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One new species of *Pista* Malmgren, 1866 (Annelida: Terebellidae) and one new species of *Pistella* Hartmann-Schröder, 1996 (Annelida: Terebellidae) from the Adriatic Sea (Mediterranean)

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During several sampling periods in the Northern Adriatic Sea (Mediterranean) from 2003–2010, one species of Pista *and one of* Pistella *were found. They were initially identified as* Pista *cf.* lornensis *(Pearson, 1969), but detailed examination revealed the presence of two new species, one belonging to the genus* Pistella *Hartmann-Schröder, 1996,* P. rovignensis *sp. nov. and one belonging to the genus* Pista, P. adriatica *sp. nov. These two species differ from each other in the structure of the branchiae, shape of lateral lobes and the structure of the anterior thoracic uncini. The two new species are compared with other species of* Pistella *and* Pista *currently known. The relationship of* Pistella *and* Pista *is confusing and a complete revision of the two genera is urgently needed together with other genera characterized by having long-handled thoracic uncini.*

Keywords: Polychaetes, Polychaeta, terebellids, taxonomy, *Pista adriatica* sp. nov., *Pistella rovignensis* sp. nov., redescription, new records

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INTRODUCTION

Numerous specimens of a terebellid with a single pair of plume-shaped branchiae resembling those of *Pista* were collected during benthic sampling in the Adriatic. Mikac (2015) in her checklist of the polychaetes from this region lists three species of *Pista* of which one, *Pista unibranchia* Day, 1963, is characterized by a single pair of plume-shaped branchiae and short-handled thoracic uncini. He described the species from South Africa and states it is endemic, which questions the listing by Mikac (2015). However, these characteristics of Day's species suggest it should be transferred to the genus *Pistella* erected by Hartmann-Schröder (1996) to accommodate species previously considered as belonging to *Pista* by Safronova[1] (1988) in her partial revision of the type species of the genus, *Pista cristata* (Müller, 1776). Safronova (1988) transferred *Scionella lornensis* Pearson, 1969 to *Pista* and subsequently Hartmann-Schröder (1996) then moved it into her new genus *Pistella* and designated it as the type species. This species was described from Loch Linnhe, Argyll, Scotland and is characterized by a single pair of plume-shaped branchiae and short-handled uncini present throughout (Hartmann-Schröder, 1996).

Recently, Jirkov (2001) synonymized *Pistella lornensis* with *Pista cristata*, based on a reinterpretation of the original description of the latter species. He suggests that the original description of *P. cristata* states that only a single pair of branchiae is present and that short-handled thoracic uncini are present throughout. Whereas Malmgren (1866) when erecting the genus *Pista* and designating the type species *P. cristata* states that the genus is characterized by two pairs of branchiae and anterior thoracic long-handled uncini restricted to anterior uncinigerous segments. This definition of *Pista* has been widely used and over 70 species have been described (Hutchings *et al.*, 2017); however, the number of uncinigerous segments with long-handled uncini is variable. An acceptance of Jirkov's proposal, would require that all species currently assigned to *Pista* would need to be transferred to a new, still unestablished genus, due to the presence of long-handled uncini on the first few thoracic segments, which are completely absent in *P. cristata sensu* Jirkov (2001). It appears that two species co-occur in the locality where Müller (1776) collected his worms. One form had a single pair of

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branchiae and short-handled uncini throughout, and the other with two pairs of branchiae and long-handled uncini on anterior segments. At this stage, we prefer to follow Malmgren's interpretation of *P. cristata* and consider both *Pista* and *Pistella* as valid genera. Hutchings *et al.* (2017) provide a generic diagnosis of both genera and these are that: *Pistella* is characterized by a single pair of plumous branchiae on segment 2, presence of lateral lobes and all neurochaetae as short-handled avicular uncini, initially in single rows but in partial to completely intercalated double rows on segments 11–20. In contrast *Pista* is characterized by arborescent, pectinate or plumous branchiae present from segment 2, typically 2 pairs on segments 2 and 3, rarely a single pair or 3 pairs; neurochaetae as long-handled avicular uncini, at least on anterior neuropodia, initially in single rows but in partial to completely intercalated double rows on segments 11–20.

However, material from the type locality (Christiansandensdis, Norway, 58°N 8°E) needs to be re-examined and a neotype designated for *P. cristata* as well as clarifying the status of the other species present.

Jirkov (2001) reported that the number of pairs of branchiae is not a valid generic character and also that the long-handled thoracic uncini are really ligaments and that they develop as the animal grows and so is also not a valid generic character. He illustrates this with figures of the thoracic uncini of *Pista bansei* Safronova, 1988 from various populations, and although the exact locality details are not given, they are from the Atlantic and the Pacific, so perhaps they are not all the same species. We suggest that a detailed study of the development of the thoracic uncini of worms from a range of locations is necessary to confirm or disprove Jirkov's comments regarding the origins of the long-handled uncini and whether or not they are ligaments (which may be called filaments in some descriptions). A detailed morphological study on the development of the uncini and branchiae is currently being undertaken combined with molecular studies (Londoño Mesa, in prep.). Pearson (1969) illustrates some filaments arising from both the heel and the dorsal button (following the terminology of Nogueira *et al.*, 2010) although his material does include some large specimens (>35 mm in length) suggesting that long-handled uncini are never present in this species. An alternative explanation to the findings of Jirkov (2001) is that two cryptic species co-occur in his sampled populations, one with long-handled thoracic uncini and one without them, but this needs to be tested using both morphological and molecular studies. However, all this is beyond the scope of this paper and so in the meantime we describe the species found in the Northern Adriatic as a new species of *Pista* and one of *Pistella*. Both these species co-occur at some stations (see Table 1).

MATERIALS AND METHODS

All specimens were collected by B. Mikac while undertaking several different research projects at the Center for Marine Research of the Ruđer Bošković Institute in Rovinj (Croatia) from 2003 to 2010. Soft bottom samples were taken with a Van Veen grab at 11 stations in the Northern Adriatic Sea (Figure 1, Table 1). Sediment was sieved through 1 mm mesh and fixed in 4% formaldehyde water solution. After removing the polychaetes from their tubes, they were preserved in 70% ethanol and examined using stereo- and light- microscopes. One to two specimens were examined under the scanning electronic microscope after being

Table 1. Locations, sampling details, sediment characteristics of sampling stations shown in Figure 1 and occurrence of two new species.

