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Morphology of terebelliform polychaetes (Annelida: Polychaeta: Terebelliformia), with a focus on Terebellidae

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Abstract

The morphology of terebelliform polychaetes was investigated for a phylogenetic study focused on Terebellidae. For this study, specimens belonging to 147 taxa, preferably type material or specimens from type localities or areas close to them, were examined under stereo, light and scanning electron microscopes. The taxa examined were 1 Pectinariidae, 2 Ampharetidae, 2 Alvinellidae, 8 Trichobranchidae, and 134 Terebellidae, which included 8 Polycirrinae, 15 Thelepodinae, and 111 Terebellinae. A comparison of the morphology, including prostomium, peristomium, anterior segments and lobes, branchiae, glandular venter, nephridial and genital papillae, notopodia and notochaetae, neuropodia and neurochaetae, and posterior end, was made of all the currently recognized families of terebelliform polychaetes, with special emphasis on Terebellidae. A discussion of the characters useful to distinguish between genera is given. This character set will be used in a subsequent phylogenetic study (Nogueira & Hutchings in prep.)

Resumo

A morfologia de poliquetas terebeliformes foi analisada para um estudo filogenético focado em Terebellidae. Para esse estudo, foram examinados espécimes pertencentes a 147 táxons, sob estereomicroscópio, microscópio óptico e microscópio eletrônico de varredura, preferencialmente material tipo ou espécimes das localidades tipo, ou de suas proximidades. Os táxons examinados foram 1 Pectinariidae, 2 Ampharetidae, 2 Alvinellidae, 8 Trichobranchidae e 134 Terebellidae, dos quais 8 Polycirrinae, 15 Thelepodinae e 111 Terebellinae. Para este estudo, foi feita a comparação entre a morfologia das famílias de poliquetas terebeliformes atualmente reconhecidas, com especial ênfase em Terebellidae, em relação ao prostômio, peristômio, segmentos anteriores e lobos, brânquias, superfície glandular ventral, papilas nefridiais e genitais, notopódios e notocerdas, neuropódios e neurocerdas, e extremidade posterior. Uma discussão dos caracteres úteis para distinguir os gêneros é fornecida. Este conjunto de caracteres será utilizado para um estudo filogenético subseqüente (Nogueira & Hutchings em preparação).

Key words: Terebelliformia, Pectinariidae, Ampharetidae, Alvinellidae, Terebellidae, Trichobranchidae, morphology

Introduction

Terebelliformia is a large group of sedentary polychaetes abundant in most types of benthic marine substrates. The group is easily recognized by the presence of multiple grooved buccal tentacles and, as currently defined

(Rouse & Fauchald 1997; Glasby et al. 2004), consists of five families: Ampharetidae Malmgren, 1866, Alvinellidae Desbruyères & Laubier, 1986, Pectinariidae Quatrefages, 1866, Terebellidae Grube, 1850, and Trichobranchidae Malmgren, 1866.

The relationships between and within some of these families are poorly known. The Alvinellidae exemplify this relational confusion. The first alvinellids were initially described as belonging to a new subfamily of Ampharetidae (Desbruyères & Laubier 1980, 1982), which was later raised to family status (Desbruyères & Laubier 1986). However, the description of the family Alvinellidae was based on weak arguments with no phylogenetic analysis having been undertaken to support this status. Recent phylogenetic studies consider the group closer to trichobranchids than to ampharetids (Rousset et al. 2003) and the validity of the family is still uncertain.

Within the family Terebellidae, the relationships between the current subfamilies are unclear. The family status of the terebellids was first recognized by Grube (1850), who named as Terebellacea the group containing the genera *Terebella* Linnaeus, 1767, *Polycirrus* Grube, 1850, and *Terebellides* Sars, 1835. Malmgren (1866) reviewed the Terebellacea, describing several new genera and dividing the forms known at that time into five subfamilies: Amphitritea Malmgren, 1866, Artacamacea Malmgren, 1866, Canephoridea Malmgren, 1866, Polycirridea Malmgren, 1866, and Trichobranchidea Malmgren, 1866, with the Canephoridea containing the genus *Terebellides* and the Trichobranchidea containing the genus *Trichobranchus* Malmgren, 1866.

Later, Hessle (1917) named the group as Terebellidae, described several new genera, synonymised other genera, transferred other previously described genera to Terebellidae, changed the name of the subfamilies to an *–inae* ending, described the subfamily Thelepodinae Malmgren, 1866 (as Thelepinae), synonymised Artacaminae with Amphitritinae and raised the trichobranchids, including *Octobranchus* Marion & Bobretzky, 1875, *Terebellides* and *Trichobranchus*, to family status. Hessle (1917) suggested that the Terebellidae contained three subfamilies: Amphitritinae, Polycirrinae and Thelepinae. All these changes, however, were rejected by Fauvel (1927), who resurrected the subfamilies Canephorinae, Trichobranchinae and Artacaminae.

Day (1967) synonymised Canephorinae with Trichobranchinae and Artacaminae with Amphitritinae, and changed the last name to Terebellinae, but this was not immediately followed by other workers. Hartmann-Schröder (1971) re-validated Artacaminae and the family Trichobranchidae, and McHugh (1995), after a phylogenetic analysis, synonymised Artacaminae with Amphitritinae again and demonstrated that Terebellinae was the correct name for the group, according to the rules of the International Code of Zoological Nomenclature. More recently, the Trichobranchidae were considered as a subfamily of Terebellidae by Rouse & Pleijel (2001) and Garraffoni & Lana (2003, 2004, 2008), but this view was not supported by other phylogenetic studies based on molecular and morphological data (Colgan et al. 2001; Rousset et al. 2003; Glasby et al. 2004).

As a result, the diagnoses of the subfamilies of terebellids have varied. For instance, several abranchiate genera of terebellids were considered by some authors as polycirrines due to the absence of branchiae (Fauvel 1927; Day 1967) and as terebellines by others (Hutchings 1974, 1977; Hutchings & Glasby 1988, 1990), until McHugh (1995) redefined Terebellinae to include all taxa with uncini arranged in double rows on at least some chaetigers, including several abranchiate genera and *Artacama* Malmgren, 1866.

Currently the Terebellidae contains three subfamilies: Polycirrinae, Terebellinae, and Thelepodinae. However, recent phylogenetic studies based on molecular and morphological data have demonstrated that the relationships between these groups are still unresolved, and only the polycirrines (Glasby et al. 2004; Garraffoni 2007), or both the polycirrines and the terebellines (Garraffoni & Lana 2008) are monophyletic.

In addition, the relationships within these subfamilies, particularly the Terebellinae, are also unresolved. Terebellinae includes a large number of monotypic genera, some of which have never been recorded since they were originally collected and often this type material is damaged or lost. Several authors have pointed out that a comprehensive phylogenetic analysis of the group is required in order to determine the relationships within the Terebellinae and the characters that are useful to define genera (McHugh 1995; Hutchings 1997a; Nogueira et al. 2003).

We believe that a major contribution to this poor state of knowledge is the confusion that exists in the literature with regard to the morphology of Terebelliformia, especially the anterior end, as also discussed by Garraffoni & Lana (2009). This is mainly due to the fact that authors have used different names for the same structures and often have not used the terms consistently over time, making it difficult to make comparisons and assess homologies between taxa (see Table 1 in Zhadan & Tzetlin [2002] and Garraffoni & Lana [2009]).

In order to investigate the relationships within the Terebellidae, a phylogenetic analysis of the whole group is presently being carried out by Nogueira & Hutchings (in prep.), with representatives of Pectinariidae, Ampharetidae, Alvinellidae, and Trichobranchidae as outgroups. The first step towards that analysis was a careful examination of all taxa to develop a consistent character set. In this paper we present the results of that study, which was restricted to external morphological characters, based preferably on type material of the species included.

Some of the interpretations presented in this paper, especially with regard to the nature of the anterior end, and notochaetae, differ from the literature, but our observations are based on detailed SEM examinations as well as light microscope examination of a large number of taxa and numerous specimens.

We believe this paper will be valuable for other researchers in defining the structure of the anterior end, notochaetae and neurochaetae, as well as other characters, providing an indication of the degree of variation observed for each character. However, all our interpretations and conclusions are based exclusively on the morphology of the adults and some need to be confirmed by developmental studies, especially with regard to the development of the prostomium, peristomium and anterior segments. A recent study on larval development of four species of Terebellinae (Garraffoni & Lana 2009) confirmed our interpretation on the anterior end of terebellids.

Material and methods

For the present study, more than 1500 specimens representing 147 species were examined, consisting of 1 Pectinariidae, 2 Ampharetidae, 2 Alvinellidae, 8 Trichobranchidae and 134 Terebellidae, including 8 Polycirrinae, 15 Thelepodinae and 111 Terebellinae. The specimens used were either type specimens or material from the type localities or areas close to them, borrowed from 19 museums worldwide. Tables 1–3 indicate the material examined and the museums from which the specimens were loaned.

While we selected only two representatives of Ampharetidae, we are aware that this large family consisting of over 70 genera and over 210 species, many of which are poorly known and often known only from the type specimen, should be better represented. Therefore, in the following discussion of characters, we have added comments from papers published on other genera where additional states have been reported. A similar study of the Ampharetidae is certainly needed, but it is beyond the scope of this paper, the main purpose of which is to discuss the family Terebellidae and compare it to the other families in the Terebelliformia.

Another outgroup, the Pectinariidae, consists of only five genera with over 50 described species and while no major revision of them has been undertaken they are a more morphologically conservative group than the ampharetids. In the case of the Alvinellidae, the taxa included in this study cover most of the variation found in the group.

The abbreviations used in Tables 1–3 are as follows:

AM—The Australian Museum, Sydney, Australia
BCPM—Royal British Columbia Provincial Museum, Ontario, Canada
BMNH—British Museum of Natural History, London, UK
LACM—Los Angeles County Museum, Los Angeles, USA
MCZ—Museum of Comparative Zoology, Harvard Institution, Cambridge, USA
MNHU—Museum für Naturkunde der Humboldt-Universitat, Berlin, Germany
NIWA—National Institute of Water & Atmospheric Research Limited, Wellington, New Zealand
NMV—Museum of Victoria, Melbourne, Australia
NTM—Museum and Art Gallery of the Northern Territory, Darwin, Australia

MCEM—Museu do Centro de Estudos do Mar, Paranaguá, Brazil
MHN—Museu de História Natural, IB-UNICAMP (currently 'Museu de Zoologia, Universidade Estadual de Campinas—ZUEC'), Campinas, Brazil
MZUSP—Museu de Zoologia, Universidade de São Paulo, São Paulo, Brazil
SMNH — Naturhistorika Riksmuseet (Swedish Museum of Natural History), Stockholm, Sweden
SMF—Naturmuseum Senckenberg, Frankfurt, Germany
USNM—United States Natural History Museum, Washington DC, USA
YPM—Yale Peabody Museum, New Haven, USA
ZMA—Zoölogisch Museum Amsterdam, University of Amsterdam, the Netherlands
ZMUB—Zoologisk Museum Universitetet i Bergen (Zoological Museum at the University of Bergen), Bergen, Norway
ZMUC—Zoologisk Museum, Københavns Universitet, Copenhagen, Denmark

Except for the polycirrine *Biremis blandi* Polloni, Rowe & Teal, 1973, the thelepodines *Parathelepus collaris* (Southern, 1914), *Pseudothelepus oligocirrus* (Schmarda, 1861) and *Telothelepus capensis* Day, 1955, and the terebellines *Bathya* Saint-Joseph, 1894, *Colymmatops granulatus* Peters, 1855, *Eupistella* Chamberlin, 1919, *Scionides reticulata* (Ehlers, 1887), and *Spiroverma ononokomachii* Uchida, 1968, representatives of all other currently known genera of terebellids were examined for the present study. Type material of *Opisthopista sibogae* Caullery, 1944 and *Paralanice timorensis* Caullery, 1944 was also examined, but the specimens are in such a poor state of preservation that they could not be used for this study.

The only taxa for which live material was studied were *Pectinaria dodeka* Hutchings & Peart, 2002, *Amphitritides carawa* Nogueira & Hutchings, 2007, and *Reteterebella aloba* Hutchings & Glasby, 1988, from a collection by João M. M. Nogueira and Pat Hutchings (Tables 1, 3). Those specimens were relaxed in magnesium chloride solution, fixed in 4 % formalin, and subsequently transferred to 80 % ethanol. All other material used for this study was housed in museums and preserved in 70% ethanol.

Specimens were studied under the stereomicroscope. Notochaetae and small portions of the uncinial tori were removed, mounted on slides with polyvinyl-lactophenol, and examined under the compound microscope. In the case of distally serrated notochaetae with the blade at an angle to the shaft, measurements of the angle (α) between the blade and shaft were taken (for example, as in Fig. 19A). For many species, specimens were also mounted for SEM examination (see Tables 1–3).

The nomenclature used here follows that which has been used in recent papers by Nogueira (Nogueira et al. 2004; Nogueira & Alves 2006; Nogueira & Hutchings 2007; Nogueira 2008; Santos et al. 2010) and, in the case of the neurochaetae, by Hutchings for more than three decades (Hutchings 1974, 1977, 1990, 1997a–b; Hutchings & Murray 1984; Hutchings & Glasby 1986a–c, 1987, 1988, 1990). Differences between the nomenclature adopted herein and others available in the literature are discussed separately in each section.

Photographs were taken of specimens in a petri dish basally coated with black wax, and kept in position with the aid of entomological pins. Images of specimens were taken at the SEM lab at the Australian Museum with a Digital camera (Spot FLEX) using the image-capturing software (Spot Software version 4.6), and at the Laboratório de Poliquetologia, IB–USP, with an Olympus C-7070 camera. Photographs of the uncini and chaetae were taken at Laboratório de Poliquetologia, IB–USP, with an Olympus C-7070 camera. All photographs were edited with Adobe Photoshop CS software.

For examination under SEM, specimens were critical-point dried, covered with 25 nm of gold, and examined at the SEM labs of the Australian Museum and the Museu de Zoologia, Universidade de São Paulo (MZUSP).

Morphology of terebelliform polychaetes

General shape of the body

The body of terebelliform polychaetes is usually divided into a thoracic and an abdominal regions, the former typically with notochaetae and neurochaetae, and the latter with neurochaetae only. Usually, both notopodia and notochaetae are absent on the abdominal region, however, there are several taxa that have abdominal achaetous notopodia reduced to short papillae (Fig. 1C, K). This demarcation of thorax and abdomen is based purely on external morphological features and may not be reflected internally.

In pectinariids, the body has been considered to be divided into three regions: a thorax comprising two achaetous and abranchiate segments, two branchiate segments, and three segments with notopodia only; an abdomen with both chaetae-bearing notopodia and neuropodia; and a sucker-like scaphe, which is apodous and achaetous except for one row of scaphal hooks on either side of the base (Day 1967; Rouse & Pleijel 2001). We, however, disagree with this division and suggest that the first two regions in pectinariids and the thorax of most other terebelliform polychaetes are homologous: an anterior region with a variable number of achaetous segments, often bearing branchiae, followed by a variable number of segments with notopodia only, and then a number of biramous segments. Thus, we consider pectinariids to have two body regions, a thorax extending until the end of the notopodia and an abdomen modified as a scaphe (Fig. 1A–B), and this may or may not be distinctly separated from the rest of the body, as in *Petta* Malmgren, 1866.

In the other groups of terebelliform polychaetes, such a pattern of an abdomen without notopodia or with varying development of achaetous notopodia is observed in ampharetids (Fig. 1C), trichobranchids (Fig. 1D, I–K), polycirrines (Fig. 1F), several thelepodines (Fig. 1G), and most terebellines.

In contrast, alvinellids (Fig. 1E), many thelepodines, and other terebellines have fully developed notopodia with notochaetae extending onto the posterior segments; in these groups, therefore, there is no clear distinction between thorax and abdomen.

In polycirrines, species of *Hauchiella* Levinsen, 1893 do not exhibit a clear distinction between thorax and abdomen, as notopodia and neuropodia are completely absent in this taxon and the body gradually tapers to the pygidium. *Enoplobranchus sanguineus* (Verrill, 1873) has notopodia extending posteriorly, but in other taxa of polycirrines, the demarcation between thorax and abdomen is usually clearly defined and marked by the distribution of nephridial and genital papillae, the termination of the notopodia, or, in the case of species of *Lysilla* Malmgren, 1866, by the complete absence of parapodia (Fig. 1H). An exception is *Biremis blandi*, which has only abdominal neuropodia present and the segment on which they begin demarcates the beginning of the abdomen (Polloni et al. 1973).

Within the thelepodines, we recognize two groups of taxa. The first group, hereafter named Group A, is characterized by a narrow and elongated upper lip (see below) and consists of five genera: *Decathelepus* Hutchings, 1977, *Glossothelepus* Hutchings & Glasby, 1986a, *Parathelepus* Caullery, 1915, *Rhinothelepus* Hutchings, 1974, and *Thelothelepus* Day, 1955, the latter and *Parathelepus* based on the original descriptions (Caullery 1915; Day 1955), as no material was examined. In this group, thoracic and abdominal regions are well marked, the first consisting of some achaetous segments followed by a few segments with notopodia only and then biramous parapodia, and the abdominal region with neuropodia only, as slightly raised pinnules (Fig. 1G).

In the second group of thelepodines, hereafter named Group B, which includes all the other genera of the subfamily, the demarcation between thorax and abdomen is not as clear. Several taxa have a thorax consisting of 1-2 achaetous segments followed by 2–3 segments with notopodia only and then biramous parapodia, and an abdomen with neuropodia only, having tori either slightly raised or forming pinnules. Other taxa, however, have biramous parapodia present on the majority of body segments and there is no clear distinction between a thoracic and an abdominal regions.

Most taxa of terebellines have a thorax with some achaetous segments followed by one to a few segments with notopodia only and then biramous parapodia, while the abdominal segments have only neuropodia, frequently as raised pinnules. However, many other terebelline taxa have biramous parapodia extending to posterior body.

Therefore, the division of the body into thoracic and abdominal regions, although sometimes useful, is not always easy to define in Terebelliformia. In addition, this division is based exclusively on the absence of notochaetae. On the other hand, if we were to consider internal structures, we could divide the body into a region anterior to the gular membrane, from prostomium to segment 4, and another posterior to it, from segment 5 to the pygidium (Zhadan & Tzetlin 2003).

For this reason, we prefer not to use the terms "thorax" and "abdomen", but instead use "region with biramous parapodia" and "region after notopodia terminate" hereafter, although we are aware that this terminology is not completely correct either, as the "region with biramous parapodia" also has some segments without parapodia and others with notopodia only. Garraffoni & Lana (2008) followed a similar reasoning, but these authors did not name these "regions".

Anterior end: prostomial and peristomial characters

The nature of the anterior end of terebelliform polychaetes is one of the most difficult parts of this group to interpret. This is in part due to the difficulties in analyzing and comparing the structures that form the "head" of these animals, as they are highly modified from the typical prostomium and peristomium head pattern found in many other polychaete families. Another problem is that few studies on the larval development of terebelliform polychaetes have been undertaken.

In pectinariids, the prostomium and peristomium are fused to each other forming a cephalic veil (Rouse & Pleijel 2001), which may have smooth or cirrate margins and may be partly fused to the operculum, as in *Lagis* Malmgren, 1866, or completely free, as in *Pectinaria* Savigny, 1818. The buccal tentacles originate from the ventral part of this veil, an upper lip is absent, and the lower lip is reduced (Figs. 1A; 2A–B, D). The origin of the buccal tentacles in this group is unclear because of the fusion of the prostomium and peristomium, although according to Watson (1928) they cannot be retracted into the mouth and lie just above the buccal opening suggesting that they are peristomial in origin.

All other terebelliform polychaetes have the prostomium and peristomium as distinct structures, with the prostomium much shorter and, except for some polycirrines, not forming a complete ring around the body, but located only on the dorsal surface of the peristomial upper lip. Except for the alvinellids, the prostomium consists of two parts: a basal part frequently bearing ocelli and a distal part.

The peristomium is often restricted to the upper and lower lips, sometimes continuing laterally and/or posteriorly from the mouth for some distance. The lips are often ciliated and this is used for the selection of food particles. A partially eversible pharyngeal organ is present in these animals, which, when everted, lies just at the level of the mouth and has sometimes been considered as the lower lip in taxonomic descriptions (Zhadan & Tzetlin 2002).

In ampharetids, both prostomial parts are conspicuous, the basal part frequently has ocelli and the distal part forms a trilobed structure (Fig. 2G–H). The oblique ciliated pits of the nuchal organs are located on the peristomium adjacent to the boundary between it and the basal part of the prostomium (Fig. 2G–H).

In alvinellids, the prostomium is restricted to a short dorsal annulation (Fig. 3F), the peristomium is well developed, forming a complete ring (Fig. 3F), and the lower lip is robust and longer than the anterior segments (Fig. 3B–D, H–I). No eyes or nuchal organs have been described in alvinellids, although the latter should be present according to Rouse & Fauchald (1997), who suggested that the presence of nuchal organs was one of the few characters that define the polychaetes.

In ampharetids (Fig. 2C, F–H) and alvinellids (Fig. 3B–D, H), the upper lip and buccal tentacles originate from the roof of the mouth and can be retracted into it (Hilbig 2000a, b), which differs from the arrangement found in terebellids and trichobranchids. As the buccal tentacles of ampharetids and alvinellids originate from inside the mouth, and the prostomium in these families is situated on the dorsal part of the peristomium, well separated from the mouth, the buccal tentacles of ampharetids and alvinellids are most likely peristomial in origin. However, Rouse & Pleijel (2001) stated that at least some buccal tentacles of ampharetids are of prostomial origin, according to studies on larval development (Okuda 1947; Cazaux 1982), suggesting that both prostomial and peristomial tentacles are present. This contradicts Rouse & Fauchald (1997) and only highlights the need for more detailed larval studies to be carried out to resolve these problems.

Another potential issue is that in at least two genera of ampharetids, *Melinnexis* Annenkova, 1931 and *Amelinna* Hartman, 1969, one or two much longer and thicker buccal tentacles are present, and whether these are homologous with the other buccal tentacles is unknown.

In trichobranchids and many terebellids, the two prostomial parts may be almost indistinguishable, except for the eyespots, which, if present, identify the basal part, the distal part being characterized by the origin of the buccal tentacles. Therefore, in both families the buccal tentacles are of prostomial origin. So, while buccal tentacles within the Terebelliformia appear similar they are not homologous structures and their origins are still being debated.

Ocelli easily fade in preserved material and frequently they are not visible in type material even though they were described as being present in the original descriptions. For this reason, the presence and distribution of ocelli were not considered in the present study, although we believe they could be useful characters, at least at the specific level, when fresh material is available for examination.

In trichobranchids, the prostomium forms a low crest on the dorsal surface of the upper lip (Fig. 4A–B, D–G). Both the upper lip and buccal tentacles originate outside the mouth and are not retractable into it. The tentacles arise from the prostomium, which is fused to the dorsal side of the upper lip. There are at least two types of buccal tentacles present in trichobranchids, the longer type being distally expanded and the shorter type uniformly cylindrical and tapering to the tip. The basal part of the prostomium is situated at the base of the upper lip and the distal part may also be situated on the basal part of the upper lip, as in *Trichobranchus bunnabus* Hutchings & Peart, 2000 (Fig. 4E–G), or extend along it and terminate subdistally, close to the anterior border of the upper lip, as in *Terebellides anguicomus* Müller, 1858 (Fig. 4A–B, D).

The peristomium of trichobranchids is well developed. The upper lip is a large, hood-like, nearly circular structure above the mouth, and is usually folded into three lobes (Fig. 4A–H). The lower lip usually extends posteriorly from the mouth as an extension that is longer than the anterior segments. In *Terebellides*, the lower lip forms a large scoop-like process projecting forwards (Fig. 4A–D), and has been interpreted by some authors as segment 1 (Garraffoni & Lana 2004; Parapar & Moreira 2008 a, b). In many, if not all, species of *Trichobranchus*, the peristomium continues laterally from the mouth as a pair of large lateral lobes that terminate dorso-laterally (Fig. 4E–H).

In terebellids, the prostomium and the peristomium exhibit a greater morphological variation than found in any other family of Terebelliformia. In polycirrines, both prostomial parts form thick crests on the dorsal part of the upper lip. These crests are larger than in other subfamilies of terebellids, and usually extend posteriorly, cover segment 1 dorso-laterally and terminate laterally (Fig. 5A–C, H–I) or ventrally between shields of segments 1 and 2 (Fig. 5D–F). In some polycirrines, as in several trichobranchids, the distal part of the prostomium extends along the dorsal surface of the upper lip and terminates close to the anterior margin of this latter structure (Fig. 5H–I), while in others it is restricted to the basal part (Fig. 5A–C). In addition, several polycirrines have a mid-dorsal differentiated structure developed on the distal part of the prostomium, forming either an oval to rectangular area (Fig. 5A–B) or paired lobes (Fig. 5E, G); the function of such a structure is uncertain, but it is probably sensory. In regard to the buccal tentacles, at least two types are present in polycirrines, the longer distally or subdistally expanded, and the shorter uniformly cylindrical or tapering and ending in fine tips (Fig. 5A–B, D, F–G).

The upper lip of polycirrines is well developed, expanded, almost circular, and folded into three lobes; the lower lip is small, button-like, and sometimes covered by the shield on segment 1 (Fig. 5A–D, F, H–I). The peristomium of polycirrines frequently extends laterally from the mouth for some distance and may form a complete ring around the body (Fig. 5C, E, G).

In thelepodines, we recognize two groups of taxa based on the morphology of the prostomium and peristomium, among other characters. Group A is characterized by having an upper lip that is narrow and elongate, distinctly longer than wide, and a large, segment-like to cushion-like lower lip (Figs. 6A–B, D–E, G; 7B, D–G, I, K), while Group B has an upper lip about as long as wide and a lower lip of variable morphology, but never segment-like (Figs. 8A–H; 9A–B, E, I–J).

Considering the thelepodines of Group A, in *Rhinothelepus* the basal part of the prostomium forms a thick crest with eyespots concentrated in a pair of dorsolateral clusters (Fig. 6C, F) and the distal part of the prostomium has a mid-dorsal process with a large, free, tongue-like lobe (Fig. 6B, F). In this genus, the peristomium forms a complete ring around the body. Ventrally, the upper lip is long and narrow, convoluted, and with a total length equivalent to the distance from the mouth to segment 3 or 4, while the lower lip is segment-like and wrinkled (Fig. 6A–B, D–E, G). Dorsally, the peristomium is narrow, with one pair of pits corresponding to nuchal organs present on the border with the prostomium (Fig. 6C).

In the other genera of Group A, the presence of a mid-dorsal prostomial process originating from the distal part of prostomium is not always as clear, mostly due to the poor condition of type material. In *Decathelepus ocellatus* Hutchings, 1977, the type species of the genus with a single known specimen, the anterior end is so damaged that it is not possible to assess the morphology of the upper lip and prostomium. The distal part of the prostomium appears to have a large tongue-like mid-dorsal process, with a distally bifid free lobe (Fig. 7A–D), although it is shorter than that found in *Rhinothelepus*. The upper lip, although broken, is highly convoluted, resembling that found in *Rhinothelepus* (Fig. 7B, D). The other species of this genus, *D. wambirra* Nogueira & Hutchings, 2007, lacks such mid-dorsal prostomial process and, although it has an elongated upper lip that is much longer than broad, this lip is much shorter than in *Rhinothelepus* and is not convoluted (Fig. 7E–F, I). In both species of *Decathelepus* the lower lip is large and cushion-like (Fig. 7B, D–F, I).

Finally, in *Glossothelepus mexicanus* Hutchings & Glasby, 1986a, the upper lip is extremely elongated and convoluted (Fig. 7G, K) and the lower lip is segment-like. Both structures are similar to those found in *Rhinothelepus*. The presence of a mid-dorsal prostomial process originating from the distal part of the prostomium could not be confirmed in the paratypes due to the damaged type material (Fig. 7H, J), but a large prostomial process completely free from the upper lip is very conspicuous in the holotype.

In Group B, except for the eyespots and buccal tentacles, the two prostomial parts are almost indistinguishable (Figs. 8C, F; 9C–H, J), except in those species where adults are typically several centimeters in length and in which the distal part forms a shelf-like process from which the buccal tentacles originate (Fig. 8A, D, G–I). The upper lip of the thelepodines of Group B is broader than long (Fig. 8A–B, D–E) or about as broad as long (Figs. 8G–H; 9A–B, I). The lower lip is short, usually button-like, and restricted to the oral area or covering segment 1 (Fig. 8C, E–H); in some cases, such as in *Euthelepus serratus* Hutchings & Glasby, 1986b, the lower lip has a thin marginal lobe (Fig. 8A–B). In most thelepodines belonging to this group, the peristomium does not continue dorsally, but sometimes it forms a complete ring around the body (Fig. 8C–D, F) with one pair of ciliated dorso-lateral nuchal organs on the border with the prostomium (Fig. 9C–H, J).

All taxa of thelepodines have a single type of buccal tentacle, which is usually uniformly cylindrical. However, there are a few taxa with buccal tentacles that are distally expanded, such as *Pseudostreblosoma brevitentaculatum* Nogueira & Alves, 2006 (Fig. 9A–B, I–J).

In the third subfamily of Terebellidae, Terebellinae, the two prostomial parts are either almost indistinguishable (Fig. 10E, G, I–J), or, more commonly, the distal part develops a shelf-like process, from which the buccal tentacles originate (Figs. 10A–D; 11A–B, D–H; 12A–B, D–H; 13A–I). Frequently, this distinction seems to be related to size, with larger individuals having a shelf-like distal part of the prostomium, but this is not always the case. In some taxa, the distal part of the prostomium is indented mid-dorsally by the branchiae, but in species of *Artacama* it is distinctly bilobed (Fig. 11A, D, F).

The upper lip of terebellines varies from being broader than long to being as broad as long, but it is never conspicuously longer than broad, as in the Group A of thelepodines, or expanded and nearly circular as in polycirrines.

The morphology of the lower lip of terebellines is also variable. Most have a short lower lip restricted to the oral area (Figs. 10F, H; 12C–D, G–H; 13E, H–I; 14A, F–G; 15G, I; 16A–D, F–G), but in some taxa the lower lip extends posteriorly from the mouth covering segment 1 ventrally or is partially fused to it (Figs. 10D; 13A–C; 15C, F). The lower lip is particularly small and difficult to see in taxa with large ventral lobes on segment 1 (see below) (Figs. 10F, H; 13E, H–I).

In species of *Artacama*, however, the lower lip is developed to form a large papillated process projecting forwards as an extension equivalent to the length of several anterior segments (Fig. 11A–H). This structure has been considered in the literature (Malmgren 1866; Hartman 1967) as a proboscis, but this nomenclature is not correct because this structure is not retractable as a true proboscis would be. This genus was placed in a subfamily of its own, Artacaminae, the validity of which has been questioned several times (Hessle 1917; Day 1967), until McHugh (1995) showed that *Artacama* should be placed in the Terebellinae due to the presence of uncini arranged in double rows on some segments; the subfamily Artacaminae, therefore, is not valid.

In the taxa in which the lower lip extends posteriorly from the mouth, the lower lip could be considered as restricted to the area around the mouth and the rest of this structure regarded as peristomial, especially if there is some type of morphological differentiation between the two parts, as frequently occurs, for instance, in species of *Amphitrite* Müller, 1771 (Fig. 10D), *Proclea* Saint-Joseph, 1894 (Fig. 13A–C), and *Terebella* (Fig. 15C, F). We, however, consider this irrelevant because the lower lip is also part of the peristomium and therefore we designate the whole structure as the lower lip.

Finally, in most terebellines the peristomium is restricted to lips, but in some taxa it extends laterally from the mouth to a variable degree, terminating dorso-laterally, being mid-dorsally fused to segment 1 (Fig. 10A–B, G, I–J), or forming a complete ring around the body. Most terebellines have only one type of buccal tentacle, but species of *Artacama* have two types, the longer being distally expanded and the shorter uniformly cylindrical.

As said above, all our interpretation is based on the morphology of the adults and needs to be confirmed by developmental studies; however, the few studies available on larval development of Terebellidae confirm our interpretation of the prostomium, peristomium, and buccal tentacles (Heimler 1983; Bhaud & Grémare 1988; Blake 1991; Garraffoni & Lana 2009). In the particular case of the peristomial origin of the buccal tentacles in Pectinariidae and Ampharetidae, and prostomial origin in Trichobranchidae and Terebellidae, this has also been confirmed by studies on the patterns of innervations of these structures among the families of Terebelliformia (Orrhage 2001; Orrhage & Müller 2005).

Anterior segments: paleae, lobes, and raised crests

The numbering of anterior segments in terebelliform polychaetes has often been confused. These animals usually have faint segmentation on the anterior segments and, in addition, these segments are often reduced, or inconspicuous, making them difficult to count.

Another difficulty stems from the fact that many taxonomic descriptions have confused the peristomium with segment 1. For instance, many taxa of terebellids have been described as having peristomial lobes (Hutchings & Glasby 1988; McHugh 1995). However, according to the counting system adopted in this paper, these lobes are actually on segment 1. Garraffoni & Lana (2004, 2008) discussed the subject and correctly considered these lobes as originating from segment 1, but, on the other hand, these authors considered the papillated process of *Artacama* as originating from segment 1 instead of the lower lip as discussed above, and they also did not comment on the amount of variation for segment 1 of terebellids as discussed below. Such confusion between the peristomium and segment 1 alters the numbering of all subsequent segments and this is critical given that the segment on which various structures arise, such as the notopodia, neuropodia, and branchiae, defines the genus.

In addition to the lobes on segment 1, many taxa of terebelliforms have lobes on other anterior segments. Such lobes have been considered in the literature as lateral lobes (Holthe 1986; Hutchings & Glasby 1988), but they can also be placed ventrally or dorsally, so the term “lateral lobes” is inappropriate. We suggest that these structures are homologous regardless of whether they arise laterally, ventrally, or dorsally, although it is important to define their position for taxonomic purposes. Usually, these lobes are large flaps of tissue covering at least part of the preceding segment, but in several taxa they are reduced to thickened ridged structures.

In addition, raised crests that do not cover any part of the preceding segment, but just protrude slightly from the surface may be present on anterior segments. Such crests have not previously been described in taxonomic papers, but they are conspicuous in some taxa and should be considered. Since lobes and raised crests can be present on the same segment, we regard them as separate structures.

In cases where lobes are reduced to short, thickened ridged structures, it is difficult to distinguish them from crests. In this paper we define lobes as those structures that cover at least some portion of the preceding segment, and crests as structures which arise from the surface of the segment forming a raised ridge that just protrude beyond the alignment of the segments.

Following the criteria above, in *Pectinaria dodeka*, which we are using as our representative pectinariid, segment 1 is ventrally inconspicuous and dorsally developed, forming a large operculum that is completely surrounded by a narrow ring, with 10–12 pairs of large, golden, cylindrical to slightly flattened, pointed paleae inserted ventrally (Figs. 1A; 2A–B, D–E); in other genera, up to 13 pairs may be present. The margins of the operculum may be smooth as in *Pectinaria* or cirrate as in *Amphictene* Savigny, 1818 (Fauchald 1977). In addition, segment 1 has one pair of tentacular cirri inserted laterally on the ventral margin of the operculum. These cirri are expanded basally and gently taper to the tip (Fig. 2A–B, D). Ventral to the tentacular cirri, the ventro-lateral margins of segment 1 are thickened, forming a small crest ending laterally to the mouth. At the base of each tentacular cirrus, a crest with one spherical structure, which may be a nephridial papilla (see below), is present (Figs. 1A; 2A–B, D). Segment 2 is dorsally short, with a thickened crest on the anterior margin extending dorso-laterally and continuing ventro-laterally as short ear-shaped lobes. These are connected to each other by a raised membrane across the venter, with maximum height mid-ventrally (Fig. 2A–B). Also, segment 2 has one pair of tentacular cirri inserted dorso-laterally on each side arising from the anterior margin of the lobes, and two pairs of papillae, one pair digitiform and inserted laterally, and the other pair smaller and almost spherical (Figs. 1A; 2A–B). Segments 3 and 4 have short dorso-lateral lobes and ventral crests markedly raised from the body wall; the dorso-lateral lobes and the ventral crests are not connected to each other (Figs. 1A; 2A–B, D). Segments 5 and 6 have low ventro-lateral lobes connected to each other by a raised membrane across the venter. The lobes on segment 5 are larger than those on segment 6, this latter segment has a crenulated mid-ventral lobe (Figs. 1A; 2A–B).

In ampharetids, all the branchial filaments emerge from segments 2–3 and have migrated to an anterior position in relation to the segments on which they originate, with the branchial stalks dorso-laterally fused to the body wall (Figs. 2F–H; 17A–B). This results in the anterior segments appearing almost fused, with only faint segmentation visible and partially hidden by the branchial stalks.

Ampharetids are subdivided into two subfamilies based largely on the morphology of the anterior segments. In *Amphicteis dalmatica* Hutchings & Rainier, 1979, lobes and crests are absent, except for segment 1 having a ventral crest protruding below the lower lip (Fig. 2C, F) and segments 2–4 forming a triangular mid-dorsal crest between the fused stalks of the branchial filaments (Fig. 2G–H). In this subfamily, segment 1 bears lateral notopodial paleae (Fig. 2C, F). The absence of dorso-lateral lobes and the presence of the stout notopodial paleae often referred to as notopodial hooks are characteristic for Ampharetinae Chamberlin, 1919.

In contrast, segment 1 of *Melinna elisabethae* McIntosh, 1885, has a large ventral lobe covering the posterior part of the lower lip (Fig. 17C–D). Dorsally from segments 1–4, a pair of large dorso-lateral lobes encloses a mid-dorsal depression inside which the branchial filaments arise (Fig. 17A–B, D). The posterior margin of this dorso-lateral structure is demarcated by a serrated dorsal lobe on segment 5, which forms a mid-dorsal pocket extending to segment 6 (Fig. 17A–B). The presence of these dorso-lateral lobes is characteristic for Melinninae Chamberlin, 1919. Paleae are absent in this group, but segment 3 has one pair of stout dorsal notopodial hooks (Fig. 17A–B).

Alvinellids, like ampharetids, have branchiae that emerge anterior to the segments on which they actually originate. In this family, the anterior segments are only visible mid-dorsally as a narrow stripe between the branchial stalks (Fig. 3A, E, G). Ventrally, alvinellids have compressed anterior segments, with conspicuous segmentation (Fig. 3B–D, H–I). Except for the anterior margin of segment 1 forming a protruding crest below the lower lip, lobes and crests are absent in the family (Fig. 3A–E, G–I). Paleae are absent in this group, but robust notopodial hooks are present on segments 5–6 in *Alvinella pompejana* Desbruyères & Laubier, 1980 (Fig. 3A, G) and segment 8 in *Paralvinella grasslei* Desbruyères & Laubier, 1982 (Fig. 3H–I).

Our segment count of alvinellids is different from that of Jouin-Toulmond & Hourdez (2006). Those authors considered what we are treating as the peristomium as segment 1 in both species of alvinellids discussed above. In addition, these authors considered *Alvinella pompejana*, according to the arrangement of the branchial blood vessels, as having four fused segments corresponding to what we are referring to as segment 1, the mid-dorsal stripe originating exclusively from segment 2 and notopodia beginning from segment 6. In the case of *Paralvinella grasslei*, Jouin-Toulmond & Hourdez (2006) considered the mid-dorsal stripe as being exclusively from segment 5, which the authors regarded as segment 6, as they treated what we are calling the peristomium as segment 1 (Jouin-Toulmond, pers. com.). We disagree with the interpretation by Jouin-Toulmond & Hourdez (2006) because the peristomium is not a true segment and so it should not be considered as segment 1. The peristomium originates from the area around the mouth of the trochophore, instead of the growth zone, from which true segments arise. In many families of polychaetes, the peristomium has cirri and even chaetae, indicating that some “true segments” may have fused with it during ontogeny, but this is not the case in alvinellids.

In addition, the mid-dorsal stripe extends through a region that, in *Alvinella pompejana*, corresponds in ventral view to segments 1 and 2 and in *Paralvinella grasslei*, to segments 1–4, with clear segmentation both on the stripe and ventrally, and, in the case of *P. grasslei*, notopodia with notochaetae are present on what we are referring to as segments 2–4 (see Fig. 3A–E, G–I).

Finally, we consider that during development the branchiae migrate from the segments on which they originate to a more anterior position, as occurs in the closely related ampharetids, instead of having several segments fused into what appear in the adults as a single segment. In alvinellids, however, no signs of branchial stalks fused to the integument are visible dorso-laterally, even though the branchiae may have kept their original pattern of blood vessels internally. Of course, both our hypothesis and that of Jouin-Toulmond & Hourdez (2006) require studies on the larval development of the group to confirm which is correct.

In trichobranchids, segment 1 is more conspicuous ventrally. In *Trichobranchus* (Fig. 4G) and *Octobranchus*, segment 1 terminates dorso-laterally and does not form a complete ring around the body, while in *Terebellides* it continues dorsally, but is shorter (Fig. 4A–C).

In *Trichobranchus*, a large eversible ventral process is present on segment 1; this process, when retracted, is folded between segments 1 and 2. Segment 1 has one pair of large lateral lobes (Fig. 4E, G–H) that disappear when this process is everted, as they are part of this structure. This eversible process has been regarded in the literature as a proboscis and because of that the genus *Artacamella* Hartman, 1955 was described to accommodate *Artacamella hancocki* Hartman, 1955 and placed in the subfamily Artacaminae, family Terebellidae, together with *Artacama*. Later, both Holthe (1977) and Hutchings (1977) independently suggested that *Artacamella* should be placed in the Trichobranchidae based on the structure of the thoracic neurochaetae and of the prostomium and peristomium. Finally, Garraffoni & Lana (2004) synonymized *Artacamella* with *Trichobranchus* based on a phylogenetic analysis.

According to our examination of specimens originally described as *Artacamella* and *Trichobranchus* the only difference between these “taxa” is whether the eversible process is everted or not, and it seems possible that the same species may have been described both as a species of *Trichobranchus* and *Artacamella* depending on the state of eversion of this structure (Nogueira 2008). Further studies will no doubt reduce the number of species within the genus *Trichobranchus*.

In *Terebellides*, segment 1 is more developed ventrally below the lower lip, segment 2 is conspicuous both ventrally and dorsally with a dorsal crest from which the branchial stalk emerges, and in many species segment 3 is conspicuous only ventrally because the body is deflected on this segment and it is dorsally fused with segment 2 (Fig. 4A–C). A conspicuous dorsal hump is present in a few species on segment 9 (Fig. 4A). The degree of deflection on segment 3 varies between taxa and depends on the state of preservation of the specimens, but it is usually conspicuous. Garraffoni & Lana (2004) and Parapar & Moreira (2008a, b) considered the scoop-like process of *Terebellides*, which we consider in this paper as the lower lip, as segment 1 and did not observe the segment posterior to it, which we consider as segment 1. The scoop-like process clearly originates from around the mouth and therefore is of peristomial origin, and posterior to it, a shorter, but conspicuous true segment is present (Fig. 4A–D).

In all trichobranchids, the anterior margins of the anterior segments develop crests or low lobes, either completely encircling the posterior part of the preceding segments and forming a collar (Fig. 4F–H), or occurring only ventrally and laterally, terminating in slightly expanded lateral lobes on some anterior segments (Fig. 4A–C).

Terebellids exhibit a significant amount of variation with regard to the anterior segments. Large lobes and crests are relatively common in this group, especially in the Terebellinae. In contrast, the polycirrines are highly conservative in regard to the morphology of the anterior segments. In all polycirrines, the lower lip is partially hidden by a large shield, which we consider to be derived from segment 1, then a short and narrower segment, followed by the segment on which the notopodia first appear, if these structures are present (Fig.

5C–D, F, I). The basal part of prostomium may terminate laterally or extend ventrally and terminate between shields on segments 1 and 2. The only other difference between taxa is whether or not peristomium is dorsally conspicuous; this is important as it may make the counting of anterior segments difficult. Possibly for that reason, species of polycirrines have been described as having notopodia from segment 2, 3, or 4 (Hessle 1917; Holthe 1986; Hutchings & Glasby 1986b), but we believe that all species of polycirrines with notopodia have those structures from segment 3.

Lobes on anterior segments are absent in polycirrines. Crests are sometimes present, but, except for the ventro-lateral crests on segment 1, we suspect that they are highly susceptible to the methods of preservation, given the intraspecific variation within taxa examined for this study.

In the thelepodines of Group A, *Rhinothelepus* (Fig. 6A–E, G) and *Glossothelepus* (Fig. 7G, K) have segment 1 ventrally developed around the lower lip and dorsally reduced, becoming almost inconspicuous. Segment 2 is dorsally conspicuous, terminating ventro-laterally and not forming a complete ring around the body. In contrast, in *Decathelepus* segment 1 terminates ventro-laterally, and segment 2, although short, surrounds the lower lip (Fig. 7A–F). Low ventral crests are present on segments 3 and 4 in *Rhinothelepus* and *Glossothelepus* (Figs. 6A, D–E, G; 7G, K), present on all anterior segments, starting from segment 2, in *Decathelepus ocellatus* (Fig. 7B, D), but absent in *Decathelepus wambira* (Fig. 7E–F). Lobes are absent in this group.

In most taxa of Group B of the thelepodines, segment 1 is dorsally conspicuous, although the boundary of the peristomium is sometimes difficult to discern. Segment 1 continues around the lower lip ventrally or is partially fused to it (Figs. 8A–I; 9E–H), but in some taxa it forms a developed ventral lobe below the lower lip (Fig. 9A–B, I–J). Segment 2 usually has a developed crest on the anterior margin, either present laterally and ventrally (Figs. 8C, E–I; 9A–B, G–J; 17E–H), or as a complete collar (Figs. 8A–B, D; 9E). Except for this crest on segment 2, other lobes and crests are rare in this group, although some taxa have such a glandular venter that segments are frequently corrugated and protruding (see below). We do not consider these as crests because the whole segment is ventrally swollen and protruding instead of just the anterior border.

Lobes are present in a few taxa of Thelepodinae as short, sometimes swollen tissues situated laterally or ventro-laterally on segments 2–3 or 2–4 (Figs. 8A–B; 9A–D, I–J). However, *Pseudothelepus binara* Hutchings, 1997a, has large lobes on segments 6 and 7, forming low collars that completely encircle the body on segment 6 and are interrupted mid-dorsally and mid-ventrally on segment 7 (Fig. 17E–I).

The greatest development of lobes observed during the present study is exhibited by species of Terebellinae, and their morphology is critical for many specific and generic diagnoses (Hutchings & Glasby 1988).

Segment 1 is usually dorsally conspicuous, although in the taxa in which the peristomium continues dorsally, the border between the peristomium and segment 1 is difficult to distinguish, at least mid-dorsally (Fig. 10A–B, G, I–J). Ventrally, we identified four states of segment 1:

(1) segment 1 continues around the lower lip or is partially fused to it (Figs. 10D; 11B, E–H; 13A–C; 15A–F), a state also found in most thelepodines.

(2) segment 1 with a short ventral lobe below the lower lip (Figs. 12D, G–H; 13E, G–I; 15G, I; 16A–D, F–G).

(3) segment 1 with one pair of low dorso-lateral lobes not covering the distal part of the upper lip and connected to each other ventrally by a membrane below the lower lip (Figs. 12A–C; 14A–H).

(4) segment 1 with one pair of large triangular to rounded lobes directed upwards, covering the distal part of the upper lip, beginning dorso-laterally and terminating ventro-laterally. These lobes are connected to each other ventrally by a membrane indented at the level of the lower lip (Fig. 10E–J).

On the following segments, lobes may be present in a variety of sizes and shapes. They are usually laterally placed, varying from large structures (Figs. 10E–J; 12D–G; 13E–I; 14A–H; 15G–I; 16A–G) to narrow strips of tissue (Figs. 12D–G; 13A–D; 15G–I) or rounded swellings (Fig. 10A–D) on the anterior border of the segments. A taxon may have more than one type of lobe present on the anterior segments (Figs. 12D–G; 15G–I). Lobes within a pair may be connected to each other ventrally and/or dorsally by a low membrane or a crest (Figs. 10D; 13A–C, E–H; 14A, C–D, F–H; 15G, I; 16A–D, F–G). In some cases, however, lobes can also be situated ventrally, as on segment 2 of *Stschapovella tatjanae* Levenstein, 1957 (Fig. 12B–C), or dorsally, as on segment 4 of *Thelepides koehleri* Gravier, 1911 (Fig. 13F) and *Scionella japonica* Moore, 1903 (Fig. 14B–C, E, H).

Species of *Lanicola* Hartmann-Schröder, 1986 exhibit a unique feature, with lobes originating dorso-laterally on segment 3, fused to the body wall ventro-laterally on segment 2, and continuing to segment 3 attached to the integument of segment 2 (Fig. 16A–E). This description differs from that provided by Londoño-Mesa (2006, as *Paraeupolymnia*) and Capa & Hutchings (2006), who stated that the lobes originate from segments 2 and 3 together.

In addition to lobes, crests are also commonly found among Terebellinae taxa. It appears that all species of terebellines have a protruding crest on segment 2, usually only ventrally, below the lower lip (Figs. 10D, F, H; 11 B–C, E–H; 12D, G; 13A–C, E, H; 14A, D, F–G; 15C–G, I; 16A–D, F–G), but sometimes extending laterally or dorsally. Other crests are frequently present dorsally, most commonly on branchiate segments at the base of the branchiae (Figs. 12E–F; 15H).

Segmental branchiae

Branchiae are present in all taxa of terebelliform polychaetes except the polycirrines and some terebellines. In all of the branchiate taxa except for *Terebellides*, branchiae are paired structures situated dorso-laterally to dorsally on anterior segments, varying from single filaments to complex arborescent or spiralled structures.

In *Pectinaria dodeka*, there are two pairs of tentacular cirri on segments 1 and 2, and two pairs of lamellate branchiae on segments 3 and 4 (Figs. 1A; 2A–B). In other pectinariids not included in the present study, there is an additional pair of pectinate branchiae posterior to the lamellate pairs. Orrhage (2001) demonstrated that the tentacular cirri of pectinariids are homologous to the branchiae of other terebelliform polychaetes. However, he was confused with regard to the numbering of segments and considered the tentacular cirri to be present on segments 2 and 3, whereas they are actually on segments 1 and 2.

Branchiae are present in all ampharetids except *Emaga* Hartman, 1978, and *Uschakovius* Laubier, 1973, although Rouse and Pleijel (2001) suggest that *Emaga* may be a terebellid and scars are present on *Uschakovius* suggesting that Laubier (1973) was mistaken in describing it as an abranchiate ampharetid. Typically, ampharetids have four pairs of branchiae, although some genera have only three pairs and *Auchenoplax* Ehlers, 1887 has only two pairs. Branchiae typically are smooth tapering cylinders but often some of the pairs are flattened as in *Amphicteis* Grube, 1850 or composed of numerous branches that may be filamentous, papillose or lamellate ornamented with filaments (e.g., in *Isolda* Müller, 1858, *Gnathampharete* Desbruyères, 1978, and *Schistocomus* Chamberlin, 1919). The lamellate branchiae of *Schistocomus* resemble those of Pectinariidae. The individual branchiae exhibit varying degrees of lateral fusion within genera and species, and in species like *Isolda pulchella* Müller, 1858, all four branchiae on each side arise from a fused basal stalk obscuring their segmental origins. In others, this basal web only unites the first three pairs of branchiae, leaving the fourth pair free (Hutchings 2000). So, while the number of branchial scars is useful to determine numbers of pairs of branchiae present they provide no indication of the type of branchiae present and whether they are all similar or two types are present.

Both ampharetids included in the present study have four pairs of branchiae, each formed by one long and thick filament on each side of the body. They are originally from segments 2–5, but have migrated to a more anterior position during ontogeny. In *Amphicteis dalmatica*, there are conspicuous branchial stalks fused to the body wall from the segment on which each filament originates, but they do not become free from the body wall until segments 2–3 (Fig. 2F–H).

In *Melinna elisabethae*, the branchial filaments emerge inside the mid-dorsal depression on segments 1–4 (Fig. 17A–B). These filaments are arranged in two groups each consisting of four filaments arising from a raised crest close to the lateral margins of the mid-dorsal depression. Within each group, the filaments are fused to each other at different levels by connecting membranes. There is some confusion in the literature with regard to the numbering of the anterior segments in *Melinna elisabethae*. Mackie & Pleijel (1995) considered the branchiae as originating from segments 3–6 based on a study on larval development by Grehan et al. (1991). However, Rouse & Pleijel (2001) stated that they arise from segments 2–5 and suggested that Grehan et al. (1991) had misinterpreted the numbering of anterior segments as the figures provided by the latter authors show only one segment present between the peristomium and that bearing the first pair of notopodia. The segmental numbering system proposed by Rouse & Pleijel (2001) is followed in this paper.

In alvinellids, there are four pairs of branchiae originating from segments 2–5 but, as said above, they have migrated during ontogeny to a more anterior position in relation to the segments on which they originate. They appear to arise from segments 1–2 in *Alvinella pompejana* (Fig. 3A, G) and segments 1–4 in *Paralvinella grasslei* (Fig. 3E). However, there are no remains of branchial stalks fused to the body wall (Fig. 3A, E, G–I). Branchiae are large structures in alvinellids. Each member of a pair has a thick central main stem, from which arise multiple approximately triangular lamellae as in *Alvinella pompejana* (Fig. 3A–D, G), or thin cirriform filaments as in *Paralvinella grasslei* (Fig. 3E, H–I). The papillae at the base of the branchiae of segment 4 in Fig. 3E indicate that the specimen is a female (Zal et al. 1994; Jouin-Toulmond pers. com.).

Among the trichobranchids, *Trichobranchus* has 2–3 pairs of branchiae originating from segments 2–3 or 2–4, each pair consisting of one long, thick, unbranching filament on each side of the body, the first pair frequently originating more dorsally than the second (Fig. 4F–G). In *Octobranchus*, there are four pairs of branchiae originating from segments 2–5. In *O. myunus* Hutchings & Peart, 2000, each pair of branchiae consists of one long, thick, unbranched filament on each side of the body, but according to Hutchings & Peart (2000) different types of branchiae are found in other species of *Octobranchus*.

In *Terebellides,* there are two pairs of branchiae originating from segments 2 and 3, but these are basally fused to each other and form a single, typically lamellate, four-lobed structure. This structure originates mid-dorsally from a common stem on segment 2 (Fig. 4A–B), between segments 2 and 3, or between segments 2–4 (Jouin-Toulmond & Hourdez 2006), and the single stalk present is formed by the fusion of the individual stalks of the branchiae of segments 2, 3 and 4 (Hutchings & Peart 2000).

There is some confusion in the literature in regard to the segment from which branchiae arise in *Terebellides*. Most of the available descriptions state that they arise from segment 3. However, although the origin of the branchia is at the same level as the nephridial papilla on segment 3, segment 2 is oblique, with a dorsal crest projecting posteriorly and segment 3 is usually dorsally inconspicuous and fused to segment 2 due to the deflection of the body. The branchial stalk originates from this crest and, therefore, arises on the posterior part of segment 2 (Fig. 4A–B), between segments 2 and 3, or segments 2–4. Garraffoni & Lana (2003, 2004) stated that the branchiae of *Terebellides* originate from segment 3 and these authors labelled a figure by Hutchings & Peart (2000) to show their interpretation of the anterior segments. According to the labels inserted on that figure, we consider their segment 1 as the lower lip, the unnamed segment present in the figure but not labelled (Garraffoni & Lana 2004: 979, fig. 3A) as segment 1, and the branchial stalk to be inserted on segment 2.

Terebellids also exhibit great intra-familial variation with regard to the structure of their branchiae. Typically there are 2–3 pairs of branchiae on segments 2–3 or 2–4, respectively, but the polycirrines and some genera of terebellines completely lack branchiae. Other terebellines, such as *Terebellobranchia natalensis* Day, 1951, *Polymniella aurantiaca* Verrill, 1900 and some species of *Terebella* have branchiae present on discontinuous segments. Species of *Pistella* Hartmann-Schröder, 1996 (Fig. 15G–I) and *Ramex* Hartman, 1944, have a single pair of branchiae on segment 2, and those of *Scionella* Moore, 1903, have a single pair of branchiae on segment 4 (Fig. 14B, E, H).

Among the branchiate terebellids, the thelepodines have branchiae as multiple short and thin filaments originating directly from the body wall (Figs. 6A–B, D–G; 7A, C, E–H, J; 8C–F, I; 9C–H; 17E–G, I). In a few taxa, the branchial filaments arise from raised swollen areas of the dorso-lateral surface (Fig. 9C–D). Often a mid-dorsal gap is present between filaments of the left and right sides of the same pair. Usually, branchial filaments do not extend laterally beyond the level of the notopodia, but this may occur on the first branchiferous segment in some taxa (Figs. 8F, I; 9E).

Several abranchiate genera occur within Terebellinae: *Arranooba* Hutchings & Glasby, 1988, *Articulatia* Nogueira, Hutchings & Amaral, 2003, *Baffinia* Wesenberg-Lund, 1950, *Hutchingsiella* Londoño-Mesa, 2003, *Lanassa* Malmgren, 1866, *Laphania* Malmgren, 1866, *Leaena* Malmgren, 1866, *Morgana* Nogueira & Amaral, 2001, *Phisidia* Saint-Joseph, 1894, *Proclea* (Fig. 13D), *Pseudoproclea* Hutchings & Glasby, 1990, *Spinosphaera* Hessle, 1917, and *Stschapovella* Levenstein, 1957 (Fig. 12A–B). Previous studies on the phylogeny of the group have demonstrated that the loss of the branchiae has occurred independently several times within the subfamily (McHugh 1995; Glasby et al. 2004; Garraffoni & Lana 2008).

All the branchiate terebellines have branching or non-branching filaments originating from a common stem or from a discrete area on either side of the body wall, but these structures may assume a great variety of shapes. Similar to Garraffoni & Lana (2008), in the present study we deal only superficially with them, but any revision of genera such as *Pista* Malmgren, 1866 or *Loimia* Malmgren, 1866 should include a detailed analysis of the method of branching, although branchiae can be lost presumably by predation and regeneration certainly occurs. It is also possible that the development of branchiae may be habitat dependent (Hutchings pers. obs.).

We recognize three major types of branchiae in terebellines:

(1) unbranching branchiae: characterized by long, unbranched branchial filaments originating from a short to inconspicuous common stalk. This type of branchia occurs in several taxa, such as *Amphitrite cirrata* Müller 1771 *in* 1776 (Fig. 10A–C), species of *Artacama* (Fig. 11A–B, D–H), *Thelepides koehleri* (Fig. 13F–G), and *Scionella japonica* (Fig. 14B, E, H).

(2) branching branchiae: characterized by the branches originating from a common stem with a variable number of ramifications and terminating in either short, thick, flattened filaments or cylindrical filaments of variable length (Fig. 10E–G, I). The first ramification may be either close to the origin of the main stem, such as in species of *Terebella* (Fig. 15A–E) and *Lanicola lobata* Hartmann-Schröder, 1986 (Fig. 16D–E), or at some distance from the origin and forming a relatively long common stem, sometimes exceeding the length of several segments (Fig. 10E–G, I). This type of branchia may exhibit either dichotomous or arborescent branching depending on the number of ramifications, and the planes on which they occur. Dichotomously branching branchiae have few levels of ramification with branches coming off along the main stem on the same plane, while arborescent branchiae have multiple levels of ramification in many planes. These subtypes, however, are often difficult to distinguish from each other and several taxa present intraspecific variation, sometimes in the same specimen (e.g., see the recently described *Nicolea ceciliae* Santos, Nogueira, Fukuda & Christoffersen [2010]). This is possibly due to the loss and regeneration of the branchiae. For this reason, we prefer to name both subtypes together as branching branchiae.

(3) plumous branchiae: characterized by the branchial filaments originating in a spiral around the common stem, which is typically long. This type occurs in several species of *Pista* (Fig. 12D–H) and in *Pistella* (Fig. 15G–I).

