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Abstract

The study of material collected during routine monitoring surveys dealing with oil extraction and aquaculture in waters off Myanmar (North Andaman Sea) and Indonesia (Macasar Strait), respectively, allowed us to analyse the taxonomy and diversity of the polychaete genus *Terebellides* (Annelida) . Three species were found, namely *Terebellides* af. *woodlawa*, *Terebellides hutchingsae* **spec. nov. (**a new species fully described and illustrated), and *Terebellides* sp. (likely a new species, but with only one available specimen) . The new species is characterised by the combination of some branchial (number, fusion and relative length of lobes and papillation of lamellae), and thoracic (lateral lobes and relative length of notopodia)

characters and is compared with all species described or reported in the SW Indo-Pacific area. The taxonomic relevance of the relative length of branchial lobes and different types of ciliature in branchial lamellae for species discrimination in the genus is discussed. A key to all *Terebellides* species described in SE Indo-Pacific waters is presented.

Key words

Polychaeta, Myanmar, Indonesia, *Terebellides*, New Species, Branchial morphology, SEM.

Introduction

The genus *Terebellides* is characterised by combination of several characters including the compact appearance of the prostomium, a peristomium forming two lips (upper and lower), a thorax composed by 18 chaetigers, capillary notochaetae, denticulate thoracic neurochaetal hooks and abdominal avicular uncini. Nevertheless, the two most distinctive characters are the single mid-dorsal branchiae composed by 2−5 lamellate lobes, and the geniculate chaetae present in the first 1−2 thoracic neuropodia.

The peculiar shape of the branchiae of the type species (i.e. *T. stroemii* Sars, 1835) led to attribute most subsequent records to this taxon. Therefore, the number of fully described species was relatively low and *T. stroemii* was thought as being cosmopolitan. Prior to the 1980's this species was reported from a wide variety of world areas and depths. In addition to this, the 'Catalogue of World Polychaetes' by Hartman (1959) contributed to this consideration by synonymizing several species with *T. stroemii* (e.g. *T. ypsilon*). However, since Williams (1984), this idea has gradually been changing. Imajima and Williams (1985) and Solís-Weiss *et al*. (1991) further supported to this trend and, thus, a progressively high number of new species have

47 been (and are being) described (e.g. Hutchings *et al*., 2015; Parapar & Moreira, 2008; Parapar *et*
48 *al*., 2011; 2013; 2016; Schüller & Hutchings, 2010; 2012; 2013). At the same time new
49 characters for the species discrimination have been reported, and those traditionally used (e.g.
50 branchial shape) have increasingly been described in greater detail. As a result, the true diversity
51 of the genus *Terebellides* begins to be revealed.

52 In the SW Indo-Pacific, ten species of *Terebellides* have been described: four from the
53 Philippine and China Seas (Salazar-Vallejo *et al*., 2014), namely *T. intoshi* Caullery, 1915, *T.*
54 *jorgeni* Hutchings, 2007, *T. sieboldi* Kinberg, 1867 and *T. ypsilon* Grube, 1878, and six from the
55 Australian coasts: *T. akares* Hutchings, Nogueira & Carrerette, 2015, *T. jitu* Schüller &
56 Hutchings, 2010, *T. kowinka* Hutchings & Peart, 2000, *T. mundora* Hutchings & Peart, 2000, *T.*
57 *narribri* Hutchings & Peart, 2000 and *T. woodlawa* Hutchings & Peart, 2000. Additional
58 references to the presence of *T. stroemii* in these waters are found in Caullery (1944), Rullier
59 (1965), Gallardo (1967), Stephenson *et al*. (1970, 1974), Gibbs (1971), Knox & Cameron (1971),
60 Hutchings (1977), Shin (1982), Amoureux (1984), Hutchings & Murray (1984), Hutchings *et al*.
61 (1993) and Tan & Chou (1993). Many reports of *T. stroemii* from Australian and New Zealand
62 waters were summarized by Day & Hutchings (1979) while Hutchings & Peart (2000), by
63 reviewing a high number of references and material of the Australian *Terebellides* (as well as
64 from near the type locality in the SW coast of Norway), described four new species and conclude
65 that *T. stroemii* is not present in southern latitudes. Further papers by Hutchings (2007), Schüller
66 & Hutchings (2010) and Hutchings *et al*. (2015) continued with the reassessment of the diversity
67 of *Terebellides* in Australian-Indonesian coasts.
68 Our paper addresses the study of the genus in waters off Myanmar and Indonesia, allowing us to
69 describe a new species. We are also reviewing and updating the previous works reporting this

genus in the area, and we present a key to all species recorded in the SE Indo-Pacific. Our study, which is by far not definitive, represents one more contribution for unveiling the hidden diversity of the genus *Terebellides* in world oceans and confirms that the type species is probably absent in the Indo-Pacific area. Furthermore, we provide evidences supporting that the diversity of *Terebellides* is still far to be well known.

Material and Methods

This study is based on 82 specimens of the genus *Terebellides* from 25 samples collected during routine monitoring surveys dealing with oil extraction and aquaculture in waters off Myanmar (North Andaman Sea, 2003) and Indonesia (East of the Borneo Island, North of Macasar Strait, 2004), respectively (Table 1).

The samples were collected by means of a van Veen grab covering about 0.3 m^2. The grab contents were mixed in a sufficiently large container, and then sieved out on board by pouring the contents through a 1 mm mesh sieve. The retained sediment was then transferred into a plastic bag, fixed with a 10% formaldehyde/seawater solution, stained with “Rose of Bengal” and stored until sorted. An initial sorting was performed under a dissecting stereomicroscope (Zeiss Stemi 2000-C) and the specimens of *Terebellides* were counted and preserved in 70% ethanol.

In Myanmar, a one-liter volume of sediment from one grab was used for physico-chemical analyses (viz. granulometry, organic carbon content). The sediment was taken at each station and transferred into a wide-mouthed double-closing 500 ml polyethylene flasks, which were stored in the dark until transferred to the laboratory. Laser granulometry (% volume) was performed on dry sediment after sifting through a 0.8 mm mesh sieve using a Malvern Mastersizer S laser

93 granulometer. Sediments were characterized by the percentage of silt and clay (diameter < 63
94 µm) Estimates of organic carbon have been made according to the European experimental
95 standard NF ISO 14235 (oxidation method, 0.1 % m/m).
96 Light microscope images were obtained by means of a Olympus SZX12 stereomicroscope
97 equipped with a Olympus C-5050 digital camera. Line drawings were made by means of an
98 Olympus BX40 stereomicroscope equipped with camera lucida. Specimens used for examination
99 with Scanning Electron Microscope (SEM) were prepared by critical point drying, covered with
100 gold and examined and photographed under a JEOL JSM-6400 electron microscope at the
101 Servizos de Apoio á Investigación-SAI (Universidade da Coruña-UDC, Spain).
102 Most of the obtained material was deposited in the Museo Nacional de Ciencias Naturales
103 (Madrid, Spain; MNCN). Additional paratypes of *T. hutchingsae* **spec. nov.** were deposited in
104 the collections of the Australian Museum (Sydney, Australia; AM) and Göteborgs
105 Naturhistoriska Museum (Göteborg, Sweden; GNM). Type material of *Terebellides gracilis*
106 Malm, 1874 was loaned for study by the Göteborgs Naturhistoriska Museum (Holotype, GNM
107 Polych 641). Type material of *Terebellides sieboldi* Kinberg, 1866 was requested to the Swedish
108 Museum of Natural History for comparison but only one specimen, and badly preserved, could
109 be located (L. Gustavsson, *in litt*.).
110 The electronic version of this article in Portable Document Format (PDF) will represent a
111 published work according to the International Commission on Zoological Nomenclature (ICZN),
112 and hence the new names contained in the electronic version are effectively published under that
113 Code from the electronic edition alone. This published work and the nomenclatural acts it
114 contains have been registered in ZooBank, the online registration system for the ICZN. The
115 ZooBank LSIDs (Life Science Identifiers) can be resolved and the associated information viewed