Station	Description	Geographic position	Depth (m)	Sediment type	Sampling date	Presence of new species
1	13 NM of the W coast of Istrian peninsula on the line Poreč (Cro) – Venice-Lido (It)	45.283333 N 13.266667 E	31	Silty sand	05.12.2008 23.7.2003	*Pista adriatica* sp. nov.
2	13 NM of the W coast of Istrian peninsula on the line Rovinj (Cro) – river Po delta (It)	45.046667 N 13.316667 E	37	Silty sand	27.2.2003 28.5.2003	*Pistella rovignensis* sp. nov. *Pista adriatica* sp. nov.
3	1NM off the W coast of Istrian peninsula	45.083467 N 13.605183 E	28.5	–	22.10.2008	*Pistella rovignensis* sp. nov.
4	Rovinj, near the island Banjole	45.09525 N 13.619283 E	13	Slightly gravelly sand	20.9.2010	*Pista adriatica* sp. nov.
5	Rovinj, harbour Valdibora	45.085617 N 13.63305 E	19	Gravelly mud	20.9.2010	*Pistella rovignensis* sp. nov.
6	Rovinj, city harbour	45.07985 N 13.634747 E	7	Gravelly muddy sand	30.9.2010	*Pistella rovignensis* sp. nov. *Pista adriatica* sp. nov.
7	Rovinj, yacht harbour	45.076317 N 13.63395 E	11	Gravelly muddy sand	29.9.2010	*Pistella rovignensis* sp. nov.
8	Rovinj, yacht harbour	45.07735 N 13.636333 E	5	Gravelly sand	29.9.2010	*Pista adriatica* sp. nov.
9	Rovinj, yacht harbour	45.078083 N 13.63725 E	6	Gravelly sand	29.9.2010	*Pistella rovignensis* sp. nov.
10	Rovinj, 1000 m SE from the Cuvi waste water outfall	45.057733 N 13.64835 E	28	Gravelly sand	19.1.2011	*Pistella rovignensis* sp. nov.
11	Rovinj, 150 m NE from the Cuvi waste water outfall	45.05835 N 13.648517 E	23.5	Gravelly sand	24.11.2009	*Pistella rovignensis* sp. nov.

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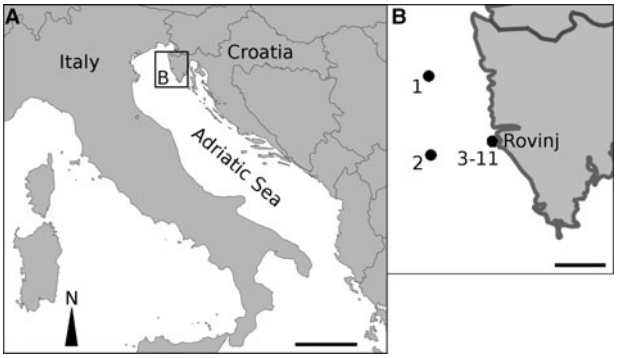

Fig. 1. Map of sampling area and stations 1–11, Scale bars: (A) 200 km; (B) 20 km.

dehydrated in ethanol, critical point dried and covered with 20 nm of gold, at the Australian Museum (Zeiss Evo LS15 scanning electron microscopy, using Robinson Backscattered and ET secondary electron detectors) and at Macquarie University (JEOL JSM 6480LA) and imaged with a secondary detector.

The following abbreviations are used: AM Australian Museum, Sydney; NHMR Natural History Museum in Rijeka, Croatia.

RESULTS

Taxonomic account

SYSTEMATICS

Family TEREBELLIDAE Johnston, 1845
Genus *Pista* Malmgren, 1866
Type species: *Amphitrite cristata* Müller, 1776, by original designation.

DIAGNOSIS

Transverse prostomium attached to dorsal surface of upper lip; basal part as thick crest, eye spots sometimes present; distal part shelf-like. Buccal tentacles all uniformly cylindrical. Peristomium restricted to lips; relatively short upper lip, hood-like; swollen, cushion-like and mid-ventral lower lip. Segment 1 reduced dorsally, with pair of lobes of variable size and position; segments 2–4 also with pairs of lobes of variable size and position, sometimes extending for a few more segments. Anterior segments highly glandular ventrally, with discrete, smooth to slightly corrugated, rectangular to trapezoidal mid-ventral pads. Paired arborescent, pectinate or plumous branchiae present from segment 2, typically 2 pairs, on segments 2 and 3, rarely a single pair or 3 pairs. Conical to rectangular notopodia beginning on segment 4, typically extending for 17 segments, until segment 20; notochaetae all distally winged, frequently broadly winged. Neuropodia beginning on segment 5, as low ridges in conjunction with notopodia and short pinnules posteriorly; neurochaetae as long-handled avicular uncini, at least on anterior neuropodia, frequently until segment 10 or termination of notopodia, then short-handled; uncini in partial to completely intercalated double rows on segments 11–20. Nephridial papillae present on segment 3, genital papillae on variable number of segments, usually on segments 6–7, posterior and dorsal to notopodia. Pygidium smooth to slightly crenulated.

The above generic diagnosis is from Hutchings *et al.* (2017).

Pista adriatica sp. nov.
Figures 2–4

MATERIAL EXAMINED

Holotype: AM W.49056, Station 1, 23.7.2003.

Paratypes:AM W.49057, Station 4, 20.9.2010, complete, 8 mm in length, 1 mm in width, about 82 segments, posterior segments very compacted; AM W.49058, Station 2, 28.5.2003, 2 specs: (1) incomplete, 6 mm in length, 1 mm in width, complete thorax plus 2 abdominal chaetigers, (2) complete, 8 mm in length, 0.5 mm in width, difficult to accurately count numbers of abdominal segments, covered in mucous; NHMR PMR 18356. Station 8, 29.9.2010, complete, 10 mm in length, 1 mm in width, about 67 chaetigers; AM W.49062.001, Station 1, 5.12.2008, mounted for SEM; AM W.49065.001, Station 6, 30.09.2010, mounted for SEM.

A total of seven specimens were examined.

DESCRIPTION

The following description is based on the holotype, a complete specimen, 18 mm in length, 1 mm in width anteriorly, with 87 chaetigers. Preserved worm pale cream with no pigmentation. Transverse prostomium attached to dorsal surface of upper lip, basal part thickened, crest with numerous scars where buccal tentacles were attached, those remaining uniform in width and length. No eye spots present. One pair of unequal sized plumose branchiae on segment 2, with filaments arranged in a spiral fashion around central stalk, about 8 whorls, each filament with about 2–3 branches (Figures 2A–D & 4A). Branchial stalk rounded, long, markedly annulated. Shorter branchia approximately length of stalk of larger branchia, with about 5 whorls.

Peristomium restricted to lips, upper lip large, rectangular, glandular, cushion shaped, ventral surface grooved down towards mouth. Lower lip mid ventral, compact, U-shaped, glandular. Segment 1 reduced dorsally, forms narrow glandular ventral bi-lobed structure connected mid dorsally. Segment 2 with narrow lateral lobe, which continues across ventrum as narrow glandular ridge. Segment 3 has rectangular lateral lobes with rounded margins, connected across ventrum by narrow strip and continuing across dorsum as a narrow ridge (Figure 2A, B). Segment 4 lacking lateral lobes but anterior segmental margins glandular. Dorsal margins of segments 2 and 3 glandular forming thickened ridges.

