1–3 Ac/1–3 Ca	Hartman 1976; Salazar-Vallejo *et al.* 2019
R. chaba **sp. nov.**	34	2 Ac	2–4 Ac	This study
R. plahmuk **sp. nov.**	56–106	2–4 Ac	1–6 Ac/ 1–5 Ca	This study

Type material was deposited in the Princess Maha Chakri Sirindhorn Natural History Museum, Prince of Songkla University (PSUZC), Thailand and the Australian Museum (AM) Sydney, Australia. Additional material is maintained in the personal collections of Jintana and Sakanan Plathong at MEM.

Station codes in offshore localities in the Gulf of Thailand

CAR, Chabaref; CB: Chaba; GT, Gulf of Thailand; FU, Funan; FUR, Funanref; KPP, Kapong; MA, Maliwan; MG, MoragotA; MGD, MoragotD; MWB, Maliwan B; PD, Plagang; PKW, PakarangW; PLE, PlathongE; PLG, PlathongG; PLO, PlathongO; PMA, PlahmukA; PMH, PlahmukH; SPM, Single Point Mooring; SRF, Satunref;

SUD, SuratD; SWG, SatunG; TR, Trad; TRW, TradW; TWB, TantawanB;TWC, TantawanC; TWE, TantawanE; UBD, Ubon; YWA, YalaA.

Stations CA2, B04, B06, B10, C04 and C10 are stations in RTR (Rigs to Reefs) Project, no platforms.

Molecular taxonomy and analysis

Three specimens of *L. tantawan* **sp. nov.**, and two specimens of *R. plahmuk* **sp. nov.**, collected in September 2021, were fixed with 96% ethanol for DNA extraction. Genomic DNA was extracted using DNeasy Blood & Tissue kit (Qiagen; Germantown, USA) following the manufacturer's protocol. Partial COI amplicon of both species was amplified using the universal primers LCO1490 (5'-GGTCAACAAATCATAAAGATATTGG-3') and HCO2198 (5'-TAAACTTCAGGGTGACCAAAAAATCA-3') (Folmer *et al.* 1994). The 20 µl PCR reaction mixture included 10 µl of 2X MyTaq HS Mix (Bioline, USA), 2 µl of 10 pmol/µl forward and reverse primers and 1–2 µl of genomic DNA template. PCR condition was performed by 94 °C for 5 minutes, 35 cycles at 94 °C for 45 seconds, 40 °C for 60 seconds, 72 °C for 90 seconds, and a final extension of 72 °C for 5 minutes. Quality and quantity of PCR products was checked in 1.5% gel electrophoresis. PCR amplicons were cleaned up and sequenced by Sanger sequencing (Bionics Co., Ltd., Korea). Nucleotide sequences were checked and trimmed using CodonCode Aligner software v. 6.0.2 (CodonCode Corp., Dedham, Massachusetts). The COI sequences were deposited in the NCBI (https://www.ncbi.nlm.nih.gov/). Multiple sequence alignment was carried out with ClustalW (1.6) with default settings (Gap Opening Penalty = 15, Gap Extension Penalty = 6.66 in both pairwise and multiple alignments) in MEGAX software (Kumar *et al.* 2018).

Average nucleotide composition was evaluated by MEGAX software (Kumar *et al*. 2018). Sequence divergences were calculated using DNAsp (Rozas & Rozas 1997) to investigate intraspecific genetic distances. However, interspecific genetic distances cannot be calculated since there are no other deposited-nucleotide sequences for *Laubieriopsis* or *Riseriopsis* in databases.

Results

Systematics

Family Fauveliopsidae Hartman, 1971

Genus *Fauveliopsis* McIntosh, 1922

Diagnosis. Fauveliopsids with body medially wider, club-shaped or swollen posteriorly. Segments short, 2–4 times wider than long. Integument opaque, multiannulate or rugose, often with papillae. Interramal papillae prominent, often with a long stalk (after Salazar-Vallejo *et al*. 2019).

Fauveliopsis pladang **sp. nov.**

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Figs 2–3

Material examined. Western Pacific, Offshore the Gulf of Thailand. A single specimen, holotype: PSUZC-POL-0365, Sta. GT-PD (8°28'N, 101°24'E), 2 Oct. 2019, 60 m, coll. Marine Ecosearch Management Co., Ltd., mud mixed with sand and shells fragments.

Diagnosis. *Fauveliopsis* with 41 chaetigers. First three chaetigers with 2–3 aciculae per bundle. Parapodia of median and posterior chaetigers with one aciculum and one capillary chaeta per bundle.

Description. Holotype small, complete, 3.9 mm long, 0.36 mm wide (posterior region), 41 chaetigers. Color in alcohol semitransparent, without pigmentation. Body slender, divided into four regions: 1) Anterior chaetigers (first three chaetigers), slightly swollen, annulated, wider than following region; 2) Antero-median region (chaetigers 4 to 20), each segment longer than those present along anterior and posterior regions, each 137–163 µm in length, with

3–4 rings; and 3) Postero-median region (chaetigers 21 to 25), segments shorter than previous region (each 94–112 µm); and 4) Posterior region (from chaetigers 26 to end of body), slightly swollen, wider than other regions, length about 31–55 µm per segment, each with two rings (Figs 2; 3A–B).

Prostomium and peristomium short, fused together; nuchal organs not seen. Eyes absent (Fig. 2).

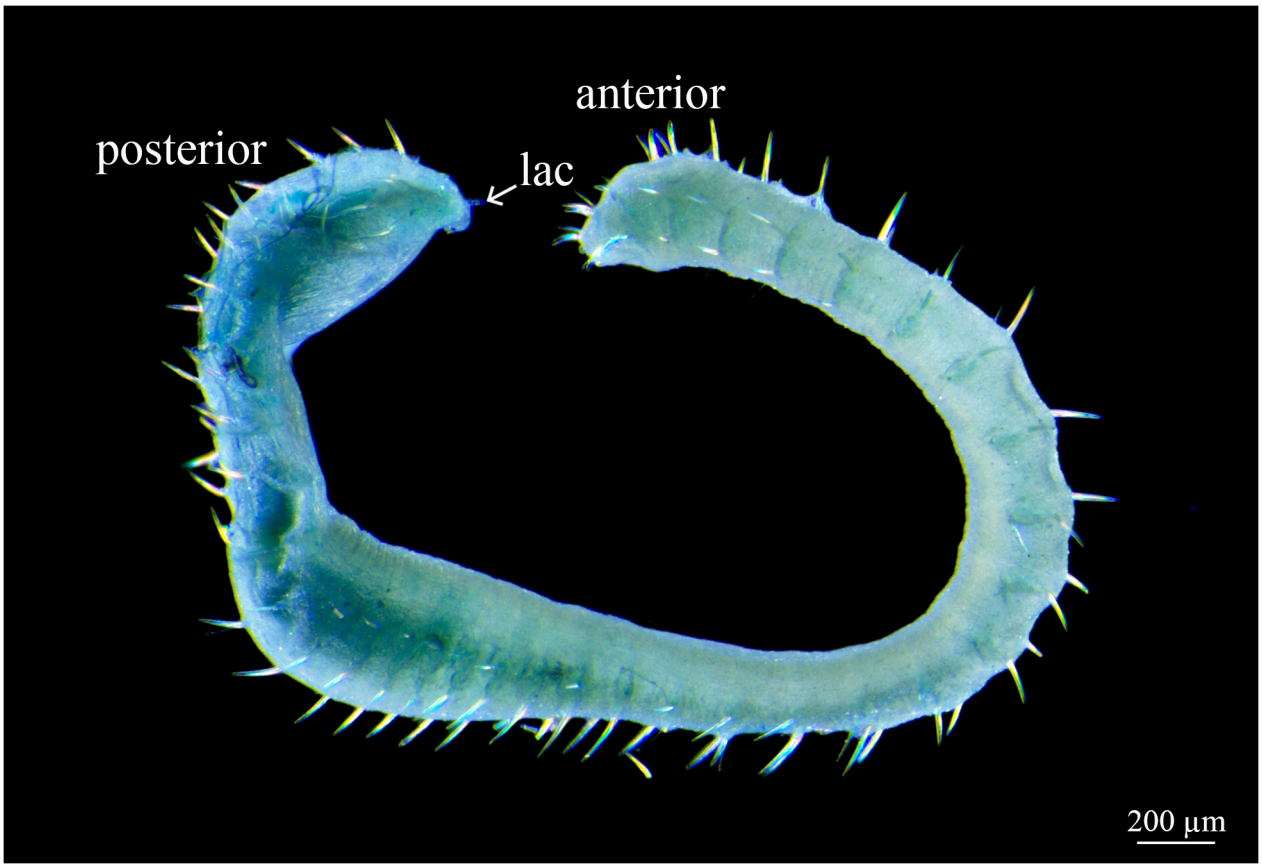

FIGURE 2. *Fauveliopsis pladang* **sp. nov.**, light photograph, holotype (PSUZC-POL-0365). Whole specimen, left lateral view (lac, lateral anal cirrus).

Parapodia biramous. Notopodia of anterior chaetigers: left side, chaetigers 1–2 with 3 acicula per bundle, chaetiger 3 with 2 acicula per bundle; right side, all chaetigers with 2 acicula per bundle. Neuropodia, chaetigers 1–3 with 2 acicula per bundle. Median and posterior chaetigers with one aciculum and one capillary per bundle. Neuroacicula shorter and thinner than notoacicula. Genital papillae not visible.

Pygidium with two short lateral anal cirri, anus ventral (Figs 2; 3A–B).

Etymology. The species is named after Pladang oil platform in the Gulf of Thailand, where the holotype was found. The specific name is a noun in the nominative singular (ICZN 1999, Art. 11.9.1.2).

Distribution. Gulf of Thailand, likely free living since it was not found in a tube or shell, in mixed muddy substrates with sand and shell fragments, at 60 m depth.

Remarks. *Fauveliopsis pladang* **sp. nov.**, belongs to the group of species with some parapodia having different number of chaetae per bundle along body, and two chaetae per bundle with one aciculum and one capillary (Table 1). This group consists of four species: *F. adriatica* Katzmann & Laubier, 1974, *F. levensteinae* Salazar-Vallejo, Zhadan & Rizzo, 2019, *F. magna* Fauchald & Hancock, 1981 and *F. magalhaesi* Salazar-Vallejo, Zhadan & Rizzo, 2019 (Table 1). However, *F. pladang* **sp. nov.**, differs from all those species by having both noto-and neurochaetae in posterior chaetigers only two chaetae per bundle, whereas *F. adriatica*, *F. levensteinae*, and *F. magna* have more than two neurochaetae per bundle in posterior chaetigers (up to 6 chaetae per bundle in *F. adriatica*, 3–4 in *F. levensteinae*, and up to 8 in *F. magna*).