116 through any standard web browser by appending the LSID to the prefix http://zoobank.org/. The
117 LSID for this publication is: 39745D2F-9163-48B2-9FAB-FBF66D3AEFB5. The online version
118 of this work is archived and available from the following digital repositories: PeerJ, PubMed
119 Central and CLOCKSS.
120
121 *Abbreviations used in text and figures*: BL—branchial lobes; BT—buccal tentacles; CP = ciliated
122 papillae; CHG = chaetiger with geniculate chaetae; dl—dorsal lobes; gc—geniculate chaeta;
123 go—genital opening; GP = genital papillae; LL—lateral lappets; NACH = number of abdominal
124 chaetigers; npa—nephridial papillae; NRTU = number of rows of frontal rostral teeth in thoracic
125 uncini; PPP = posterior pointed projection; r—rostrum; TC—thoracic chaetiger; TN—thoracic
126 notopodia; tp—terminal projection; TU—thoracic uncini.
127
128 **Results**
129 *Systematics*
130 Family Trichobranchidae Malmgren, 1866
131 Genus *Terebellides* Sars, 1835, emended by Schüller & Hutchings, 2013
132
133 Type species
134 *Terebellides stroemii* Sars, 1835, redescribed by Parapar & Hutchings, 2015
135
136 *Terebellides hutchingsae* **spec. nov.**
137 LSID: 78E96984-41E7-43E6-8E5D-03E9421BE306
138 (Figs 1–8, Tables 2–3)

139

140 *Material examined*

141 **INDONESIA** (Macasar Strait): **Holotype**: MNCN 16.01/0000 (St. 6). **Paratypes:** MNCN
142 16.01/0000 (St. 2, 4 specs); MNCN 16.01/0000 (St. 3, 3 specs); MNCN 16.01/0000 (St. 5, 2+1
143 specs); MNCN 16.01/0000 (St. 5, 1 spec. on SEM stub); MNCN 16.01/0000 (St. 6, 5 specs);
144 MNCN 16.01/0000 (St. 7, 5 specs); MNCN 16.01/0000 (St. 8, 7 specs); MNCN 16.01/0000 (St.
145 8, 1 spec. on SEM stub); MNCN 16.01/0000 (St. 15, 2 specs); MNCN 16.01/0000 (St. 16, 6
146 specs); MNCN 16.01/0000 (St. 23, 1 spec. on SEM stub. **MYANMAR** (North Andaman Sea):
147 **Paratypes**: MNCN 16.01/0000 (St. E7(2), 1 spec.); MNCN 16.01/0000 (St. E8(3), 1 spec.);
148 MNCN 16.01/0000 (St. E11B(2), 4 specs); MNCN 16.01/00000 (St. E11B(3), 2 specs); MNCN
149 16.01/0000 (St. E14(2), 4 specs); MNCN 16.01/0000 (St. E15(2), 10 spec.); MNCN 16.01/0000
150 (St. E16(1), 2 specs); MNCN 16.01/0000 (St. E16(3), 1 spec.); MNCN 16.01/0000 (St. 17(3), 1
151 spec.); MNCN 16.01/0000 (St. S2(2), 1 spec.); MNCN 16.01/0000 (St. S3(2), 4 specs); MNCN
152 16.01/0000 (St. S3(2), 1 spec. on SEM stub); MNCN 16.01/0000 (St. S3(3), 4 specs); MNCN
153 16.01/0000 (St. S4(2), 2 specs); MNCN 16.01/0000 (St. S4(3), 1 spec.); MNCN 16.01/0000 (St.
154 WP2(2), 2 specs); MNCN 16.01/0000 (St. WP2(3), 2 specs); MNCN 16.01/0000 (St. WP2(3), 2
155 specs on SEM stub); MNCN 16.01/0000 (St. WP3(3), 1 spec.).

156

157 *Description* (based on holotype and paratypes)

158 Complete individuals ranging from 9.0 to 14.0 mm in length (14 mm in holotype; Fig. 2A–B)
159 and 0.7 to 1.5 mm in maximum width at thoracic region (1.3 mm in holotype, excluding
160 parapodia). Body tapering posteriorly with segments increasingly shorter and crowded towards
161 pygidium. Prostomium compact; peristomium forming a tentacular membrane with large upper

and lower lips surrounding mouth, sometimes almost devoid of buccal tentacles (Fig. 3A). Buccal tentacles of two types, short ventral tentacles uniformly cylindrical or slightly expanded at tips, and long dorsal tentacles more expanded at tips (Figs 2B, 4A–B). Lateral lappets on TC1–5 (SGIII–VII), being larger in TC1–3 (Figs 2B, 3A, 4C, 6A). No conspicuous dorsal rounded projection on anterior chaetigers or oval-shaped glandular region in TC3. Both notopodia and notochaetae in TC1 less developed than in following chaetigers (Figs 3A, 4C).

Branchiae arising as single structure from SGII–III, with a single, mid-dorsal, stalk and two pairs of unfused lobes; lower (=ventral) (BL3–4) pair smaller and much shorter than upper (=dorsal) (BL1–2) pair of lobes (Figs 3A–B, 6B–C). Upper and lower lobes with a short terminal pointed projection (although deciduous and sometimes damaged) (Fig. 3C). Dorsal pair of branchial lobes with short anterior projection (fifth lobe; BL5) (Fig. 3D), sometimes hidden behind buccal tentacles (Fig. 2A–B). Loss of any of branchial lobes not observed. One side of branchial lamellae with parallel bent rows of cilia and well-developed ciliated papillae on edge of one side of each branchial lamella (Fig. 3D–F).

Eighteen thoracic chaetigers (SGIII–XX), all with notopodia; neuropodia from SGVIII. Notopodia of TC1 smaller than following ones (Fig. 4C, E); all remaining notopodia similar in size. Thoracic neuropodia as sessile pinnules, from TC6 (SGVIII) to TC18, with uncini in single rows from TC7 (SGIX) throughout. Thoracic notochaetae similar in length, with textured surface (Fig. 4F). Ciliated papilla dorsal to each thoracic notopodia not observed. First thoracic neuropodia (TC6) with 4–7 geniculate acicular chaetae with minute teeth in their upper part forming a *capitium* easily overlooked without SEM (Fig. 6E–F); sharply bend. Subsequent thoracic neuropodia with one row of about 8–10 uncini per torus (Fig. 5A); uncini as shafted denticulate hooks with long, pointed *rostrum* surmounted by 4–5 teeth and an upper crest of

several smaller denticles of different sizes (Fig. 5A–C). One finger-shaped nephridial papilla basal to branchial stem (Fig. 4E); genital openings, dorsal to notopodia in TC4 and TC5 (Figs 4D, 6D).

Twenty seven to 30 abdominal chaetigers (30 in holotype). Abdominal neuropodia as erect pinnules, with about 30 uncini per torus (Fig. 5D). Uncini with 3–4 teeth above main fang (Fig. 5D–E), surmounted by a row of an irregular number of shorter teeth and an upper crest of minute teeth. Pygidium blunt, funnel-like depression. No eggs were observed in body cavity of holotype, but mature females of smaller size were observed (9.0 mm length, 1.0 mm width). Colour in alcohol pale brown.

Type locality

Macasar Strait (Indonesia), muddy bottom with shell fragments at 72 m depth.

Distribution and habitat

Specimens of *T. hutchingsae* **spec. nov.** were found in shallow water bottoms (45.5–51.0 m depth) about 80 Km off the coast of Myanmar (North Andaman Sea) and in slight deeper bottoms (58.0–84.0 m depth) about 16 Km off the mouth of the Mahakam delta in the East coast of the Borneo Island (Indonesia) (North Makassar basin) (Table 1, Fig. 7).

Etymology

The species is named after Dr. Pat Hutchings, for her many contributions to the taxonomy of Terebelliform polychaetes in Australia and SW Pacific waters, and particularly to the genus *Terebellides*, and also for her key role in the study of Australian polychaetes.

208

209 *Remarks*

210 Several species of *Terebellides* were previously described in the Myanmar-Indonesia-
211 Philippines-North Australia area (Fig 7): *T. intoshi* Caullery, 1915, *T. sieboldi* Kinberg, 1867, *T.*
212 *ypsilon* Grube, 1878, *T. jorgeni* Hutchings, 2007 and *T. jitu* Schüller & Hutchings, 2010.
213 *Terebellides intoshi* is characterised by the large size of the notopodia and notochaetae from TC6
214 onwards (Fig. 8A) and probably by the presence of two chaetigers with geniculate chaetae as
215 well (see Remarks of *Terebellides* sp.); *T. sieboldi* has geniculate chaetae in TC7 instead of TC6
216 and *T. ypsilon* is considered undeterminable by Hutchings & Peart (2000) because type material
217 no longer exists. The two most recently described species, *Terebellides jorgeni* and *T. jitu*, are
218 the most similar to *T. hutchingsae* **spec. nov.** *Terebellides jorgeni* differs from the new species
219 in: 1) the presence of glandular and whitish ventral part of anterior segments, SG5 to SG9 (CH3
220 to CH7) but specially on SG5 to SG7 (absent in *T. hutchingsae* **sp. nov.**), and bearing
221 pronounced thickening and elevation of dorsal anterior margins forming dorsal crests; 2) genital
222 pores are present in SG4 and SG5, instead of SG6 and SG7 (TC4 and TC5) as in *T. hutchingsae*
223 **spec. nov.**; 3) the branchiae are formed by four lobes instead of five**.** On the other hand, the
224 overall shape of branchiae is quite similar in both species, being lobes 1–4 unequal sized and
225 entirely free (not fused), with upper (dorsal) ones larger than lower (ventral) ones, and with
226 "surface of branchial lamellae weakly papillate" (cfr. p. 78 in Hutchings, 2007); the latter
227 probably refers to the presence of ciliated papillae, which is a feature difficult to confirm in the
228 original figures.