Anterior notopodia more dorsally displaced than subsequent ones, which progressively increase in size along the body becoming more erect, glandular. Notochaetae broad-winged capillaries, slightly curved with smooth tips, surface of capillaries ornamented (Figure 2E, F) of two lengths. First six pairs of thoracic neuropodia with long-handled uncini, handles progressively becoming shorter and by 6th neuropodia lost and uncini avicular. Anterior long-handled uncini with back straight and prow slightly curved (following terminology of Nogueira *et al.*, 2010) (Figure 4D) and posterior thoracic uncini also with back straight and prow slightly curved, dorsal button absent in both. Uncini initially arranged in single rows (Figure 3A–C), but arranged in partially to

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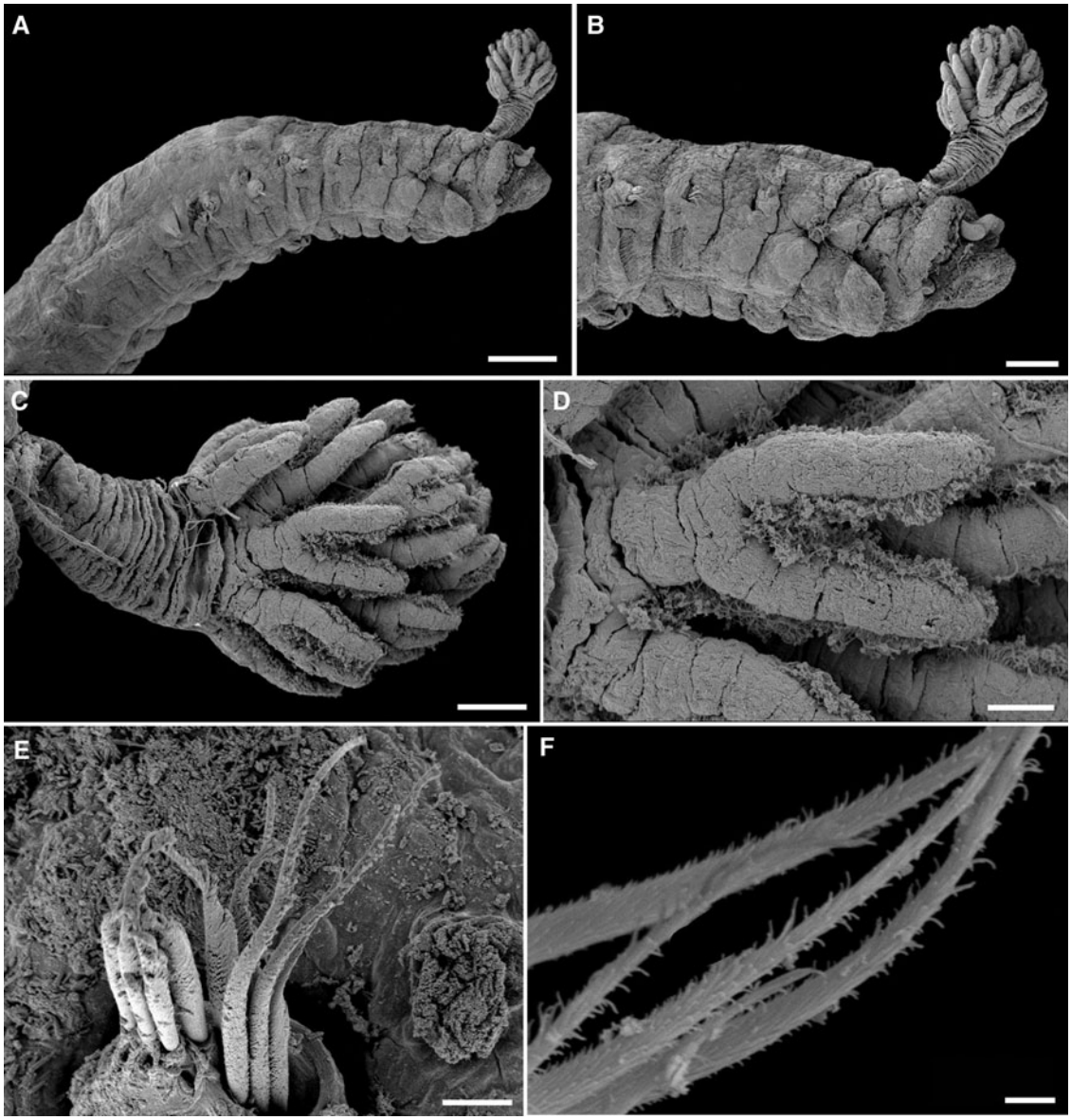

Fig. 2. *Pista adriatica* sp. nov.: (A) antero-lateral view; (B) anterior view; (C) branchia; (D) branchial filaments; (E) anterior thoracic notochaetae; (F) close up of thoracic notochaetae. Scale bars: (A) 200 μm; (B) 100 μm; (C) 50 μm; (D) 20 μm; (E) 10 μm; (F) 2 μm. All from AM W. 49065.

completely intercalated double rows on segments 11–20 (Figure 3D) and then reverting to single rows on abdomen. Thoracic notopodia and neuropodia initially widely spaced forming separate structures (Figure 2B) but by mid to posterior thorax become a single structure. Anterior thoracic uncini with dental formula MF: 3–4 : 4–5 : 4–5 (Figure 3B, C). Abdominal neuropodia becoming more erect posteriorly with about 8–9 uncini each elongate extending from torus, dental formula MF: 5–6 : 7–8 (Figure 3E, F).

Nephridial papillae conspicuous ventro-lateral, spherical, white, glandular papillae inserted posterior to chaetigers 3 and 4 (Figure 2A), more conspicuous on paratypes than holotype, nephridia visible through body all, more marked in paratypes. Ventrum with discrete elongate rectangular pads from segments 4–18, raised, glandular, each pad dissected into 2 with mid pale line of pigment spots, well demarcated segmentally (Figure 4C), then becoming restricted to mid-ventral stripe.

Anal plate with 2 short anal cirri.

VARIATION

Some paratypes exhibit pale brown pigmentation on posterior neuropodia and in some the nephridial papillae are more conspicuous than those present on the holotype. Material not well preserved as samples were fixed before the animals were removed from their tubes and none are gravid. However, none of the specimens show any sign of branchial scars, only a single pair of branchiae. The paratype NHMR has no pygidial cirri and presents a simple rounded pygidium, suggesting the anal plate of the holotype may be an artefact or represent a damaged specimen as posterior end of holotype not very well preserved.