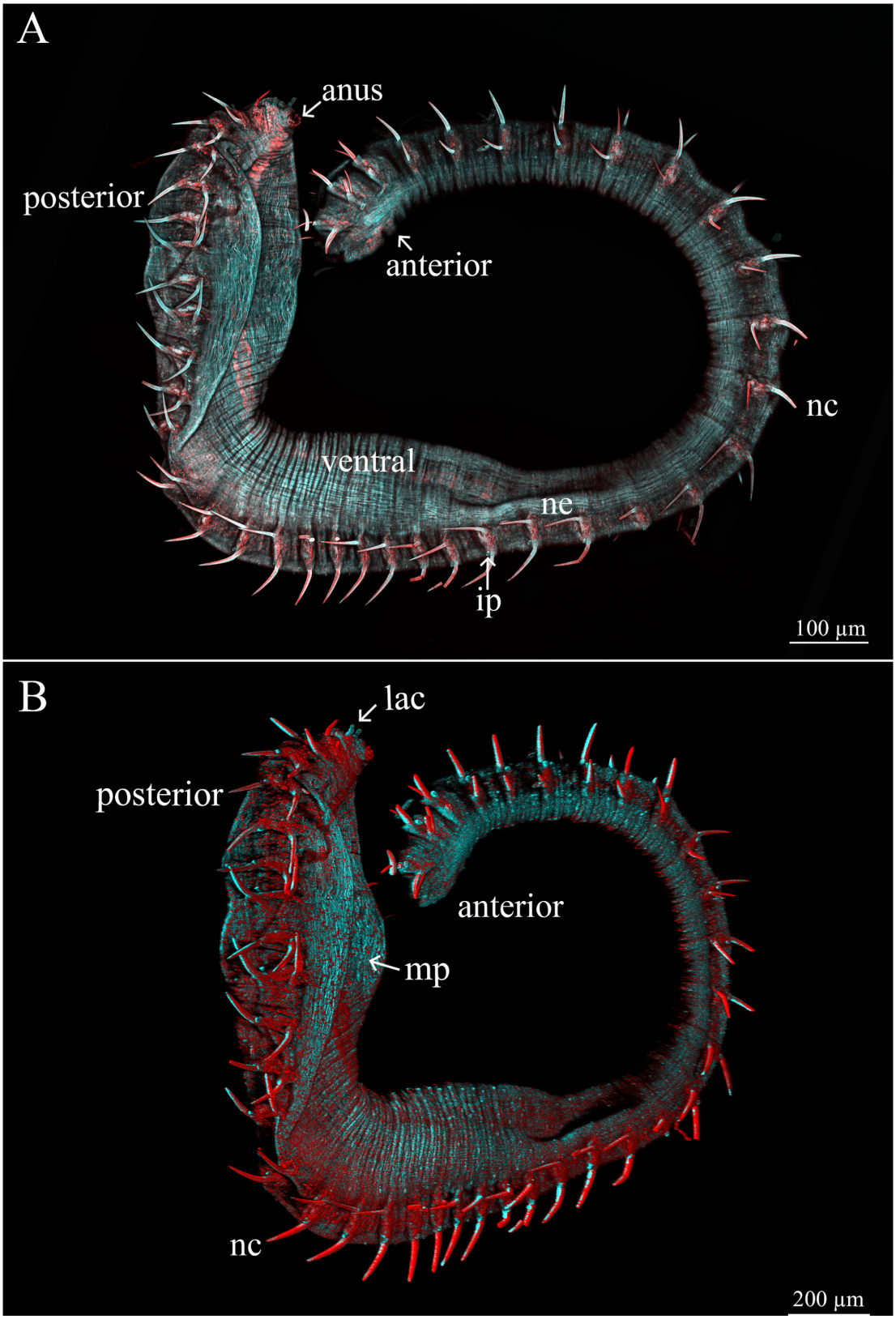

FIGURE 3. *Fauveliopsis pladang* **sp. nov.**, holotype (PSUZC-POL-0365), 2D CLSM photographs, process with lightning adaptive de convolution for sharp image. A–B, whole specimen of holotype (PSUZC-POL-0365), both in left lateral view. A. Shows acicula chaetae and multi-annulated body (used HC PL FLUOTAR 10x/0.32 DRY objective lens with 30 layers of 4.299 µm; image 7797px x 6516px (Confocal Grade). B. Shows micropapillae on the body (used HC PL APO CS2 20x/0.75 DRY UV objective lens with 139 layers of 1.001µm; image 6834px x 7542px (High) (ip, interramal papilla; lac, lateral anal cirrus; mp, micropapilla; nc, notochaeta; ne, neurochaeta).

Key to species of *Fauveliopsis* McIntosh, 1922
(Modified after Salazar-Vallejo *et al*. 2019)

1. All parapodia with the same number of chaetae per bundle 2
– Some parapodia with different number of chaetae per bundle 8
2. Parapodia with only 2 chaetae per rami 3
– Parapodia with 2c2A/2A2c; body with 16–17 chaetigers . . . . . ***F. brattegardi*** Fauchald, 1972a (NW Atlantic)
3. Body with 10 chaetigers; body surface smooth, at least anteriorly . . . . . ***F. jameoaquensis*** Núñez *in* Núñez, Ocaña & Brito, 1997 (Canary Islands)
– Body with more than 15 chaetigers 4
4. Body surface homogeneously rugose or papillated 5
– Body rugose dorsally, ventrally papillated 7
5. Genital papillae (GP) present; body rugose 6
– GP not visible; body papillated with 27–28 chaetigers; pygidium with two papillae . . . . . ***F. brevipodus*** Hartman, 1971 (Chile, Drake Passage and Falkland Islands)
6. Anterior chaetigers with sigmoid acicula, posterior chaetigers with falcate aciculae; GP on right side of chaetigers 11–12 . . . . . ***F. challengeriae*** McIntosh, 1922 (Subantarctic)
– Anterior and posterior chaetigers with sigmoid acicula; GP single on right posterior part of chaetiger 9 to 11 . . . . . ***F. armata*** Fauchald & Hancock, 1981 (NE Pacific)
7. GP on chaetiger 12, right side; body 2–5 mm long (23–30 chaetigers). . . . . ***F. rugosa*** Fauchald, 1972b (NE Pacific).
– GP not seen; body less than 1 mm long (32 chaetigers) . . . . . ***F. antri*** Jimi *in* Jimi *et al*., 2020 (Japan)
8. Median regions with only 2 chaetae per bundle 9
– Median regions with ≥3 chaetae per bundle 13
9. Posterior chaetigers with >2 chaetae per bundle 10
– Posterior chaetigers with only 2 chaetae per bundle . . . . . ***F. pladang*** **sp. nov.** (Gulf of Thailand)
10. Body annulated, posteriorly smooth; posterior region with 2–3 acicula and 1 capillary per bundle . . . . . ***F. levensteinae*** Salazar-Vallejo, Zhadan & Rizzo, 2019 (North Pacific)
– Body surface not annulated 11
11. Posterior region with up to 6 neurochaetae per bundle 12
– Posterior region with up to 8 neurochaetae per bundle . . . . . ***F. adriatica*** Katzmann & Laubier, 1974 (Mediterranean)
12. GP on the right side, before chaetal lobe of chaetiger 13 or 14; posterior chaetigers with 5–6 neurochaetae per bundle . . . . . ***F. magna*** Fauchald & Hancock, 1981 (NE Pacific)
– GP not seen; posterior chaetigers with 2–6 neurochaetae per bundle . . . . . ***F. magalhaesi*** Salazar-Vallejo, Zhadan & Rizzo, 2019 (Southwestern Atlantic)
13. Body smooth; posterior chaetigers with 2–3 acicula and 2–3 capillaries per bundle . . . . . ***F. glabra*** Hartman in Hartman & Barnard, 1960 (NE Pacific)
– Body rugose (or scabrous) 14
14. Posterior chaetigers with 1–3 acicula and 1–3 capillaries per bundle . ***F. scabra*** Hartman & Fauchald, 1971 (NE Atlantic)
– Posterior chaetigers with 3–4 acicula and 3–4 capillaries per bundle . . ***F. olgae*** Hartmann-Schröder, 1983 (NE Atlantic)

Genus *Laubieriopsis* Petersen, 2000

Diagnosis. Fauveliopsids with body cylindrical, not swollen posteriorly. Anterior segments short, intersegmental grooves shallow or not defined; median and posterior segments long (as long as wide). Integument often transparent, smooth, without large papillae. Interramal papillae small, usually with a short stalk or sessile. Chaetae include uni- or bidentate acicula, straight or sigmoid spinulose, and smooth capillaries. Posterior end with pygidium retractile, often with small papillae and large falcate acicula. Genital papillae paired or unpaired in anterior chaetigers, rarely missing. Free living, rarely in flexible, fibrous tubes, with or without foreign particles (after Salazar-Vallejo *et al*. 2019).

Laubieriopsis tantawan sp. nov.

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Figs 4–6

Material examined. Western Pacific, offshore the Gulf of Thailand, Petroleum Concession Area. Twenty four specimens, coll. Marine Ecosearch Management Co., Ltd., mud mixed with sand and shells fragments. Holotype: PSUZC-POL-0366, Sta. GT-MWB (10°18'N, 101°20'E), 31 Mar. 2020, 60 m. Twenty three paratypes: PSUZC-

POL-0367 (1 spec.), Sta. GT-SAF (9°25'N, 101°19'E), 3 Oct. 2019, 50 m; PSUZC-POL-0368–0369 (4 specs.), Sta. GT-TRW (9°21'N, 101°32'E), 60 m: 11 Mar. 2015 (1 spec.), 12 Mar. 2015 (3 specs., 2 spec. on SEM stub); PSUZC-POL-0370 (1 spec.), Sta. GT-CB (9°39'N, 101°13'E), 11 Sep. 2015, 60 m; PSUZC-POL-0371–0372 (2 specs.), Sta. GT-TWB (10°02'N, 101°27'E), 60 m: 5 Oct. 2019 (1 spec.), 28 Jun. 2018 (1 spec.); PSUZC-POL-0373 (1 spec.), Sta. GT-TWE (10°04'N, 101°27'E), 27 Jun. 2018, 60 m; PSUZC-POL-0374 (1 spec.), Sta. GT-PLO (9°41'N, 101°24'E), 23 Jun. 2018, 60 m; PSUZC-POL-0375 (1 spec.), Sta. GT-PMH (9°47'N, 101°18'E), 1 Jul. 2018, 60 m; PSUZC-POL-0376 (1 spec.), Sta. GT-CAR (9°44'N, 101°05'E), 12 Sep. 2015, 60 m; PSUZC-POL-0377 (1 spec. on SEM stub), Sta. GT-PLE (9°35'N, 101°21'E), 4 Jul. 2018, 60 m; PSUZC-POL-0378 (1 spec. on SEM stub), Sta. GT-SWG (9°23'N, 101°22'E), 20 Jul. 2018, 50 m; PSUZC-POL-0379 (1 spec.), Sta. GT-SPM (9°40'N, 101°25'E), 9 Oct. 2019, 60 m; PSUZC-POL-0380 (1 spec.), Sta. GT-UBD (8°28'N, 101°54'E), 22 Mar. 2020, 80 m; PSUZC-POL-0381 (1 spec.), Sta. GT-PLG (9°43'N, 101°22'E), 3 Jul. 2018, 60 m; PSUZC-POL-0382 (2 specs. fixed for DNA analyses, used), Sta. GT-YWA (9°57'N, 101°26'E), 23 Sep. 2021, 60 m; PSUZC-POL-0383 (1 spec. fixed for DNA analyses, used), Sta. GT-PKW (9°30'N, 101°17'E), 24 Sep. 2021, 67 m; AM W.57289 (1 spec.), Sta. GT-MWB (same as holotype), 22 Jun. 2018, 60 m; AM W.57290 (1 spec.), Sta. GT-TWE (10°04'N, 101°27'E), 23 Sep. 2019, 60 m; AM W.57291 (1 spec.), Sta. GT-PLG (9°43'N, 101°22'E), 4 Jun. 2021, 60 m.

