Two new species of *Notodasus* Fauchald, 1972 (Annelida: Capitellidae) from the Central Indo-Pacific region (#36363)

First submission

Guidance from your Editor

Please submit by **13 Jun 2019** for the benefit of the authors (and your $200 publishing discount).

Structure and Criteria
Please read the 'Structure and Criteria' page for general guidance.

Custom checks
Make sure you include the custom checks shown below, in your review.

Raw data check
Review the raw data. Download from the materials page.

Image check
Check that figures and images have not been inappropriately manipulated.

Privacy reminder: If uploading an annotated PDF, remove identifiable information to remain anonymous.

Files

Download and review all files from the materials page.

9 Figure file(s)
3 Table file(s)

Custom checks

New species checks

- Have you checked our new species policies?
- Do you agree that it is a new species?
- Is it correctly described e.g. meets ICZN standard?

Structure and Criteria

Structure your review

The review form is divided into 5 sections. Please consider these when composing your review:

1. **BASIC REPORTING**
2. **EXPERIMENTAL DESIGN**
3. **VALIDITY OF THE FINDINGS**
4. General comments
5. Confidential notes to the editor

You can also annotate this PDF and upload it as part of your review

When ready submit online.

Editorial Criteria

Use these criteria points to structure your review. The full detailed editorial criteria is on your guidance page.

BASIC REPORTING

- Clear, unambiguous, professional English language used throughout.
- Intro & background to show context. Literature well referenced & relevant.
- Structure conforms to PeerJ standards, discipline norm, or improved for clarity.
- Figures are relevant, high quality, well labelled & described.
- Raw data supplied (see PeerJ policy).

EXPERIMENTAL DESIGN

- Original primary research within Scope of the journal.
- Research question well defined, relevant & meaningful. It is stated how the research fills an identified knowledge gap.
- Rigorous investigation performed to a high technical & ethical standard.
- Methods described with sufficient detail & information to replicate.

VALIDITY OF THE FINDINGS

- Impact and novelty not assessed. Negative/inconclusive results accepted. *Meaningful* replication encouraged where rationale & benefit to literature is clearly stated.
- All underlying data have been provided; they are robust, statistically sound, & controlled.
- Speculation is welcome, but should be identified as such.
- Conclusions are well stated, linked to original research question & limited to supporting results.

Standout reviewing tips

The best reviewers use these techniques

Tip	*Example*
Support criticisms with evidence from the text or from other sources	*Smith et al (J of Methodology, 2005, V3, pp 123) have shown that the analysis you use in Lines 241-250 is not the most appropriate for this situation. Please explain why you used this method.*
Give specific suggestions on how to improve the manuscript	*Your introduction needs more detail. I suggest that you improve the description at lines 57- 86 to provide more justification for your study (specifically, you should expand upon the knowledge gap being filled).*
Comment on language and grammar issues	*The English language should be improved to ensure that an international audience can clearly understand your text. Some examples where the language could be improved include lines 23, 77, 121, 128 – the current phrasing makes comprehension difficult.*
Organize by importance of the issues, and number your points	*1. Your most important issue* *2. The next most important item* *3. …* *4. The least important points*
Please provide constructive criticism, and avoid personal opinions	*I thank you for providing the raw data, however your supplemental files need more descriptive metadata identifiers to be useful to future readers. Although your results are compelling, the data analysis should be improved in the following ways: AA, BB, CC*
Comment on strengths (as well as weaknesses) of the manuscript	*I commend the authors for their extensive data set, compiled over many years of detailed fieldwork. In addition, the manuscript is clearly written in professional, unambiguous language. If there is a weakness, it is in the statistical analysis (as I have noted above) which should be improved upon before Acceptance.*

Two new species of *Notodasus* Fauchald, 1972 (Annelida: Capitellidae) from the Central Indo-Pacific region

Junhui Lin [Corresp., 1], **María Elena García-Garza** [2], **Ucu Yanu Arbi** [3], **Jianjun Wang** [Corresp. 1]

[1] Third Institute of Oceanography, Ministry of Natural Resources, Xiamen, Fujian Province, China

[2] Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León, Nuevo León, Mexico

[3] Research Center for Oceanography, Indonesian Institute of Sciences, Jakarta, None Selected, Indonesia

Corresponding Authors: Junhui Lin, Jianjun Wang
Email address: linjunhui@tio.org.cn, wangjianjun220@tio.org.cn

Notodasus Fauchald, 1972 is a small genus of the polychaete family Capitellidae, including ten described species worldwide. The genus is unusual in the Central Indo-Pacific, and there is no taxonomic record of *Notodasus* in this area. In this study, two new species of *Notodasus* are described and illustrated herein, namely *Notodasus celebensis* sp. nov. and *Notodasus chinensis* sp. nov. The former species, collected from the mixed-species seagrass beds in the Indonesian island of Sulawesi, is mainly characterized by the longitudinally striated epithelium on thoracic segments and the completely separated notopodial lobes. The latter species, obtained from coastal waters off southern China, differs from its congeners in the genus with the following characteristcics: tessellated epithelium present on anterior thorax as well as on the dorsum of chaetigers 11–12, notopodial lobes fused and chaetal fascicles almost touching each other in anterior abdomen, and branchial pores evident from anterior abdomen. Comparisons are made with closely related species in this paper, and a revised key is provided to all described *Notodasus* species. The discoveries of the two new species represent the first record of *Notodasus* in this area and expand the distribution range of the genus.

Two new species of *Notodasus* Fauchald, 1972 (Annelida: Capitellidae) from the Central Indo-Pacific region

Junhui Lin[1], María Elena García-Garza[2], Ucu Yanu Arbi[3], Jianjun Wang[1]

[1] Third Institute of Oceanography, Ministry of Natural Resources, Xiamen, Fujian, China
[2] Laboratorio de Biosistemática, Facultad de Ciencias Biológicas, Universidad Autónoma de Nuevo León, Nuevo León, México
[3] Research Center for Oceanography, Indonesian Institute of Sciences, Jakarta, Indonesia

Corresponding Authors:
Junhui Lin[1], linjunhui@tio.org.cn
Jianjun Wang[1], wangjianjun220@tio.org.cn
178[#] Daxue Road, Xiamen, Fujian Province, 361005, China

Abstract

Notodasus Fauchald, 1972 is a small genus of the polychaete family Capitellidae, including ten described species worldwide. The genus is unusual in the Central Indo-Pacific, and there is no taxonomic record of *Notodasus* in this area. In this study, two new species of *Notodasus* are described and illustrated herein, namely *Notodasus celebensis* sp. nov. and *Notodasus chinensis* sp. nov. The former species, collected from the mixed-species seagrass beds in the Indonesian island of Sulawesi, is mainly characterized by the longitudinally striated epithelium on thoracic segments and the completely separated notopodial lobes. The latter species, obtained from coastal waters off southern China, differs from its congeners in the genus with the following characteristcics: tessellated epithelium present on anterior thorax as well as on the dorsum of chaetigers 11 and 12, notopodial lobes fused and chaetal fascicles almost touching each other on anterior abdomen, and branchial pores evident from anterior abdomen. Comparisons are made with closely related species in this paper, and a revised key is provided to all described *Notodasus* species. The discoveries of the two new species represent the first record of *Notodasus* in this area and expand the distribution range of the genus.

Introduction

Polychaetes, known as an ecologically important taxon of benthic macrofauna, are frequently found and numerically dominated in marine surveys. They exhibit high taxonomic diversity with around over 14,000 described species worldwide (Hutchings & Fauchald, 2000). Capitellidae Grube, 1862 is a family with approximately 200 described species, represented by 43 genera (García-Garza, de León-González & Tovar-Hernández, 2019). This family is usually associated with organically enriched and disturbed sediment (Magalhães & Blake, 2017), and as such, some species can be used as environmental indicators (Pearson & Rosenberg, 1978; Reish, 1980; Warren, 1991). Although extensive taxonomic studies on capitellid polychaetes have been carried out, correct identification of capitellid species is fairly challenging due to their simple morphology and the change in chaetal arrangement during ontogeny (Blake, 2000; Hutchings, 2000). With the advancements in high-resolution microscopes and molecular techniques, the taxonomy of capitellid polychaetes has been extensively improved, and additional 44 new species have been added to the family since 2000, based on the statistics from WoRMS (Read & Fauchald, 2018).

Notodasus Fauchald, 1972 is one of the least studied capitellid genera for most seas of the world's ocean, which may be due to the fact that the majority of *Notodasus* species (six out of ten species) were so far described from the coasts of North America. The genus was initially established by Fauchald (1972) for type species *Notodasus magnus* from the Gulf of California, mainly characterized by the presence of only capillaries on all 11 thoracic chaetigers as well as on first two abdominal chaetigers. Recently, García-Garza et al. (2009) reviewed the genus by re-examining type materials from museums and described four ~~more~~ new species. In this review, the authors also proposed more diagnostic ~~characteristics~~ to differentiate species within the genus, including the epithelial texture of thorax, the degree of fusion of notopodial lobes ~~in~~ on anterior abdomen, the shape of hooded hooks, size of abdominal lateral organs, and the methyl green staining (Magalhães & Blake, 2017). *Notodasus* closely resembles *Dodecaseta*, the latter genus erected by McCammon & Stull, 1978 and its generic definition expanded by Green (2002). These two genera overlap in generic diagnosis, and the minor morphological differences are that the former has the first two abdominal chaetigers with only capillaries while the latter bears the first one or two abdominal chaetigers with only capillaries. Recently, García-Garza et al. (2017) regarded *Dodecaseta* as a junior synonym of *Notodasus*, due to the high morphological similarity between these two genera. To date, 10 valid species are known in the genus (Fig. 1), and they are described from several localities: 6 species recorded from the ~~coasts of~~ North America, namely *N. dexterae* Fauchald, 1973, *N. harrisae* García-Garza et al., 2009, *N. hartmanae* García-Garza et al., 2009, *N. magnus* Fauchald, 1972, *N. oraria* (McCammon & Stull, 1978), and *N. salazari* García-Garza et al., 2009; 2 species found in the Andaman Sea, Thailand, namely *N. eibyejacobseni* (Green, 2002) and *N. fauchaldi* (Green, 2002); *N. arenicola* Hartmann-Schröder, 1992 and *N. dasybranchoides* Magalhães & Bailey-Brock, 2012 described from Ascension Island in the central Atlantic Ocean and the Hawaii Islands, respectively.

~~Currently, full undertandings of~~ the actual species diversity within the genus ~~in the world's oceans~~ and ~~the~~ its distribution range ~~of the genus~~ remain an open question, since the records of *Notodasus* species were only limited to ~~several~~ a few localities. ~~In~~ On the Indo-Pacific, *Notodasus* is an unusual ~~and least known~~ and poorly studied until now capitellid genera. Prior to this study, *Notodasus* species were only taxonomically recorded in the Andaman Sea in the western part and in the Hawaii Islands in the eastern part of the Indo-Pacific. ~~In~~ For this study, ~~the material~~ specimens of the genus was collected from the southern coasts of China (Fig. 2A) and mixed-species seagrass beds ~~in~~ among the Indonesian island of

Sulawesi (Fig. 2B), ~~respectively,~~ representing the first occurrence of *Notodasus* in Indonesian ~~waters~~ and Chinese waters. The taxonomic study of the material ~~yields~~ made possible the identification of two new species, described and illustrated herein. Detailed comparisons are made with closely related species. This study serves as a new contribution to unveil the hidden diversity of the genus *Notodasus* in the world's oceans. The ~~discovery~~ the identification of the two new species also allows us to better understand the geographical distribution of the genus. A revised key to all *Notodasus* species is also provided in this paper.