REMARKS

Pista adriatica sp. nov. is described as a new species characterized by a single pair of branchiae with the branchial filaments coming off the main axis in a continuous spiral, and by the shape and orientation of the lateral lobes and the presence of dorsal glandular ridges on segments 2 and 3. Only four other

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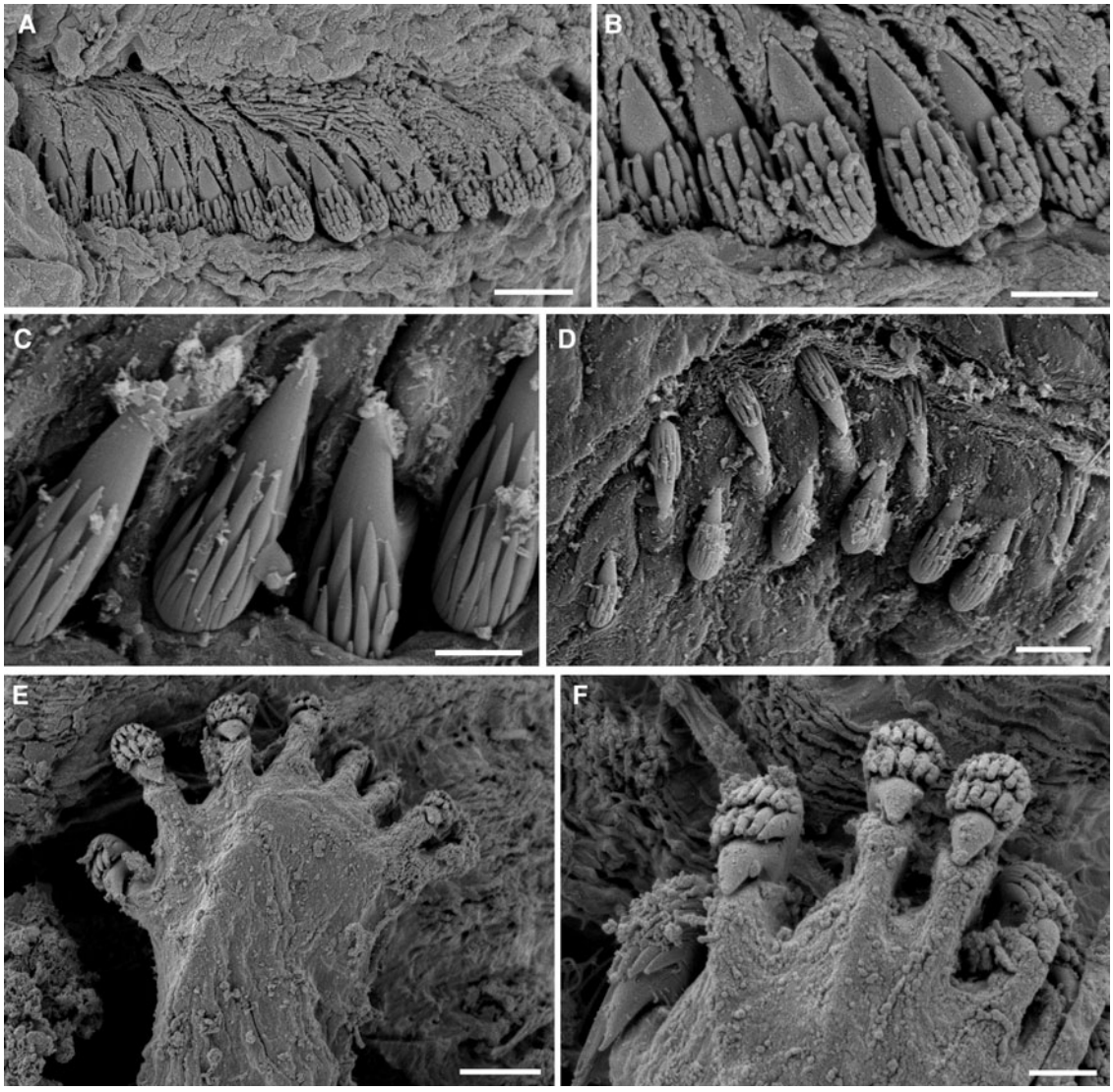

Fig. 3. *Pista adriatica* sp. nov.: (A) anterior thoracic neurochaetae; (B) close up of anterior thoracic neurochaetae; (C) neurochaetae of 3rd chaetiger; (D) 8th chaetiger; (E) posterior abdominal tori; (F) posterior abdominal neurochaetae. Scale bars: (A, D and E) 10 μm; (B and F) 5 μm; (C) 4 μm. All from AM W.49065.

species of *Pista* with a single pair of branchiae have been described: *P. dibranchis* Gibbs, 1971 from the Solomon Islands, *P. godfroyi* (Gravier, 1911) from the Antarctic, *P. mirabilis* McIntosh, 1885 from deep water off Argentina and *P. spinifera* (Ehlers, 1908) from the Antarctica. Two other species originally described as *Pista*, *P. anthela* Hutchings & Glasby, 1990 and *P. unibranchia* Day, 1963 both belong to *Pistella* as they do not have any long-handled uncini. *Pista adriatica* sp. nov. can be distinguished from both *P. spinifera* and *P. mirabilis* as they both lack plumose branchiae, having either a thick bifurcated stem, which is then divided many times, or with a thick long stalk terminating in three main branches each with numerous branches. The other two species *P. dibranchis* and *P. godfroyi* both lack any long-handled uncini and should therefore be transferred to *Pistella*. For these reasons, we describe *Pista adriatica* as a new species.

ETYMOLOGY

The name of the species refers to its finding from the Adriatic Sea.

HABITAT

Specimens were collected from 5 to 37 m, from soft substrates (gravelly sand, gravelly muddy sand, silty gravelly sand and silty sand).

Genus *Pistella* Hartmann-Schröder, 1996

DIAGNOSIS

Transverse prostomium attached to dorsal surface of upper lip; basal part as thick crest, eye spots absent. Buccal tentacles all uniformly cylindrical. Peristomium restricted to lips; relatively short upper lip, hood-like; swollen, cushion-like and mid-ventral lower lip. Segment 1 reduced dorsally, usually with pair of ventro-lateral lobes connected to each other across ventrum by low lobe, marginal to mouth; segment 2 with pair of ventro-lateral lobes connected to each other by raised crest across ventrum; segments 3, or 3 and 4, with pair(s) of short lateral lobes; absent on following segments. Anterior segments highly glandular ventrally. Single pair of plumous branchiae, on segment 2, with long main stalks.