229 *Terebellides jitu* is also similar to *T. hutchingsae* **spec. nov.** but all branchial lobes are of
230 similar length and fused half of their length instead of the lower ones being much shorter and
231 fused basally as in *T. hutchingsae* **spec. nov.**
232 *Terebellides narribri* Hutchings & Peart, 2000 and *T. woolawa* Hutchings & Peart, 2000
233 were described from the NE Australian coast. Both species share with *T. hutchingsae* **spec. nov.**
234 branchiae with similar shape and composed by five lobes; *Terebellides narribri* differs from the
235 new species by having first thoracic notopodia (TN1) of same size as the following, and TC3
236 bearing large, white, oval pair of glandular patches. *Terebellides woodlawa* is characterised by
237 the great development of BL5 (see Remarks on *T*. af. *woodlawa*) and by having anterior thoracic
238 segments with dorsal projections on lateral lappets, which are absent in *T. hutchingsae* **spec. nov.**
239 The North Atlantic species and type species of the genus *Terebellides*, i. e. *T. stroemii* Sars,
240 1835, was also widely reported in the area (e. g. Indonesia: Caullery (1944); South Korea:
241 Gallardo (1967); Hong Kong: Shin (1982); Singapore: Tan & Chou (1993); Australian coast:
242 Stephenson *et al*. (1970; 1974), Knox & Cameron (1971), Hutchings (1977), Amoureux (1984),
243 Hutchings & Murray (1984), Hutchings *et al*. (1993); Fig. 7). This species was recently
244 redescribed by Parapar & Hutchings (2015) from Norwegian specimens collected by Michael
245 Sars near the type locality. In the Southern Pacific Ocean, its presence had already been denied
246 by Hutchings & Peart (2000) after examining Norwegian material; indeed, part of this material
247 was already reassigned to other species (see Hutchings & Peart, 2000) while others specimens
248 were not. Among the latter, the material reported by Caullery (1944) and collected during the
249 Siboga expedition might well correspond to more than one species according to the description
250 and illustrations. The shape of the branchiae in specimen from station 271 (fig. 147 in Caullery,
251 1944; redrawn here in Fig. 8B) and station 311 (fig. 148 in Caullery, 1944; redrawn here in Fig.

8C) sharply differs in BL5 size; the specimen of station 311 is more similar in branchial shape to *T. hutchingsae* **spec. nov.** but differs in the high degree of fusion of dorsal and ventral lobes in Caullery's material (see Fig. 8C). The specimen reported by Gallardo (1967) cannot be properly identified because the description is quite brief (e.g. "The branchia has the typical shape…") and only a lateral view of a thoracic uncinus is illustrated and this is not relevant in species discrimination.

One of the most relevant diagnostic characters of *T. hutchingsae* **spec. nov.** is the presence of ciliated papillae in branchial lamellae. This character was long ignored in *Terebellides* descriptions and was discussed by Parapar *et al*. (2016). In fact, several recently described species from across the world oceans show this feature, namely *T. gracilis* Malm, 1874 *sensu* Parapar *et al*. (2011), off Iceland; *T. jorgeni* Hutchings, 2007, from Indonesia; *T. gracilis* Malm, 1874 *sensu* Parapar *et al*. (2013) and *T. mediterranea* Parapar *et al*., 2013, from the Adriatic Sea; *T. akares* Hutchings *et al*., 2015, from the Great Barrier Reef (NE Australia); a new species described by Parapar *et al*. (in press), from the Persian Gulf; and *T.* af. *woodlawa* Hutchings & Peart, 2000 *sensu* Parapar *et al*. (this work) from South Myanmar. This character is probably much more widespread that was thought previously, and shows at least two different morphotypes: 1) low papillae as it was found in *T. gracilis* from Iceland and the Mediterranean, and 2) well developed papillae in the rest of species. The presence of these low ciliated papillae (Parapar *et al*., 2011; 2013) in Icelandic and Adriatic specimens of *T. gracilis* could not be confirmed yet in the holotype of (see M&M above).

Terebellides af. *woodlawa* Hutchings & Peart, 2000

(Figs 2C–D)

275

276 *Material examined*

277 Two specimens. MNCN 16.01/0000 (St. S4(3), 1 spec.); MNCN 16.01/0000 (St. WP3(3), 1

278 spec.).

279

280 *Distribution and habitat*

281 Both specimens of *T*. af. *woodlawa* were found in two near shallow water stations (51.0 m depth)

282 about 80 Km off the mouth of the Irawadi river in the coast of Myanmar (North Andaman Sea)

283 (Table 1).

284

285 *Remarks*

286 *Terebellides woolawa* is characterised by the well-developed fifth branchial lobe (BL5) and the

287 presence of dorsal rounded projections on lateral lappets of SG 3–6 (TC1–4). This large species

288 was described from intertidal to shallow water habitats in eastern Australia (Fig. 7) and was

289 found across most of Australian coasts (Hutchings & Peart, 2000). Specimens found in this study

290 are large-sized, and agree fairly well with the original description; in particular, specimen

291 MNCN 16.01/0000 shows the typical shape of the branchiae, which have five lobes, BL1–4 are

292 fused up to half of their length, filamentous tips are short, and BL5 is well developed (Fig.

293 2C–D). Nevertheless, our specimens lack the characteristic dorsal lobes of anterior thoracic

294 lateral lappets: this prevented to fully confirm the identity of our material.

295

296 *Terebellides* sp.

297 (Fig 2E–F, 7, 9)

298

299 *Material examined*

300 One specimen. MNCN 16.01/0000 (St. S4(3), 1 spec.).

301

302 *Distribution and habitat*

303 The specimen was found in shallow water bottom (51.0 m depth) about 16 Km off the coast of

304 Myanmar (North Andaman Sea) (Table 1).

305

306 *Remarks*

307 The specimen differs from *T. hutchingsae* **spec. nov.** and *Terebellides* af. *woolawa* in two

308 features: 1) BL5 is large-sized, about half the length of posterior lobes (BL1–4); and 2) TC5 and

309 TC6 are both provided with acicular geniculate chaetae. Thus, BL5 is longer than in any other

310 described species including *T. woodlawa*; however, this might be due to the preservation state of

311 the specimen, which is slightly deteriorated. Anyway, the combination of the two

312 aforementioned characters may justify the erection of a new species but we prefer to wait for

313 eventual finding of additional specimens to confirm its status.

314 Four species of the genus *Terebellides* were previously described as having geniculate

315 chaetae in two thoracic chaetigers: *T. akares* Hutchings, Nogueira & Carrerette, 2015 (North-

316 East Autralia), *T. biaciculata* Hartmann-Schröder, 1992 (French Polynesia), *T. bigeniculatus*

317 Parapar, Moreira & Helgason, 2011 (Iceland) and *T. intoshi* Caullery, 1945 *sensu* Imajima &

318 Williams (1985) (Japan).

319 We follow Parapar *et al*. (2011) in considering that type material of *T. intoshi* from South China

320 Sea (see Figure 8) probably does not have two chaetigers with geniculate chaetae and thus

Japanese material would belong to a different species. Anyway, the latter also differs from *Terebellides* sp. in the branchial shape and the greater development of thoracic notopodia from TC6 (Fig. 8A). In *Terebellides akares*, the branchiae bears a much shorter BL5 and posterior ventral lobes (BL3–4) are completely free from each other; in *Terebellides* sp., these lobes are fused in most of their length (Fig. 2F).

Key of SE Indo-Pacific species of Terebellides

The key here presented has been modified from the previous key of Australian Trichobranchidae (Hutchings & Peart 2000), which was based on a limited number of easy-to-detect characters: 1) number of chaetigers with geniculate chaetae, 2) degree of development of thoracic notopodia, and 3) shape of branchiae, giving special emphasis to the relative size of branchial lobes. *Terebellides ypsilon* Grube, 1878, from the Philippines, was not included because the description is very brief and following Hutchings & Peart (2000), who revised the type material, the taxon should be considered as undeterminable.