Materials & Methods

The *Notodasus* specimens were collected from the southern coasts of China (Fig. 2A) during 2017–2018 and mix-species seagrass beds of northern Sulawesi Island, Indonesia (Fig. 2B) in May 2014, respectively (for more detail, see Table 1). Indonesian specimens examined in this study were collected with permission of the Ministry of Research and Technology of the Republic of Indonesia (permit no. 135/SIP/FRP/SM/V/2014). In Indonesia, a PVC corer (10 cm in inner diameter) was used to collect sediment samples which were washed through a 0.5 mm later sieve in the field. In China, the *Notodasus* specimens were collected by means of a grab sampler (surface area 0.05 m^2), and then sieved through a 0.5 mm sieve on board. All retained specimens were fixed with 7% diluted formalin in seawater. In the lab, *Notodasus* specimens were transferred to 70% ethanol.

Light microscope images were obtained by means of a Leica M205A stereomicroscope equipped with Leica DFC 550 digital camera. The structure of hooded hooks was observed under a light microscope using oil emersion (Axio Imager Z2; ZEISS, Oberkochen, Germany). A Scanning Electron Microscopy (SEM) analysis was conducted to observe the ultrastructure of abdominal hooks. In brief, the specimens were placed in an ultrasonic chamber with distilled water for 60 seconds to remove the hoods of the abdominal hooks. The treated specimens were dehydrated and then dried in a drying oven at 60℃ for 5 minutes. Finally, specimens were mounted on a stub and coated with gold. SEM observations were performed using ZEISS SUPRA 55 SAPPHIRE at Xiamen University, China. The methyl green staining pattern (MGSP) was used to identify the distribution of glandular areas, following the protocol of Warren et al. (1994). Morphological terminology and the characters used for classification follow those of Warren et al. (1994).

The type materials of several *Notodasus* species were reviewed from the Natural History Museum of Los Angeles County Museum-Allan Hancock Foundation (LACM-AHF) and the Colección Poliquetologica de la Universidad Autonoma de Nuevo León (UANL). The type materials of the two new species described herein are deposited in the Third Institute of Oceanography, Ministry of Natural Resources, Xiamen, China.

Nomenclatural acts

The electronic version of this article in Portable Document Format (PDF) will represent a published work according to the International Commission on Zoological Nomenclature (ICZN), and hence the new names contained in the electronic version are effectively published under that Code from the electronic edition alone. This published work and the nomenclatural acts it contains have been registered in ZooBank, the online registration system for the ICZN. The ZooBank LSIDs (Life Science Identifiers) can be resolved and the associated information viewed through any standard web browser by appending the LSID to the prefix http://zoobank.org/. The LSID for this publication is: urn:lsid:zoobank.org:pub:6342781B-D33C-4FF8-85BD-37D185FC2403. The online version of this work is archived and available from the following digital repositories: PeerJ, PubMed Central and CLOCKSS.

Results

Systematic account

Class Polychaeta *Grube, 1850*

Family Capitellidae *Grube, 1862*

Genus *Notodasus Fauchald, 1972*

Notodasus Fauchald, 1972: 246–247, Pl.51 fig a–c; Fauchald, 1977: 34; García-Garza, Hernández-Valdez & de León-González, 2009: 810; García-Garza & de León-González, 2011: 35; Magalhães & Bailey-Brock, 2012: 28; García-Garza, de León-González & Harris, 2017: 94, fig. 1; Magalhães & Blake, 2017.

Dodecaseta McCammon & Stull, 1978: 40–43, figs 1–3; Green, 2002: 311.

Type species. *Notodasus magnus* Fauchald, 1972

***Notodasus celebensis* sp. nov. Lin, García-Garza & Arbi**

urn:lsid:zoobank.org:act:A8E8DAA2-650A-4F10-AD10-3799C447670B

Figs. 3A–G, 4A–G, 5G– H

Etymology. The specific name is derived from the type locality, Sulawesi Island. Celebes is the historical name for modern Sulawesi.

Holotype. TIO-BTS-Poly-101 (sta. SGT3-3), Tanjung Merah Village, the east coast of North Sulawesi (Fig. 2), Indonesia, [1°23′41″N, 125°06′43″E], 1 m depth, fine sand, incomplete, coll. Junhui Lin, May 2014.

Paratype. TIO-BTS-Poly-102 (sta. SGT1-2), one specimen, Kema Village, the east coast of North Sulawesi, Indonesia, [1°23′11″N, 125°06′08″E], 1 m depth, fine sand, incomplete, coll. Junhui Lin, May 2014; TIO-BTS-Poly-103, one specimen, same information as TIO-BTS-Poly-102.

Comparative material examined. *N. magnus* holotype (LACM-AHF POLY 031), SW Punta Arena, Carmen Island, Gulf of California, from [25°46′00″N, 111°15′00″W] to [25°49′40″N, 111°15′30″W], 29–35 m, 18 March 1949; *N. fauchaldi* paratype (LACM-AHF POLY 2100) st. E-20 m/BC, Andaman Sea, Thailand, [8°30'N, 98°12'E], 21 m, 22 April 1996, muddy sand, coll. SB, ChA; *N. harrisae* holotype (UANL-6510), Baja California Sur, La Paz Bay, El Tesoro beach, [24°15′16.1″N, 110°18′55.4″W], 1 m, 1 August 2006, coll. MEGG and JALG.

Distribution. Currently known from the Sulawesi Island, Indonesia.

Diagnosis. Prostomium rounded, with digitate palpode. Thorax having one achaetous peristomium and 11 chaetigers with bilimbate capillary chaetae only. First chaetiger biramous. First two abdominal chaetigers with only capillary chaetae in both rami, thereafter, with hooded hooks only. Longitudinally striated epithelium through chaetiger 8. Notopodial lobes completely free along the abdomen. Multidentate hooded hooks with four rows of small teeth above main fang. Lateral organs present on thorax and abdomen.

Description

All specimens incomplete. Holotype anterior fragment with 40 chaetigers, 41.0 mm long, 2.8 mm wide in abdomen. Paratypes ranging from 20 mm long by 2.2 mm wide (35 chaetigers) to 25.5 mm long by 2.5 mm wide (39 chaetigers). Body slightly coiled. Color in alcohol yellowish white (Fig. 3A). The dorsal epithelium of anterior abdomen slightly damaged. Prostomium rounded, with digitate palpode (Fig. 3B, C). Everted proboscis papillated in paratype (TIO-BTS-Poly-103). Eyespots not observed. Peristomium achaetous, wider than long, same length as first

chaetiger, but narrower. Peristomium and first six chaetigers with epithelium longitudinally striated (Figs. 3B–D, 4A–B, 5G), chaetigers 7–8 slightly striated, following segments smooth.

Thorax with 11 chaetigers, exclusively with bilimbate capillary chaetae in both rami (Fig. 4A). First chaetiger biramous. All thoracic chaetigers biannulated, 1.5–2 times as wide as long, with deep inter-segmental and clear intra-segmental grooves (Figs. 3B, 4A–B). Chaetal fascicles inserted just posterior to midline of thoracic segments (Fig. 3B, D). Notopodia dorsolateral in anterior thorax, moving dorsally to end of thorax, and neuropodia lateral. Lateral organs present along body, located between noto- and neuropodia; those in thorax closer to notopodia, as small rounded pores; abdominal ones closer to superior neuropodial lobes, as small protuberances (Fig. 3G). Genital pores not observed.

Transition between thorax and abdomen marked by constriction and reduced length of abdominal segments (Figs. 3E–F, 4C–D, 5H). First two abdominal segments biannulated, with bilimbate capillary chaetae only and partially developed neuropodial lobes; subsequent abdominal segments with hooded hooks and expanded neuropodial lobes (Figs. 3E–F, 4D–E, 5H). Notopodial lobes free along the abdomen (Figs. 3F, 4C, 5H), approaching each other in anterior abdomen, but becoming further separated posteriorly. Notopodia with approximately 40 hooded hooks per fascicle. Abdominal neuropodial lobes separated mid-ventrally, extending from ventral area to the dorsolateral region (Figs. 3E, 4C). Neuropodial lobes covered with hooded hooks, leaving enlarged superior neuropodial lobe (Fig. 4D, F). Chaetal fascicles in neuropodia with more than 200 hooded hooks. Notopodial and neuropodial abdominal hooded hooks similar along body, with long anterior shaft, angled node, distinct constriction, developed shoulder, and short hood; posterior shaft curved, longer than anterior one, attenuated to terminal end (Fig. 4G). Hooded hooks with four rows of small teeth above main fang (Fig. 4G). Main fang subtriangular, longer than wide.

Branchiae not known, as all examined specimens incomplete. Pygidium not known.

Variations. The holotype is bigger than paratypes. Meanwhile, the longitudinally striated epithelium is more evident in the holotype.

Methyl green staining (Figs. 4A–D, 5G–H**).** Thorax uniformly stained light green except that a medium green transverse band on peristomium. Methyl green stain on first two abdominal chaetigers slightly darker than on thorax. Abdominal chaetigers 3–13 with medium green stain on dorsolateral areas between noto- and neuropodial lobes and ventral areas around neuropodia,

a longitudinal mid-ventral band stained with medium green, and light green stain on parapodial tori and lateral organs. Abdominal chaetiger 14 and following ones with light green completely, and mid-ventral band faded.

***Notodasus chinensis* sp. nov. Lin, García-Garza & Wang**

urn:lsid:zoobank.org:act:201C23E8-5FD1-4D12-813D-B0A649A0DC11

Figs. 6A–F, 7A–D, 8A–F, 9A–B

Etymology. The specific name is derived from the type locality, Chinese waters.

Holotype. TIO-BTS-Poly-105 (sta. GFC-S31), one specimen, Qinzhou Bay, Guangxi Province, [21°41′31″N, 108°39′52″E], 8 m, mud, incomplete, coll. Zhong Li, 26 January 2018.

Paratype. 11 specimens: TIO-BTS-Poly-106 (sta. GFC-S31), 4 incomplete specimens, same information as holotype, one mounted on SEM stub; TIO-BTS-Poly-107 (sta. GFC-S33), one specimen, Qinzhou Bay, Guangxi Province, [21°34′30″N, 108°52′41″E], 7 m, muddy sand, incomplete, coll. Zhong Li, 26 January 2018; TIO-BTS-Poly-108 (sta. GFC-S11), one specimen, Qinzhou Bay, Guangxi Province, [21°37′33″N, 108°38′15″E], 12 m, mud, incomplete, coll. Zhong Li, 27 October 2017; TIO-BTS-Poly-109 (sta. GFC-S24), one specimen, Qinzhou Bay, Guangxi Province, [21°32′14″N, 108°28′29″E], 11 m, mud, incomplete, coll. Zhong Li, 27 October 2017; TIO-BTS-Poly-112 (sta. GFC-S17), 2 specimens, Qinzhou Bay, Guangxi Province, [21°31′16″N, 108°49′42″E], 7 m, mud, incomplete, coll. Zhong Li, 21 April 2018; TIO-BTS-Poly-113 (sta. GFC-S18), one specimen, Qinzhou Bay, Guangxi Province, [21°35′39″N, 108°34′41″E], 9 m, muddy sand, incomplete, coll. Zhong Li, 22 April 2018.

Additional material examined. TIO-BTS-Poly-110, 2 specimens, Daya Bay, Guangdong Province, [22°36′43″N, 114°43′12″E], 9 m, mud, incomplete, coll. Junhui Lin, 30 August 2017, one mounted on SEM stub.

Comparative material examined. *N. oraria* holotype (LACM-AHF POLY 1248), Palos Verdes Peninsula, California, USA, 30–180 m; *N. dexterae* holotype (LACM-AHF POLY 2190), Naos Island, Panama, [8°53'N, 79°33'W], intertidal, sand, incomplete, July 1969.

Distribution. Currently known from shallow subtidal waters of the Qinzhou Bay (Guangxi Province) and Daya Bay (Guangdong Province), the southern coast of China.