In most branchiate terebellines, the pairs of branchiae are all approximately vertically aligned (Figs. 10A–B; 12D–G) or the branchiae are progressively arranged more laterally (Figs. 10E, G, J; 11A) or more dorsally (Fig. 13F). In some taxa, however, either the first pair of branchiae arises dorsally or ventrally in relation to subsequent pairs, or the second or even the third pair may be out of alignment with the others. This occurs, for instance, in *Terebella lapidaria* Linnaeus, 1767 (Fig. 15B, D). Branchiae may be approximately all the same size, or progressively diminish or increase in size on successive branchial segments.

Glandular venter

As in many tubiculous polychaetes, in addition to the glandular lobes frequently present on anterior segments, the ventral surface of the anterior body of terebelliform polychaetes is highly glandular in all taxa except trichobranchids. These glandular areas are almost certainly involved in the construction of the tube, or, in the case of some polycirrines that have no tube, the secretion of mucus, which enables the worms to glide through the substrate.

In *Pectinaria dodeka* (Figs. 1A; 2A–B), both ampharetids included in the present study (Figs. 2F; 17C–D), and alvinellids (Fig. 3B–D, H–I), the entire ventral epithelium is glandular, but mid-ventral pads are absent. In other ampharetids, such as *Pseudoamphicteis papillosa* Hutchings, 1977, the glandular ventral areas are poorly marked, as in the thelepodine *Thelepus australiensis* Hutchings & Smith, 1997; neither of these taxa were included in the present study. Rouse and Pleijel (2001) indicated that ventral shields are well developed in some other genera of ampharetids, but the authors did not list those genera. From material examined by one of us (PH) of a range of ampharetid genera, it would appear that the entire ventrum is glandular rather than forming well defined glandular pads.

Similarly, in trichobranchids there are no glandular areas other than the short lobes encircling the segments. Such absences of glandular areas have been interpreted by Garraffoni & Lana (2004, 2008) as a synapomorphy for the group, as these authors considered it as nested within Terebellidae.

In terebellids, the ventral surface of the anterior segments is much more glandular than in the other families of terebelliform polychaetes, and usually this glandular area is followed by a mid-ventral groove with small shields inside that extends to the pygidium. A similar, but less conspicuous mid-ventral groove, without shields, is often present from the midbody in the other families of terebelliform polychaetes, although in pectinariids it does not continue to the scaphal region.

In polycirrines, paired and sometimes highly papillate ventro-lateral pads are present on anterior segments, and the mid-ventral groove extends from close to the mouth, usually from segment 3 (Fig. 5C–D, I), to the end of the body. Such paired ventro-lateral pads are sometimes difficult to notice in preserved material, especially if the specimens present the anterior body inflated and distended (Fig. 5D, F), but they are clearly glandular and the tissues are far more swollen than adjacent areas. Mid-ventral shields begin from segment 1 and continue inside the mid-ventral groove from the segment on which this groove begins; shields are larger and swollen on segments 1–2, the largest on segment 1, below the lower lip and partially or completely obscuring it (Fig. 5C–D, F, I). From segment 3, mid-ventral shields are short and rectangular, usually forming a narrow mid-ventral stripe inside the mid-ventral groove (Fig. 5C–D, I). Garraffoni & Lana (2008) interpreted the shields inside the mid-ventral groove as ventral pads, however, even if they are also glandular, which is uncertain, they are much less swollen than the ventro-lateral pads and therefore we do not consider the main glandular areas of polycirrines and terebellines as homologous structures. Detailed studies on the development of these structures are needed before the statements of Garraffoni & Lana (2008) can be accepted (see below).

In both groups of thelepodines (A + B), discrete ventral pads are absent and the whole ventral surface is highly glandular, cushion-like, and sometimes corrugated (Figs. 6A, D–E; 7B, D–F, I, K; 8A–C, E–I; 9A–B, E, H–J; 17E, H). Garraffoni & Lana (2008) considered the condition of the ventral surface of thelepodines as the same state found in alvinellids and ampharetids, but we also disagree with this, as we distinguish a much greater development of the glandular areas in this subfamily than in both the latter families. In addition, it is also unclear to us what Garraffoni & Lana (2008: 611) considered as paired glandular pads in Thelepodinae, as we consider the entire ventral surface of anterior segments of thelepodines as uniformly glandular between neuropodia.

In terebelline terebellids, the glandular epithelium is limited to rectangular to trapezoidal mid-ventral pads, usually white in live material, that extend from the anterior segments to the posterior part of the region with biramous parapodia, and decrease in size posteriorly (Figs. 10D, F; 11C, E, G–H; 12B–D, G; 13A–C, E; 14A, D, F–G; 15C, F–G, I; 16A–D, F–G). Shields may all be similar or the anterior ones may be corrugated to varying degrees, such as in both species of *Reteterebella* Hartman, 1963, although this may be an artifact of preservation, with contraction of the anterior segments following the eversion of the pharyngeal organ at death. In several taxa of terebellines, such as *Amphitrite lobocephala* Hsieh, 1994, shields on segments 2 and 3 are fused to each other in a single, distally rounded structure (Fig. 10F, H).

Londoño-Mesa (2003, 2006, 2009) and Londoño-Mesa & Carrera-Parra (2005) provided numerous examples of the importance of the segments on which the shields begin and terminate in distinguishing between species of terebellines, but this has not usually been recorded in species descriptions. This may be due to the difficulty in determining the exact segment on which the shields begin, since the anterior segments, in addition to often being contracted, are shorter and compressed.

In terebellines, a mid-ventral groove is developed posterior to the last glandular pad, extending to the pygidium, with short shields sometimes visible within the groove. Depending on the condition of the preserved material, it is often difficult to determine precisely the segment on which the glandular pads terminate.

Nephridial and genital papillae

The gular membrane is present in all terebelliform polychaetes (Rouse & Fauchald 1997), dividing the body coelom into two sections: an anterior part, with excretory functions, and a posterior one where gametes develop and where septa between segments along the body are absent or incomplete (Zhadan pers. comm.). Except for pectinariids, which, according to Zhadan & Tzetlin (2003), have it "behind the second pair of tentacular cirri" (between segments 2–3, according to the numeration provided above), the gular membrane lies between segments 4 and 5 (segments 6 and 7 in *Terebellides* and alvinellids, according to Jouin-Toulmond & Hourdez [2006], but we consider their numeration of segments equivocal, as explained above). Thus, since the internal openings of the nephridia are situated in the segment anterior to where they exit, the papillae up to segment 5 are assumed to be excretory (nephridial papillae) and those from segment 6 onwards are assumed to be genital papillae (gonoducts) through which gametes are released (Smith 1992, 1994). Information on these structures, however, is rarely provided in taxonomic descriptions. Hessle (1917) suggested a classification of the Terebellidae based on the distribution of the nephridia but this has rarely if ever been followed and is difficult to use, as it requires a dissection of the material, which is not feasible on museum type series.

Nephridial papillae are commonly situated on segments 3 and 4, with those on segment 3 usually larger. Genital papillae occur in the following locations: (1) dorsal to the notopodia; (2) aligned with the notopodia and posterior to them; or (3) inserted between the parapodial lobes. However, while genital papillae are present in most taxa, they may become prominent only when the animals are mature. In the material examined for the present study, intraspecific variation of the number of genital papillae was sometimes observed, which may reflect specimens collected at different stages of sexual maturity.

In *Pectinaria dodeka* there is one pair of spherical papillae on segment 1 present laterally to the base of the first pair of tentacular cirri. Two pairs occur on segment 2, also laterally placed in relation to the base of the second pair of tentacular cirri, the lateral-most papillae larger and digitiform, and the other spherical (Fig. 2A–B). It is unclear whether those papillae are nephridial papillae or have another function because Zhadan (pers. comm.) stated that pectinariids have nephridial (= genital) papillae on segment 5 and some additional genital papillae on more posterior segments. Except for those papillae on segments 1 and 2 mentioned above, no other papillae were observed in the present study. Patterns for other genera are provided by Hessle (1917), according to whom the first pair is presumed to be excretory only and subsequent ones are both excretory and used for discharge of gametes. The segments on which they are present vary: *Petta* has these mixonephridia on segments 4-7, whereas in *Amphictene*, *Cistenides* Malmgren, 1866, *Lagis*, and *Pectinaria* they are present on segments 4, 7, and 8 but not on segments 5 and 6.

In the ampharetid *Amphicteis dalmatica*, nephridial papillae are absent, but in *Melinna elisabethae* there are four pairs of nephridia on segments 4–7 (segments 5–8, according to Mackie & Pleijel [1995], however the numbering of the anterior segments provided by Mackie & Pleijel is equivocal, as explained above). Genital papillae are only visible at the time of maturity (Hutchings 1973). Hutchings (1973) confirmed the findings of Goodrich (1945) that the first pair of segmental organs appears to have only an excretory function and the posterior pairs are used both for excretion and gamete release.

According to the literature, in *Paralvinella grasslei* there are two pairs of nephridia, the first having an excretory function with nephridiopores opening above the notopodia of segment 4 (segment 5, according to Jouin-Toulmond & Hourdez [2006]), the second genital, opening through a single mid-dorsal pore at the base of the branchiae (Zal et al. 1994; Jouin-Toulmond & Hourdez 2006); a similar condition occurs in *Alvinella pompejana* (Jouin-Toulmond et al. 1997; Desbruyères et al. 1998; Zhadan et al. 2000; Jouin-Toulmond & Hourdez 2006). In addition, females of *Paralvinella grasslei* have one pair of papillae at the base of the last pair of branchiae (Fig. 3E), with unknown function (Zal et al. 1994). We did not observe those nephridiopores in any of the specimens examined for the present study. Instead, in *Alvinella pompejana* we noticed structures that have not previously been mentioned in the literature. These are a pair of small papillae between the parapodial lobes on segments 9 and 10, and two pairs of papillae from segment 11 (considering they are found on both sides of the body), present on a large number of segments (Fig. 18F). We thought those papillae could have genital functions, as they begin on segment 9, posterior to the gular membrane. Both Zhadan (pers.

comm.) and Jouin-Toulmond (pers. comm.), however, considered this very unlikely. Jouin-Toulmond (pers. comm.) suggested those pores could be related to the bacterial filaments that cover these animals from mid-body. We do not fully agree with this interpretation, as the filaments begin posteriorly to the first occurrence of papillae and they occur dorsally, while the papillae are laterally located.

In *Paralvinella grasslei*, such papillae are absent but notopodial digitiform cirri are present on segments 7 and 9–18 (Fig. 18E) or on later segments, and these structures could also have a genital function, being used to discharge gametes.

In trichobranchids, Hessle (1917) stated that in *Terebellides* nephridia are present on segments 3 and 6–7, and Jouin-Toulmond & Hourdez (2006) confirmed that and said that the first and the last pairs have excretory functions and the intermediate pair is used to discharge gametes. In both species of *Terebellides* examined for the present study, papillae on segment 3 are large, digitiform, situated above the notopodia in *T. narribri* Hutchings & Peart, 2000, which has notopodia beginning from segment 3, or vertically aligned with the notopodia of segment 4 in *T. anguicomus*, which has notopodia from segment 4 (Figs. 4A–B; 18C). Papillae on segments 6–7 are much shorter in both species, especially the last pair, and are located posterior to the notopodia (Fig. 18C).

In addition, segments 4–7 have pronounced glandular swellings posterior to the notopodia and close to the posterior borders of the segments (Figs. 4A; 18C). These structures may be part of the lobes or reflect internal organs of unknown nature.

In *Trichobranchus*, nephridia are present on segments 3 and 7, according to Jouin-Toulmond & Hourdez (2006), but we could not observe papillae on these segments (Fig. 4G).

Among the terebellids, most polycirrines appear to lack nephridial papillae and usually have three or more pairs of genital papillae, although nephridia are often visible through the transparent body wall.

Most thelepodines have one or two pairs of nephridial papillae on segments 4 and 5, or only on segment 5, and two pairs of genital papillae on segments 6–7 (Figs. 6A–B, F; 8F, I; 9E, H; 17E–G), with the genital papillae usually larger than the nephridial papillae.

In many taxa of terebellines, nephridial papillae are often not visible, although presumably nephridia must be present to allow for discharge of excretory products. When visible, nephridial papillae are present on segment 3, or 3 and 4, occurring laterally to the branchiae (Figs. 10A–C; 11B, D; 15E) and, in taxa with large lobes, these papillae are present usually between the base of the branchiae and the lobes (Figs. 10G, J; 14B–C, E, H). Genital papillae are frequently visible in terebellines, at least in mature specimens, with their distribution and numbers varying between taxa (Figs. 10B–C, I; 11B; 12B, F; 14E; 15B, D).

Notopodia and notochaetae

Some of the most important taxonomic characters of terebelliforms are related to the notopodia and notochaetae. The segment on which the notopodia first appear, the number of pairs of notopodia, and the morphology of the notochaetae are critical for defining genera, especially in terebellids. Also, in several taxa of Terebelliformia the first pair of notopodia may be shorter than the following ones and/or situated in a more dorsal or ventral position in relation to the following pairs and with shorter notochaetae.

Except for the paleae of pectinariids and some ampharetids, and the robust hooks found on one or two segments of alvinellids, in all terebelliform polychaetes the notochaetae are arranged in two tiers, the posterior one usually with longer chaetae. While most taxa have a single type of chaeta throughout, in others the type of notochaetae varies between tiers or the type(s) of notochaetae varies along the body. Glasby et al. (2004), while noting the variation within a single podium, did not consider such variation along the body as did Garraffoni & Lana (2008), but these variations have rarely been mentioned in taxonomic descriptions or even phylogenetic studies (McHugh 1995).

Traditionally, the notochaetae of terebelliform polychaetes have been considered as being either distally smooth or distally serrated (Fauchald 1977; Hutchings & Glasby 1986a, b, c, 1987, 1988, 1990; McHugh 1995, Garraffoni & Lana 2008, among others). However, Hutchings & Glasby (1988) noted that most of the so-called smooth-tipped chaetae are finely denticulate under high magnifications while Glasby et al. (2004)

suggested serrated chaetae actually consist of more than one type.

In fact, although the notochaetae of terebelliform polychaetes have been divided into two basic types, distally smooth or distally serrated, a variety of terms have been used to describe the variations of these types (Day 1967; Hutchings & Murray 1984; Holthe 1986; Hutchings & Glasby 1988; Hutchings & Smith 1997) and authors have not been consistent over time. In this paper, we propose a new classification of chaetae into two major types, those with tips being distally winged or distally serrated, and each then being sub-divided. The types of notochaetae found in terebelliform polychaetes are listed in Table 4.

Distally winged notochaetae are characterized by having limbation extending to the tip of the chaeta, although in a few taxa the limbation terminates subdistally and is followed by an alimbate smooth tip (see below). Except for *Alvinella pompejana* and species of *Proclea*, which have hirsute limbation (see below), distally winged capillaries have smooth to striated limbation under light microscopy. They appear minutely denticulate under the highest magnifications of the light microscope and SEM, having teeth of uniform size evenly distributed along the entire length of the limbation (Figs. 20D; 24D, G). Distally winged notochaetae are divided into subtypes based on the width and length of the limbation, and, in the case of the notochaetae of the posterior tier, the point at which the limbation begins. This latter character is not useful for the notochaetae of the anterior tier because, as they are typically shorter, they have the limbation from the base. Distally serrated notochaetae are characterized by the presence of a distal blade with teeth present only along the cutting edge of the blade. This type of notochaeta is subdivided mainly by the presence or absence of a limbate area below the serrated blade, the angle (α) between the serrated blade and the shaft (Fig. 19A), and whether or not there are some differentiated areas below or on the serrated blade.

While it is typically stated that pectinariids have smooth capillary chaetae, a study by Hutchings & Peart (2002) revealed that some are winged capillaries with finely hirsute surfaces and vary from ones with finely pointed tips to those with strongly curved tips, and include some with pectinate margins. In addition to paleae on segment 1 (Figs. 1A; 2A–B, D–E), *Pectinaria dodeka* has two types of notochaetae on the 17 pairs of notopodia that begin from segment 5; the first two pairs of notopodia are shorter than the others and ventrally aligned to them (Figs. 1A; 2A–B). The anterior tier of notochaetae bears subdistally limbate, distally serrated chaetae, having the blades at an angle lower than 90º with the shafts (Fig. 19A, C), the posterior tier presents distally narrowly winged chaetae having a limbation present on the distal third of the chaetae (Fig. 19A–B). The narrowly winged notochaetae type is defined as having limbation distinctly narrower than the width of the shaft.

Amphicteis dalmatica has pointed paleae on segment 1 (Figs. 2C, F; 19E–F) and narrowly winged chaetae on the 17 pairs of thoracic notopodia present from segment 2. The first three pairs of notopodia are much shorter than those on segment 5 and are dorsally aligned with them; they subsequently become progressively more lateral (Fig. 2F–H). All the notopodia have a rounded papilla at the tip (Fig. 18A–B, D). The notochaetae on both tiers have a basally geniculate limbation, and those of the posterior tier are thicker, with limbation present on the distal half (Figs. 18B; 19G–H). In this taxon, the notopodia continue as short achaetous papillae (Fig. 1C) onto the region beyond where the notochaetae terminate. Holthe (1986) suggested that the neuropodial papillae on the region after the notopodia terminate are not related to dorsal cirri associated with notopodia, but in this species, in addition to those neuropodial papillae, there is another set of papillae present in a notopodial position (Fig. 1C). In other ampharetid taxa, notopodial structures are completely absent after notochaetae terminate (Hutchings 2000).

In *Melinna elisabethae*, paleae are absent, but one stout notopodial hook is present on each notopodium of segment 3 (Fig. 17A–B). Notopodia with typical notochaetae begin from segment 4 or 5 and extend for 15–16 segments, with the first two pairs shorter than the following pairs and dorsally aligned. Both notopodial tiers have distally limbate, narrowly winged chaetae with basally geniculate limbation (Fig. 19D); the chaetae in the posterior tier have limbation present on the distal half.

Some genera of ampharetids have the posterior notopodia elevated and displaced dorsally with modified notochaeta that differ from all other notochaetae present. The position of those modified notopodia is important to define the genera: they can be present on chaetiger 9 (*Mugga* Eliason, 1955), chaetiger 10 (*Muggoides* Hartman, 1965), chaetiger 11 (*Anobothrella* Hartman, 1967), chaetiger 10 or 11 (*Anobothrus* Levinsen, 1884 and *Sosanides* Hartmann-Schröder, 1965), chaetiger 13 (*Sosanella* Hartman, 1965) or chaetiger 14 (*Sosane* Malmgren, 1866).

These modified notochaetae, which may be numerous, may be distally broad and frayed (*Muggoides cinctus* Hartman, 1965: 220–222 and Plate 48d [354]) or distally pointed and hirsute (*Anobothrus antarcticus* Monro, 1939 and *A. gracilis* [Malmgren, 1866; chaetal figures by Hilbig 2000a: 193, Fig. 8.9d]).

In alvinellids, *Alvinella pompejana* has notopodia beginning on segment 2 and extending nearly to the pygidium (Fig. 1E). The notopodia on segment 2 are shorter than the following pairs and dorsally aligned (Fig. 3A, C), and those on segments 5–6 have robust, distally pointed hooks (Figs. 3A, G; 18F). The remaining notopodia have an anterior tier of hirsute winged capillaries and a posterior tier of distally serrated chaetae, with the blade along the same angle as the shaft and two rows of large teeth (Fig. 20A).

Paralvinella grasslei has notopodia from segment 2 with the first three pairs much shorter than following pairs. The notopodia of segments 3 and 4 are dorsally aligned to those of segment 2, and those of segments 5–7 are progressively more laterally aligned (Fig. 3I). Except for segment 8, the notopodia of *Paralvinella grasslei* have, in both tiers, distally narrowly winged notochaetae, with the chaetae in the posterior tier having limbation on the distal half (Fig. 20B–C). Segment 8 has notochaetae as robust, distally pointed hooks (Fig. 3H–I).

All trichobranchids have distally narrowly winged notochaetae in both tiers (Figs. 20D–G; 21A–B). Taxa in this group vary in the number of pairs of notopodia present, the segment on which they begin, and the extent of limbation on the posterior tier of notochaetae.

*Octobranchus myunu*s has 16 pairs of notopodia beginning from segment 4, with the first pair shorter than the rest and those on segments 4–6 dorsally aligned to the subsequent ones, which are progressively inserted more laterally. The notochaetae of the posterior tier have limbation restricted to the distal third (Fig. 21A–B).

In *Terebellides,* the notopodia begin from segment 3 or 4, with 17 or 18 pairs present, depending on where they begin. The first one or two pairs are shorter than the following ones and dorsally aligned to them (Fig. 18C). Chaetae of the posterior tier are entirely limbate (Fig. 20D, G).

Trichobranchus has 15 pairs of notopodia present beginning from segment 6. In *T. bunnabus*, the first two pairs of notopodia are slightly shorter than subsequent ones, and they arise progressively more laterally. From segment 6, the notopodia are vertically aligned (Fig. 4F–H). The notochaetae of the posterior tier are entirely limbate (Fig. 20E–F).

Among polycirrine terebellids, only four genera possess notopodia: *Amaeana* Hartman, 1959, *Enoplobranchus* Webster, 1879, *Lysilla* Malmgren, 1866 and *Polycirrus*; except for *Enoplobranchus* and some species of *Polycirrus*, they are restricted to the anterior part of the body. In this group, the notochaetae are either distally narrowly winged, with the limbation extending for most of the length, or pinnate. This latter type is only found in the polycirrines. Both types of chaetae may be present on the same notopodium, one in each tier (Fig. 21C), or only a single type is present throughout, varying intragenerically.

In the thelepodines, most taxa have distally narrowly winged notochaetae, but more specialized chaetae are present in a few taxa. In the thelepodines of Group A, all genera have notopodia beginning from segment 3. *Decathelepus*, *Parathelepus*, *Rhinothelepus*, and *Telothelepus* have 15 pairs of notopodia, while *Glossothelepus mexicanus* has at least 23 pairs of notopodia, although the absolute number is not known as all collected specimens are posteriorly incomplete and have notopodia extending until the ends of the fragments (Hutchings & Glasby 1986a). *Decathelepus* has distally narrowly winged notochaetae, with those in the posterior tier with limbation present on the distal half of each chaeta. *Glossothelepus mexicanus* has anterior notopodia with bayonet chaetae in the anterior tier and distally narrowly winged chaetae in the posterior tier, having limbation present on the distal third of each chaeta; on posterior notopodia, chaetae in both tiers are distally very narrowly limbate, almost alimbate. Both species of *Rhinothelepus* included in the present study have anterior notopodia with bayonet notochaetae on the anterior tier, and distally narrowly winged chaetae in the posterior tier, having limbation present on the distal third of each chaeta (Fig. 22A, D). The posterior notopodia have distally narrowly winged chaetae present in both tiers, with those from the posterior tier having limbation on the distal third of each chaeta (Fig. 22B–C, E). Bayonet chaetae are defined as having a very narrow limbation terminating subdistally in a bulbous and hispid head, followed by a short acuminate tip (Fig.

22A, D). These chaetae resemble those of some sabellids (Fitzhugh 1989).

In the thelepodines of Group B, notopodia begin from segment 2 or 3 and a large number of pairs of notopodia are present, usually extending into the midbody and sometimes almost to the pygidium. Most taxa have distally narrowly winged chaetae in both tiers (Fig. 23A–B, D), with intrageneric variation regarding the point at which limbation begins.

In *Pseudothelepus binara*, chaetae in the anterior tier are distally narrowly winged, and the shaft is geniculate and inflated at the base of the limbation (Fig. 21D–E). In *Euthelepus serratus* (Fig. 22F–G) and *Pseudostreblosoma* Hutchings & Murray, 1984, chaetae in the anterior tier are distally serrated, with the blade and shaft vertically aligned (Hutchings & Murray 1984; Hutchings & Glasby 1987; Nogueira & Alves 2006). In all species of *Streblosoma* Sars, 1872, the notochaetae are distally winged, but some species have notochaetae, especially in the anterior tier, with limbation almost as broad as the width of the shaft, and they appear lanceolate with a twisted tip under SEM (Fig. 23C, E–F).

Most terebelline genera have 17 pairs of notopodia, beginning from segment 4, although some have them beginning from segments 2–5. Also, there is a great variation in the number of pairs present, from 10–11 in *Leaena*, to several species of *Terebella* where notopodia continue almost to the pygidium.

As there is so much variation in the morphology of notochaetae present, we propose a new classification of notochaetae in the Terebellinae.

Distally winged chaetae consist of three types:

(1) Narrowly winged chaetae (Figs. 24A–B, D–G; 25A–B, E–F; 26A, C; 27A, F; 28E; 29A–B; 32A–B): the most common type, characterized by a long, narrow limbation extending to the tip. The limbation is always minutely denticulate under SEM, and often visible under oil emersion, with denticulation all around the shaft (Figs. 24D, G; 29A–B; 32B). These denticulations differ from those present on the serrated chaetae type, where they occur in a single distinct row and are more robust, usually distally sharp. The limbation may be of even width around the blade, or wider on one side, in which case they may appear geniculate at the base of the limbation wing (Figs. 24A; 25E–F; 26A, C). This type of chaetae is also common in sabellids (Fitzhugh 1989); however, a study on the ultrastructure and development of these chaetae should be undertaken to determine if they are homologous.

(2) Broadly winged chaetae (Figs. 25A–E, H–I; 26E–F; 28A; 30E): notochaetae that are similar to the narrowly winged type, but with a limbation that is at least the same width as the shaft. This type of chaeta is also similar to one type of chaeta of sabellids (Fitzhugh 1989). In the case of the notochaetae from the anterior tier of species of *Leaena* (Fig. 25C, H) and *Laphania boecki* Malmgren, 1866 (Fig. 25E, I), and both tiers in the anterior notopodia of *Thelepides koehleri* (Fig. 26E), the limbation is broad on both margins and it terminates subdistally, followed by a gently tapering alimbate tip (Fig. 26E). In the anterior tier of notochaetae of *Artacama* (Fig. 25A–B) and *Pista*, the posterior tier of *Leaena* (Fig. 25C–D) and the posterior tier of the posterior notopodia of *Thelepides koehleri* (Fig. 26F), all have broad limbation on one margin and are geniculate. In species of *Spinosphaera* that have true *Spinosphaera*-chaetae *sensu* Nogueira & Hutchings (2007) on the posterior notopodia (see below), the chaetae of the posterior tier of the anterior notopodia have broad limbation on both margins and a sinuous shaft (Figs. 28A; 30E). This is considered to be transitional to the true *Spinosphaera*-chaetae present on posterior notopodia, which have similar subdistal broad limbation on both margins with a sinuous shaft (Figs. 28B–C; 30F).

(3) Hirsute chaetae (Figs. 26B, D; 27C, E; 28F, H–I): broadly winged notochaetae, sometimes geniculate, with the limbation strongly hirsute, resembling distally serrated chaetae but with long hairs all around the limbation. This type of chaeta occurs only in the posterior tier of the posterior notopodia of *Proclea* species.

A possible fourth type of distally limbate capillary, the "quill-like" chaeta, is known to occur only in *Arranooba* on segment 14. However, we could not study this type of chaeta because they are all shaved off in the holotype, which is the only known specimen of this taxon.

Distally serrate chaetae consist of four types:

(1) Saw-like chaetae (Figs. 24C; 25G; 26B, F–G; 27A–D; 28B, D–G; 29C–E, G; 30C–D, F; 32A): this type of notochaeta is characterized by having an alimbate shaft and a long serrated and relatively transparent blade. As these teeth are very close to each other, they appear as numerous "striations" transverse to the

axis of the shaft (while true striations are always oblique or along the same axis as the shaft). Saw-like chaetae can have the blade in line with the shaft, at least at the base of the blade, since the tip is often curved backwards (Figs. 25G; 26B, F–G; 27A–D; 28E–G; 29E, G), or the base of the blade is clearly at an angle to the shaft, and sometimes the tip is rotated (Figs. 24C; 28B, D; 29C–D; 30C–D, F; 32A). These subtypes are sometimes difficult to distinguish from each other because the difference in the angle of the blade in relation to the shaft may be small (Figs. 28B, D; 30F; 32A). This type of notochaeta most commonly occurs in the anterior tier of notochaetae of the posterior notopodia (Figs. 25G; 26B, F–G; 27C–D; 28B, D, F–G; 30F), but it may also occur in both tiers of the posterior notopodia, as in *Hutchingsiella cowarrie* (Hutchings, 1997a) (Fig. 24C), *Baffinia biseriata* Hutchings & Glasby, 1988 (Fig. 29C–D) and *Terebella lapidaria* (Fig. 30C–D), or it may be present from the anterior notopodia onwards, as in some species of *Proclea* (Figs. 27A–B; 28E–G), *Phisidia* (Fig. 29E) and *Morgana* (Fig. 32A). The name “saw-like chaetae” was proposed by McHugh (1995) who considered these chaetae as a synapomorphy for the genus *Proclea*, but they occur in several other taxa.

(2) Limbate and serrated chaetae (Figs. 27G–H; 28A, J; 29G; 30A–B; 31A–J; 32C–E, G–H): this type of notochaeta is characterized by a limbate shaft with the limbation terminating subdistally, followed by a serrated blade. The limbation may either be restricted to a short swelling or thickening on the shaft, as in *Spinosphaera oculata* Hartman, 1944 (Fig. 27G–H) and several species of *Terebella* (Fig. 31C–J), or it may be basally inflated or bulbous, as in species of *Phisidia* (Fig. 29G), other species of *Terebella* including the type species *T. lapidaria* (Fig. 30A–B), and *Longicarpus* Hutchings & Murray, 1984 (Fig. 31A–B). The blade may be either long or short in relation to the length of the shaft. It may be approximately in line with the shaft, as in the anterior tier of notochaetae of the anterior notopodia of *S. harrisae* Londoño-Mesa, 2003 (Fig. 28A, J), in *Phisidia* (Fig. 29G), *Longicarpus* (Fig. 31A–B) and some species of *Terebella* (Fig. 31C–J), or at an angle to the shaft, as in *Spinosphaera oculata* (Fig. 27G–H) and *Terebella lapidaria* (Fig. 30A–B). In these cases, the notochaetae have previously been referred to as “flail-tipped capillaries” (Hutchings & Glasby 1988). The serrations on the blade are typically conspicuous, but sometimes they are small and only seen under oil immersion and SEM, and have previously been referred to as “finely denticulate capillaries” (Day 1967; Hutchings & Glasby 1988). We have not distinguished between teeth size and we have referred to both types of notochaetae as “limbated and serrated chaetae”.

(3) Deep-cut chaetae (Fig. 32C–H): this type of notochaeta is characterized by having a limbate shaft and a serrated blade articulated with the shaft due to a deep cut at the base of the blade. It occurs only in the anterior tier of notochaetae of the posterior notopodia of *Articulatia aberrans* Nogueira, Hutchings & Amaral, 2003, being a possible synapomorphy for that taxon. The name “deep-cut chaeta” was used by Nogueira et al. (2003) in the original description of *A. aberrans*.

(4) *Spinosphaera*-chaetae (Figs. 28B–C; 30F–G): this type of notochaeta is characterized by a shaft with a broad limbation at midlength followed by a hirsute process and a finely serrated blade. They occur in the posterior tier of notochaetae of the posterior notopodia of some species of *Spinosphaera*. The name “*Spinosphaera*-chaeta” was proposed by Londoño-Mesa (2003), and while the description of the notochaetae provided is very detailed and complete, the drawings included in his paper actually correspond to the definition of “limbate and serrated chaetae” given above (Londoño-Mesa 2003: 750, Fig. 2C), because the hirsute region between the wing and the serrated blade is absent (to compare that figure with illustrations of true *Spinosphaera*-chaetae, see Hessle [1917: 209, Fig. 60A] and the figures provided in the present paper [Figs. 28B–C; 30F–G]). Since the genus *Spinosphaera* was described (Hessle 1917), Hartman (1944) described a second species, *S. oculata*, Londoño-Mesa (2003) described three more species, *S. carrerai* Londoño-Mesa, 2003, *S. harrisae* and *S. hutchingsae* Londoño-Mesa, 2003, and Nogueira & Hutchings (2007) described an additional species, *S. barega* Nogueira & Hutchings, 2007. However, according to the figures provided by Londoño-Mesa (2003), Hessle (1917) and our own examination, of these six species only *S. harrisae* (Fig. 28B–C), *S. barega* (Fig. 30F-G), and *S. pacifica* Hessle, 1917, have true “*Spinosphaera*-chaetae”. If this type of chaeta is shown to be a synapomorphy for *Spinosphaera*, the remaining three species described by Hartman (1944; Fig. 27F–H) and Londoño-Mesa (2003) will need to be allocated to another genus.

In several taxa of terebellids, there is a transition in the type of notochaetae present in one or both tiers of notochaetae from anterior to posterior notopodia (Figs. 24B–C; 25E–F, G, I; 26A–G; 27A–H; 28A–J; 29A–G; 30A–G; 32B–H). This transition from one type to another is often abrupt, usually occurring on segment 11, but in others, such as in some species of *Phisidia*, this transition occurs gradually, with the chaetae on the anterior segments having limbation terminating subdistally followed by an alimbate blade with fine spines at the tip. These spines become progressively thicker over several segments until by segment 11 a well formed serrated blade is present (Fig. 29E–G).

Neuropodia and neurochaetae

Various characters of the neuropodia and neurochaetae are important for diagnosing subfamilies and genera, including the segment on which the neuropodia first appear and the arrangement and morphology of the uncini. For example, McHugh (1995) considered the presence of uncini arranged in double rows on at least some chaetigers as the synapomorphy of Terebellinae and synonymised Artacaminae with it, as both present this character.

In pectinariids (Fig. 1A–B) and ampharetids (Figs. 2F; 17A, C–D), the neuropodia are large rounded to semicircular structures. In pectinariids, the posterior part of the body is modified into a sucker-like scaphal region, on which the neuropodia are absent (Fig. 1A–B) and which may or may not be separated from the rest of the body. In ampharetids, the neuropodia are similar shaped throughout, although smaller and with a short and rounded papilla on the dorsal edge in the region after the notopodia terminate in our studied taxa (Figs. 1C; 34E). As said above, Holthe (1986) suggested that these papillae are not related to dorsal cirri associated with notopodia and we agree with that, since they are clearly neuropodial structures.

In alvinellids, the neuropodia are sessile ridges extending onto the posterior body (Fig. 1E). In *Alvinella pompejana*, neuropodia are present from segment 10, and from segment 13 in *Paralvinella grasslei.*

In trichobranchids, the segments with biramous parapodia have neuropodia as sessile ridges (Fig. 4 A, G–H) and those on the region after the notopodia terminate as raised, rounded to leaf-shaped pinnules (Fig. 1D, I–K) with uncini on the distal margin. The uncini are attached by ligaments to the internal skeletal shafts of the neuropodia (Fig. 36B, G). Such internal shafts have been referred to as ligaments by some authors (Hilbig 2000b), or regarded as part of the uncini by others. In the material examined for the present study, especially on poorly preserved specimens, they were sometimes exposed to reveal chitinous structures independent of the uncini and connected to them by light, transparent ligaments. Similar shafts occur in the neuropodial pinnules of ampharetids (Fig. 34G) and many terebellids (see below).

In polycirrines, neuropodia are absent in *Hauchiella* and *Lysilla* (Fig. 1H) but present in *Amaeana*, *Biremis* Polloni, Rowe & Teal, 1973, and *Polycirrus*. In *Amaeana*, they are sessile and found only on the posterior segments situated lateral to the mid-ventral stripe, while in *Biremis* and *Polycirrus* they form raised pinnules (Fig. 1F), which are bilobed in *Biremis*, according to Polloni et al. (1973).

Thelepodines of Group A usually have neuropodia of the biramous parapodia as sessile ridges (Figs. 6A, E; 7B, E–G) and neuropodia of the region after the notopodia terminate as slightly raised pinnules (Fig. 1G). Thelepodines of Group B usually have the neuropodia of the biramous parapodia as low, fleshy ridges (Figs. 8 A, C, E–F, I; 9A, E, H; 17E–G) and those after the notopodia terminate as pinnules. In this group, however, the distinction between these regions is not clear since biramous parapodia occur into the posterior body in many taxa.

In terebellines, the neuropodia of the biramous region are low ridges, sometimes fleshy, but usually less elevated than those of thelepodines of Group B (Figs. 10F, I; 11B, E, G–H; 12B, D, G; 13A–B, E, G; 14A–B, D–E, G; 15A–B, D–E, G, I; 16A, C–E, G; 33A–B, D). In most taxa, the neuropodia on the region after the notopodia terminate are raised pinnules with internal chitinous shafts, with a well-marked transition between the region with biramous parapodia and region after notopodia terminate (Fig. 33A-C, E), but in those taxa in which the notopodia extend to the posterior segments, the neuropodia are similar throughout, although decreasing in size posteriorly (Fig. 33G). Dorsal papillae are commonly found on the neuropodia of the region after notopodia terminate of terebellines (Fig. 33F) and, in *Artacama*, they form digitiform, distally pointed structures or large ear-shaped lobes (Fig. 33B–C). Garraffoni & Lana (2008) considered those neuropodial lobes as exclusive to *Artacama*, but we believe they are homologous to the neuropodial papillae that occur in several other taxa.

Except for species of *Amaeana* (see below), all other terebelliform polychaetes have neuropodia with uncinial neurochaetae. In ampharetids of the subfamily Melinninae (Fig. 34I) and the trichobranchid *Terebellides* (Fig. 35G–H), anterior to the first pair of neuropodia with uncini there are one to a few segments with thin, distally pointed neuropodial spines.

The morphology of the neuropodial uncini varies considerably within terebelliform polychaetes. Pectinariids usually have bipectinate uncini with stout handles, each series of teeth with the basal teeth shorter than the middle ones, and some having a crest with more than two rows of teeth (Fig. 34A–B). Holthe (1986) discussed the variation of the morphology of the uncini within the genus *Pectinaria*, and compared those of *P. californiensis* Hartman, 1941 and *P. regalis* (Verrill, 1900), based on the original description of *P. californiensis* by Hartman (1941) and the redescription of *P. regalis* by Long (1973). Both species have bipectinate uncini with an arched row on top and a gutter-like prow on the bottom, but in *P. californiensis* a main fang and a dorsal button are present (Holthe 1986: 36, Fig. 8A), whereas both these structures are absent in *P. regalis*. Another variant is found in *P. koreni* (Malmgren, 1866), illustrated by Hausen (2005: 42, fig. 3A), which has a different type of uncinus. *Cistenides* also has uncini with teeth arranged in two rows.

In *Pectinaria dodeka*, the main fang and a dorsal button are not differentiated and the prow appears as a single vertical line when viewed laterally (Fig. 34A), and as a cluster of densely packed tiny teeth when viewed frontally with SEM (Fig. 34B). This highlights the need to describe the uncinial structure of all terebellomorphs in both lateral and frontal views, and the desirability of SEM examination to reveal the dentition. Holthe (1986) suggested a classification of neurochaetae based purely on schematic illustrations, which only recently has been followed and we suggest that this classification is inadequate because, for each species, illustrations of both the frontal and lateral views are critical and provide useful diagnostic characters (see below).

Ampharetids have pectinate avicular uncini with a short triangular heel and a rounded prow. Day (1964) suggested that the shape of the uncini varies from triangular to quadrangular with one or more series of teeth above the base. In the Melinninae there is always a single series of teeth, whereas in the Ampharetinae the teeth may be arranged in one, two or as many as five vertical rows, with the uncini on the region after the notopodia terminate often having more rows of teeth than those on the region with biramous parapodia. The base of the uncinus may be long and well separated from the rows of teeth, or it may be short and curved upwards towards the basal tooth, to form a bluntly rounded prow. Hessle (1917) and others have suggested that these differences are useful generic characters, whereas Day (1964) regarded them as specific characters, although he stated that the number of rows of teeth appears to be more important when there are only one or two vertical series, because the numbers above that seem to have little generic value.

In *Amphicteis dalmatica*, a main fang is absent and the dorsal button is reduced, or virtually absent, and situated close to the origin of the basal tooth (Fig. 34C–H). In *Melinna elisabethae*, a prominent dorsal button is present below the large, long basal uncinial tooth, with the other uncinial teeth becoming progressively shorter and thinner towards the tip of the uncinus (Fig. 34J–K).

Alvinellids also have pectinate avicular uncini, each with a short triangular heel, a distally pointed prow, no dorsal button, and a prominent main fang with a single tooth above (Fig. 35A–D).

Trichobranchids have acicular uncini on the biramous parapodia with elongate bases forming long, thin sigmoid handles, and a main fang with several transverse series of secondary teeth above (Figs. 35E–F; 36A, C–E, H). A dorsal button is absent on the acicular uncini of *Terebellides* (Fig. 35E–F), but present in both species of *Trichobranchus* studied. The dorsal button is close to the main fang and forms a tuft of bristles that extends along the lower surface of the main fang, but this is only evident under SEM (Fig. 36A, C–E, H). In addition, the uncini of the region with biramous parapodia of *T. bunnabus* are arranged in irregular double rows from the first torus onwards, with uncini on the ventral edge of the tori in a single row and those on the dorsal edge in irregular double rows, arranged beak to back (Fig. 36A, C–D).

After the notopodia terminate, trichobranchids have avicular uncini similar to those found in terebellids

(Figs. 35I–J; 36B, F–G, I), except that secondary teeth surround the main fang on top and laterally whereas in terebellids they only occur above the main fang.

Terebellids exhibit considerable variation in the morphology of the avicular uncini and this has been the subject of several recent morphometric studies (Glasby & Glasby 2006; Garraffoni & Camargo 2006, 2007).

As well as problems in classifying types of avicular uncini present, there is considerable confusion with regard to terminology of the structures. Holthe (1986: 31, Fig. 6) provides a generalized labelled terebellomorph avicular uncinus, and these terms have been used by Glasby & Glasby (2006), Garraffoni & Camargo (2006, 2007), Londoño-Mesa (2003, 2006, 2009), and Londoño-Mesa & Carrera-Parra (2005).

In this paper, we follow the terminology of Hutchings (1974, 1977, 1990, 1997a, b; Hutchings & Murray 1984; Hutchings & Glasby 1986a, b, c, 1987, 1988, 1990). The uncinial parts, according to such nomenclature, are shown in Fig. 37 and include the following (Holthe's terms in quotes):

(1) Main Fang (MF; "rostrum").
(2) Dorsal Button (DB; "subrostral process", and the tuft of bristles often present at the tip, "subrostral appendix"): this short projection of the upper part of the base below the main fang may be reduced and inconspicuous in some taxa.
(3) Prow (P; "lower subrostrum" and its tip, "anterior process"): refers to the anterior part of the uncinus, situated on the upper part of the base, between the dorsal button and the uncinial tip.
(4) Base (Ba; "basis"): the lowest part of the uncinus.
(5) Heel (H; "posterior process"): the posterior part of the base, often separated from the rest of the base and the back of the uncinus by indentations.
(6) Back (B; "occipitium"): the posterior part of the uncinus.
(7) Crest (C; "capitium"): a series of usually transverse rows of secondary teeth above the main fang.

In addition to these parts, at least two morphometric measurements are important for the taxonomy of this group: the height (He) of the uncinus, measured from the tip of the crest to the lowest part of the base, including the heel, and the length (L), measured from the anterior tip of the uncinus to the posterior tip.

Among the polycirrines, neurochaetae occur as stout, sharply pointed spines in *Amaeana* (Fig. 38A), "type 1 uncini" *sensu* Glasby & Glasby (2006) in some species of *Polycirrus* (Figs. 37B; 38B–C) and *Biremis blandi* (Polloni et al. 1973), and "type 2 uncini" *sensu* Glasby & Glasby (2006) in other species of *Polycirrus* (Figs. 37A; 38D–E).

"Type 1 uncini" *sensu* Glasby & Glasby (2006) are shorter than "type 2 uncini" *sensu* Glasby & Glasby (2006) and are characterized by being much longer than high, with a flat base, a short triangular heel directed posteriorly, a short back, and a reduced dorsal button, which is situated closer to the base of main fang than to the tip of the elongated prow (Figs. 37B; 38B–C). "Type 2 uncini" *sensu* Glasby & Glasby (2006) are about as long as high and have an arched base, an elongate heel directed downwards, an elongate back, a reduced to inconspicuous dorsal button, situated at the base of main fang, and an elongate prow (Figs. 37A; 38D–E). Garraffoni & Camargo (2007) said they had found a single pattern of uncini for the entire subfamily, but this is because these authors did not include any species with "type 2 uncini" *sensu* Glasby & Glasby (2006) in their study. Usually, each taxon has either one type of uncinus or the other, but at least one still undescribed species of *Polycirrus* from Hawaii has "type 1 uncini" on the region with biramous parapodia and "type 2 uncini" on the region after the notopodia terminate (Nogueira & Harris in prep.).

The thelepodines also exhibit two types of uncini and because of that Garraffoni & Camargo (2006) correctly could not find a single pattern for the uncini of this subfamily. Group A thelepodines have uncini either as high as long or higher than long, with a slightly curved base, a short triangular heel, and a crest with several rows of secondary teeth above the main fang (Fig. 38F–J). A short dorsal button is present closer to the tip of the prow than to the base of the main fang, but, at least in *Rhinothelepus occabus*, which is the only species of this group we have examined under SEM (Fig. 38H–I), this dorsal button is internal, not protruding through the tegument, and therefore visible only with light microscopy. Except for the dorsal button not protruding, this type of uncinus is similar to that found in most terebellines (see below).

Group B thelepodines have uncini that are typically longer than high, with the lower margin of the base typically more curved and swollen. The uncinial prow is reduced to a short knob or absent, and the main fang is surmounted by a crest with few transverse series of secondary teeth (Figs. 37C; 39G–K; 40C–I). The dorsal button is situated on the anterior margin of the upper surface of the uncinial base or close to it, and, under SEM, appears as a circular patch of densely packed bristles (Figs. 37C; 39G–K; 40C–I). This type of uncinus is found only in Group B. However, there are some taxa in this group that have uncini similar to those of Group A, such as *Pseudostreblosoma* (Fig. 39A–F), but its dorsal button also forms the circular patch of densely packed bristles (Fig. 39C–D).

The uncini of thelepodines of both groups are usually arranged in single, straight rows (Figs. 38F–I; 39A–K), but there are a few species of *Thelepus* Leuckart, 1849 and *Streblosoma* (Fig. 40B, E–F) in which they are in curved, U-shaped, or even in looped rows from midbody (Day 1955; Hutchings 1990; Hutchings & Glasby 1990; Hutchings & Smith 1997; Nogueira et al. 2004).

In terebellines, the shape of the uncini is more varied than in any of the other groups of terebellids. Typically, the uncini of terebellines are higher than long and have the dorsal button distant from the anterior margin of the uncinus, on the middle or posterior third of the upper surface of the base (Fig. 37D). A posterior heel is present, but its extension and angle of orientation are highly variable. A conspicuous main fang surmounted by a crest with a variable number of secondary teeth arranged in transverse rows is present in all taxa except for species of *Loimia* (see below).

The uncini of the anterior to midbody chaetigers of terebellines can be divided into two types, short-handled and long-handled, depending on the presence of a handle originating from the heel, or sometimes together with part of the base. In taxa having anterior neuropodia with long-handled uncini, they become short-handled somewhere along the region with biramous parapodia or immediately after it terminates, and this continues to the last neuropodium.

These types of uncini have been used to distinguish between genera (Fauchald 1977; Hutchings & Glasby 1988; Hutchings 1997a). However, there is such great variation in regard to the other parts of the uncinus in both types that we prefer to treat each uncinial part independently.

The uncini of species of *Loimia* are unique among terebellines because they are pectinate, with teeth arranged vertically in a single row (Figs. 41L–M; 42A–C). Garraffoni & Lana (2009) state that, in the first stages of development, species of *Loimia* have uncini with a crest with several transverse rows of minute secondary teeth and this changes to a pectinate arrangement during the transition from juveniles to adults.

All other terebellines have an uncinial crest with multiple transverse rows of secondary teeth above the main fang, although the numbers of rows and teeth in each row vary greatly between species and are used for species identification (Figs. 41A–K; 42D–I; 43A–L; 44C–J; 45A–M; 46B–N; 47A–M; 48A–H; 49A–G).

The main fang of the uncini of terebellines is always clearly marked, even in species of *Loimia* (Figs. 37D; 41A–M; 42A–I; 43A–L; 44C–J; 45A–M; 46B–N; 47A–M; 48A–H; 49A–G). In species of *Artacama*, however, it is considerably sharper, thinner and more elongate than in the other genera (Figs. 41F–G; 43E–F).

The dorsal button of terebellines, at least in the chaetigers of the region with biramous parapodia, has a tuft of elongate bristles that often surround the tip of the main fang and may be protective. Although this tuft is difficult to see under light microscopy (Figs. 37D; 41C), it is usually conspicuous under SEM (Figs. 42D–G; 43C–D, F–H; 44C–J). The dorsal button on the upper surface of the base from which it arises is usually evident under the light microscope (Figs. 41A–C, F–J, 45A–D, H–M; 46B–N; 47A–M; 48A–H; 49A–G), except for a few taxa in which it is inconspicuous, such as in *Lanice conchilega* (Pallas, 1766) (Fig. 45E–G) and *Amphitrite lobocephala* (Figs. 41D–E; 43J–L). The dorsal button is particularly well developed in some taxa with long-handled uncini, forming a cushion of bristles around the tip of the main fang (Figs. 42F–G; 44G).

In most terebellines, the dorsal button is situated about midway between the base of the main fang and the tip of the prow (Figs. 37D; 41A–C; 45D, H–M; 46E–H, M–N; 47A–K, M), but in some taxa it is closer to the base of main fang (Figs. 41F–G, J; 43F; 45A–B; 48A–H; 49A–G) and in a few others it is closer to the tip of the prow, such as in *Hadrachaeta aspeta* Hutchings, 1977 (Fig. 46B–D) and on anterior chaetigers of *Longicarpus modestus* (Quatrefages, 1865) (Fig. 47L).

The prow varies in shape, and there is a gradation from those that are distally pointed (Figs. 37D; 41A–M; 45A–M; 46B–D, M–N; 47D, H, J–M) to those that are more distally rounded (Figs. 46E–L; 47A–C, E–G, I; 48A–H; 49A–G). However, a clear delineation between genera is not feasible. Ligaments and muscles are attached to the prow and these may be conspicuous (Figs. 41C–E, I; 45A–M; 46B–F, M–N; 47D–E, H, K–M; 48A–D, F–H; 49A–G).

The short-handled type of uncinus typically has a short, triangular heel directed posteriorly (Figs. 41A–M; 45A–D, G–M; 46B–D, H–N; 47D–E, H–M; 48A–D, F, H; 49A–C, G), but in some taxa, such as species of *Lanice* Malmgren, 1866 (Fig. 45E) and *Amphitrite ornata* (Leidy, 1855) (Nogueira 2008), the heel is more pronounced, forming a triangular projection.

The long-handled type of uncinus has a downwardly directed handle, previously called a shaft by Day (1967), Hutchings (1997a, b; Hutchings & Glasby 1988) and several other authors. However, we recognize two types of long-handled uncini, one with a thin handle originating exclusively from the heel (species of *Pista* [Fig. 46E–G], *Longicarpus modestus* [Fig. 47L] and *Lanicides bilobata* [Grube, 1877] [Fig. 49D–F]), the other with the handle originating more from the base, although the prow is clearly marked (such as *Betapista dekkerae* Banse, 1980 [Fig. 47A–C], *Lanicides lacuna* Hutchings & Glasby, 1988 [Fig. 47F–G] and *Axionice spinifera* [Ehlers, 1912] [Fig. 48E]). Usually, the presence of one type of long-handled uncini or another is useful to distinguish between genera, but in *Lanicides bilobata*, the type species of this genus, the handle is a continuation of the heel (Fig. 49D–F), while in other species of this genus, such as *L. lacuna*, it is a continuation of most of the uncinial base (Fig. 47F–G). Such intrageneric variation should be explored to confirm if the currently designated members of *Lanicides* Hessle, 1917 form a monophyletic group.

Another example of intrageneric variation in the morphology of the uncini occurs in *Axionice* Malmgren, 1866. The type species, *A. flexuosa* (Grube, 1860), has short-handled uncini (Fig. 48A–D), while *A. spinifera* has stout, long-handled uncini on segment 5 with the handle a continuation of the entire base (Fig. 48E), and, from segment 6 until the segment on which notopodia terminate, long-handled uncini with a thin handle originating only from the heel (Fig. 48G).

Some taxa with long-handled uncini on the anterior segments are characterized by heavily chitinised uncini on the anteriormost tori, which are remarkably darker than those on the following segments (e.g., *Longicarpus modestus*, *Betapista dekkerae*, *Axionice spinifera*, and some species of *Lanicides*).

Hadrachaeta aspeta also has neurochaetae of segments 5–8 markedly more chitinised than those of the following segments (Fig. 50A), and they also differ in structure to subsequent uncini. Unique amongst the terebellines, there are stout scoop-shaped chaetae (Figs. 44A–B; 46A). Glasby et al. (2004) considered those chaetae as acicular uncini and suggested that if this type of uncinus was to be considered as a synapomorphy of trichobranchids, a reversion would have to have occurred in *Hadrachaeta* Hutchings, 1977. We disagree, as we do not recognize any similarity between the anterior neurochaetae of *Hadrachaeta* and the acicular uncini of trichobranchids.

Garraffoni & Camargo (2007) suggested that the acicular uncini of trichobranchids were not homologous to the long-handled uncini of terebellids because in the former the handle originated from the entire base, while in the latter it was derived only from the heel. Although Garraffoni & Camargo (2007) did not include in their analysis any species of terebellines with the second type of long-handled uncini as described above, we support their assumption as trichobranchids have acicular uncini with a straight handle, which arises from the entire base and a prow is never present.

In most taxa, the uncinial back is slightly curved (Figs. 37D; 41A–I, L–M; 45A–M; 46B–N; 47A–M; 48A–H; 49A–G), but in some species, such as *Proclea malmgreni* (Ssolowiew, 1899) (Fig. 41J–K), it is strongly bent posteriorly. In some species, this occurs only on uncini from the posterior neuropodia, while in others this type occurs on all neuropodia. In all species with strongly posteriorly bent uncini, the crest has numerous transverse rows of secondary teeth. However, the uncinial curvature is not due to the presence of multiple rows of secondary teeth because several taxa with as many or more rows of secondary teeth have the uncinial back only slightly curved.

Finally, two taxa of terebellines have uncini that are different from those of all other terebellines. Both known species of *Reteterebella* have uncini that are longer than high, superficially resembling the “type 1 uncini” of some species of *Polycirrus* (Fig. 45H–M). In *Hadrachaeta aspeta*, in addition to the spoon-shaped neurochaetae on segments 5–8 discussed above, from segment 9 the uncini are short and thin, with few rows of secondary teeth (Figs. 44C, F; 46B–D) and those on the posterior body have a crest with a fringe of flattened, distally rounded bristles arranged in a single row (Fig. 44D–E).

In addition to the morphology of the uncini, the arrangement into double rows on at least some segments is characteristic for terebellines (McHugh 1995). In this subfamily, the first pairs of neuropodia have uncini arranged in single rows, then, usually from segment 11 or close to it, they are arranged in double rows for a variable number of segments and, at least on the posteriormost chaetigers, they are arranged in single rows again.

Usually, the uncini are arranged in double rows until the segment on which the notopodia terminate, but, as partially discussed by Garraffoni & Lana (2008), there is some variation. In *Axionice flexuosa* the uncini are arranged in single rows again from the last segment with notopodia, which is segment 18 (Fig. 48D). In species of *Phisidia* the arrangement in double rows extends for a few segments after the notopodia terminate (Nogueira & Alves 2006), and in several other taxa, such as *Hadrachaeta aspeta*, *Longicarpus*, *Amphitritides* Augener, 1922 and many species of *Terebella*, the uncini are arranged in double rows until the posterior body. A few taxa have uncini arranged in two well-separated rows facing each other in a beak-to-beak arrangement (Figs. 41F; 43E; 45B; 46M). In species of *Lanice*, the rows of uncini are typically disposed in a back-to-back arrangement (Fig. 45G). Species of *Loimia* have also been considered as having the double rows arranged back-to-back (Fauchald 1977; Hutchings & Murray 1984; Kritzler 1984; Hutchings & Glasby 1988, 1990, 1995), however, this is not correct because the uncini are turned 90º from their original position and they therefore have a crest-to-crest arrangement (Figs. 41L; 42B). In this genus, the contraction of the muscles at preservation, or during dehydratation for SEM studies, may distort the arrangement of the uncini during preservation, and this has led to the above confusion.

Most taxa have the uncini arranged in intercalating rows, with variable degrees of intercalation, as also partially discussed by Garraffoni & Lana (2008). In some taxa, the uncini from both rows are completely intercalated (Figs. 41H; 44H; 45D; 46G, J, L; 47E, J; 48C, F; 49G), while in other taxa the uncini are arranged in partially intercalating rows at varying positions, such as with tips aligned (Figs. 41B; 44C; 46C; 47H, M), dorsal buttons aligned (Figs. 42F–G; 43H; 45I, L; 49B), or with one row slightly posterior to the other so that the uncini are in a partial back-to-back arrangement (Figs. 41E; 43A–B, K). The arrangement of the double rows seems to be specific for each genus, with little intrageneric variation, but in *Amphitrite*, the type species of this genus, *A. cirrata*, and *A. pachyderma* Hutchings & Glasby, 1988 have double rows in a partially intercalated arrangement, with tips aligned, while *A. lobocephala* has them intercalated in a partial back-to-back arrangement (Figs. 41E; 43K). *Terebella* also shows variation in the arrangement of the double rows of uncini, as the type species, *T. lapidaria*, has well-separated rows facing each other (Fig. 45B), while in *T. pappus* Hutchings & Murray, 1984 (Fig. 43A), *T. tantabiddycreekensis* Hartmann-Schröder, 1980 (Fig. 43B), and *T. leslieae* Santos, Nogueira, Fukuda & Christoffersen (2010) the rows are intercalated in a partial back-to-back arrangement, and in *T. gorgonae* Monro, 1933 they are arranged back-to-back (Capa & Hutchings 2006).

Several authors have studied the ontogenetic development of the double rows of uncini (Wilson 1928; Bhaud 1988; Bhaud & Grémare 1988; Blake 1991; Garraffoni & Amaral 2009; Garraffoni & Lana 2009). These studies showed that during the first stages of the larva, uncini are arranged in single rows on all neuropodia and then some chaetoblasts invert their position and produce uncini in an inverted direction, forming the second row of uncini as found in the adults of all species of terebellines.

Because of that, Garraffoni & Lana (2009) suggested that “uncini in inverted rows” would be a more appropriate name than “uncini in double rows”, since it reflects the ontogenetical development of this character. We agree with the authors that this new name is more informative in regard to the origin of the so-called “double rows of uncini”. However, that is also misleading in our opinion, because it could mean that the uncini are arranged in a single row with the main fangs pointing posteriorly, what would be an “inverted position” from the original one, on which uncini in single rows always have the main fangs pointing anteriorly. Therefore, we prefer to use “uncini arranged in double rows”, until a new nomenclature that reflects all aspects of this character is devised.

Posterior body: pygidial and anal characters

In pectinariids, the body terminates with a sucker-like scaphe (Fig. 1A–B), which is achaetous, except for two rows of modified basal hooks. The scaphe terminates with an anal flap or ligule, which is probably the pygidium (Rouse & Pleijel 2001).

In ampharetids, alvinellids (Fig. 1E), trichobranchids (Fig. 1D, J), polycirrines, thelepodines, and most terebellines (Fig. 50B, E–G, J–K), the pygidium is terminal and smooth to crenulated, but this may be an artifact of fixation. In some ampharetid genera the pygidium is surrounded by a number of low indistinct papillae, sometimes with embedded basal eyespots, or may bear a number of long anal cirri (Uschakov 1955; Holthe 1986).