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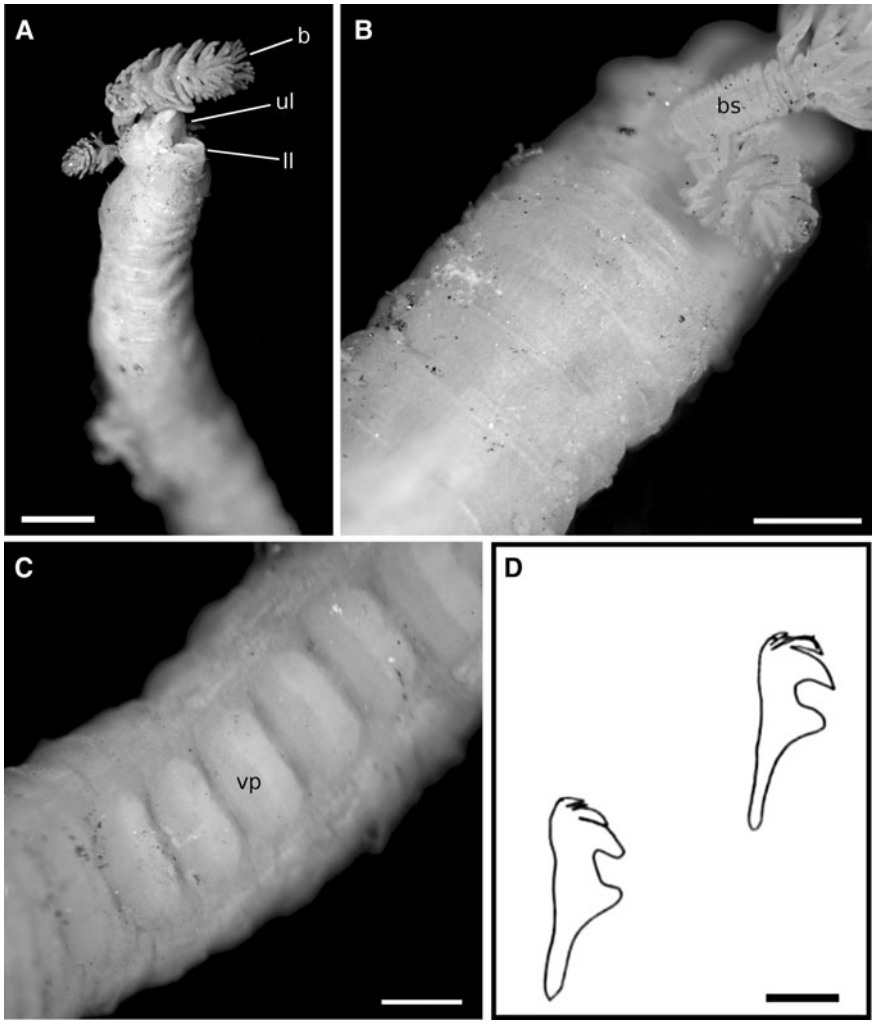

Fig. 4. *Pista adriatica* sp. nov.: (A) anterior end showing unequal sized branchiae; (B) anterior dorsal view; (C) anterior view of ventral pads; (D) line drawing of 1st thoracic neurochaeta. Scale bars: (A) 400 μm; (B, C) 250 μm; (D) 10 μm. All from AM W.49057. b, showing branchial filaments coming off in a spiral fashion; bs, branchial stalk; ll, lower lip; ul, upper lip; vp, ventral pads.

Notopodia from segment 4, extending for 17 segments, notochaetae all distally winged. Neuropodia from segment 5, as low ridges in conjunction with notopodia and short pinnules posteriorly; neurochaetae as short-handled avicular uncini throughout, in partial to completely intercalated double rows on segments 11–20. Nephridial papillae present on segment 3, genital papillae usually on segments 6–7, posterior and dorsal to notopodia. Pygidium crenulated or with small rounded papillae.

The above generic diagnosis is from Hutchings *et al.* (2017).

Pistella rovignensis sp. nov.
Figures 5–7

MATERIAL EXAMINED

Holotype: AM W.49050, Station 3, 22.10.2008.

Paratypes: AM W.49064.001, 1 spec., Station 6, 30.9.2010, mounted for SEM; AM W.49063.001, 1 spec., Station 6, 30.9.2010, mounted for SEM; AM W.49052, Station 9, 29.9.2010, 2 specs, 12 mm in length, 1 mm in width, complete with about 87 chaetigers, 4 mm in length, 1 mm in width, posteriorly incomplete with 31 chaetigers; NHMR PMR 18355, Station 5, 20.9.2010, 2 specs, both incomplete, (1) 8 mm in length, 1.5 mm in width, 32 chaetigers, 16 mm in length, 1 mm in width, about 36 chaetigers, (2) posterior thorax damaged; NHMR PMR 18354, 1 spec., Station 10, 19.1.2011, incomplete, 11 mm in length, 2 mm in width, 26 chaetigers.

Non-type material: AM W.49066, 8 specs, Station 11, 24.11.2009; AM W.49053, 3 specs, Station 7, 29.9.2010; AM W.49061, 1 spec., Station 5, 20.9.2010; AM W.49054, 6 specs, Station 6, 30.9.2010; AM W.49055, 1 spec., Station 2, 27.2.2003.

A total of 27 specimens were examined.

DESCRIPTION

The following description is based on the holotype, which is posteriorly incomplete, 17.5 mm in length, 1 mm in width, with 31 chaetigers. Preserved specimen pale cream with speckled pale brown pigmentation anteriorly. Numerous colourless buccal tentacles all of similar width but of 2 lengths, short ones about length of longest branchial stalk, more numerous long ones just longer than the longest branchia