Diagnosis. Prostomium conical, with short palpode. Thorax having one achaetous peristomium

and 11 chaetigers with bilimbate capillary chaetae only. First chaetiger biramous. First abdominal chaetigers with only capillary chaetae in both rami, thereafter, with hooded hooks only. Tessellated epithelium through chaetiger 5 as well as on dorsum of chaetigers 11–12. Notopodial lobes fused dorsally into a raised coalesced lobe on abdominal chaetigers 2–4, while fused but not raised on abdominal chaetigers 5–11. Multidentate hooded hooks with four rows of small teeth above main fang. Lateral organs present on thorax and abdomen. Branchiae present, retractile, arising just above neuropodial hooks. Branchial pores commencing from anterior abdomen.

Description

All specimens incomplete. Holotype anterior fragment with 67 chaetigers, 21.6 mm long, 1.7 mm wide in abdomen (maximum width 1.9 mm at chaetiger 4). Paratypes ranging from 7.7 mm long by 0.6 mm wide in abdomen (23 chaetigers; maximum width 1.0 mm at chaetiger 4) to 87.4 mm long by 2.8 mm wide in abdomen (broken into two parts; more than 100 chaetigers; maximum width 3.7 mm at chaetiger 4). Body slightly coiled. Color in alcohol whitish tan (Fig. 6A). Prostomium conical, with short palpode. Everted proboscis distally ciliated, and proximal portion with numerous minute papillae (Figs. 6A–B, 8A–B). Peristomium about same length as first chaetiger, but narrower. Eyespots present, covered by lateral margin of peristomium (TIO-BTS-Poly-106). Peristomium and first 5 chaetigers with epithelium tessellated, dorsum of chaetigers 11–12 slightly tessellated, and remaining segments smooth (Figs. 6A–B, 8A–B).

Thorax with 11 chaetigers, exclusively with bilimbate capillary chaetae in both rami (Figs. 6A, 7A–C, 8A). First chaetiger biramous. Thoracic chaetigers biannulated, being of similar length, 3.5–5 times as wide as long, with clear inter-segmental and intra-segmental grooves (Figs. 6A–D, 8A–B). Notopodia dorsolateral in first chaetiger, approaching each other gradually to end of thorax, and neuropodia lateral (Fig. 8A). Chaetal fascicles inserted just posterior to midline of thoracic segments (Figs. 6A–C, 7A–B, 8A–B). Lateral organs evident from posterior thorax, located between noto- and neuropodia; those in posterior thorax closer to notopodia, as small rounded pores (Fig. 6D); those in the abdomen closer to superior neuropodial lobes from chaetiger 12 (first abdominal chaetiger), as small protuberances, protruded above surface in posterior segments (Figs. 6F, 7B, 8E). Genital pores not seen.

Transition between thorax and abdomen marked by constriction and reduced length of first

abdominal segment (Figs. 6C–E, 7B, 8A). First abdominal segments biannulated, with bilimbate capillary chaetae in both rami and partially developed neuropodial lobes; subsequent abdominal segments with hooded hooks and expanded neuropodial lobes (Figs. 6C–E, 8A). Notopodial lobes fused dorsally into a raised coalesced lobe on abdominal chaetigers 2–4 (Figs. 6C, 8C), while fused but not raised on abdominal chaetigers 5–11. Notopodial fascicles almost touching each other on abdominal chaetigers 2–11, forming a continuous line (Fig. 8A, C). From abdominal chaetiger 11, gap between notopodial lobes becoming gradually larger. Neuropodial lobes expanded, separated mid-ventrally (Fig. 8D), extending from ventral area to dorsolateral region (Fig. 6D, E). Neuropodial lobes covered with hooks, leaving enlarged superior neuropodial lobe (Fig. 6D). Notopodial fascicles positioned posterior part of segment (Fig. 8A, C). Chaetal fascicles with approximately 30 hooks in notopodia and more than 150 hooks in neuropodia. Notopodial and neuropodial abdominal hooded hooks similar along body, with long anterior shaft, developed shoulder, angled node, indistinct constriction, and short hood; posterior shaft slightly longer than anterior shaft (Fig. 8F). Four rows of small teeth above main fang (Figs. 7D, 8F). Main fang subtriangular, longer than wide.

Branchiae digitiform in holotype, may be retractile, only observed on some superior neuropodial lobes of abdominal segments (Fig. 6F), arising from a small pore just above neuropodial fascicles. Pygidium not seen.

Variations. All specimens are incomplete, without posterior abdomen. Tessellated epithelium on chaetigers 11–12 are more evident in larger specimens. Fused notopodial lobes located on a raised coalesced lobe on abdominal chaetigers 2–4 in larger specimens, while on abdominal chaetigers 2–3 in smaller specimens.

Methyl green staining pattern (Figs. 8A–C, 9A–B**).** Thorax and abdominal segments completely stained light green except that dark green stain from chaetiger 6 to prechaetal area of chaetiger 7, and moderate green stain from chaetiger 11 to prechaetal area of chaetiger 12.

Discussion

On *Notodasus celebensis* sp. nov.

Among all ten known *Notodasus* species worldwide, *Notodasus celebensis* sp. nov. (Fig. 5G) is the most similar to *N. magnus* (Fig. 5A) and *N. harrisae* (Fig. 5C) from the Gulf of California, and *N. fauchaldi* (Fig. 5E) from the Andaman Sea by having longitudinally striated epithelium

297 on thoracic segments, whereas the rest members of the genus bear thoracic segments with
298 tessellated epithelium. However, *N. celebensis* sp. nov. differs from these three closely related
299 species, based on the morphological characteristics (Table 2). *N. celebensis* sp. nov. is
300 distinguished from *N. magnus* in that: (1) *N. celebensis* sp. nov. bears rounded prostomium with
301 digitate palpode compared with conical prostomium with short palpode in *N. magnus*; (2) striated
302 epithelium is present on more thoracic segments in *N. magnus* than in *N. celebensis* sp. nov.; (3)
303 abdominal notopodial lobes are completely separated along the abdomen in *N. celebensis* sp.
304 nov., while in *N. magnus*, they are fused with a median constriction in anterior abdomen; (4) *N.*
305 *celebensis* sp. nov. has abdominal hooks with four rows of small teeth above main fang instead
306 of three rows as in *N. magnus*. *N. celebensis* sp. nov. also differs from *N. harrisae* in that: (1) *N.*
307 *celebensis* sp. nov. bears prostomium with digitate palpode and without eyespots compared with
308 prostomium with short palpode and eyespots in *N. harrisae*; (2) striated epithelium are present
309 on anterior 8 chaetigers of *N. celebensis* sp. nov. but on the entire thorax of *N. harrisae*; (3)
310 abdominal notopodial lobes are completely separated along the abdomen in *N. celebensis* sp. nov.
311 whereas they are fused in the anterior abdomen of *N. harrisae*; (4) abdominal hooks of *N.*
312 *celebensis* sp. nov. have four rows of small teeth above main fang instead of three rows as in *N.*
313 *harrisae*. Furthermore, *N. celebensis* sp. nov. differs from *N. fauchaldi* in that: (1) *N. celebensis*
314 sp. nov. bears prostomium with digitate palpode and without eyespots compared with
315 prostomium with short palpode and eyespots in *N. fauchaldi*; (2) abdominal notopodial lobes are
316 completely separated along the abdomen in *N. celebensis* sp. nov. whereas they are fused in the
317 anterior abdomen of *N. fauchaldi*; (3) in anterior abdomen, lateral organs are situated in a pit in
318 *N. celebensis* sp. nov. but protruded above surface in *N. fauchaldi*.
319 The inhabiting environment is also different: *N. celebensis* sp. nov. was found in the shallow
320 nearshore seagrass beds characterized by fine sand; *N. magnus* was collected from soft sediments
321 mixed with sand, mud, and pebbles at depths of 29 to 35 m; *N. harrisae* was found to inhabit
322 intertidal and shallow fine sand; and *N. fauchaldi* was recorded in a variety of sediments at
323 depths of 21 to 55 m.
324 As for methyl green staining, the most relevant characteristic of *Notodasus celebensis* is that it
325 has a dark transverse band on peristomium and medium green stain on dorsolateral areas of
326 abdominal chaetigers 3–13 (Fig. 5G–H), which is distinct from the other three *Notodasus* species.
327 Based on the original descriptions of type species, *N. magnus* has darker prechaetal and

postchaetal transverse band on abdominal chaetigers 3–5 (Fig. 5B); *N. harrisae* has two dark dorsolateral longitudinal bands on abdominal chaetigers 3–22 (Fig. 5D); and *N. fauchaldi* has dark green stain on dorsum of abdominal chaetigers except for notopodial lobes and lateral organs (Fig. 5F). Moreover, the latter three species have uniform light green stain on anterior thorax, without a dark band on peristomium.

Quite a few monographs and papers dealing with Indonesian polychaetes have been published (Caullery, 1915, 1944; Horst, 1903, 1910, 1912, 1015, 1916a, 1916b, 1917, 1924; Pettibone, 1970, 1971; AI-Hakim & Glasby, 2004; Pamungkas, 2015, 2017). In these publications, seven capitellid genera were taxonomically recorded in Indonesian waters, namely *Capitella*, *Dasybranchus*, *Mediomastus*, *Notomastus*, *Polymastigos*, *Promastobranchus*, and *Scyphoproctus*. *Notodasus celebensis* sp. nov., which is newly described from Sulawesi Island, represents the discovery of *Notodasus* in Indonesian waters for the first time. The number of capitellid genera in this area rises to eight genera.

On *Notodasus chinensis* sp. nov.

N. chinensis sp. nov. mostly resembles *N. oraria* (Fig. 9C) from the waters off California, USA and *N. dexterae* (Fig. 9D) from the Pacific coast of Panama. These three species share the tessellated epithelium on thoracic segments, the fused notopodial lobes in anterior abdomen, and the mid-ventrally separated neuropodial lobes along the abdomen. However, *N. celebensis* sp. nov. bears tessellated epithelium on the dorsum of chaetigers 11–12 and branchial pores commencing from abdominal chaetiger 2, which are not found in other species in the genus. In addition to the above characteristics exclusive to *N. chinensis* sp. nov., *N. chinensis* sp. nov. can be distinguished from *N. oraria* in that: (1) eyespots are present in *N. chinensis* sp. nov while absent in *N. oraria*; (2) thoracic segments have tessellated epithelium on anterior 5 chaetigers in *N. chinensis* sp. nov. while on chaetigers 1–8 of *N. oraria*. *N. chinensis* sp. nov. also differs from *N. dexterae* in that: (1) lateral organs are situated in a pit in anterior abdomen in *N. chinensis* sp. nov. while protruded above surface in *N. dexterae*; (2) abdominal hooks have four rows of small teeth above main fang and angled node in *N. chinensis* sp. nov. instead of five rows of small teeth and bulbous node as in *N. dexterae*. For more details, see Table 3.

In terms of inhabiting environment, *N. chinensis* sp. nov. is described from shallow subtidal mud or muddy sand (7–12 m), *N. dexterae* inhabits intertidal sand, and *N. oraria* is mainly found

in muddy sediment at depths of 1–180 m.

Furthermore, *N. chinensis* sp. nov. has a distinct methyl green staining pattern: dark green stain on chaetigers 7–8, medium green stain on chaetigers 11–12, and light green stain on the remaining segments (Fig. 9A–B). According to the original descriptions of type materials, *N. oraria* has medium green stain from the postchaetal part of chaetiger 6 to prechaetal part of chaetiger 10, and dark green stain on chaetigers 11 and 12 (Fig. 9C); *N. dexterae* has medium green stain on chaetigers 9–13, and two dark dorsolateral bands from the third abdominal chaetiger (Fig. 9E).

According to ‘‘Checklist of marine biota of China seas’’ (Liu, 2008), a total of 17 capitellid species was recorded from Chinese waters, represented by ten genera, including *Capitella*, *Dasybranchus*, *Heteromastus*, *Leiochrides*, *Mastobranchus*, *Neoheteromastus*, *Neomediomastus*, *Notomastus*, *Parheteromastus*, and *Rashgua*. In this study, *Notodasus* is recorded for the first time in Chinese waters.