1. GC in two TC .....
2
- GC in one TC .....
4
2. All TN of similar length .....
3

- TN from TC6 onwards much bigger in size and with more numerous and longer notochaetae .... *T. intoshi* Caullery, 1944

3. TU with GC similar in shape and position ..... *T. akares* Hutchings *et al*., 2015

- TU with GC different in shape and position ..... ***Terebellides* sp.**

4. GC in TC7[1] ..... *T. sieboldi* Kinberg, 1867

- GC in TC6 5

5. Branchial lobes 1-4 loosely fused ..... *T. mundora* Hutchings & Peart, 2000

- Branchial lobes 1-4 more or less fused 6

6. Four branchial lobes 7

- Five branchial lobes 8

7. All TN similar in size and well developed ..... *T. kowinka* Hutchings & Peart, 2000

- TN1 and TN2 much smaller than subsequent ones ..... *T. jorgeni* Hutchings, 2007

8. BL5 about 1/5 length of posterior lobes; thoracic LL without dorsal projections, GC of TC6 sharply bent 9

- BL5 almost 1/2 length of posterior lobes; LL of TC1-4 with dorsal projections, GC of TC6 gently curved ..... *T. woolawa* Hutchings & Peart, 2000

9. TN1 not reduced; large, white, oval glandular patches in TC3 .....

..... *T. narribri* Hutchings & Peart, 2000

- TN1 strongly reduced; no glandular patches in TC3 .....

10

10. All branchial lobes of similar length and fused half of their length; BL with transverse ridges of ciliature ..... *T. jitu* Schüller & Hutchings, 2010

- Ventral (posterior) branchial lobes much sorter than dorsal (anterior) ones and fused basally; BL with ciliated papillae on border ..... ***T. hutchingsae* spec. nov.**

(1) The position of GC in TC7 is very rare in the genus *Terebellides*; this feature is apparently only shared with *T. pacifica* Kinberg, 1866, a species which has been removed from synonymy with T. *stroemii* by Garraffoni *et al*. (2005).

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Table 1(on next page)

Main abiotic characteristics: Silt and Organic Carbon contents

Main abiotic characteristics of the samples where *Terebellides* specimens were collected. Org. car., organic carbon content (%).

	Station	*Date*	*Longitude N*	*Latitude E*	*Depth (m)*	*≤63μm%*	*Org. car.*
Myanmar (N Andaman Sea)	E7	03/12/03	15º07'59.8"	94º46'46.5"	46.0	76.3	1.26
	E8	"	15º06'27.7"	94º46'50.2"	47.0	78.7	1.29
	E11	"	15º07'23.2"	94º46'45.9"	47.0	83.6	1.21
	E14	"	15º07'20.0"	94º46'51.1"	47.4	76.7	1.12
	E15	"	15º07'15.9"	94º46'51.1	47.0	80.4	1.16
	E16	"	15º07'07.8"	94º46'51.0"	47.6	73.8	1.15
	E17	"	15º07'14.9"	94º45'25.9"	48.0	74.0	1.28
	S2	"	15º02'03.3"	94º45'45.7"	51.0	72.8	0.86
	S3	"	15º02'19.4"	94º46'02.6"	51.0	80.5	0.98
	S4	"	15º03'08.2"	94º46'03.0"	51.0	90.2	0.92
	WP2	"	15º09'06.6"	94º45'26.7"	45.5	86.2	1.19
	WP3	"	15º02'03.0"	94º46'19.2"	51.0	69.6	2.42
Indonesia (Macasar Strait)	*Station*	*Date*	*Longitude S*	*Latitude E*	*Depth (m)*	*sediment*	
	2	23/07/04	0º44'35"	117º45'30"	84	Mud + shell fragments	
	3	"	0º43'20"	117º48'52"	67	Coarse + shell fragments	
	5	26/03/04	0º46'00"	117º47'32"	72	Mud + shell fragments	
	6	"	0º47'02"	117º45'45"	73	"	
	7	25/03/04	0º49'45"	117º44'10"	70	Homogeneous clear mud	
	8	26/03/04	0º48'12"	117º48'15"	78	Mud + shell fragments	
	15	24/03/04	0º55'55"	117º40'52"	58	Clear mud + shell fragments	
	16	"	0º55'41"	117º43'11"	70	"	
	23	29/03/04	0º36'24"	117º35'12"	3	Fine black mud	

1

Table 2(on next page)

Comparison of body characters in *Terebellides*

Comparison of several body characters of the species of *Terebellides* described with ciliated papillae in branchial lamellae.

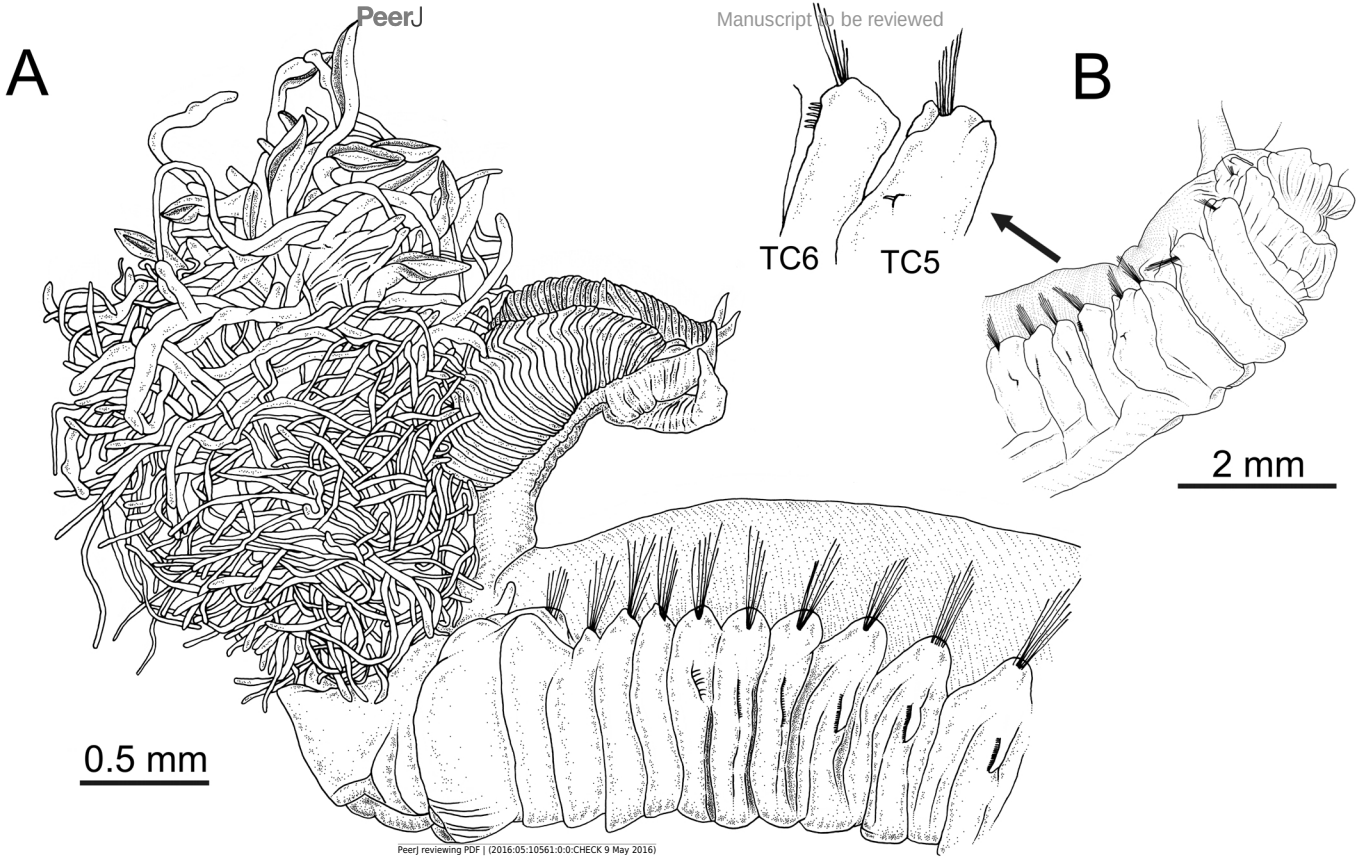
	Source	GP	LL	Branchiae				CH1	CHG	NRTU	NACH	Distribution
				Lobes	Relative length	CP + presence	PPP					
T. gracilis Malm, 1874	Parapar *et al.* (2011)[1]	TC4−5	TC1−5[2]	4[3]	Same	Low + both sides	no	Shorter	6	2[4]	44	Swedish coast of Skagerrak
T. jorgeni Hutchings, 2007	Hutchings (2007)	TC 2−3[5]	SG1−5 and SG7−8	4	Ventral shorter	High[6]	No[7]	Shorter[8]	6	4-6	~48	Bali[9]
T. akares Hutchings *et al.*, 2015	Hutchings *et al.* (2015)	TC4−5	TC1−8	5	Ventral shorter	High + both sides	No[7]	Shorter	5-6	4[7]	17−25	North-east Australia
Terebellides shetlandica Parapar *et al.* 2016	Parapar *et al.* (2016)	TC4−5	TC1−6	5	Ventral shorter	High + one side	Short	Shorter	6	4	27−36	Iran
***T. hutchingsae* spec. nov.**	This work	TC4−5	TC1−5	5	Ventral shorter	High + one side	Short	Shorter	6	4	27−30	Indonesia and Myanmar