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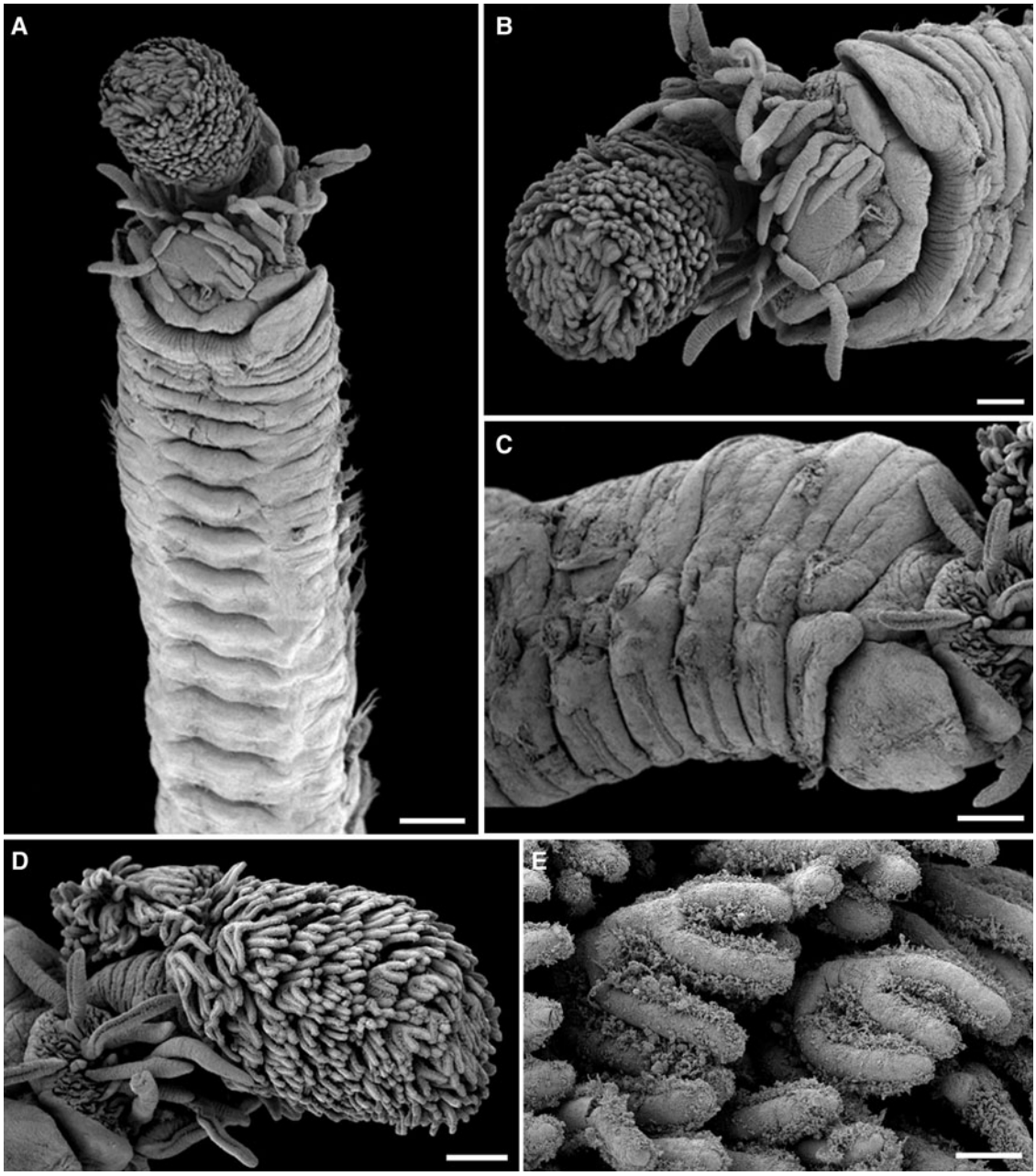

Fig. 5. *Pistella rovignensis* sp. nov.: (A) anterior lateroventral view; (B) anterior ventral view; (C) anterior lateral view; (D) branchia; (E) branchial filaments. Scale bars: (A) 500 μm; (B–D), 250 μm; (E) 50 μm. All from AM W.49064.

(Figures 5A, B & 7A). Eye spots absent but some scattered pigment on margin of lower lip.

One pair of unequal sized plumose branchiae, filaments arranged in distinct tiers around a main shaft, filaments themselves branched 2 or 3 times, each branchia with stout, wide stalk with faint basal pigmentation on segment 2 (Figures 5D, E & 7A, B).

Peristomium consisting of short rectangular upper lip, forming a swollen cushion with rounded margins, mid ventral lower lip slightly V shaped, glandular. Segment 1 reduced dorsally continues across ventrum, covered by base of buccal tentacles. Segment 2 with well developed lateral almost rectangular lobes with anterior margins rounded that merge with the ventral pad to form a continuous ventral glandular collar (Figures 5A–C & 7B, C). Segment 3 small but conspicuous elongated asymmetrical triangular lateral lobes slightly displaced dorsally, not connected across ventrum with greater concentration of pale brown pigmented spots and continuing across the dorsum as a raised glandular anterior margin forming a dorsal crest (Figure 7B). Segment 4 with thickened glandular anterior margins (Figure 5C). Anterior dorsum very glandular (Figure 7B).

First pair of notopodia slightly displaced dorsally compared with subsequent ones. Notopodia short rectangular podia not extended from body wall initially, becoming more erect and larger posteriorly. Notochaetae broadly winged capillaries with marked inflection tapering to fine tips arranged in two tiers, short and long (Figure 6A, B). All thoracic neuropodia sessile, with all thoracic uncini short-handled avicular, initially arranged in single rows (Figure 6C), from segments 11–20 arranged

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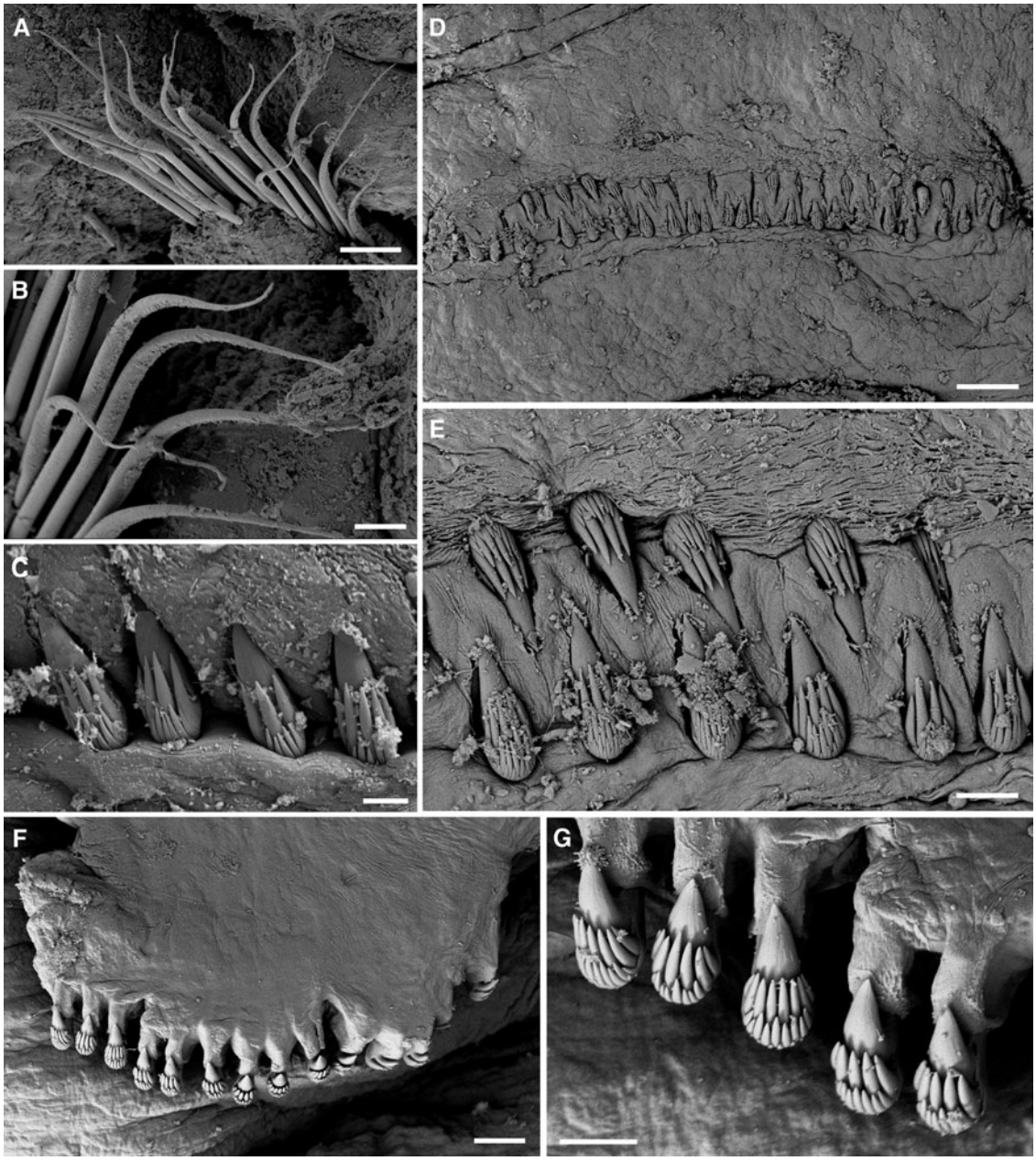