On the generic definition of *Notodasus*

The genus *Notodasus* was originally erected by Fauchald (1972), distinct from other capitellid genera mainly by having only capillaries on all 11 thoracic chaetigers as well as on the first two abdominal ones. Since then, eight *Notodasus* species had been added to the genus, all in agreement with the generic definition. The genus *Dodecaseta* was initially established by McCammon & Stull (1978), then its definition was expanded by Green (2002) as having first one or two abdominal chaetigers with capillaries instead of first abdominal chaetiger as in the original definition. Of the three known *Dodecaseta* species, *D. eibyejacobseni* completely matched the generic diagnosis of *Notodasus*. The remaining two species, *D. oraria* and *D. fauchaldi*, agree well with the generic definition of *Notodasus* except that they bear abdominal capillaries only on first abdominal chaetiger instead of on first two abdominal chaetigers as in *Notodasus*. García-Garza et al. (2017) believed that the above morphological difference might be due to the fact that these two *Dodecaseta* species were described based on immature specimens. It is well known that the replacement of hooded hooks by capillaries occurs in some capitellid genera during ontogeny (Ewing, 1982; Blake, 2000), and the number of chaetigers with capillaries will change until the adult condition is reached. Based on the high morphological

similarity, García-Garza et al. (2017) considered *Dodecaseta* as a junior synonym of *Notodasus*, without any technical change in the generic definition.

In addition to the presence of capillaries on all 11 thoracic chaetigers and first two abdominal chaetigers, *Notodasus* bears other distinctive characteristics: partially developed neuropodia and protruded lateral organs on the last one or two chaetigers with capillaries (Green, 2002). In this study, one of the newly described species, *N. celebensis* sp. nov., completely matches the generic diagnosis of *Notodasus*. However, the other species, *N. chinensis* sp. nov., agrees with the generic diagnosis of *Notodasus* in most morphological characteristics except that all examined specimens are characterized by the presence of capillaries on first abdominal chaetiger and absence on the following abdominal segments, irrespective of body size. Given that the specimens of *N. chinensis* sp. nov. were collected in different seasons (October 2017, January 2018, and April 2018), we believe that *N. chinensis* sp. nov. has capillaries restricted to chaetigers 1–12, including 11 thoracic chaetigers and first abdominal chaetiger. Therefore, we suggest expanding the generic definition of *Notodasus* to have capillaries on all 11 thoracic chaetigers as well as on first one or two abdominal chaetigers, to accommodate the new species. To better clarity the chaetal arrangement of the first two abdominal chaetigers during ontogeny, more specimens of *Notodasus* species at different development stages are required.

Conclusions

Located between the Pacific Ocean and the Indian Ocean, the Central Indo-Pacific region is an important marine biodiversity hotspot with especially rich marine life. In this region~~.~~ *Notodasus* is an uncommon and poorly known group~~.~~ and Prior to this study, there was ~~is~~ no taxonomic report of *Notodasus* species ~~in this region~~. The discovery of new *Notodasus* species in Sulawesi Island and southern China indicates that there is higher diversity within the genus than expected, and this contributes to the better understanding of *Notodasus* diversity worldwide. Besides, this study provides more data ~~to~~ about the ~~study of the~~ ecological ~~characteristics~~ aspects of *Notodasus*. However, ~~more~~ future efforts should be devoted to the taxonomy of polychaete fauna in this region due to relatively scant information on ~~the polychaeta~~ this group.

Key to *Notodasus* species (modified from García-Garza et al., 2009)

1. Epithelium longitudinally striated on all or part of thoracic segments……..…**2**
– Epithelium tessellated on all or part of thoracic segments…….....**5**
2. Epithelium longitudinally striated throughout the thorax…..….***N. magnus*** **Fauchald, 1972**
– Epithelium longitudinally striated not exceeding chaetiger 9…….……..**3**
3. Notopodial lobes completely free throughout the abdomen……....***N. celebensis*** **sp. nov.**
– Notopodial lobes fused dorsally in anterior abdomen..……...…….**4**
4. Fascicles of notopodial hooded hooks forming a continuous line in anterior abdomen, abdominal neuropodial lobes fused ventrally, hooded hooks with three rows of teeth above main fang…***N. harrisae*** **García-Garza, Hernández Valdez & de León González, 2009**
– Fascicles of notopodial hooded hooks clearly separated along the abdomen, neuropodial lobes separated mid-ventrally along the abdomen, hooded hooks with four rows of teeth above main fang…….…….....***N. fauchaldi*** **(Green, 2002)**
5. Epithelium tessellated along the entire thorax..…….....***N. hartmanae*** **García-Garza, Hernández Valdez & de León González, 2009**
– Epithelium tessellated in anterior thorax……..……**6**
6. Notopodial lobes completely free throughout the abdomen…….……**7**
– Notopodial lobes fused dorsally in anterior abdomen……...…….....**9**
7. Thoracic epithelium tessellated on segments 1–8, hooded hooks with three rows of teeth above main fang and angled node, first two abdominal chaetigers stained dark green……..***N. salazari*** **García-Garza, Hernández Valdez & de León González, 2009**
– Thoracic epithelium tessellated on segments 1–6, hooded hooks with two rows of teeth above main fang and indistinct node, first two abdominal chaetigers stained light green or do not stain..…….....**8**
8. Abdominal lateral organs protruded, dark green stain on chaetiger 14 and following segments except for parapodial tori……...***N. eibyejacobseni*** **(Green, 2002)**
– Abdominal lateral organs situated in deep pits, no distinct staining pattern…….……...***N. dasybranchoides*** **Magalhães & Bailey-Brock, 2012**
9. Posterior neuropodial lobes small, fused mid-ventrally, hooded hooks with four rows of teeth above main fang and angled node……....***N. arenicola*** **Hartmann-Schröder, 1992**
– Neuropodial lobes separated mid-ventrally……..…….....**10**

10. Notopodial fascicles almost touching each other in anterior abdomen; the epithelium tessellated on the dorsum of chaetigers 11–12…….***N. chinensis* sp. nov.**

– Notopodial fascicles separated in anterior abdomen; chaetigers 11–12 smooth……**11**

11. Fused notopodial lobes without a median constriction, hooded hooks with five rows of teeth above main fang……...***N. dexterae* Fauchald, 1973**

– Fused notopodial lobes with a median constriction, hooded hooks with four rows of teeth above main fang…..…….……***N. oraria* (McCammon & Stull, 1978)**

Acknowledgements

We are grateful to Mr. Heshan Lin and Mr. Zhiyuan Ma for their assistance with field sampling when in Indonesia. We thank Dr. Xikun Song from Xiamen University, China for his assistance in SEM observations, Dr. Kun Liu for the suggestion for preparing Figure 1 and 2, and Dr. Zhong Pan for editing of the manuscript. We also thank Leslie Harris (LACM-AHF) for her help during one of our authors (M.E. G.-G.) visit to the museum.

References

AI-Hakim Inayat, Glasby CJ. 2004. Polychaeta (Annelida) of the Natuna Islands, South China Sea. *Raffles Bulletin of Zoology, Supplement* 11: 25–45.

Blake JA. 2000. Family Capitellidae Grube, 1862. In: Blake JA, Hilbig B, Scott PV, eds. *Taxonomic atlas of the benthic Fauna of the Santa Maria Basin and the western Santa Barbara Channel. Volumen 7. The Annelida part 4, Polychaeta: Flabelligeridae to Sternaspidae*. California: Santa Barbara Museum of Natural History, 47–96.

Caullery M. 1915. Sur les Térébelliens du genere Pista Malmgr. Et en particulier sur les uncini de ces annelids. *Bulletin de la Societe Zoologique de France* 40: 68–78.

Caullery M. 1944. Polychètes Sédentaires de l'Expédition du Siboga: Ariciidae, Spionidae, Chaetopteridae, Chlorhaemidae, Opheliidae, Oweniidae, Sabellariidae, Sternaspidae, Amphictenidae, Ampharetidae, Terebellidae. *Siboga-Expeditie Uitkomsten op Zoologisch, Bonatisch, Oceanographisch en Geologisch gebied verzameld in Nederlandsch Oost-Indië 1899–1900* XXIV 2 bis: 1–204.

Ewing RM. 1982. A partial revision of the genus *Notomastus* (Polychaeta: Capitellidae) with a description of a new species from the Gulf of Mexico. *Proceedings of the Biological Society of Washington* 95(2): 232–237.

Fauchald K. 1972. Benthic polychaetous annelids from deep waters off Western Mexico and adjacent areas in the Eastern Pacific Ocean. *Allan Hancock Monographs in Marine Biology* 7: 1–575.

Fauchald K. 1973. Polychaetes from central American sandy beaches. *Bulletin of the Southern California Academy of Sciences* 72: 19–31.

Fauchald K. 1977. The Polychaete Worms. Definitions and keys to the orders, families and genera. *Natural History Museum of Los Angeles County, Science Series* 28: 1–190.

García-Garza ME, de León-González JA. 2011. Review of the Capitellidae (Annelida, Polychaeta) from the Eastern Tropical Pacific region, with notes on selected species. *Zookeys* 151: 17–52. https://doi.org/10.3897/zookeys.151.1964

García-Garza ME, de León-González JA, Harris LH. 2017. Relocation of *Dodecaseta* McCammon & Stull, 1978 (Annelida, Capitellidae) in *Notodasus* Fauchald, 1972. *ZooKeys* 715: 93–101. https://doi.org/10.3897/zookeys.715.13936

García-Garza ME, de León-González JA, and Tovar-Hernández. 2019. Catalogue of *Notomastus* M. Sars, 1851 (Annelida, Capitellidae) and the description of a new species from the Gulf of California. *Zootaxa* 4577(2): 249–273. https://doi.org/10.11646/zootaxa.4577.2.2

García-Garza ME, Hernández-Valdez VD, de León-González JA. 2009. Generic revision of *Notodasus* Fauchald, 1972 (Polychaeta: Capitellidae) with descriptions of four new species from the coasts of Mexico. *Scientia Marina* 73(4): 809–823. https://doi.org/10.3989/scimar.2009.73n- 4809

Green KD. 2002. Capitellidae (Polychaeta) from the Andaman Sea. In: Eibye Jacobsen D, ed. *Proceedings of the international workshop on the Polychaetes of the Andaman Sea. Thailand: Phuket Marine Biological Center Special Publication*, pp 249–343.

Grube AE. 1862. *Noch ein Wort über die Capitellen und ihre Stelle im Systeme der Anneliden*. Berlin: Archiv für Naturgeschichte, 378pp.

Hartmann-Schröder G. 1992. Die Polychaeten der Amsterdam-Expedition nach der Insel Ascension (Zentral-Atlantik). *Bijdragen Tot De Dierkunde* 61: 219–235.