In other terebellines the anus is surrounded by a crown of soft anal papillae of variable size and morphology, from short and rounded to digitiform papillae (Fig. 50D, I), to more elongate, distally pointed cirri (Fig. 50C, H).

Conclusions

Terebelliformia comprises five families of polychaetes and, although systematic assumptions are beyond the scope of this paper, it is clear that this group can be subdivided into three subgroups, according to morphology.

The first of these subgroups contain the pectinariids, which are very different from all other families of Terebelliformia in having the prostomium and peristomium fused to each other forming a cephalic veil, in the morphology of the uncini, and by having the posterior part of the body modified as a sucker-like scaphe.

The second of these subgroups includes the ampharetids and the alvinellids, which share several characters, such as peristomial buccal tentacles that can be retracted into the mouth, branchiae located anterior to the segments on which they originate, and, in the alvinellids and the subfamily Melinninae, the presence of notopodial hooks.

The third group comprises the terebellids and the trichobranchids, which have prostomial buccal tentacles that cannot be retracted into the mouth.

Within the Terebellidae, the subfamily Polycirrinae appears to be the most derived group, with a loss of branchiae and the general tendency to have reduced notopodia, neuropodia and associated chaetae, with the most extreme case found in *Hauchiella*, which lacks all noto- and neuropodia.

Within the Thelepodinae we have recognized two groups (A and B), which are primarily separated by the degree of extension of the upper lip; we suspect that a detailed phylogenetic study will clearly show the close relationship of genera within these two groups.

A biogeographical study may also reveal interesting relationships, as most of the genera in Group A have been described from the southern hemisphere, primarily from the Indo-Pacific, except for *Telothelepus*, which has been recorded from the southern tip of South Africa, on the Atlantic side, and from the Arabian Gulf, northern hemisphere (Day 1955; Mohammad 1980), *Glossothelepus*, which is known only from the Gulf of California, northern hemisphere (Hutchings & Glasby 1986a), and *Parathelepus collaris*, which was described from Ireland. On the other hand, both species of *Decathelepus* are only known to occur in Australia (Hutchings 1977; Nogueira & Hutchings 2007) and all four species of *Rhinothelepus* occur only around Australia and in Hong Kong (Hutchings 1974, 1977, 1990, 1997a, b).

The terebellines show a large degree of variation in all morphological characters, and the only character shared by all members of this group is the presence of uncini arranged in double rows on at least some segments. A variety of characters has been used to define genera and species, but we suggest that the most useful one for genera is the presence or absence of branchiae and their morphology. While McHugh (1995) and Garraffoni & Lana (2008) showed that branchiae have been lost on several occasions in this group, and we agree with this, we have found this character to be consistent at least within the genera as currently known. In addition, the structure of the branchiae is relatively consistent within a genus. While in most cases branchiae appear on consecutive segments, some species of *Terebella*, *Polymniella* Verrill, 1900 and *Terebellobranchia* Day, 1951 have branchiae present on discontinuous segments, and as these genera share many other morphological characters, a detailed examination of the true status of these genera needs to be carried out.

In conclusion, this detailed review of the morphology of the group based on the type material of virtually all genera of Terebellidae and representatives of the other family members of the Terebelliformia provides a sound basis for a detailed phylogenetic study (Nogueira & Hutchings in prep.). This will certainly lead to some taxonomic changes, and they will be presented in subsequent papers. In addition, any such changes based on morphology need to be checked against molecular studies. For example, Rousset et al. (2007) found some molecular similarities between *Artacama* and *Artacamella* and suggested that the ventral processes of these taxa were homologous and therefore their relationship should be re-evaluated, but this is currently not supported by our morphological studies.

We have already performed a phylogenetic analysis of Terebelliformia with the character set discussed throughout this paper, and it confirms the relationships discussed above. However, similar to earlier phylogenetic analyses of this group (Rousset et al. 2003; Garraffoni & Lana 2008), we obtained low resolution and low support for our clades. Therefore, rather than publishing it, we prefer to search for more characters, different ways to code them, and to include more taxa, in an attempt to obtain a better resolution. This analysis is currently being carried out (Nogueira & Hutchings in prep.) and we hope it will help to elucidate the evolutionary relationships within this group.

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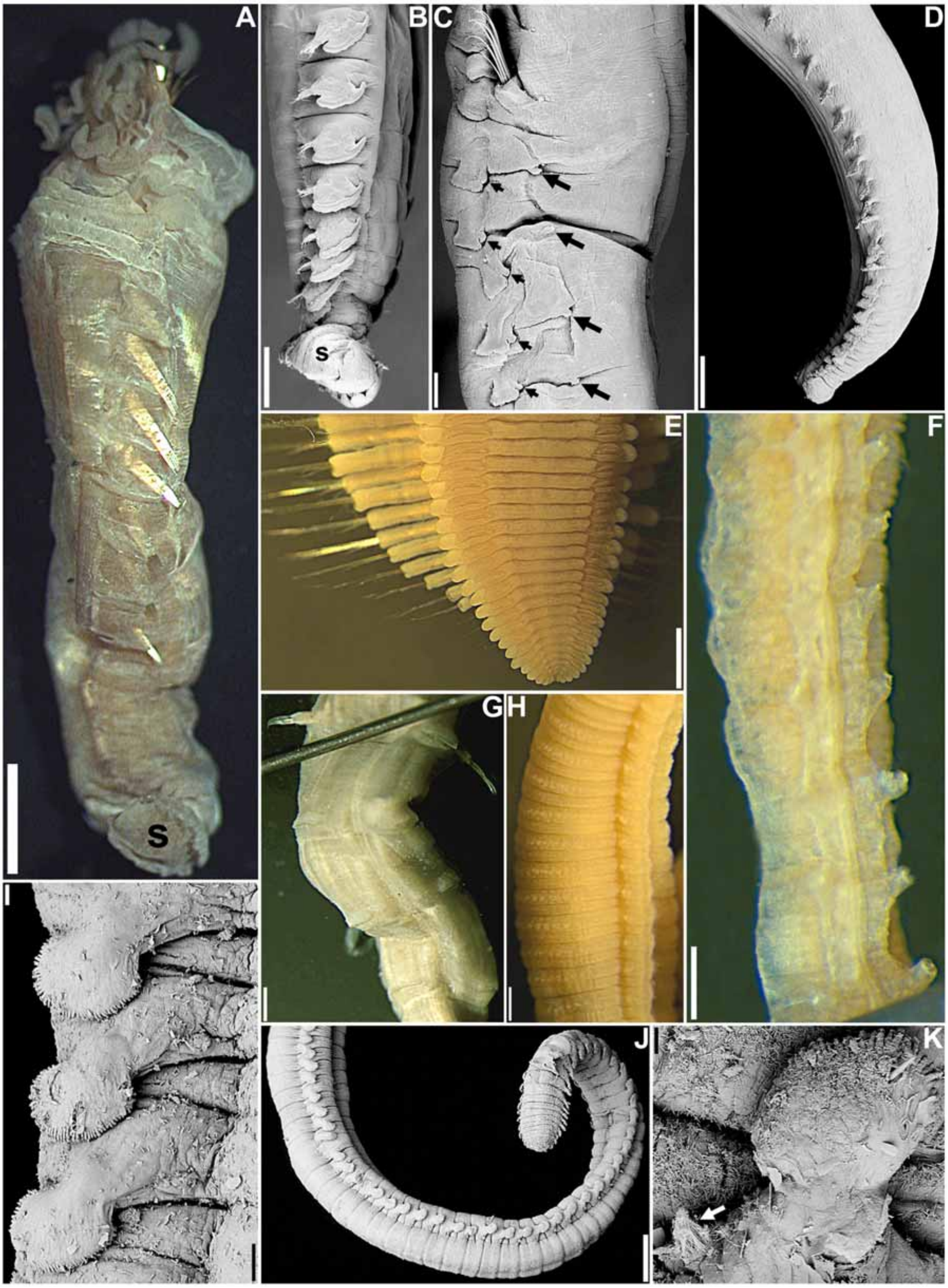

FIGURE 1. *Pectinaria dodeka*: A (holotype, AM W25615), left ventro-lateral view; B (AM W34182), posterior end, right lateral view. *Amphicteis dalmatica* (paratype, AM W8230): C, last segments from region with biramous parapodia and first segments from region after notopodia terminate, left lateral view; small arrows point to neuropodial papillae; large arrows point to notopodial papillae. *Terebellides anguicomus* (AM W34183): D, posterior end, left lateral view. *Alvinella pompejana* (AM W29585): E, posterior end, ventral view. *Polycirrus glaucus* (holotype, AM W20937): F, segments from region after notopodia terminate. *Rhinothelepus lobatus* (holotype, AM W5234): G, last segment from region with biramous parapodia and first segments from region after notopodia terminate, ventral view. *Lysilla laciniata* (holotype, AM W199626): H, segments from region after notopodia terminate. *Trichobranchus bunnabus* (AM W24230): I, neuropodia from region after notopodia terminate; J, general view of the posterior end; K, closer view of a parapodium from region after notopodia terminate; arrow points to notopodial papilla with tuft of cilia. Scale bars: A = 2 mm; B = 0.9 mm; C = 0.3 mm; D = 1.2 mm; E = 1 mm; F = 0.2 mm; G = 0.5 mm; H = 0.4 mm; I = 0.06 mm; J = 0.45 mm; K = 0.02 mm.

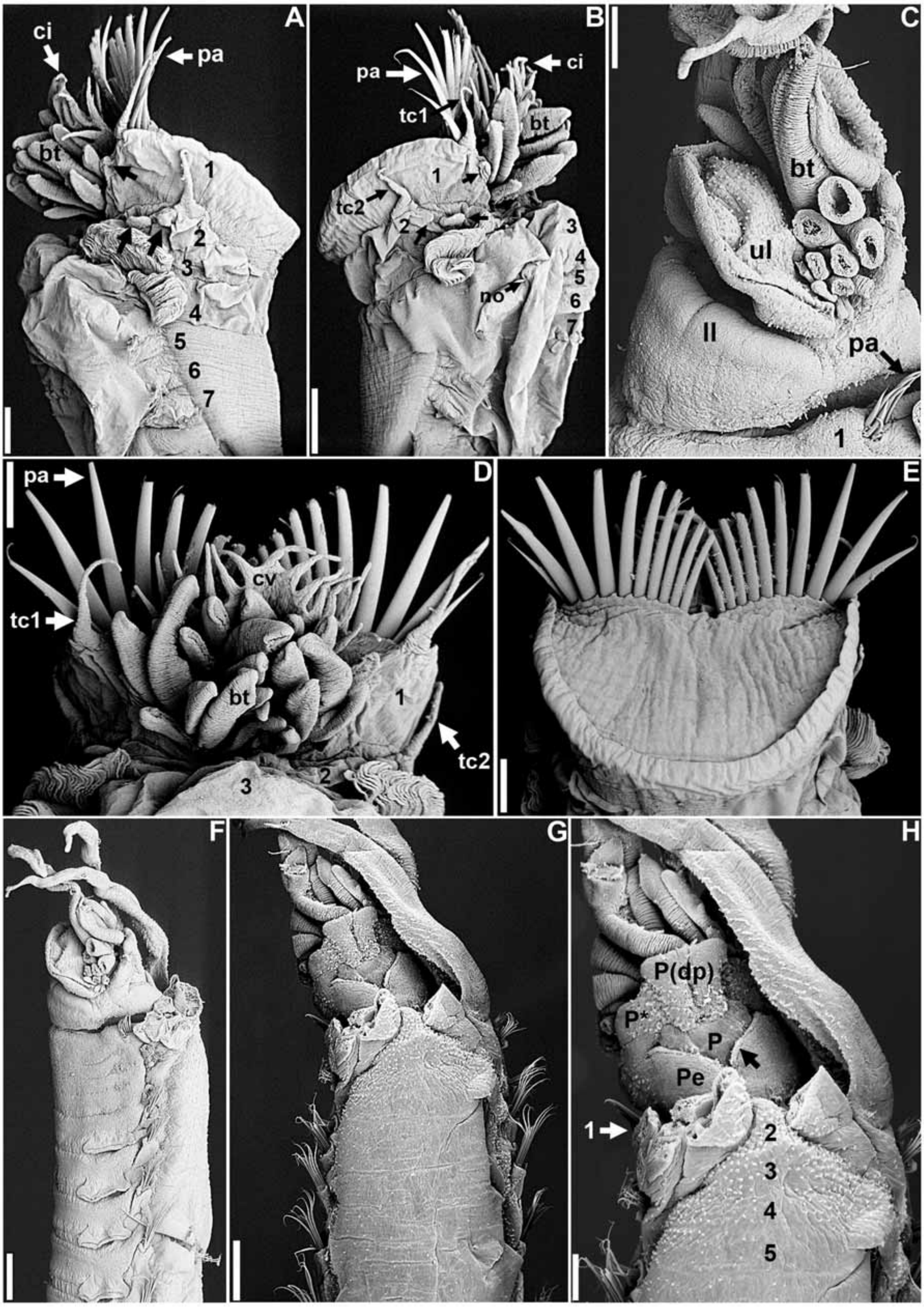

FIGURE 2. *Pectinaria dodeka* (AM W34182): A, anterior end, left lateral view; B, anterior end, right lateral view; D, cephalic veil and peristomial tentacles, ventral view; E, segment 1, superior view. *Amphicteis dalmatica* (paratype, AM W8230; most branchial filaments and some buccal tentacles intentionally removed to show anterior end): C, anterior end, left ventro-lateral view; F, anterior end, left lateral view; G, anterior end, dorsal view; H, detail of anterior end, dorsal view; unspecified arrow points to nuchal organ. Numbers refer to segments; unspecified arrows in A–B point to possible nephridial papillae; bt = buccal tentacles; ci = marginal cirri of cephalic veil; cv = cephalic veil; ll = lower lip; no = first pair of notopodia; P = basal part of prostomium; P* and P (dp) = lobes of distal part of prostomium; pa = paleae; Pe = peristomium; ul = upper lip; tc1 = tentacular cirrus of segment 1; tc2 = tentacular cirrus of segment 2. Scale bars: A, D–E = 0.6 mm; B = 0.9 mm; C, H = 0.2 mm; F–G = 0.4 mm.

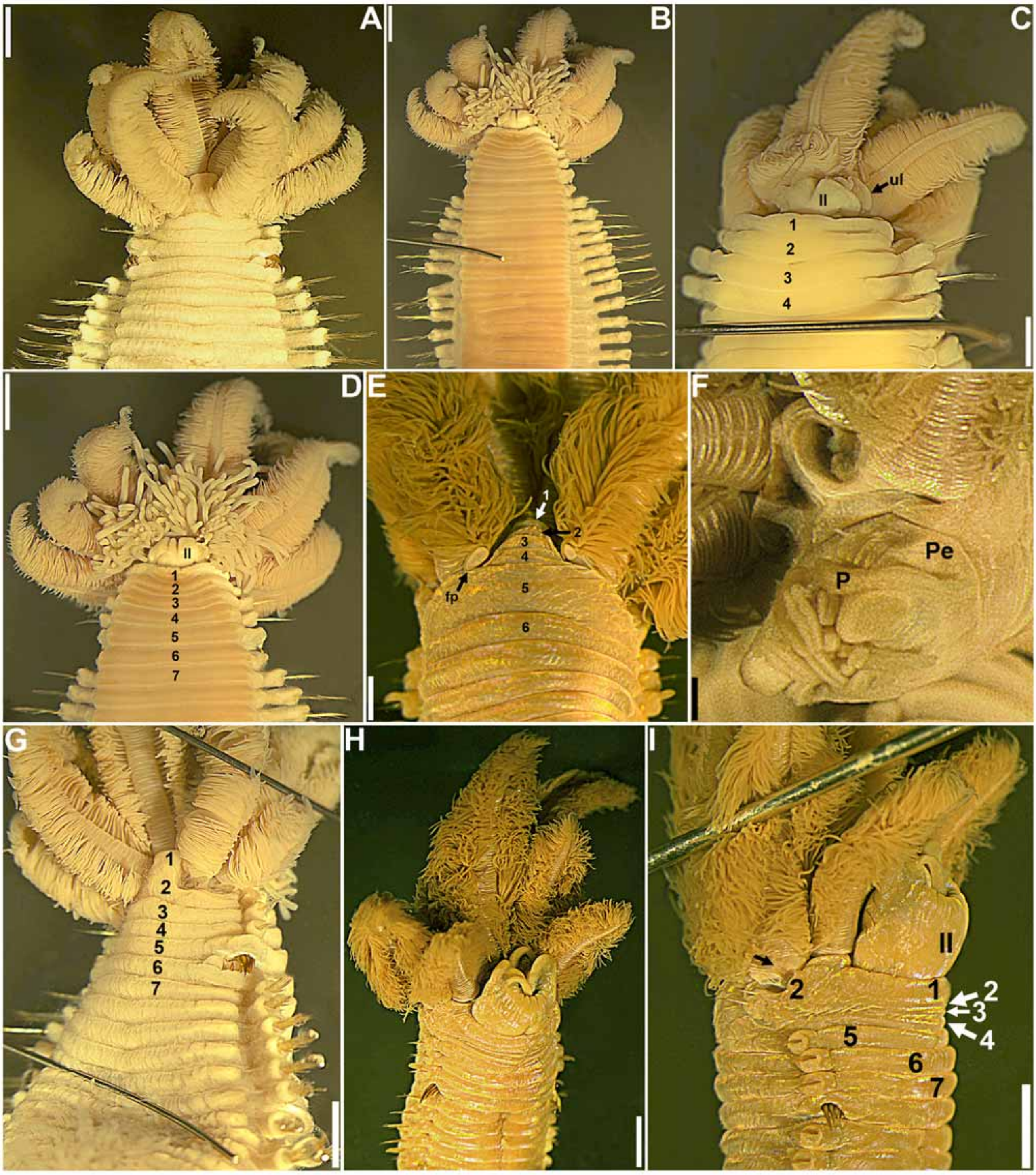

FIGURE 3. *Alvinella pompejana*: A, anterior end, dorsal view; B, anterior end, ventral view; C–D, closer views of anterior end, ventral views, of two specs.; G, anterior end, right dorso-lateral view (A–B, D, G from one spec. from sample AM W29585; C from AM W29589). *Paralvinella grasslei* (AM W29588): E, anterior end, dorsal view; F, anterior end, frontal view; H, anterior end, right ventro-lateral view; I, closer view of anterior end, right lateral view; unspecified arrow points to first notopodium. Numbers refer to segments; fp = female papilla; ll = lower lip; P = prostomium; Pe = peristomium; ul = upper lip. Scale bars: A–B, D, G–I = 2 mm; C, E = 1 mm; F = 0.5 mm.

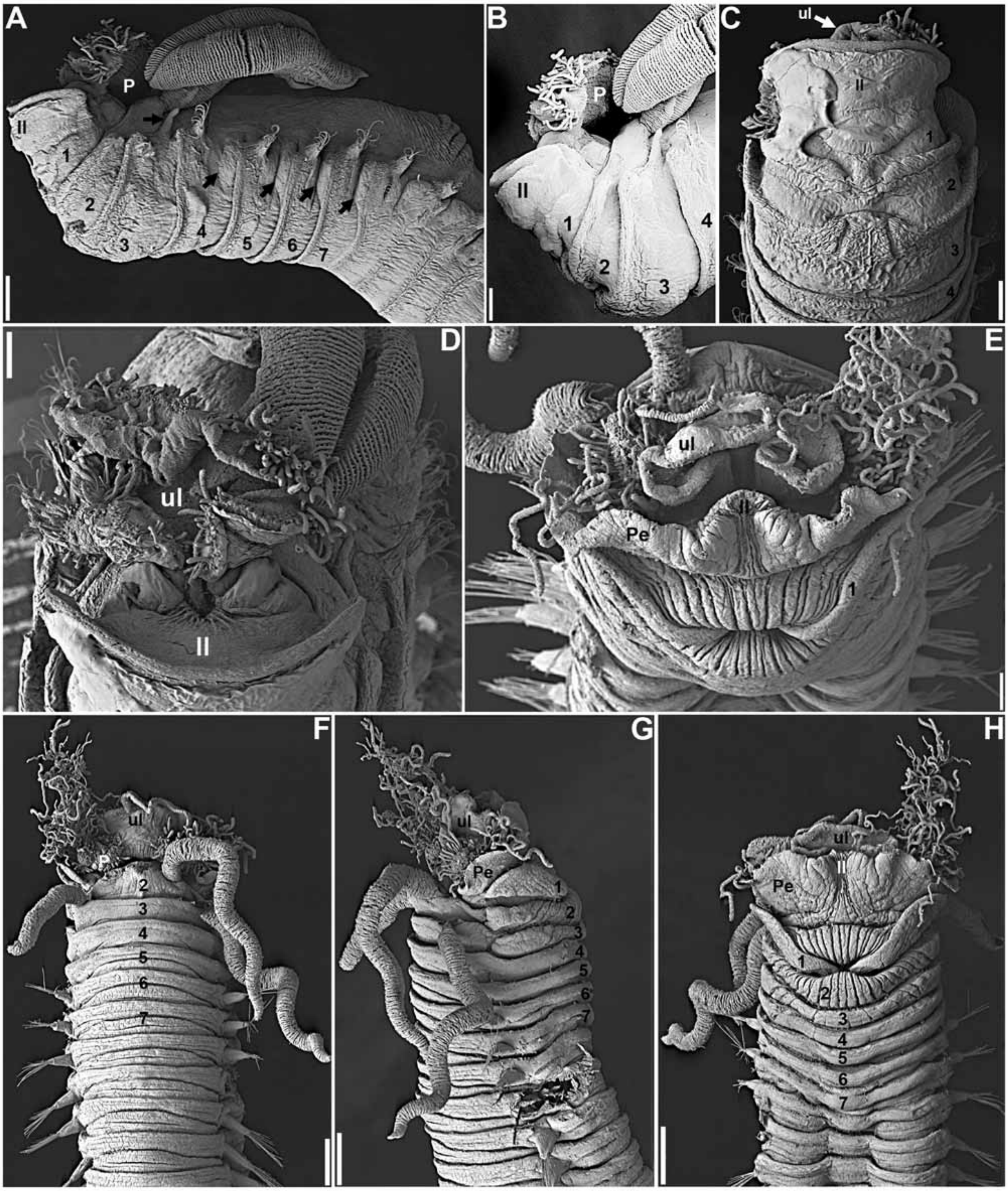

FIGURE 4. *Terebellides anguicomus* (AM W34183): A, anterior end, left lateral view; horizontal unspecified arrow points to nephridial papilla; oblique unspecified arrows on segments 4–7 point to pronounced glandular swellings; B, closer view of anterior end, left lateral view; C, anterior end, ventral view; D, oral area, superior view. *Trichobranchus bunnabus* (AM W24230): E, oral area, superior view; F, anterior end, dorsal view; G, anterior end, right lateral view; H, anterior end, ventral view. Numbers refer to segments; ll = lower lip; P = prostomium; Pe = peristomium; ul = upper lip. Scale bars: A = 0.6 mm; B–C, F–H = 0.4 mm; D–E = 0.3 mm.

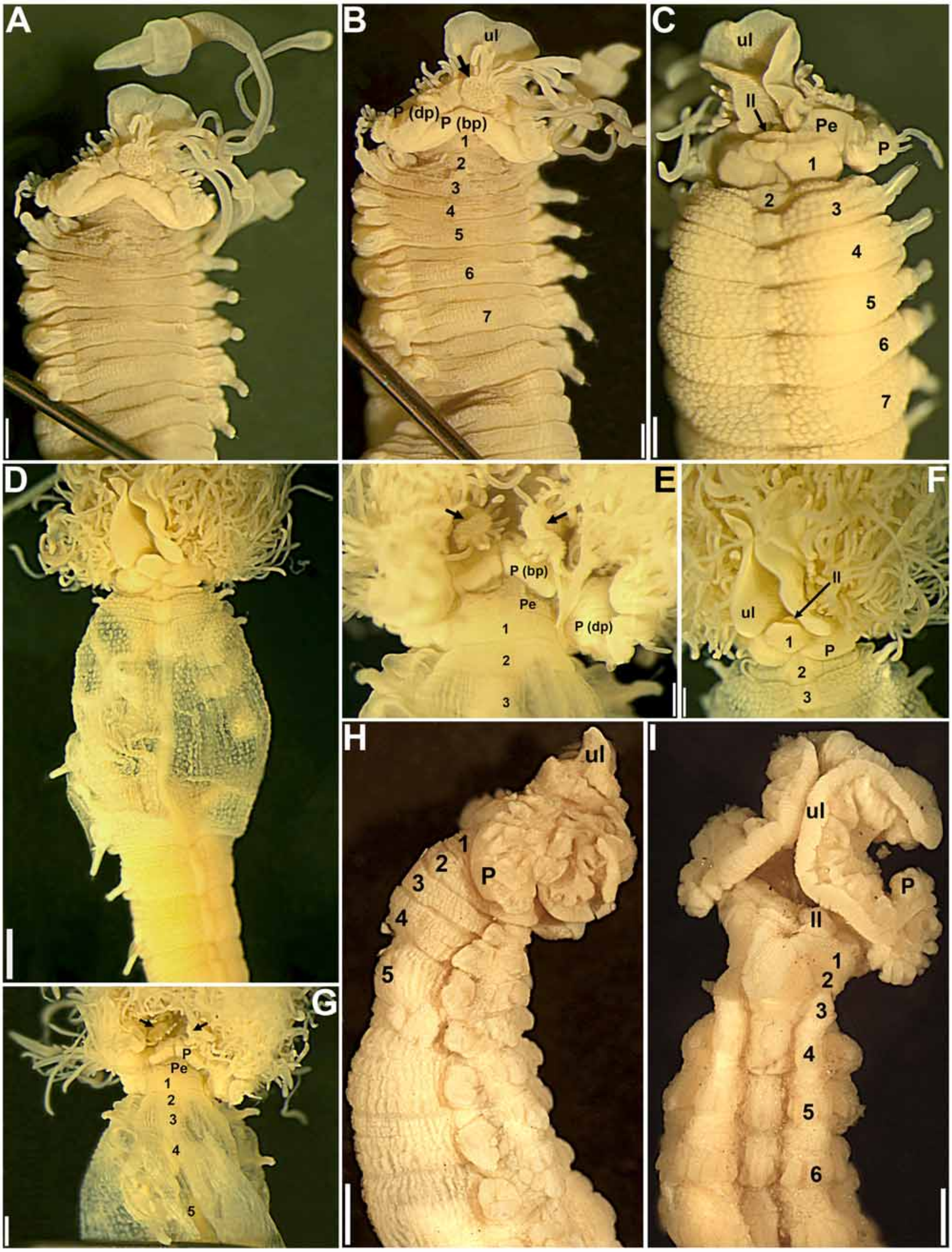

FIGURE 5. *Amaeana apheles* (holotype, AM W5239): A, anterior end, dorsal view; B, closer view of anterior end, dorsal view; arrow points to mid-dorsal prostomial process; C, anterior end, ventral view. *Lysilla laciniata* (holotype, AM W199626): D, anterior end, ventral view; E, close up view of anterior end, dorsal view; arrows point to mid-dorsal prostomial lobes; F, oral area, ventral view; G, general view of anterior end, dorsal view; arrows point to mid-dorsal prostomial lobes. *Enoplobranchus sanguineus*: H, anterior end, right lateral view (syntype, YPM 40569); I, anterior end, ventral view (syntype, YPM 40568). Numbers refer to segments; ll = lower lip; P = prostomium; P (bp) = basal part of prostomium; P (dp) = distal part of prostomium; Pe = peristomium; ul = upper lip. Scale bars: A, G = 0.5 mm; B–C, F = 0.4 mm; D, H–I = 1 mm; E = 0.3 mm.

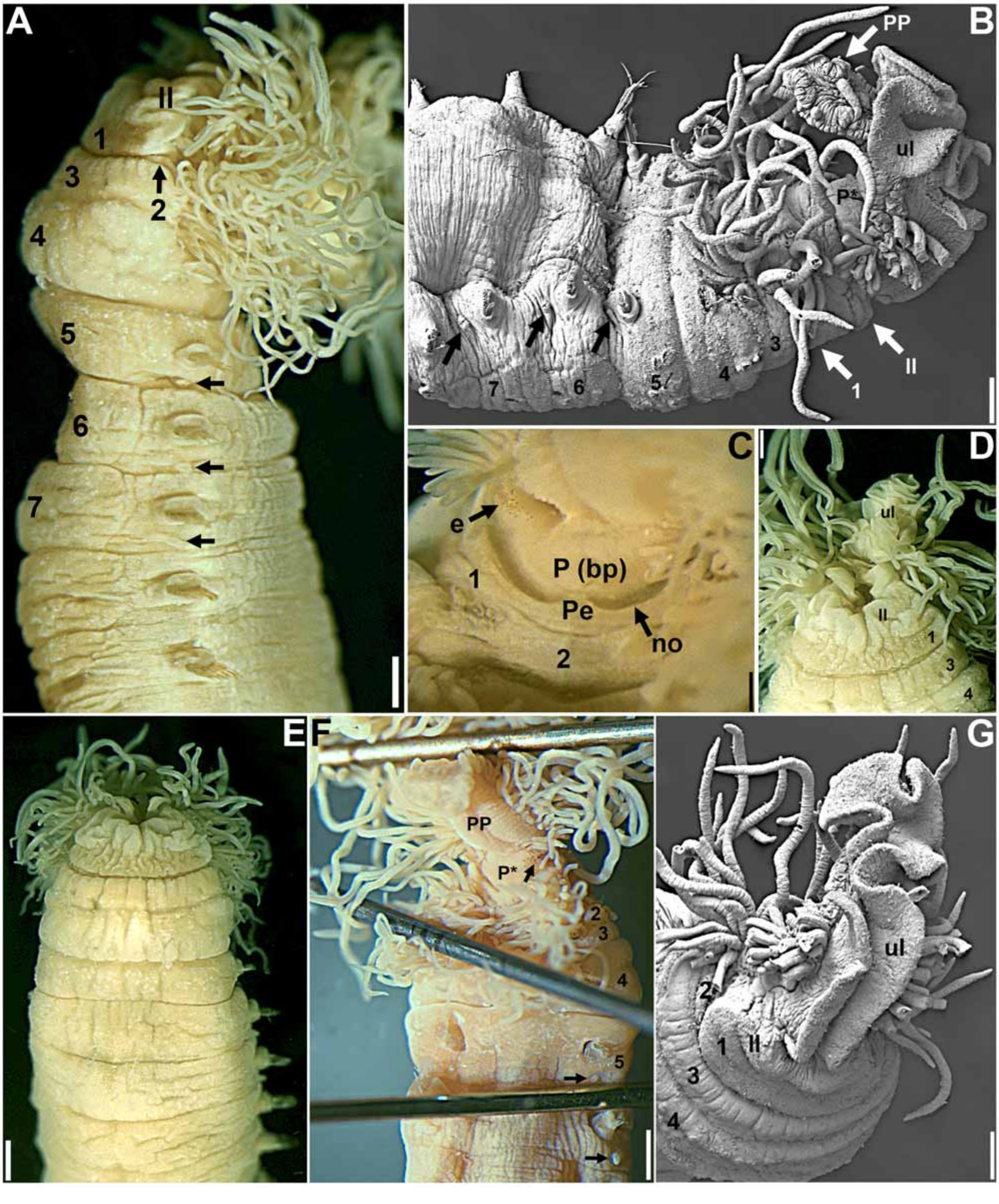

FIGURE 6. *Rhinothelepus lobatus* (holotype, AM W5234): A, anterior end, left lateral view; C, close up view of anterior end, dorsal view; D–E, anterior end, ventral views. *Rhinothelepus occabus*: B, anterior end, right lateral view; F, anterior end, dorsal view; oblique arrow points to eyespots; G, anterior end, superior right ventro-lateral view (B, G from paratype, AM W201904, buccal tentacles intentionally removed to show anterior end; F from holotype, AM W201903). Numbers refer to segments; unspecified arrows point to nephridial and genital papillae; e = eyespots; ll = lower lip; no = nuchal organs; P* and P (bp) = basal part of prostomium; Pe = peristomium; PP = prostomial mid-dorsal process; ul = upper lip. Scale bars: A, E–F = 0.5 mm; B, G = 0.15 mm; C = 0.2 mm; D = 0.4 mm.

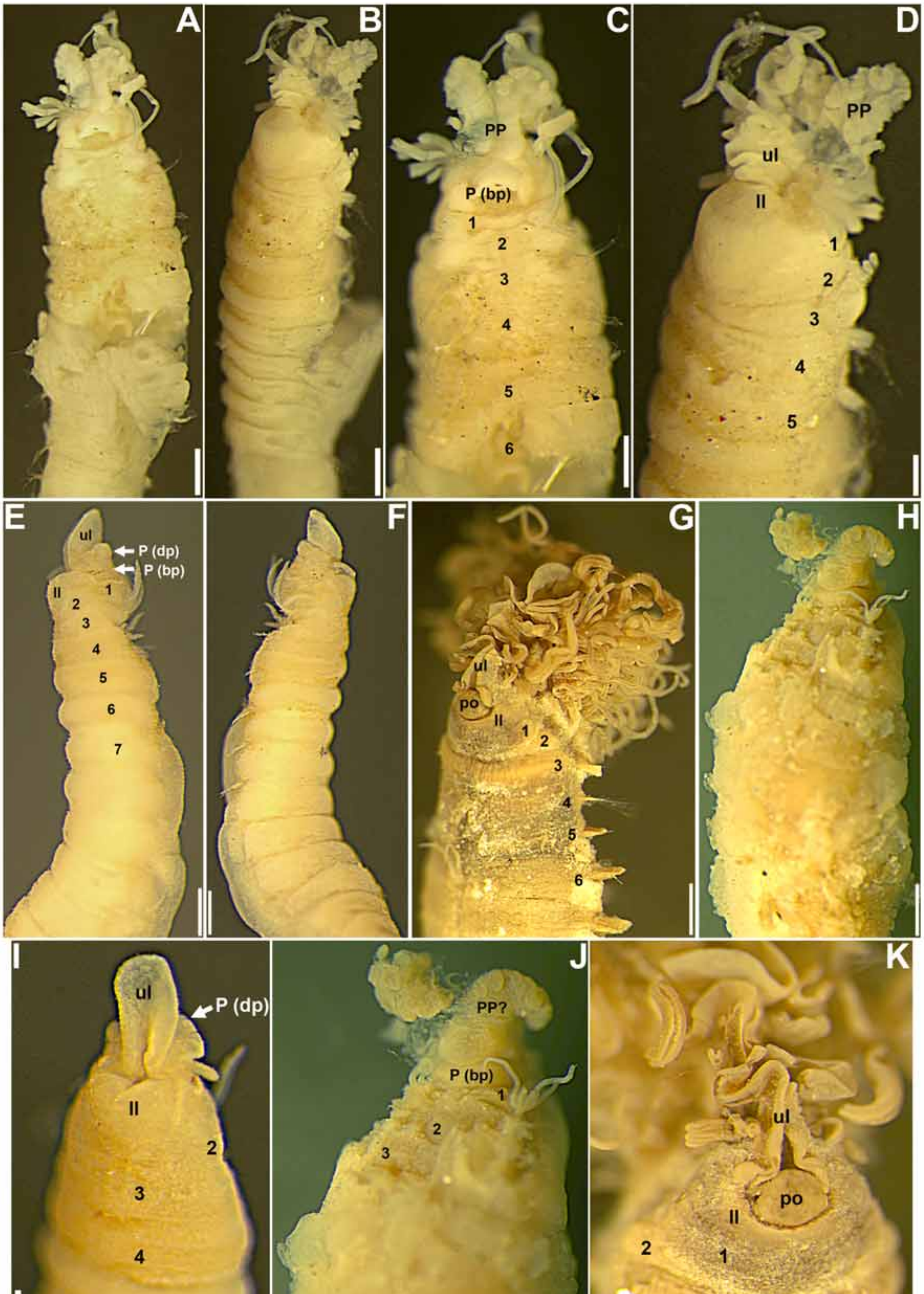

FIGURE 7. *Decathelepus ocellatus* (holotype, AM W6782): A, anterior end, dorsal view; B, anterior end, left ventro-lateral view; C, closer view of the anterior end, dorsal view; D, closer view of anterior end, left ventro-lateral view. *Decathelepus wambira* (paratype, AM W8741): E, anterior end, left lateral view; F, anterior end, right lateral view; I, anterior end, left ventro-lateral view. *Glossothelepus mexicanus*: G, anterior end, left ventro-lateral view; H, J, closer view of anterior end, dorsal view; K, oral area, right ventro-lateral view (G, K from paratype, USNM 98572; H, J from paratype, AM W199659). Numbers refer to segments; ll = lower lip; P (bp) = basal part of prostomium; P (dp) = distal part of prostomium; po = pharyngeal organ; PP = prostomial mid-dorsal process; ul = upper lip. Scale bars: A–B = 0.4 mm; C = 0.3 mm; D = 0.2 mm; E–F = 0.25 mm; G–H = 0.7 mm; I = 0.2 mm; J–K = 0.5 mm.

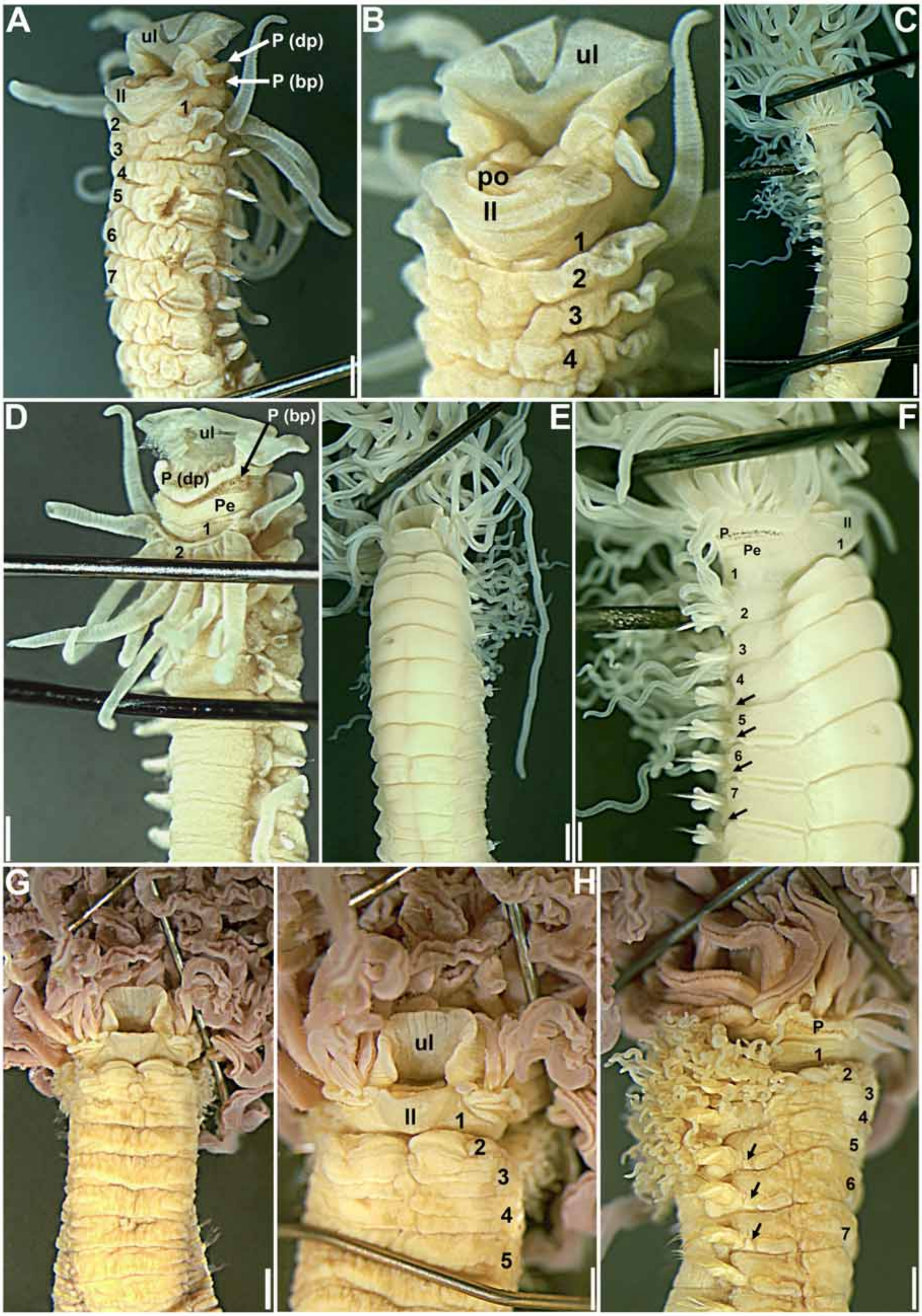

FIGURE 8. *Euthelepus serratus* (holotype, AM W199007): A, anterior end, left ventro-lateral view; B, close up view of oral area, left ventro-lateral view; D, anterior end, right dorso-lateral view. *Streblosoma porchatensis* (paratype, AM W29240): C, anterior end, right ventro-lateral view; E, anterior end, left ventro-lateral view; F, closer view of anterior end, right ventro-lateral view. *Thelepus robustus* (AM W30722): G, anterior end, ventral view; H, close up view of anterior end, ventral view; I, anterior end, right lateral view. Numbers refer to segments; unspecified arrows point to nephridial and genital papillae; ll = lower lip; P = prostomium; P (bp) = basal part of prostomium; P (dp) = distal part of prostomium; Pe = peristomium; po = pharyngeal organ; ul = upper lip. Scale bars: A, D = 0.5 mm; B = 0.3 mm; C, E, H–I = 0.7 mm; F = 0.4 mm; G = 1 mm.

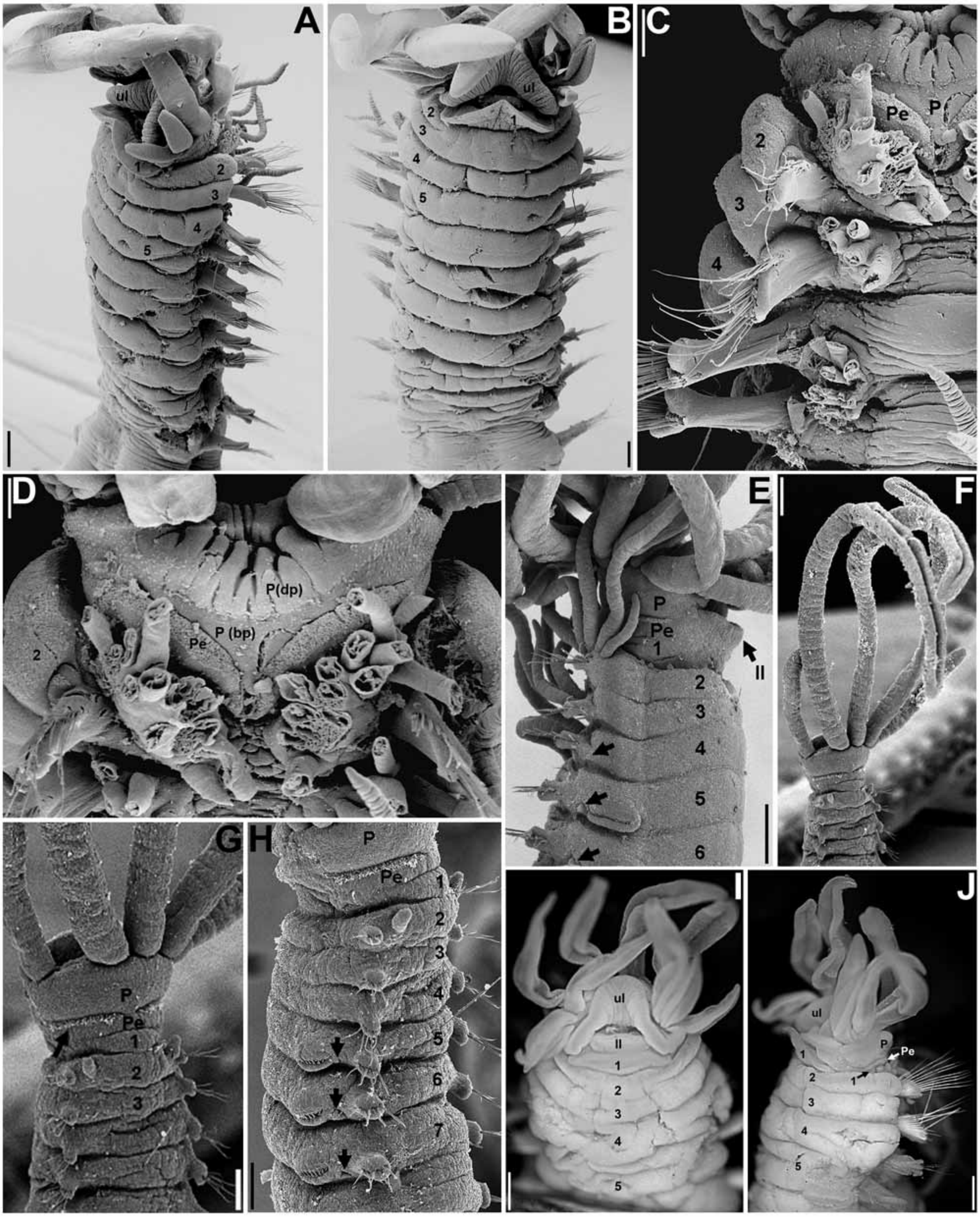

FIGURE 9. *Pseudostreblosoma brevitentaculatum*: A, anterior end, left ventro-lateral view; B, anterior end, ventral view; C, close up view of left side of anterior end, dorsal view; D, close up view of anterior end, dorsal view; I, anterior end, ventral view; J, anterior end, left ventro-lateral view (I–J from holotype, MZUSP 16925; A–D from discarded spec.; branchial filaments from the first pair and those from second and third pairs of left side of body intentionally removed to show anterior end). *Streblosoma porchatensis* (discarded spec.): E, anterior end, left lateral view. *Streblosoma oligobranchiatum* (discarded spec.): F, anterior end, left dorso-lateral view; G, close up view of anterior end, left dorso-lateral view; arrow points to nuchal organ; H, anterior end, left lateral view. Numbers refer to segments; unspecified arrows point to nephridial and genital papillae; ll = lower lip; P = prostomium; P (bp) = basal part of prostomium; P (dp) = distal part of prostomium; Pe = peristomium; ul = upper lip. Scale bars: A = 0.24 mm; B = 0.2 mm; C = 0.15 mm; D, G–H = 0.1 mm; E–F = 0.3 mm; I–J = 0.5 mm.

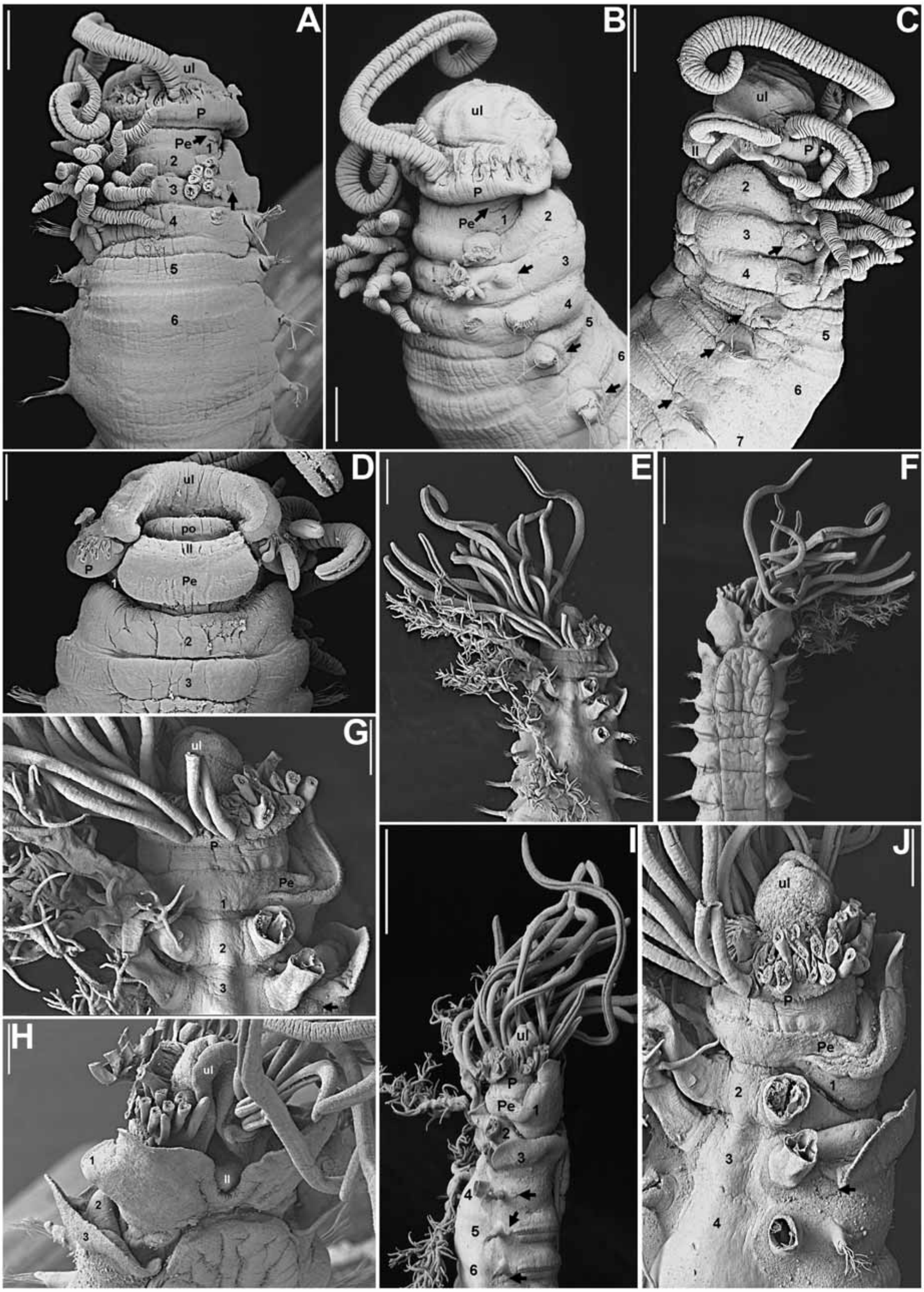

FIGURE 10. *Amphitrite cirrata* (AM W34751; branchiae of right side of the body intentionally removed to show anterior end): A, anterior end, dorsal view; B, anterior end, right dorso-lateral view; C, anterior end, left lateral view; D, close up view of anterior end, ventral view. *Amphitrite lobocephala* (paratype, AM W20888; branchiae and buccal tentacles of right side of body intentionally removed to show anterior end): E, anterior end, dorsal view; F, anterior end, ventral view; G, close up view of anterior end, dorsal view; H, close up view of anterior end, right ventro-lateral view; I, anterior end, right lateral view; J, close up view of anterior end, right dorso-lateral view. Numbers refer to segments; unspecified arrows point to nephridial and genital papillae; ll = lower lip; P = prostomium; Pe = peristomium; po = pharyngeal organ; ul = upper lip. Scale bars: A, C, E = 0.5 mm; B = 0.4 mm; D = 0.3 mm; F, I = 1 mm, G, H, J = 0.25 mm.

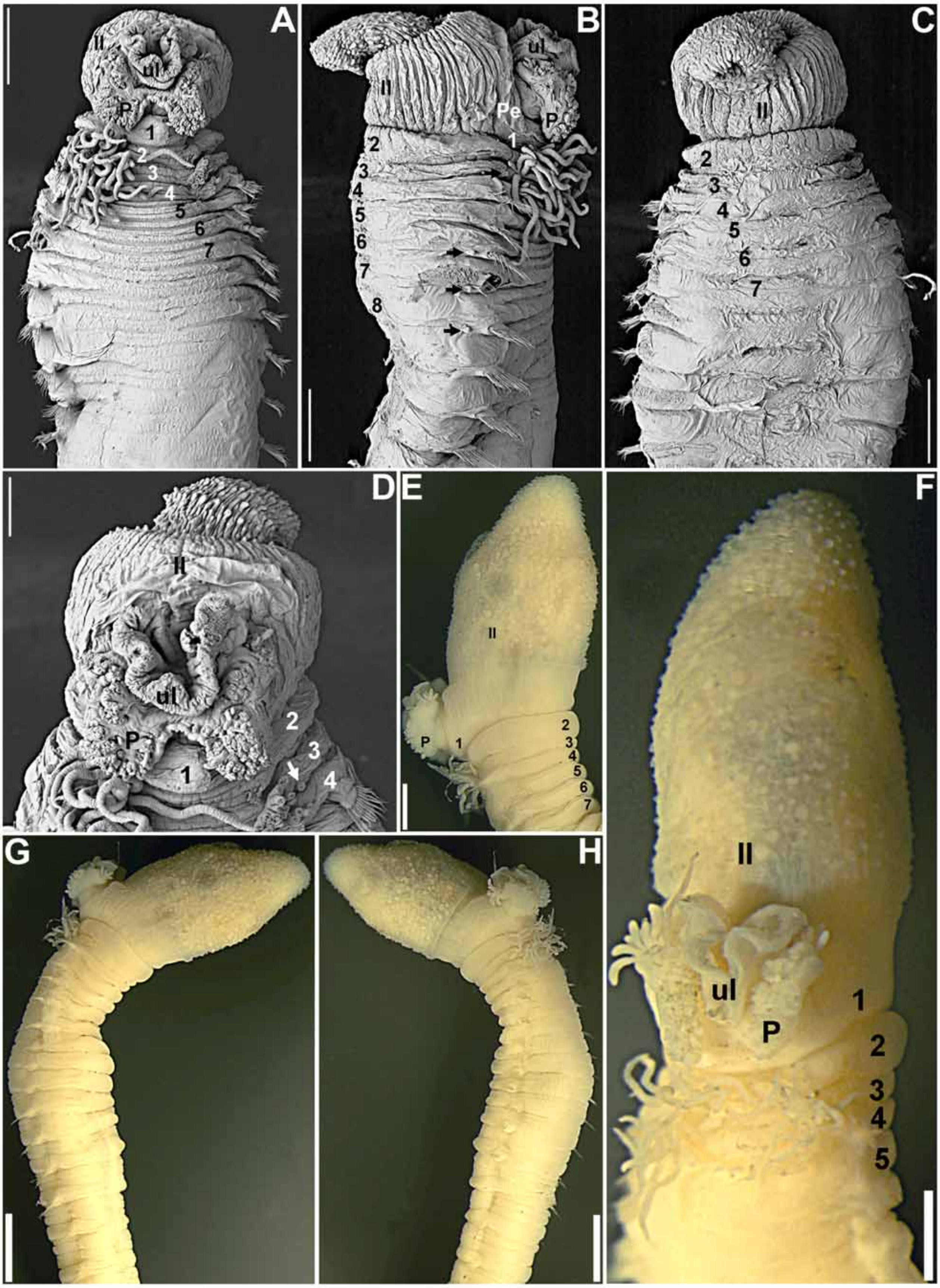

FIGURE 11. *Artacama proboscidea*: A, anterior end, dorsal view; B, anterior end, left lateral view; C, anterior end, ventral view; D, close up view of anterior end, dorsal view; E, close up view of anterior end, right lateral view; F, close up view of anterior end, dorsal view; G, general view of anterior end, right lateral view; H, general view of anterior end, left lateral view (A–D from AM W34752; E–H from SMNH 72082). Numbers refer to segments; arrows point to nephridial and genital papillae; ll = lower lip; P = prostomium; Pe = peristomium; ul = upper lip. Scale bars: A–C, E–F = 1 mm; D = 0.5 mm; G–H = 2 mm.

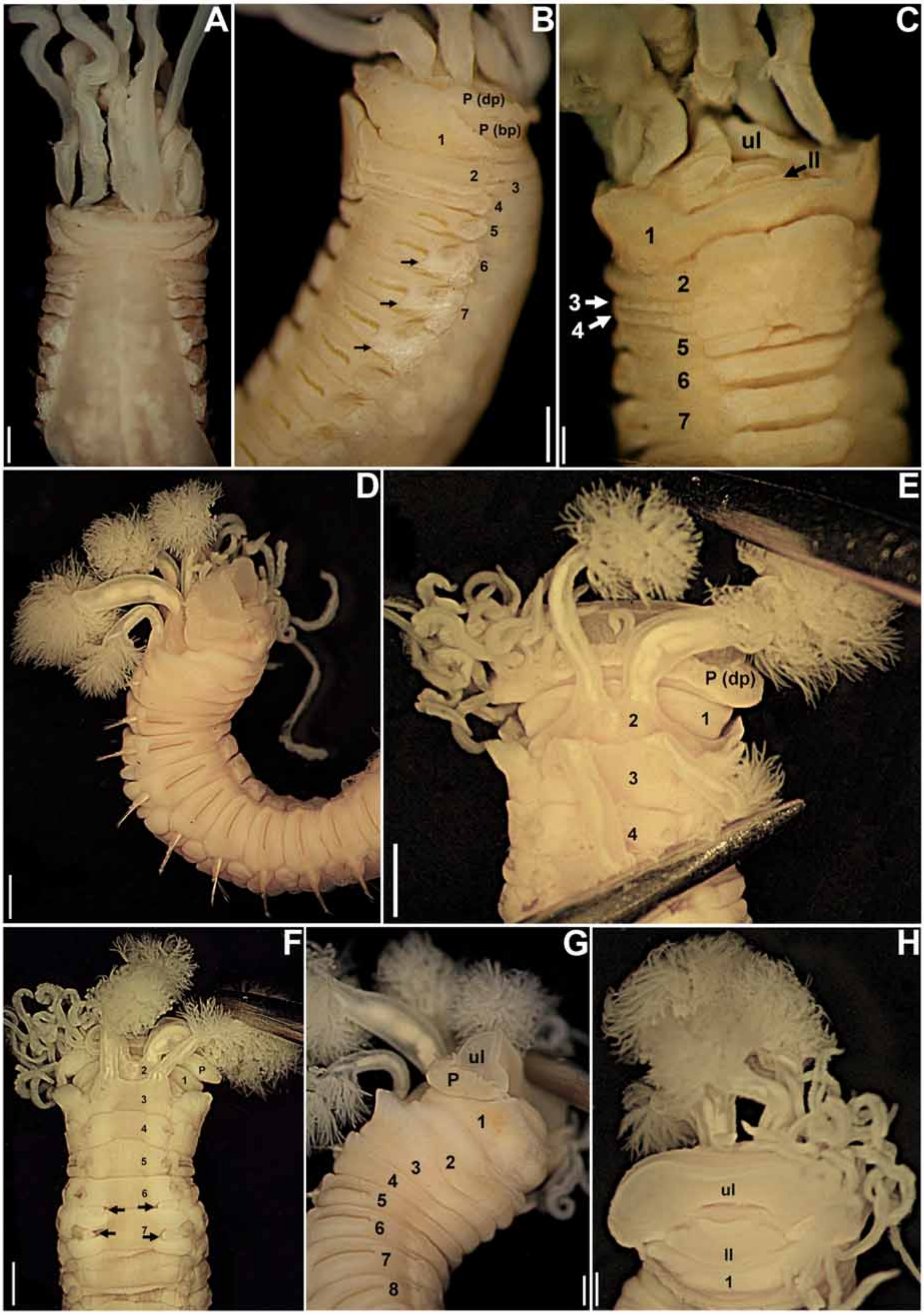

FIGURE 12. *Stschapovella tatjanae* (ZMUC-POL-1743): A, anterior end, dorsal view; B, anterior end, left lateral view; C, anterior end, right ventro-lateral view. *Pista cristata* (ZMUC-POL-707): D, anterior end, right ventro-lateral view; E, close up view of anterior end, dorsal view, showing segment 2; F, anterior end, dorsal view; G, anterior end, right ventro-lateral view; H, oral area, superior view. Numbers refer to segments; unspecified arrows point to genital papillae; ll = lower lip; P = prostomium; P (bp) = basal part of prostomium; P (dp) = distal part of prostomium; ul = upper lip. Scale bars: A, C = 0.2 mm; B = 0.4 mm; D–F = 1 mm; G–H = 0.5 mm.

