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Anoplosyllinae Aguado & San Martín, 2009 (Annelida: Syllidae) from shelf and slope depths in the northwest Atlantic Ocean, primarily off New England, slope depths in the Gulf of Mexico off Louisiana, and shallow water in British Columbia in the Northeast Pacific

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Abstract

Collections of syllid polychaetes belonging to the subfamily Anoplosyllinae from shelf and slope depths in the northwest Atlantic Ocean, primarily off New England, slope depths in the Gulf of Mexico off Louisiana, and shallow water in British Columbia in the Northeast Pacific were examined. Three of the five anoplosyllin genera were represented: *Streptospinigera* Kudenov, 1983, *Streptosyllis* Webster & Benedict, 1884, and *Syllides* Örsted, 1845. Sixteen taxa were found, including six that are new to science; all are described and illustrated herein. Five species belonging to *Streptospinigera* were found, including *Streptospinigera niuqtuut* Olivier, San Martín, & Archambault, 2013 and four new species: *Streptospinigera karlbansei* **sp. nov.** from British Columbia; *Sts. kudenovi* **sp. nov.** from 350 m off Louisiana in the Gulf of Mexico; and *Sts. nola* **sp. nov.** and *Sts. septima* **sp. nov.** from 850 m off Louisiana. Six species belonging to the genus *Streptosyllis* were found: *Streptosyllis arenae* Webster & Benedict, 1884, *Str. varians* Webster & Benedict, 1887, and *Str. verrilli* (Moore, 1907); one new species, *Streptosyllis mallea* **sp. nov.** from 800 m off South Carolina, is described; *Syllides minutus* Blake & Weston, 1977, from California, is transferred to *Streptosyllis*; and *Str. pettiboneae* Perkins, 1981, is removed from synonymy with *Str. websteri* Southern, 1914. In addition, *Streptosyllis* cf. *arenae*, which differs from *Str. arenae* in the pattern of hooded and non-hooded setae, is discussed. Five species and one uncertain taxon belonging to the genus *Syllides*, are included: *Syl. benedicti* Banse, 1971 and *Syl. convolutus* Webster & Benedict, 1884 are redescribed from new material; *Syl. eburneus* Riser, 1997 is poorly known and no new material was found; *Syllides setosus* Verrill, 1882 is revalidated and redescribed, with the designation of a neotype; *Syllides profundus* **sp. nov.**, a deep-water species from 600 m off Cape Hatteras, North Carolina, is described. A single specimen with double helmet-tipped golden acicula is discussed as *Syllides* cf. *benedicti* Banse. The separation of the genera is discussed, along with a key, and tables of morphological details of all species of *Streptospinigera* are presented.

Key words: *Streptospinigera*, *Streptosyllis*, *Syllides*, British Columbia, California, Canada, neotype, new species, Pacific Ocean

Introduction

Syllidae is one of the largest and most complex families of polychaetous annelids, with representatives common in all benthic marine habitats, although they are best known from shallow sandy habitats (San Martín & Aguado 2022). Aguado & San Martín (2009) demonstrated the polyphyletic nature of the Eusyllinae, one of the four traditional syllid subfamilies, and established a fifth subfamily to accommodate genera characterized by lacking a pharyngeal tooth. The Anoplosyllinae is comprised of five closely related genera: *Anoplosyllis* Claparède, 1868; *Astreptosyllis* Kudenov & Dorsey, 1982; *Streptospinigera* Kudenov, 1983; *Streptosyllis* Webster & Benedict, 1884, and *Syllides* Örsted, 1845 (San Martín & Aguado 2022). *Anoplosyllis*, with only two species, is known originally from the Gulf of Naples (Claparède 1868) with the second species from South America (Hartmann-Schröder 1962); *Astreptosyllis* also includes two species and is known only from Australia (Kudenov & Dorsey 1982, Hartmann-Schröder 1986). The three remaining genera have wider geographical occurrences and a greater number of species; including species described or reassigned in this study, *Streptospinigera* currently comprises 10 species, *Streptosyllis* 17 species, and *Syllides* 21–23 species (Olivier *et al.* 2013; San Martín & Aguado 2022; Read & Fauchald 2025).