Horst R. 1903. New species of the genus Euphrosyne from the Siboga Expedition with a table of

512 the species hitherto known. *Notes from the Leyden Museum* 23: 213–222.
513 Horst R. 1910. On the genus *Chloeia*, with some new species from the Malay-Archipelago,
514 partly collected by the Siboga Expedition. *Notes from the Leyden Museum* 32: 169–175.
515 Horst R. 1912. Polychaeta errantia of the Siboga Expedition. Part 1, Amphinomidae. *Siboga-*
516 *Expeditie Uitkomsten op Zoologisch, Bonatisch, Oceanographisch en Geologisch gebied*
517 *verzameld in Nederlandsch Oost-Indië 1899–1900* 24a: 1–43, 10 plates. available online at
518 https://biodiversitylibrary.org/page/2187401
519 Horst R. 1915. On new and little-known species of Polynoinae from the Netherlands' East-Indies.
520 *Zoologische Mededeelingen* (*Leiden*) 1: 2–20.
521 Horst R. 1916a. On a new genus of Aphroditidae from the Netherlands East Indies. *Zoologische*
522 *Mededeelingen* (*Leiden*) 2: 63–64.
523 Horst R. 1916b. Malayan species of the genera Aphroditella, Hermione, Laetmonice and
524 Aphrogenia. *Zoologische Mededeelingen* (*Leiden*) 2(2): 65–77.
525 Horst R. 1917. Polychaeta Errantia of the Siboga Expedition. Part 2. Aphroditidae and
526 Chrysopetalidae. *Siboga-Expeditie Uitkomsten op Zoologisch, Bonatisch, Oceanographisch*
527 *en Geologisch gebied verzameld in Nederlandsch Oost-Indië 1899–1900* 24b: 1–140.
528 Horst R. 1924. Polychaeta errantia of the Siboga Expedition, Part 3. Nereidae and Hesionidae.
529 *Siboga-Expeditie Uitkomsten op Zoologisch, Bonatisch, Oceanographisch en Geologisch*
530 *gebied verzameld in Nederlandsch Oost-Indië 1899–1900* 24(1c): 145–198, pls 30–36.
531 Hutchings P, Fauchald C. 2000. Class Polychaeta. Definition and general description. In:
532 Beesley PL, Ross GJB, Glasby CJ, eds. *Polychaetes & allies: the southern synthesis*.
533 Melbourne: CSIRO Publishing, pp 1–3.
534 Hutchings P. 2000. Family Capitellidae. In: Beesley PL, Ross GJB, Glasby CJ, eds. *Polychaetes*
535 *& Allies: The Southern Synthesis. Fauna of Australia. Vol. 4A Polychaeta, Myzostomida,*
536 *Pogonophora, Echiura, Sipuncula*. Melbourne: CSIRO Publishing, pp 67–72.
537 Magalhães WF & Bailey-Brock JH. 2012. Capitellidae Grube, 1862 (Annelida: Polychaeta) from
538 the Hawaiian Islands with description of two new species. *Zootaxa* 3581: 1–52.
539 Magalhães WF & Blake JA. 2017. Capitellidae Grube, 1862. In: Westheide W & Purschke G,
540 eds. Handbook of Zoology Online, a Natural History of the Phyla of the Animal Kingdom—
541 Annelida, Polychaetes. Boston: De Gruyter, Berlin.
542 https://www.degruyter.com/view/Zoology/bp_029147-6_76.

543 Liu Ruiyu (ed). 2008. Checklist of marine biota of China seas. China Science Press, Beijing. (in
544 Chinese)
545 McCammon JA, Stull JK. 1978. A new genus and species of Capitellidae (Polychaeta) from
546 California. *Bulletin of the Southern California Academy of Sciences* 77(1): 40–43.
547 Pamungkas J. 2015. The description of a new species *Polymastigos javaensis* n. sp. (Annelida:
548 Capitellidae) from the Segara Anakan mangroves, Central Java, Indonesia. *Zootaxa* 3980(2):
549 279–285. https://doi.org/10.11646/zootaxa.3980.2.8.
550 Pamungkas J. 2017. *Capitella ambonensis*: a new polychaete species (Annelida: Capitellidae)
551 collected from a mangrove habitat on Ambon Island, Indonesia. *Zootaxa* 4227(4): 573–582.
552 Pearson TH & Rosenberg R. 1978. Macrobenthic succession in relation to organic enrichment
553 and pollution of the marine environment. *Oceanography and Marine Biology, Annual*
554 *Review* 16: 229–311.
555 Pettibone MH. 1970. Polychaeta errantia of the Siboga Expedition. Part Ⅳ. Some additional
556 polychaetes of the Polynoidae, Hesionidae, Nereidae, Goniadidae, Eunicidae and Onuphidae,
557 selected as new species by the late Dr. Hermann Augener, with remarks on other related
558 species. In: Weber M, Beaufort LF, Stock JH, eds. *Siboga-Expeditie Uitkomsten op*
559 *Zoologisch, Bonatisch, Oceanographisch en Geologisch gebied verzameld in Nederlandsch*
560 *Oost-Indië 1899–1900*. Leiden, E.J. Brill, 199–270.
561 Pettibone MH. 1971. Partial revision of the genus *Sthenelais* Kinberg (Polychaeta: Sigalionidae)
562 with diagnoses of two new genera. *Smithsonian Contributions to Zoology* 109: 1–40.
563 available online at http://si-pddr.si.edu/dspace/handle/10088/5688
564 Read G & Fauchald K. (Ed.) 2018. World Polychaeta database. Capitellidae Grube, 1862.
565 Accessed at: http://marinespecies.org/polychaeta/aphia.php?p=taxdetails&id=921 (accessed
566 31 December 2018)
567 Reish DJ. 1980. The effect of different pollutants on ecologically important polychaete worms.
568 U.S.E.P.A. Report, EPA-600/3-80-053. 138pp.
569 Warren LM. 1991. Problems in capitellid taxonomy. The genera *Capitella*, *Capitomastus* and
570 *Capitellides* (Polychaeta). *Ophelia* 5: 275–282.
571 Warren LM, Hutchings PA, Doyle S. 1994. A revision of the genus *Mediomastus* Hartman, 1944
572 (Polychaeta: Capitellidae). *Records of the Australian Museum* 46(3): 227–256.
573 https://doi.org/10.3853/j. 0067-1975.46.1994.6

Figure 1

Type localities of described species of *Notodasus* worldwide

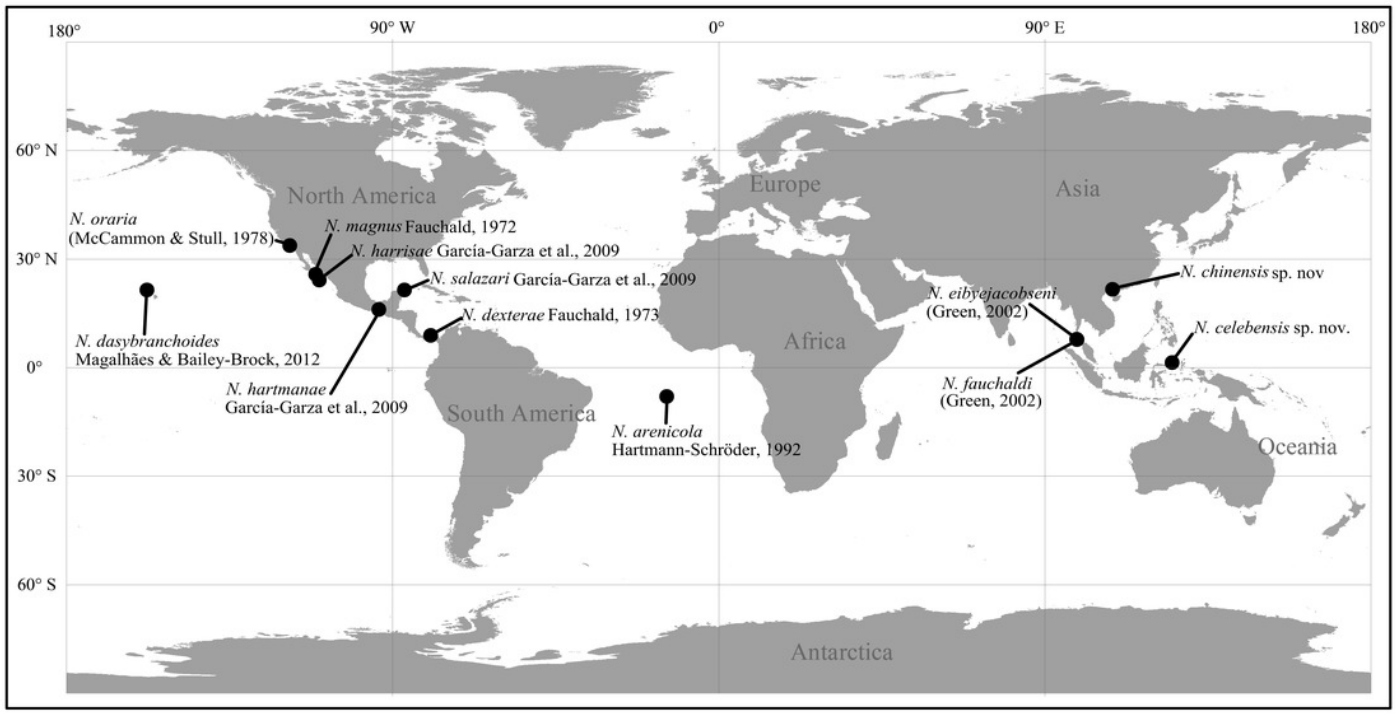

Figure 2

Map of survey areas

(A) sampling stations in the Qinzhou Bay, the southern coast of China, and (B) sampling stations in mixed-species seagrass beds of northern Sulawesi Island, Indonesia

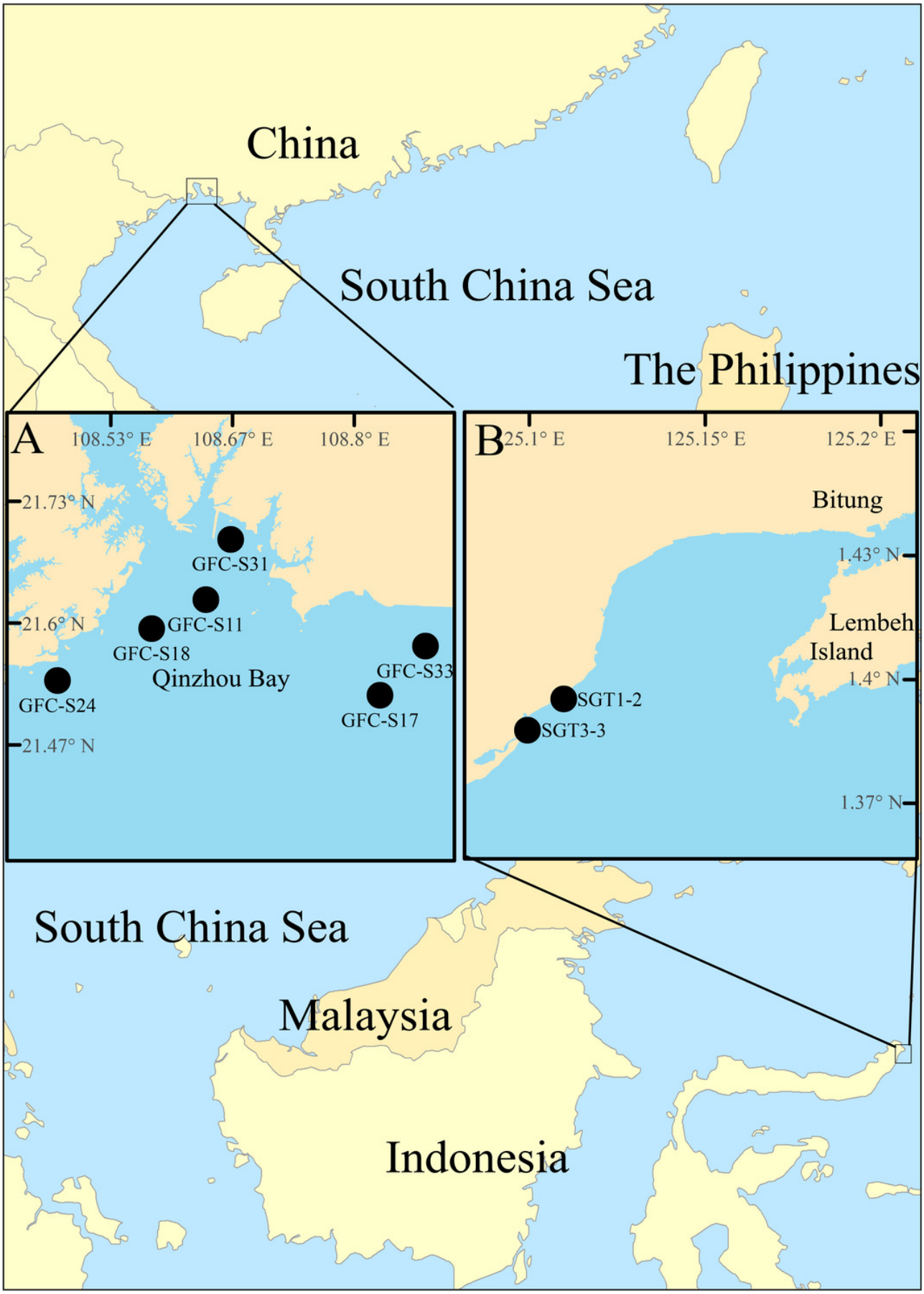
China
South China Sea
The Philippines
A
108.53° E
108.67° E
108.8° E
21.73° N
21.6° N
21.47° N
GFC-S31
GFC-S11
GFC-S18
Qinzhou Bay
GFC-S24
GFC-S33
GFC-S17
B
25.1° E
125.15° E
125.2° E
Bitung
1.43° N
Lembeh
Island
1.4° N
SGT1-2
SGT3-3
1.37° N
South China Sea
Malaysia
Indonesia

Figure 3

Photomicrographs of *Notodasus celebensis* sp. nov.