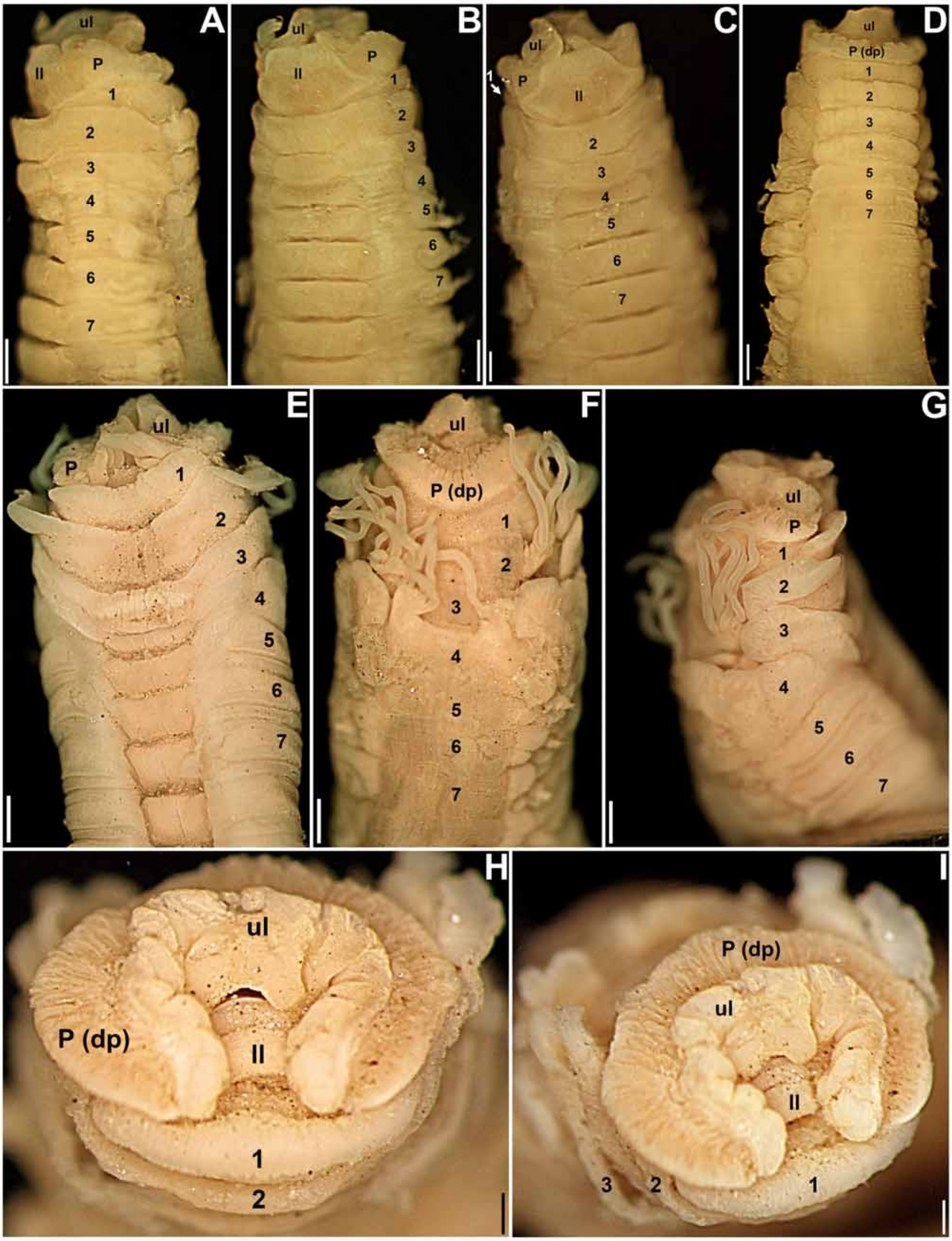

FIGURE 13. *Proclea malmgreni* (ZMUC-POL-2057): A, anterior end, left lateral view; B, anterior end, left ventro-lateral view; C, anterior end, ventral view; D, anterior end, dorsal view. *Thelepides koehleri* (unreg., from Nonato private coll.): E, anterior end, ventral view; F, anterior end, dorsal view; G, anterior end, right ventro-lateral view; H–I, close up views of oral area, superior views. Numbers refer to segments; ll = lower lip; P = prostomium; P (dp) = distal part of prostomium; ul = upper lip. Scale bars: A, D = 0.2 mm; B–C = 0.15 mm; E–G = 0.5 mm; H–I = 0.3 mm.

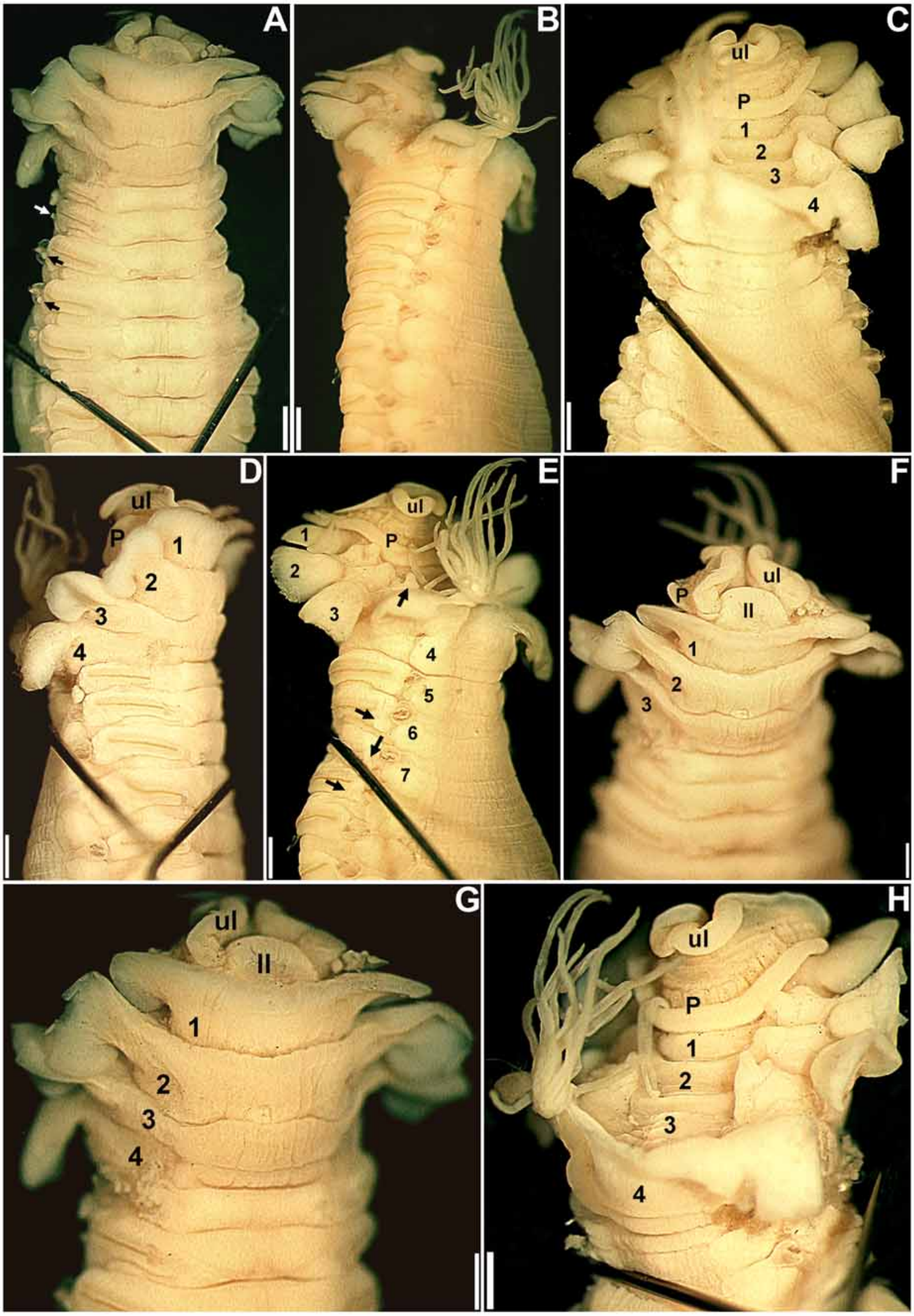

FIGURE 14. *Scionella japonica* (holotype, USNM 15723): A, anterior end, ventral view; B, anterior end, left lateral view; C, anterior end, dorsal view; D, anterior end, right ventro-lateral view; E, anterior end, left dorso-lateral view; F, oral area, superior view; G, close up view of anterior end, ventral view; H, anterior end, right dorso-lateral view. Numbers refer to segments; arrows point to nephridial and genital papillae; ll = lower lip; P = prostomium; ul = upper lip. Scale bars: A–D = 1 mm; E, G–H = 0.8 mm; F = 0.7 mm.

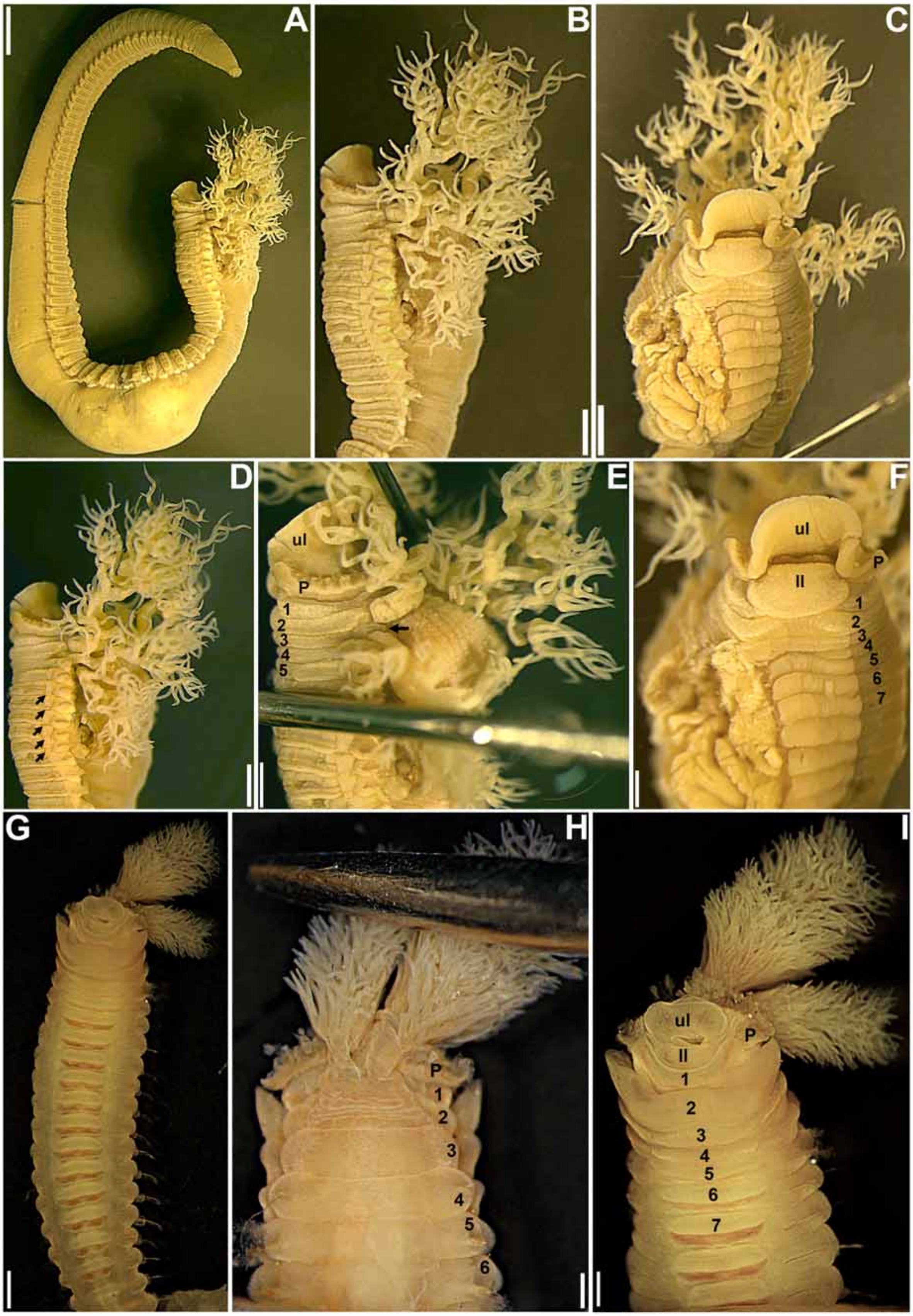

FIGURE 15. *Terebella lapidaria* (BMNH 1928.4.26.330-32): A, entire animal, left lateral view; B, anterior end, left lateral view; C, anterior end, ventral view; D, anterior end, left lateral view; E, close up view of anterior end, left lateral view, showing nephridial papilla on segment 3; F, close up view of anterior end, ventral view. *Pistella lornensis* (ZMUC-POL-1744): G, anterior end, ventral view; H, anterior end, dorsal view; I, close up view of anterior end, ventral view. Numbers refer to segments; arrows point to nephridial and genital papillae; ll = lower lip; P = prostomium; ul = upper lip. Scale bars: A = 2 mm; B–D, G = 1 mm; E, H = 0.4 mm; F, I = 0.5 mm.

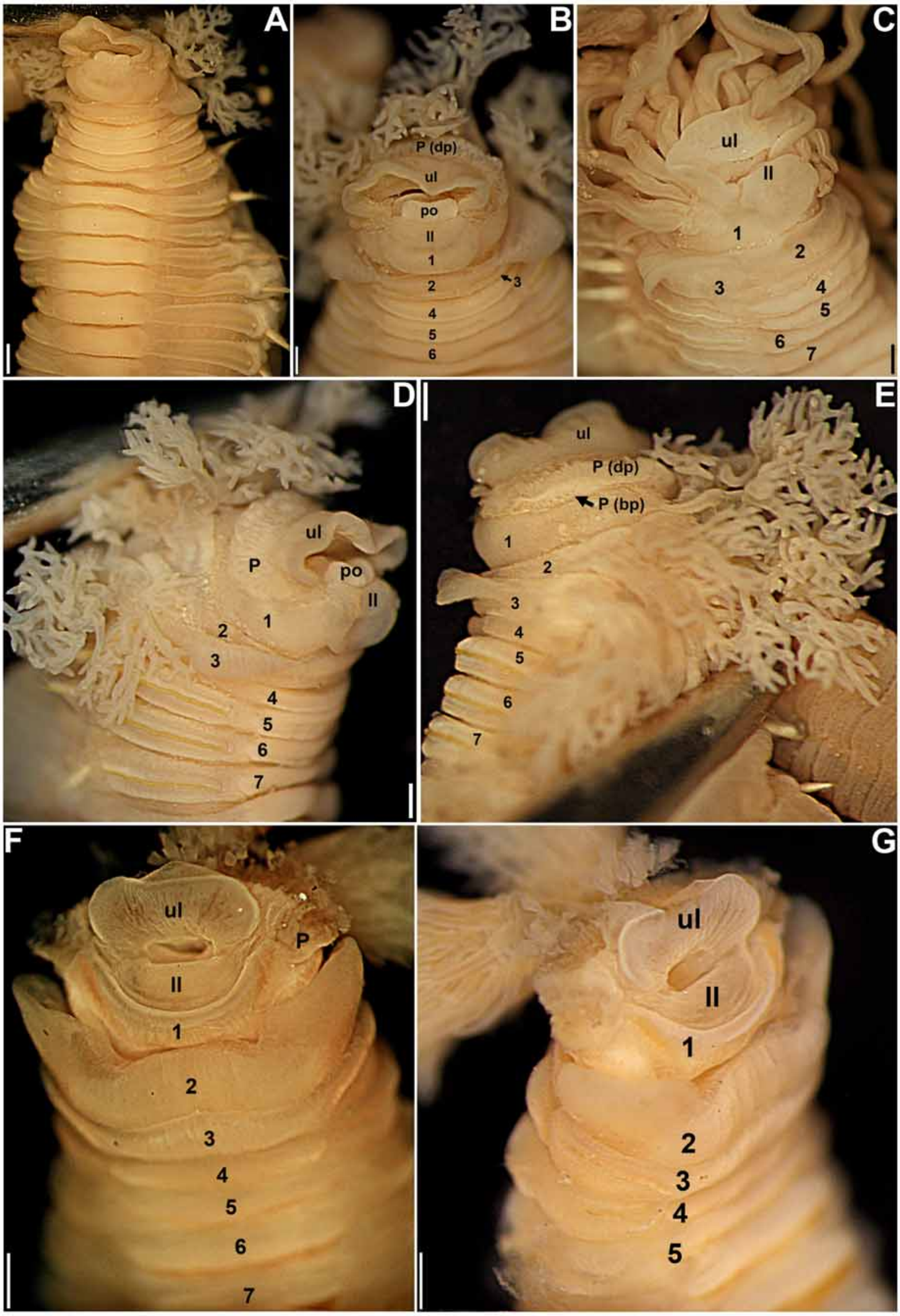

FIGURE 16. *Lanicola lobata* (NMV F94335): A, close up view of anterior end, ventral view; B, close up view of anterior end, ventral view; C–D, close up views of anterior end, right ventro-lateral views; E, anterior end, left dorso-lateral view. *Pistella lornensis* (ZMUC-POL-1744): F–G, close up views of oral area, superior views. Numbers refer to segments; ll = lower lip; P = prostomium; P (bp) = basal part of prostomium; P (dp) = distal part of prostomium; po = pharyngeal organ; ul = upper lip. Scale bars: A = 0.5 mm; B–E = 0.3 mm; F–G = 0.4 mm.

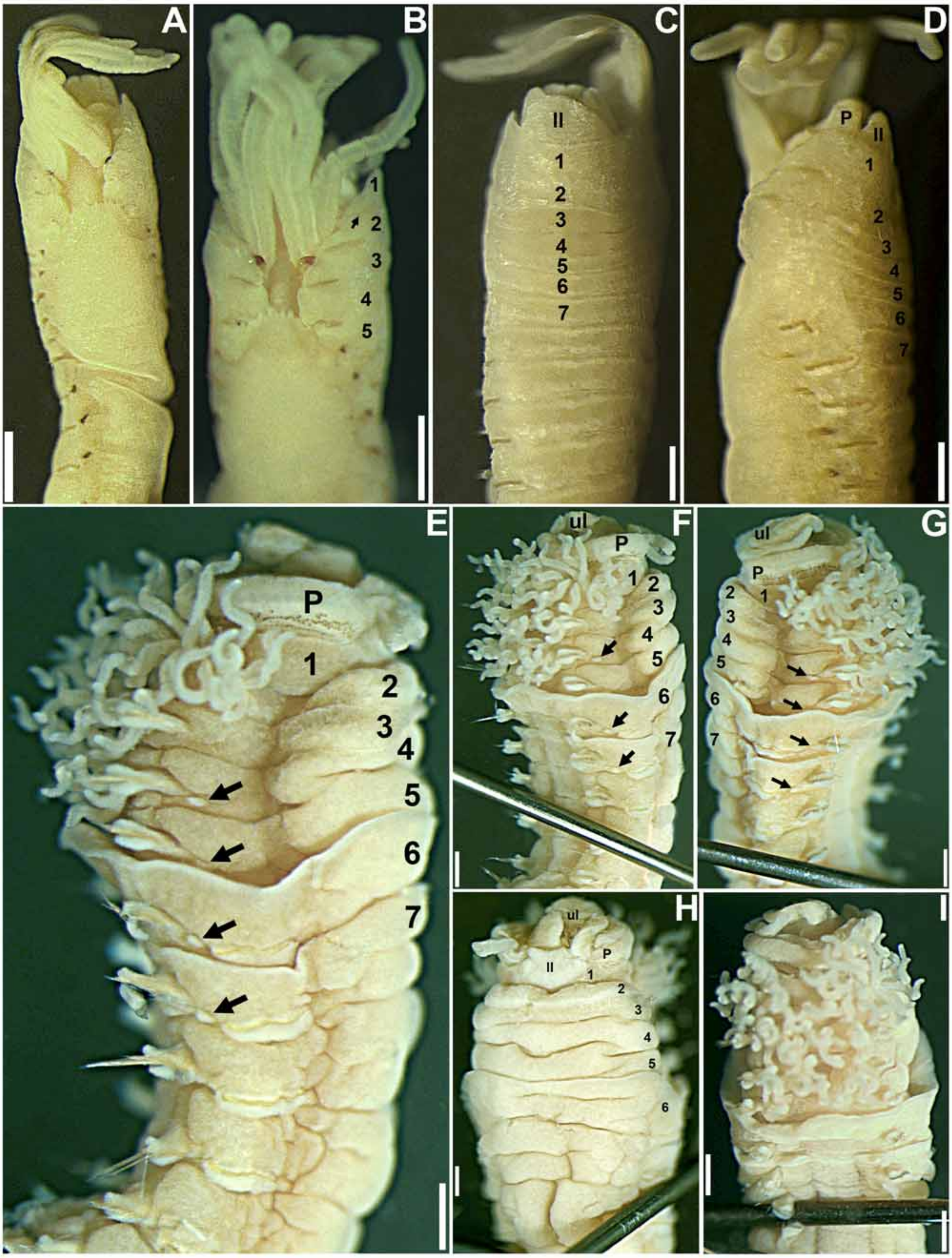

FIGURE 17. *Melinna elisabethae*: A, anterior end, dorsal view; B, close up view of anterior end, dorsal view; arrow points to first neuropodium; C, anterior end, ventral view; D, anterior end, right lateral view (A, C–D from AM W21793; B from AM W21792). *Pseudothelepus binara* (holotype, AM W22505): E, anterior end, right lateral view; F, anterior end, right dorso-lateral view; G, anterior end, left lateral view; H, anterior end, ventral view; I, anterior end, dorsal view. Numbers refer to segments; arrows point to nephridial and genital papillae; ll = lower lip; P = prostomium; ul = upper lip. Scale bars: A–B = 0.5 mm; C–D, H = 0.3 mm; E–G, I = 0.4 mm.

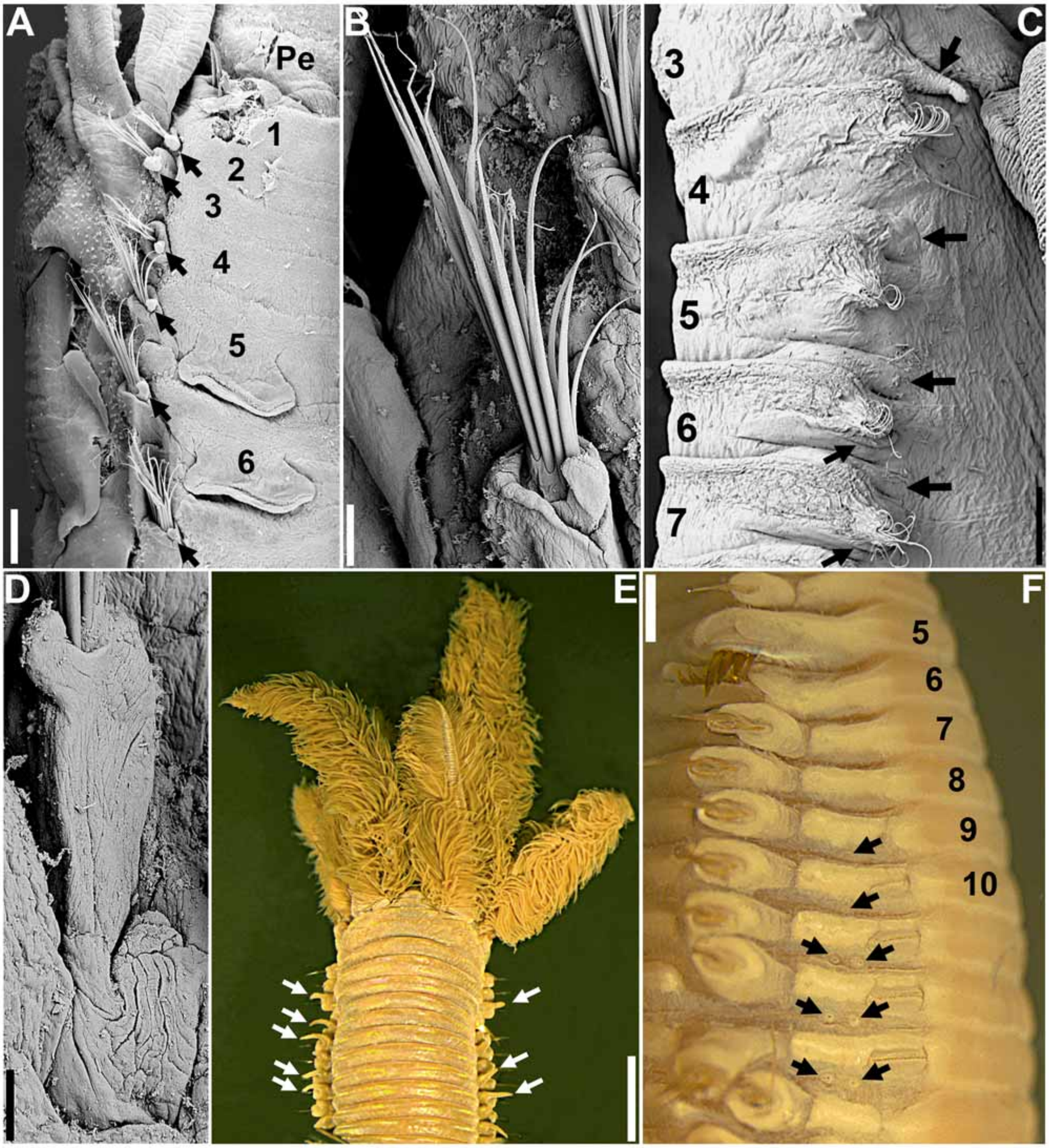

FIGURE 18. *Amphicteis dalmatica* (paratype, AM W8230): A, anterior end, right ventro-lateral view; arrows point to distal notopodial papillae; B, notopodium, segment 6; D, close up view of the notopodium from segment 6. *Terebellides anguicomus* (AM W34183): C, anterior segments, left lateral view; oblique arrows point to nephridial and genital papillae; horizontal arrows point to glandular swellings. *Paralvinella grasslei* (AM W29588): E, anterior end, dorsal view; arrows point to notopodial cirri. *Alvinella pompejana* (AM W29585): F: anterior segments, right lateral view; arrows point to papillae of unknown function. Numbers refer to segments; Pe = peristomium. Scale bars: A = 0.2 mm; B, D = 0.06 mm; C = 0.4 mm; E = 3 mm; F = 1 mm.

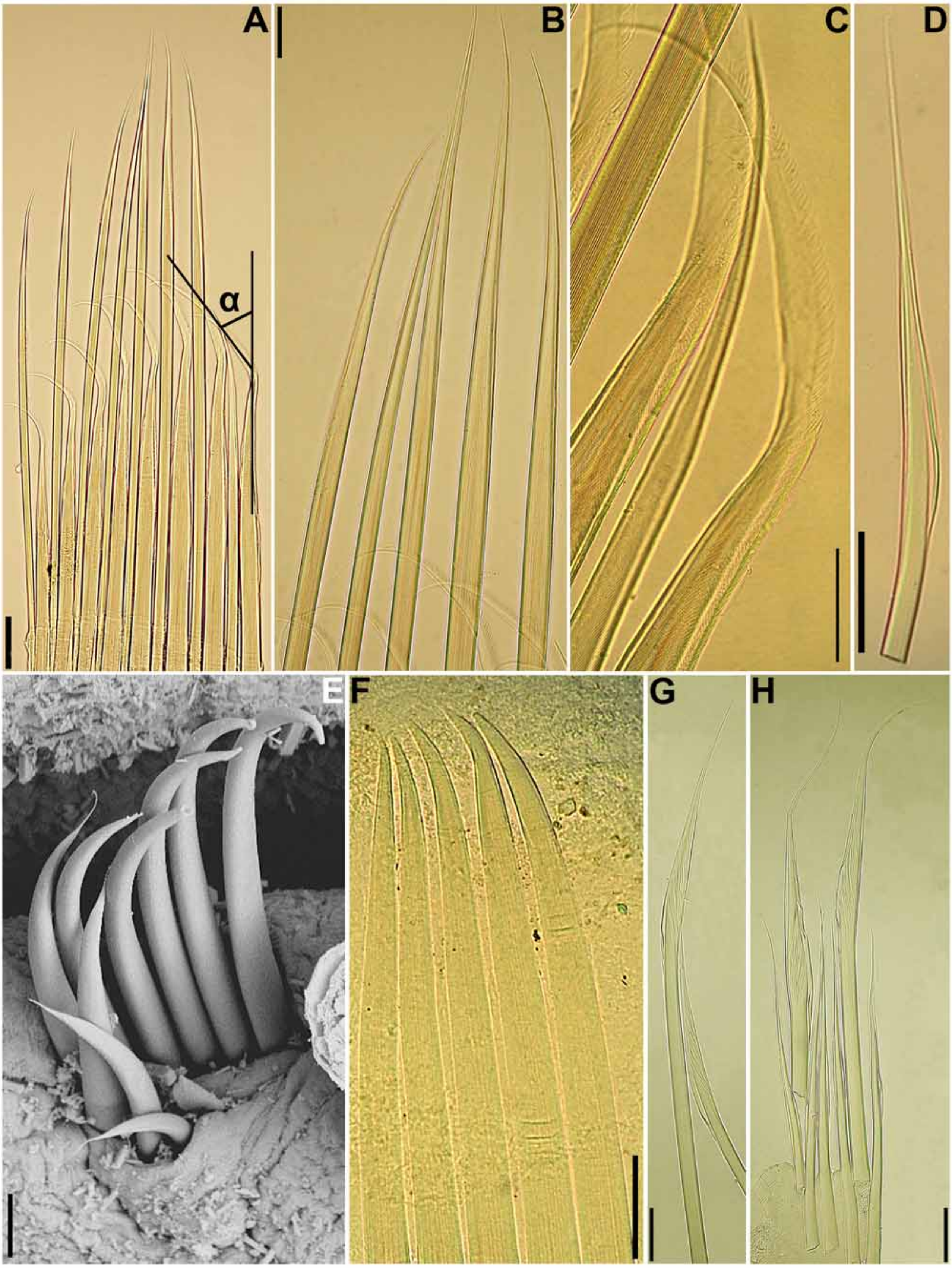

FIGURE 19. *Pectinaria dodeka* (AM W35293): A, notochaetae, segment 9; α = angle between shaft and blade; B, tips of notochaetae from posterior tier, segment 9; C, tip of notochaeta from anterior tier, segment 9. *Melinna elisabethae* (AM W21792): D, notochaetae from anterior tier, segment 13. *Amphicteis dalmatica* (paratype, AM W8230): E–F, paleae; G–H, notochaetae, segment 14. Scale bars: A = 110 µm; B–D, F = 50 µm; E = 30 µm; G–H = 70 µm.

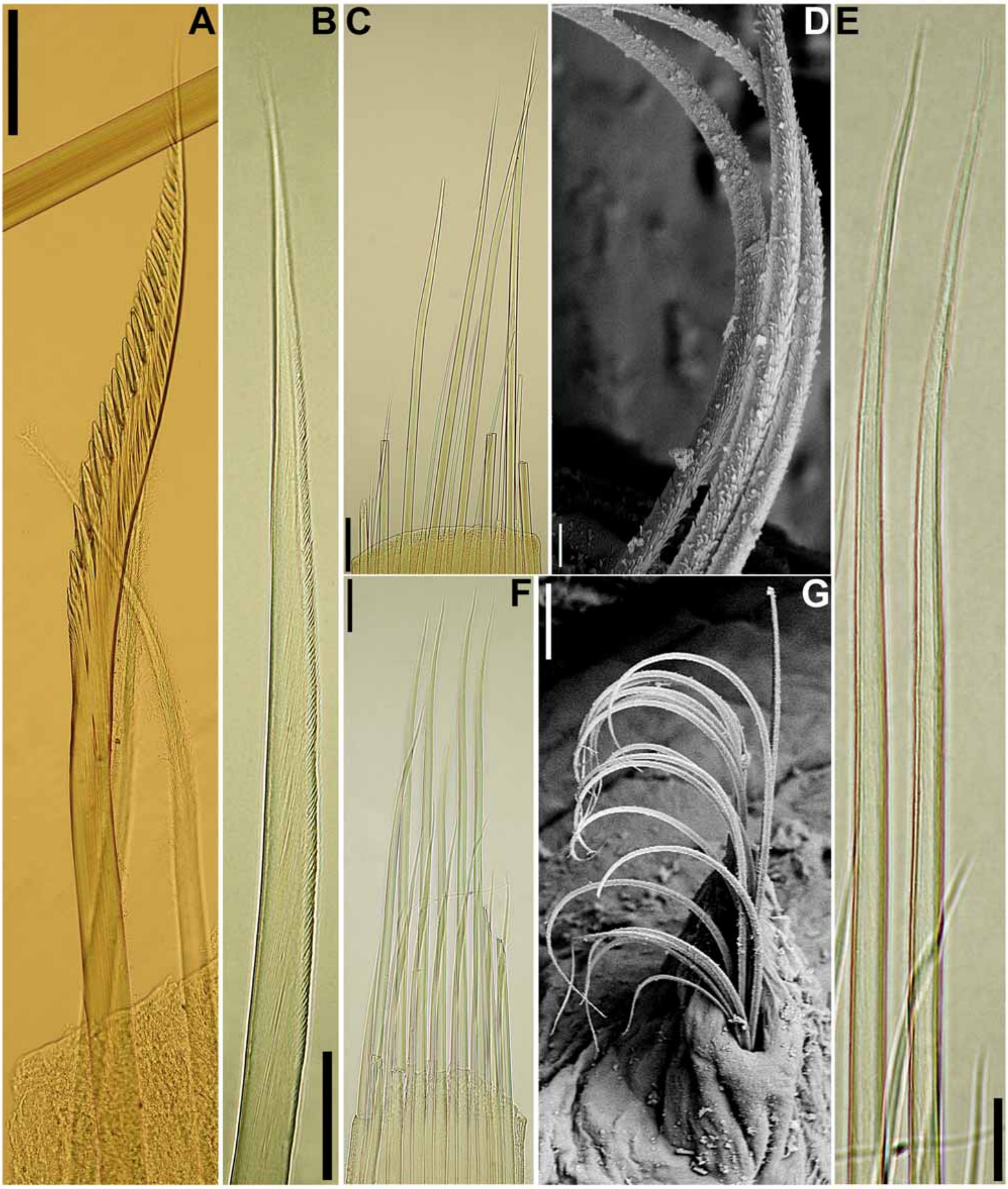

FIGURE 20. *Alvinella pompejana* (AM W29589): A, notochaetae, segment 20. *Paralvinella grasslei* (AM W29588): B, blade of notochaeta from posterior tier, segment 31; C, notochaetae, segment 58. *Terebellides anguicomus* (AM W34183): D, close up view of notochaetae from posterior tier, segment 4; G, general view of notochaetae from segment 4. *Trichobranchus dibranchiatus* (AM W23053): E, tips of notochaetae from posterior tier, segment 9; F, notochaetae, segment 9. Scale bars: A, C = 150 µm; B, F = 50 µm; D = 9 µm; E = 20 µm; G = 60 µm.

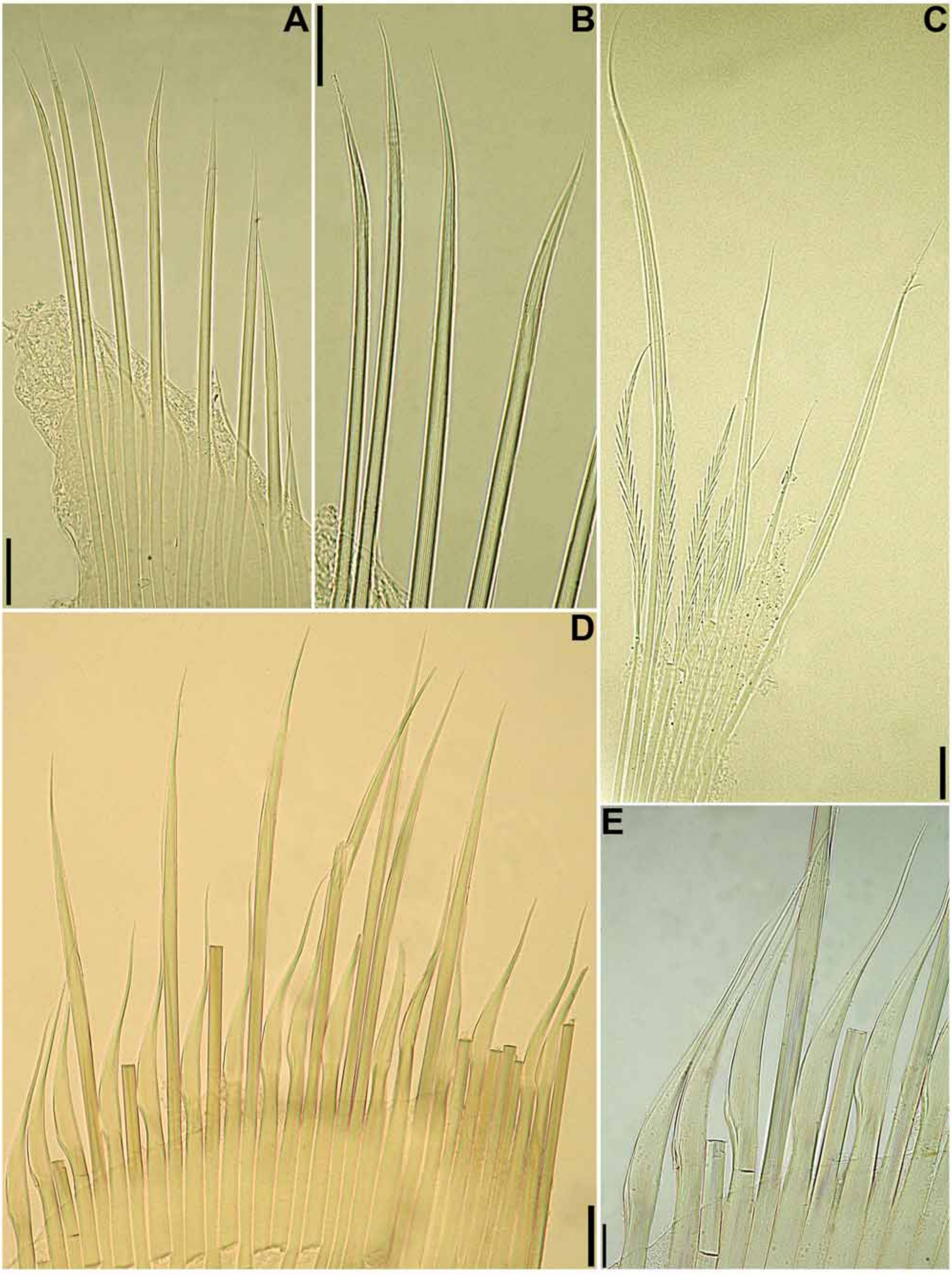

FIGURE 21. *Octobranchus myunus* (AM W29208): A, notochaetae, segment 14; B, tips of notochaetae from posterior tier, segment 14. *Polycirrus bicrinalis* (paratype, AM W199638): C, notochaetae, segment 13. *Pseudothelepus binara* (paratype, AM W22506): D, notochaetae, segment 27; E, notochaetae from anterior tier, segment 27. Scale bars: A = 40 µm; B, E = 30 µm; C = 20 µm; D = 70 µm.

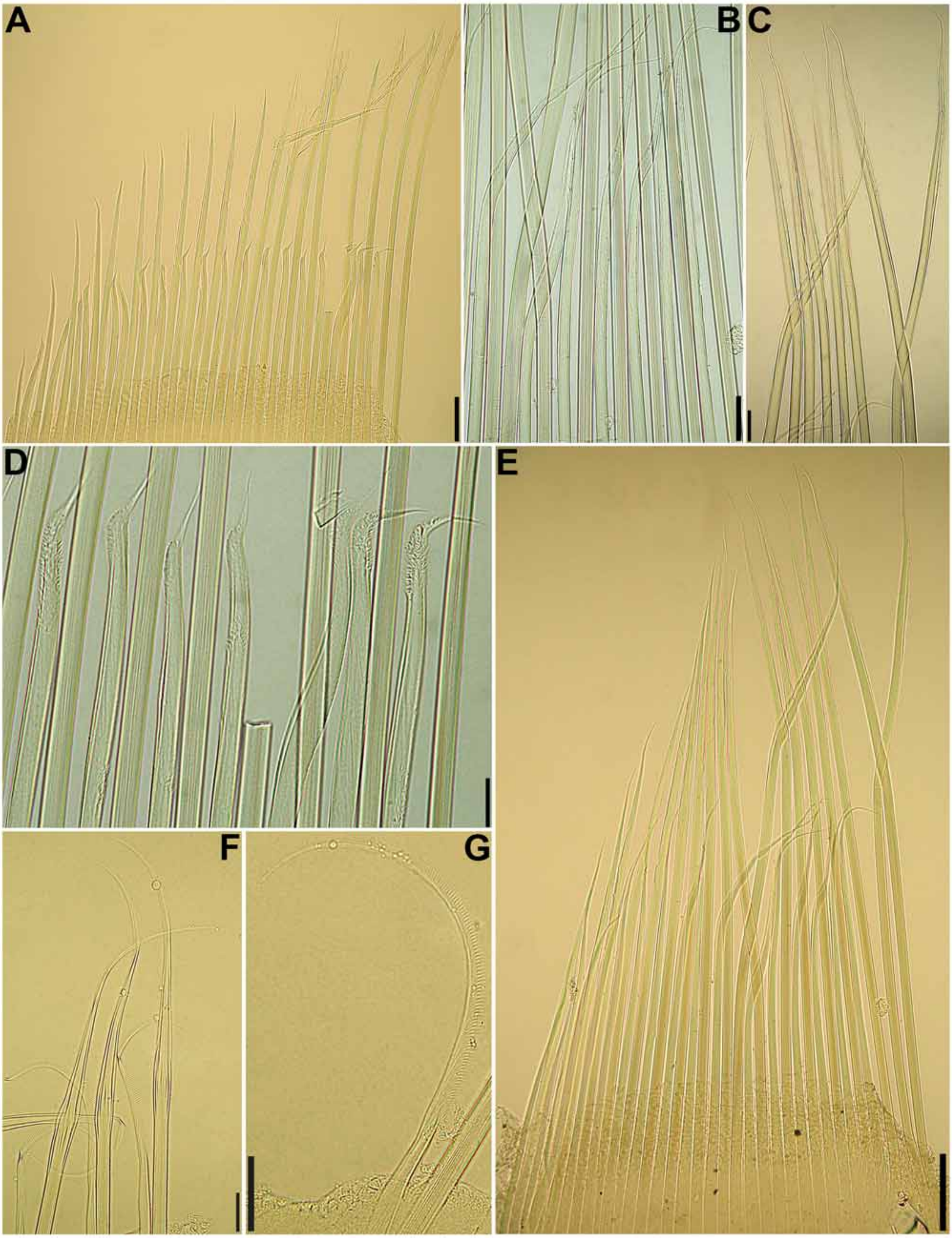

FIGURE 22. *Rhinothelepus lobatus* (holotype, AM W5234): A, notochaetae, segment 5; B, notochaetae from anterior tier, segment 13; C, tips of notochaetae from posterior tier, segment 13; D, notochaetae from anterior tier, segment 5; E, notochaetae, segment 13. *Euthelepus serratus* (paratype, AM W5443): F, notochaetae, segment 35; G, notochaeta from anterior tier, segment 35. Scale bars: A = 60 µm; B–C, F = 30 µm; D, G = 20 µm; E = 80 µm.

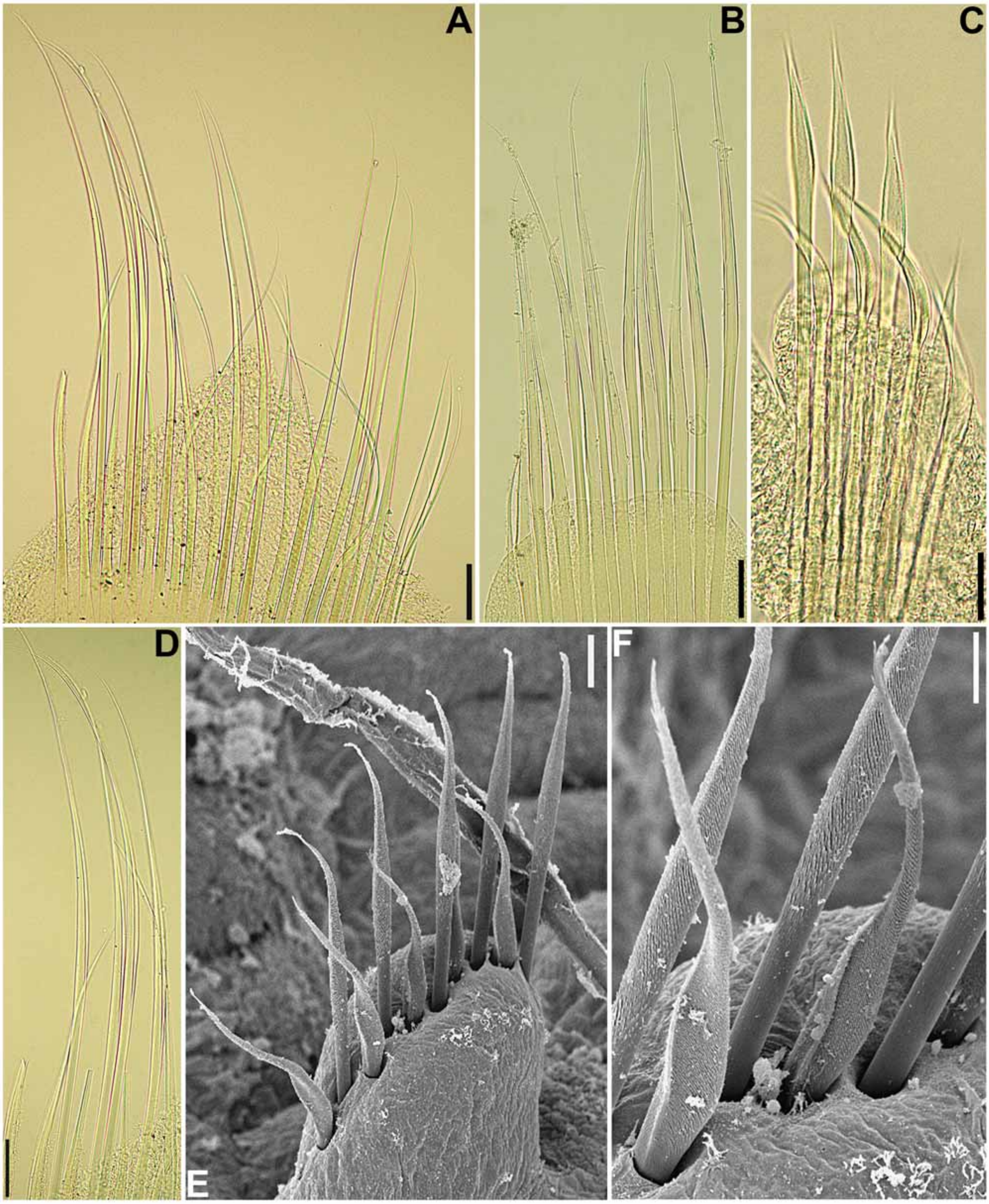

FIGURE 23. *Streblosoma acymatum* (AM W22478): A, notochaetae, segment 26; D, tips of notochaetae from segment 26. *Thelepus cincinnatus* (ZMUC-POL-2016): B, notochaetae, segment 40. *Streblosoma oligobranchiatum* (discarded spec.): C, notochaetae, segment 7; E; midbody parapodium; F, close up view of chaetae from anterior tier, midbody parapodium. Scale bars: A–B = 50 µm; C, E = 20 µm; D = 40 µm; F = 10 µm.

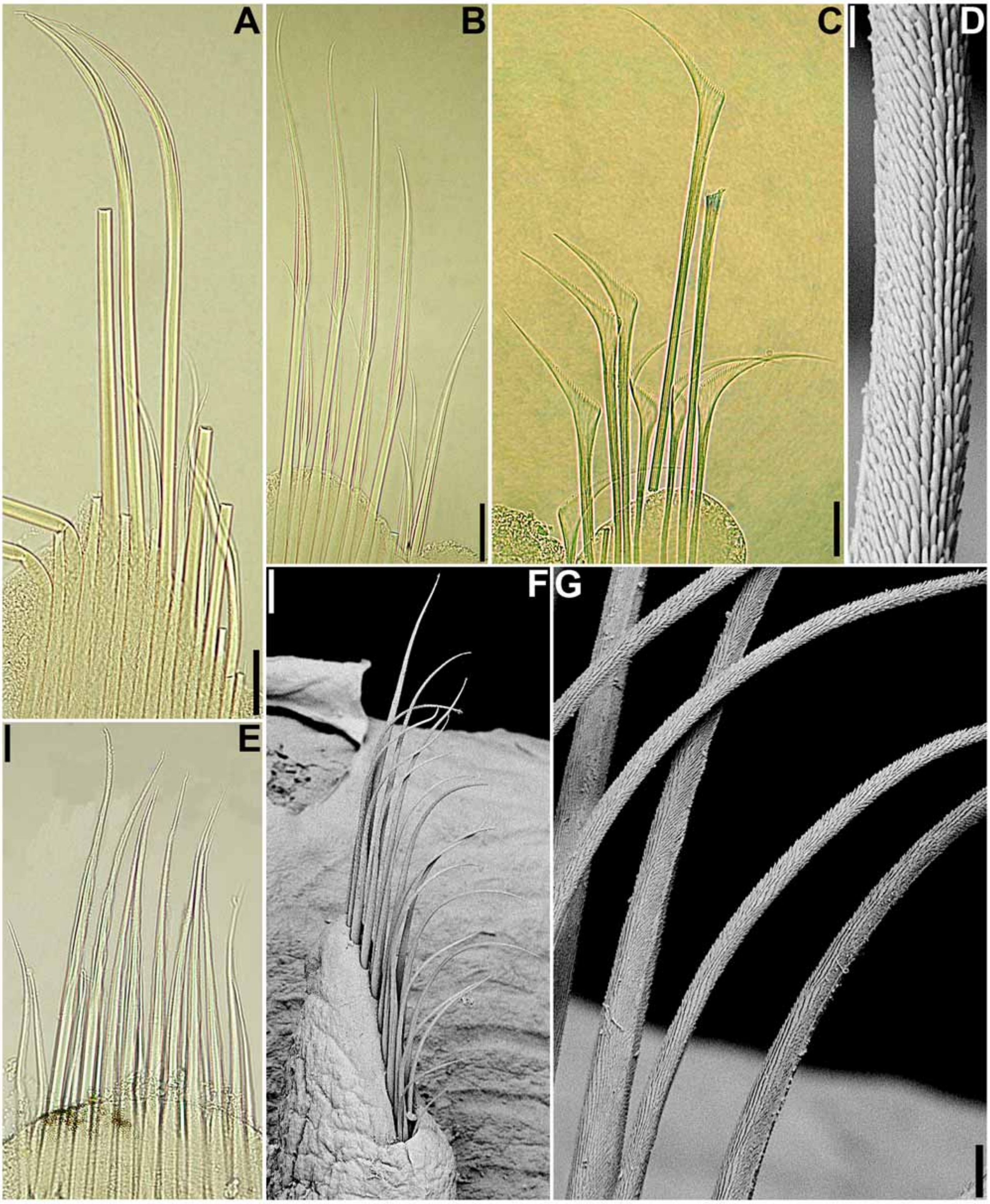

FIGURE 24. *Nicolea zostericola* (ZMUC-POL-1959): A, notochaetae, segment 15. *Hutchingsiella cowarrie* (AM W22542): B, notochaetae, segment 6; C, notochaetae, segment 17. *Eupolymnia koorangia* (AM W34753): D, close up view of limbation on chaeta from posterior tier of posterior region with biramous parapodia; F, notochaetae, segment 8; G, close up view of limbation on notochaetae from segment 8. *Eupolymnia nebulosa* (AM W35295): E, notochaetae, segment 7. Scale bars: A = 70 µm; B = 50 µm; C = 25 µm; D = 2 µm; E = 300 µm; F = 60 µm; G = 10 µm.

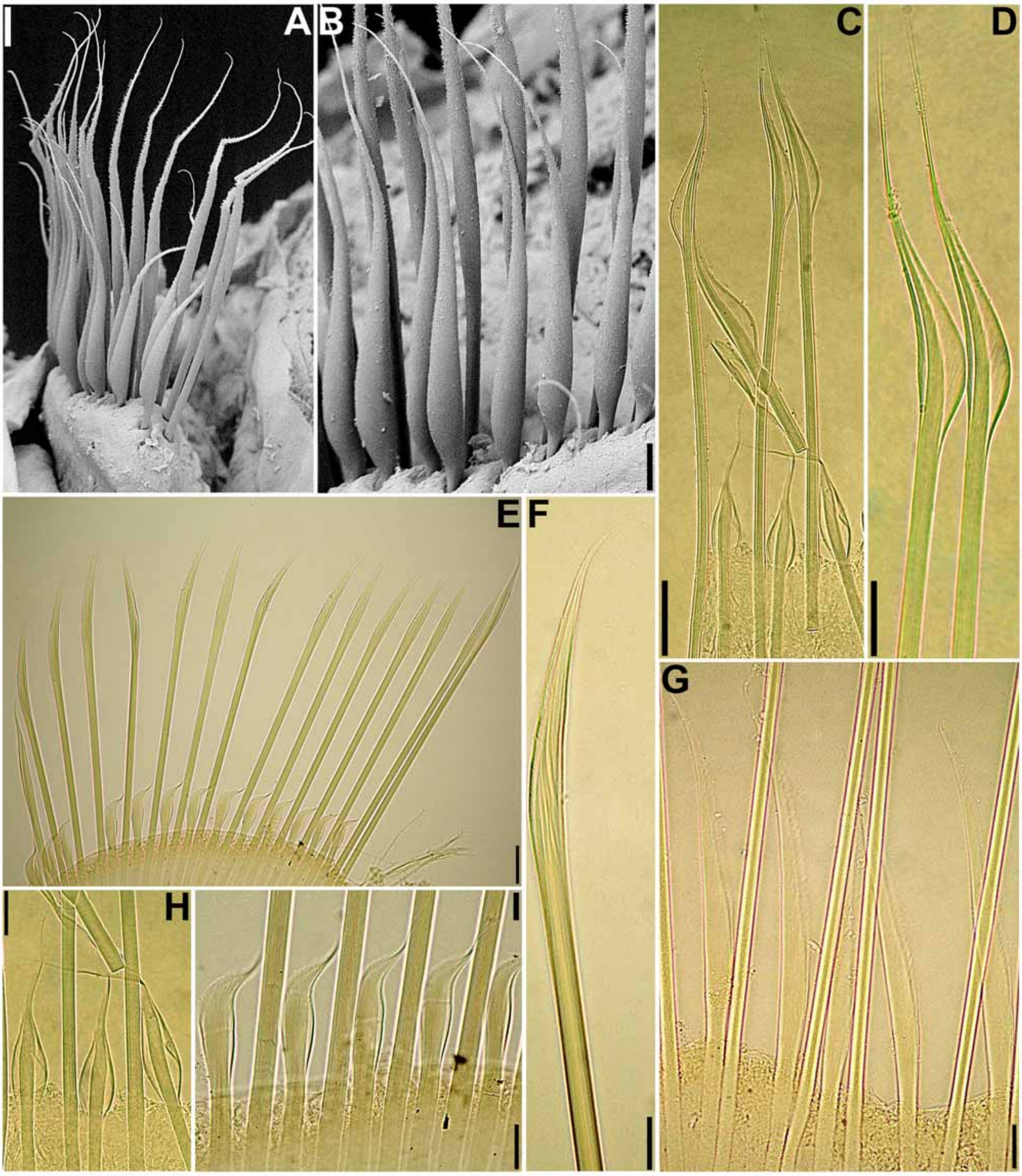

FIGURE 25. *Artacama proboscidea* (AM W34752): A, notochaetae, segment 6; B, close up view of notochaetae from anterior tier, segment 6. *Leaena ebranchiata* (ZMUC-POL-2046): C, notochaetae, segment 6; D, notochaetae from posterior tier, segment 6; H, notochaetae from anterior tier, segment 6. *Laphania boecki* (SMNH 72089): E, notochaetae, segment 7; F, close up view of one notochaeta from posterior tier, segment 7; G, notochaetae from anterior tier, segment 17; I, notochaetae from anterior tier, segment 7. Scale bars: A = 30 µm; B, D, F–I = 20 µm; C, E = 50 µm.

FIGURE 26. *Proclea malmgreni* (ZMUC-POL-2057): A, notochaetae, segment 5; B, notochaetae, segment 13; C, close view of two notochaetae from posterior tier, segment 5; D, close view of one notochaeta from posterior tier, segment 13. *Thelepides koehleri* (unreg., from Nonato private coll.): E, notochaetae, segment 9; F, notochaetae, segment 18; G, close up view of tip of notochaeta from anterior tier, segment 18. Scale bars: A, E = 20 µm; B–D, G = 10 µm; F = 33 µm.

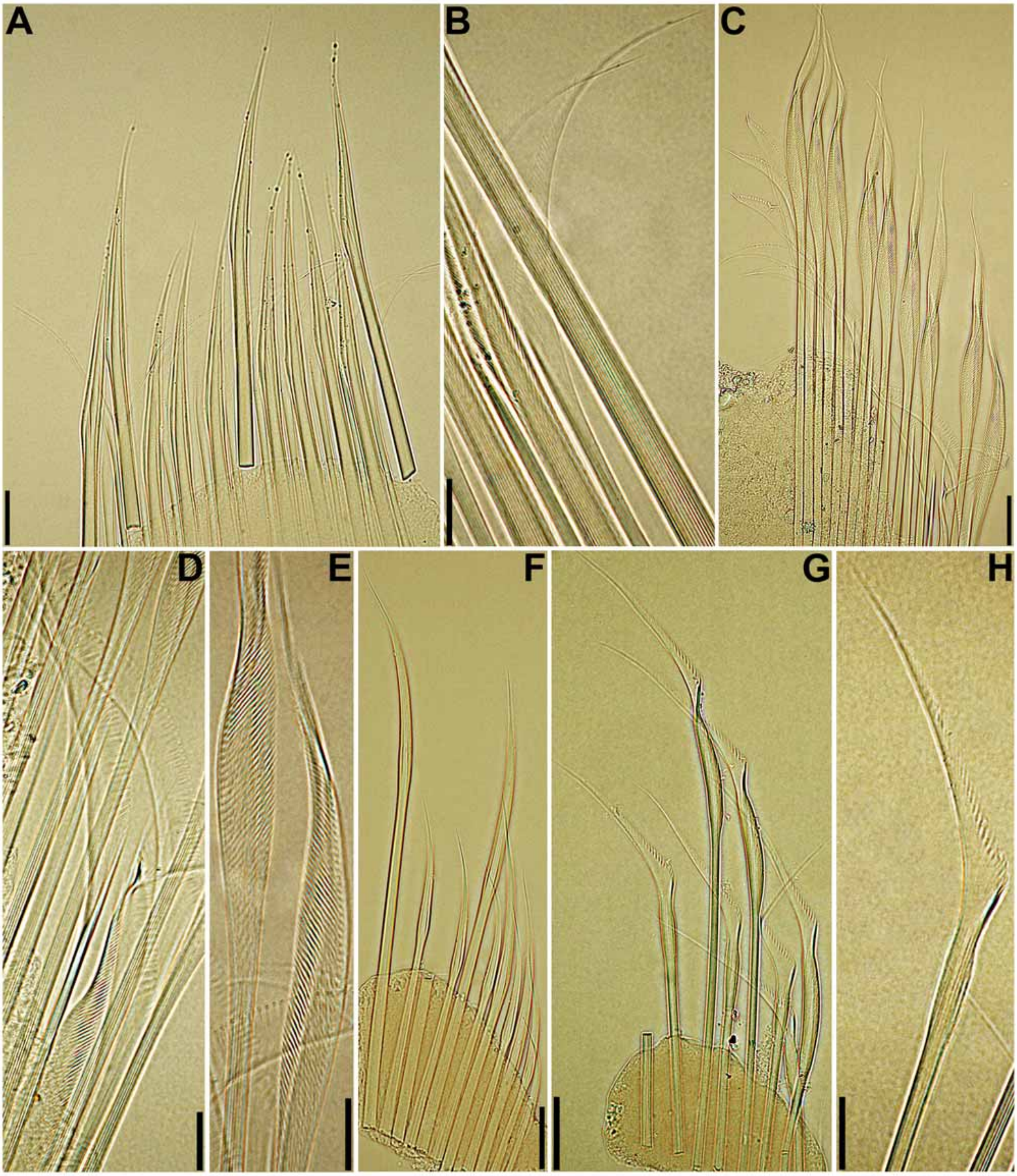

FIGURE 27. *Proclea* sp. 1 (LACM-AHF/021-BRA-02): A, notochaetae, segment 6; B, close up view of notochaeta from anterior tier, segment 6; C, notochaetae, segment 22; D, close up view of notochaetae from anterior tier, segment 22; E, close up view of part of blades of notochaetae from posterior tier, segment 22. *Spinosphaera oculata* (LACM unreg.): F, notochaetae, segment 7; G, notochaetae, segment 18; H, close up view of notochaeta from anterior tier, segment 18. Scale bars A, C, F–G = 30 µm; B, D–E, H = 15 µm.