Additional material. One specimen, Sta. GT-SAF (same as paratype), 6 Sep. 2012; one specimen, Sta. GT-FUR (8°53'N, 101°32'E), 21 May 2020, 70 m.

Diagnosis. *Laubieriopsis* with 27–43 chaetigers in adults. First three anterior parapodia with two acicula per bundle. Median and posterior parapodia with one aciculum and one capillary per bundle.

Description. Holotype complete, with oocytes in coelom, 3.2 mm long, 0.24 mm wide, 40 chaetigers (Fig. 4A). Paratypes: adults 1.7–3.7 mm long, 0.3–1.9 mm wide, 23–43 chaetigers. One juvenile specimen 1.2 mm long, 16 chaetigers. Color in alcohol white to light tan, semi-transparent.

Prostomium and peristomium not seen (retracted in all specimens) (Fig. 4A–D). Nuchal organs not seen. Eyes absent.

Body slender, first three chaetigers slightly swollen, biannulate (Fig. 4A–B). Chaetiger 4 and following ones biannulate, venter with a groove (Fig. 4B). Body divided into two regions, anterior (first three chaetigers) and mid- and posterior chaetigers (from chaetiger 4 throughout), segments longer in anterior region, shorter in abdominal segments; decreasing in posterior segment. Posterior region swollen.

Integument smooth, scattered with minute micropapillae throughout body, difficult to be detected with light microscope; visible under higher magnification and in SEM (Figs 4A–D; 5D). Parapodia biramous throughout. First 3 chaetigers with two spinulose, slightly curved acicula per ramus, acicula subdistally depressed, tips blunt. Median and posterior regions (chaetiger 4 to throughout the body) with one thick aciculum and one thin capillary per ramus. Notochaetae with upper and neurochaetae with lower chaetae capillary (Figs 4A–D; 5A–D).

Interramal papillae small, short–stalked located between noto- and neuropodia (near notopodia) (Figs 4B–D; 5A, C–D).

Genital papillae not seen (maybe absent).

Pygidium with anus terminal and three short anal cirri, shorter than chaetae: two digitate lateral and one conical ventral cirri (Figs 4A–B; 5D–E).

Variation. Three large SEM specimens were dissected for observing oocytes and spermatids in coelom, all had very small oocytes in posterior segments (visible only under high magnification and SEM), each about 1–4.5 μm in diameter and very small spermatids about 0.237–0.566 μm in diameter. Therefore, it might be hermaphrodite species.

Etymology. The species is named after the name of the oil platform in the Gulf of Thailand where most specimens were found. The specific epithet "tantawan" is the Thai word for sunflower. The specific name is in the nominative singular (ICZN 1999, Art. 11.9.1.2).

Distribution. Only known from the type locality, offshore in the Gulf of Thailand. Free living in mixed muddy substrates with sand and shell fragments, at 50–80 m depth.

Genetic data. The 634 bp partial COI of *L. tantawan* **sp. nov.**, (GenBank accession code OQ544391–OQ544393) was composed of the average nucleotide composition: 21.6% A, 15.2% C, 26.6% G, and 36.6% T, showing a high A+T bias (58.2%). Nucleotide substitutions occurred at 2 positions within the partial COI fragment, and all positions were singleton variables leading to 0.3% intraspecific genetic distances for *L. tantawan* **sp. nov.**

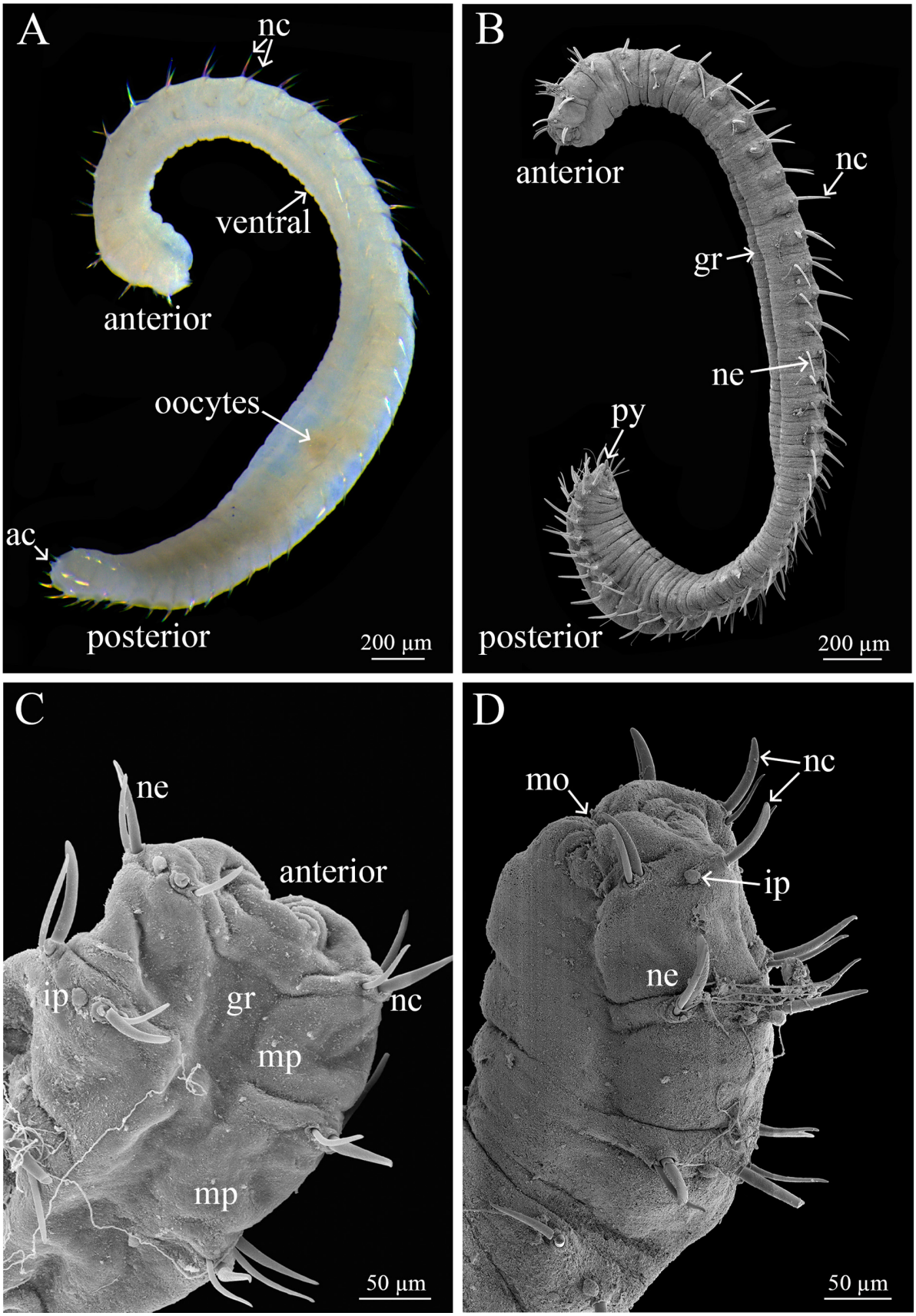

FIGURE 4. *Laubieriopsis tantawan* **sp. nov.**, light photograph (A, PSUZC-POL-0366, holotype) and SEM micrographs (B–D, PSUZC-POL-0369, paratype). A–B. Complete left lateral view. C. First three chaetigers, dorsal view. D. First three chaetigers, left lateral view (ac, aciculum; gr, groove; ip, interramal papilla; mo, mount; mp, micropapilla; nc, notoaciculum; ne, neurochaeta; py, pygidium).

Remarks. *Laubieriopsis tantawan* **sp. nov.**, resembles *L. arenicola* from New Zealand and *L. fauchaldi* from the Adriatic Sea because they have more than 21 chaetigers, and anterior segments with tapered acicula, each with entire tips (Riser 1987; Salazar-Vallejo *et al.* 2019). However, *L. tantawan* **sp. nov.**, differs from *L. arenicola* by having first three chaetigers with two acicula per bundle, whereas *L. arenicola* has first four chaetigers with two acicula and two capillaries per bundle (Riser 1987). Moreover, *L. tantawan* **sp. nov.**, has more chaetigers than *L. arenicola* (27–43 vs. 25) and the body segments of *L. tantawan* **sp. nov.**, are biannulate, whereas in *L. arenicola* they have 3–4 rings.