(A) Thorax and anterior abdomen, lateral view. (B) Anterior end, lateral view. (C) Prostomium with digitate palpode, lateral view. (D) Longitudinally striated epithelium, lateral view. (E) Transition between thorax and abdomen, lateral view. (F) Anterior abdomen, dorsal view. (G) Posterior part, lateral view. Abbreviations: pro: prostomium; lo: lateral organ; cc: capillary chaetae; hh: hooded hook; ch: chaetiger.

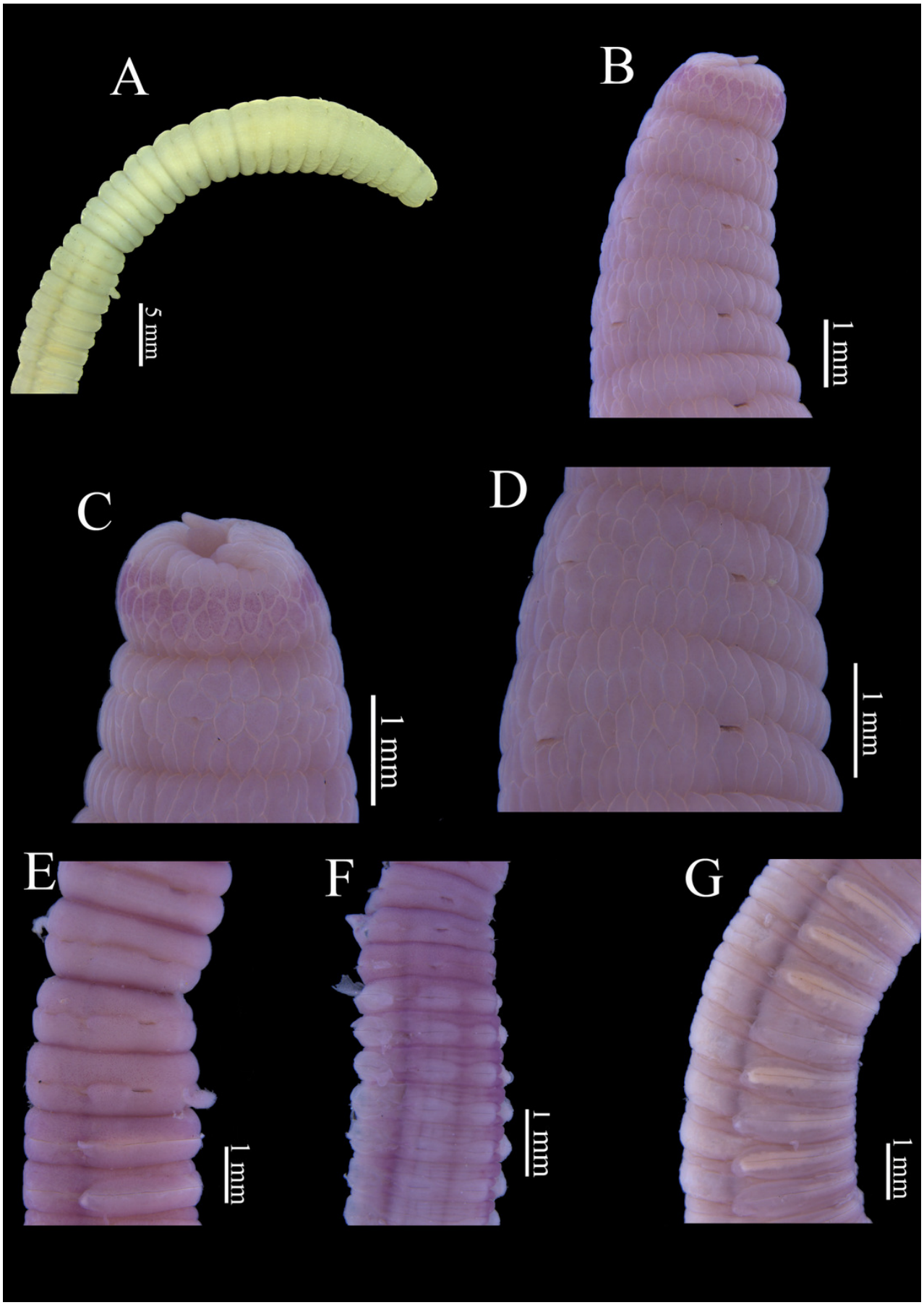
A
5 mm
B
1 mm
C
1 mm
D
1 mm
E
1 mm
F
1 mm
G
1 mm

Figure 4

Holotype of *Notodasus celebensis* sp. nov.

(A) Anterior 17 chaetigers, lateral view. (B) Anterior end, lateral view. (C) Chaetigers 10–20, dorsal view, showing transition between thorax and abdomen. (D) Chaetigers 10–16, lateral view. (E) Chaetigers 12–18, ventrolateral view. (F) Chaetigers 32–40, lateral view. (G) Neuropodial hook from chaetiger 40. Shading on A–E indicates methyl green staining. Scale bars: A–F, 1 mm; G, 20 µm.

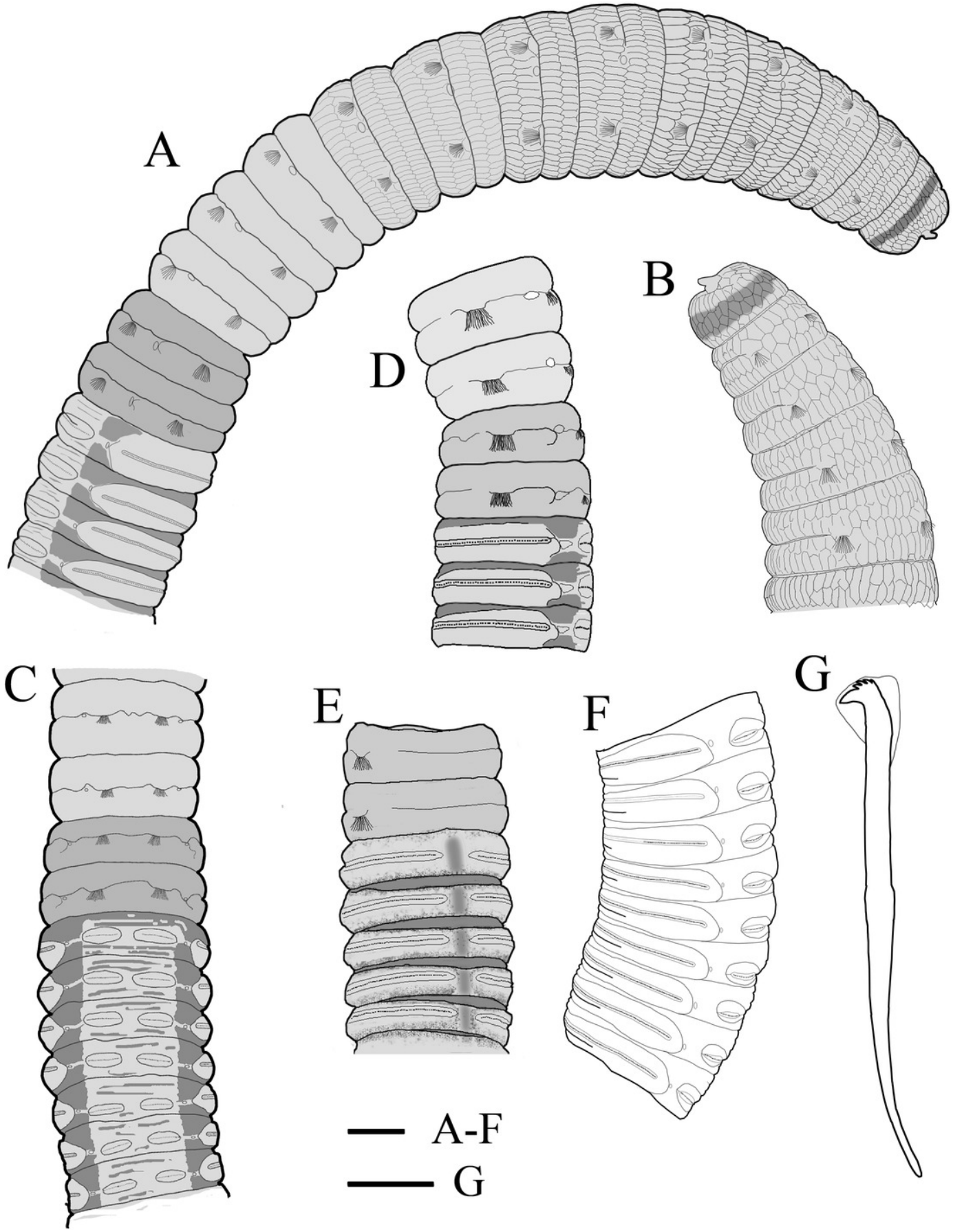
A
B
D
C
E
F
G
A-F
G

Figure 5

Notodasus species with longitudinally striated epithelium

Holotype of *N. magnus*: (A) Anterior end, lateral view. (B) Chaetigers 12–17, dorsal view. Holotype of *N. harrisae*: (C) Anterior end, lateral view. (D) Chaetigers 11–22, dorsal view. Paratype of *N. fauchaldi*: (E) Anterior end, dorsal view. (F) Chaetigers 11–17, dorsal view. Holotype of *N. celebensis* sp. nov., (G) Anterior end, lateral view. (H) Chaetigers 10–19, dorsal view. Methyl green stain: B–H. Scale bars: A–H, 1 mm.