(1) From a redescription of Malm's holotype; (2) very low lappets; (3) the fifth lobe is very low and therefore branchiae could be described as with only four lobes; (4) character observed from the study of several specimens under the SEM; it cannot be properly observed in holotype; (5) author mentions SG 3−5; this can be interpreted as NP in SG3 (TC1) and GP in TC2-3; author probably meant TC3−5; (6) author simply mentions "surface of (branchial) lamellae weakly papillate"; (7) not explicitly mentioned in the original description of the species; taken from figures; (8) CH2 also smaller than subsequent ones; (9) this species shows a disjunct distribution, being originally described from Bali but also reported from W and S Africa and Tasman Sea.

Figure 1(on next page)

Line drawings of the species of *Terebellides*

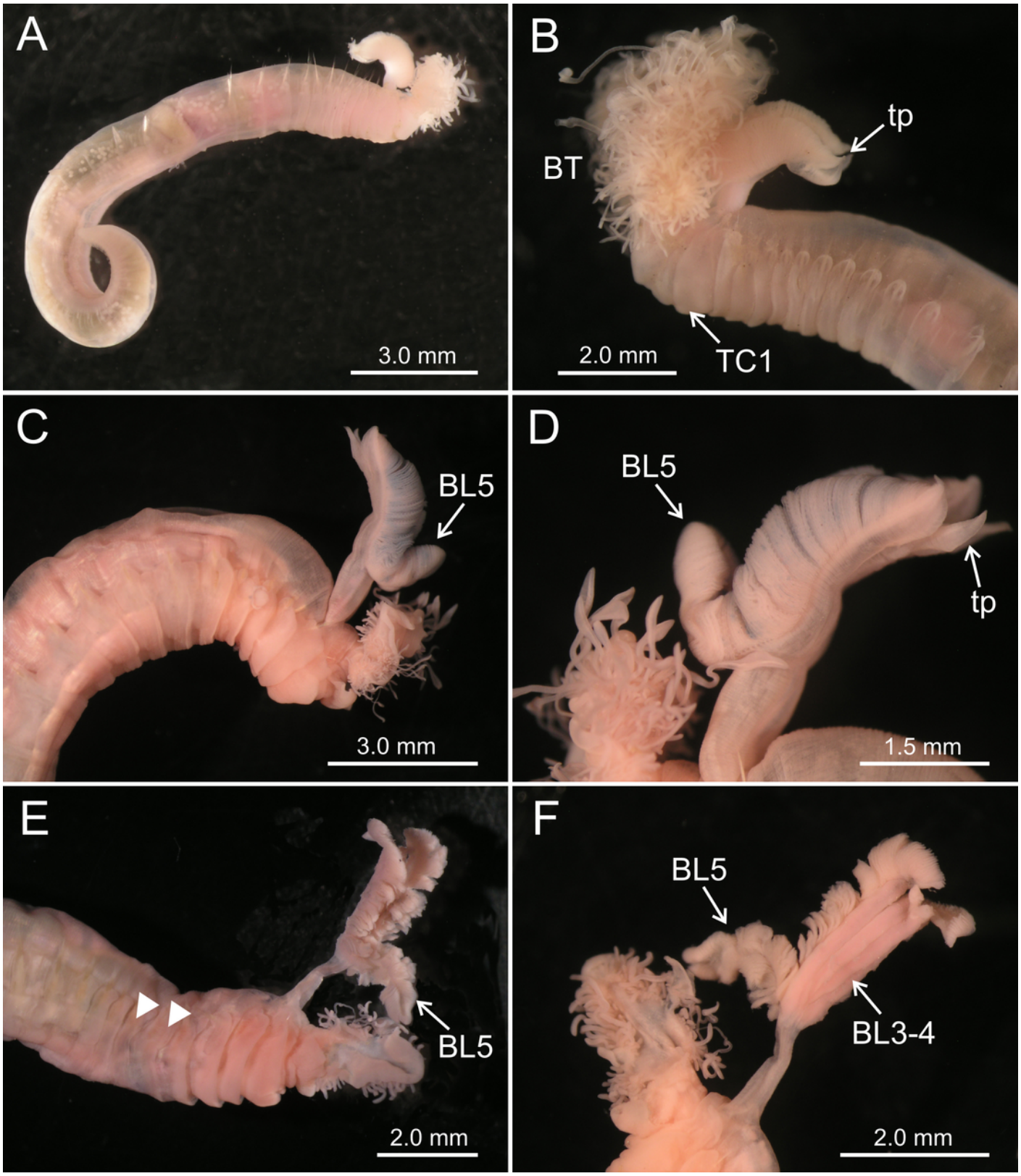
Terebellides hutchingsae **spec. nov.**, Holotype from Indonesia, MNHN 16.01/0000. A, left lateral view; *Terebellides* sp., MNCN 16.01/0000. B, detail of geniculate chaetae in CH5 and CH6 of right side of body.


A
B
TC6
TC5
2 mm
0.5 mm

2

Stereomicroscope images of *Terebellides* spp.

A–B. *Terebellides hutchingsae* **spec. nov.** Stereomicroscope images. Holotype MNCN 16.01/0000. A, general view; B, anterior end, left lateral view. C–D. *Terebellides* af. *woodlawa* MNCN 16.01/0000. C. anterior end right lateral view; D, detail of branchiae, left lateral view. E–F. *Terebellides* sp. MNCN 16.01/0000. E. anterior end right ventro-lateral view, arrowheads pointing to thoracic chaetigers CH5 and CH6; F. detail of branchiae in ventral view.