Several species belonging to the Anoplosyllinae were originally described from the east coast of Canada and the United States (Verrill 1882; Webster & Benedict 1884, 1887; Moore 1907); later authors (Hartman 1944; Pettibone 1963; Banse 1971), perhaps following the advice of Verrill (1881), who thought much of the New England fauna was the same as that of northern Europe, often proposed synonymies in which these species were synonymized with species originally described from Europe or elsewhere. Additional work by Banse (1971), Perkins (1981), Sardá & San Martín (1992), and Riser (1997) added to the knowledge of the syllid fauna along the Atlantic coast of North America; Banse (1968, 1971), Kudenov & Harris (1995), and others studied eastern Pacific fauna. San Martín (1990, 1991a–c, 1992) made major contributions to the syllid fauna from Cuba and the Gulf of Mexico.

This paper is part of a review of Syllidae collected during several projects conducted during the period 1980–2020 as part of large reconnaissance and monitoring surveys primarily along the U.S. Atlantic and Pacific coasts, as well as smaller deep-water studies in the Gulf of Mexico and other locations. The first paper covering these collections dealt with the genus *Anguillosyllis* Day, 1963 (Maciolek 2020); the present paper examines species belonging to the subfamily Anoplosyllinae. In this paper, six new species are named, one species is removed from synonymy and revalidated, one new combination is made, and one poorly known species is redescribed.

Methods and materials

Collections of benthic infauna from Massachusetts harbors and bays were made during programs conducted for the Massachusetts Water Resources Authority (MWRA) during the 1980–90s. Sampling was carried out offshore the U.S. Atlantic coast in the 1980s during the Georges Bank Benthic Infauna Monitoring Program (GBMP, aka BIMP) conducted for the U.S. Department of the Interior, Bureau of Land Management (BLM), now the Bureau of Ocean Energy Management (BOEM), and the deep-water U.S. Atlantic Continental Slope & Rise Program (ACSAR, aka ASLAR) under contracts with Battelle Memorial Institute (Battelle) and the Woods Hole Oceanographic Institution (WHOI). Benthic samples from Long Island Sound and offshore New York were collected under contracts with ENSR for the US Environmental Protection Agency (EPA) and the US Army Corps of Engineers (ACOE) and private contractors. On Georges Bank, in addition to the 18 stations sampled along depth intervals, an array of 28 site-specific stations centered around Station 5 were sampled; these were designated Sta. 5-1 through 5-29. Collections of syllids from offshore the U.S. Gulf coasts were made during deep-water oil and gas explorations off Louisiana, performed for Total E&P USA. Near-shore samples from British Columbia, Canada, off Ridley Island were collected as part of a proposed oil and gas export facility for the BG Group. Specimens from NOAA's Ocean Pulse program are courtesy of Mr. Robert Reid (Reid *et al.* 1991). Specimens from the LEO-15 experiment are courtesy of Ms. Rose Petrecca, Rutgers University (Grassle *et al.* 2009).

In the field, samples were sieved on a 300-µm-mesh sieve, preserved in 10% formalin, and later transferred to 70% ethyl alcohol (ETOH). During each project, all infauna were removed from each sample and identified to the lowest practical taxon, usually to species. In some cases when the identification was uncertain, letter or number designations were used. For the first eight collections of the GBMP, each sample was sieved through 0.5-mm- and 0.3-mm-mesh screens to evaluate size fractions; these lots were combined if found during the current study.