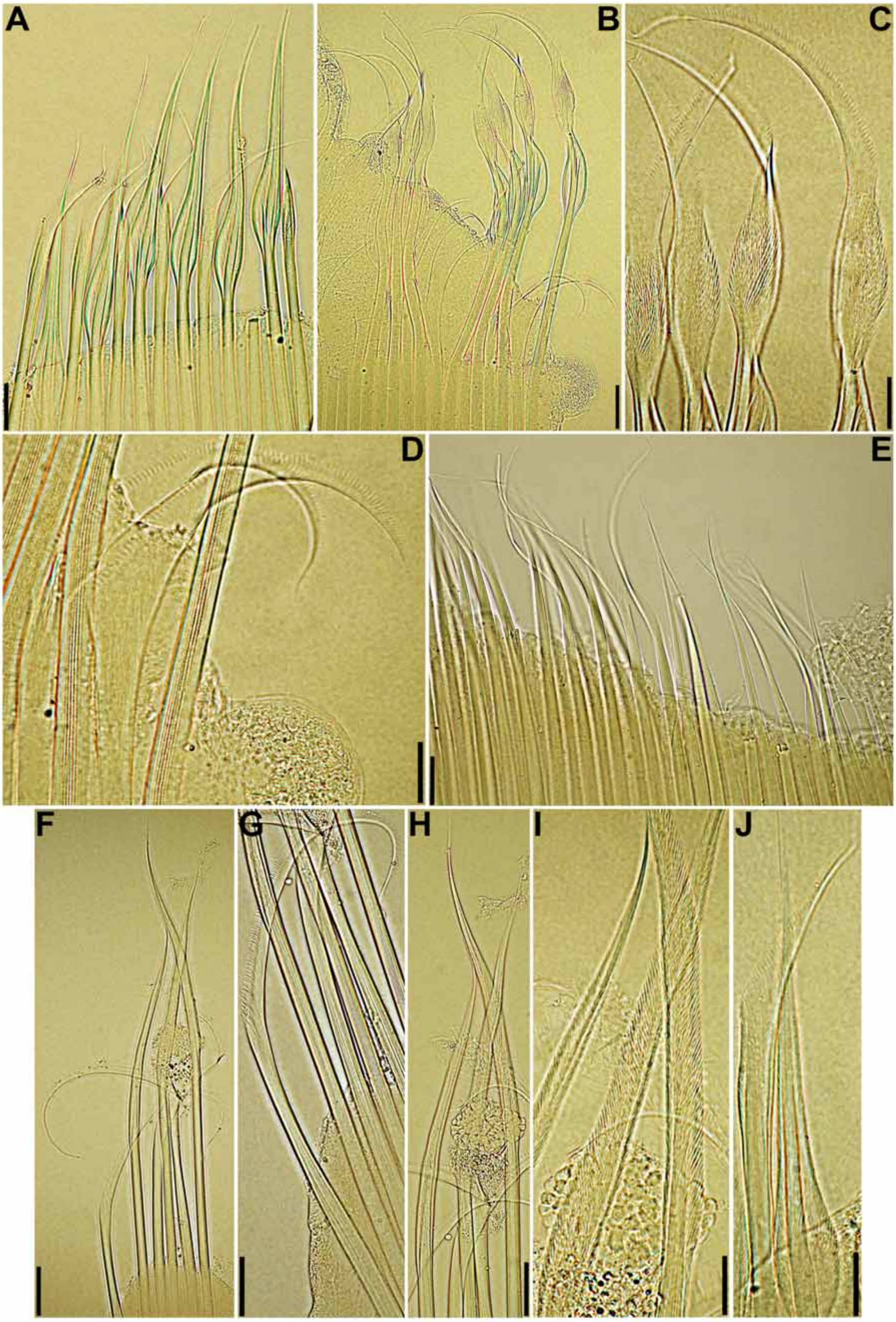

FIGURE 28. *Spinosphaera harrisae* (holotype, LACM-AHF Poly 2114): A, notochaetae, segment 7; B, notochaetae, segment 22; C, close up view of blades of notochaetae from posterior tier, segment 22; D, close up view of notochaetae from anterior tier, segment 22; J, close up view of notochaeta from anterior tier and another from posterior tier, segment 7. *Proclea glabrolimbata* (LACM Elt. 426): E, notochaetae, segment 7; F, notochaetae, segment 18; G, close up view of notochaeta from anterior tier, segment 18; H, close up view of notochaetae from posterior tier, segment 18; I, close up view of part of blades of notochaetae from posterior tier, segment 18. Scale bars: A = 20 µm; B, E, G–H = 30 µm; C–D, I–J = 15 µm; F = 40 µm.

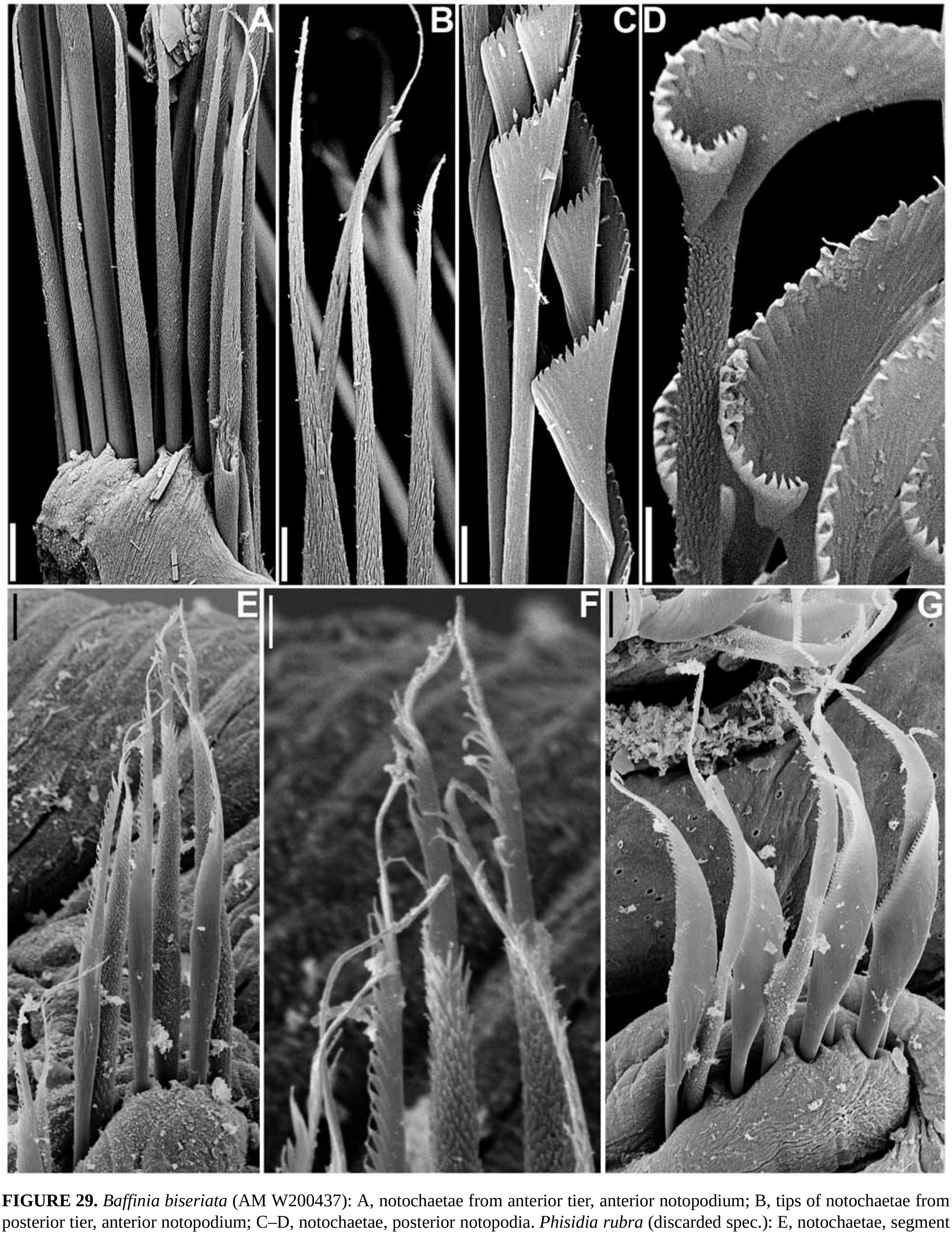

FIGURE 29. *Baffinia biseriata* (AM W200437): A, notochaetae from anterior tier, anterior notopodium; B, tips of notochaetae from posterior tier, anterior notopodium; C–D, notochaetae, posterior notopodia. *Phisidia rubra* (discarded spec.): E, notochaetae, segment 6; F, close up view of tips of notochaetae from posterior tier, segment 6; G, notochaetae, segment 15. Scale bars: A = 12 µm; B = 8 µm; C, G = 6 µm; D = 4 µm; E = 5 µm; F = 2 µm.

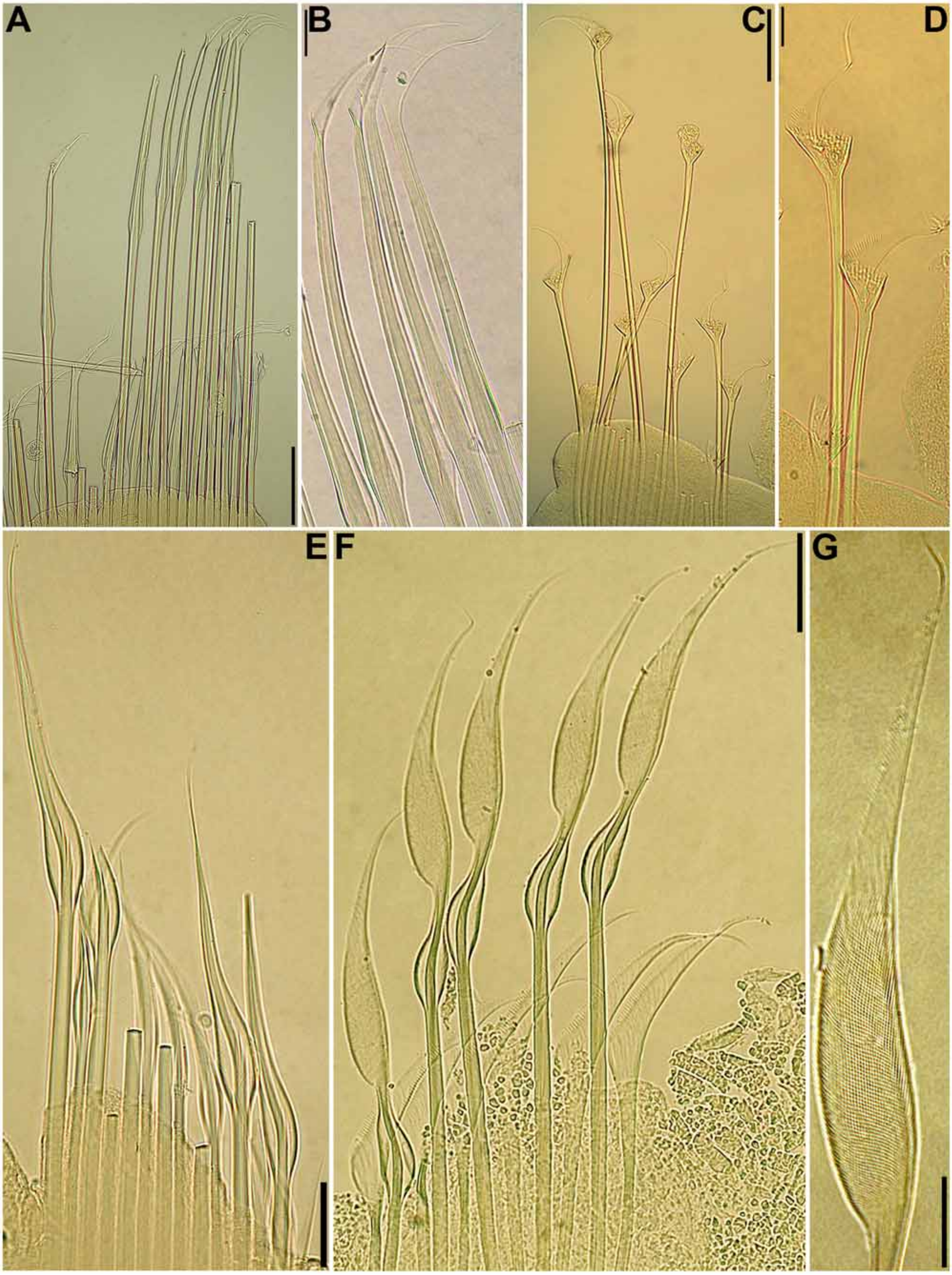

FIGURE 30. *Terebella lapidaria* (BMNH 1928.4.26.330-32): A, notochaetae, segment 17; B, close up view of tips of notochaetae from posterior tier, segment 17; C, notochaetae, segment 46; D, close up view of tips of notochaetae from anterior and posterior tiers, segment 46. *Spinosphaera barega* (holotype, AM W30726): E, notochaetae, segment 6; F, notochaetae, segment 20; G, close up view of tip of notochaeta from posterior tier, segment 20. Scale bars: A = 100 µm; B, D = 25 µm; C = 100 µm; E = 30 µm; F = 50 µm; G = 20 µm.

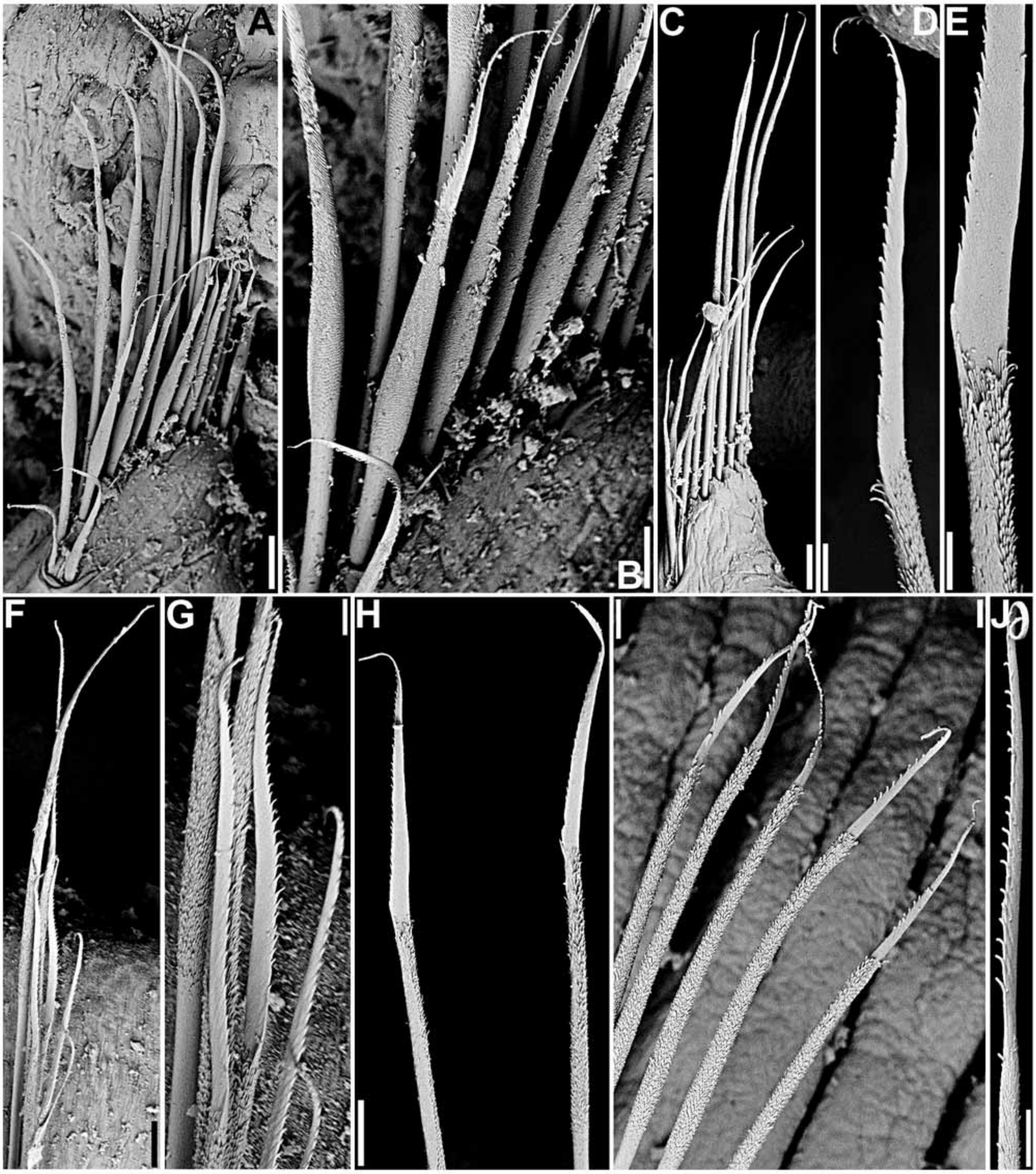

FIGURE 31. *Longicarpus modestus* (AM W34755): A, notochaetae, segment 7; B, notochaetae from anterior tier, segment 7. *Terebella pappus* (AM W34757): C, notochaetae, segment 9; D, tip of notochaeta from posterior tier, segment 9; E, transition between limbation and blade of notochaeta from posterior tier, posterior notopodium; F, tips of notochaetae from anterior tier, posterior notopodium; G, tips of notochaetae from anterior tier, posterior notopodium; H, tips of notochaetae from posterior tier, posterior notopodium. *Terebella tantabiddycreekensis* (AM W34758): I, tips of notochaetae from posterior tier, segment 9; J, tip of notochaeta from anterior tier, posterior notopodium. Scale bars: A, C = 40 µm; B, F, H = 20 µm; D–E, G = 6 µm; I = 10 µm; J = 5 µm.

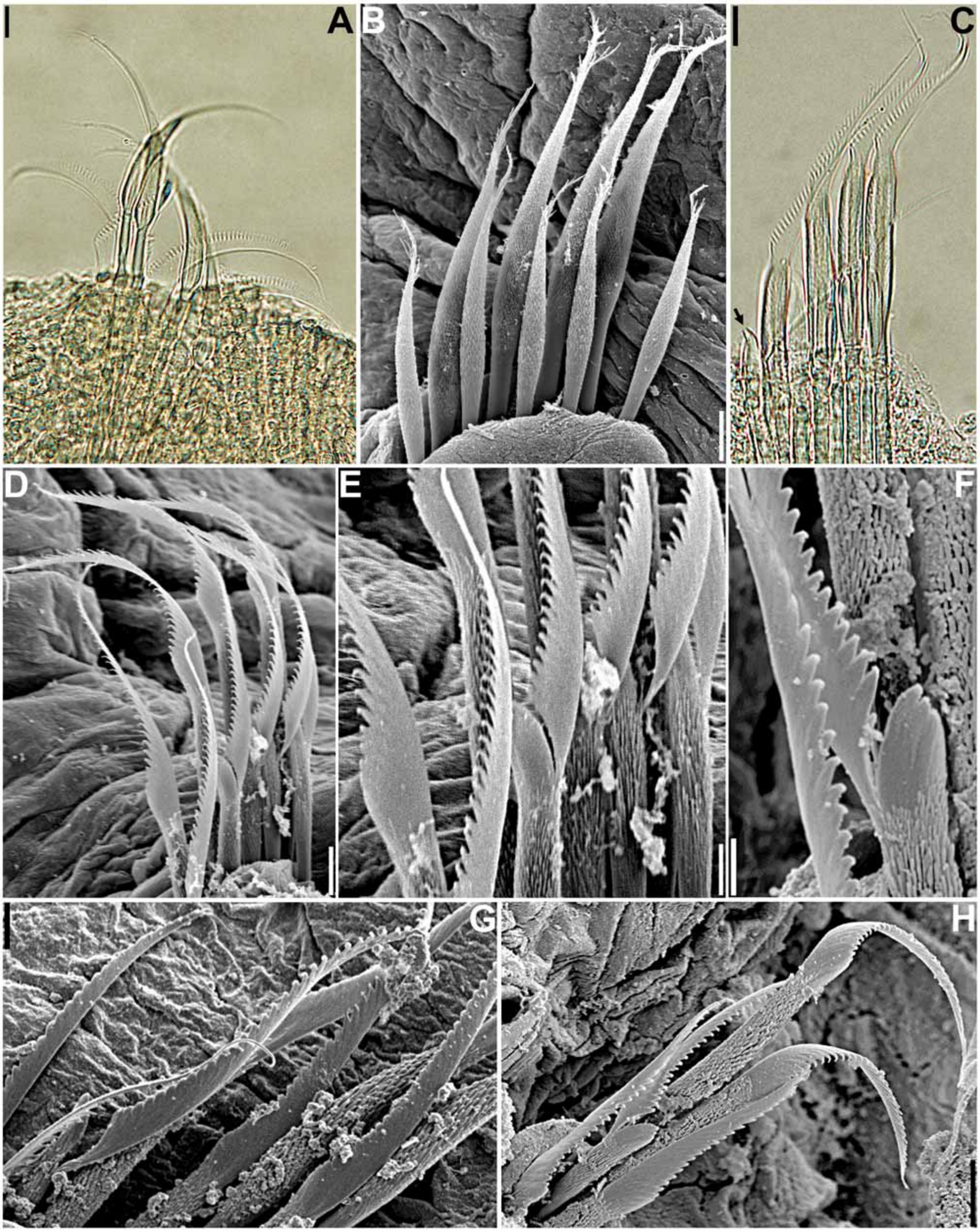

FIGURE 32. *Morgana bisetosa* (MZUSP 00616): A, notochaetae, posterior notopodium. *Articulatia aberrans*: B, notochaetae, segment 6; C, notochaetae, posterior notopodium; arrows point to deep cut; D, notochaetae, segment 11; E, close up view of notochaetae from segment 11, showing deep-cut on chaetae on anterior tier; F, detail of deep-cut of one chaeta from segment 13; G, notochaetae, segment 12; H, notochaetae, segment 13 (C from unreg. spec.; B, D–H from three discarded specs.). Scale bars: A–E, H = 10 µm; F = 3 µm; G = 5 µm.

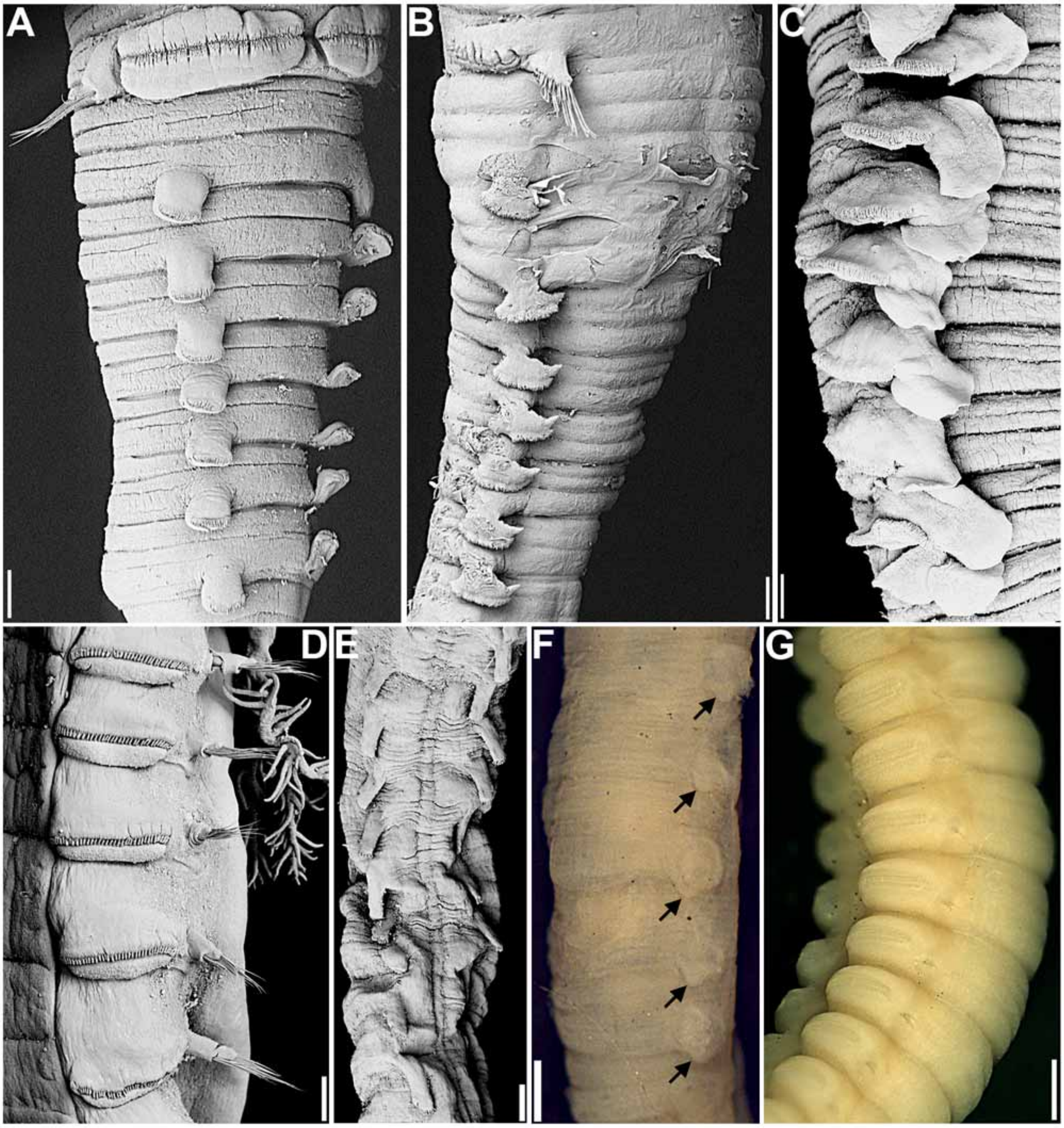

FIGURE 33. *Loimia ingens* (NTM W6764): A, last chaetiger from region with biramous parapodia and first chaetigers from region after notopodia terminate, right ventro-lateral view. *Artacama proboscidea* (AM W34752): B, last chaetiger from region with biramous parapodia and first chaetigers from region after notopodia terminate, left dorso-lateral view. *Artacama benedeni* (AM W34749): C, neuropodia from region after notopodia terminate, left dorso-lateral view. *Amphitrite lobocephala* (paratype, AM W20888): D, chaetigers from anterior region with biramous parapodia, left ventro-lateral view; E, chaetigers from region after notopodia terminate, ventral view. *Nicolea simplex* (syntype, YPM 162): F, parapodia from region after notopodia terminate, right dorso-lateral view; arrows point to dorsal neuropodial papillae. *Terebella* cf. *verrilli* (YPM 40571): G, posterior parapodia, left dorso-lateral view. Scale bars: A = 0.4 mm; B, F = 0.3 mm; C–E = 0.2 mm; G = 1 mm.

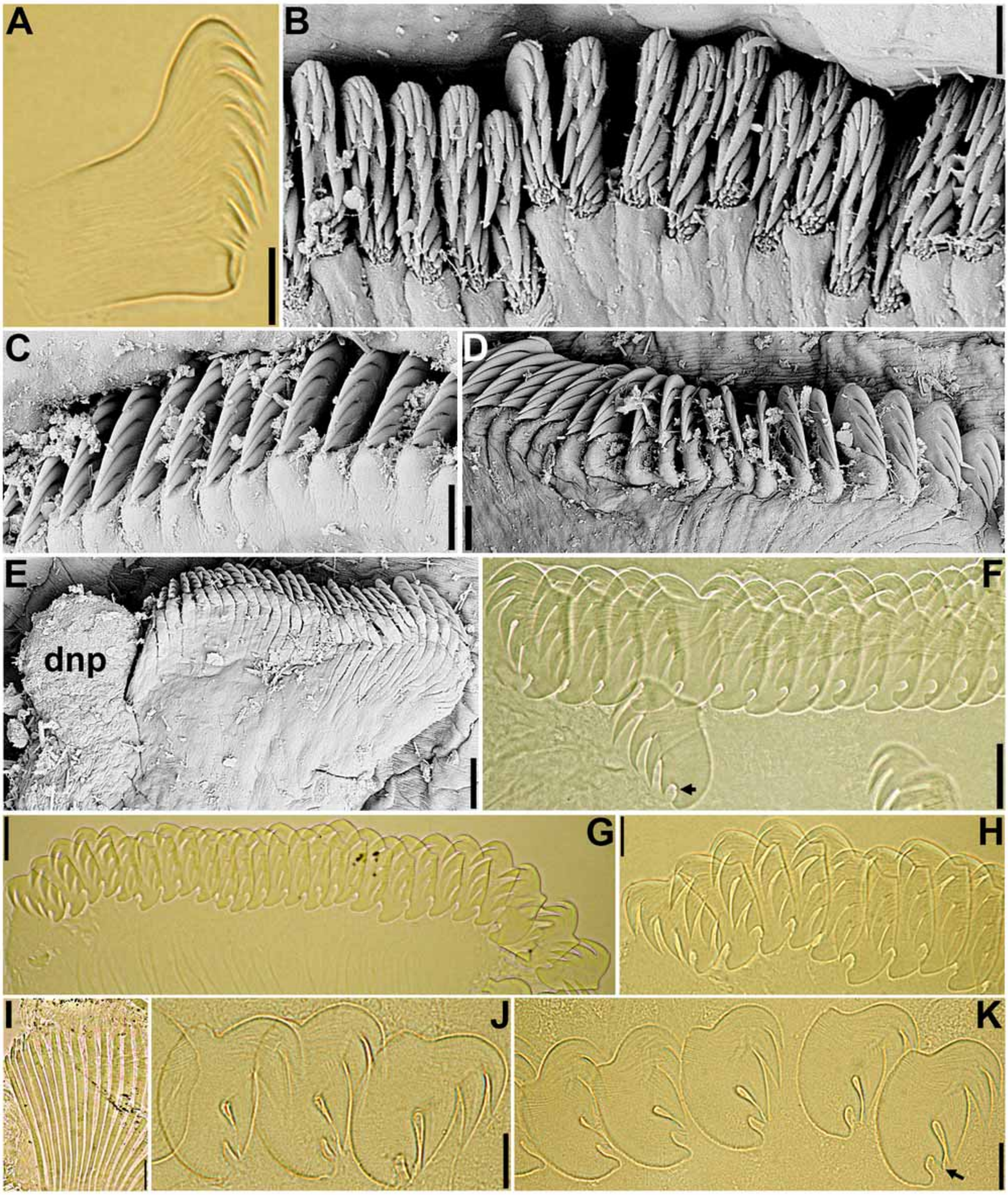

FIGURE 34. *Pectinaria dodeka*: A, uncinus, segment 9; B, uncini, segment 8 (A from AM W35293; B from AM W34182). *Amphicteis dalmatica* (paratype, AM W8230): C, uncini, segment 8; D, uncini from region after notopodia terminate; E, neuropodium from region after notopodia terminate; dnp = dorsal neuropodial papilla; F, uncini, segment 14; arrow points to nearly inconspicuous dorsal button; G–H, uncini from region after notopodia terminate. *Melinna elisabethae* (AM W21792): I, neuropodial spines, segment 4; J, uncini, segment 18; K, uncini from region after notopodia terminate; arrow points to dorsal button. Scale bars: A, D, H, J–K = 10 µm; B–C = 9 µm; E = 200 µm; F–G, I = 20 µm.

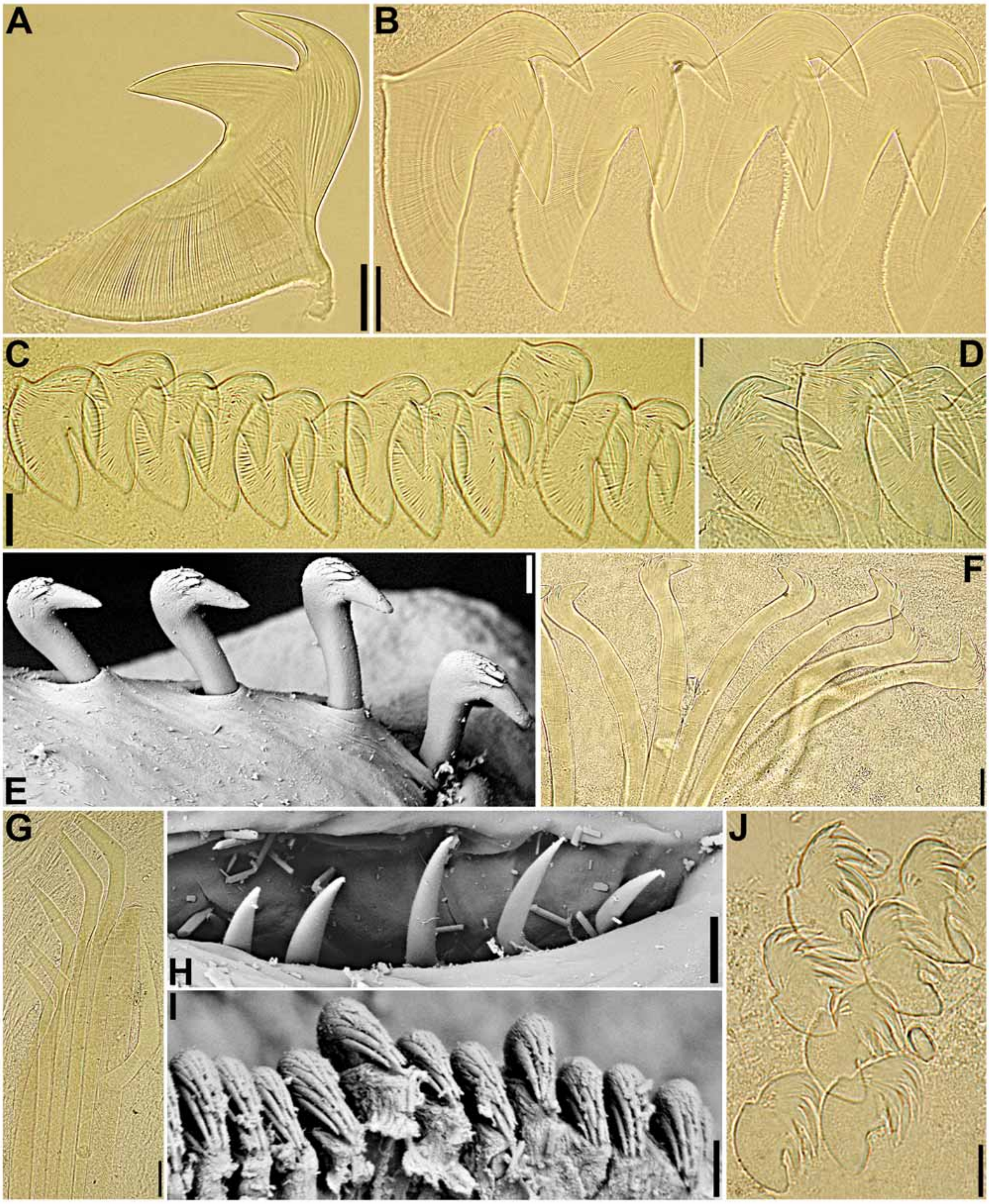

FIGURE 35. *Alvinella pompejana* (AM W29589): A, uncinus, segment 11; B, uncini, segment 49. *Paralvinella grasslei* (AM W29588): C, uncini, segment 15; D, uncini, segment 93. *Terebellides anguicomus*: E, uncini from region with biramous parapodia; F, uncini from region with biramous parapodia, segment 11; G–H, neuropodial spines, segment 8; I–J, uncini from region after notopodia terminate (E, H–I from AM W34183; F, G, J from MCEM-BPO 327). Scale bars: A, C, F = 20 µm; B, D, H = 30 µm; E, J = 10 µm; G = 50 µm; I = 6 µm.

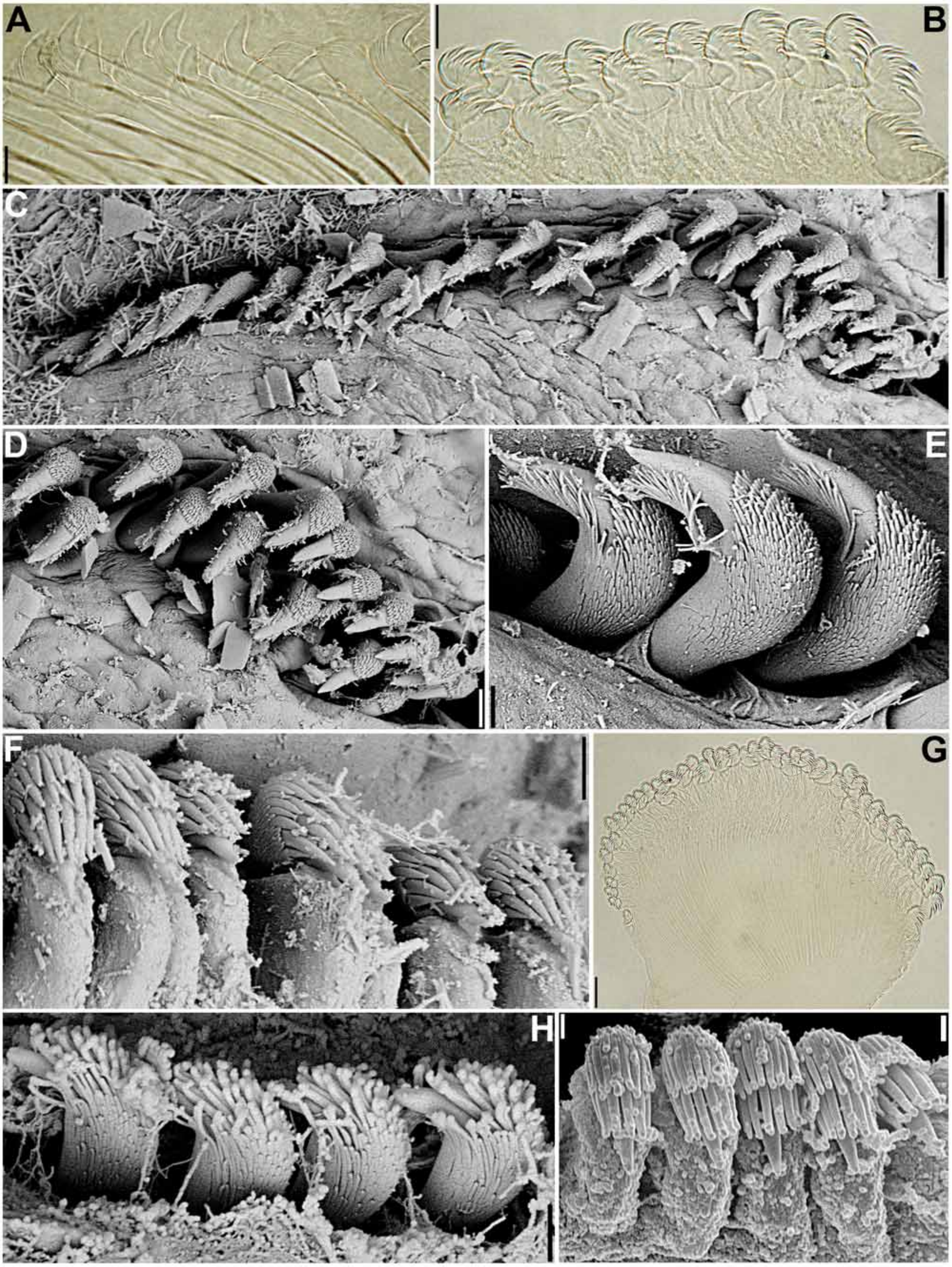

FIGURE 36. *Trichobranchus bunnabus*: A, uncini, segment 9; B, uncini from region after notopodia terminate; C, uncini, segment 17; D, detail of uncini from segment 27; E, close up view of uncini from segment 20; F, uncini from region after notopodia terminate; G, neuropodium from region after notopodia terminate (A–B, G from AM W35294; C–F from AM W24230). *Trichobranchus dibranchiatus* (AM W24136): H, uncini, segment 19; I, close up view of uncini from region after notopodia terminate. Scale bars: A–B = 10 µm; C, G = 20 µm; D–E = 3 µm; F = 4 µm; H = 2 µm; I = 1 µm.

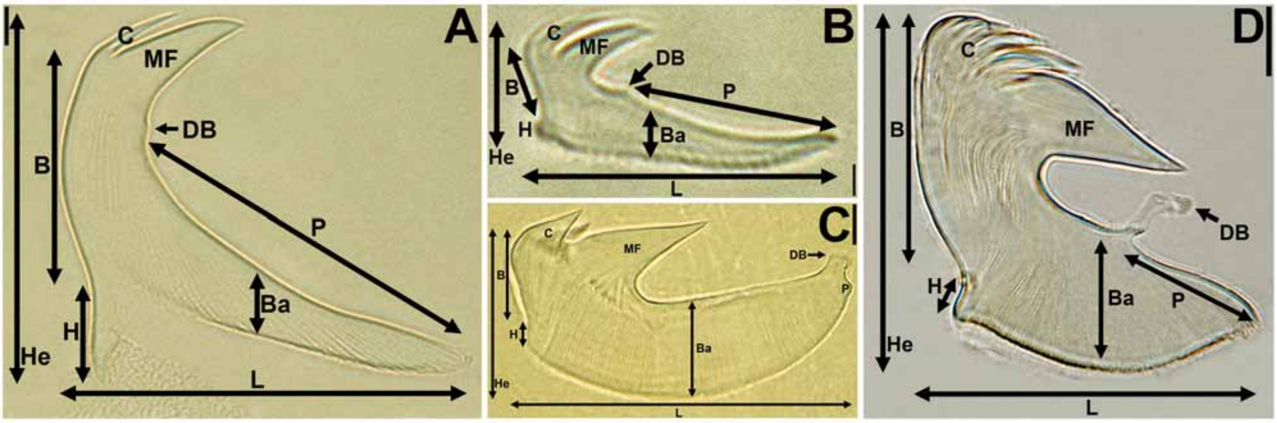

FIGURE 37. Uncinial parts. *Polycirrus glaucus* (paratype, AM W20966): A, uncinus from region after notopodia terminate. *Polycirrus variabilis* (paratype, AM W199540): B, uncinus from region after notopodia terminate. *Streblosoma bingarra* (holotype, AM W30721): C, uncinus, segment 6. *Amphitrite affinis* (ZMUC-POL-2018): D, uncinus from the region after notopodia terminate. B = back; Ba = base; C = crest; DB = dorsal button; H = heel; He = height; L = length; MF = main fang; P = prow. Scale bars: A = 5 µm; B = 2 µm; C–D = 10 µm.

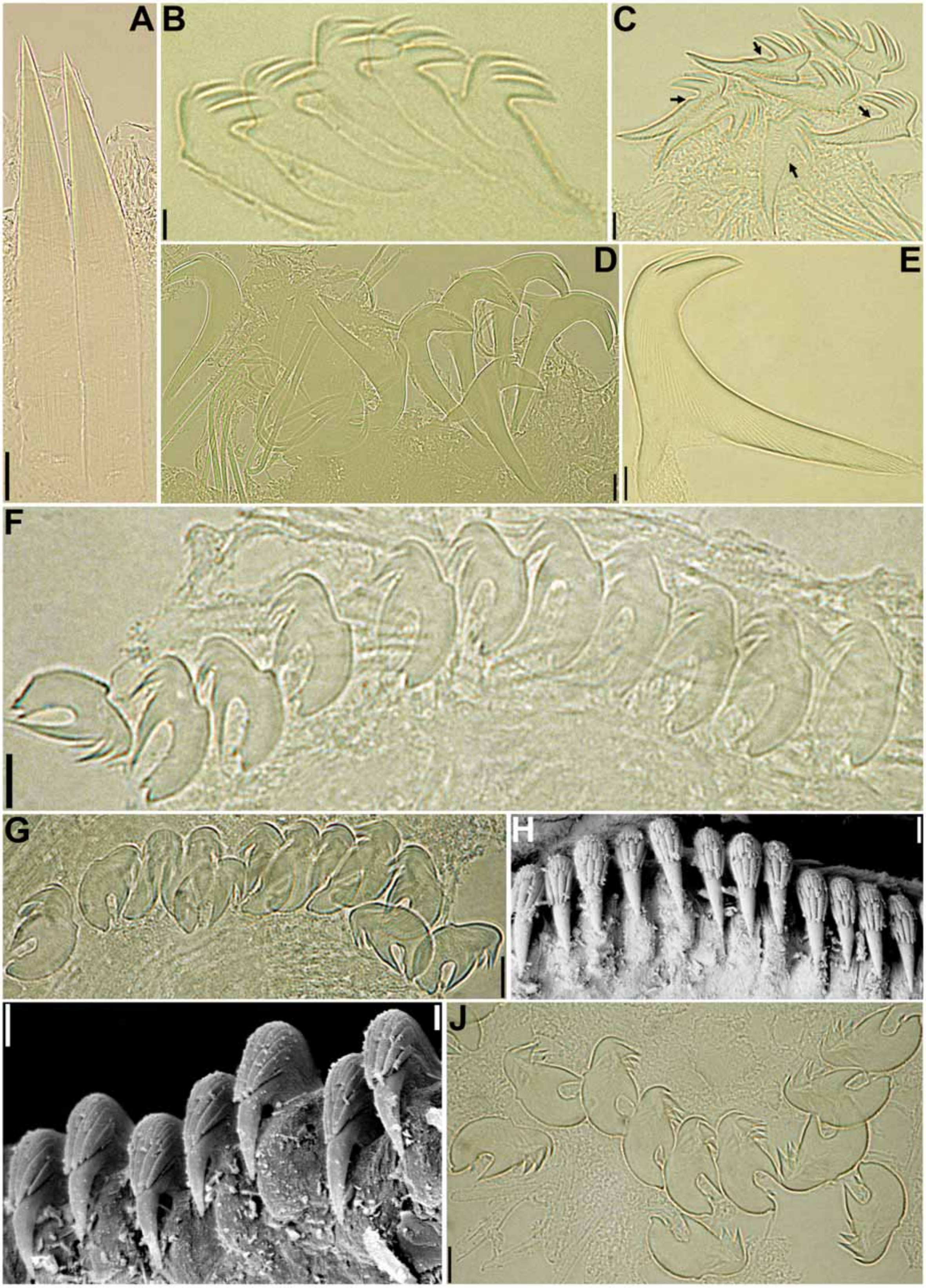

FIGURE 38. *Amaeana apheles* (AM W29203): A, neurochaetae from region after notopodia terminate. *Polycirrus bicrinalis*: B–C, uncini from region after notopodia terminate (B from holotype, AM W199637; C from paratype, AM W199638). *Polycirrus disjunctus* (paratype, AM W199633): D–E, uncini from region after notopodia terminate. *Decathelepus ocellatus* (holotype, AM W6782): F, uncini, segment 18. *Glossothelepus mexicanus* (paratype, AM W199659): G, uncini from posterior region with biramous parapodia; J, uncini, segment 8. *Rhinothelepus occabus* (paratype, AM W201904): H, uncini from anterior region after notopodia terminate; I, uncini, segment 12. Scale bars: A = 20 µm; B, H–I = 3 µm; C = 5 µm; D = 10 µm; E = 7 µm; F = 6 µm; G, J = 8 µm.

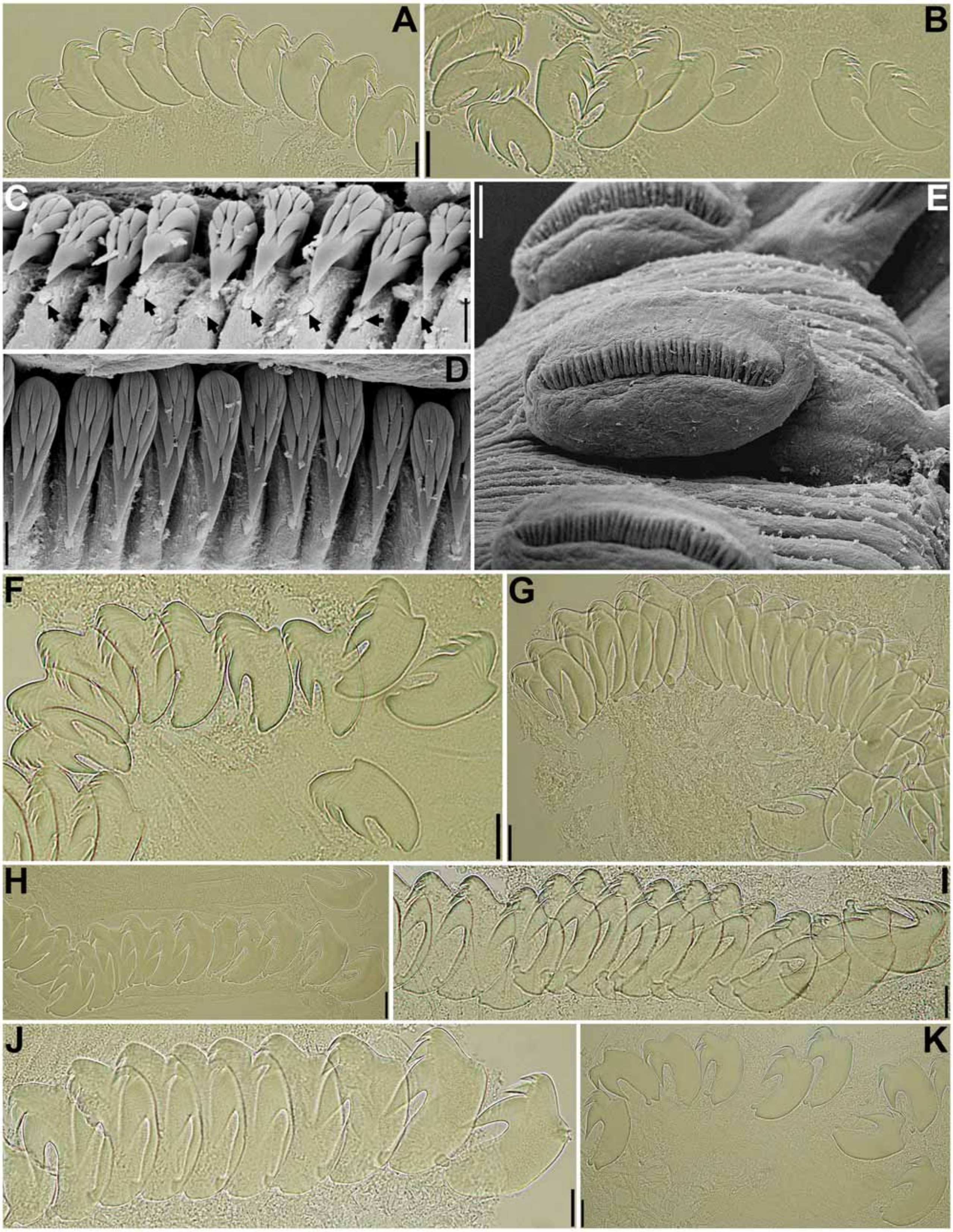

FIGURE 39. *Pseudostreblosoma brevitentaculatum*: A, uncini, segment 7; B–D, uncini from posterior region with biramous parapodia; arrows point to dorsal buttons; E, neuropodia from posterior region with biramous parapodia (A–B from paratype, AM W29696; C–E from discarded spec.). *Pseudostreblosoma serratum* (holotype, AM W18949): F, uncini, segment 14. *Pseudothelepus binara* (paratype, AM W22506): G, uncini, segment 27; H, uncini, segment 7. *Thelepus cincinnatus* (ZMUC-POL-2016): I, uncini, segment 40; J, uncini, segment 5; K, posterior uncini. Scale bars: A–B, F, I–J = 15 µm; C = 5 µm; D = 6 µm; E = 70 µm; G–H, K = 20 µm.

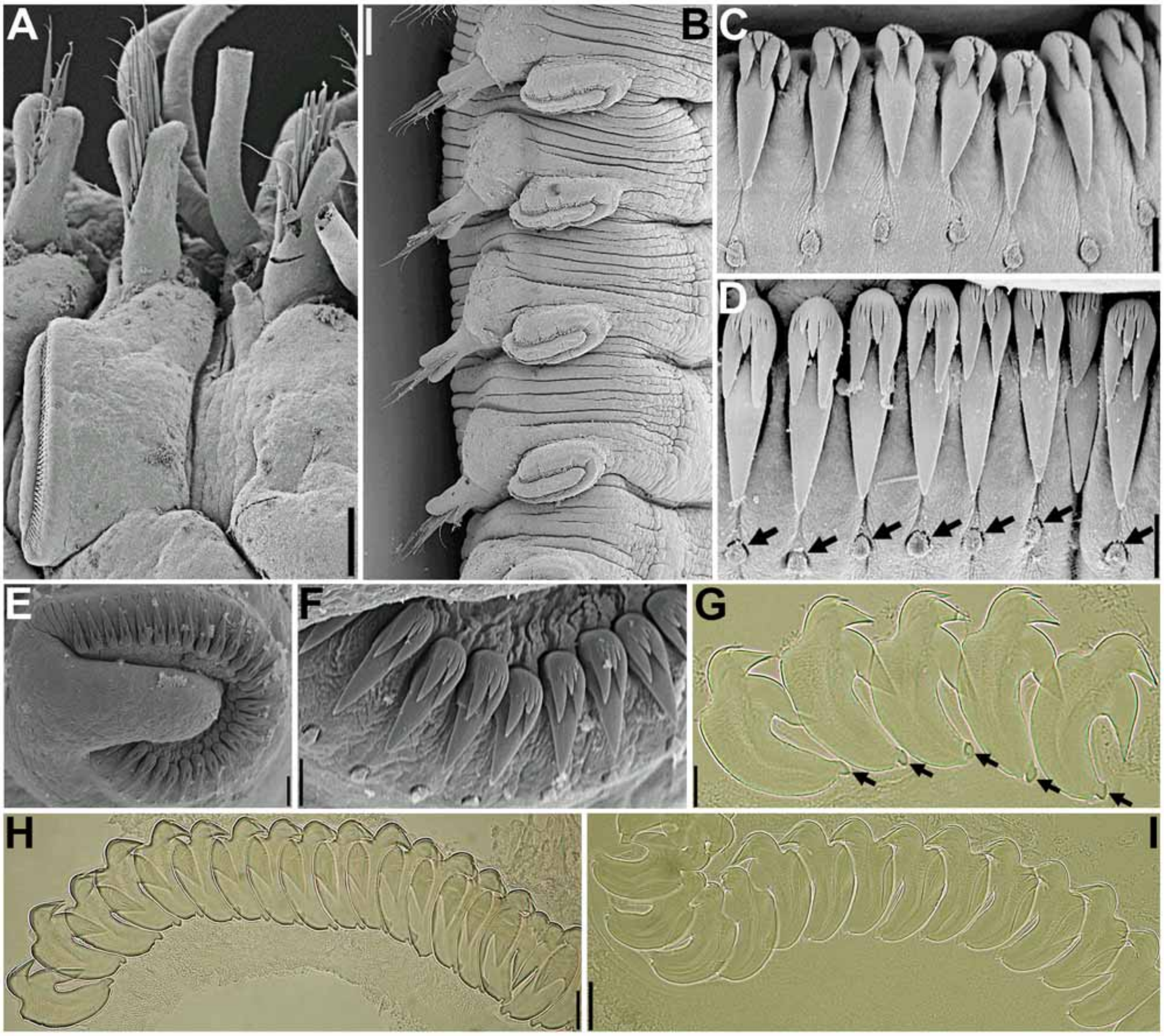

FIGURE 40. *Streblosoma porchatensis*: A, chaetigers 4–6; B, midbody parapodia; C, anterior uncini; D, midbody uncini; E, posterior neuropodium; F, detail of posterior uncini; G, posterior uncini; H, uncini, segment 8; I, uncini, segment 17 (A–F from discarded spec.; G–I from paratype, AM W29240). Arrows point to dorsal buttons. Scale bars: A = 200 µm; B = 300 µm; C–D, F–G = 10 µm; E, H–I = 20 µm.