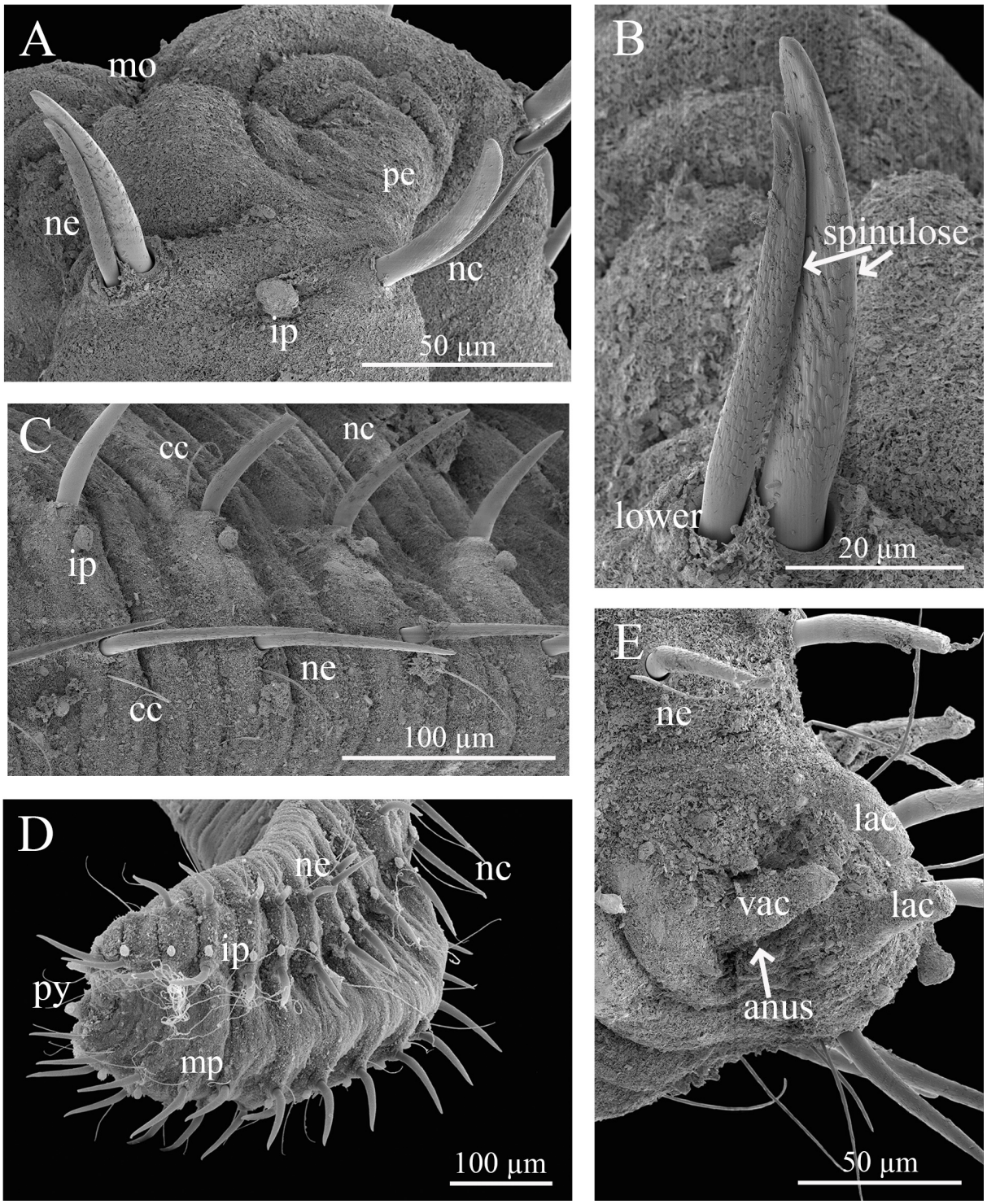

FIGURE 5. *Laubieriopsis tantawan* **sp. nov.**, paratype (PSUZC-POL-0369). A. First left parapodium, frontal view; B. Same, close-up of anterior acicula; C. Chaetigers 20–22, left parapodia, frontal view. D. Posterior end, dorsal view. E. Pygidium, ventral view (cc, capillary chaeta; ip, interramal papilla; lac, lateral anal cirrus; mp, micropapilla; nc, notochaeta; ne, neurochaeta; mo, mouth; pe, peristomium; py, pygidium; vac, ventral anal cirrus).

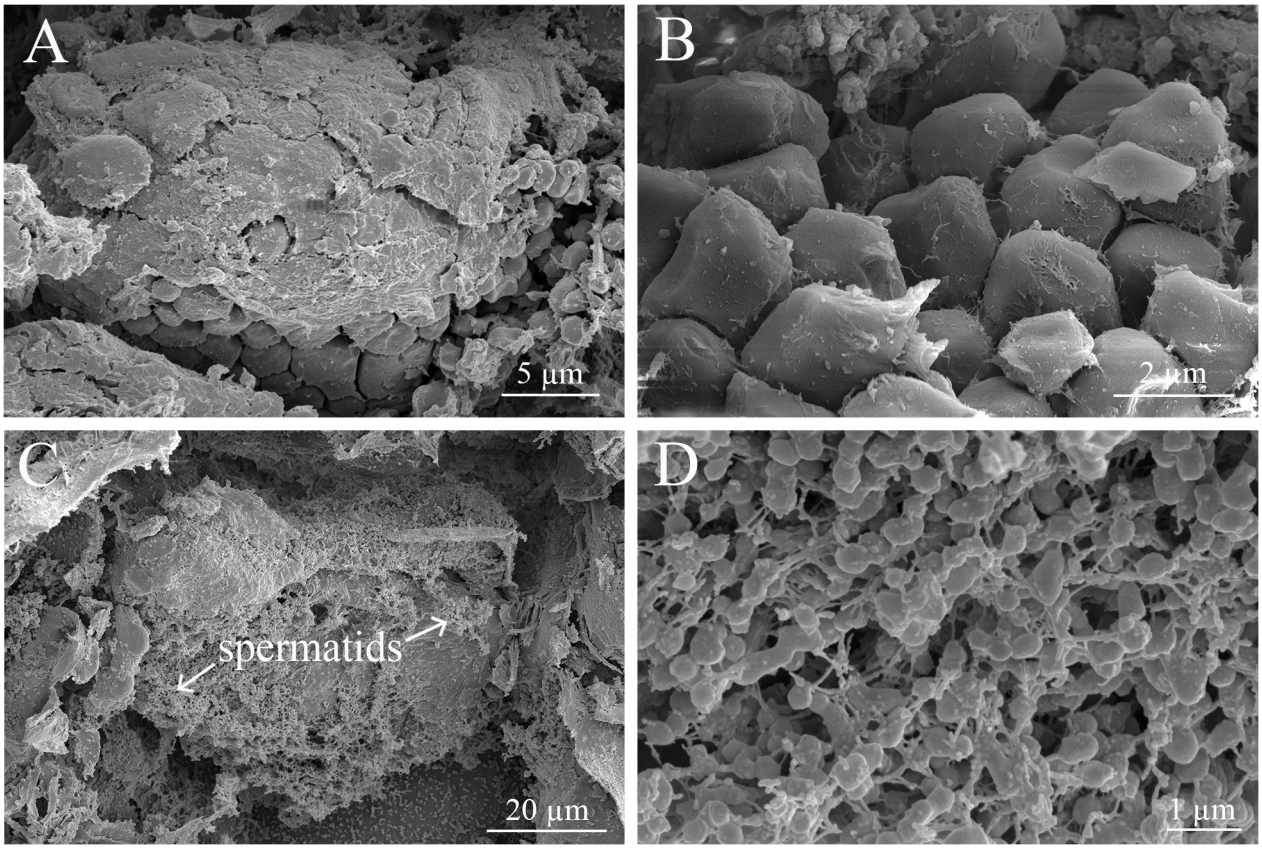

FIGURE 6. *Laubieriopsis tantawan* **sp. nov.**, paratype (PSUZC-POL-0369). A. Oocytes in ovary. B. Same, close-up. C. Spermatids, lateral view. D. Same, close-up.

On the other hand, *L. tantawan* **sp. nov.**, differs from *L. fauchaldi* regarding the number of chaetigers, and details of the integument. The larger specimens of *L. tantawan* **sp. nov.**, have 40–43 chaetigers, less than in *L. fauchaldi* (47 chaetigers). In *L. tantawan* **sp. nov.**, segments are annulated throughout body, whereas in *L. fauchaldi* the body segments are annulated only along its median region, anterior and posterior regions do not have rings.

Laubieriopsis tantawan **sp. nov.**, was more abundant than any other regional species, and the number of chaetigers is not fixed, unlike other species of *Laubieriopsis* from other regions (Petersen 2000; Zhadan & Atroshchenko 2012; Magalhães *et al.* 2014; Salazar-Vallejo *et al.* 2019). It seems that the number of chaetigers is size-dependent in this species because larger specimens have 40–43 chaetigers, and smaller ones have 27–37 chaetigers. The smallest specimen only had 23 chaeigers, and one specimen with less than 20 chaetigers is regarded as a juvenile.

Laubieriopsis tantawan **sp. nov.**, is among the few species recorded from shallow water. Actually, there are only two species: *L. tantawan* **sp. nov.**, from the Gulf of Thailand (50–70 m) and *L. arenicola* from New Zealand (22 m). However, they are found in different depths and differ in several features, as indicated above. We can only anticipate that extending research activities into deeper waters may result in more records.

Key to species of *Laubieriopsis* Petersen, 2000

(Modified after Salazar-Vallejo *et al*. 2019)

1.	Body with 15–16 chaetigers	2
–	Body with ≥20 chaetigers	5
2.	Body with 15 chaetigers.	3
–	Body with 16 chaetigers; genital papilla on chaetiger 6/7	4
3.	Thoracic chaetigers with bidentate acicula..	***L. petersenae*** Magalhães, Bailey-Brock & Rizzo, 2014 (Central Pacific)
–	All chaetigers with tapered acicula…	***L. blakei*** Salazar-Vallejo, Zhadan & Rizzo, 2019 (SE Pacific)
4.	Genital papilla short, globular, granulose	***L. hartmanae*** Levenstein, 1970 (NW Pacific)

–	Genital papilla long, oval, smooth	.. ***L. brevis*** Hartman, 1965 (NW Atlantic)
5.	Body with 20–21 chaetigers	6
–	Body with ≥22 chaetigers	7
6.	Thorax with bidentate acicula….	***L. cabiochi*** Amoureux, 1982 (Eastern Atlantic)
–	Thorax without bidentate acicula, all tapered	.. ***L. verrucosa*** Jimi, Hookabe, Fujimoto, Kise, Ogawa & Tsuchiya, 2023 (Ryukyu Trench, Japan)
7.	Anterior chaetigers with acicula tapered, tips entire	8
–	Anterior chaetigers with acicula bidentate….	***L. norvegica*** Zhadan & Atroschenko, 2012 (Norway)
8.	Anterior and posterior segments entire, not annulated	9
–	Anterior segments annulated	10
9.	Body with 24 chaetigers.	***L. soyoae*** Jimi *in* Jimi *et al*., 2020 (Japan)
–	Body with 47 chaetigers	***L. fauchaldi*** Katzmann & Laubier, 1974 (Mediterranean)
10.	Anterior segments biannulate; body with 23–43 chaetigers	***L. tantawan*** **sp. nov. (**Gulf of Thailand)
–	Anterior segments each with 3–4 rings; body with 25 chaetigers	***L. arenicola*** Riser, 1987 (New Zealand)

Genus *Riseriopsis* Salazar-Vallejo, Zhadan & Rizzo, 2019

Diagnosis. Fauveliopsids with body cylindrical, slightly swollen anteriorly, markedly swollen posteriorly. Anterior and posterior segments short, intersegmental grooves well defined; median segments long. Integument mostly transparent, smooth, with minute papillae mainly near pygidium. Interramal papillae small, usually with a short stalk or sessile. Noto- and neurochaetae include uni- or bidentate acicula, straight or falcate spinulose, and smooth capillaries in anterior and posterior regions. Median chaetigers with one notoaciculum chaeta **and 1–2 capillaries per bundle**. Pygidium non-retractile, often with small papillae, and large, falcate aciculum surpassing pygidial margin. **Genital papilla present in median region at chaetiger 43, on the right side of the body, globular or absent (**modified from Salazar-Vallejo, Zhadan & Rizzo 2019 emended; new features from the present species highlighted in bold modifications to diagnosis).