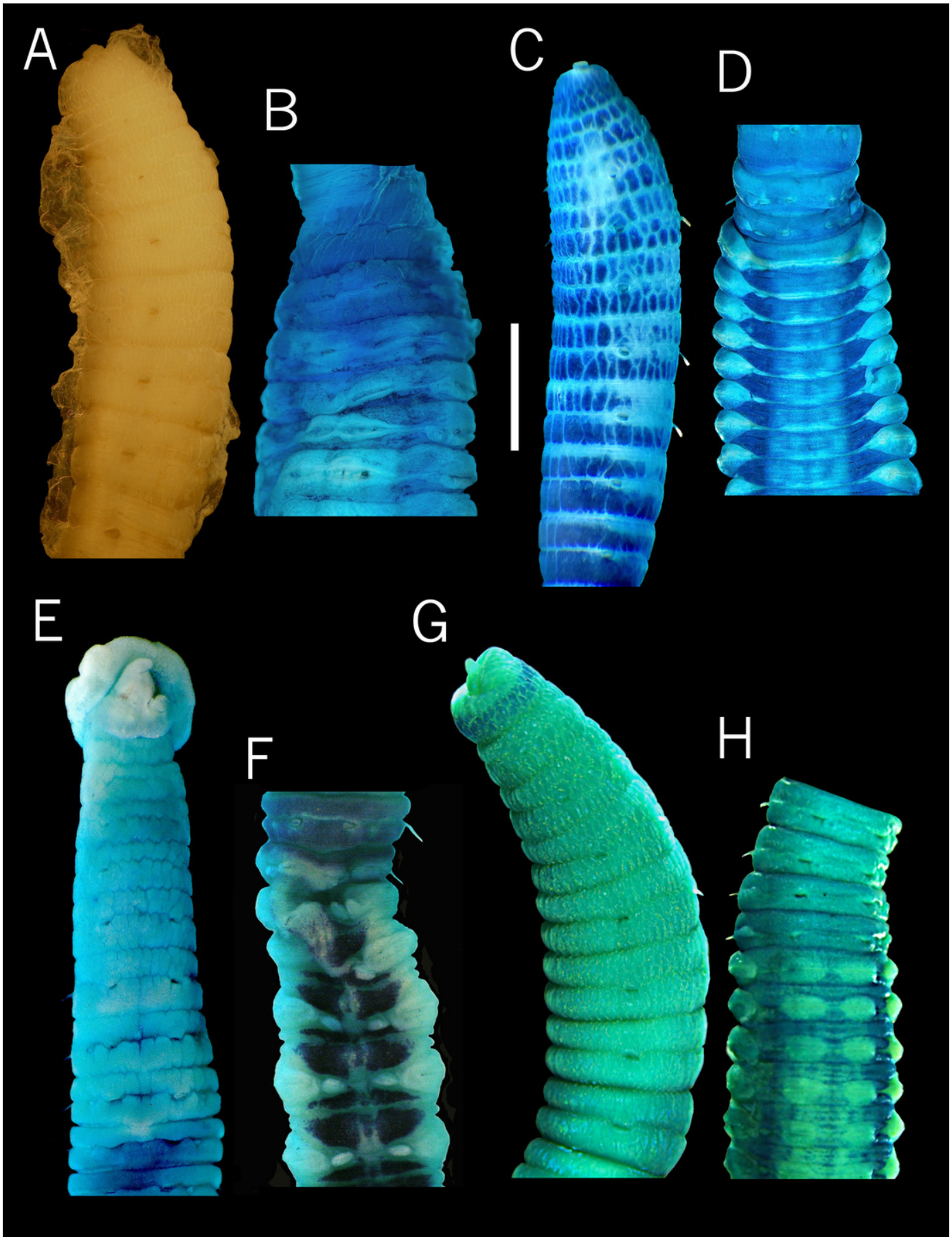
A
B
C
D
E
F
G
H

Figure 6

Photomicrographs of *Notodasus chinensis* sp. nov.

(A) Thorax and anterior abdomen, lateral view. (B) Anterior thorax, dorsolateral view. (C) Transition between thorax and abdomen, dorsolateral view. (D) Transition between thorax and abdomen, lateral view. (E) Anterior abdomen, showing branchial pores, lateral view. (F) Posterior part of holotype, showing retractile branchiae and lateral organs, lateral view.

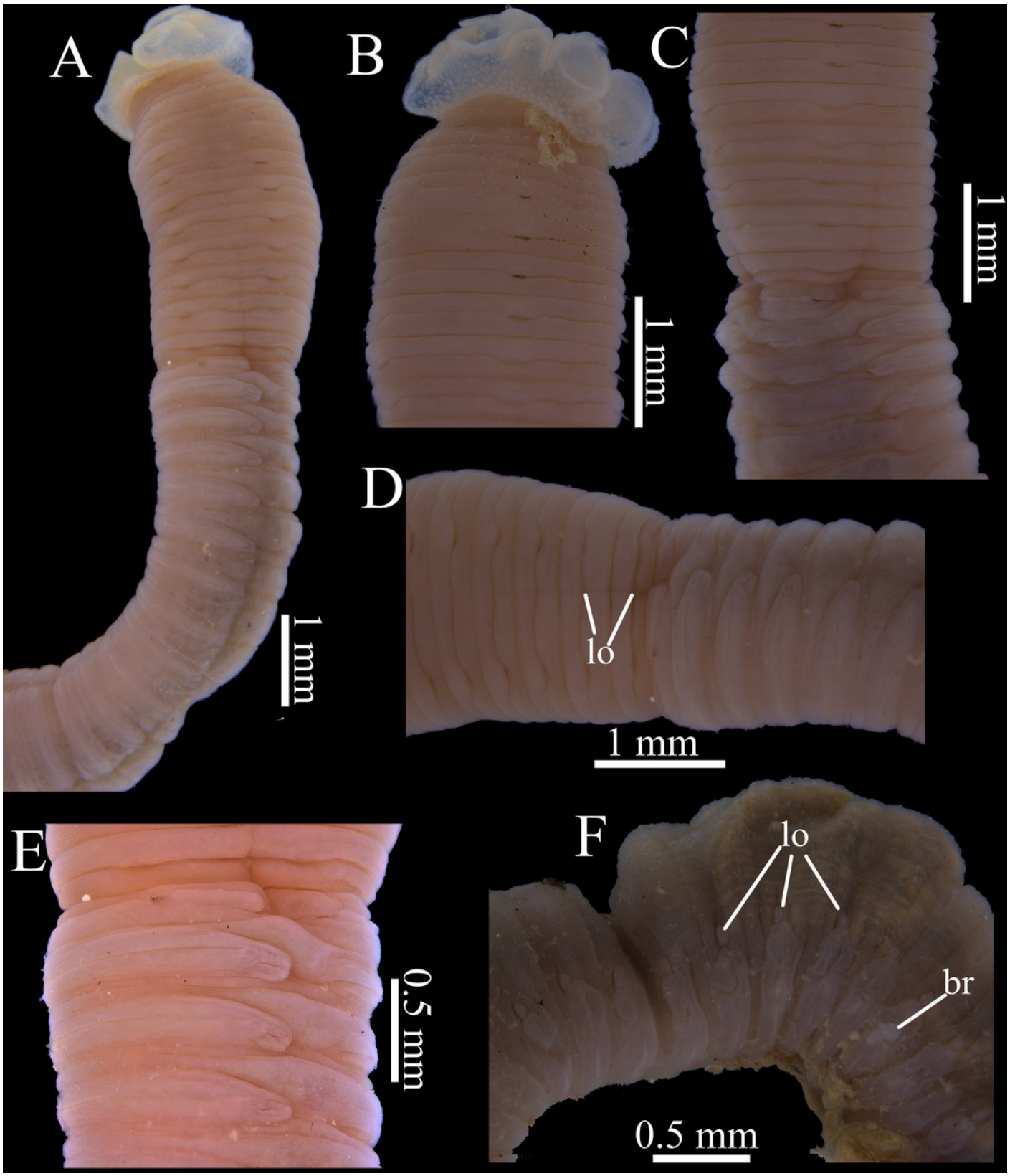
A
B
C
1 mm
1 mm
1 mm
D
lo
1 mm
E
0.5 mm
F
lo
br
0.5 mm

Figure 7

Scanning electron micrographs of *Notodasus chinensis* sp. nov. (TIO-BTS-Poly-106)

(A) Anterior end, dorsolateral view. (B) Transition between thorax and abdomen, dorsolateral view. (C) Capillary chaetae from chaetiger 9. (D) Abdominal hooded hooks.

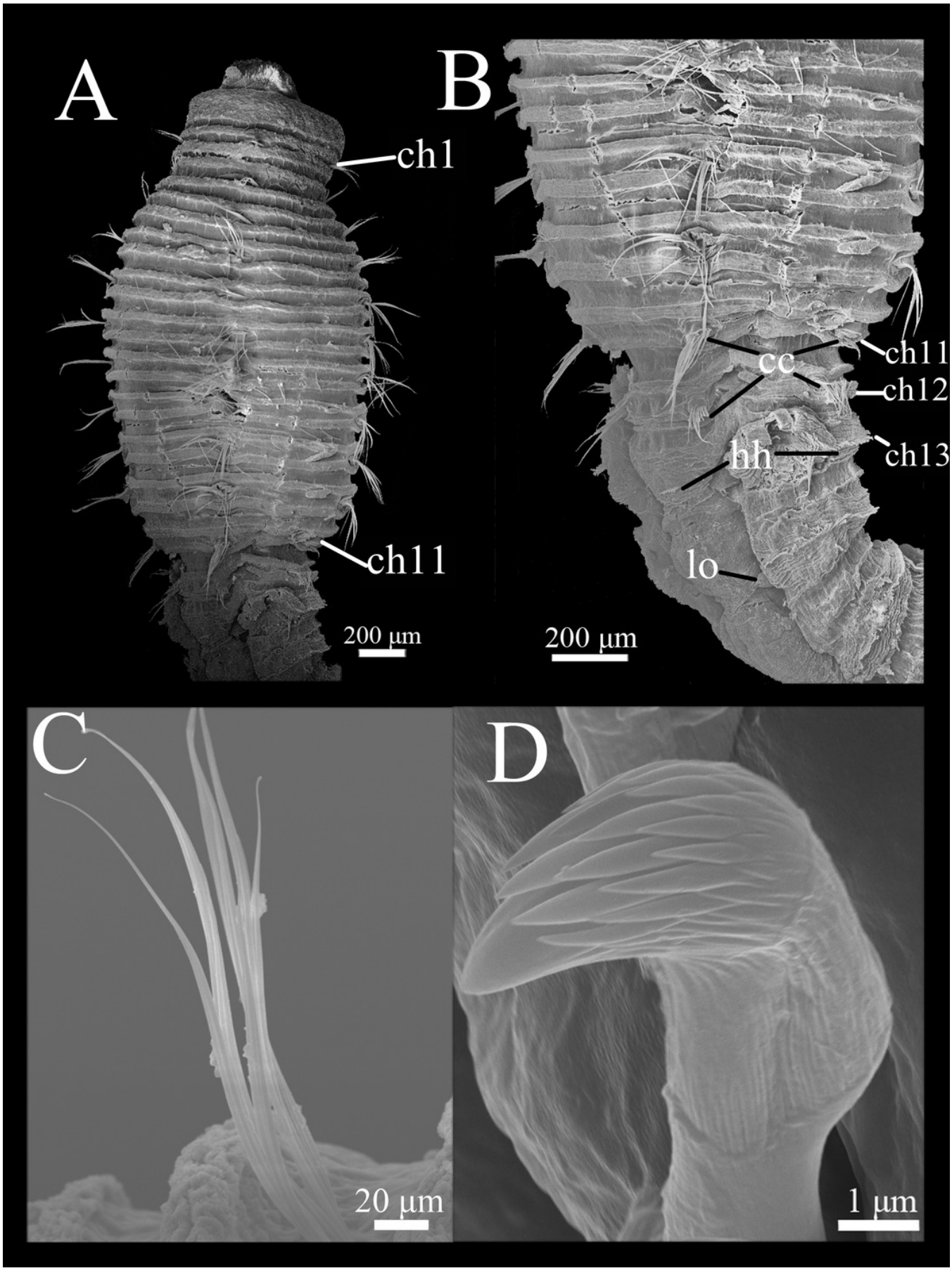
A
ch1
ch11
200 µm
B
cc
ch11
ch12
hh
ch13
lo
200 µm
C
20 µm
D
1 µm

Figure 8

Holotype of *Notodasus chinensis* sp. nov.

(A) Anterior 17 chaetigers, dorsolateral view. (B) Anterior end, lateral view. (C) Chaetigers 11–18, dorsolateral view, showing transition between thorax and abdomen. (D) Chaetigers 10–20, ventral view. (E) Chaetigers 55–67, lateral view. (F) Neuropodial hook from chaetiger 40. Shading on A–C indicates methyl green staining. Scale bar: A–E = 1 mm; F = 10 µm.