Fig. 6. *Pistella rovignensis* sp. nov.: (A) thoracic notochaetae of 2nd segment; (B) close up of thoracic notochaetae of 2nd segment; (C) 1st neurochaetae; (D) 13th chaetiger; (E) close up of 13th chaetiger; (F) abdominal tori; (G) abdominal uncini. Scale bars: (A) 50 μm; (B and F) 20 μm; (C) 5 μm; (D) 40 μm; (E and G) 10 μm. All from AM W.49064.

in completely intercalated double rows (Figure 6D, E). Uncini with well developed main fang, small dorsal button and basal heel (following Nogueira *et al.*, 2010) (Figure 7D). Thoracic uncini with the following dental formula MF: 6–8: 4–5:∞. Initially thoracic notopodia and neuropodia well separated (Figure 5C) but by mid to posterior thorax, contiguous on a raised glandular ridge (Figure 5A). Abdominal neuropodia becoming more erect posteriorly as raised tori with about 12 avicular uncini with the following dental formula MF: 5–8: 8–9: 6–9, with individual uncini projecting from torus (Figure 6F, G).

Nephridial papillae present on segments 6 to 7. Entire ventrum very glandular with well developed and well defined (Figure 7C) rectangular glandular pads extending to chaetiger 10–11, appear to be divided into anterior and posterior sections but without any corresponding pigmentation in preserved material; subsequently pads not discrete just entire ventrum glandular, leading to a thin ventral glandular streak which continues on all remaining segments.

Holotype posteriorly incomplete.

VARIATION

The type and non-type material vary in the intensity of pigmentation on anterior segments and while one pair of unequal sized branchiae are always present, they vary in relative size to each other. There is no evidence of any branchial scars meaning that only one pair of branchiae was ever present.

All the material examined exhibits two lengths of buccal tentacles, regardless of the size of the individual, which

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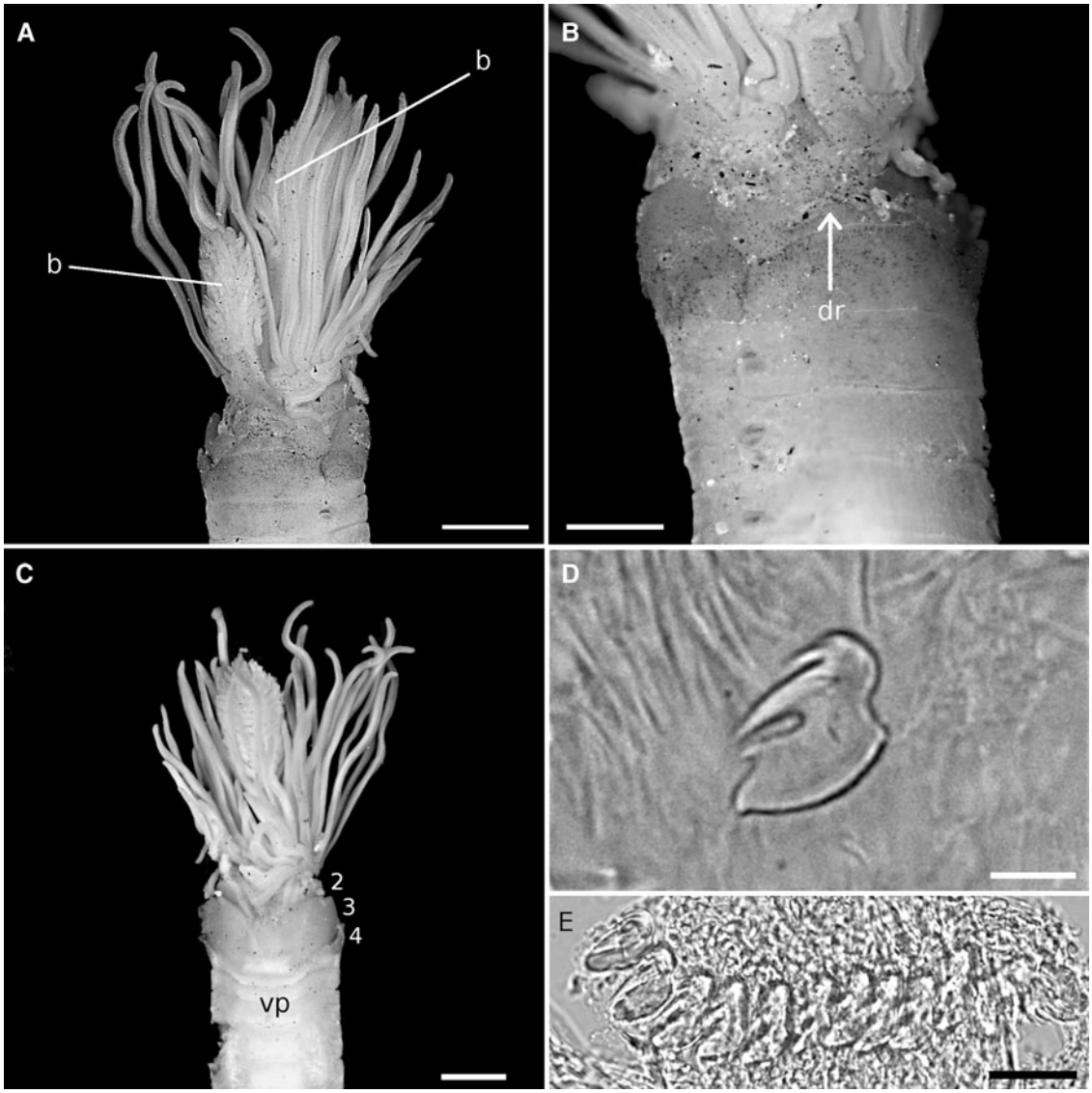