Riseriopsis chaba sp. nov.

urn:lsid:zoobank.org:act:419014C8-0731-4C7C-94B4-41656CF2404E
Fig. 7

Material examined. Western Pacific, Offshore the Gulf of Thailand. A single specimen, holotype: PSUZC-POL-0384, Sta. GT-CB (9°38'49"N, 101°12'59"E), 11 Sep. 2015, 60 m.

Diagnosis. *Riseriopsis* with 34 chaetigers. First three anterior parapodia with two acicula per bundle. Median region; notopodia with one aciculum and one capillary per bundle, neurochaetae with 1–2 acicula and 1–2 capillaries per bundle, and posterior parapodia, notopodia with 1–2 acicula and one capillary per bundle and neuropodia with one aciculum and one capillary per bundle.

Description. Holotype (PSUZC-POL-0384) small, complete, 3.7 mm long, 0.37 mm wide, 34 chaetigers. Body slender, semi-transparent, divided into three regions: 1) Anterior region (first three chaetigers), segments slightly swollen, bi- or triannulate, wider than those present along abdominal region; 2) Median region (chaetigers 4 to 21), long, multi-annulated segments; and 3) Posterior region (chaetigers 22 to end of body), segment slightly decreasing in length and annulation. Last ten segments biannulate, slightly swollen (Fig. 7). Acicula long, with tips acute; light gold in color along body.

Prostomium and peristomium not seen (retracted). Nuchal organs not seen. Eyes absent (Fig. 7A).

Parapodia biramous throughout. First three chaetigers with two slightly curved acicula per bundle (right side, all chaetae broken), acicula subdistally depressed, and tips blunt. Anterior notochaetae, upper acicula smaller and thinner than lower acicula. Anterior neurochaetae, upper acicula larger and coarser than lower acicula.

Median region from chaetiger 4 to 21 (left side of parapodia, chaetigers 4 to 9, most chaetae broken), notopodia with one aciculum and one capillary per bundle; neuropodia with 1–2 acicula and 1–2 capillaries per bundle.

Posterior region with notopodia with 1–2 thick acicula and one thin capillary per ramus, neuropodia with 1–2 acicula and one capillary per bundle (Fig. 7B).

Interramal papillae very small, short–stalked, closer to notopodia, from chaetiger 1 to end of body. Genital papillae not seen.

Pygidium with two short digitiform lateral anal cirri, and one short, conical ventral papilla; anus ventral (Fig. 7D–E).

Etymology. The species is named after Chaba Petroleum platform in the Gulf of Thailand, where the holotype of this new species was collected. The specific name is in the nominative singular (ICZN 1999, Art. 11.9.1.2).

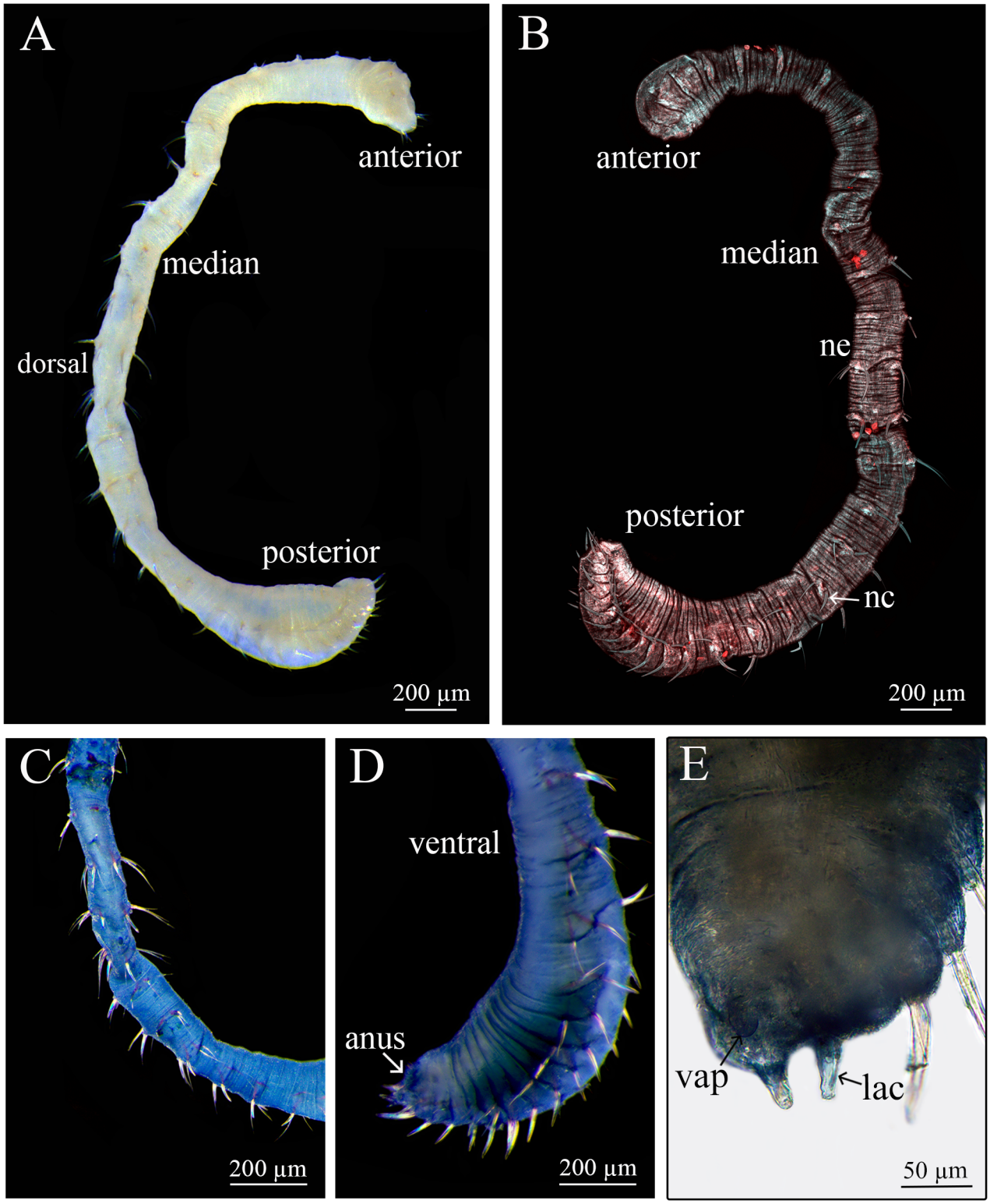

FIGURE 7. *Riseriopsis chaba* **sp. nov.,** holotype (PSUZC-POL-0384), light photographs (A, C–E) and CLSM photograph (B). A. Whole specimen, right lateral view. B. Same, shows multi-annulated body (2D image process with lightning adaptive de convolution for sharp image), left lateral view. C–E, stained with Methyl green. C. Mid region with multi-annulated segments, lateral view. D. Posterior region with biannulate segments, left lateral view. E. Posterior end, ventral view (lac, lateral anal cirrus; ne, neurochaeta; nc, notoaciculum; vap, ventral anal papilla).

Distribution. Gulf of Thailand, living inside fibrous soft tubes in mixed muddy substrates with sand and shell fragments, at 60 m water depth.

Remarks. *Riseriopsis chaba* **sp. nov.**, resembles *R. arabica* from the Arabian Sea, NW Indian Ocean, and *R. plahmuk* **sp. nov.**, from the Gulf of Thailand (see below) because all three species have brownish chaetae in posterior chaetigers (Riser 1987; Salazar-Vallejo *et al.* 2019). However, *R. chaba* **sp. nov.**, differs from *R. arabica* by having anterior parapodia with two acicula per bundle, and lack of capillaries, whereas *R. arabica* has one aciculum and one capillary per bundle (Salazar-Vallejo *et al.* 2019). Moreover, the number of chaetigers also differs; in *R. chaba* **sp. nov.**, there are only 34 chaetigers, less than in *R. arabica* and *R. plahmuk* **sp. nov.**, having 49–87 and 56–106 chaetigers, respectively (Table 2).

Riseriopsis plahmuk sp. nov.

urn:lsid:zoobank.org:act:2E6AC8B1-96A9-4BBD-A317-6E32615CB5C4
Figs 8–12

Material examined. Gulf of Thailand, offshore petroleum concession area. 23 specimens. Holotype, PSUZC-POL-0385, Sta. GT-CA2 (7°39.9'N, 100°37'E), 14 Jul. 2024, 71 m. Twenty two paratypes: PSUZC-POL-0386 (1 spec.), Sta. GT-PMA (9°45'16"N, 101°17'50"E), 16 Jun. 2015, 60 m; PSUZC-POL-0387 (2 specs, 1 on SEM stubs), Sta. GT-PMH (9°47'33"N, 101°18'36"E), 1 Jul. 2018, 60 m; PSUZC-POL-0388 (1 spec. on SEM stub), Sta. GT-SWG (9°22'59"N, 101°21'37"E), 20 Jun. 2018, 50 m; PSUZC-POL-0389 (1 spec.), Sta. GT-MA (10°22'08"N, 101°19'21"E), 2 Apr. 2020, 60 m; PSUZC-POL-0390 (1 spec.), Sta. GT-CB (9°38'49"N, 101°12'59"E), 6 Jul. 2018, 60 m; PSUZC-POL-0391 (1 spec.), Sta. GT-MG (8°37'59"N, 101°32'23"E), 25 Sep. 2019, 60 m; PSUZC-POL-0392 (1 spec.), Sta. GT-TR (9°27'N, 101°32'E), 6 Oct. 2019, 71 m; PSUZC-POL-0393 (1 spec.), Sta. GT-MGD (8°43'N, 101°39'E), 26 Sep. 2020, 60 m; PSUZC-POL-0394 (1 spec.), Sta. GT-SUD (10°40'N, 101°19'E), 19 May 2014, 60 m; PSUZC-POL-0395 (1 spec. on SEM stub), Sta. GT-TWE (10°05'N, 101°27'E), 28 Mar. 2020, 60 m; PSUZC-POL-0396–0397 (3 specs. fixed for DNA analyses), Sta. GT-FU (8°47'N, 101°32'E), 69 m: 26 Sep. 2021 (2 specs., abdominal chaetigers of 2 specs. used and one anterior on SEM stub), 19 Mar. 2022 (1 spec.); PSUZC-POL-0398 (1 spec.), Sta. B04 (7°54.5'N, 101°53.4'E), 5 Jul. 2024, 72 m; PSUZC-POL-0399 (1 fixed for DNA analyses), Sta. B10 (7°54.1'N, 101°53.7'E), 6 Jul. 2024, 73 m; PSUZC-POL-0400 (1 spec. fixed for DNA analyses), Sta. C04 (7°44.9'N, 102°01.7'E), 10 Jul. 2024, 73 m; PSUZC-POL-0401 (1 spec.), Sta. C10 (7°44.6'N, 102°02'E), 12 Jul. 2024, 70 m; PSUZC-POL-0402 (1 spec.), Sta. GT-KPP (9°53'N, 101°26 E), 7 Sep. 2024, 72 m; AM W.57292 (1 spec.), Sta. GT-TWC (10°01'N, 101°28'E), 25 Sep. 2019, 60 m; AM W.57293 (1 spec. fixed for DNA analyses), Sta. B06 (7°54.3'N, 101°53.6'E), 5 Jul. 2024, 72 m; AM W.57294 (1 spec.), Sta. GT-PKW (9°30'N, 101°17'E), 16 Sep. 2024, 67 m.