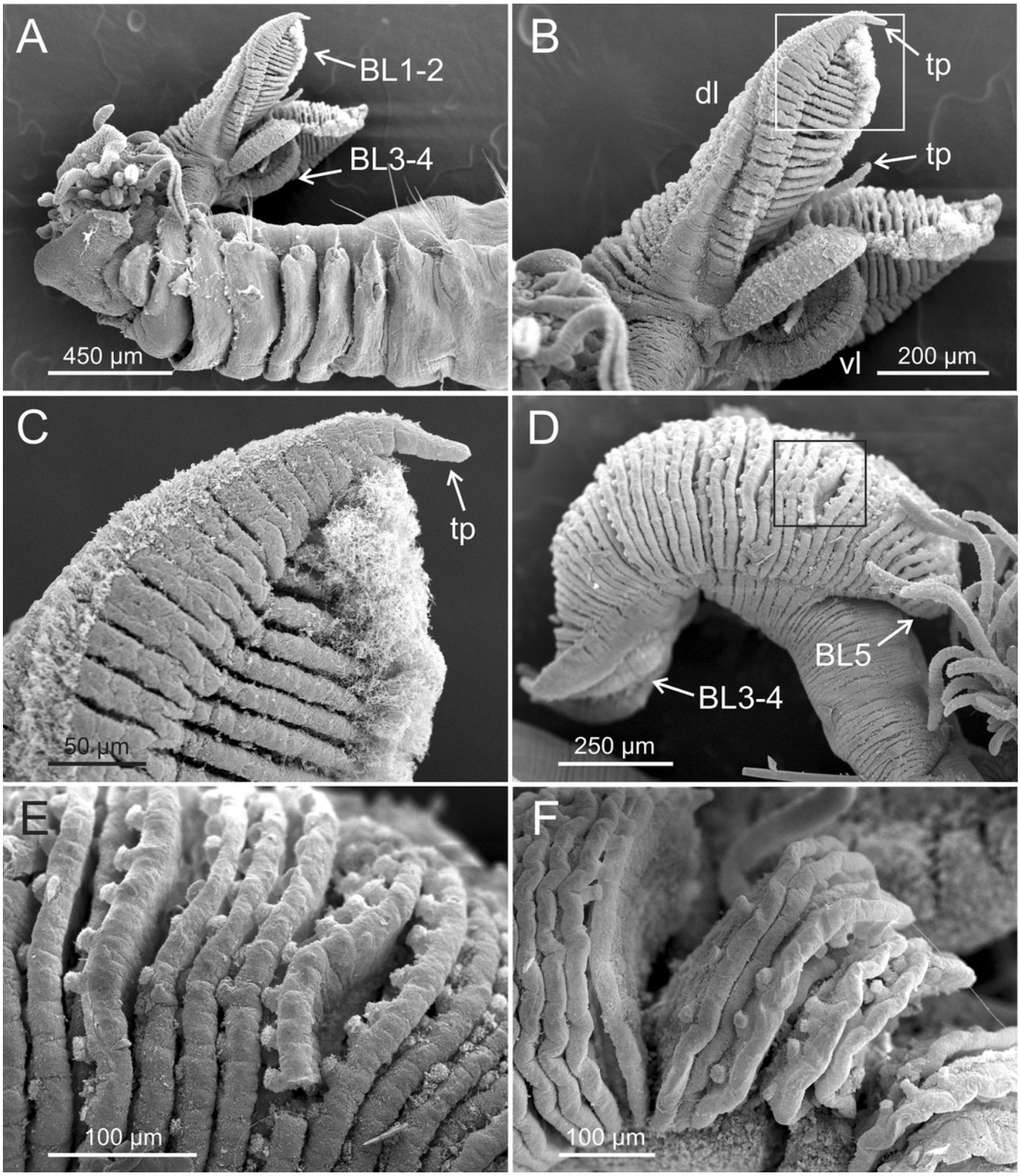

A
3.0 mm
B
tp
BT
2.0 mm
TC1
C
BL5
3.0 mm
D
BL5
tp
1.5 mm
E
BL5
2.0 mm
F
BL5
BL3-4
2.0 mm

3

SEM micrographs of paratypes of *Terebellides hutchingsae* spec. nov. from Indonesia

Terebellides hutchingsae **spec. nov.**, SEM micrographs of paratypes from Indonesia, MNCN 16.01/0000 and MNCN 16.01/0000. A, anterior end, left lateral view, showing lateral lappets and relative size of branchial lobes; B, detail of branchial lobes showing degree of fusion between dorsal (dl) and ventral (vl) lobes; C, detail of distal end of left dorsal lobe showing ciliary fields and terminal projection (tp); D and E, Detail of ciliated papillae of branchial lobes lamellae.

**Note: Auto Gamma Correction was used for the image. This only affects the reviewing manuscript. See original source image if needed for review.*

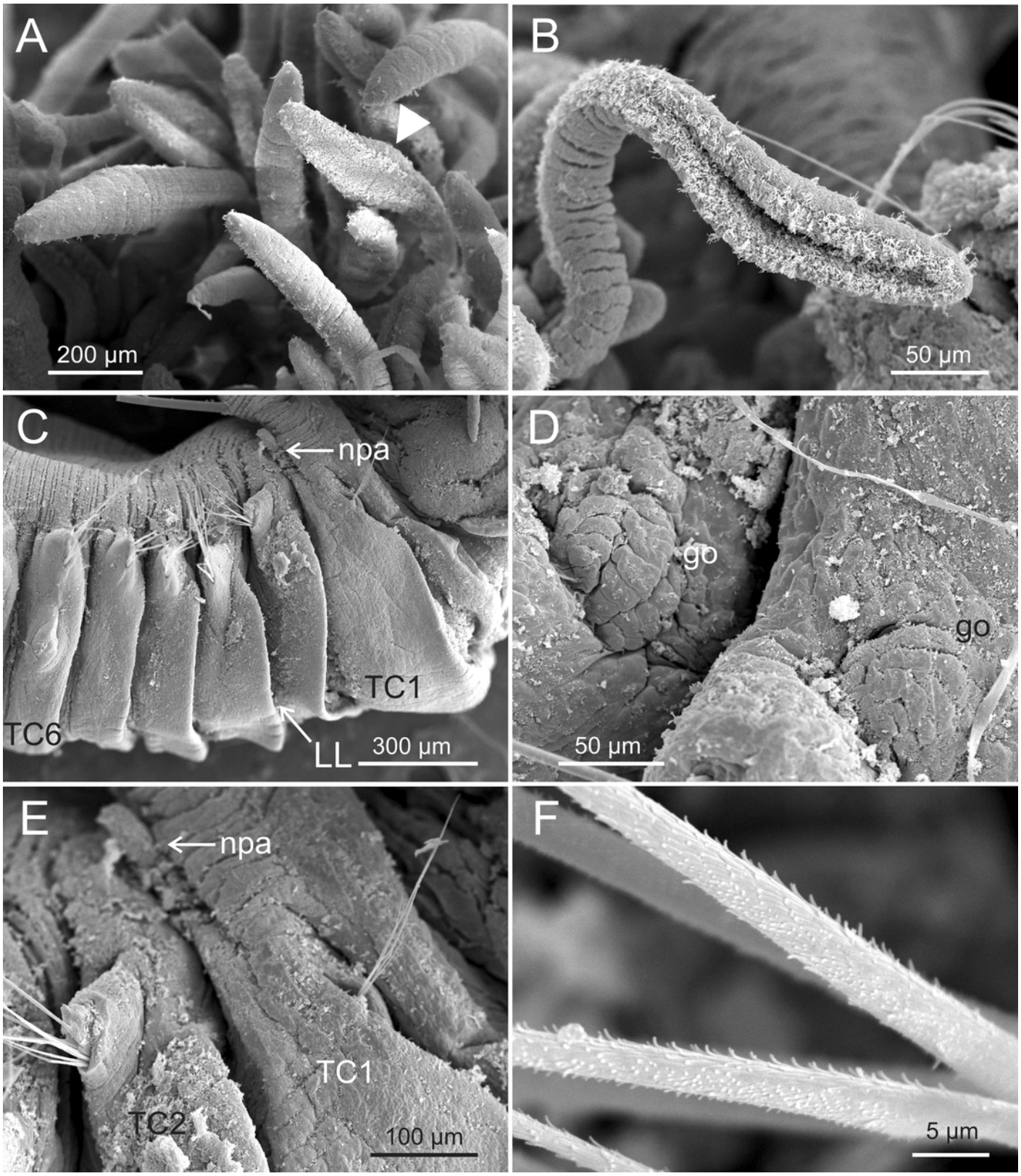

A
BL1-2
BL3-4
450 µm
B
dl
tp
tp
vl
200 µm
C
tp
50 µm
D
BL5
BL3-4
250 µm
E
100 µm
F
100 µm

4

SEM micrographs of paratypes from Indonesia, Cont.

Terebellides hutchingsae **spec. nov.**, SEM micrographs of paratypes from Indonesia, MNCN 16.01/0000 and MNCN 16.01/0000. A, several buccal tentacles, one showing ciliated side of distal end (arrowhead); B. detail of ciliated distal end of a buccal tentacle; C, anterior end, left lateral view, showing lateral lappets (ll) from TC1 to TC6 and nephridial papilla (npa) in TC1; D, detail of genital papillae (gp) of TC4 and TC5; D, TC1 and TC2; E, TC1 and TC2 thoracic notopodia showing reduction of TC1; F. detail of pilose surface of thoracic notochaetae.

**Note: Auto Gamma Correction was used for the image. This only affects the reviewing manuscript. See original source image if needed for review.*