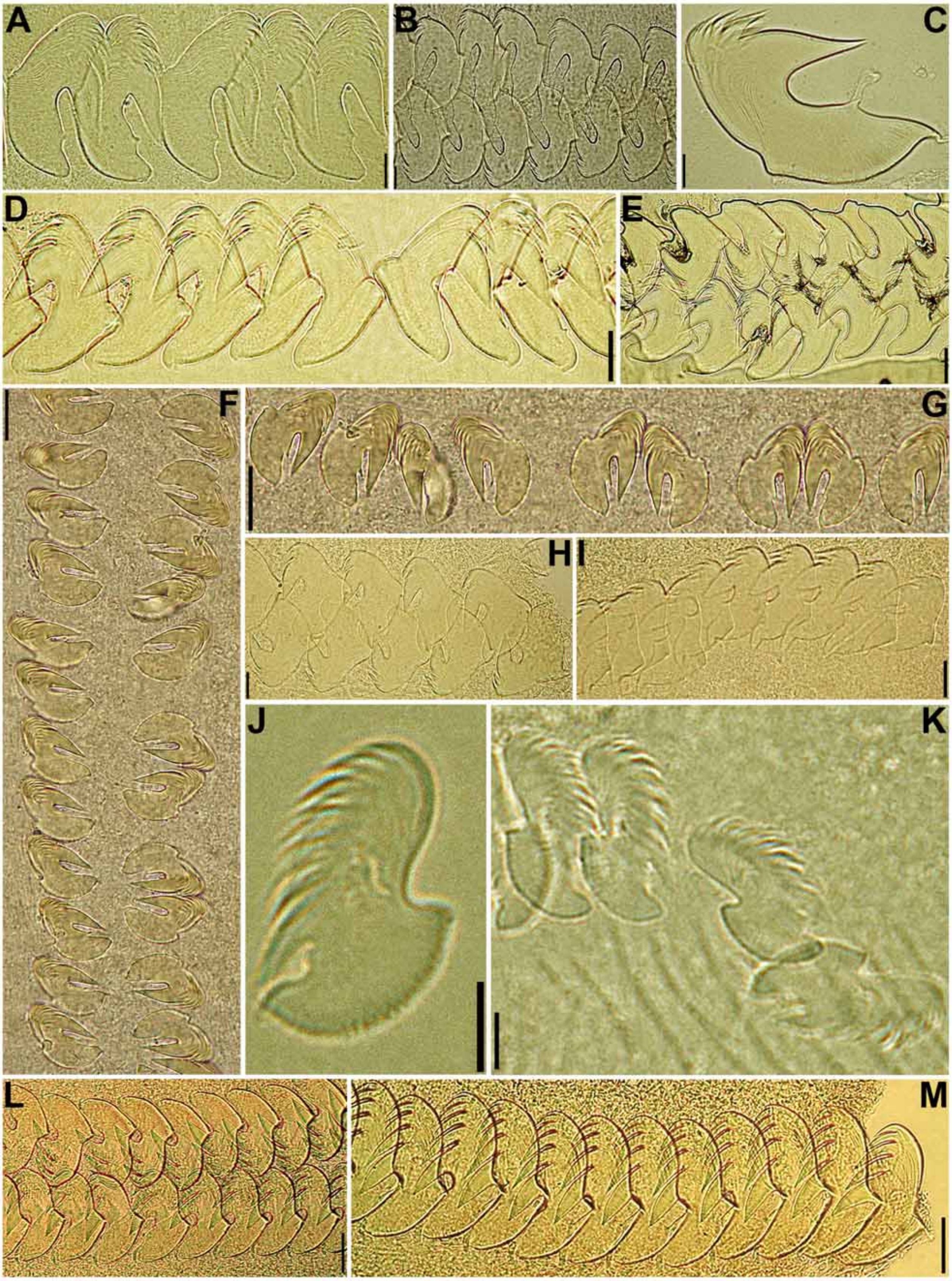

FIGURE 41. *Amphitrite cirrata* (ZMUC-POL-2023): A, uncini, segment 8; B, uncini, segment 18; C, uncinus from anterior region after notopodia terminate. *Amphitrite lobocephala* (paratype, AM W20888): D, uncini, segment 10; E, uncini, segment 11. *Artacama benedeni* (MCEM–BPO 254): F–G, uncini, segment 11. *Nicolea zostericola* (ZMUC-POL-1959): H, uncini, segment 11; I, uncini from region after notopodia terminate. *Proclea malmgreni* (ZMUC-POL-2057): J, uncinus, segment 6; K, uncini from region after notopodia terminate. *Loimia ingens* (NTM W 6775): L, uncini, segment 11; M, uncini from region after notopodia terminate. Scale bars: A, C = 1 µm; B = 2 µm; D–G = 20 µm; H–I = 10 µm; J–K = 5 µm; L–M = 25 µm.

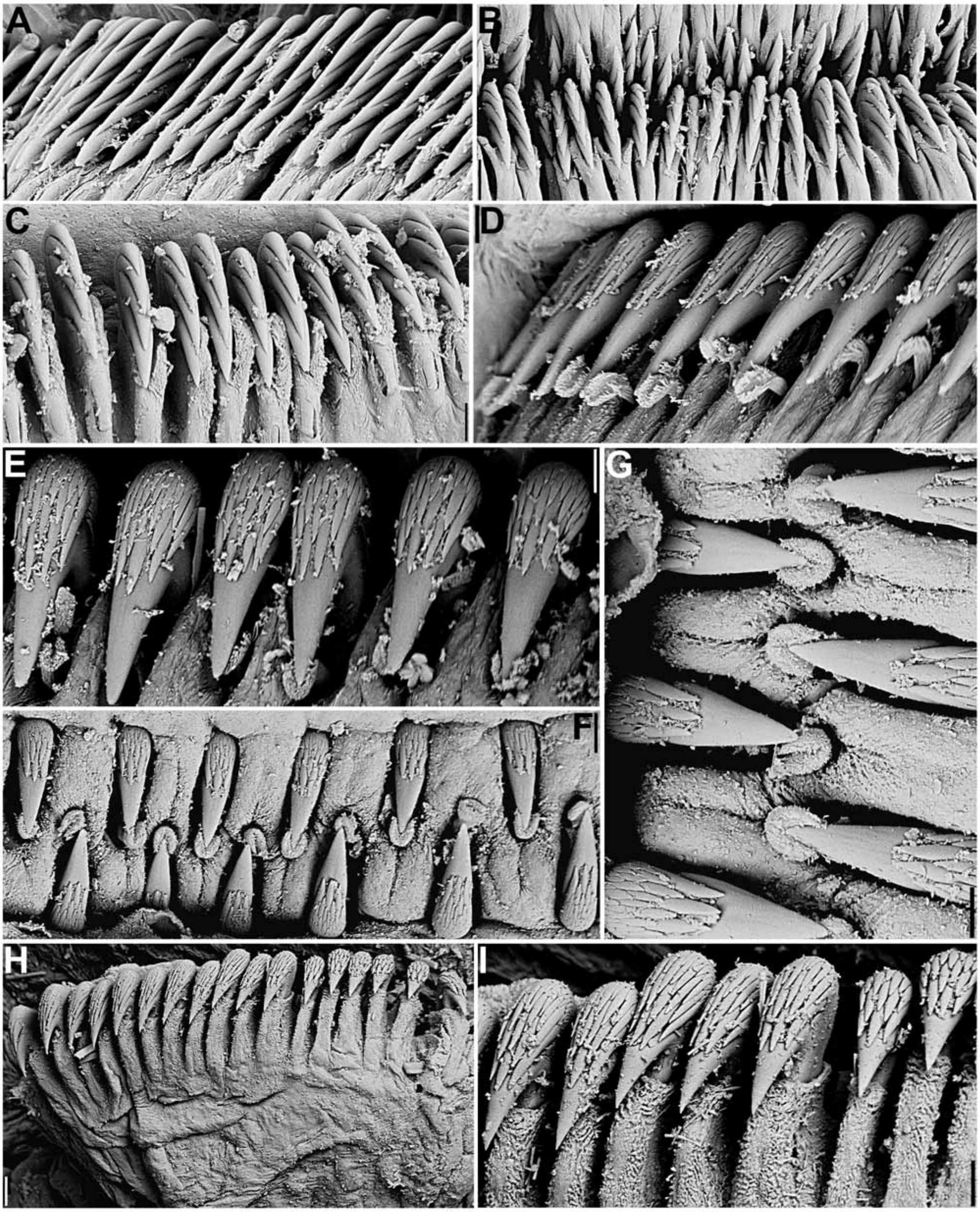

FIGURE 42. *Loimia ingens* (NTM W6764): A, uncini, segment 5; B, uncini, segment 12; C, uncini from posterior region after notopodia terminate. *Pista* sp. (AM W34750): D, uncini, segment 5; E, uncini, segment 6; F, uncini, segment 12; G, close up view of uncini from segment 12, showing dorsal buttons; H, uncini from region after notopodia terminate; I, close up view of uncini from region after notopodia terminate. Scale bars: A, C, F, H = 10 µm; B = 20 µm; D–E, G, I = 6 µm.

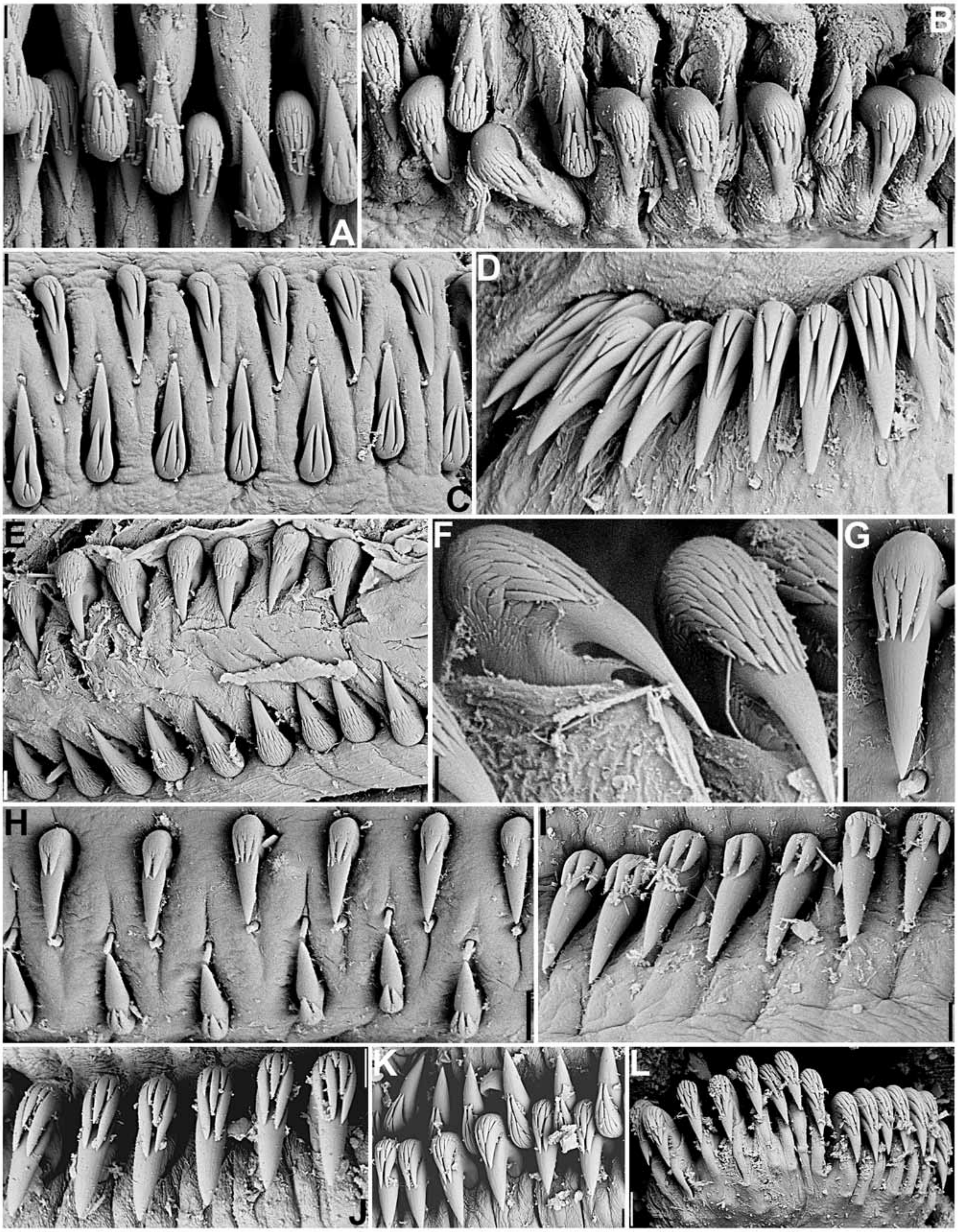

FIGURE 43. *Terebella pappus* (AM W34757): A, uncini, segment 17. *Terebella tantabiddycreekensis* (AM W34758): B, uncini from mid-length of region after notopodia terminate. *Eupolymnia koorangia* (AM W34753): C, uncini, segment 11; D, uncini from posterior region after notopodia terminate. *Artacama proboscidea* (AM W34752): E, uncini, segment 13; F, uncini from region after notopodia terminate. *Nicolea amnis* (AM W34756): G–H, uncini, segment 11; I, uncini, segment 8. *Amphitrite lobocephala* (paratype, AM W20888): J, uncini, segment 6; K, uncini from posterior region with biramous parapodia; L, uncini from region after notopodia terminate. Scale bars: A–B, D–E, G, K = 6 µm; C, H–J, L = 10 µm; F = 3 µm.

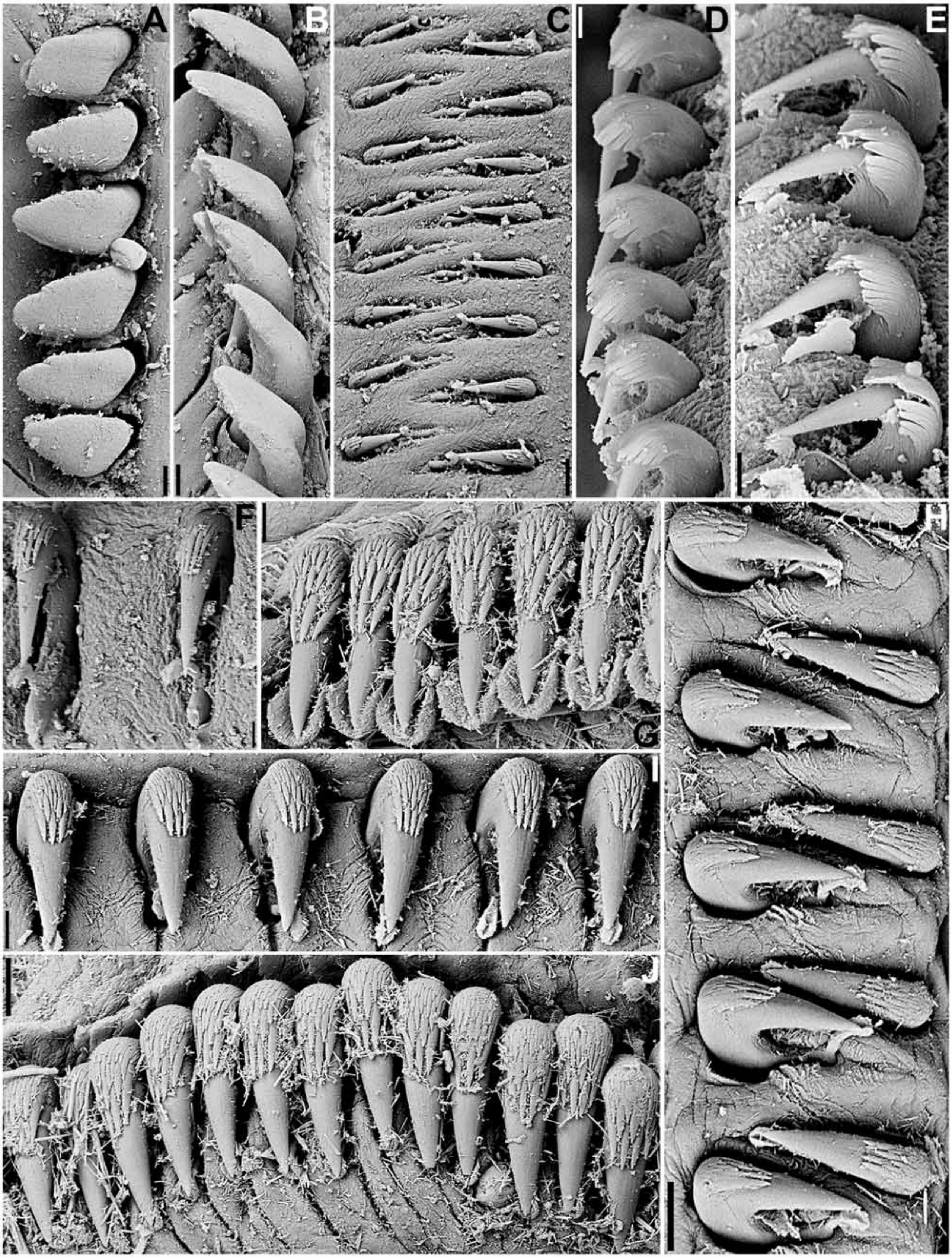

FIGURE 44. *Hadrachaeta aspeta* (paratype, AM W6853): A, neurochaetae, segment 5; B, neurochaetae, segment 6; C, uncini from posterior region with biramous parapodia; D–E, uncini from posterior region after notopodia terminate; F, uncini from mid-length of region after notopodia terminate. *Lanicides lacuna* (AM W200878): G, uncini, segment 6; H, uncini, segment 11; I, uncini, segment 9; J, uncini from region after notopodia terminate. Scale bars: A–B, F, H–J = 10 µm; C = 3 µm; D–E = 4 µm; G = 9 µm.

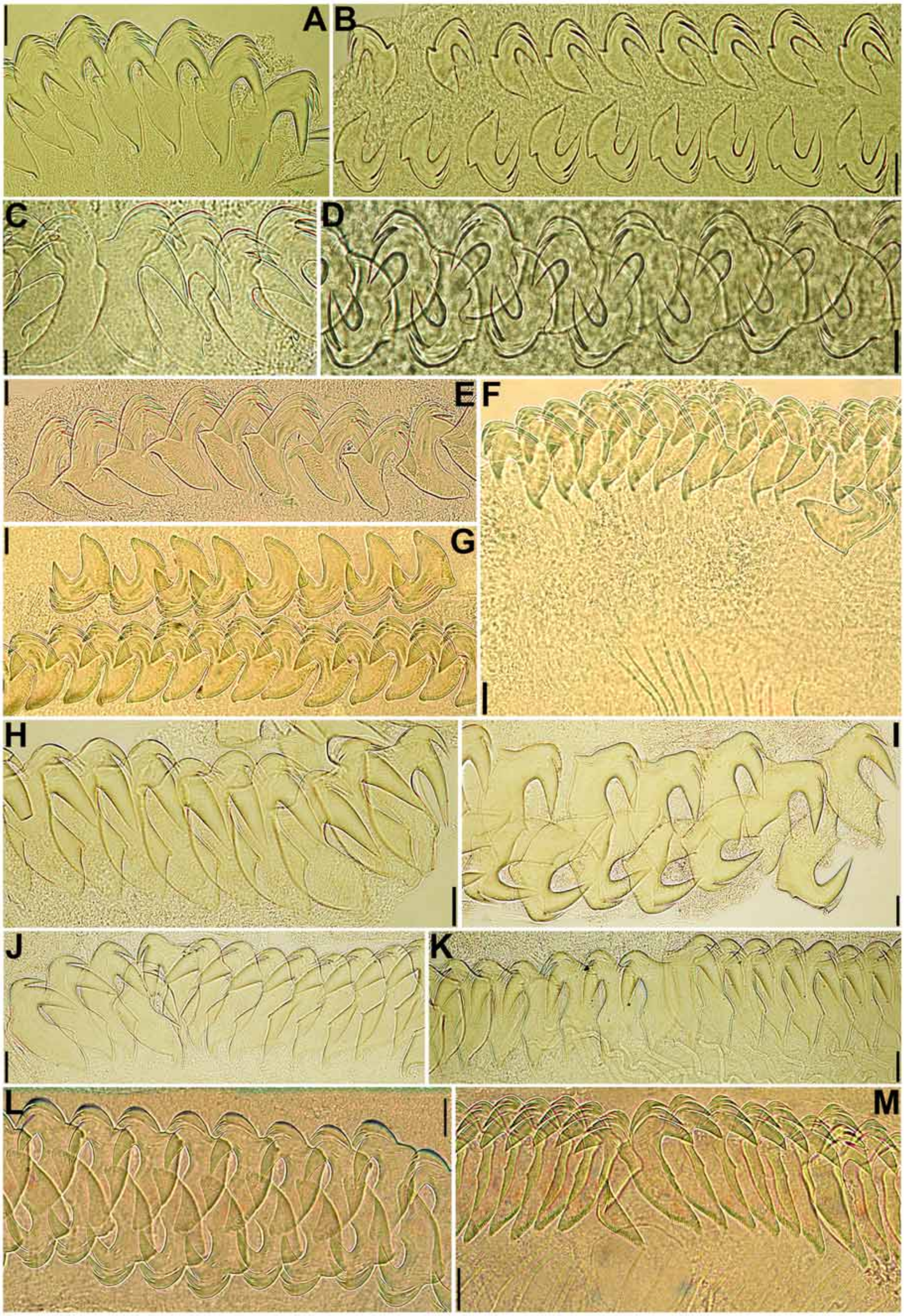

FIGURE 45. *Terebella* cf. *lapidaria* (BMNH 1928.4.26.330-32): A, uncini, segment 8; B, uncini, segment 33. *Eupolymnia koorangia* (NMV F52595): C, uncini, segment 7; D, uncini, segment 19. *Lanice conchilega* (USNM 203875): E, uncini, segment 5; F, uncini from region after notopodia terminate; G, uncini, segment 11. *Reteterebella queenslandia* (holotype, AM W3755): H, uncini, segment 6; I, uncini, segment 14; J, uncini from anterior part of region after notopodia terminate; K, uncini from posterior part of region after notopodia terminate. *Reteterebella aloba* (AM W30717): L, uncini, segment 11; M, uncini from region after notopodia terminate. Scale bars: A–B, D = 2 µm; C = 1 µm; E–G = 25 µm; H–M = 20 µm.

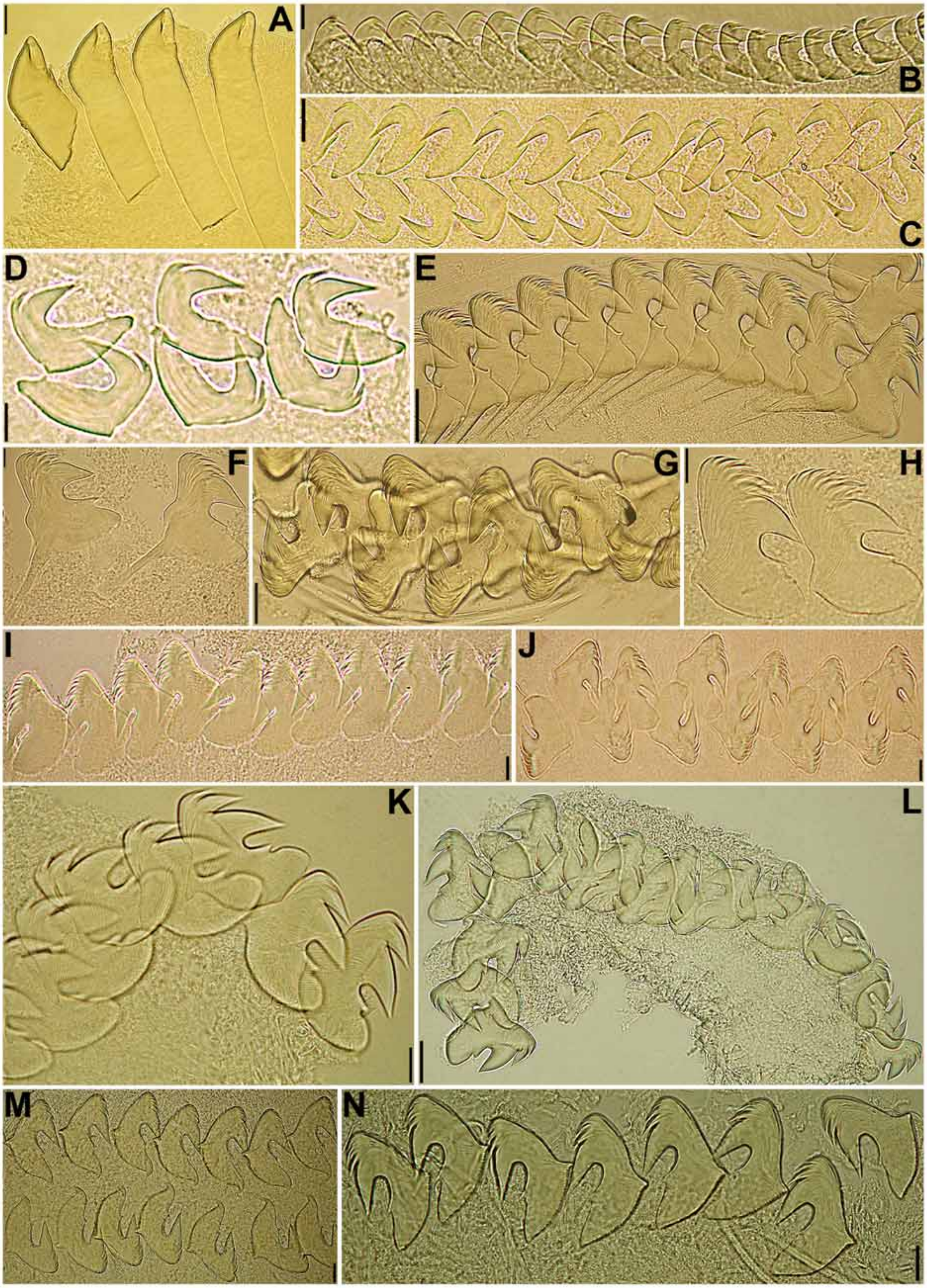

FIGURE 46. *Hadrachaeta aspeta* (paratype, AM W6856): A, neurochaetae, segment 8; B, uncini, segment 9; C, uncini, segment 17; D, uncini, segment 11. *Pista cristata* (ZMUC-POL-707): E, uncini, segment 10; F, uncini, segment 11; G, uncini, segment 14; H, uncini from region after notopodia terminate. *Laphania boecki* (SMNH 72089): I, uncini, segment 10; J, uncini, segment 11. *Stschapovella tatjanae* (ZMUC-POL-1743): K, uncini, segment 7; L, uncini, segment 14. *Amphitrite affinis* (ZMUC-POL-2018): M, uncini, segment 19; N, uncini from anterior region after notopodia terminate. Scale bars: A–D, F, I–K = 10 µm; E = 30 µm; G = 20 µm; H = 1 µm; L–N = 2 µm.

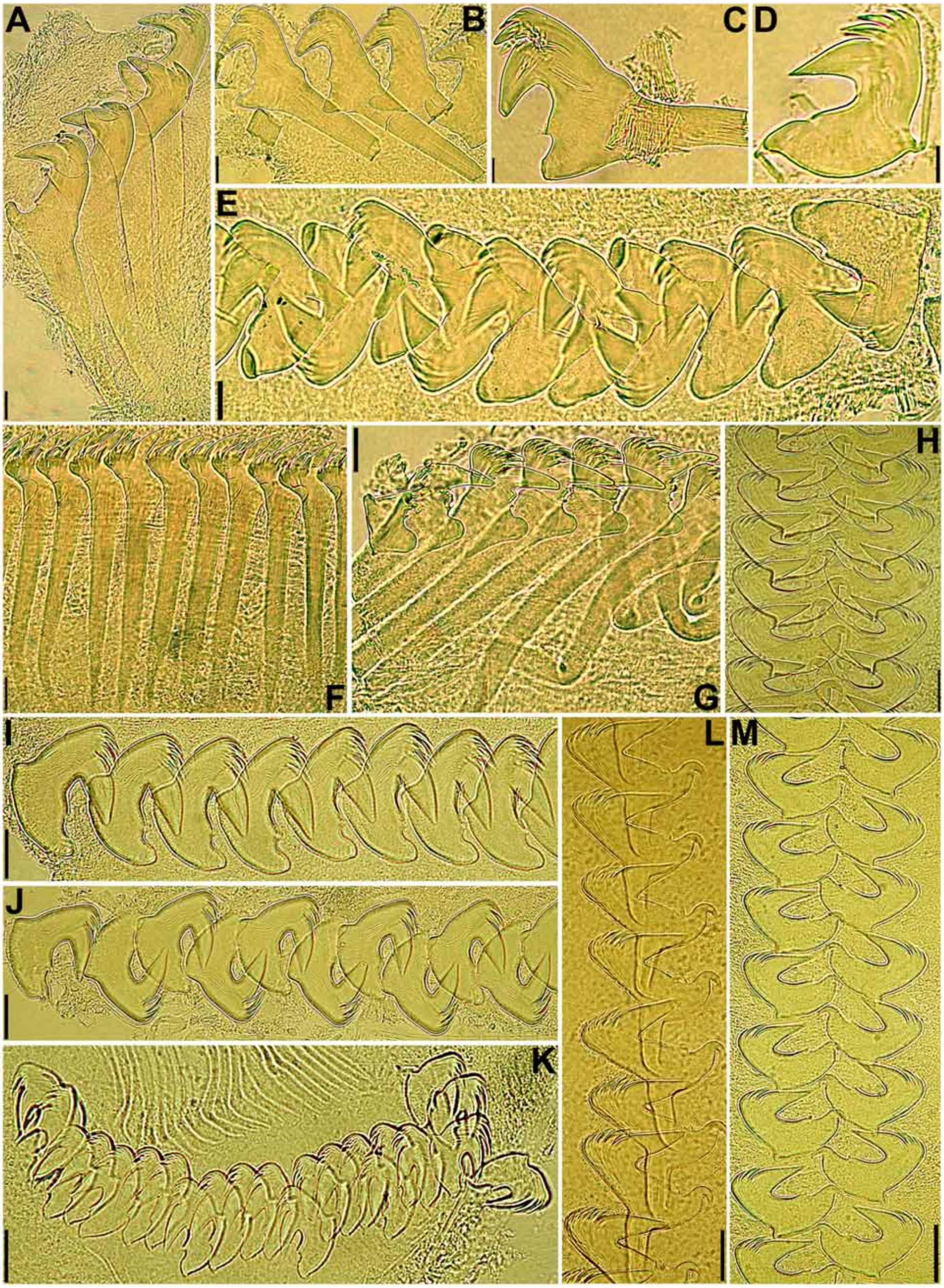

FIGURE 47. *Betapista dekkerae* (holotype, BCPM 978-00174-001): A, uncini, segment 5; B, uncini, segment 6; C, uncinus, segment 7; D, uncinus from anterior part of region after notopodia terminate, segment 22; E, uncini, segment 11. *Lanicides lacuna* (paratype, AM W200610): F, uncini, segment 5; G, uncini, segment 6; I, uncini, segment 8; J, uncini, segment 11; K, uncini from mid-length of region after notopodia terminate. *Longicarpus modestus* (NMV F94344): H, uncini, segment 16; L, uncini, segment 9; M, uncini from mid-length of region after notopodia terminate. Scale bars: A–B, F–L = 20 µm; C–D = 10 µm; E = 15 µm; M = 30 µm.

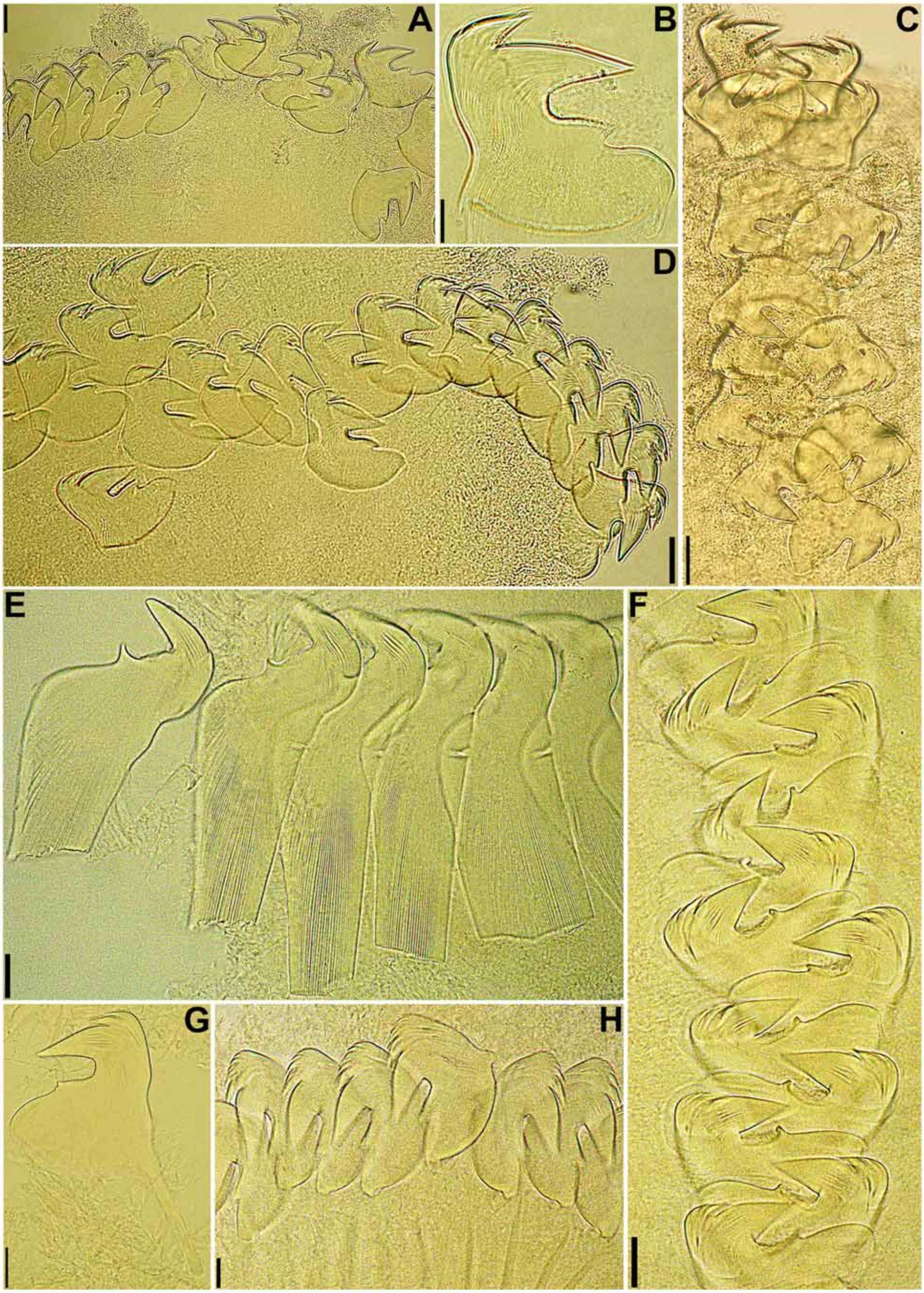

FIGURE 48. *Axionice flexuosa* (ZMUC-POL-2033): A–B, uncini, segment 5; C, uncini, segment 14; D, uncini, segment 18. *Axionice spinifera* (unreg., from Nonato private coll.): E, uncini, segment 5; F, uncini, segment 11; G, uncinus, segment 7; H, uncini from posterior part of region after notopodia terminate. Scale bars: A, C–G = 20 µm; B, H = 10 µm.

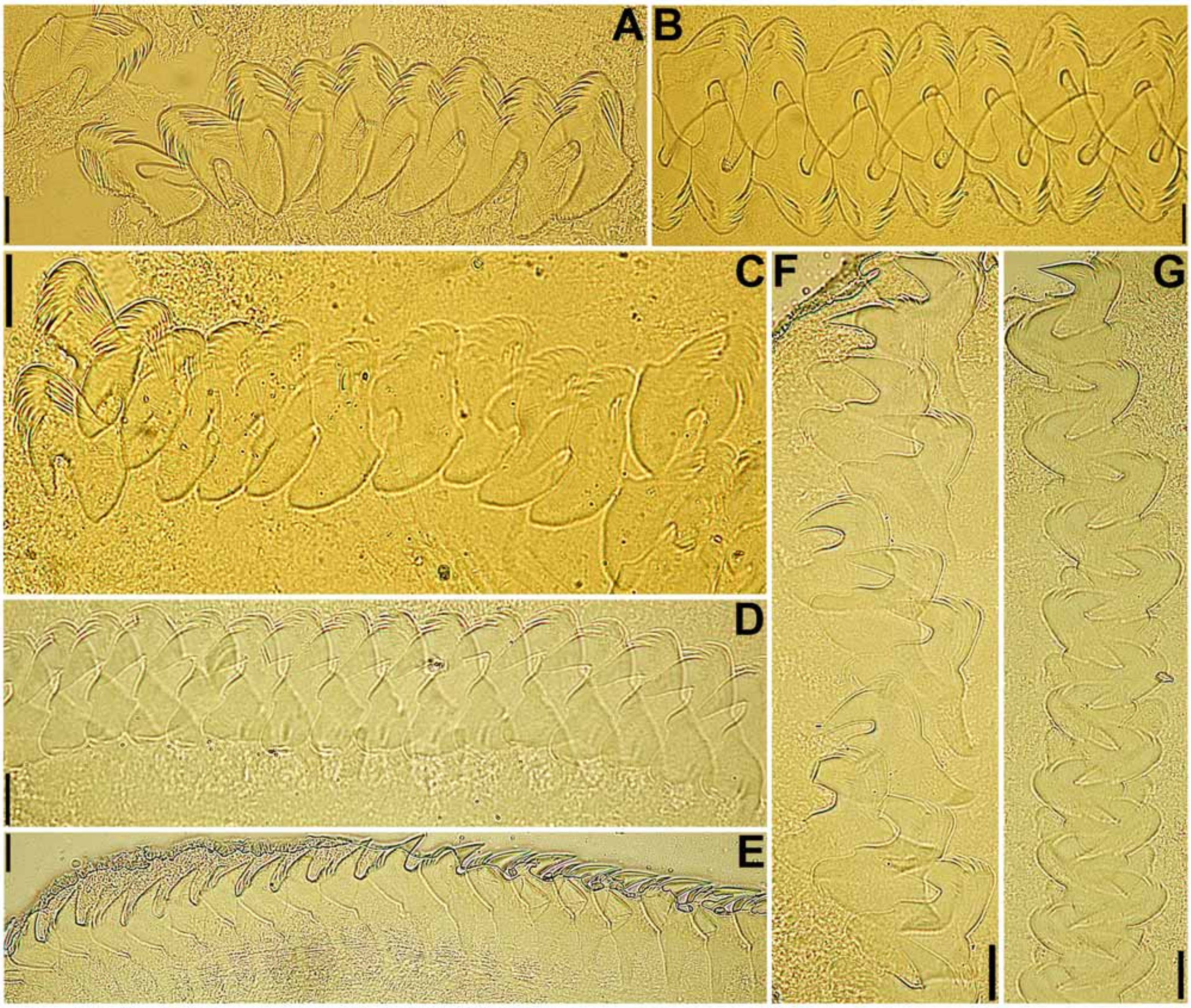

FIGURE 49. *Leaena ebranchiata* (ZMUC-POL-2046): A, uncini, segment 6; B, uncini, segment 12; C, uncini from posterior region after notopodia terminate. *Lanicides bilobata* (holotype, MNHU 898): D, uncini, segment 5; E; uncini, segment 7; F, uncini, segment 6; G, uncini, segment 15. Scale bars: A–G = 20 µm.

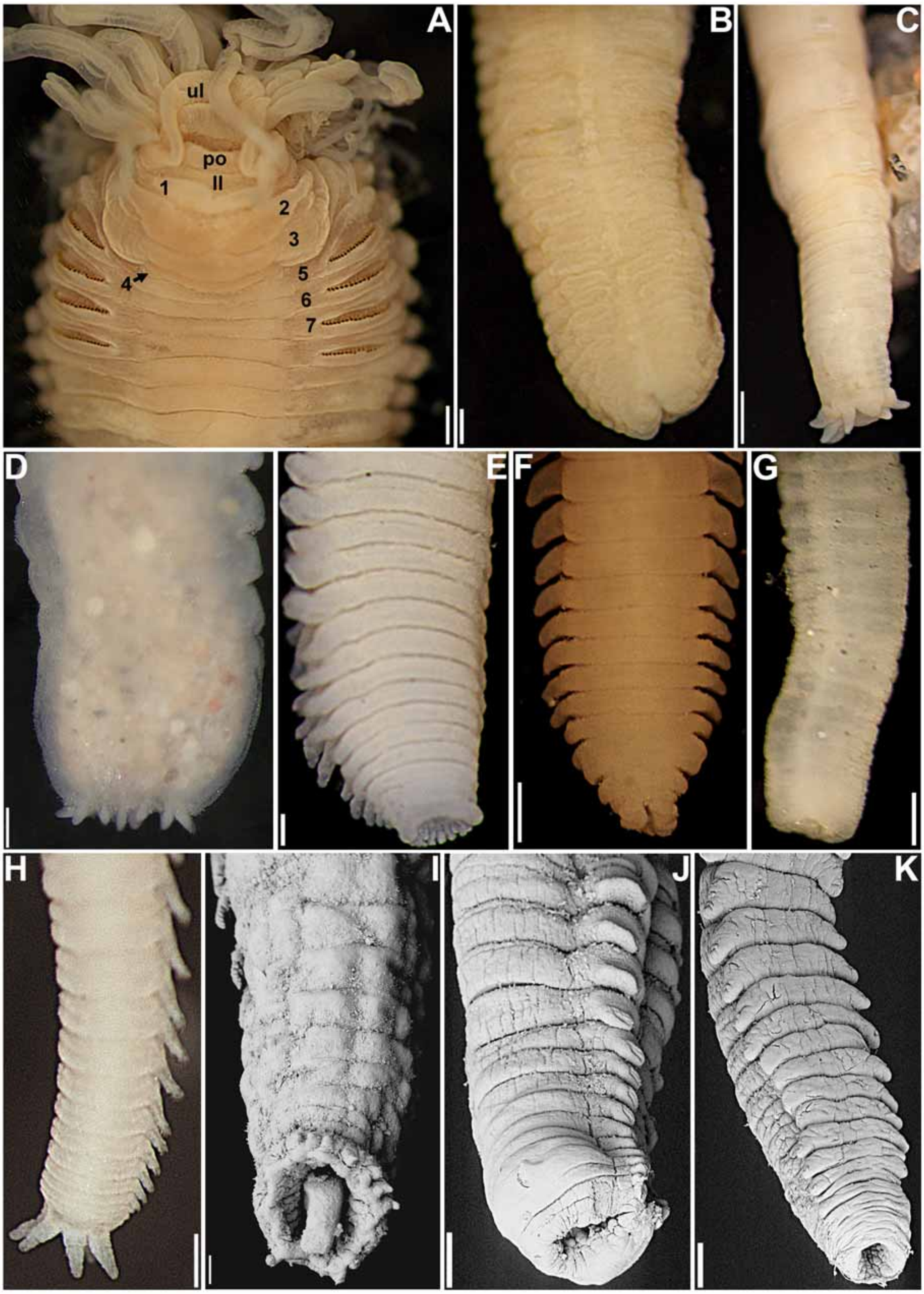

FIGURE 50. *Hadrachaeta aspeta* (paratype, AM W6856): A, anterior end, ventral view; numbers refer to segments; ll = lower lip; po = pharyngeal organ; ul = upper lip; B, posterior end, ventral view. *Axionice maculata* (ZMUC-POL- 2035): C, posterior end, right ventro-lateral view. *Axionice flexuosa* (ZMUC-POL-2033): D, posterior end, dorsal view. *Eupolymnia nebulosa* (AM W200882): E, posterior end, left dorso-lateral view. *Leaena ebranchiata* (ZMUC-POL-2046): F, posterior end, dorsal view. *Neoleprea macrocercus* (AM W201178): G, posterior end, left ventro-lateral view. *Loimia* cf. *medusa* (MCEM–BPO 297): H, posterior end, right dorso-lateral view. *Amphitrite lobocephala* (paratype, AM W20888): I, posterior end, left dorso-lateral view. *Eupolymnia koorangia* (AM W34753): J, posterior end, right ventro-lateral view. *Nicolea amnis* (AM W34756): K, posterior end, ventral view. Scale bars: A, F = 0.4 mm; B, D–E, H, J = 0.2 mm; C = 0.5 mm; G = 0.3 mm; I = 0.09 mm; K = 0.6 mm.

TABLE 1. List of material of the families Alvinellidae, Ampharetidae, Pectinariidae and Trichobranchidae examined for the present study.

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Alvinellidae	**Desbruyères & Laubier, 1986**						
Alvinella pompejana	Desbruyères & Laubier, 1980	East Pacific Rise (20°50′N 109°06′W)	AM W29585	Pacific Antarctic Ridge (37°47′S 110°54′W); coll. G. Rouse, 23 Mar 2005, 2222 m (Alvin dive n° 4089)	1	—	—
			AM W29589	East Pacific Rise (12°48′40″N 103°56′26″W), 2630 m	1	Notochaetae: segs. 8, 20, and 48 Neurochaetae: segs. 11, 21, 49, and 68	—
Paralvinella grasslei	Desbruyères & Laubier, 1982	Galapagos Rift, “Rose Garden” area (00°48′25″N 86°13′48″W)	AM W29588	Gulf of California, Guaymas Basin (30°12′N 153°18′W) – Mexico; 2007 m	11	Notochaetae: segs. 4, 31, and 58 Neurochaetae: segs. 15, 40, 61, and 93	—
Ampharetidae	**Malmgren, 1866**						
Ampharetinae	**Chamberlin, 1919**						
Amphicteis dalmatica	Hutchings & Rainier, 1979	Pittwater – New South Wales, Australia	AM W8672 (holotype)	Pittwater – New South Wales, Australia; 3 May 1973, *Zostera*	1	—	—
			AM W8230 (paratype)	Careel Bay, Pittwater (33°37′S 151°20′E) – New South Wales, Australia; 6 Feb 1973, *Posidonia*	1	Notochaetae: seg. 14 Neurochaetae: segs. 14 and from region after notopodia terminate Paleae	Yes
			AM W8242 (paratype)	Careel Bay, Pittwater (33°37′S 151°20′E) – New South Wales, Australia; 30 Jul 1973, *Zostera*	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W8243 (paratype)	Careel Bay, Pittwater (33°37′S 151°20′E) – New South Wales, Australia; 30 Jul 1973, *Zostera*	1	—	—
			AM W8249 (paratype)	Careel Bay, Pittwater (33°37′S 151°20′E) – New South Wales, Australia; 30 Jul 1973, *Zostera*	1	—	—
			AM W8251 (paratype)	Careel Bay, Pittwater (33°37′S 151°20′E) – New South Wales, Australia; 30 Jul 1973, *Posidonia*	1	—	—
			AM W8252 (paratype)	Careel Bay, Pittwater (33°37′S 151°20′E) – New South Wales, Australia; 30 Jul 1973, *Zostera*	1	—	—
			AM W8253 (paratype)	Careel Bay, Pittwater (33°37′S 151°20′E) – New South Wales, Australia; 30 Jul 1973, *Posidonia*	1	—	—
			AM W11667 (paratype)	Careel Bay, Pittwater (33°37′S 151°20′E) – New South Wales, Australia; 6 Feb 1973, *Posidonia*	1	—	—
			AM W11668 (paratype)	Careel Bay, Pittwater (33°37′S 151°20′E) – New South Wales, Australia; 6 Sep 1973, *Zostera*	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Melinninae	**Chamberlin, 1919**						
Melinna elisabethae	McIntosh, 1885	Fife, St Andrews – Scotland, in the stomach of fish	AM W21792	off Tynemouth, Tyne and Wear (55°00′N 1°30′W) – England; Apr 1993, 41 m, mud and sand	1	Notochaetae: segs. 13 and 18 Neurochaetae: segs. 4, 13, 18, and from region after notopodia terminate Post branchial hook	—
			AM W21793	Tees Bay, Cleveland (54°36′N 1°48′W) – England; 7 Sep 1984, 44 m, gravelly mud and rocks	2	Notochaetae: segs. 9 and 16	—
Pectinariidae	**Quatrefages, 1865**						
Pectinaria dodeka	Hutchings & Peart, 2002	Moreton Bay, Dunwich (27°30′S 153°24′E) – Queensland, Australia	AM W25615 (holotype)	Moreton Bay, Dunwich (27°30′S 153°24′E) – Queensland, Australia; 27 Mar 1962	1	—	—
			AM W19076 (paratype)	Moreton Bay, Dunwich (27°30′S 153°24′E) – Queensland, Australia; 27 Mar 1962	1	—	—
			AM W24053	Cowan Creek, Cottage Point (33°37′S 151°12′12″E) – New South Wales, Australia; Aug 1997	2	—	—
			AM W24389	Cowan Creek, Cottage Point (33°37′S 151°12′30″E) – New South Wales, Australia; 3 Nov 1996, sand mud	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W34182	Cowan Creek, Cottage Point (33°37′S 151°12′12″E) – New South Wales, Australia; coll. P. Hutchings & J. Nogueira, 10 Oct 2004, intertidal, under rocks	1	—	Yes
			AM W35293	Cowan Creek, Cottage Point (33°37′ S 151°12′30″E) – New South Wales, Australia; 3 Nov 1996, sand mud	1	Notochaetae: segs. 6 and 9 Neurochaetae: seg. 9 Scaphal hooks	—
Trichobranchidae	**Malmgren, 1866**						
Octobranchus myunus	Hutchings & Peart, 2000	Hole in the Wall, Jervis Bay – New South Wales, Australia	AM W24184	off Tathra Head (36°45′S 150°02′E) – New South Wales, Australia; 10 Jun 1980, 64 m	3	—	—
			AM W24185	Hole in the Wall, Jervis Bay (35°07′36″S 150°44′48″E) – New South Wales, Australia; Jun 1991	4	—	—
			AM W24186	Jervis Bay, Montagu Roadstead (35°02′12″S 150°46′E) – New South Wales, Australia; Jun 1991, 12 m, unvegetated sediment	1	—	—
			AM W29207	Murrumbulga Creek, Twofold Bay (37°05′S 149°54′E) – New South Wales, Australia; 25 Jun 1985, subtidal rock platform, kelp holdfast	1	Notochaetae: segs. 8 and 12 Neurochaetae: segs. 8, 12, and from region after notopodia terminate	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W29208	Murrumbulga Creek, Twofold Bay (37°05′S 149°54′E) – New South Wales, Australia; 25 Jun 1985, subtidal rock platform, kelp holdfast	2	Notochaetae: seg. 14 Neurochaetae: seg. 14	—
			AM W201598	Murrumbulga Creek, Twofold Bay (37°05′S 149°54′E) – New South Wales, Australia; 25 Jun 1985, subtidal rock platform, kelp holdfast	1	—	—
Terebellides anguicomus	Müller, 1858	Santa Catarina Is., Brazil (original description); Ponta da Cruz, Baia de Paranaguá – Paraná, Brazil (neotype)	AM W34183	Ponta do Maciel, estuary of Maciel river (25°33′S 48°25′W) – Paraná, Brazil; 4 Nov 1986, 18 m, muddy sand	1	—	Yes
			MCEM-BPO 249	Ponta do Maciel, estuary of Maciel river (25°33′S 48°25′W) – Paraná, Brazil; 4 Nov 1986, 18 m, muddy sand	2	—	—
			MCEM-BPO 250	Brazilian southeastern continental shelf (26°29′S 48°21′04″W) – Paraná, Brazil; 1 Sep 1982, 38 m, sand	2	—	—
			MCEM-BPO 327	Buoy 34 of access channel to Paranaguá Harbour, Paranaguá Bay (25°30′30″S 48°24′W) – Paraná, Brazil; 26 Nov 1986, 12 m, fine sand	1	Notochaetae: segs. 4, 8, and 11 Neurochaetae: segs. 8, 11, and from region after notopodia terminate	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			MCEM-BPO 330	Paranaguá Bay (29°42′48″S 48°29′42″W) – Paraná, Brazil; 2 Oct 1986, 16 m, muddy sand	1	—	—
			MCEM-BPO 331	Paranaguá Bay (25°29′42″S 48°29′42″W) – Paraná, Brazil; 26 Nov 1985, 18 m, fine muddy sand	3	—	—
			MCEM-BPO 332	Paranaguá Bay (25°49′S 48°25′W) – Paraná, Brazil; 2 Oct 1986, 16 m, sand gravel and silt	1	—	—
			MCEM-BPO 333	Paranaguá Bay (25°33′S 48°34′W) – Paraná, Brazil; 16 Dec 1983, 2 m, mud	6	—	—
			MCEM-BPO 334	Paranaguá Bay (25°33′S 48°25′W) – Paraná, Brazil; 5 Aug 1986, 18 m, sand gravel and silt	1	—	—
Terebellides narribri	Hutchings & Peart, 2000	Moreton Bay (27°30′S 153°21′E) – Queensland, Australia	AM W198501	Kangaroo Is., Maston (35°49′S 137°44′E) – South Australia, Australia; 2 Mar 1979, *Posidonia* beds	1	—	—
			AM W21652	Botany Bay (33°58′08″S 151°11′10″E) – New South Wales, Australia; 7 Apr 1992, 5 m	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W23839	Rottnest Is., Duffield Ridge (32°02′30″S 115°28′39″E) – Western Australia, Australia; 10 Jan 1991, 35 m , coralline algae and reef limestone	1	—	—
			AM W23840	Pittwater (33°35′51″S 151°18′43″E) – New South Wales, Australia; 20 Oct 1994, 16 m	2	—	—
			AM W27473	1 Km NE of Legendre Is. (20°35′07″S 116°35′38″E) – Western Australia, Australia; 6 Aug 2000, 17 m, boulders	1	—	—
			AM W27490	between Enderby and Lewis Is. (20°35′06″S 116°35′37″E) – Western Australia, Australia; 28 Jul 2000, 17 m, fine silt	1	—	—
			AM W29199	NW of Sloping Is., Frederic Henry Bay (42°56′S 147°37′E) – Tasmania, Australia; 26 Mar 1970, 37 m, mud	7	—	—
			AM W29200	NW of Sloping Is., Frederic Henry Bay (42°56′S 147°37′E) – Tasmania, Australia; 26 Mar 1970, 37 m, mud	1	Notochaetae: segs. 6, 8, and 14 Neurochaetae: segs. 6, 8, 14, and from region after notopodia terminate	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Trichobranchus bunnabus	Hutchings & Peart, 2000	Cape Banks (34°00′S 151°16′E) – New South Wales, Australia	AM W16133	Geelong Arm (38°14′S 144°49′48″E) – Victoria, Australia; 12 Feb 1970, 25 m, clay-silt	2	—	—
			AM W24229	Darwin Harbour, Bangalow (12°30′S 130°48′E) – Northern Territory, Australia; 7 Jul 1993, intertidal spring tide, clay-silt	1	—	—
			AM W24230	Beacon Is., Houtman Abrolhos (28°25′30″S 113°47′E) – Western Australia, Australia; 18 May 1992, 32 m, coral rubble	1	—	Yes
			AM W24231	Spencer Gulf, Port Pirie (33°12′S 137°55′E) – South Australia, Australia; 1979, 5.5 m	1	—	—
			AM W24235	Wattamolla (34°44′S 150°39′E) – New South Wales, Australia; 18 Jan 1991, 65–70 m	1	—	—
			AM W24236	Bass Pt. (34°36′S 150°54′E) – New South Wales, Australia; 26 Jul 1990, 65–70 m	1	—	—
			AM W24239	off Providential Head, Wattamolla (34°08′S 151°08′30″E) – New South Wales, Australia; Jul 1990, 70 m	2	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W35294	Beacon Is., Houtman Abrolhos (28°25′30″S 113°47′E) – Western Australia, Australia; 18 May 1992, 32 m, coral rubble	1	Notochaetae: seg. 9 Neurochaetae: segs. 9 and from region after notopodia terminate	—
			AM W198239	Gladstone, Auckland Creek (23°51′S 151°16′E) – Queensland, Australia; Mar 1980, 1.9 m, silty sand	1	—	—
Trichobranchus dibranchiatus	(Knox & Cameron, 1971)	Port Phillip Bay – Victoria, Australia	AM W23053	Bass Point (34°36′S 150°54′E) – New South Wales, Australia; 1 Feb 1990, 50 m	1	Notochaetae: seg. 9 Neurochaetae: seg. 9	—
			AM W24135	off Providential Head, Wattamolla (34°08′S 151°08′30″E) – New South Wales, Australia; 1 Feb 1990, 50 m.	1	Neurochaetae: from region after notopodia terminate	—
			AM W25225	East Central Port Phillip Bay, St. Leonard (38°10′S 144°44′52″E) – Victoria, Australia; 8 Apr 1991, 11.6–13.5 m, sandy mud	6	—	—
			AM W25227	East Central Port Phillip Bay, St. Leonard (38°10′S 144°44′52″E) – Victoria, Australia; 8 Apr 1991, 11.6–13.5 m, sandy mud	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W25228	East Central Port Phillip Bay, St. Leonard (38°10′S 144°44′52″E) – Victoria, Australia; 8 Apr 1991, 11.6–13.5 m, sandy mud	1	—	—
			AM W25229	East Central Port Phillip Bay, St. Leonard (38°10′S 144°44′52″E) – Victoria, Australia; 8 Apr 1991, 11.6–13.5 m, sandy mud	1	—	—
			AM W25230	East Central Port Phillip Bay, St. Leonard (38°10′S 144°44′52″E) – Victoria, Australia; 8 Apr 1991, 11.6–13.5 m, sandy mud	1	—	—
Trichobranchus drewi	Nogueira, 2008	Atlantic Ocean, about 70 km SE of Martha´s Vineyard (40º34´N 70º51´W)	YPM 30174 (holotype)	~70 km SE of Martha´s Vineyard (40º34´N 70º51´W) – USA; coll. H.L. Sanders, 27 Nov 1967, 67.7–71.4 m, mud	1	Notochaetae: segs. 10 and 17 Neurochaetae: segs. 10, 19, and from region after notopodia terminate	—
Trichobranchus lobiungens	Hessle, 1917	Off the coast of Uruguay (33ºS 51º10´W)	MCEM-BPO 325	Brazilian southeastern continental shelf (24°44′S 45°55′02″W) – São Paulo, Brazil; 14 Nov 1985, 69 m, muddy sand	1	Notochaetae: seg. 7 Neurochaetae: segs. 7, 12, and from region after notopodia terminate	—
			MCEM-BPO 326	Brazilian southeastern continental shelf (25°10′S 45°11′W) – São Paulo, Brazil; 19 Aug 1982, 18 m, muddy sand	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Trichobranchus torulosus	(Hutchings & Peart, 2000)	Halifax Bay, north of Townsville – Queensland, Australia	AM W24124 (holotype)	Halifax Bay, north of Townsville (19º10´S 146º37´E) – Queensland, Australia; Jan 1977, 2–5 m	1	Notochaetae: segs. 8, 17, and 20 Neurochaetae: segs. 8, 15, and posterior region after notopodia terminate	—
			AM W24136	off Providential Head, Wattamolla (34°08′S 151°08′30″E) – New South Wales, Australia; 14 Nov 1990, 65–70 m	1	—	Yes

TABLE 2. List of material of the family Terebellidae, subfamilies Polycirrinae and Thelepodinae, examined for the present study.