Diagnosis. *Riseriopsis* with brownish chaetae in posterior chaetigers. First four chaetigers with 2–4 acicula per ramus. Median region with one notoaciculum and one capillary; neuropodia with two acicula and two capillaries; posterior parapodia (last 20 chaetigers), neuropodia with 1–6 acicula and 1–4 capillary chaetae. Living inside scaphopod shells and in fibrous soft tubes.

Description. Holotype longest specimen, complete, 37.6 mm long, 0.3 mm wide (at chaetiger 1), 95 chaetigers (Fig. 8A). Twenty paratypes: complete ones 10.7–51.9 mm long, 0.15–0.30 mm wide (at chaetiger 1), 56–106 chaetigers. Body long with three regions: 1) Anterior region with 4 chaetigers (chaetigers 1–4); 2) Median region or abdomen with 53 chaetigers, from chaetiger 5 to chaetiger 57 (37–70 chaetigers in paratypes); and 3) Posterior region with 38 chaetigers (27–32 chaetigers in paratypes); stiff, slightly macerated, progressively widened into a bulbous, swollen posterior region (Figs 8A–C; 10D); integument finely rugose with small papillae; segments multi-annulate, especially in abdominal region. Color in alcohol light tan to light brown, yellowish along posterior chaetigers, semitransparent (Fig. 8A–B). They are sessile, living inside scaphopod shell and fibrous soft tubes.

Prostomium short, fused with prostomium, anterior end invaginated (Fig. 9A–C).

Acicula long, spinulose, with tips acute (Figs 9A–D; 10A–E); pale in anterior chaetigers, light brown or golden along median and posterior chaetigers. Capillaries in notopodia, both median and posterior regions with smooth thin capillaries; in medial neuropodia aristae, posterior region with smooth thin capillaries.

Anterior region (chaetigers 1–4) with notopodia with 2–3 acicula per bundle (two per bundle in paratypes); neuropodia with two large acicula per bundle (2–4 in paratypes) (Fig. 9A–B, D).

Median region 53 chaetigers (37 chaetigers in small paratype and up to 70 chaetigers in large paratype), start from chaetigers 5 in all specimens; multi-annulated chaetigers, with segments about three times as long as wide in

anterior of abdomen (Fig. 10A). Notopodia with one aciculum and one–two capillaries per bundle, neuropodia with two acicula and two capillaries per bundle (Figs 9A; 10A–C).

Posterior region from chaetigers 58, notopodia each with 1–4 acicula accompanied with 1–3 long, thin capillaries (Fig. 10D); chaetigers 58–69, notopodia with 2 acicula accompanied with 2 capillaries; chaetigers 70–77, notopodia with 3 acicula accompanied with 2 capillaries; chaetiger 78, notoacicula increasing to 4 acicula accompanied with 3 capillaries, chaetigers 79–91, notopodia with 3 acicula accompanied with 2 capillaries; last two chaetigers with one aciculum and one capillary. Neuropodia with 1–5 acicula accompanied with 1–5 capillaries (1–6 acicula accompanied with 1–5 capillaries in paratypes); fewer spines on smallest specimens (Fig. 10D–E); chaetigers 58–93, neuropodia with 3–5 acicula accompanied with 3–5 capillaries; last two chaetigers, neuropodia with 1–2 acicula accompanied with one capillary.

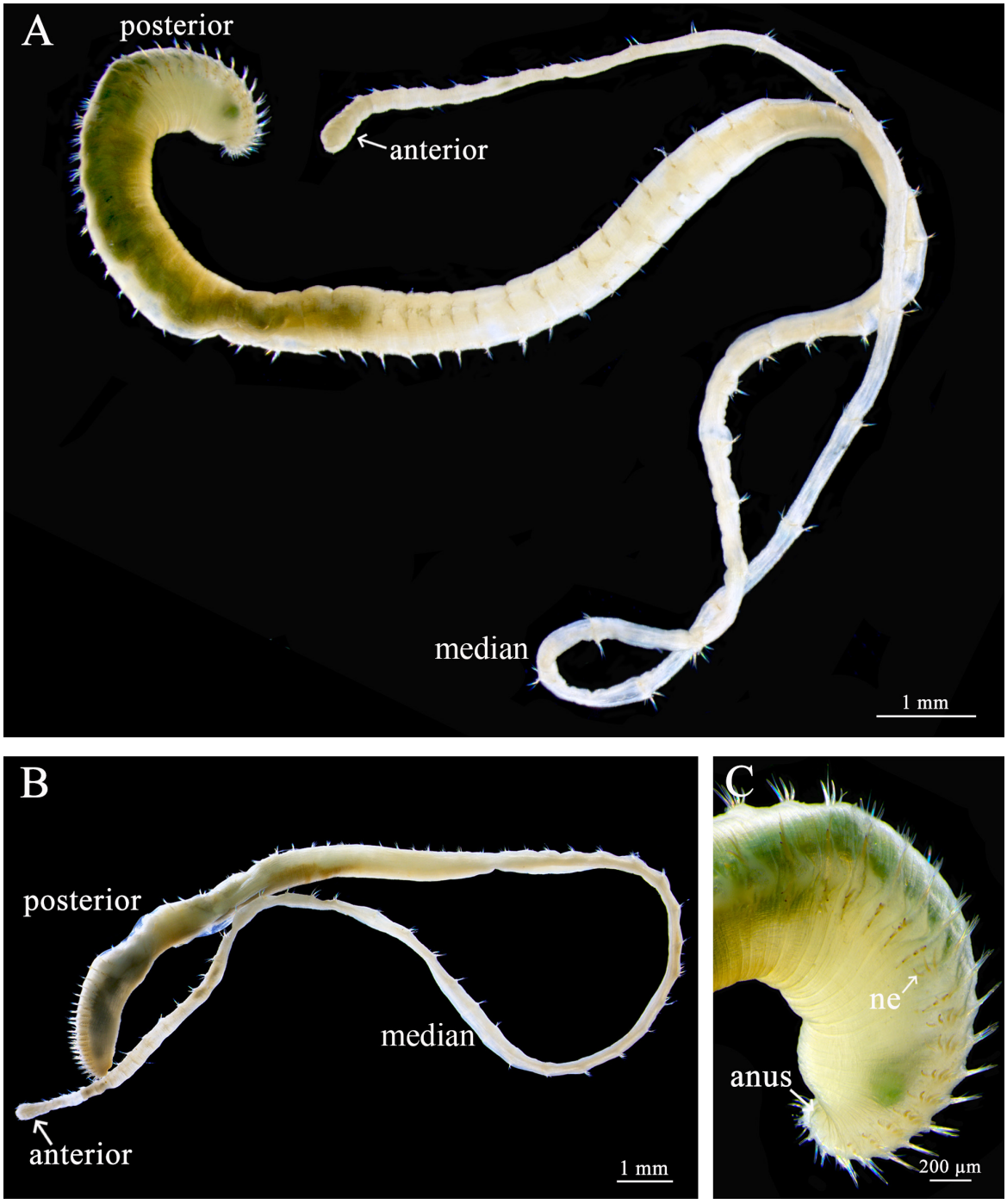

FIGURE 8. *Riseriopsis plahmuk* **sp. nov.**, complete specimens (A, C, PSUZC-POL-0385, holotype; B, PSUZC-POL-0390). A. Whole specimen, left lateral view. B. Paratype, right lateral view. C. Holotype, posterior region, left lateral view (ne, neurochaeta).