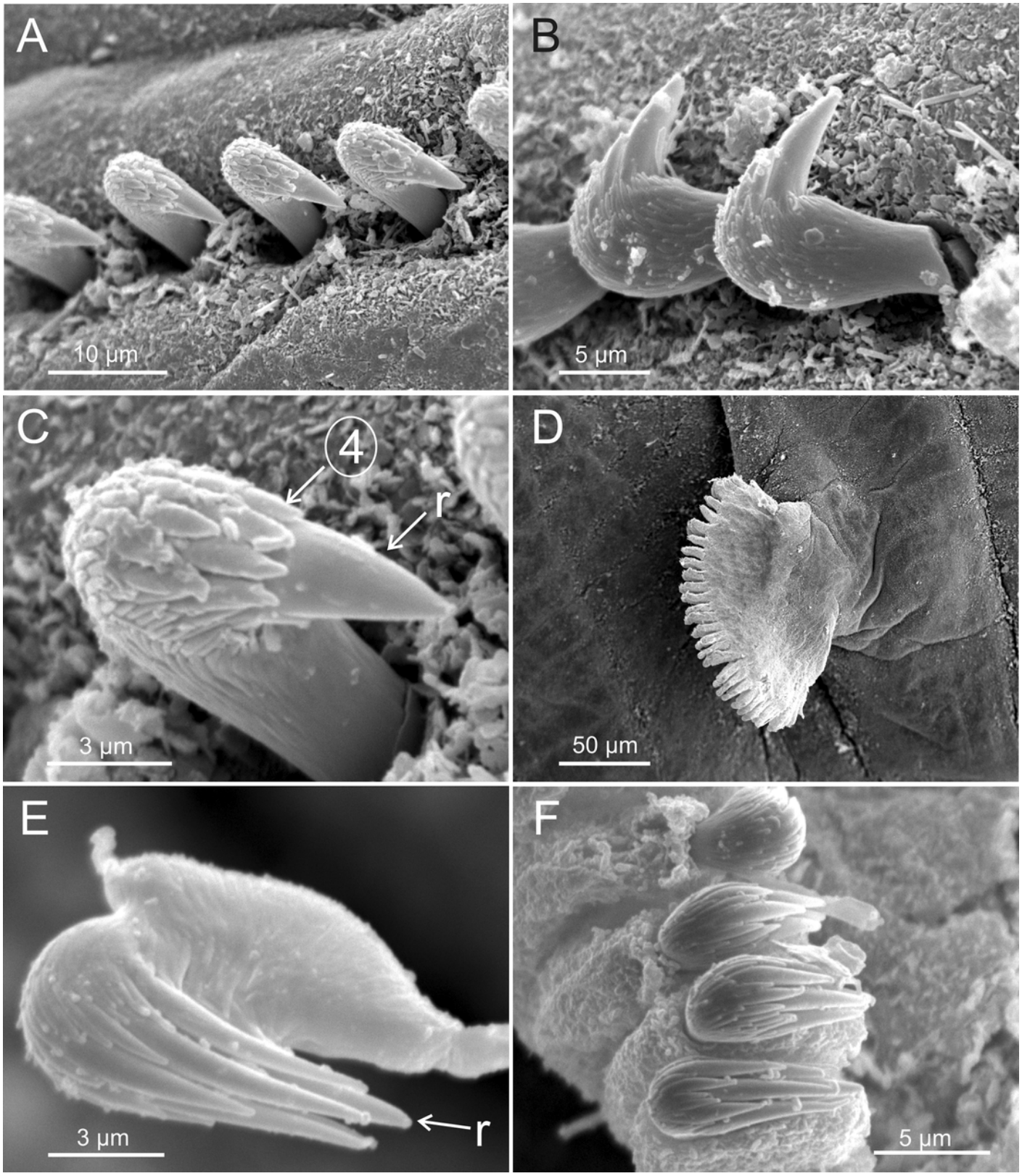

A
200 µm
B
50 µm
C
npa
TC1
TC6
LL
300 µm
D
go
go
50 µm
E
npa
TC1
TC2
100 µm
F
5 µm

5

SEM micrographs of paratypes from Indonesia, Cont. 2

Terebellides hutchingsae **spec. nov.**, SEM micrographs of paratypes from Indonesia, MNCN 16.01/0000 and MNCN 16.01/0000. A, row of uncini in a thoracic uncinigerous torus in lateral view; B, detail of two thoracic uncini in lateral view; C, detail of a thoracic uncinus in frontal view; D, one abdominal neuropodial pinnule; E-F, detail of abdominal uncini in lateral and upper view.

**Note: Auto Gamma Correction was used for the image. This only affects the reviewing manuscript. See original source image if needed for review.*


A
10 µm
B
5 µm
C
4
r
3 µm
D
50 µm
E
3 µm
r
F
5 µm

6

SEM micrographs of paratypes from Myanmar

Terebellides hutchingsae **spec. nov.**, SEM micrographs of paratypes from Myanmar, MNCN 16.01/0000 and MNCN 16.01/0000. A, anterior end, left lateral view, showing lateral lappets (ll) from TC1 to TC6 and geniculate chaetae (gc) in TC6; B, lateral view of lower branchial lobes (BL3-4) showing terminal projection (tp); C, ventral view of lower branchial lobes (BL3-4); D, dorsal view of TC4 to TC7 showing genital pores (gp) in TC4-5; E, TC6 geniculate chaetae (gc) in lateral view; F, detail of *capitium* of one geniculate chaeta.

**Note: Auto Gamma Correction was used for the image. This only affects the reviewing manuscript. See original source image if needed for review.*

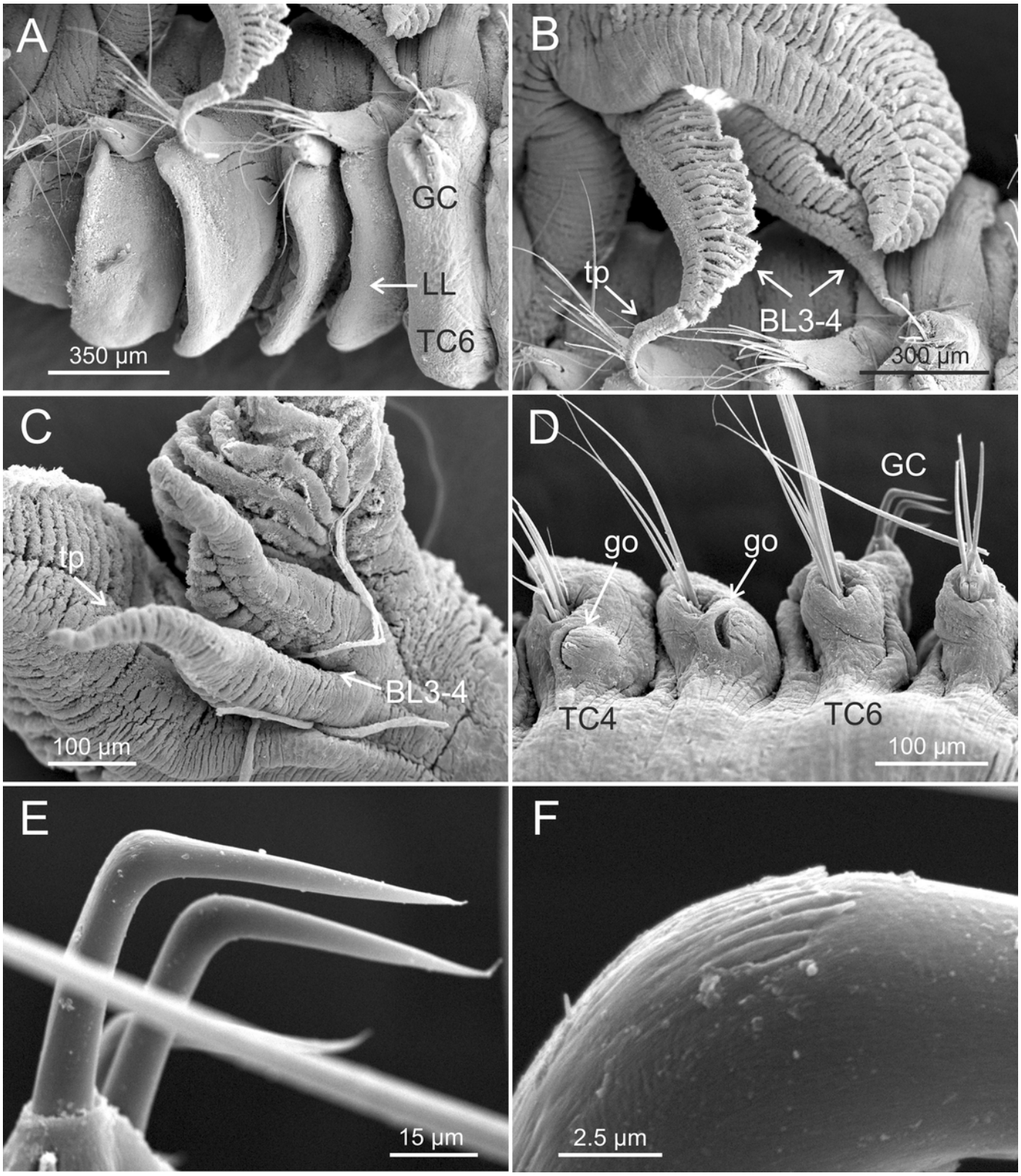

A
GC
LL
TC6
350 µm
B
tp
BL3-4
300 µm
C
tp
BL3-4
100 µm
D
GC
go
go
TC4
TC6
100 µm
E
15 µm
F
2.5 µm

Figure 7 (on next page)

Map of SW Indo-Pacific Ocean

Map of SW Indo-Pacific Ocean showing locations where species of *Terebellides* reported in this paper were found (big circles), along with type localities of other *Terebellides* species previously described (medium circles) or reported (small circles).