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Terebellidae	**Grube, 1850**						
Polycirrinae	**Malmgren, 1866**						
Amaeana apheles	(Hutchings, 1974)	Wallis Lake, S of Yahoo Is. (32°17′S, 152°29′E) – New South Wales, Australia	AM W5239 (holotype)	Wallis Lake, S of Yahoo Is. (32°17′S, 152°29′E) – New South Wales, Australia; Dec 1970	1	—	—
			AM W5237 (paratype)	Wallis Lake, S of Yahoo Is. (32°17′S, 152°29′E) – New South Wales, Australia; Dec 1970	1	—	—
			AM W5238 (paratype)	Wallis Lake, S of Yahoo Is. (32°17′S, 152°29′E) – New South Wales, Australia; Dec 1970	1	—	—
			AM W5384	Hervey Bay, Mary River, Kangaroo Is. (25°26′S 152°53′E) – Queensland, Australia; Dec 1971, fine muddy sand	2	Notochaetae: seg. 9 Neurochaetae: posterior body	—
			AM W29203	Hervey Bay, Mary River, Kangaroo Is. (25°26′S 152°53′E) – Queensland, Australia; Dec 1971, fine muddy sand	1	Neurochaetae: posterior body	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Enoplobranchus sanguineus	(Verrill, 1873)	From Great Egg Harbor to New Haven and Vineyard Sound – NE coast of the United States	YPM 181 (syntype)	Long Is. Sound – Connecticut, USA; coll. A.E. Verrill and class, Oct 1866	1	Notochaetae: midbody and posterior body	—
			YPM 182 (syntype)	Long Is. Sound – Connecticut, USA; coll. A.E. Verrill and class, Oct 1866	1	—	—
			YPM 890 (syntypes)	Long Is. Sound, Savin Rock, West Haven – Connecticut, USA; coll. A.E. Verrill, 1872	many	—	—
			YPM 2723 (syntypes)	Long Is. Sound, Stony Creek, Branford – Connecticut, USA; coll. A.E. Verrill, 15 May 1871	many	—	—
			YPM 40568 (syntype)	Long Is. Sound, Savin Rock, West Haven – Connecticut, USA; coll. A.E. Verrill, 1872	1	—	—
			YPM 40569 (syntype)	Long Is. Sound, Savin Rock, West Haven – Connecticut, USA; coll. A.E. Verrill, 1872	1	—	—
			YPM 40570 (syntype)	Long Is. Sound, Savin Rock, West Haven – Connecticut, USA; coll. A.E. Verrill, 1872	1	—	—
Hauchiella renilla	Hutchings & Glasby, 1986c	Wreck Bay (35º10′S 150º41′E) – Australian Capital Territory, Australia	AM W199607 (holotype)	Wreck Bay (35º10′S 150º41′E) – Australian Capital Territory, Australia; coll. P. Hutchings, 27 Feb 1976, 15 m, coralline algae	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W199608 (paratype)	Lizard Is. (14º40´S 141º28´E) – Queensland, Australia; 10 m	1	—	—
			AM W199610 (paratype)	Lizard Is. (14º40´S 141º28´E) – Queensland, Australia; Jan 1977, 10 m	1	—	—
			AM W199611 (paratype)	Lizard Is. (14º40´S 141º28´E) – Queensland, Australia; Jan 1977, 10 m	1	—	—
			AM W199614 (paratype)	One Tree Is. (23º30´S 152º05´E) – Queensland, Australia; Oct 1972, 3 m	1	—	—
Lysilla laciniata	Hutchings & Glasby, 1986c	Coffin Bay (34º28′S 135º19′E) – South Australia, Australia	AM W199626 (holotype)	Coffin Bay (34º28′S 135º19′E) – South Australia, Australia; coll. I. Thomas, 1 Dec 1978, intertidal, *Zostera*	1	—	—
			AM W199627 (paratype)	Coffin Bay (34º28′S 135º19′E) – South Australia, Australia; coll. I. Thomas, 1 Dec 1978, intertidal, *Zostera*	10	—	—
			AM W202415	Port Pirie, Spencer Gulf (33°12′S 137°55′E) – South Australia, Australia; Aug 1979, 5 m, *Posidonia*	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W202416	Port Pirie, Spencer Gulf (33°12′S 137°55′E) – South Australia, Australia; Mar 1980, 3 m, *Posidonia*	1	Notochaetae: seg. 4	—
Polycirrus bicrinalis	Hutchings & Glasby, 1986c	Lizard Is. (14º40′S 141º 28′E) – Queensland, Australia	AM W199637 (holotype)	Lizard Is. (14º40′S 141º28′E) – Queensland, Australia; Jan 1977, coral substrates	1	Neurochaetae: from region after notopodia terminate	—
			AM W199638 (paratype)	North West Shelf, off Port Headland (20º23′S 118º37′E) – Western Australia, Australia; 23 Feb 1980, 52 m, muddy sediments	1	Notochaetae: segs. 4 and 13 Neurochaetae: from region after notopodia terminate	—
			AM W199639 (paratype)	North West Shelf, off Port Headland (20º23′S 118º37′E) – Western Australia, Australia; 25 Oct 1983, 37 m, muddy sediments	1	—	—
			AM W199640 (paratype)	Lizard Is. (14º40′S 141º28′E) – Queensland, Australia; Jan 1977	2	—	—
Polycirrus disjunctus	Hutchings & Glasby, 1986c	Solitary Is. (29º56′S 153º25′E) – New South Wales, Australia	AM W199632 (holotype)	Solitary Is. (29º56′S 153º25′E) – New South Wales, Australia; 19 May 1972, intertidal to 10 m	1	—	—
			AM W199633 (paratype)	Seal Rocks (32º28´S 152º33´E) – New South Wales, Australia; 14 Jan 1981, 2 m, rock pool	1	Notochaetae: segs. 4 and 9 Neurochaetae: from region after notopodia terminate	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W199634 (paratype)	Angourie Point (29º29´S 153º22´E) – New South Wales, Australia; 3 Jan 1972, algal mat and rock	2	—	—
Polycirrus glaucus	Hutchings, 1993	Roe Reef, Rottnest Is. (31°58′24″S 115°31′48″E) – Western Australia, Australia	AM W20937 (holotype)	Roe Reef, Rottnest Is. (31°58′24″S 115°31′48″E) – Western Australia, Australia; 10 Jan 1991, 30 m, coral reef substrate	1	—	—
			AM W20966 (paratype)	Roe Reef, Rottnest Is. (31°58′24″S 115°31′48″E) – Western Australia, Australia; 10 Jan 1991, 20 m, coral reef substrate	2	Notochaetae: segs. 5 and 8 Neurochaetae: from region after notopodia terminate	—
Polycirrus variabilis	Hutchings & Glasby, 1986c	Lizard Is. (14º40′S 141º28′E) – Queensland, Australia	AM W199538 (holotype)	Lizard Is. (14º40′S 141º28′E) – Queensland, Australia; Jan 1977, 7.12 m, coral reef substrate	1	—	—
			AM W199477 (paratype)	Lizard Is. (14º40′S 141º28′E) – Queensland, Australia; Jan 1977, 7.12 m, coral reef substrate	1	—	—
			AM W199539 (paratype)	Lizard Is. (14º40′S 141º28′E) – Queensland, Australia; Jan 1977, 7.12 m, coral reef substrate	2	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W199540 (paratype)	Lizard Is. (14º40′S 141º28′E) – Queensland, Australia; Jan 1977, 7.12 m, coral reef substrate	1	Notochaetae: segs. 7 and 9 Neurochaetae: from region after notopodia terminate	—
			AM W199541 (paratype)	Lizard Is. (14º40′S 141º28′E) – Queensland, Australia; Jan 1977, 7.12 m, coral reef substrate	4	—	—
			AM W199543 (paratype)	Lizard Is. (14º40′S 141º28′E) – Queensland, Australia; Jan 1977, 7.12 m, coral reef substrate	3	—	—
			AM W199544 (paratype)	Lizard Is. (14º40′S 141º28′E) – Queensland, Australia; Jan 1977, 7.12 m, coral reef substrate	1	—	—
			AM W199479	Lizard Is. (14°40′S 145°27′E) – Queensland, Australia; 1977	1	—	—
			AM W199481	Lizard Is. (14°40′S 145°27′E) – Queensland, Australia; 1977	1	—	—
Thelepodinae	**Hessle, 1917**						
Decathelepus ocellatus	Hutchings, 1977	Moreton Bay, south of Peel Is. (27°25′S 153°20′E) – Queensland, Australia	AM W6782 (holotype)	Moreton Bay, S of Peel Is. (27°25′S 153°20′E) – Queensland, Australia; Sep 1971, 4 m	1	Notochaetae: segs. 4, 6, 13, and 15 Neurochaetae: segs. 13 and anterior region after notopodia terminate (seg. 18)	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Decathelepus wambira	Nogueira & Hutchings, 2007	Belmont Beach (33°02′36″S 151°40′56″E) – New South Wales, Australia	AM W8742 (holotype)	Belmont Beach (33°02′36″S 151°40′56″E) – New South Wales, Australia; coll. J. Laxton, Sep 1975	1	Notochaetae: segs. 8, 13, and 17 Neurochaetae: segs. 13, 16, and anterior region after notopodia terminate (seg. 19)	—
			AM W8741 (paratype)	1 km E of Burwood Beach (32°57′31″S 151°44′43″E) – New South Wales, Australia; coll. J. Laxton, May 1975	1	—	—
Euthelepus serratus	Hutchings & Glasby, 1986b	Wreck Bay (35°20′S 150°37′E) – New South Wales, Australia	AM W199007 (holotype)	Wreck Bay (35°20′S 150°37′E) – New South Wales, Australia; 9 Apr 1972, 18 m, boulders	1	Neurochaetae: anterior and posterior regions after notopodia terminate	—
			AM W5443 (paratype)	Port Gregory (28°12′S 114°15′E) – Western Australia, Australia; 23 May 1975, 2.5 m, coral slab in detritus	1	Notochaetae: segs. 6 and 35 Neurochaetae: segs. 6 and 35	—
			AM W203358	Shirley Is., Kimberley (16°17′S 123°26′E) – Western Australia, Australia; 26 Jul 1988, mangrove and sand	13	—	—
Glossothelepus mexicanus	Hutchings & Glasby, 1986a	Fraile Bay, Gulf of California (25°31′05″N 109°31′05″W) – Mexico	LACM-AHF Poly 1449 (holotype)	Fraile Bay, Gulf of California (25°31′05″N 109°31′05″W) – Sonora, Mexico; 16 m	1	Notochaetae: segs. 6 and 20 Neurochaetae: segs. 12 and 20	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W199659 (paratype)	Fraile Bay, Gulf of California (23°24′45″N 109°23′50″W to 23°24′30″N 109°24′00″W) – Sonora, Mexico; 91 m, sand and mud	1	Notochaetae: segs. 8 and posterior region with biramous parapodia Neurochaetae: segs. 8 and posterior region with biramous parapodia	—
			USNM 98572 (paratype)	Fraile Bay, Gulf of California (23°21′55″N 109°24′40″W) – Sonora, Mexico; 146 m, mud	1	—	—
Pseudostreblosoma brevitentaculatum	Nogueira & Alves, 2006	Ubatuba (23°41′S 45°17′W) – São Paulo, Brazil	MZUSP 16925 (holotype)	Ubatuba (23°41′S 45°17′W) – São Paulo, Brazil; coll. BIOTA/FAPESP team, 23 May 2002	1	—	—
			MZUSP 16926 (paratype)	São Sebastião (23°55′S 45°13′W) – São Paulo, Brazil; coll. BIOTA/FAPESP team, 27 Jun 2002	1	—	—
			AM W29695 (paratype)	Ubatuba (23°41′S 45°17′W) – São Paulo, Brazil; coll. BIOTA/FAPESP team, 23 May 2002, intertidal rocky shore	1	—	—
			AM W29696 (paratype)	Ubatuba (23°32′S 44°43′W) – São Paulo, Brazil; coll. BIOTA/FAPESP team, 17 May 2001, 45 m	1	Notochaetae: segs. 7 and 17 Neurochaetae: segs. 7, 9, and posterior region with biramous parapodia	—
			AM W29697 (paratype)	Ubatuba (23°30′S 45°04′W) – São Paulo, Brazil; coll. BIOTA/FAPESP team, 21 Mar 2002, fine sand	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			ZMUC-POL-1816 (paratype)	Ubatuba (23°39′–41′S 45°17′–18′W) – São Paulo, Brazil; coll. BIOTA/FAPESP team, 23 May 2002	3	—	—
Pseudostreblosoma serratum	Hutchings & Murray, 1984	Botany Bay (34°36′S 151°07′48″E) – New South Wales, Australia	AM W18949 (holotype)	Botany Bay (34°36′S 151°07′48″E) – New South Wales, Australia; 24 Mar 1975, 8 m, subtidal, muddy sand	1	Notochaetae: segs. 4 and 14 Neurochaetae: seg. 14	—
			AM W195617	Georges River, E of Captain Cook Bridge (34°36′S 151°07′48″E) – New South Wales, Australia; 2 Feb 1975	3	—	—
Pseudothelepus binara	Hutchings, 1997a	Abrolhos Is, Wallabi Group (28°27′03″S 113°45′06″E) – Western Australia, Australia	AM W22505 (holotype)	Abrolhos Is, Wallabi Group (28°27′03″S 113°45′06″E) – Western Australia, Australia; coll. P. Hutchings, 30 May 1994, 38 m, scallop beds, sand and shell debris	1	Notochaetae: seg. 4 Neurochaetae: segs. 4 and posterior region after notopodia terminate	—
			AM W22506 (paratype)	Abrolhos Is, Wallabi Group (28°23′36″S 113°45′05″E) – Western Australia, Australia; coll. P. Hutchings, 30 May 1994, 35 m, scallop beds, shell and sponge debris	1	Notochaetae: segs. 26 and 27 Neurochaetae: seg. 27	—
Rhinothelepus lobatus	Hutchings, 1974	Wallis Lake (32°17′S 152°29′E) – New South Wales, Australia	AM W5234 (holotype)	Charlotte Bay, Wallis Lake (32°17′S 152°29′E) – New South Wales, Australia; Dec 1970, *Zostera* beds	1	Notochaetae: segs. 5 and 13 Neurochaetae: segs. 9, 13, and anterior region after notopodia terminate (seg. 24)	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W5228 (paratype)	Charlotte Bay, Wallis Lake (32°17′S 152°29′E) – New South Wales, Australia; Dec 1970, sandy mud clay with sparse *Halophila*	1	—	—
			AM W5229 (paratype)	Charlotte Bay, Wallis Lake (32°17′S 152°29′E) – New South Wales, Australia; Dec 1970, *Zostera* beds	1	—	—
			AM W5230 (paratype)	Charlotte Bay, Wallis Lake (32°17′S 152°29′E) – New South Wales, Australia; Dec 1970, *Zostera* beds	2	—	—
			AM W5231 (paratype)	Charlotte Bay, Wallis Lake (32°17′S 152°29′E) – New South Wales, Australia; Dec 1970, *Zostera* beds	1	—	—
			AM W5233 (paratype)	Charlotte Bay, Wallis Lake (32°17′S 152°29′E) – New South Wales, Australia; Dec 1970, *Zostera* beds	1	—	—
			AM W5235 (paratype)	Charlotte Bay, Wallis Lake (32°17′S 152°29′E) – New South Wales, Australia; Dec 1970, *Zostera* beds	1	—	—
			AM W5236 (paratype)	Charlotte Bay, Wallis Lake (32°17′S 152°29′E) – New South Wales, Australia; Dec 1970, *Zostera* beds	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W24047	Royal Prince Alfred Yacht Club, Pittwater (33°39′30″S 151°18′06″E) – New South Wales, Australia; Apr 1992, 10 m, sand	1	Notochaetae: seg. 8 Neurochaetae: segs. 8 and from region after notopodia terminate	—
Rhinothelepus occabus	Hutchings, 1990	North side of Tolo Channel (22°15′N 114°20′E) – Hong Kong, China	AM W201903 (holotype)	N side of Tolo Channel (22°15′N 114°20′E) – Hong Kong, China; 13 Apr 1986, 9 m, silt and sand	1	Notochaetae: segs. 5 and 16 Neurochaetae: segs. 12, and anterior (seg. 20) and posterior regions after notopodia terminate	—
			AM W201904 (paratypes)	N side of Tolo Channel (22°15′N 114°20′E) – Hong Kong, China; coll. P. Hutchings, 13 Apr 1986, silty sand	8	Notochaetae: seg. 12 Neurochaetae: segs. 12 and from posterior region after notopodia terminate	—
			AM W201904 (paratype)	N side of Tolo Channel (22°15′N 114°20′E) – Hong Kong, China; coll. P. Hutchings, 13 Apr 1986, silty sand	1	—	Yes
			AM W201905 (paratypes)	N side of Tolo Channel (22°15′N 114°20′E) – Hong Kong, China; coll. P. Hutchings, 13 Apr 1986, 7 m, mud, sand, shells	2	—	—
Streblosoma acymatum	Hutchings & Rainier, 1979	Port Jackson, Sydney (33°51′S 151°16′E) – New South Wales, Australia	AM W78 (holotype)	Port Jackson, Sydney (33°51′S 151°16′E)– New South Wales, Australia; coll. E.F Hallman, 1909	1	Neurochaetae: anterior and posterior regions after notopodia terminate	—
			AM W5107 (paratype)	Charlotte Bay, Wallis Lake (32°20′S 152°33′E) – New South Wales, Australia; Dec 1970	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W5108 (paratype)	Charlotte Bay, Wallis Lake (32°20′S 152°33′E) – New South Wales, Australia; Dec 1970	1	—	—
			AM W5766 (paratype)	Careel Bay (33°37′S 151°19′E) – New South Wales, Australia; 6 Feb 1973, *Posidonia*	1	Notochaetae: seg. 12 Neurochaetae: segs. 12 and from region after notopodia terminate	—
			AM W22478	Port Jackson, Sydney (33°52′S 151°100′E) – New South Wales, Australia; coll. M. Lincoln-Smith, Mar 1986	1	Notochaetae: segs. 21 and 26	—
Streblosoma bingarra	Nogueira & Hutchings, 2007	North Stradbroke Is., Moreton Bay (27°31′09″S 153°24′07″E) – Queensland, Australia	AM W30721 (holotype)	North Stradbroke Is., Moreton Bay (27°31′09″S 153°24′07″E) – Queensland, Australia; coll. P. Hutchings & K. Attwood, 9 Nov 2002, sand/mud flat at low tide	1	Notochaetae: segs. 6 and 16 Neurochaetae: segs. 6 and 14	—
Streblosoma oligobranchiatum	Nogueira & Amaral, 2001	Ilha dos Alcatrazes (26°06′S 45°42′W) – São Paulo, Brazil	MZUSP 00595	Praia São Franscisco, São Sebastião (23°45′25″S 45°24′25″W) – São Paulo, Brazil; coll. LaPol team, 19 Apr 2003, rocky shore	22	—	—
			MZUSP 00596	Praia São Franscisco, São Sebastião (23°45′25″S 45°24′25″W) – São Paulo, Brazil; coll. LaPol team, 16 Jul 2003, rocky shore	152	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			MZUSP 00597	Praia São Franscisco, São Sebastião (23°45′25″S 45°24′25″W) – São Paulo, Brazil; coll. LaPol team, 27 Sep 2003, rocky shore	104	—	—
			MZUSP 00598	Praia Preta, São Sebastião (23°49′15″S 45°24′35″W) – São Paulo, Brazil; coll. LaPol team, 18 Apr 2003, rocky shore	15	—	—
			MZUSP 00599	Praia Preta, São Sebastião (23°49′15″S 45°24′35″W) – São Paulo, Brazil; coll. LaPol team, 18 Jul 2003, rocky shore	1	—	—
			MZUSP 00600	Praia Barequeçaba, São Sebastião (23°49′35″S 45°26′30″W); coll. LaPol team, 20 Apr 2003, rocky shore	41	—	—
Streblosoma porchatensis	Nogueira, Garraffoni & Alves, 2004	Ilha Porchat, São Vicente (23°58′50″S 46°22′30″W) – São Paulo, Brazil	MHN-BPO 93/0 (holotype)	Ilha Porchat, São Vicente (23°58′50″S 46°22′30″W) – São Paulo, Brazil; coll. LaPol team, 15 Jun 2003, rocky shore	1	—	—
			MHN-BPO 93/1 (paratype)	Ilha Porchat, São Vicente (23°58′50″S 46°22′30″W) – São Paulo, Brazil; coll. LaPol team, 15 Jun 2003, rocky shore	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			MHN-BPO 93/2 (paratype)	Ilha Porchat, São Vicente (23°58′50″S 46°22′30″W) – São Paulo, Brazil; coll. LaPol team, 15 Jun 2003, rocky shore	1	—	—
			AM W29240 (paratype)	Ilha Porchat, São Vicente (23°59′S 46°22′30″W) – São Paulo, Brazil; coll. LaPol team, 15 Jun 2003, rocky shore	1	Notochaetae: segs. 5, 18, 21 and 35 Neurochaetae: segs. 8, 17, and posterior body	—
Thelepus cincinnatus	(Fabricius, 1780)	Greenland	ZMUC-POL-2016	Petit Passage, S of East Ferry, Digby Neck – Nova Scotia, Canada; coll. M.E. Petersen, 21 Jul 1970, lower intertidal, *Mytilus*	7	Notochaetae: segs. 5 and 40 Neurochaetae: segs. 5 and 40	—
			ZMUC-POL-2017	off Myggenæs, Faroe Is (61°40′N 7°40′W); coll. Bertelsen, 'Diana', 15 Sep 1902, 354 m	5	—	—
			ZMUB 31119	Spitsbergen, st. 39; 27 Jul 1923, 87–211 m	1 + tubes	Notochaetae: segs. 7 and 13 Neurochaetae: posterior region after notopodia terminate	—
Thelepus robustus	(Grube, 1878)	Philippines	AM W30722	North Stradbroke Is., Moreton Bay (27°31′09″S 153°24′07″E) – Queensland, Australia; coll. P. Hutchings & K. Attwood, 9 Nov 2002, sand/mud flat at low tide	3	Notochaetae: segs. 6 and 24 Neurochaetae: segs. 6, 24, and 48	—

TABLE 3. List of material of the family Terebellidae, subfamily Terebellinae, examined for the present study.

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Terebellidae	**Grube, 1850**						
Terebellinae	**Malmgren, 1866**						
Amphitrite affinis	(Malmgren, 1866)	Spitsbergen	ZMUC-POL-2018	Solitær Bugt (72°54'N 25°03'W) – Greenland; coll. East Greenland exp., st. 124, 24 Aug 1932	2	Notochaetae: segs. 6, 7, 12, 16, and 17 Neurochaetae: segs. 5, 10, 11, 19, and anterior (seg. 21) and posterior regions after notopodia terminate	—
			ZMUC-POL-2019	Skovfjord – Greenland; coll. 'Rink', st. 143, 17 Jul 1912, 65–90 m, clay with large stones	1	—	—
			ZMUC-POL-2020	Uttentalssund – Greenland; coll. Bertelsen, 7th 'Thule' Exp., Aug 1933	7	—	—
			ZMUC-POL-2021	Isafjord – Iceland; coll. Bertelsen, 17 Aug 1935	-4	—	—
			ZMUC-POL-2022	W Greenland (66°35'N 56°38'W); coll. 'Ingolf' st. 32, 11 Jul 1895, 599 m	1	—	—
Amphitrite cirrata	Müller, 1771 *in* 1776	Iceland	AM W34751	Denmark (57°09'N 9°E); coll. Fr. Johansen, 21 Jun 1905	1	—	Yes
			ZMUC-POL-2023	Herads Floin, Snurrevad – Iceland; coll. R. Hörring, 'Diana' st. 14, 29 May 1899, dredge	2	Notochaetae: segs. 9 and 18 Neurochaetae: segs. 5, 8, 17, 18, and anterior and posterior regions after notopodia terminate	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			ZMUC-POL-2024	Reykjavic – Iceland; coll. A.C. Johansen, 'Diana', 14 Oct 1900, 15 m, sponges	2	—	—
			ZMUC-POL-2025	Seydisfjord, Skúlavig – Iceland; coll. A.C. Johansen, 'Diana', 1900, 56 m, on iron anchor	1	—	—
			ZMUC-POL-2026	Reykjavic – Iceland; coll. A.C. Johansen, 'Diana', 26 Sep 1900, laminarians	1	Notochaetae: segs. 10 and 17 Neurochaetae: segs. 8, 17, and from anterior region after notopodia terminate	—
			ZMUC-POL-2027	off Havnefjord – Iceland; coll. Fr. Johansen, 'Beskytteren', 21 Jun 1905, 23 m	9	—	—
Amphitrite lobocephala	Hsieh, 1994	Hsiang-Shan (24°50'N 120°54'E) – Hsin-Chu Hsien, Taiwan	AM W20887 (paratypes)	Hsiang-Shan (24°50'N 120°54'E) – Hsin-Chu Hsien, Taiwan; 29 Sep 1990, intertidal sandy flat	3	—	—
			AM W20888 (paratypes)	Hsiang-Shan (24°50'N 120°54'E) – Hsin-Chu Hsien, Taiwan; coll. H. Hsieh, 10 Aug 1991, intertidal sandy flat	4	Notochaetae: segs. 10 and 11 Neurochaetae: segs. 10, 11, and from region after notopodia terminate	Yes, one of the paratypes examined under SEM
Amphitrite ornata	(Leidy, 1855)	Rhode Is., USA	YPM 30149	Barnstable Harbor, Cape Cod Bay – Massachusetts, USA; coll. D. Grant & P. Schwamb, 15 Jun 1964	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			YPM 30150	Lake Tashmoo, Duke County – Massachusetts, USA; coll. P. Shave, J. Reinhart & J. Speel, 29 Aug 1967	2	—	—
			YPM 30151	Lake Tashmoo, Duke County – Massachusetts, USA; coll. P. Shave, J. Reinhart & J. Speel, 29 Aug 1967	1	—	—
			YPM 40572	Beach off Plymouth, Plymouth County – Massachusetts, USA; coll. J. Reinhart & P. Shave, 11 Sep 1967	1	Notochaetae: segs. 5, 17, and 41 Neurochaetae: segs. 7, 10, 11, and posterior region after notopodia terminate (segs. 75 and 100)	—
			YPM 40591	Marine Biological Laboratory Supply House	1	—	—
Amphitrite pachyderma	Hutchings & Glasby, 1988	Peel Is., Moreton Bay (20°26'S 147°05'E) – Queensland, Australia	AM W5100 (holotype)	Peel Is., Moreton Bay (20°26'S 147°05'E) – Queensland, Australia; Jun 1970, 2 m, sand, mud and shells	1	—	—
			AM W7091 (paratypes)	Moreton Bay (20°26'S 147°05'E) - Queensland, Australia; May 1972	5	Notochaetae: segs. 10 and 11 Neurochaetae: segs. 10, 11, and anterior region after notopodia terminate	—
			AM W198246 (paratype)	Caliope River (23°55'S 151°10'E) - Queensland, Australia; Sep 1981, 8 m, coarse sand	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W198247 (paratypes)	Caliope River (23°55'S 151°10'E) - Queensland, Australia; Sep 1981	2	—	—
			MZUSP 00601	Tom Ugly's Bridge, Georges River (34°18'S 151°06'42"E) – New South Wales, Australia; 10 May 1972	3	—	—
Amphitrite cf. *variabilis*	(Risso, 1826)	Mediterranean Sea	MCEM-BPO 262	Brazilian southeastern continental shelf (25° 29'S 46°43'00"W) – Brazil; 11 Nov 1985, 90 m, mud	3	Notochaetae: segs. 5, 7, 8, and 18 Neurochaetae: segs. 6, 7, 8, 11, 20, and anterior, midlength and posterior regions after notopodia terminate	—
Amphitrite sp. A	—	—	LACM-AHF/ LH03-0913	Marina Bay Yacht Harbor, Richmond, San Francisco Bay, Contra Costa County – California, USA; coll. R. Ayres & G. Brooks (CAS), 12 Apr 2002, 0-1 m, fouling on concrete dock	1	—	—
			LACM-AHF/ LH03-0914	Port of Redwood city, San Mateo County – California, USA; coll. R. Mooi & C. Brown (CAS), 20 Sept 2002, 0-1 m, outer floating docks, taken from wire	1	Notochaetae: segs. 5, 16, and 48 Neurochaetae: segs. 6, 10, 11, and midlength and posterior regions after notopodia terminate	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			LACM-AHF/ LH03-0915	SE of San Francisco Intl. Airport, San Mateo County, San Francisco Bay – California, USA; coll. CAS, 16 Jan 2002, Petersen grab, 3 m, mud	1	—	—
Amphitrite sp. B	—	—	LACM-AHF/T628 Terebellidae	Not available	2	Notochaetae: segs. 7 and 17; Neurochaetae: segs. 6, 10, 11, and anterior and posterior regions after notopodia terminate	—
			LACM-AHF/T665 MBARI	Not available	1	—	—
			LACM-AHF/T666 R3	Not available	1	—	—
Amphitritides carawa	Nogueira & Hutchings, 2007	Cowan Creek, Cottage Point (33°39'S 151°10'E) – New South Wales, Australia	AM W30724 (holotype)	Cowan Creek, Cottage Point (33°39'S 151°10'E) – New South Wales, Australia; coll. P. Hutchings & J.M.M. Nogueira, 10 Oct 2004, intertidal, under rocks	1	Notochaetae: segs. 6, 9, 19, 20, and 22 Neurochaetae: segs. 7, 8, 11, 12, and anterior, midlength- and posterior regions after notopodia terminate	—
			AM W30725 (paratype)	Cowan Creek, Cottage Point (33°39'S 151°10'E) – New South Wales, Australia; coll. P. Hutchings & J.M.M. Nogueira, 10 Oct 2004, intertidal, under rocks	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W30727 (paratype)	Cowan Creek, Cottage Point (33°39'S 151°10'E) – New South Wales, Australia; coll. P. Hutchings & J.M.M. Nogueira, 10 Oct 2004, intertidal, under rocks	1	—	—
			MZUSP 17359 (paratypes)	Cowan Creek, Cottage Point (33°39'S 151°10'E) – New South Wales, Australia; coll. P. Hutchings & J.M.M. Nogueira, 10 Oct 2004, intertidal, under rocks	2	—	—
			AM W30723	Smiths Creek, Cottage Point (33°36'58″S 151°11'20″E) – New South Wales, Australia; 2 Jun 2001, intertidal	2	—	—
Amphitritides gracilis	(Grube, 1860)	Mediterranean Sea	MNHU Q5045 (syntypes)	Not available	4	Notochaetae: segs. 7, 16 and 17 Neurochaetae: segs. 5, 8, 11, and anterior (seg. 22) and posterior regions after notopodia terminate	—
			AM W200884	Wembury, Devon (50°19'01″N 4°04'40″W) – England; coll. P. Gibbs, 26 Mar 1970	2	—	—
Amphitritides harpa	Hutchings & Glasby, 1988	Eclipse Is., Great Barrier Reef (18°46'S 146°33'E) – Queensland, Australia	AM W200344 (holotype)	Eclipse Is., Great Barrier Reef (18°46'S 146°33'E) – Queensland, Australia, 13 m	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W200345 (paratype)	One Tree Is., Great Barrier Reef (23°30'S 152°05'E) – Queensland, Australia; Oct 1972	1	Notochaetae: segs. 10 and 11 Neurochaetae: segs. 11 and from region after notopodia terminate	—
Amphitritides ithya	Hutchings & Glasby, 1988	Port Denison (20°03'S 148°15'E) – Queensland, Australia	AM W200338 (holotype)	Port Denison (20°03'S 148°15'E) – Queensland, Australia	1	—	—
			AM W200339 (paratype)	W of Topsy Creek, Gulf of Carpentaria (15°28'30″S 140°53'12″E) – Queensland, Australia, 26 m	1	Notochaetae: segs. 10 and 11 Neurochaetae: segs. 10, 11, and from region after notopodia terminate	—
			MZUSP 00602	NE of East Wallabi Is., Houtman Abrolhos (28°24'S 113°46'09″E) – Western Australia, Australia; 30 May 1994	2	—	—
			NTM W2107	Mangrove Point, Broome (17°58'12″S 122°14'24″E) – Western Australia, Australia; coll. R. Hanley, 27 Sep 1984	1	—	—
			NTM W2794	East Point, Darwin (12°25'12″S 130°49'48″E) – Northern Territory, Australia; coll. R. Hanley, 18 May 1985	1	Notochaetae: seg. 18 Neurochaetae: seg. 18	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			NTM W2825	East Point, Darwin (12°25'12″S 130°49'48″E) – Northern Territory, Australia; coll. R. Hanley, 18 May 1985	1	—	—
			NTM W3954	Cable Beach, Broome (17°58'12″S 122°11'24″E) – Western Australia, Australia; coll. R. Hanley, 29 Sep 1984	2	—	—
Arranooba booromia	Hutchings & Glasby, 1988	Rat Is., Abrolhos Group (16°24'S 123°07'E) – Western Australia, Australia	AM W200429 (holotype)	Rat Is., Abrolhos Group (16°24'S 123°07'E) – Western Australia, Australia; 24 Aug 1982, 1 m, coral rubble	1	Notochaetae: segs. 6, 17, and 20 Neurochaetae: segs. 7, 15, 17, and anterior and posterior regions after notopodia terminate	—
Artacama benedeni	Kinberg, 1867	Brazil	AM W34749	Brazilian southeastern continental shelf (24°16'S 46°01'02″W) – Brazil; 17 Nov 1985, 45 m, sand	1	—	Yes
			MCEM-BPO 252	Brazilian southeastern continental shelf (25°29'S 46°43'W) – Brazil; 20 Mar 1984, 90 m, mud	1	—	—
			MCEM-BPO 254	Brazilian southeastern continental shelf (24°33'S 46°20'04″W) – Brazil; 23 Mar 1984, 48 m, muddy sand	3	Notochaetae: segs. 7 and 8 Neurochaetae: segs. 7, 8, and from region after notopodia terminate	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			MCEM-BPO 257	Brazilian southeastern continental shelf (25°49’S 46°43’W) – Brazil; 11 Nov 1985, 90 m, mud	4	—	—
			MCEM-BPO 258	Brazilian southeastern continental shelf (24°33’S 46°20'04″W) – Brazil; 14 Nov 1985, 45 m, muddy sand	1	—	—
Artacama proboscidea	Malmgren, 1866	Green Bay (Green Harbour), Vest Spitsbergen, Svalbard, Isfjord (78°N 14°E)	AM W34752	off Hälsingborg, Øresund (56°01'N 12°04'E) – Sweden; 12 Oct 1973, 30 m, mud and shells with pebbles	1	—	Yes
			SMNH 72080	Green Bay (Green Harbour), Vest Spitsbergen, Svalbard, Isfjord (78°N 14°E); 1868, 55 m	4	Notochaetae: segs. 9 and 14 Neurochaetae: segs. 6, 11, and from region after notopodia terminate	—
			SMNH 72082	Safe Harbour, Svalbard, Isfjord (78°15'N 13°55'E); 1898, 50–90 m	2	—	—
			SMNH 72084	Whalers Point, Edge Is., Svalbarg, Storfjord (77°20'N 20°30'E); 1864, 55–73 m	many	—	—
			ZMUC-POL-2028	Kara Sea; coll. 'Dijmphna' exp. 207, 1883, 94–138 m	5	—	—
			ZMUC-POL-2029	Kara Sea; coll. 'Dijmphna' exp. 207, 1883, 94–138 m	1	Notochaetae: segs. 6 and 18 Neurochaetae: segs. 6, 18, and from region after notopodia terminate	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			ZMUC-POL-2030	Kara Sea; coll. 'Dijmphna' exp. 207, 1883, 94–138 m	1	Notochaetae: segs. 9, 14, and 20 Neurochaetae: segs. 9, 20, and from region after notopodia terminate	—
			ZMUC-POL-2031	Knähaken, Øresund – Denmark; coll. K.W. Petersen, 'Ophelia', 12 Oct 1972, 20 m, soft bottom with shell and stones	16	—	—
			ZMUC-POL-2032	Knähaken, Øresund – Denmark; coll. K.W. Petersen, 'Ophelia', 12 Oct 1972, 20 m, soft bottom with shell and stones	1	Notochaetae: segs. 7 and 15 Neurochaetae: segs. 7, 15, and from region after notopodia terminate	—
Articulatia aberrans	Nogueira, Hutchings & Amaral, 2003	State of São Paulo, Brazil	AM W27134 (paratypes)	Ilha dos Alcatrazes (20°06'S 45°42'W) – São Paulo, Brazil; coll. J.M.M. Nogueira, 4 Dec 1996, 5 m, *Mussismilia hispida*	3	Whole specimen mounted	—
			AM W27135 (paratype)	Laje de Santos (24°19'S 46°11'W) – São Paulo, Brazil; coll. J.M.M. Nogueira, 17 Mar 1996, 5 m, *Mussismilia hispida*	1	—	—
			Unreg.	Laje de Santos (24°19'S 46°11'W) – São Paulo, Brazil; coll. J.M.M. Nogueira, 17 Mar 1996, 5 m, *Mussismilia hispida*	1	Notochaetae: anterior and posterior body	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Axionice flexuosa	(Grube, 1860)	Spitsbergen	ZMUC-POL-2033	Saunder's Is., Thule – Greenland; coll. C. Vibe, 31 Jul 1946, 43 m	7	Notochaetae: segs. 5, 15, and 16 Neurochaetae: segs. 5, 10, 11, 14, 18, and from region after notopodia terminate	—
Axionice maculata	(Dalyell, 1853)	Scotland	ZMUC-POL-2034	Tasiusak – Greenland; coll. 7th 'Thule' Exp. st. 19, 8 Aug 1933, 45–50 m, red algae and laminarians	2	—	—
			ZMUC-POL-2035	Tasiusak – Greenland; coll. 7th 'Thule' Exp. st. 19, 8 Aug 1933, 45–50 m, red algae and laminarians	1	Notochaetae: segs. 6 and 16 Neurochaetae: segs. 6, 10, 11, 19, and anterior region after notopodia terminate (seg. 21)	—
			ZMUC-POL-2036	Greenland (66°35'N 55°54'W); coll. 'Ingolf' Exp. st. 31, 11 Jul 1895, 166 m	2	—	—
			ZMUC-POL-2037	off Maroussia (76°45'N 18°W) – Greenland; coll. 'Denmark' Exp. st. 96, 22 Jul 1908, 160–178 m	1	—	—
			ZMUC-POL-2038	Fraskrudfjord – Iceland; coll. Hörring, 'Diana', 4 Apr 1899	1	—	—
Axionice spinifera	(Ehlers, 1912)	Bouvet Is. (Norwegian territory close to Antarctica)	Nonato private coll.	PROANTAR V, St. 5052, 24 Dec 1987, 212 m	1	Notochaetae: segs. 6 and 19 Neurochaetae: segs. 5–11, 20, and midlength and posterior regions after notopodia terminate	—
Baffinia biseriata	Hutchings & Glasby, 1988	Gabo Is. (37°34'S 149°55'E) – Victoria, Australia	AM W200437 (holotype)	Gabo Is. (37°34'S 149°55'E) – Victoria, Australia; 15 Feb 1973, 6 m, *Phyllospora* and red algae	1	Notochaetae: segs. 8 and 27 Neurochaetae: segs. 10, 27, and 43	Yes, some detached parapodia

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W200438 (paratype)	Gabo Is. (37°34'S 149°55'E) – Victoria, Australia; 15 Feb 1973, 23 m, sponges and ascidians	1	Neurochaetae: from region after notopodia terminate	—
			MZUSP 00603	North Head, Port Jackson (33°49'30″S 151°18'E) – New South Wales, Australia; 26 May 1972	4	—	—
Baffinia hesslei	(Annenkova, 1924)	Bering Sea	ZMUC-POL-0014	Vaigat, N of Disko Is., Baffin Bay (70°49'N 53°16'W) – Greenland; coll. 'Tjalfe' st. 159, 30 Jul 1908, 489 m	1	—	—
			ZMUC-POL-0015	Vaigat, N of Disko Is., Baffin Bay (70°49'N 53°16'W) – Greenland; coll. 'Tjalfe' st. 159, 30 Jul 1908, 489 m	1	Notochaetae: segs. 7, 9, 13, midbody, and posterior body Neurochaetae: segs. 9, 11, 13, midbody, and posterior body	—
Betapista dekkerae	Banse, 1980	British Columbia	BCPM 978-00174-001 (holotype)	Blubber bay, (49°48'12″N 124°37'06″W) – British Columbia, Canada; coll. D.V. Ellis, 8 Dec 1965, 25–35 m, clay sand	1	Notochaetae: segs. 8 and 18 Neurochaetae: segs. 5-11, 18, 22, and anterior region after notopodia terminate	—
Eupolymnia koorangia	Hutchings & Glasby, 1988	American River, Kangaroo Is. (35°48'S 137°46'E) – South Australia, Australia	AM W14028 (holotype)	Kangaroo Is., American River (35°48'S 137°46'E) – South Australia, Australia; Feb 1976	1	—	—
			AM W14027 (paratype)	Kangaroo Is., American River (35°48'S 137°46'E) – South Australia, Australia; Feb 1976	2	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W200726 (paratype)	Kangaroo Is., American River (35°48'S 137°46'E) – South Australia, Australia; Feb 1976	2	—	—
			AM W24036	Flinder Is., North East River (39°44.39'S 147°57'E) – Tasmania, Australia; 8 May 1997	3	—	—
			AM W34753	Shoreham Reef (38°26'S 145°03'E) – Victoria, Australia; Jan 1967	1	—	Yes
			NMV F52595	Shoreham Reef (38°26'S 145°03'E) – Victoria, Australia; Jan 1967	16	Notochaetae: segs. 7 and 19 Neurochaetae: segs. 7, 19, and from region after notopodia terminate	—
			NMV F90871	Cape Paterson (38°40.08'S 145°36.05'E) – Victoria, Australia; coll. T. O'Hara, May 1997, subtidal rocky reefs	9	—	—
Eupolymnia nebulosa	(Montagu, 1818)	England	AM W35295	Looe, Cornwall – England; 18 Mar 1972	1	Notochaetae: segs. 7 and 14 Neurochaetae: segs. 7, 12, and from region after notopodia terminate	—
			AM W200882	Looe, Cornwall – England; 18 Mar 1972	1	—	—
Eupolymnia nesidensis	(Delle Chiaje, 1828)	Gulf of Naples	SMF (unreg.)	Golfe du Lion, Banyuls-sur-Mer – Languedoc-Roussillon, France; 24 Mar 1997, 5 m, *Posidonia* beds in front of Laboratoire Arago	4	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			SMF (unreg.)	Banyuls-sur-Mer (42°28'60″N 3°07'60″E) – Languedoc-Roussillon, France; 17 Sep 1996, 7 m, *Posidonia* beds	1	—	—
			SMF (unreg.)	Banyuls-sur-Mer (42°28'60″N 3°07'60″E) – Languedoc-Roussillon, France; 10 Sep 1997, 10 m, *Posidonia* beds	1	—	—
			SMF (unreg.)	Golfe du Lion, Banyuls-sur-Mer – Languedoc-Roussillon, France; 19 Mar 1997, 5 m, *Posidonia* beds in front of Laboratoire Arago	2	—	—
			SMF (unreg.)	Golfe du Lion, Banyuls-sur-Mer (42°28'60″N 03°07'60″E) – Languedoc-Roussillon, France; 19 Mar 1997, 5 m, *Posidonia* beds in front of Laboratoire Arago	1	Notochaetae: segs. 7 and 19 Neurochaetae: segs. 6, 11, and anterior and posterior regions after notopodia terminate (segs. 22 and 51)	—
			ZMUC-POL-2039	Sundelaget, Faroe Is. – Denmark; coll. 'Kramp' st. 29, 29 Sep 1926, 5 m, laminarians	4	—	—
			ZMUC-POL-2040	Sounds S of Lysaa, Faroe Is. – Denmark; coll. 'Kramp' st. 34, 29 Sep 1926, 20–25 m, gravel, sand and shells	6	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			ZMUC-POL-2041	Fuglø , Faroe Is. (62°27'N 06°26'E) – Denmark; coll. Bruun, 'Dana' st. 3054, 30 Jun 1927, 90 m	5	—	—
			ZMUC-POL-2042	Funding Fjord, Faroe Is. – Denmark; coll. Brunn, 'Dana' st. 3056, 3 Jul 1927, 92 m	2	—	—
			ZMUC-POL-2043	Funding Fjord, Faroe Is. – Denmark; coll. Bruun, 'Dana' st. 3056, 3 Jul 1927, 92 m	1	Notochaetae: segs. 6 and 18 Neurochaetae: segs. 6, 10, 11, 20, and anterior region after notopodia terminate (seg. 23)	—
			ZMUC-POL-2044	Faxe Bay (64°06'N 22°08'W) – Iceland; coll. 'Dana' st. 6152, 28 Jul 1939, 27 m	1	—	—
			AM W200885	Torquay – England; 1 Feb 1971	1	—	—
Eupolymnia umbonis	Hutchings, 1990	East of Tap Mun (22°15'N 114°15'E) – Hong Kong, China	AM W201917 (holotype)	East of Tap Mun (22°15'N 114°15'E) – Hong Kong, China; Apr 1986, 15 m	1	Notochaetae: segs. 6 and 17 Neurochaetae: segs. 6, 11, and from region after notopodia terminate	—
Eupolymnia sp.	—	—	SMF (unreg.)	Golfe du Lion, Banyuls-sur-Mer (42°28'60"N 3°07'60"E) – Languedoc-Roussillon, France; 24 Mar 1997, 5 m, *Posidonia* beds in front of Laboratoire Arago	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Hadrachaeta aspeta	Hutchings, 1977	Broken Bay, Patonga Creek (33°32'S 151°18'E) – New South Wales, Australia	AM W6801 (holotype)	Broken Bay, Patonga Creek (33°32'S 151°18'E) – New South Wales, Australia; coll. W. McCormick, Jan 1973, mud adjacent to seaward margins of *Avicennia marina*	1	—	—
			AM W6853 (paratype)	Serpentine Creek, Moreton Bay (27°40'S 153°17'E) – Queensland, Australia; coll. C. Wallace, Aug 1972, mangroves	1	Notochaetae: segs. 6 and 15 Neurochaetae: segs. 5–11, and posterior region after notopodia terminate	Yes
			AM W6854 (paratype)	Broken Bay, Patonga Creek (33°32'S 151°18'E) – New South Wales, Australia; coll. W. McCormick, Jan 1973, mud adjacent to seaward margins of *Avicennia marina*	1	—	—
			AM W6855 (paratypes)	Yamba (29°26'S 153°22'E) – New South Wales, Australia; coll. W. McCormick, Mar 1973, mud in front of mangroves	6	—	—
			AM W6856 (paratypes)	Yamba (29°26'S 153°22'E) – New South Wales, Australia; coll. W. McCormick, Mar 1973, mud in front of mangroves	4	Notochaetae: segs. 6 and 16 Neurochaetae: segs. 8, 17, and anterior, midlength and posterior regions after notopodia terminate	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Hutchingsiella cowarrie	(Hutchings, 1997a)	Wallabi Group, Abrolhos Is. (28°24'S 113°46'16″E) – Western Australia, Australia	AM W22434 (holotype)	Wallabi Group, Abrolhos Is. (28°24'S 113°46'16″E) – Western Australia, Australia; coll. P. Hutchings, 30 May 1994, 35 m, scallop beds and shell debris	1	—	—
			AM W22541 (paratypes)	Wallabi Group, Abrolhos Is. (28°27'30″S 113°45'06″E) – Western Australia, Australia; coll. P. Hutchings, 30 May 1994, 35–38 m, scallop beds, medium to fine sand and shell debris with terebellids	2	—	—
			AM W22542	Beacon Is., Wallabi Group, Abrolhos Is. (28°27'30″S 113°46'42″E) – Western Australia, Australia; coll. P. Hutchings, 25 May 1994, 8 m, dead *Acropora* covered in coralline algae	1	Notochaetae: segs. 6 and 17	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W22543	Long Is., Wallabi Group, Abrolhos Is. (28°28'18″S 113°46'18″E) – Western Australia, Australia; coll. C. Bryce, 22 May 1994, 8 m, dead coral covered in coralline algae	1	—	—
			AM W22545	Wallabi Group, Abrolhos Is. (28°23'59″S 113°46'43″E) – Western Australia, Australia; coll. P. Hutchings, 30 May 1994, 39 m, scallop beds and shell debris	2	—	—
			AM W35298	Wallabi Group, Abrolhos Is. (28°23'59″S 113°46'43″E) – Western Australia, Australia; coll. P. Hutchings, 30 May 1994, 39 m, scallop beds and shell debris	1	Notochaetae: seg. 14 Neurochaetae: seg. 14	—
Lanassa exelysis	Hutchings & Glasby, 1988	Swan Bay, Port Phillip Bay (38°14'S 144°39'E) – Victoria, Australia	AM W200603 (holotype)	Swan Bay, Port Phillip Bay (38°14'S 144°39'E) – Victoria, Australia; 2 Jul 1981, subtidal, fine sand silt	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W200604 (paratype)	Swan Bay, Port Phillip Bay (38°14'S 144°39'E) – Victoria, Australia; 2 Jul 1981, subtidal, fine sand silt	1	—	—
			AM W200604 (paratypes)	Port Pirie, Spencer Gulf (33°12'S 138°00'E) – South Australia; 4–8 m, *Posidonia* and *Amphibolus*	3	Notochaetae: segs. 5 and 17 Neurochaetae: segs. 5, 17, and posterior regions after notopodia terminate	—
			NMV F52565	Swan Bay, Port Phillip Bay (38°14'S 144°39'E) – Victoria, Australia; fine sand silt, subtidal	1	Notochaetae: segs. 4 and 16 Neurochaetae: segs. 10, 16, and from region after notopodia terminate	—
Lanassa nordenskioeldi	Malmgren, 1866	Spitsbergen	SMNH 72088	Safe Bay, Svalbard, Vest Spitzbergen, Isfjord; 55 m	2	Notochaetae: seg. 16 Neurochaetae: segs. 10, 11, and from region after notopodia terminate	—
			ZMUB 1895	Magdalene Bay, Spitzbergen	1	Notochaetae: segs. 7 and 13	—
Lanassa ocellata	Hutchings & Glasby, 1988	Twofold Bay, Murumbulaga Point (37°06'S 149°56'E) – New South Wales, Australia	AM W200602 (holotype)	Twofold Bay, Murumbulaga Point (37°06'S 149°56'E) – New South Wales, Australia; 25 Jun 1985, intertidal, rock platform, cryptic fauna	1	—	—
			AM W202414	Port Pirie, Spencer Gulf (33°16'S 137°51'E) – South Australia, Australia; Aug 1979, 5 m, *Posidonia* and *Amphibolus*	1	Notochaetae: segs. 7–9, 14, and 15 Neurochaetae: segs. 10, 11, and anterior and posterior regions after notopodia terminate (segs. 21–23, and posterior chaetiger)	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W35296	Spencer Gulf (33º12'S 137º55'E) South Australia, Aug 1979, 5 m, *Posidonia* and *Amphibolus*	1	—	—
			AM W35297	Port Pirie, Spencer Gulf (33°16'S 137°51'E) – South Australia, Australia; Mar 1980, 5 m, *Posidonia* and *Amphibolus*	3	—	—
Lanassa sarsi	McIntosh, 1885	off Northern New Zealand	NIWA ST U262	Canyon just S of Kaikoura Peninsula (42°36'30″S 173°42'30″E) – New Zealand; 'Kaikoura Benthos cruise', st. U262, 15 Dec 1982, 890 m	1	Notochaetae: segs. 8 and 16 Neurochaetae: segs. 11, 19, and posterior region after notopodia terminate	—
			NIWA ST U263	Canyon just S of Kaikoura Peninsula (42°36'42″S 173°44'51″E) – New Zealand; 'Kaikoura Benthos cruise', st. U263, 1496 m, 15 Dec 1982	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Lanassa sp.	—	—	LACM-AHF/23279 BFI	off East Point, Santa Rosa Is. (33˚54’00″N 119˚54’00″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV', st. 23279-75, bio box core, 12 Nov 1975, 265 m	6	—	—
			LACM AHF/ 24263 BFI	off Point Bennett, San Miguel Is. (33˚57’00″N 120˚26’00″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV', st. 24263-76, bio box core, 17 Jan 1976, 237 m	4	—	—
			LACM- AHF/ 24385 BFI	off China Point, San Clemente Is. (32˚37’00″N 118˚59’00″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV', st. 24385-76, bio box core, 18 Feb 1976, 704 m	45	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			LACM-AHF/ 24385 BFI	off China Point, San Clemente Is. (32˚37’00″N 118˚59’00″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV', st. 24385-76, bio box core, 18 Feb 1976, 704 m	1	Notochaetae: segs. 6 and 14 Neurochaetae: segs. 5, 14, and from region after notopodia terminate	—
Lanice bidewa	Hutchings & Glasby, 1988	Cape Everard (37°16'S 150°03'E) – Victoria, Australia	AM W200764 (holotype)	Cape Everard (37°16'S 150°03'E) – Victoria, Australia; 16 Feb 1973, 10 m, *Phyllospora*	1	—	—
			AM W200687 (paratype)	Port Jackson, Green Point (33°53'S 151°13'E) – New South Wales, Australia; 19 Nov 1980, 5 m	1	—	—
			MZUSP 00604	NE entrance to Goss Passage, Beacon Is. (28°27'54″S 113°46'42″E) – Western Australia, Australia; 25 May 1994	1	—	—
			MZUSP 00605	NE of East Wallabi Is., Houtman Abrolhos (28°23'36″S 113°45'05″E) – Western Australia, Australia; 30 May 1994	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			MZUSP 00606	Wallabi Group, Houtman Abrolhos (28°36'31″S 113°44'56″E) – Western Australia, Australia; 28 May 1994	1	—	—
			NMV F94337	King Is., Central Bass Strait (39°13'36″S 143°55'36″E) – Tasmania, Australia; 23 Nov 1981	10	—	—
			NMV F94338	King Is., Central Bass Strait (39°13'36″S 143°55'36″E) – Tasmania, Australia; 23 Nov 1981	19	Notochaetae: segs. 9–12 Neurochaetae: segs. 5–12, and from region after notopodia terminate	—
			NMV F94339	King Is., Central Bass Strait (39°13'36″S 143°55'36″E) – Tasmania, Australia; 23 Nov 1981	12	—	—
Lanice conchilega	(Pallas, 1766)	Holland	USNM 203875	Katwyk – Netherlands; coll. H. Maden, 2 Aug 1933	2	Notochaetae: segs. 7, 9, 12, and 15 Neurochaetae: segs. 5–11, and from region after notopodia terminate (seg. 25)	—
			NMV F94336	unknown; donation from the Naples Aquarium	1	Notochaetae: seg. 14 Neurochaetae: segs. 5–9, 12, and from region after notopodia terminate	—
Lanice sinata	Hutchings & Glasby, 1990	Kimberley region, Descartes Is. (14°11'S 125°40'E) – Western Australia, Australia	AM W203513 (holotype)	Kimberley region, Descartes Is. (14°11'S 125°40'E) – Western Australia, Australia; 20 Jul 1988, intertidal sand flats	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W203514 (paratype)	Kimberley region, Descartes Is. (14°11'S 125°40'E) – Western Australia, Australia; 20 Jul 1988, intertidal sand flats	1	—	—
			AM W21846	Bangalow, Darwin Harbour (12°27'18″S 130°46'E) – Northern Territory, Australia; 9 Jul 1993	1	Notochaetae: segs. 6 and 18 Neurochaetae: segs. 5, 13, 14, anterior and posterior regions after notopodia terminate	—
			AM W21847	Gauthaume Point, Broome (17°58'S 122°14'E) – Western Australia, Australia; 1 Jul 1970	1	—	—
			AM W21851	Imalek Creek, Darwin Harbour (12°24'S 130°45'E) – Northern Territory, Australia; 22 Jul 1993	2	—	—
			AM W21861	West Point, Darwin Harbour (12°26'S 130°46'E) – Northern Territory, Australia; 17 Jul 1993, 8 m, sponges, algae, and coral rubble	1	—	—
			MZUSP 00607	Imalek Creek, Darwin Harbour (12°24'S 130°45'E) – Northern Territory, Australia; 22 Jul 1993	1	—	—
Lanice sp.	—	—	LACM-AHF/ BLM	North Pacific Ocean – California, USA	5	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			LACM-AHF/ 22943 BF	off China Point, San Clemente Is. (32˚44’00″N 119˚07’00″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV', st. 22943-75, bio box core, 12 Oct 1975, 314.5 m	5	Notochaetae: segs. 6 and 19 Neurochaetae: segs. 6, 10, 11, and anterior and posterior regions after notopodia terminate	—
			LACM-AHF/ 23151 BFI	off Judith Rock, San Miguel Is. (34˚00’00″N 120˚22’00″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV', st. 23151-75, bio box core, 5 Nov 1975, 54.8 m	1	—	—
			LACM-AHF/ 23192 BFI	off Ford Point, Santa Rosa Is. (33˚54’00″N 120˚01’00″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV', st. 23192-75, bio box core, 6 Nov 1975, 31 m	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			LACM-AHF/ 23195 BFI	off Ford Point, Santa Rosa Is. (33˚54’00″N 120˚00’00″W) – California, USA; coll. Allan Hancock Foundation, 'R/V *Velero* IV', st. 23195-75, bio box core, 6 Nov 1975, 36.5 m	1	—	—
			LACM-AHF/ 23211 BFI	off East Point, Santa Rosa Is. (33˚54’00″N 119˚57’00″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV', st. 23211-75, bio box core, 8 Nov 1975, 73. 1 m	2	—	—
			LACM-AHF/ 23279 BFI	off East Point, Santa Rosa Is. (33˚54’00″N, 119˚54’00″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV', st. 23279-75, bio box core, 12 Nov 1975, 155 m	2	—	—
Lanicides attenuata	Hutchings & Glasby, 1990	Enderby Is. (20°36'S 116°31'24″E) – Western Australia, Australia	AM W203539 (holotype)	Enderby Is. (20°36'S 116°31'24″E) – Western Australia, Australia; 31 Mar 1987, intertidal mudflats	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W203540 (paratype)	Roly Rock, Dampier Archipelago (20°28'54″S 116°30'06″E) – Western Australia, Australia; 27 Mar 1987, 10–15 m, crevice fauna	1	—	—
			AM W22495	Long Is., Abrolhos Is. (28°28'10″S 113°46'10″E) – Western Australia, Australia; 24 May 1992, 24 m, coralline algae	1	—	—
			MZUSP 00608	Beacon Is., Goss Channel (28°27'32″S 113°47'E) – Western Australia, Australia; 25 May 1992	1	Notochaetae: segs. 9 and 16 Neurochaetae: segs. 5–11, and posterior region after notopodia terminate	—
Lanicides banatawa	Hutchings, 1997b	Darwin Harbour, Weed Reef (12°30'S 129°48'E) – Northern Territory, Australia	NTM W4233 (holotype)	Weed Reef, Darwin Harbour (12°30'S 129°48'E) – Northern Territory, Australia; coll. R. Hanley, 8 Jun 1984, 11 m, rocky reef	1	—	—
			NTM W9548 (paratype)	Flat Top Bank (12°15'S 129°15'E) – Northern Territory, Australia; coll. R. Hanley, 17 May 1992, subtidal, sandy	1	Notochaetae: seg. 11 Neurochaetae: segs. 5–11, and from region after notopodia terminate	—
Lanicides bilobata	(Grube, 1877)	Strait of Magellan	MNHU 898 (holotype)	Not available	1	Notochaetae: segs. 7 and 18 Neurochaetae: segs. 5–11, and from region after notopodia terminate	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Lanicides fascia	Hutchings & Glasby, 1988	Port Macdonnell, Cape Northumberland (38°03'S 140°42'E) – South Australia, Australia	AM W200608 (holotype)	Port Macdonnell, Cape Northumberland (38°03'S 140°42'E) – South Australia, Australia; 27 Feb 1978, under rocks in sheltered pool	1	Neurochaetae: seg. 5	—
Lanicides lacuna	Hutchings & Glasby, 1988	One Tree Is., Great Barrier Reef (23°30'S 152°05'E) – Queensland, Australia	AM W200609 (holotype)	One Tree Is., Great Barrier Reef (23°30'S 152°05'E) – Queensland, Australia; Oct 1972, 10 m, dead coral substrate in lagoon	1	—	—
			AM W200610 (paratype)	One Tree Is., Great Barrier Reef (23°30'S 152°05'E) – Queensland, Australia; Oct 1972, 10 m, dead coral substrate in lagoon	1	Notochaetae: segs. 8 and 14 Neurochaetae: segs. 5–11, and anterior and posterior regions after notopodia terminate	—
			AM W200761	One Tree Is., Capricorn Group (23°30'S 152°05'E) – Queensland, Australia; Oct 1972	3	—	—
			AM W200878	One Tree Is., Capricorn Group (23°30'S 152°05'E) – Queensland, Australia; coll. F. Talbot, 20 Sep 1969, dead *Acropora* in lagoon	1	—	Yes