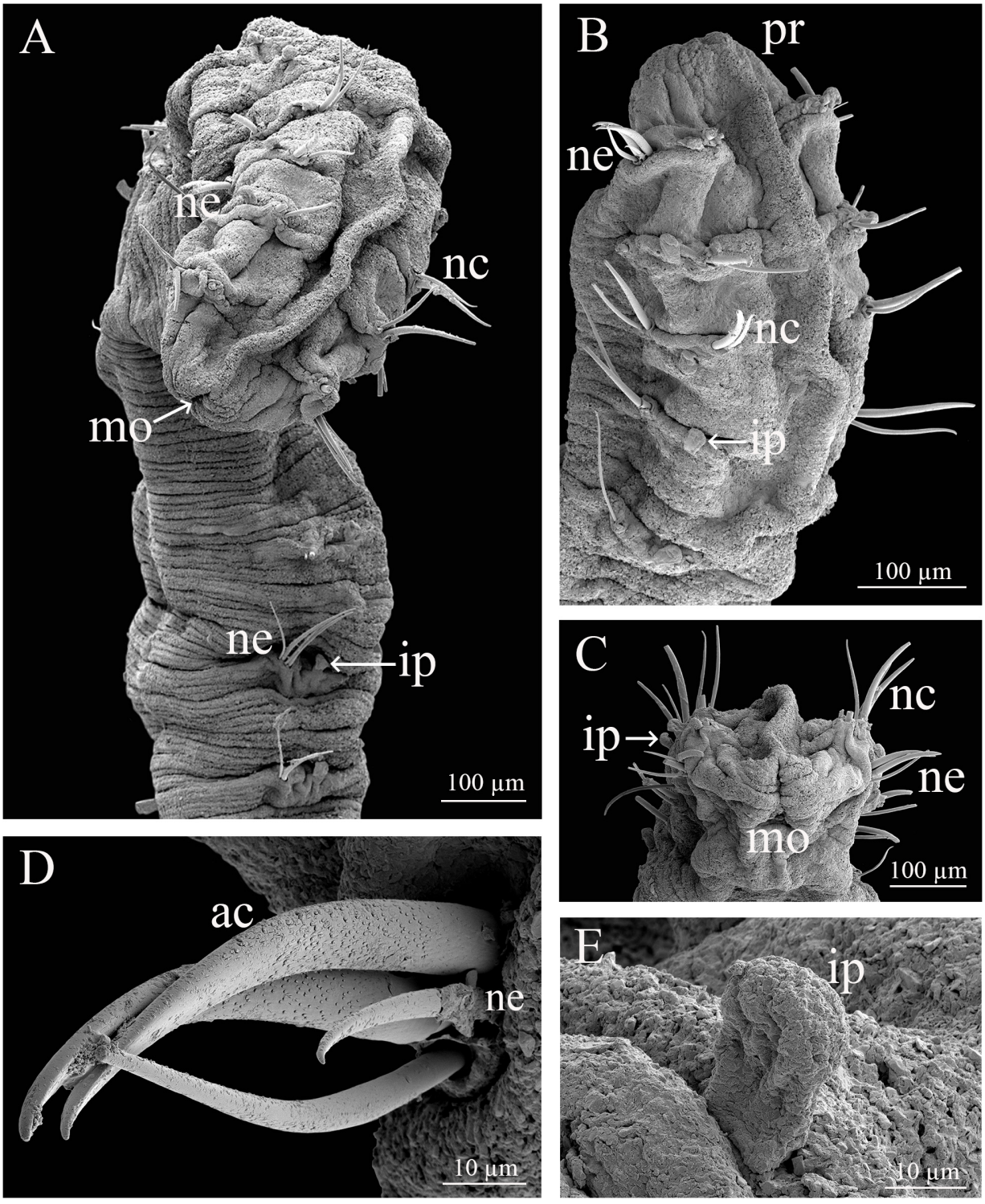

FIGURE 9. *Riseriopsis plahmuk* **sp. nov.**, paratype (PSUZC-POL-0388). A. Anterior region, front view. B. Anterior region, oblique dorsolateral view. C. Anterior end, frontal view. D. First left neuropodium, close-up of acicula, lateral view. E. Close-up of anterior interramal papilla (ac, aciculum; ip, interramal papilla, nc, notochaeta; ne, neurochaeta; mo, mount; pr, prostomium).

Posterior region swollen, wider than most of body, tapered into a blunt cone; segments slightly wider than long, progressively wider towards posterior end (Figs 8A–C; 10D). Pre-pygidial chaetiger (last chaetiger), noto- and neuropodia having one aciculum and one capillary per bundle.

Pygidium with two short lateral anal cirri (37 µm in length after SEM of one paratype) and one short ventral papilla under anus (Fig. 10F).

Reproduction. It is hermaphrodite because one SEM specimen was dissected and small oocytes and spermatids were found in the body along posterior chaetigers (Fig. 11A–F). Oocytes found next to the body wall, more abundant near parapodia, each about 0.9–2.7 μm in diameter (Fig. 11A–C). Spermatids are very small, spherical, barely modified into irregular ti-shape, each about 300–430 nm in diameter (Fig. 11A, D–E). Genital papilla present (Fig. 12A–B), globular (139 μm in length, 73 μm wide) on chaetiger 43 (the right side of body, near notopodia) in holotype, with small papillae located above parapodia, slightly longer than parapodia length, longer than notoaciculum of chaetiger 43 (139:123 μm), not seen in paratypes.

Etymology. The species is named after Plahmuk Petroleum platform where most specimens of this new species were collected. The specific epithet "plahmuk" is the Thai word for squid. The specific name is in the nominative singular (ICZN 1999, Art. 11.9.1.2).

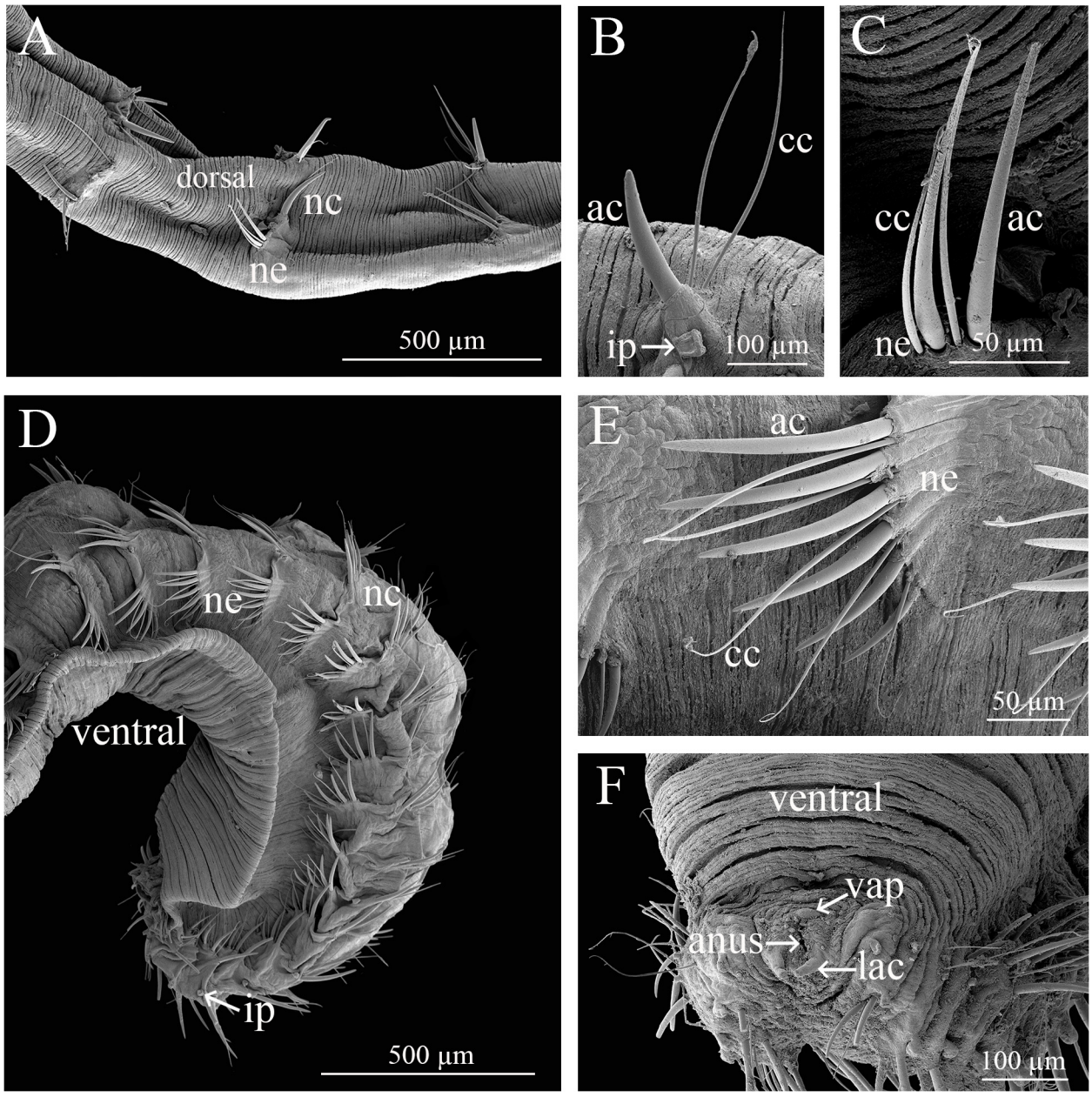

FIGURE 10. *Riseriopsis plahmuk* **sp. nov.,** paratypes (A–C, PSUZC-POL-0395; D–F, PSUZC-POL-0388). A. Median parapodia, dorsal view. B. Close-up notochaetae, lateral view. C. Close-up neurochaetae, lateral view. D. Posterior region, left lateral view. E. Same, close up of neurochaetae. F. Posterior end, frontal view (ac, aciculum; cc, capillary chaeta; ip, interramal papilla; lac, lateral anal cirrus; nc, notochaeta; ne, neurochaeta; vap, ventral anal papilla).

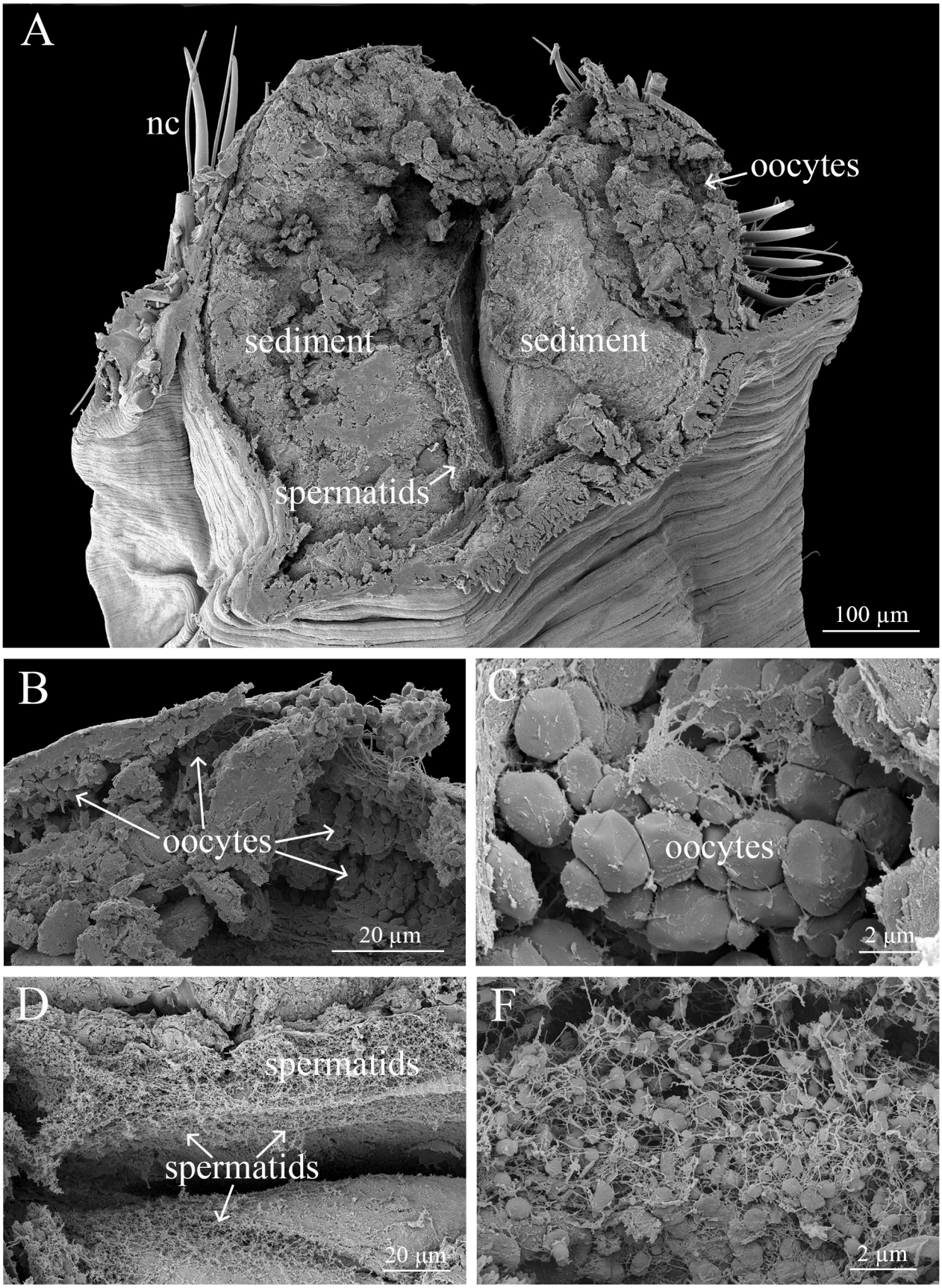

FIGURE 11. *Riseriopsis plahmuk* **sp. nov.**, paratype (PSUZC-POL-0388). A. Posterior region, cross-section, frontal view. B. Oocytes in ovary. C. Same, close-up. D. Spermatids in testis. E. Same, close-up (nc, notochaeta).