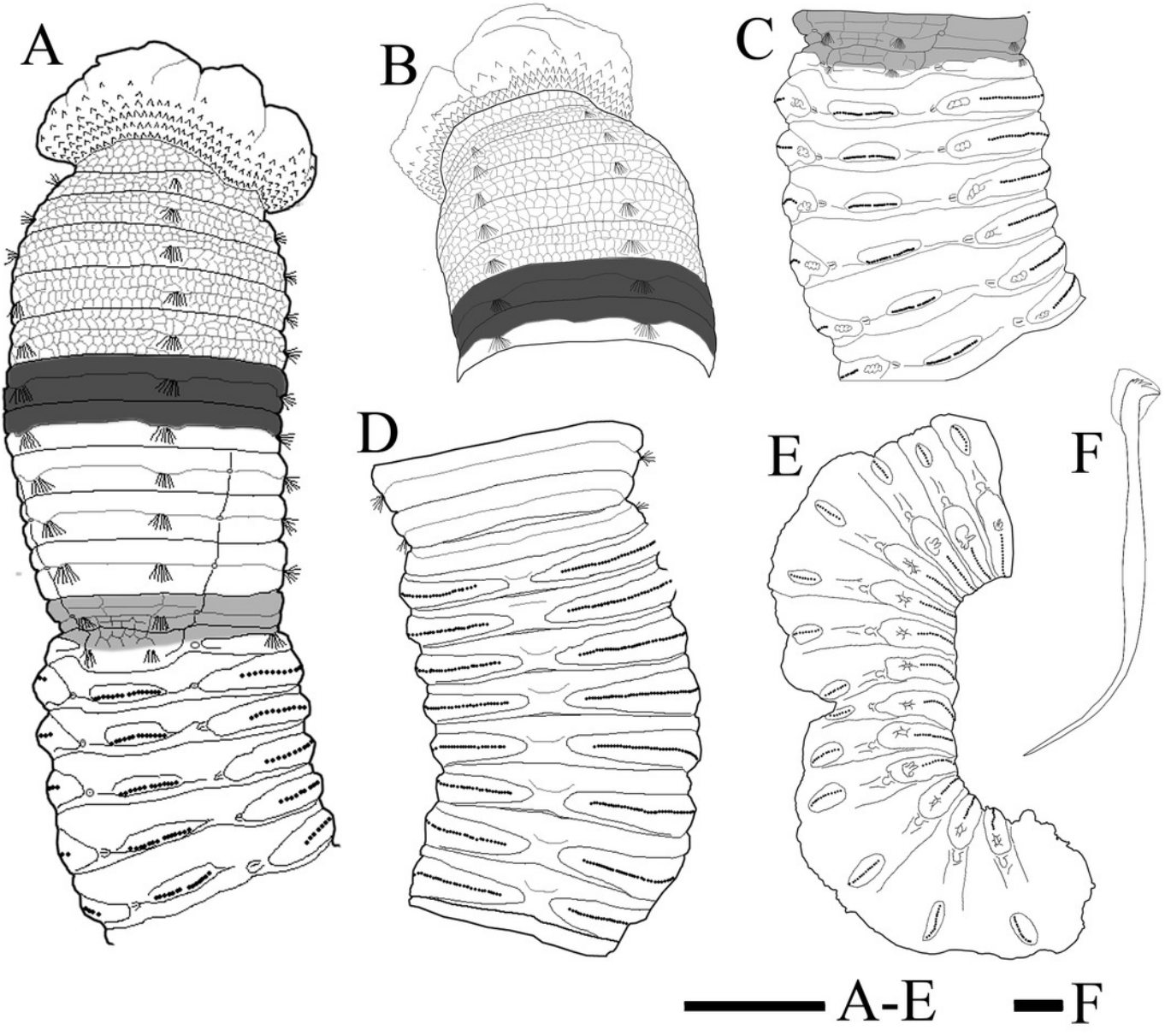

Figure 9

Methyl green staining patterns

(A–B) *Notodasus chinensis* sp. nov. (A) Anterior end, dorsolateral view (TIO-BTS-Poly-106). (B) Anterior end, dorsal view (TIO-BTS-Poly-110). (C) *N. oraria* holotype, anterior end, dorsolateral view. (D–E) *N. dexterae* holotype. (D) Anterior end, lateral view. (E) Chaetigers 11–17, dorsal view.

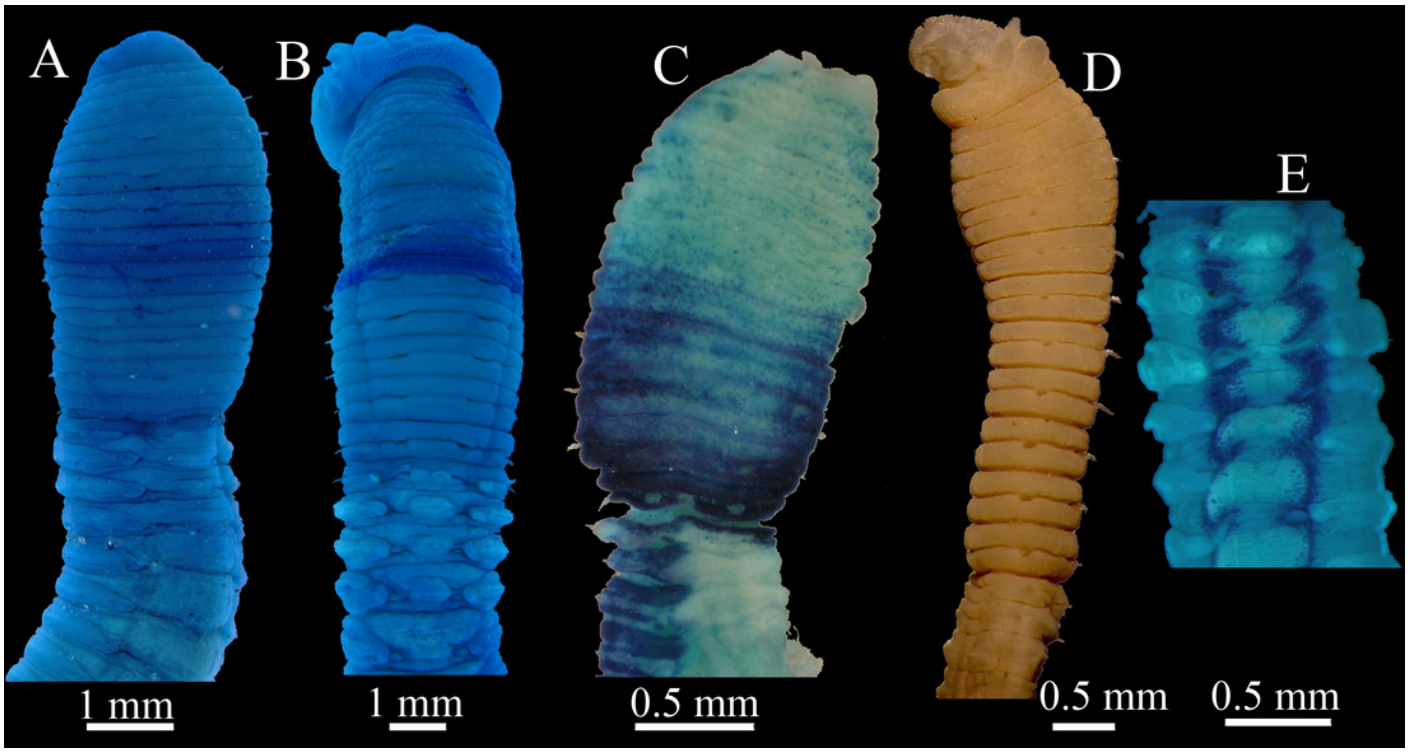

Table 1(on next page)

Sampling stations where *Notodasus* specimens were collected

1

2 **Table 1 Sampling stations where *Notodasus* specimens were collected**

Locality	Station	Specimen amount	Date (dd/mm/yyyy)	Longitude	Latitude	Depth (m)	Substrate
Sulawesi Island	SGT 1-2	1	23/05/2014	125°06′43″E	1°23′41″N	1	Fine sand
(Indonesia)	SGT 3-3	2	25/05/2014	125°06′08″E	1°23′11″N	1	Fine sand
Guangxi Province	GFC-S11	1	27/10/2017	108°38′15″E	21°37′33″N	12	Mud
(China)	GFC-S24	2	27/10/2017	108°28′29″E	21°32′14″N	11	Mud
	GFC-S31	5	26/01/2018	108°39′52″E	21°41′31″N	8	Mud
	GFC-S33	1	26/01/2018	108°52′41″E	21°34′30″N	7	Muddy sand
	GFC-S17	2	21/04/2018	108°49′42″E	21°31′16″N	7	Mud
	GFC-S18	1	22/04/2018	108°34′41″E	21°35′39″N	9	Muddy sand

3

4

Table 2(on next page)

Comparisons of closely related species in the genus

1

2 **Table 2 Comparisons of closely related species in the genus**

Morphological characters	***N. celebensis* sp. nov.** **Holotype**	***N. fauchaldi*** **(Green, 2002)** **Paratype**	***N. harrisae*** **García-Garza et al., 2009** **Holotype**	***N. magnus*** **Fauchald, 1972** **Holotype**
Body width in abdomen	2.8 mm	0.7 mm	2 mm	5 mm
Eyespots	Absent	Present	Present	Absent
Prostomium	Rounded with palpode	Conical with palpode	Conical with palpode	Conical with palpode
Thoracic epithelium	Longitudinally striated through chaetiger 8	Longitudinally striated through chaetiger 7	Longitudinally striated through chaetiger 11	Longitudinally striated except for peristomium
Degree of fused notopodia in anterior abdomen	Completely free	Notopodia fused dorsally but chaetal fascicles separated	Notopodia fused dorsally and chaetal fascicles almost fused	Notopodia fused dorsally with a median constriction, and chaetal fascicles fused
Dental structure of hooded hooks	Four rows of small teeth above main fang	Four rows of small teeth above main fang	Three rows of small teeth above main fang	Three rows of small teeth above main fang
Shape of the shaft of hooded hooks	With angled node	With bulbous node	With angled node	With angled node
Abdominal lateral organs	As a small protuberance in the pits	Protruded above surface	As a small protuberance in the pits	Protruded above surface
Pygidium	Unknown	Unknown	Unknown	Unknown
Branchiae	Unknown	Unknown	Evident from chaetiger 60, with around 14 filaments	Evident from chaetiger 61, with around 6 filaments
Habitat	1m; fine sand	21–55 m; sandy mud, muddy sand, and sand with shell fragments	0–1 m; fine or coarse sand	29–35 m; mixed sediment of sand, mud, and pebbles
Type locality	Sulawesi Island, Indonesia	Andaman Sea, Thailand	Gulf of California	Gulf of California
Reference	This study	García-Garza et al., 2017	García-Garza et al., 2009	García-Garza et al., 2009

3

Table 3(on next page)

Comparisons of closely related species in the genus

1

2 **Table 3 Comparisons of closely related species in the genus**

Morphological characters	***N. chinensis* sp. nov. Holotype**	***N. oraria* (McCammon & Stull, 1978) Holotype**	***N. dexterae* García-Garza et al., 2009 Holotype**
Body width in abdomen	1.7 mm	0.8 mm	1 mm
Eyespots	Present	Absent	Present
Prostomium	Conical with short palpode	Conical with palpode	Conical with distal palpode
Thoracic epithelium	Tessellated through chaetiger 5	Tessellated through chaetiger 8	tessellated through chaetiger 5
Degree of fused notopodia in anterior abdomen	Notopodial lobes fused and Chaetal fascicles almost touching	Notopodial lobes fused dorsally but chaetal fascicles separated	Notopodial lobes fused dorsally but chaetal fascicles separated
Dental structure of hooded hooks	Four rows of small teeth above main fang	Four rows of small teeth above main fang	Five rows of small teeth above main fang
Shape of the shaft of hooded hooks	With angled node	With bulbous node	With bulbous node
Lateral organs	As a small protuberance in the pits but protruded above surface in posterior segments	Protruded	Protruded above surface
Pygidium	Unknown	Unknown	Unknown
Branchiae	Present, retractile	Present	Unknown
Habitat	7–12 m; mud or muddy sand	1–180 m; mud	intertidal sand
Type locality	Guangxi Province, China	Waters off California, USA	Naos Island, Pacific coast of Panama
Reference	This study	García-Garza et al., 2017	García-Garza et al., 2009

3