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W200879	One Tree Is., Capricorn Group (23°30'S 152°05'E) – Queensland, Australia; 20 Sep 1969	1	—	—
			AM W200881	One Tree Is., Capricorn Group (23°30'S 152°05'E) – Queensland, Australia; 20 Sep 1969	1	—	—
			MZUSP 00609	NW of West Lewis Is. (20°33'31″S 116°38'12″E) – Western Australia, Australia: 26 Jul 2000	7	—	—
Lanicides tribranchiata	Hutchings & Glasby, 1988	Solitary Is. (30°12'S 153°16'E) – New South Wales, Australia	NMV F52569 (paratype)	Bass Strait (38°15'S 147°22'E) – Victoria, Australia; coll. MV 'Sprightly' dredging cruise, 31 Jul 1983, 16 m	1	—	—
			NMV F52570 (paratype)	E Bass Strait, 50 km SW of Lakes Entrance (38°15'00″S 147°22'30″E) – Victoria, Australia; coll. M.F. Gomon & R.S. Wilson (F/V 'Silver Gull'), 31 Jul 1983, 16 m, epibenthic sled	1	—	—
			NMV F52571 (paratype)	Bass Strait (38°15'S 147°22'E) – Victoria, Australia; coll. MV 'Sprightly' dredging cruise 1976, 31 Jul 1983, 16 m	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			NMV F52572 (paratype)	Wilson's Promontory, Cape Wellington (38°56'S 146°22'E) – Victoria, Australia; 2 Feb 1982	1	—	—
			MZUSP 00610	100 m NW of Julian Rocks, Byron Bay (28°36'48″S 153°37'48″E) – New South Wales, Australia; 4 Mar 1992	1	—	—
			MZUSP 00611	Richmond River, near Ballina (28°52'30″S 153°33'36″E) – New South Wales, Australia; 5 Mar 1992	1	—	—
			NMV F91050	Point Hicks (37°48'07″S 149°17'34″E) – Victoria, Australia; coll. T. O'Hara, 26 Mar 1996, 10 m	1	Notochaetae: segs. 9 and 20 Neurochaetae: segs. 5–11, and from region after notopodia terminate	—
Lanicola carus	(Young & Kritzler, 1987)	Twin Cays (16°50'N 88°06'W) – Belize	USNM 098908 (holotype)	Twin Cays (16°50'N 88°06'W) – Belize; coll. D.K. & M.W. Young, 9 Mar 1984, 2 m	1	Notochaetae: segs. 7 and 18 Neurochaetae: segs. 7 and 18	—
Lanicola lobata	Hartmann-Schröder, 1986	Port Riley, Wallaroo – South Australia, Australia	AM W34754	W of Eagles Nest (38°40'S 145°41'E) – Victoria, Australia; 19 Feb 1968	1	—	Yes
			NMV F52566	Western Port (38°14'28″S 145°21'52″E) – Victoria, Australia; 7 Jan 1974	1	Neurochaetae: segs. 5–11	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			NMV F52567	Western Port (38°14'28″S 145°21'52″E) – Victoria, Australia; 7 Jan 1974	1	—	—
			NMV F52568	Western Port (38°14'28″S 145°21'52″E) – Victoria, Australia; 7 Jan 1974	1	—	—
			NMV F91199	Point Nepean, Cheviot Beach (38°18'S 144°40'E) – Victoria, Australia; coll. T. O'Hara, 3.5–5 m	1	Notochaetae: segs. 10 and 11 Neurochaetae: segs. 10, 11, and from region after notopodia terminate	—
			NMV F94334	Kilcunda Beach (38°33'S 145°28'E) – Victoria, Australia; 13 Jan 1966	4	Notochaetae: segs. 5 and 12 Neurochaetae: segs. 5, 12, and from region after notopodia terminate	—
			NMV F94335	Kilcunda Beach (38°33'S 145°28'E) – Victoria, Australia; 13 Jan 1966	6	—	—
			NMV F94341	East of Jetty, Hopetoun (33°57'S 120°07'E) – Western Australia, Australia; coll. B.J.S., 13 Nov 1969, rock platform	1	Neurochaetae: seg. 5	—
			NMV F94342	East of Jetty, Hopetoun (33°57'S 120°07'E) – Western Australia, Australia; coll. B.J.S., 13 Nov 1969, rock platform	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			NTM W3667	Lee Point, Darwin (12°07'48″S 130°53'24″E) – Northern Territory, Australia; coll. R. Hanley, 12 Feb 1986, LWS	1	Notochaetae: seg. 11 Neurochaetae: seg. 11	—
Laphania boecki	Malmgren, 1866	Finmark, Norway	SMNH 72089	South Western Greenland (64°11'N 51°45'W); 183 m, sand shell	1	Notochaetae: segs. 7 and 17 Neurochaetae: segs. 10, 11, and anterior region after notopodia terminate (seg. 28)	—
			SMNH 72090	Finnmark (70°50'N 25°30'E) – Norway	1	—	—
Leaena ebranchiata	(Sars, 1865)	Norway	ZMUC-POL-2045	Greenland (77°05'30″N 71°13'W); coll. 'Godthaab' Exp. st. 87, 4 Aug 1928, 790 m	1	Notochaetae: seg. 9 Neurochaetae: segs. 6, 12, and from posterior region after notopodia terminate	—
			ZMUC-POL-2046	Greenland (77°17'N 69°59'W); coll. 'Godthaab' Exp. st. 90, 5 Aug 1928, 930 m	1	Notochaetae: segs. 6 and 12 Neurochaetae: seg. 12	—
			ZMUC-POL-2047	Kara Sea; coll. 'Dijmphna' Exp. st. 335, 111 m	1	—	—
			ZMUC-POL-2048	Danmarks Fjord – Greenland; coll. 3 Year East Greenland Exp., st. 33, 21 Aug 1933, 22 m	2	—	—
			ZMUC-POL-2049	Marmorilik – Greenland; coll. MAIA Aps., st. 16B, 2 Sep 1976	2	—	—
			ZMUC-POL-2050	Lyngmarksbugt, Disko Is. – Greenland; coll. Høpner & Curtis, st. 400, 6 Apr 1960, 36 m	12	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			ZMUC-POL-2051	Seydisfjord – Iceland; coll. ‘Ingolf’ Exp., 14 May 1895	5	—	—
			ZMUC-POL-2052	Faroe Is. (63°26'N 7°56'W) – Denmark; coll. 'Ingolf' Exp. st. 138, 10 Aug 1896, 887 m	3	—	—
Leaena sp. 1	—	—	LACM-AHF/unreg.	Coll. 28 March 2003; det. Leslie Harris; no more data available	1	Notochaetae: segs. 6 and 12 Neurochaetae: segs. 6, 17, and from posterior region after notopodia terminate	—
Leaena sp. 2	—	—	ZMUC-POL-2053	Greenland (74°12'N 77°00'W); 'Godthaab' Exp. st. 131, 22 Aug 1928, 680 m	1	Notochaetae: segs. 5, 9, and 16 Neurochaetae: segs. 9, 16, and from posterior region after notopodia terminate	—
Leaena sp. 3	—	—	NIWA S156	SE of Banks Peninsula, right on the shelf drop off (44°12'18″S 173°29'54″E) – New Zealand; 28 Oct 1979, 27 m	4	Notochaetae: segs. 5 and 11 Neurochaetae: from region after notopodia terminate	—
			NIWA S170	Offshore, E of Banks Peninsula (43°59'48″S 174°19'12″E) – New Zealand; 30 Oct 1979, 565 m	1	—	—
Loimia batilla	Hutchings & Glasby, 1988	Moreton Bay, S of Peel Is. (20°26'S 147°05'E) – Queensland, Australia	AM W5162 (holotype)	S of Peel Is., Moreton Bay (20°26'S 147°05'E) – Queensland, Australia; 1971, sand, mud, shells	1	—	—
			AM W7097 (paratype)	Middle Banks off Tangalooma (27°12'S 153°21'48″E) – Queensland, Australia; Dec 1972	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W7098 (paratype)	Middle Banks off Tangalooma (27°12'S 153°21'48″E) – Queensland, Australia; Dec 1972	1	—	—
			AM W7106 (paratypes)	Middle Banks off Tangalooma (27°12'S 153°21'48″E) – Queensland, Australia; Dec 1972	3	—	—
			AM W7107 (paratype)	Moreton Bay, S of Peel Is. (20°26'S 147°05'E) – Queensland, Australia; Jun 1970, 2 m, sand, mud, shells	1	Notochaetae: segs. 6, 9, 15, and 19 Neurochaetae: segs. 6, 11, and from region after notopodia terminate	—
Loimia cf. *grubei*	(Grube, 1878)	Philippines	MCEM-BPO 301	Brazilian southeastern continental shelf (24°53’S 46°46'07″W) – Brazil; 18 Aug 1982, 47 m, sand	1	—	—
			MCEM-BPO 302	Brazilian southeastern continental shelf (24°26’S 46°01'02″W) – Brazil; 26 Mar 1984, 45 m, sand	3	—	—
			MCEM-BPO 303	Brazilian southeastern continental shelf (26°51’S 47°06'01″W) – Brazil; 6 Nov 1985, 75 m, muddy-sand	1	—	—
			MCEM-BPO 304	Brazilian southeastern continental shelf (24°16’S 46°01'02″W) – Brazil; 17 Nov 1985, 45 m, sand	2	Notochaetae: segs. 6–8, 13, and 14; Neurochaetae: segs. 5, 11, and from anterior and posterior regions after notopodia terminate	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Loimia ingens	(Grube, 1878)	Philippines	MZUSP 00612	South Ledge, Cook Is. (28°11'39″S 153°34'37″E) – New South Wales, Australia; 9 Jun 1993	1	—	—
			MZUSP 00613	North Ledge, Cook Is. (28°11'26″S 153°34'40″E) – New South Wales, Australia; 8 Jun 1993	1	—	—
			MZUSP 00614	Foot of drop off North Point, Lizard Is. (14°40'S 145°28'E) – Queensland, Australia; 8 Mar 1986	3	—	—
			NTM W3222	East Bay, Port Essington (11°24'36″S 132°11'24″E) – Northern Territory, Australia; coll. R. Hanley, 16 Sep 1985, LWS	1	—	—
			NTM W3628	Mangrove Creek Point, Port Essington (11°24'S 132°10'12″E) – Northern Territory, Australia; coll. R. Hanley, 15 Sep 1985	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			NTM W6764	E end of Napier Bay, Mission Bay, Broome (14°06'S 126°42'E) – Western Australia, Australia; coll. R. Hanley, 14 Aug 1988	12	—	Yes
			NTM W6775	Scorpion Island – West Australia, Australia	1	Notochaetae: segs. 8 and 15 Neurochaetae: segs. 8, 11, and from region after notopodia terminate	—
			NTM W14011	Annesley Point, Murganella (11°24'S 132°51'E) – Northern Territory, Australia; coll R. Hanley, 18 Jun 1984, intertidal	1	Notochaetae: seg. 11 Neurochaetae: segs. 6, 11, and from region after notopodia terminate	—
			NTM W14012	Sandy Beach, Victoria Settlement, Port Essington (11°21'36″S 132°09'E) – Northern Territory, Australia; coll. R. Hanley, 11 Sep 1985, LWM	7	—	—
			NTM W17193	Tulamben – Bali, Indonesia; coll. K.L. Gowlett-Holmes, 10 Oct 2000	1	—	—
			NTM W17330	Wreck of MV ‘Sanyo Maru’, 31km NNW of Cape Stewart (11°41'24″S 134°36'36″E) – Northern Territory, Australia; coll. R.C. Willan & G. Dally, 22 Apr 2002	5	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Loimia medusa	(Savigny, 1818)	Coast of Red Sea (original description); upper Persian Gulf, Red Sea (neotype)	LACM-AHF Poly 1656 (neotype)	Upper Persian Gulf; coll. Tetra Tech, Apr 1982 st. 2S2, shallow shelf	1	Notochaetae: segs. 10 and 15 Neurochaetae: segs. 10, 12, and from anterior and posterior regions after notopodia terminate	—
Loimia cf. *medusa*	(Savigny, 1818)	Coast of Red Sea (original description); upper Persian Gulf, Red Sea (neotype)	MCEM-BPO 288	Paranaguá Bay (25°30'10″S 48°29'W) – Paraná, Brazil; 28 May 1982, 5 m, muddy-sand with shells	2	—	—
			MCEM-BPO 289	Paranaguá Bay (25°30'S 48°17'W) – Paraná, Brazil; 17 Jul 1983, 7 m, sand	1	Notochaetae: segs. 7–9 and 18 Neurochaetae: segs. 6–8, 12, 26, and from posterior region after notopodia terminate	—
			MCEM-BPO 291	Paranaguá Bay – Paraná, Brazil; 24 Jun 1986, intertidal	1		—
			MCEM-BPO 292	Paranaguá Bay (25°S 48°20'W) – Paraná, Brazil; 24 Jun 1984, intertidal, banks of bivalves	4	—	—
			MCEM-BPO 294	Paranaguá Bay (26°35'S 45°25'00″W) – Paraná, Brazil; 7 Jan 1986, 18 m, sand with gravel and mud	1	—	—
			MCEM-BPO 295	Paranaguá Bay (26°35'S 45°25'00″W) – Paraná, Brazil; 27 Feb 1986, 18 m, sand with gravel and mud	1	—	—
			MCEM-BPO 296	Paranaguá Bay (26°33'S 48°25'00″W) – Paraná, Brazil; 26 Jun 1986,18 m, sand with gravel and mud	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			MCEM-BPO 297	Paranaguá Bay (26°33'S 48°25'00″W) – Paraná, Brazil; 1 Jul 1986, 18 m, sand with gravel and mud	2	Notochaetae: segs. 7 and 8 Neurochaetae: segs. 7, 8, and from region after notopodia terminate	—
			MCEM-BPO 298	Paranaguá Bay (26°33'S 48°25'00″W) – Paraná, Brazil; 5 Aug 1986, 18 m, sand with gravel and mud	1	—	—
			MCEM-BPO 299	Paranaguá Bay (25°29'42″S 48°29'42″W) – Paraná, Brazil; 3 Jul 1986, 16 m, fine sand	1	—	—
			MCEM-BPO 300	Paranaguá Bay (25°29'42″S 48°42'W) – Paraná, Brazil; 7 Aug 1986, 16 m, fine sand	1	—	—
Longicarpus modestus	(Quatrefages, 1865)	Jervis Bay, New South Wales, Australia	AM W25175	500 m S of Tathra Head (36°43'44″S 149°49'46″E) – New South Wales, Australia; 16 May 1995, 16 m, sponge	1	Notochaetae: segs. 6 and 24 Neurochaetae: segs. 5, 10, 11, and from anterior and posterior regions after notopodia terminate	—
			AM W34755	Port Phillip Bay (38°06'36″S 144°30'48″E) – Victoria, Australia; coll. NMV, 22 Jan 1961, 4.5 m	1	—	Yes
			AM W195332	Port Jackson (33°51'S 151°16'E) – New South Wales, Australia	1	—	—
			AM W195333	Port Jackson (33°51'S 151°16'E) – New South Wales, Australia	many	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W201823	Crawfish Rock (38°16'S 145°17'E) – Victoria, Australia, 10 m	1	—	—
			NMV F41682	off St. Leonards, Bellarine Peninsula, Port Phillip Bay (38°10'30″S 144°43'30″E) – Victoria, Australia; 5 May 1963	2	—	—
			NMV F41718	Centre of mouth of Corio Bay, Port Phillip Bay (38°06'36″S 144°37'48″E) – Victoria, Australia .	1	Notochaetae: seg. 7 Neurochaetae: segs. 5–11	—
			NMV F41719	Port Phillip Bay near The Pope's Eye (38°16'12″S 144°42'E) – Victoria, Australia; 21 Feb 1960	7	—	—
			NMV F94344–94345	Portland Pier (38°18'S 141°36'E) – Victoria, Australia; coll. B.J.S., 14 Dec 1968	6	Notochaetae: segs. 9 and 16 Neurochaetae: segs. 5, 9, 16, and from region after notopodia terminate	—
Longicarpus nodus	Hutchings, 1990	Wong Wan Chau (22°31'N 114°18'E) – Hong Kong, China	AM W201932 (holotype)	Wong Wan Chau (22°31'N 114°18'E) – Hong Kong, China; 12 Apr 1986, 5 m, boulders	1	—	—
			AM W201933 (paratype)	Ferry Pier, Lai Chi Chong (22°27'N 114°18'E) – Hong Kong, China; 17 Apr 1986	2	Notochaetae: segs. 7 and 24 Neurochaetae: segs. 5–11, and from anterior and posterior regions after notopodia terminate	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W201938 (paratypes)	Tide Pole Point, Hoi Ha (22°28'N) – Hong Kong, China; 16 Apr 1986, boulders, crevice fauna	14	—	—
			MZUSP 00615	Sui Mun, just off Double Haven – Hong Kong, China; 7 Apr 1986	4	—	—
Morgana bisetosa	Nogueira & Amaral, 2001	Ilha dos Alcatrazes (26°06'S 45°42'W) – São Paulo, Brazil	AM W27133	Ilha dos Alcatrazes (26°06'S 45°42'W) – São Paulo, Brazil; coll. J.M.M. Nogueira, 4 Dec 1996	3	—	—
			MZUSP 00616	Laje de Santos (24°19'S 46°11'W) – São Paulo, Brazil; coll. J.M.M. Nogueira, 17 Mar 1996	1	Notochaetae: posterior seg.	—
Naneva hespera	Chamberlin, 1919	Balboa, Laguna Beach – California, USA	MCZ 2169 (holotype)	Balboa, Laguna Beach – California, USA; coll. W.A. Hilton	1	Notochaetae: segs. 5, 7, 17, and 19 Neurochaetae: segs. 5, 17, and from anterior and posterior regions after notopodia terminate	—
Neoleprea booligal	Hutchings, 1997a	Wallabi Group, Abrolhos Is. (28°27.05'S 113°45.10'E) – Western Australia, Australia	NTM W18327	Taylor Street Jetty, Esperance (33°51'S 121°54'36″E) – Western Australia, Australia; coll. Mulligan, Mar 2002	1	Notochaetae: segs. 9–11 Neurochaetae: from region after notopodia terminate	—
			NMV F94349	W of Eagles nest – Victoria, Australia; coll. R. Jensz, Jan 1966	1	Notochaetae: segs. 4, 10, and 11 Neurochaetae: segs. 10, 11, and from region after notopodia terminate	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Neoleprea macrocercus	Hutchings & Glasby, 1988	Diggers Camp, between Minnie Water and Wooli (29°19'S 153°17'E) – New South Wales, Australia	AM W200340 (holotype)	Diggers Camp, between Minnie Water and Wooli (29°19'S 153°17'E) – New South Wales, Australia; 27 Feb 1971, rock pool	1	Neurochaetae: segs. 8, 10, and 11	—
			AM W200341 (paratype)	Diggers Camp, between Minnie Water and Wooli (29°19'S 153°17'E) – New South Wales, Australia; 27 Feb 1971, rock pool	1	Notochaetae: segs. 5, 17, and 30 Neurochaetae: segs. 7–12, 16, and from anterior and posterior regions after notopodia terminate	—
			AM W200342 (paratypes)	Diggers Camp, between Minnie Water and Wooli (29°19'S 153°17'E) – New South Wales, Australia; 27 Feb 1971, rock pool	2	—	—
			AM W200343	SW of Solitary Is. (30°13'S 153°16'E) – New South Wales, Australia; 18 May 1972, 18 m, clumps of corals and ascidians	1	—	—
			AM W201178	Split Solitary Is., NE of Coffs Harbour (30°15'S 153°11'E) – New South Wales, Australia; 26 Apr 1986, 10 m	3	—	—
			AM W201179	S of Old Bar (32°S 152°34'E) – New South Wales, Australia; 28 Apr 1986, intertidal pool	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Neoleprea papilla	Hutchings & Smith, 1997	Leigh Harbour (36°20'S 174°48'E) – New Zealand	NIWA Z8813	Not available	1	—	—
			NIWA (unreg.)	Not available	3	Notochaetae: segs. 10 and 24 Neurochaetae: segs. 11, and from anterior and posterior regions after notopodia terminate (segs. 29 and posterior chaetiger)	—
Neoleprea sp.	—	—	NIWA St. S186	Canyon Coral (43°16'12″S 173°35'24″E) – off New Zealand; 450 m	1	—	—
			NIWA St. T554	Altrina Benthic (41°04'48″S 173°48'E) – off New Zealand; 18 m	1	Notochaetae: segs. 9 and 12 Neurochaetae: segs. 10, 11, and 24	—
Nicolea amnis	Hutchings & Murray, 1984	Botany Bay (33°58.11'S 151°11.9'E) – New South Wales, Australia	AM W196218 (holotype)	Botany Bay (33°58'11″S 151°11'09″E) – New South Wales, Australia; 8 Feb 1978, 10 m	1	—	—
			AM W196837 (paratypes)	Botany Bay (33°58'11″S 151°11'09″E) – New South Wales, Australia; 8 Feb 1978, 9 m	5	Notochaetae: segs. 6 and 13 Neurochaetae: segs. 10, 11, and from region after notopodia terminate	—
			AM W34756	Gabo Is. (37°34'S 149°55'E) – Victoria, Australia; coll. S.A. Shepherd, 17 Feb 1973, 8 m	1	—	Yes
			MZUSP 00617	Woodmans Groin, Fremantle (32°08'S 115°44'E) – Western Australia, Australia; 4 Mar 1972	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			MZUSP 00618	Western Australia, Sulphur Rock Channel, Cockburn Sound (32°11'S 115°43'E) – Western Australia, Australia;16 Jan 1972	1	—	—
			NMV F94347	Gabo Is. (37°34'S 149°55'E) – Victoria, Australia; coll. S.A. Shepherd, 17 Feb 1973	2	—	—
			NMV F94348	Gabo Is. (37°34'S 149°55'E) – Victoria, Australia; coll. S.A. Shepherd, 17 Feb 1973	1	Notochaetae: seg. 10 Neurochaetae: segs. 11–13, and from region after notopodia terminate	—
Nicolea armilla	Hutchings & Smith, 1997	Matheson Bay, North Is. (36°18'05″S 174°48'02″E) – New Zealand	AM W22585 (holotype)	Matheson Bay, North Is. (36°18'05″S 174°48'02″E) – New Zealand; 18 Mar 1992, intertidal	1	—	—
			NIWA Z8989	Not available	1	Notochaetae: segs. 6 and 19 Neurochaetae: segs. 11 and from region after notopodia terminate	—
			NIWA (unreg.)	Not available	6	—	—
Nicolea lazowasemi	Nogueira, 2008	Long Is. Sound, New Haven County – Connecticut, USA	YPM 40593 (holotype)	Long Is. Sound, New Haven County – Connecticut, USA; coll. W.D. Hartman, 25 Mar 1955, below mean low water	1	Neurochaetae: segs. 15 and from posterior region after notopodia terminate	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			YPM 40594 (paratype)	Long Is. Sound, New Haven County – Connecticut, USA; coll. W.D. Hartman, 25 Mar 1955, below mean low water	1	Notochaetae: segs. 8 and 15 Neurochaetae: segs. 8, 10, 11, and from region after notopodia terminate	—
			YPM 40595 (paratypes)	Long Is. Sound, New Haven County – Connecticut, USA; coll. W.D. Hartman, 25 Mar 1955, below mean low water	3	—	—
			YPM 40603 (paratypes)	Long Is. Sound, New Haven County – Connecticut, USA; coll. W.D. Hartman, 25 Mar 1955, below mean low water	many	—	—
Nicolea maxima	Augener, 1923	Akaroa Harbour – New Zealand	NIWA T494	Altrina Benthic (41°07'52″S 174°22'12″E) – off New Zealand; 18m	1	—	—
			NIWA Knox 191 (unreg.)	Musgrave Harbour, New Zealand; Apr 1942	1	Notochaetae: segs. 7 and 11 Neurochaetae: segs. 11 and from region after notopodia terminate	—
Nicolea simplex	Verrill, 1873	New Haven to Vineyard Sound – USA Northeastern Coast	YPM 162 (syntype)	Long Is. Sound, New Haven County – Connecticut, USA; coll. A.E. Verrill and class, 1865	1	Notochaetae: segs. 9 and 16 Neurochaetae: segs. 7, 10, 11, and from region after notopodia terminate	—
			YPM 2958 (syntypes)	Block Is. Sound, Washington County – Rhode Is., USA; coll. A.E. Verrill, 12 Apr 1873	7	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Nicolea zostericola	(Örsted, 1844)	Denmark	AM W9147	Cape Cod Bay (42°N 70'W) – Massachusetts, USA; 20 Feb 1968, 2–4 m	4	—	—
			ZMUC-POL-1959	Strib, Lesser Belt – Denmark; coll. Schiødte	6	Notochaetae: seg. 15 Neurochaetae: segs. 11, 15, and from region after notopodia terminate	—
			ZMUC-POL-1960	Ebeltoft Vig, Great Belt; coll. Winther	8	—	—
Nicolea sp. A	—	—	LACM-AHF/unreg.	LA-LB Harbors, Dominguez Channel	1	—	—
			LACM-AHF/unreg.	San Francisco Bay – California, USA	many	Notochaetae: segs. 7 and 15 Neurochaetae: segs. 6, 10, 11, and from anterior and posterior regions after notopodia terminate (segs. 23 and posterior chaetiger)	—
			LACM-AHF/unreg.	Harris Dock; coll. under *Bugula neritima* lumps	many	—	—
Opisthopista sibogae	Caullery, 1944	Sumba Strait	ZMA v. pol. 1547 (holotype)	Between Flores & Sumba (9°03'S 119°56'E) – Indonesia; 'Siboga' Exp., st. 52, 959 m	1	Notochaetae: segs. 9 and 11 Neurochaetae: segs. 6–11, and from region after notopodia terminate	—
Paramphitrite tetrabranchia	Holthe, 1976	Between Sotra and Geditanger (60°23'N 05°01'E) – Norway	ZMUB 57987 (holotype)	Between Sotra and Geditanger (60°23'N 05°01'E) – Norway; coll. J. Kjennerud, 5 Sep 1950, 92–100 m, clay and silt with stones	1	—	—
			ZMUB 31094 (paratype)	Herdlafjorden, NW of Bergen – Norway; 10 Sep 1923, 138 m	1	—	—
			ZMUB 34211 (paratypes)	Leosen, near Herdla (60°33'N 05°01'E) – Norway; coll. J. Grieg, 18 Sep 1924, 55 m	2	Notochaetae: segs. 6 and 12 Neurochaetae: segs. 5, 11, 14, and from anterior and posterior regions after notopodia terminate (segs. 19 and posterior chaetiger)	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Paraxionice artifex	Fauchald, 1972	Guaymas Basin, Gulf of California	LACM-AHF 0973 (paratypes)	Gulf of California, Guaymas Basin (27˚03'N 112˚18'W) – Mexico; coll. S. Calvert, st. SI-L184, 894 m	4 + tubes	Notochaetae: segs. 6 and 17 Neurochaetae: segs. 5, 10, 11, and from anterior and posterior regions after notopodia terminate(segs. 20 and posterior chaetiger)	—
Phisidia echuca	Hutchings & Glasby, 1988	Victor Harbour, Kangaroo Is. (35°33'S 138°38'E) – South Australia, Australia	AM W200472 (holotype)	Victor Harbour, Kangaroo Is. (35°33'S 138°38'E) – South Australia, Australia; 16 Mar 1979, crevice fauna	1	Notochaetae: segs. 9 and 16 Neurochaetae: segs. 6–8, 13, and from midlength of region after notopodia terminate	—
			AM W200473	Victor Harbour, Kangaroo Is. (35°33'S 138°38'E) – South Australia, Australia; 16 Mar 1979	1	Notochaetae: segs. 6 and 16	—
			NMV F52602	Westernport Beacon Bottom, Western Port – Victoria, Australia; 14 Jan 1975	1	—	—
Phisidia sanctaemariae	Hilbig, 2000b	off Purisima Point, Santa Maria Basin (35°05'50″N 120°53'40″W) – California, USA	LACM-AHF Poly 1929 (paratypes)	off Purisima Point, Santa Maria Basin (34°42'41.4″N 120°50'49.8″W) – California, USA; coll. Battelle Ventura, H-S box corer, Jan. 1987 & Oct. 1988, 154 m	11	Notochaetae: segs. 6 and 16 Neurochaetae: segs. 7, 13, and from posterior region after notopodia terminate	—
Phisidia sp.	—	—	NIWA St. T9/4	Not available	1	Notochaetae: segs. 4, 5, and 14 Neurochaetae: from region after notopodia terminate	—
			NIWA St. T8/2	Not available	1	Notochaetae: segs. 6–8 and 14 Neurochaetae: segs. 6–8 and 14	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Pista anthela	Hutchings & Glasby, 1990	Enderby Is., Dampier Archipelago (20°36'01″S 116°31'04″E) – Western Australia, Australia	AM W203515 (holotype)	Enderby Is., Dampier Archipelago (20°36'01″S 116°31'04″E) – Western Australia, Australia; 27 Mar 1987, intertidal mudflats	1	—	—
			AM W203516 (paratypes)	Enderby Is., Dampier Archipelago (20°36'01″S 116°31'04″E) – Western Australia, Australia; 2 Apr 1987, intertidal mudflats	6	—	—
			AM W203517 (paratypes)	Enderby Is., Dampier Archipelago (20°36'01″S 116°31'04″E) – Western Australia, Australia; 2 Apr 1987, intertidal mudflats	8	—	Yes
			AM W203520 (paratype)	Wildcat Rocks (15°17'S 124°06'E) – Western Australia, Australia; 11 Jul 1988, 20 m, rocks	1	Notochaetae: segs. 7 and 12 Neurochaetae: segs. 7, 12, and from region after notopodia terminate	—
			AM W203521 (paratypes)	Jackson Is. (15°10'S 124°28'E) – Western Australia, Australia; 11 Jul 1988, intertidal sand flats	3	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W203523 (paratypes)	Slate Is., Kimberley region (15°32'S 124°24'E) – Western Australia, Australia; coll. P. Hutchings, 9 Jul 1988, lower intertidal, crevice fauna	2	—	—
			MZUSP 00619	Corneille Is., Kimberley region (14°10'S 125°47'E) – Western Australia, Australia; coll. P. Hutchings, 19 Jul 1988	1	—	—
Pista australis	Hutchings & Glasby, 1988	Merimbula (36°53'S 149°52'E) – New South Wales, Australia	AM W200877 (holotype)	Merimbula (36°53'S 149°52'E) – New South Wales, Australia; 4 Dec 1975, *Zostera* and *Halophila*	1	—	—
			AM W11382 (paratypes)	Merimbula (36°53'S 149°52'E) – New South Wales, Australia; 4 Dec 1975, *Posidonia* beds	2	—	—
			AM W11769 (paratypes)	Merimbula (36°53'S 149°52'E) – New South Wales, Australia; 4 Dec 1975, *Zostera* and *Halophila*	8	—	—
			AM W11773 (paratypes)	Merimbula (36°53'S 149°52'E) – New South Wales, Australia; 4 Dec 1975, *Posidonia* beds	10	—	—
			MZUSP 00620	Port Phillip Bay (38°16'18″S 144°41'30″E) – Victoria, Australia; 11 Jun 1971	2	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			MZUSP 00621	off Monumental Bay, Gabo Island (37°34'S 149°55'E) – Victoria, Australia; 20 Feb 1973	1	—	—
			NTM W6768	Scorpion Is. (13°51'36″S 126°36'E) – Western Australia, Australia; coll. R. Hanley, 14 Aug 1988, LWS	1	Notochaetae: seg. 11 Neurochaetae: segs. 5–11, and from region after notopodia terminate	—
			NTM W6789	Jones Is. (13°45'S 126°01'48″E) – Western Australia, Australia; coll. R. Hanley, 16 Aug 1988, LWS	1	—	—
Pista cristata	(Müller, 1776)	Norway	ZMUC-POL-707	Kummelbankens W edge, off Læsø – Denmark; coll. C. Nielsen, R/V 'Ophelia' dredge 72, 7 Jul 1960, 39–43 m, stones and mud	3	Notochaetae: segs. 6 and 19 Neurochaetae: segs. 5–11, 14, and from region after notopodia terminate	—
			ZMUC-POL-2054	Frederikshavn – Denmark; coll. H. Ditlevsen, 15 Jul 1927, soft bottom	3	—	—
			ZMUC-POL-2055	Læsø Rende – Denmark; coll. Biological field course, 29 Jul 1947, 30 m	3	—	—
			ZMUC-POL-2056	Frederikshavn – Denmark; coll. Biological field course, 1 Aug 1947	6	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Pista sinusa	Hutchings & Glasby, 1988	Crib Point, Western Port (38°20.94'S 145°13.62'E) – Victoria, Australia	NMV F94350	off Crib Point, Western Port (38°20'56″S 145°13'37″E) – Victoria, Australia; coll. 29 Mar 1965	3	—	—
			NMV F94351	off Crib Point, Western Port (38°21'09″S 145°13'31″E) – Victoria, Australia; coll. 20 Mar 1967	3	—	—
			NMV F94352	off Crib Point, Western Port (38°21'20″S 145°13'38″E) – Victoria, Australia; coll. 8 Apr 1965	3	—	—
			NMV F94353	off Crib Point, Western Port (38°20'56″S 145°13'20″E) – Victoria, Australia; coll. 29 Mar 1965	3	Notochaetae: seg. 12 Neurochaetae: segs. 5–11, and from region after notopodia terminate	—
			NMV F94354	off Crib Point, Western Port (38°20'36″S 145°13'28″E) – Victoria, Australia; coll. 18 Mar 1965	1	—	—
Pista violacea	Hartmann-Schröder, 1984	E Arm Boat Ramp, Darwin – Northern Territory, Australia	MZUSP 00622	Hole in the Wall, Jervis Bay (35°07'36″S 150°44'48″E) – Commonwealth Territory, Australia; 20 Feb 1989	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			MZUSP 00623	Hole in the Wall, Jervis Bay (35°07'36″S 150°44'48″E) – Commonwealth Territory, Australia; 5 Jun 1989	2	—	—
			NTM W0023	Trepang Bay, Port Essington (11°07'48″S 131°57'E) – Northern Territory, Australia; coll. R. Hanley 14 Oct 1981, reef flat	1	Notochaetae: seg. 12 Neurochaetae: segs. 5–11, and from region after notopodia terminate	—
			NTM W1644	E Arm Boat Ramp, Darwin (12°49'S 130°E) – Northern Territory, Australia; coll. R. Hanley et al., 31 Jan 1984, LWS	1	—	—
			NTM W2461	Rottnest Is. (32°S 115°30'36″E) – Western Australia, Australia; coll. R. Hanley, 27 Jan 1983	1	—	—
Pista sp.[1]	—	—	AM W34750	Brazilian southeastern continental shelf (26°22'S 48°19'08″W) – Brazil; 3 Nov 1985, 49 m, sand with mud	1	—	Yes

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[1] This taxon has been identified for a long time as *Pista corrientis* McIntosh, 1885, but the study of the holotype of this latter species showed the Brazilian material is a different species, still undescribed. The formal description of this new species is in prep. by Nogueira, Hutchings & Harris.

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			MCEM-BPO 271	Brazilian southeastern continental shelf (24°16’S 46°01'02″W) – Brazil; 26 Mar 1984, 45 m, sand	2	—	—
			MCEM-BPO 273	Brazilian southeastern continental shelf (26°22’S 48°19'08″W) – Brazil; 17 Mar 1984, 49 m, muddy-sand	2	—	—
			MCEM-BPO 274	Brazilian southeastern continental shelf (25°04’S 46°26'00″W) – Brazil; 22 Mar 1984, 65 m, muddy-sand	1	Notochaetae: segs. 5–14 Neurochaetae: segs. 5–14, and from region after notopodia terminate	—
			MCEM-BPO 276	Brazilian southeastern continental shelf (26°22'S 48°19'08″W) – Brazil; 3 Nov 1985, 49 m, muddy-sand	2	—	—
			MCEM-BPO 277	Brazilian southeastern continental shelf (25°55’S 47°52'03″W) – Brazil; 4 Nov 1985, 49 m, muddy-sand	1	—	—
			MCEM-BPO 278	Brazilian southeastern continental shelf (25°04’S 46°26'00″W) – Brazil; 13 Nov 1985, 65 m, muddy-sand	1	—	—
			MCEM-BPO 282	Paranaguá Bay (25°33’S 48°25’W) – Paraná, Brazil; 27 Feb 1986, 18 m, sand with gravel and mud	2	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Pistella lornensis	(Pearson, 1969)	Scotland	ZMUC-POL-1744	5 km SE of Hirsholmene, Frederikshavn – Denmark; coll. C. Nielsen, 21 Jun 1960, 25–30 m, mud	4	Notochaetae: segs. 5 and 19 Neurochaetae: segs. 5, 10, 11, 20, and from midlength and posterior regions after notopodia terminate	—
Polymniella aurantiaca	Verrill, 1900	Castle Harbor, St. George's Parish, Bermuda	YPM 1237 (syntype)	Castle Harbor, St. George's Parish, Bermuda; coll. A.E. Verrill, 1898	1	Notochaetae: segs. 7 and 17 Neurochaetae: segs. 7, 10, 11, and 25	—
Proclea glabrolimbata	Hessle, 1917	Grahams Land (64°30'S 56°37') – Antarctica	LACM Elt 426	Not available	many	Notochaetae: segs. 7 and 18 Neurochaetae: segs. 8, 10, 11, 15, and from anterior and posterior regions after notopodia terminate	—
Proclea malmgreni	(Ssolowiew, 1899)	White Sea	ZMUC-POL-2057	Greenland; coll. MAIA Aps for Greenland fisheries investigations, 298-4	2	Notochaetae: segs. 5, 6, 13, 14, 16, and 18 Neurochaetae: segs. 5, 6, 10, 11, 16, and from region after notopodia terminate	—
			ZMUC-POL-2058	Greenland; coll. MAIA Aps for Greenland fisheries investigations, 5299-1	1	Notochaetae: seg. 13 Neurochaetae: seg. 13	—
Proclea sp. 1	—	—	LACM-AHF/ MMS phase I 004-BRA-02	off Point Arguello (34˚27'32.3″'N 120˚40'21.8″W and 34˚28'09.7″N 120˚40'11.3″W) – California, USA; coll. SAIC/MBC, 168–237 m, on rock	1	Neurochaetae: from anterior and posterior regions after notopodia terminae	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			LACM-AHF/ 021-BRA-02	off Purissima Point (34˚47'20.1″N 120˚45'54.1″W to 34˚47'32.8″N 120˚46'07.3″W) – California, USA; coll. SAIC/MBC, 75–90 m, on rock	1	Notochaetae: segs. 6 and 18 Neurochaetae: segs. 7, 10, 11, and 19	—
			LACM-AHF/ 001-BRC-02	off Refugio Beach, (34˚24'27.2″N 120˚01'52.2″W and 34˚24'27.8″N 120˚00'52.6″W) – California, USA; coll. SAIC/MBC, 69–73.5 m, on rock	1	—	—
Proclea sp. 2	—	—	NIWA Z8806	Not available	1	—	—
			NIWA Z8806	Not available	7	Notochaetae: segs. 11, 17, and 21 Neurochaetae: segs. 11, 17, and from anterior and posterior regions after notopodia terminate (segs. 21 and posterior chaetiger)	—
Proclea sp. 3	—	—	NIWA Z8806	Not available	1	—	—
			NIWA (unreg.)	off Kaputi Is. – New Zealand; coll. F. Aberrethy, Dec 1953, 18–28 m	1	Notochaetae: segs. 6, 10, 11, and 19 Neurochaetae: segs. 5, 10, 11, 14, and from posterior region after notopodia terminate	—
Pseudoproclea australis	Hutchings & Glasby, 1990	East Montalivet Is., Kimberley region (15°06'S 125°18'E) – Western Australia, Australia	AM W203541 (holotype)	East Montalivet Is., Kimberley region (15°06'S 125°18'E) – Western Australia, Australia; 16 Jul 1988, 6 m	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W203542 (paratypes)	Port George IV (15°17'S 124°38'E) – Western Australia, Australia; 18 Jul 1988, 6 m, dredging	6	—	—
			AM W203543 (paratype)	East Montalivet Is., Kimberley region (15°06'S 125°18'E) – Western Australia, Australia; 16 Jul 1988, 6 m	1	Notochaetae: segs. 7, 8, 14, and 17 Neurochaetae: segs. 5, 11, and from posterior region after notopodia terminate	—
Pseudopista rostrata	Hutchings & Smith, 1997	Leigh Harbour (36°20'S 174°48'E) – New Zealand	AM W22583 (holotype)	Leigh Harbour (36°20'S 174°48'E) – New Zealand; coll. R.I. Smith, 23 Mar 1992, intertidal	1	—	—
			NIWA (unreg.)	Taylors Mistake, near Christchurch – New Zealand; coll. G. Knox, 1948	1	—	—
			NIWA T477	Altrina Benthos (41°05'24″S 174°18'E) – off New Zealand; 16 m	1	Notochaetae: segs. 8 and 19 Neurochaetae: segs. 5–11, and from region after notopodia terminate	—
Pseudopista sp.	—	—	NIWA St. E79	Chatham Camera (43°04'48″S 178°E) – off New Zealand; 371 m	1	—	—
			NIWA St. V372	Chatham Rise Benthos (43°19'48″S 178°58'48″E) – off New Zealand; 418 m	1	Notochaetae: segs. 7 and 17 Neurochaetae: segs. 5–12	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Ramex californiensis	Hartman, 1944	California, USA	LACM-AHF Poly 0221	Tomales Point (ocean side) Marin County – California, USA; coll. M. Pettibone & O. Hartman, 10 Jun 1941, intertidal	3	Notochaetae: segs. 8, 10, and 14 Neurochaetae: segs. 9, 10, 12, and from anterior and posterior regions after notopodia terminate	—
Reteterebella aloba	Hutchings & Glasby, 1988	Bottle and Glass Rocks, Port Jackson (35°53'S 151°13'E) – New South Wales, Australia	AM W200135 (holotype)	Bottle and Glass Rocks, Port Jackson (35°53'S 151°13'E) – New South Wales, Australia; Feb 1910	1	—	—
			AM W102 (paratype)	Bottle and Glass Rocks, Port Jackson (35°51'S 151°16'E) – New South Wales, Australia; Feb 1910	3	—	—
			AM W200134 (paratype)	Port Jackson (33°51'S 151°16'E) – New South Wales, Australia	1	—	—
			AM W30717	Cowan Creek, Cottage Point (33°39'S 151°10'E) – New South Wales, Australia; coll. P. Hutchings & J. M. M. Nogueira, 10 Oct 2004, intertidal, under rocks	2	Notochaetae: segs. 9 and 16 Neurochaetae: segs. 5, 8–11, and from posterior region after notopodia terminate	—
			MZUSP 00624	Split Solitary Is. (30°15'S 153°11'E) – New South Wales; 21 Mar 1992	2	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			NTM W2842	Table Head, Port Essington (11°25'S 132°18'E) – Northern Territory, Australia; coll. R. Hanley, 12 May 1983	2	—	—
			NTM W5005	Shiprock, Port Hacking – New South Wales, Australia; coll. N. Coleman, 14 Oct 1979	2	Notochaetae: seg. 11 Neurochaetae: segs. 11 and from region after notopodia terminate	—
Reteterebella queenslandia	Hartman, 1963	Heron Is. (23°27'S 151°55'E) – Queensland, Australia	AM W3755 (holotype)	Heron Is. (23°27'S 151°55'E) – Queensland, Australia; Aug 1959, rocks	1	Notochaetae: segs. 9 and 16 Neurochaetae: segs. 6, 14, and from anterior and posterior regions after notopodia terminate	—
			NMV F94340	Heron Is. (23°27'S 151°55'E) – Queensland, Australia; Aug 1959	1	Notochaetae: segs. 9 and 18 Neurochaetae: segs. 5, 10, and from region after notopodia terminate	—
Scionella japonica	Moore, 1903	off Kinkwasan Light, off Honshu Is. – Japan	USNM 15723 (holotype)	off Kinkwasan Light, off Honshu Is. – Japan; 5 Jun 1900, 104 m	1	Neurochaetae: segs. 5, 11, and from anterior and posterior regions after notopodia terminate	—
			LACM-AHF/ 29234	11.2 miles off Rocky Point (NW of Point Conception) (34˚23’45″N 120˚44’30″W to 34˚23’45″N 120˚49’00″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV' st. 29234-81, CTD, 26 Mar 1981, 566 m	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			LACM-AHF/ 29237	1 mile off Rocky Point (NW of Point Conception) (34˚23’45″N 120˚39’00″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV' st. 29237-81, CTD, 26 Mar 1981	1	—	—
			LACM-AHF/ 29239	7 miles off Rocky Point (NW of Point Conception) (34˚29’18″N 120˚31’21″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV', st. 29239-81, CTD, 26 Mar 1981	1	—	—
Scionella vinogradovi	(Uschakov, 1955)	Sea of Okhotsk	LACM-AHF/ 2417-53	2.15 miles from Point Fermin Light, Los Angeles County (33°41’57’N 118°20’08″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV', st. 2417-53, Orange Peel grab, 29 Sep 1953, 62.1 m, black mud	1	Notochaetae: segs. 9 and 17 Neurochaetae: segs. 8, 10, 11, and from anterior and posterior regions after notopodia terminate	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			LACM-AHF/ 2747-54	5 miles from Abalone Point, Los Angeles County (33°33’54″N 117°49’23″W to 33°32’29″N 117°48’48″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV', st. 2747-54, 14 May 1954, 54.8–56.6 m, bio dredge	1	—	—
			LACM-AHF/ 6838	2.9 miles off Pyramid Head Light, San Clemente Island, Los Angeles County (32°48’10″N 118°17’50″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV', st. 6838-60, Campbell grab, 30 Jan 1960, sand & gravel	1	—	—
			LACM-AHF/ 11815	11 miles off Isla Tortuga, Gulf of California (27˚28’30″N 111˚43’30″W to 27˚18’00″N 111˚35’30″W) – Baja California, Mexico; coll. Allan Hancock Foundation, st. 11815-67, 28 Nov 1967, beam trawl, 1609–1645 m	2	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			LACM-AHF/ 11830	5 miles N off Isla Las Animas, Gulf of California (28˚43’15″N 113˚03’00″W) – Baja California, Mexico; coll. Allan Hancock Foundation, st. 11830-67, 1 Dec 1967, Campbell grab, 1408 m	1	—	—
			LACM-AHF/ 29240	13.5 miles off Point Arguello (34˚33’56″N 120˚55’20″W to 34˚27’24″N 120˚15’00″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV', st. 29240-81, 26 Mar 1981, 21.9 m	1	—	—
			LACM-AHF/ 29241	3.2 miles off Rocky Point (NW of Point Conception) (34˚31’48″N 120˚35’06″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV', st. 29241-81, CTD, 31 Mar 1981, 25 m	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			LACM-AHF/ 29242	off Rocky Point (NW of Point Conception) (34˚31’48″N 120˚35’06″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV', st. 29242-81, Niskin bottles, 31 Mar 1981, 25 m	1	—	—
			LACM-AHF/ 29243	3.7 miles off Rocky Point (NW of Point Conception) (34˚30’30″N 120˚36’06″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV', st. 29243-81, CTD, 31 Mar 1981, 50 m	1	—	—
			LACM-AHF/ 29244	3.7 miles off Rocky Point (NW of Point Conception) (34˚30’30″N 120˚36’06″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV', st. 29244-81, Niskin bottles, 31 Mar 1981, 50 m	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			LACM-AHF/ 29247	6 miles off Rocky Point (NW of Point Conception) (34˚27’54″N 120˚38’30″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV', st. 29247-81, Niskin bottles, 31 Mar 1981, 105 m	1	—	—
			LACM-AHF/ 29248	6 miles off Rocky Point (NW of Point Conception) (34˚27’54″N 120˚38’30″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV', st. 29248-81, EGG net, 31 Mar 1981, 192 m	1	—	—
			LACM-AHF/ 29249	9.8 miles off Rocky Point (NW of Point Conception) (34˚24’20″N 120˚41’36″W) – California, USA; coll. Allan Hancock Foundation, 'R/V Velero IV', st. 29249-81, CTD, 31 Mar 1981, 350 m	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Spinosphaera barega	Nogueira & Hutchings, 2007	Long Is., Wallabi Group, Abrolhos Is. (28°28'03″S 113°46'03″E) – Western Australia, Australia	AM W30726 (holotype)	Long Is., Wallabi Group, Abrolhos Is. (28°28'03″S 113°46'03″E) – Western Australia, Australia; coll. C. Bryce, 22 May 1994, 8 m, dead coral covered in coralline algae	1	Notochaetae: segs. 6 and 20 Neurochaetae: posterior region after notopodia terminate	—
			AM W22544 (paratype)	Wallabi Group , Abrolhos Is. (28^{o}24’S 113^{o}46’09″E) – Western Australia, Australia; coll. P. Hutchings, 30 May 1994, 35 m, scallop beds with shell debris	1	Neurochaetae: segs. 5, 20, and 26	—
Spinosphaera harrisae	Londoño-Mesa, 2003	Off San Diego, California, USA	LACM-AHF Poly 2114 (holotype)	Off San Diego (32^{o}34’N 117^{o}10’W) – California, USA; coll. City of San Diego MBL, 8 Apr 1997, 87.3 m	1	Notochaetae: segs. 7 and 22 Neurochaetae: segs. 6, 10, 11, 23, and from anterior and posterior regions after notopodia terminate	—
			LACM-AHF Poly 2115 (paratype)	Off San Diego (32^{o} 34’N 117^{o}10’W) – California, USA; coll. City of San Diego MBL, 8 Apr 1997, 87.3 m	1	—	—
Spinosphaera hutchingsae	Londoño-Mesa, 2003	Off Xahuayxol, southern Mexican Caribbean	LACM-AHF Poly 2117 (paratype)	Off Punta Herradura (18^{o}32'23″N 87^{o}44'32″W) – southern Mexican Caribbean, Mexico; 28 Sep 1996, 2 m, inside dead *Montastrea* coral	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
Spinosphaera oculata	Hartman, 1944	California, USA	LACM unreg.	Monterey – California, USA; 2 Nov 2006, 2 m, fouling	2	Notochaetae: segs. 6 and 18 Neurochaetae: segs. 6, 11, and from anterior and posterior regions after notopodia terminate	—
Stschapovella tatjanae	Levenstein, 1957	Bering Sea	ZMUC-POL-1743	Bering Sea (59°30'N 168°00'E); 17 Sep 1950, 3100 m	2	Notochaetae: segs. 7, 15, and 16 Neurochaetae: segs. 5, 10, 11, 14, 15, 20, and from midlength and posterior regions after notopodia terminate	—
Terebella lapidaria	Linnaeus, 1767	Mediterranean Sea	BMNH 1928.4.26.330-32	Cherbourg, northern France	4	Notochaetae: segs. 9, 17, 33, and 46 Neurochaetae: segs. 8, 17, 33, 46, and 85	—
			AM W9154	off Brenton's Reef Light-ship, off Newport – Rhode Is., USA; 22 Aug 1880, 36 m	1	—	—
Terebella muliarrus	Hutchings, 1993	Stark Bay, Rottnest Is. – Western Australia, Australia	AM W20942 (holotype)	Stark Bay, Rottnest Is. (32°00'30″S 115°28'54″E) – Western Australia, Australia; 13 Jan 1991, 2–3 m, algal clumps and coralline algae	1	—	—
			AM W20940 (paratype)	Fish Hook Cove, Rottnest Is. (32°01'24″S 115°27'06″E) – Western Australia, Australia; 17 Jan 1991, 10 m, coralline algal reef	2	Notochaetae: segs. 6 and 18 Neurochaetae: segs. 6, 11, and from region after notopodia terminate	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W20941 (paratypes)	Stark Bay, Rottnest Is. (32°00'30″S 115°28'54″E) – Western Australia, Australia; 13 Jan 1991, 2–3 m, algal clumps and coralline algae	2	—	—
			MZUSP 00625	Beacon Is., Houtman Abrolhos (28°25'30″S 113°47'E) – Western Australia, Australia; 23 May 1992	4	—	—
			MZUSP 00626	Goss Channel, Beacon Is. (28°27'54″S 113°46'42″E) – Western Australia, Australia; 25 May 1992	1	—	—
Terebella pappus	Hutchings & Murray, 1984	Merimbula (36°53'42″S 149°54'18″E) – New South Wales, Australia	AM W196195 (holotype)	Merimbula (36°53'42″S 149°54'18″E) – New South Wales, Australia; 17 Mar 1976, intertidal sandy mud flats	1	—	—
			AM W196196 (paratypes)	Merimbula (36°53'42″S 149°54'18″E) – New South Wales, Australia; 17 Mar 1976, intertidal sandy mud flats	20	—	—
			AM W34757	Swan Bay, Queenscliffe (38°14'S 144°39'E) – Victoria, Australia	1	—	Yes
			MZUSP 00627	Cemetery Point, Wreck Bay (35°10'S 150°40'E) – New South Wales, Australia; 27 Feb 1976	3	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			MZUSP 00628	Long Reef, W end of reef (33°44'S 151°19'E) – New South Wales, Australia; 23 Feb 1971	2	—	—
			NMV F94355	Westernport Bay, Flinders (38°29'S 145°02'E) – Victoria, Australia; Jul 1969	5	—	—
			NMV F94356	Westernport Bay, Flinders (38°29'S 145°02'E) – Victoria, Australia; Jul 1969	1	Notochaetae: segs. 10 and 11 Neurochaetae: segs. 10, 11, and from region after notopodia terminate	—
			NMV F94357	W of Eagles Nest – Australia; Jan 1966	1	—	—
			NMV F94358	Swan Bay, Queenscliffe (38°14'S 144°39'E) – Victoria, Australia	1	—	—
			NMV F94359	Swan Bay, Queenscliffe (38°14'S 144°39'E) – Victoria, Australia	1	Notochaetae: segs. 9–11 Neurochaetae: segs. 9–11	—
			NMV F94360	Altona (37°53'S 144°51'E) – Victoria, Australia; Sep 1964	1	—	—
Terebella tantabiddycreekensis	Hartmann-Schröder, 1980	Tantabiddy Creek (21°54'46″S 113°58'13″E)– Western Australia, Australia	AM W34758	200 m E of Point Hicks (37°48'S 149°17'E) – Victoria, Australia; 26 Mar 1996	1	—	Yes
			MZUSP 00629	Coloundra – Queensland, Australia; 29 Mar 1972	1	—	—
			MZUSP 00630	Coloundra – Queensland, Australia; 29 Mar 1972	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			MZUSP 00631	Coloundra – Queensland, Australia; 20 Oct 1976	1	—	—
			NMV F91225	near Cape Conran, Beware Reef (37°49'21″S 148°47'23″E) – Victoria, Australia; 15 Apr 1998	1	—	—
			NMV F91227	near Peterborough, Schomberg Reef (38°36'49″S 142°53'19″E) – Victoria, Australia; 19 May 1998	6	Notochaetae: segs. 10, 11 and 28 Neurochaetae: segs. 10, 11 and 28	—
			NMV F91228	off Honeysuckle Hill, Bunurong (38°40'32″S 145°37'47″E) – Victoria, Australia; 1 Apr 1997	1	—	—
			NMV F91229	off Eagles Nest, Bunurong (38°40'40″S 145°38'46″E) – Victoria, Australia; 1 Apr 1997	4	—	—
			NMV F91230	off Eagles Nest (38°40'46″S 145°39'14″E) – Victoria, Australia; 1 Apr 1997	3	Posterior parapodium	—
Terebella cf. *verrilli*	(Verrill, 1873)	Vineyard Sound, Woods Hole Harbor – Massachusetts, USA	YPM 30168	Vineyard Sound, Woods Hole Harbor – Massachusetts, USA; 15 Feb 1960	2	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			YPM 40571	Vineyard Sound, Woods Hole Harbor – Massachusetts, USA; 15 Feb 1960	1	Notochaetae: segs. 7, 15, 31, and 56 Neurochaetae: segs. 7, 10, 11, 26, 56, and >80	—
Terebellobranchia natalensis	Day, 1951	Umtwalumi – South Africa	BMNH 1961.16.88 (holotype)	Umtwalumi – South Africa; coll. J.H. Day	1	Notochaetae: segs. 7 and 18 Neurochaetae: segs. 7 and 18	—
Thelepides koehleri	Gravier, 1911	Antarctica	Nonato private coll. (Proantar III I Snow)	Not available	2	Notochaetae: segs. 9, 16, and 18 Neurochaetae: segs 5, 10, 11, 20, and from midlength of region after notopodia terminate	—
Tyira owensi	Hutchings, 1997a	Abrolhos Is., Wallabi Group (28°23'59″S 113°46'43″E) – Western Australia, Australia	AM W22558 (holotype)	Abrolhos Is., Wallabi Group (28°23'59″S 113°46'43″E) – Western Australia, Australia; coll. P. Hutchings, 30 May 1994, 39 m, scallop beds, shell debris	1	—	—
			AM W22564	Abrolhos Is., Wallabi Group (28°27'30″S 113°45'06″E) – Western Australia, Australia; coll. P. Hutchings, 30 May 1994, 35–38 m, scallop beds, medium to fine sand and shell debris	2	—	—
			AM W22565	Abrolhos Is., Wallabi Group (28°23'59″S 113°46'43″E) – Western Australia, Australia; coll. P. Hutchings, 30 May 1994, 39 m, scallop beds, shell debris	1	—	—

Taxon	Authorities	Type locality	Collection Number	Collection Data	Number of specimens	Slides	SEM
			AM W22566	Abrolhos Is., Wallabi Group (28°23'59″S 113°46'43″E) – Western Australia, Australia; coll. P. Hutchings, 30 May 1994, 35 m, scallop beds, shell debris	2	—	—
			AM W22567	Abrolhos Is, Wallabi Group (28°23'59″S 113°46'43″E) – Western Australia, Australia; coll. P. Hutchings, 30 May 1994, 35 m, scallop beds, shell debris	1	Notochaetae: segs. 5 and 16 Neurochaetae: segs. 5, 10, 11, and from anterior and posterior regions after notopodia terminate	—

TABLE 4. Types and subtypes of notochaetae of Terebelliformia.

Type	Subtype		Examples of taxa on which these notochaetae occur
Paleae			**Ampharetidae, Ampharetinae:** *Amphicteis dalmatica* (Figs 2C; 19E–F) **Pectinariidae:** *Pectinaria dodeka* (Fig. 2A–B, D–E).
Hooks			**Alvinellidae:** *Alvinella pompejana* (Figs 3A, G; 18F), *Paralvinella grasslei* (Fig. 3H–I) **Ampharetidae, Melinninae:** *Melinna elisabethae* (Fig. 17A–B)
Pinnate			**Terebellidae, Polycirrinae:** *Polycirrus bicrinalis* (Fig. 21C)
Bayonet chaetae			**Terebellidae, Thelepodinae:** *Rhinothelepus lobatus* (Fig. 22A, D)
Distally winged	Narrowly winged	With short, fine hairs all around	**Pectinariidae:** *Pectinaria dodeka* (Fig. 19A–B). **Ampharetidae, Ampharetinae:** *Amphicteis dalmatica* (Fig. 19 G–H); **Melinninae:** *Melinna elisabethae* (Fig. 19D). **Alvinellidae:** *Paralvinella grasslei* (Fig. 20B–C). **Trichobranchidae:** *Terebellides anguicomus* (Fig. 20D, G). **Terebellidae, Polycirrinae:** *Polycirrus bicrinalis* (Fig. 21C); **Thelepodinae:** *Thelepus cincinnatus* (Fig. 23B); **Terebellinae:** *Eupolymnia koorangia* (Fig. 24D, F–G)
		Hirsute	**Alvinellidae:** *Alvinella pompejana* (Fig. 20A)
	Broadly winged	With fine, short hairs all around	**Terebellidae, Thelepodinae:** *Streblosoma oligobranchiatum* (Fig. 23C, E–F); **Terebellinae:** *Leaena ebranchiata* (Fig. 25C–D, H)
		Hirsute	**Terebellidae, Terebellinae:** *Proclea malmgreni* (Fig. 26B, D)

Type	Subtype				Examples of taxa on which these notochaetae occur
Distally serrated	Alimbate	With two series of teeth			**Alvinellidae:** *Alvinella pompejana* (Fig. 20A)
		With single series of teeth	With blade along same axis as shaft	Blade with deep cut	**Terebellidae, Terebellinae:** *Articulatia aberrans* (Fig. 32C–H)
				Blade entire (saw-like chaetae)	**Terebellidae, Thelepodinae:** *Euthelepus serratus* (Fig. 22F–G); **Terebellinae:** *Phisidia rubra* (Fig. 29E–G)
			With blade at an angle with shaft		**Terebellidae:** *Terebella lapidaria* (Fig. 30C–D)
	Medially limbate	With blade along same axis as shaft	Hirsute subdistal process absent		**Terebellidae, Terebellinae:** *Longicarpus modestus* (Fig. 31A–B)
			Spinosphaera chaetae		**Terebellidae, Terebellinae:** *Spinosphaera barega* (Fig. 30F–G)
		With blade at an angle with shaft (flail-tipped capillaries)			**Pectinariidae:** *Pectinaria dodeka* (Fig.19A, C). **Terebellidae, Terebellinae:** *Terebella lapidaria* (Fig. 30A–B)