Fig. 7. *Pistella rovignensis* sp. nov.: (A) anterior end showing unequal sized branchiae; (B) anterior dorsal view; (C) anterior ventral view; (D) 1st thoracic uncinus; (E) head on view of the uncini of 5th thoracic segment. Scale bars: (A, C) 500 μm; (B) 250 μm; (D) 10 μm; (E) 30 μm. All from AM W.49050. b, unequal sized branchiae; dr, dorsal ridge; vp, ventral pads; 2, 3, 4, lateral lobes.

indicates that the shorter tentacles are not just regenerating ones. The non-type material varies in terms of the quality of fixation and with it the ability to really resolve the nature of the lateral lobes, as the worms were fixed within their tubes in the sediment and only later sorted and removed from their tubes.

REMARKS

Pistella rovignensis sp. nov. can be distinguished from *P. lornensis* (Pearson, 1969) by the arrangement of the branchial filaments, which are arranged in distinct tiers, whereas the latter species has them arranged in a spiral. The shape and orientation of the lateral lobes also differs but both species have anterior dorsal crests, those of *P. rovignensis* sp. nov. occur only on segment 3 (Figure 7B) whereas *P. lornensis* has them on segments 2–4 (J.M.N. Noguiera, personal communication). *Pistella lornensis* has large lateral lobes on segment 2 which project anteriorly, and those of segment 3 are very small, whereas in the new species those on segment 3 are discrete elongated triangular and project dorsally (see Figures 5A & 7A, B). The number of pairs of ventral pads is greater in *P. lornensis* where they extend from segment 6 to 20, whereas in the new species they begin from segment 2 and continue to 14 or 15. No information is given in the *P. lornensis* description regarding the dentition of the uncini. While PH has examined the holotype, she did not have access to photographic equipment and was unable to prepare SEMS, so this material needs to be re-examined and the description updated.

Pistella rovignensis sp. nov. can be distinguished from other described *Pistella* species (*P. anthela* (Hutchings & Glasby, 1990) and *P. franciscana* Nogueira, Hutchings & Carrerette, 2015) by the number and arrangement of the lateral lobes. *Pistella anthela* has lateral lobes on segments 1, 2 and 3, which continue across the dorsum as crests, whereas in *P. franciscana* these lobes are on segments 1, 2 and 3 but do not continue across the dorsum, in contrast in *P. rovignensis* sp. nov. they are only present on segment 3 and they continue

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across the dorsum as crests. This has been disputed by Londoño Mesa (personal communication) who suggests they are just dorsally swollen anterior margins of the segments, which we disagree with and instead follow Nogueira *et al.* (2010) and refer to them as dorsal crests as they appear to be discrete structures.

Pistella franciscana occurs in shallow waters around Lizard Island on the Great Barrier Reef and *P. anthela* also occurs in shallow tropical waters in Dampier Archipelago in Western Australia, so these tropical coral reef habitats are very different to the environment in the Northern Adriatic where *P. rovignensis* sp. nov. was collected.

In addition, as mentioned earlier, some other species currently assigned to the genus *Pista* should be transferred to the genus *Pistella*, these include *Pista unibranchiata* Day, 1963, *P. dibranchis* Gibbs, 1971 and *P. godfroyi* Gravier, 1911, as all lack any long-handled uncini and should therefore be transferred to *Pistella* according to the illustrations and text provided in their descriptions. Such a transfer should occur when the entire genus is revised.

ETYMOLOGY

The name of the species refers to the location where it was found: the city of Rovinj in the Northern Adriatic Sea (Croatia).

HABITAT

Specimens were collected from 6 to 37 m, from soft substrates (gravelly sand, gravelly muddy sand, silty sand and gravelly mud).

DISCUSSION

This study highlights the need to clarify the validity of *Pista* as currently accepted (Hutchings *et al.*, 2017) and this must include an examination of material from the type locality of *Pista cristata* and the designation of a neotype. That study should ideally consider the taxonomic value of the numbers of pairs of branchiae, and a study on the development of the long-handled thoracic uncini and how these characters change if at all as the animal grows and allow the proposals by Jirkov (2001) to be evaluated. Only then can the validity of the genus *Pistella* be determined.

Further adding to the confusion of the validity of these two genera, is that the type species have been widely reported geographically. *Pista cristata* has been reported from around the world in part due to its characteristic plume-shaped branchiae, which seems unlikely (P. Hutchings, personal communication). In the Adriatic Sea, four species of *Pista* have been recorded, *P. cretacea*, *P. cristata*, *P. maculata* and *P. unibranchia*, the first three being distributed also in the Northern Adriatic (Mikac, 2015). *Pista cretacea* and *P. cristata* were previously found (Fauvel, 1934; Vatova, 1935, 1943; Bellan, 1969; Katzmann, 1971, 1972; Zavodnik, 1971; Marcuzzi, 1972; Amoureux, 1975; Mikac, 2015) close to or in the same area (Mikac, 2015) from which the two newly described species were found. All these species of *Pista* have the plume-shaped branchiae similar to those of *P. cristata*.

Similarly *Pistella lornensis* has subsequently been reported from many localities apart from its original type locality of the West coast of Scotland (Pearson, 1969), namely Yellow Sea (Saphronova, 1991), Saguenay Fjord in Canada (north-west Atlantic Ocean) (Bossé *et al.*, 1996), Mediterranean (Arvanitidis, 2000), north-west of Portugal (Mucciolo, 2015) and western Africa (an ongoing survey of the University Museum of Bergen, Norway: http://miwa.b.uib.no/). The species was reported for the first time in the Mediterranean in the north Aegean Sea, Greece, by Arvanitidis (2000) and subsequently Musco *et al.* (2013) reported it from the southern coast of Sicily. Pearson (1969) provides some ecological data of the two sites where he collected his species from Lochs Linnhe and Eil, in depths of 25–94 m, salinities varying from 28–34‰, temperatures of 6 and 12°C and dissolved oxygen concentration varying between 6 and 10 ppm over 4 years of hydrographic surveys. These lochs are well protected from the open ocean although connected. We suggest that all of the above records for *P. lornensis* need checking to confirm this very wide distribution range and the type species need to be redescribed. We further suggest that the Mediterranean records may represent a mixture of *Pista adriatica* sp. nov. and *Pistella rovignensis* sp. nov.

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NOTE

[1]Two versions of the English translation of this Russian researcher occur in the literature, Safranova and Saphronova, and we use the spelling as it appears in the reference, but both refer to the same person.

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