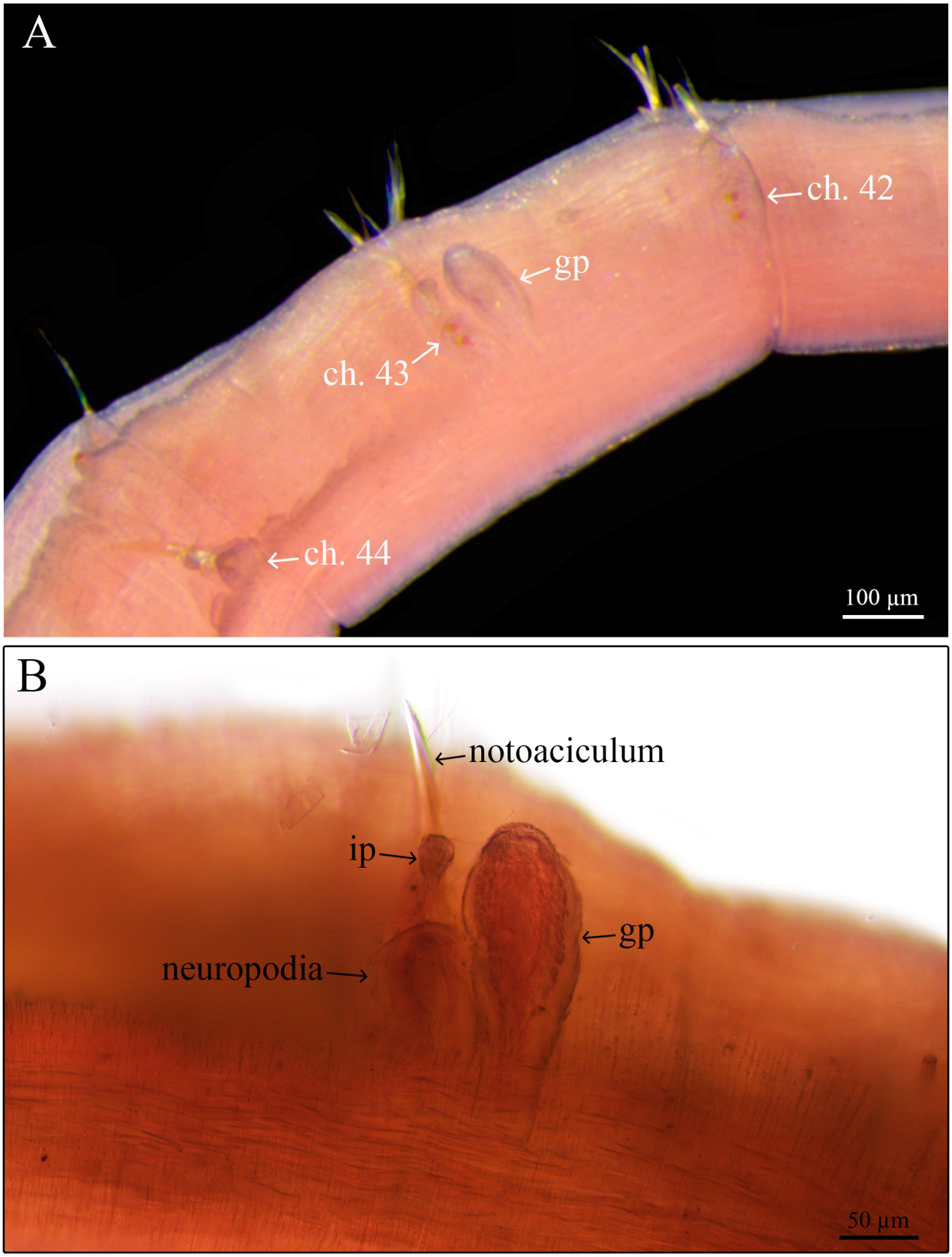

FIGURE 12. *Riseriopsis plahmuk* **sp. nov.**, holotype (PSUZC-POL-0385), light photographs stained with Shirlastain-A. A. Chaetigers 42–44, right side, lateral view. B. Close-up genital papilla, lateral view (ch. 42, chaetiger 42; ch. 43, chaetiger 43; ch. 44, chaetiger 44; ip, interramal papilla; gp, genital papilla).

Genetic data. The COI sequence of *R. plamhuk* **sp. nov.**, was 485 bp (GenBank accession code OQ544431 and OQ544430) were obtained and calculated for the average nucleotide composition: 21.4% A, 16.0% C, 26.5% G, and 36.1% T, showing a high A+T bias (57.5%). Nucleotide substitutions occurred at 2 positions within the partial COI fragment and all positions were singleton variables leading to 0.4% intraspecific genetic distances for this species.

Distribution. Gulf of Thailand, living inside fibrous soft tubes in mixed muddy substrates with sand and shell fragments, at 60 m water depth.

Remarks. *Riseriopsis plahmuk* **sp. nov.**, belongs to the group of species having posterior chaetigers with brownish chaetae. It is diagnosed by the following combination of characters: first four anterior chaetigers with 2–4 acicula per bundle; in medial region, notopodia with one aciculum and 1–2 capillaries per bundle, and neuropodia with two acicula and two capillaries per bundle; and posterior region, notopodia with up to five acicula with three capillaries; neuropodia with up to six acicula and five capillaries.

Riseriopsis plahmuk **sp. nov.**, resembles *R. arabica* and *R. chaba* **sp. nov.**, by having brownish chaetae along posterior chaetigers and living inside scaphopod shells. However, *R. plahmuk* **sp. nov.**, differs from *R. arabica* because its anterior parapodia have 2–4 acicula per bundle, higher than *R. arabica* which has anterior parapodia with only one aciculum and one capillary per ramus.

Moreover, the chaetal pattern in medial and posterior chaetigers are different. In median region, *R. plahmuk* **sp. nov.**, has neurochaetae with two acicula and two capillaries per bundle, higher than *R. arabica* which has only one aciculum and two capillaries per bundle. While in posterior chaetigers, *R. plahmuk* **sp. nov.**, has up to 6 acicula and 5 capillaries per bundle, higher than *R. arabica* and *R. chaba* **sp. nov.**, which have 1–3 acicula and 1–3 capillaries, and 1–2 acicula and one capillary per bundle, respectively (Table 2).

Additional, both species have been found in different water depths, and region; *R. arabica* was collected from the Arabian Sea, Indian Ocean, in 110–315 m water depth. Whereas *R. plahmuk* **sp. nov.**, was collected from the Gulf of Thailand, Western Pacific in 50–70 m water depths.

Riseriopsis plahmuk **sp. nov.**, differs from *R. confusa* Thiel, Purschke & Böggemann, 2011 from Angola and Guinea Basins and *R. santosae* Salazar-Vallejo, Zhadan & Rizzo, 2019 from off Rio de Janeiro, Brazil because it is sessile species, living inside scaphopod shells and in fibrous soft tubes, and by having posterior chaetigers with brownish–golden chaetae. In comparison, *R. confusa* and *R. santosae* are free living and their posterior chaetigers have hyaline chaetae (Thiel *et al.* 2011; Salazar-Vallejo *et al.* 2019). Moreover, median chaetigers of *R. plahmuk* **sp. nov.**, are multi-annulated and notopodia have one aciculum and one–two capillaries per bundle whereas in *R. santosae* segments are bi- or tri-annulated and there is only one aciculum per bundle in medial notopodia (Salazar-Vallejo *et al.* 2019).

Key to species of *Riseriopsis* Salazar-Vallejo, Zhadan & Rizzo, 2019

(Modified from Salazar-Vallejo, Zhadan & Rizzo, 2019)

1. Posterior chaetigers with hyaline chaetae; free-living 2
– Posterior chaetigers with brownish–golden chaetae; often in scaphopod shells 3
2. Notopodia of median region with one aciculum and one capillary per bundle . . . . . ***R. confusa*** Thiel, Purschke & Böggemann, 2011 (Angola and Guinea Basins)
– Notopodia of median region with only one aciculum per bundle . . . . . ***R. santosae*** Salazar-Vallejo, Zhadan & Rizzo, 2019 (off Rio de Janeiro, Brazil)
3. Anterior parapodia with one aciculum and one capillary per bundle, notopodia of median region with one aciculum and one capillary . . . . . ***R. arabica*** Hartman, 1976 (Arabian Sea, NW Indian)
– Anterior parapodia with 2–4 acicula per bundle 4
4. Body short (34 chaetigers); median region with neuropodia with 1–2 acicula and 1–2 capillaries per bundle . . . . . ***R. chaba*** **sp. nov.** (Gulf of Thailand, Western Pacific)
– Body long (56–102 chaetigers); notopodia of posterior region with one–five acicula and one–four capillaries per bundle . . . . . ***R. plahmuk*** **sp. nov.** (Gulf of Thailand, Western Pacific)

General discussion

We have shown that the Thailand seas contain undescribed species belonging to different families. In this contribution, we are describing four *Fauveliopsis* species from subtidal depths sediments (50–80 m), and we think many other

unknown species will be discovered as we progress in the study of the already collected material, as well as after surveying deeper waters.

On the other hand, we have noted for *L. tantawan* **sp. nov.**, and *R. plahmuk* **sp. nov.**, the presence of abundant cells that we have regarded as oocytes. However, after their small size, we think they must be in the early previtellogenic phase (Eckelbarger 2006) such that the cell contents include solely the nucleus. Egg-size has a long history of being related to early development pattern, but because even smallest oocytes in marine invertebrates are around 70 μm (Wray & Raff 1991; Chen *et al*. 2008; Belal 2012), far larger than what we have regarded as oocytes, it is enigmatic how large can oocytes become in these two species, and which development pattern they would undertake after fertilization. The early reproduction biology of Fauveliopsids is certainly a subject worthy of further interest for our colleagues in the region, or elsewhere.

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