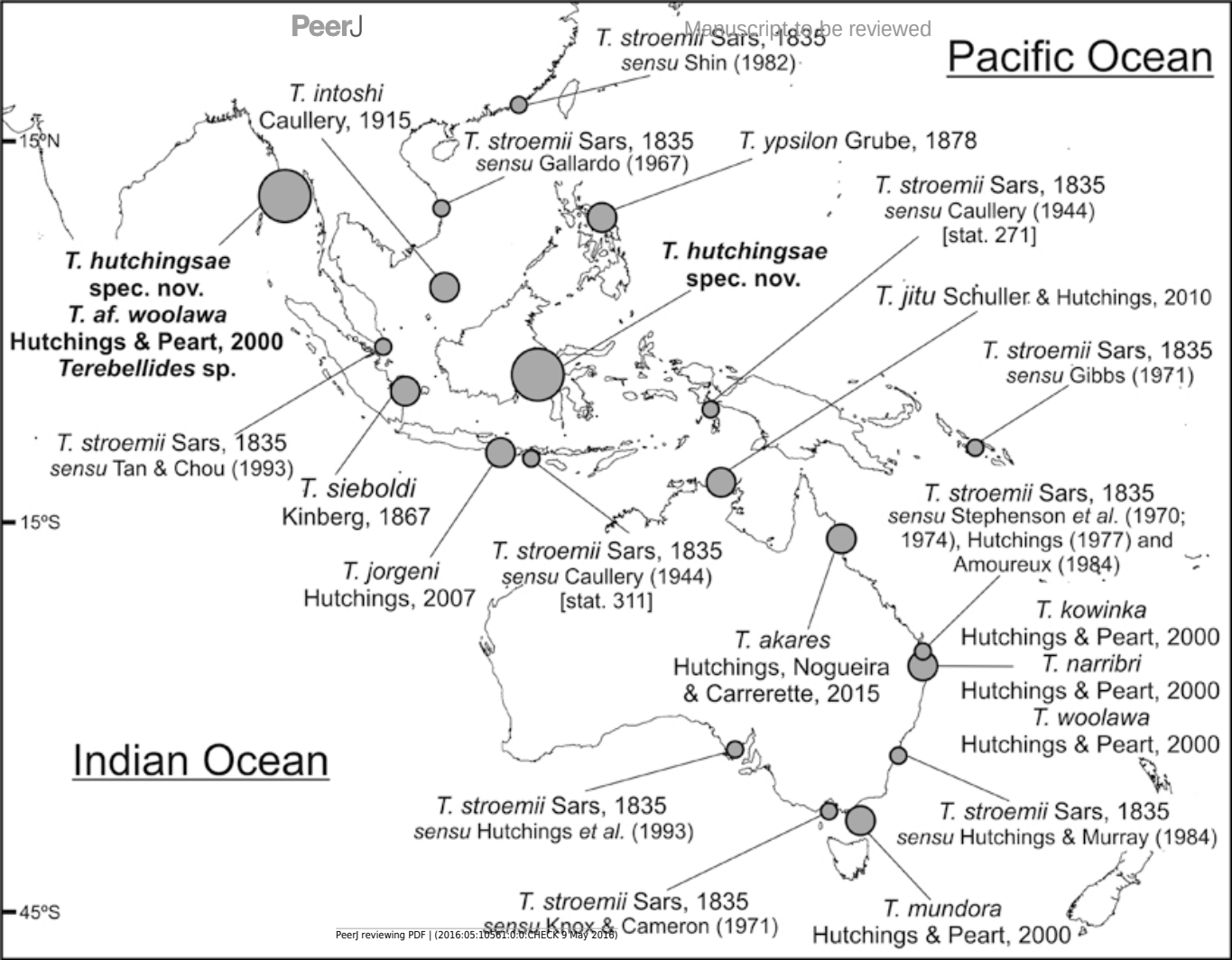
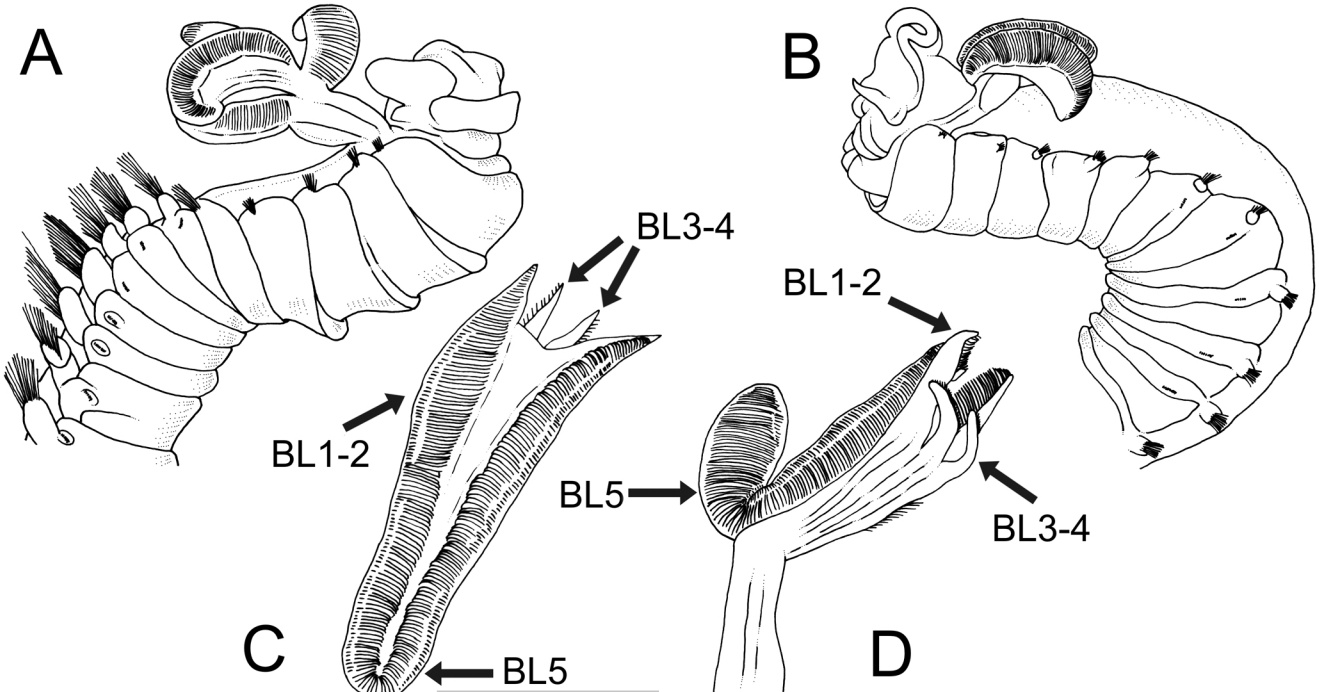

Pacific Ocean
Indian Ocean
15°N
15°S
45°S
T. stroemii Sars, 1835 sensu Shin (1982)
T. intoshi Caullery, 1915
T. stroemii Sars, 1835 sensu Gallardo (1967)
T. ypsilon Grube, 1878
T. stroemii Sars, 1835 sensu Caullery (1944) [stat. 271]
T. hutchingsae spec. nov.
T. af. woolawa Hutchings & Peart, 2000
Terebellides sp.
T. hutchingsae spec. nov.
T. jitu Schuller & Hutchings, 2010
T. stroemii Sars, 1835 sensu Gibbs (1971)
T. stroemii Sars, 1835 sensu Tan & Chou (1993)
T. sieboldi Kinberg, 1867
T. jorgeni Hutchings, 2007
T. stroemii Sars, 1835 sensu Caullery (1944) [stat. 311]
T. stroemii Sars, 1835 sensu Stephenson et al. (1970; 1974), Hutchings (1977) and Amoureux (1984)
T. akares Hutchings, Nogueira & Carrerette, 2015
T. kowinka Hutchings & Peart, 2000
T. narribri Hutchings & Peart, 2000
T. woolawa Hutchings & Peart, 2000
T. stroemii Sars, 1835 sensu Hutchings et al. (1993)
T. stroemii Sars, 1835 sensu Hutchings & Murray (1984)
T. stroemii Sars, 1835 sensu Knox & Cameron (1971)
T. mundora Hutchings & Peart, 2000

Figure 8(on next page)

Line drawings of two Terebellides species previously described or reported in SW Pacific Ocean

Two *Terebellides* species previously described or reported in SW Pacific Ocean by Caullery (1915), redrawn from original. *Terebellides intoshi* Caullery, 1915. A. Anterior end in right lateral view showing great size of notopodia and notochaetae of thoracic chaetigers from TC6 onwards; *Terebellides stroemii* Sars, 1835. B. Anterior end in left lateral view of; C. dorsal and ventral view of branchial lobes showing high development of fifth branchial lobe (BL5), small size of branchial ventral lobes (BL3-4) and high degree of fusion of BL1-BL4.


A
B
BL3-4
BL1-2
BL1-2
BL5
BL3-4
C
BL5
D