Specimens were examined with light microscopy using a high-quality Wild M-5 stereomicroscope and a Zeiss research compound microscope equipped with phase contrast optics. Measurements were made using scales calibrated against a stage micrometer, the lengths of some setae were difficult to measure due to very fine tips that curled in different planes of view. Maximal width was measured across the proventricular area, including the parapodia but excluding the setae. Some specimens were stained with Shirlastain A to highlight surficial morphology; other specimens were stained with a saturated solution of Methyl Green (MG) in 70% ETOH to elucidate staining patterns that are usually associated with glandular structures that preferentially retain this stain. The MG stain dissipates completely in fresh ETOH, although some morphological features may retain the stain for several days or even weeks. Line drawings were made in pencil using a drawing tube (*camera lucida*) on the Zeiss microscope or sometimes by tracing photographs. Sketches were scanned and imported into Adobe Illustrator where vector line drawings were made and plates assembled. Photographs were taken with a Nikon D7100 camera mounted on the stereo- and compound microscopes, and plates were prepared using Adobe Power Point and Adobe Photoshop or Illustrator software.

Abbreviations

Genera:
Sts.—*Streptospinigera* Kudenov, 1983
Str.—*Streptosyllis* Webster & Benedict, 1884
Syl.—*Syllides* Örsted, 1845
Miscellaneous:
af—anterior fragment
dss—dorsal simple seta
ETOH—ethanol
g—with gametes
n or nat—with natatory setae
pf—posterior fragment
rep.—replicate
set—setiger (alternate spelling of chaetiger)
tc—tentacular cirrus

Programs and institutions:

ACSAR	Atlantic Continental Slope & Rise (aka ASLAR)
AHF	Allan Hancock Foundation, Los Angeles, California
AMNH	American Museum of Natural History, New York, New York
ASLAR	Atlantic Slope and Rise (aka ACSAR)
BOEM	Bureau of Ocean Energy Management
BLM	Bureau of Land Management
BIMP	Benthic Infauna Monitoring Program (aka GBMP)
GBMP	Georges Bank Monitoring Program (aka BIMP)
LACM	Los Angeles County Museum, Los Angeles, California
MBL	Marine Biological Laboratory, Woods Hole, Massachusetts
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, MA
MMS	Minerals Management Service
MWRA	Massachusetts Water Resources Authority
NOAA	National Oceanic and Atmospheric Administration
USACE	United States Army Corps of Engineers
USNM	Smithsonian Institution, National Museum of Natural History, Washington, D.C.

Taxonomic account

Anoplosyllinae Aguado & San Martín, 2009

Anoplosyllis Claparède, 1868.
Astreptosyllis Kudenov & Dorsey, 1982.
Streptospinigera Kudenov, 1983.
Streptosyllis Webster & Benedict, 1884.
Syllides Örsted, 1845.

Diagnosis. (*modified from Aguado & San Martín 2009*). Syllid with cylindrical body, size minute to small or medium. Palps usually fused basally, without medial groove, sometimes turned ventrally, sometimes with ventrolateral or terminal papilla. Prostomium with three antennae, usually long, extending beyond palps. Two pairs of lensed eyes, occasionally with additional pair of anterior eyespots, or eyes may be absent. Peristomium of some genera with inclusions of bright hyaline (translucent) granules. Two pairs of tentacular cirri. Nuchal organs as two densely ciliated grooves between prostomium and peristomium. Pharynx straight or twisted, relatively short, without any armature; proventricle occupying four to seven segments, lacking medial raphe. Antennae, tentacular cirri, and anterior dorsal cirri smooth; remaining dorsal cirri smooth or articulated, with articles marked by constrictions. Ventral cirri inserted medially on parapodia. Pygidium with one midventral and two dorsolateral anal cirri.

Remarks. Both morphological and molecular analyses support the grouping of these five genera into a single monophyletic clade that diverges from the remainder of the Syllidae (Aguado *et al.* 2007; Aguado & San Martín 2009); this division was also suggested by Licher (1996). Aguado & San Martín (2009) suggest that this split may actually reflect a deeper, perhaps family-level, divergence. The main apomorphies separating these genera from the majority of the syllids include the lack of pharyngeal armature, the presence in some genera of granular inclusions in the peristomium, and the medial insertion of the ventral cirri. The name of the subfamily, Anoplosyllinae, meaning 'unarmed syllis', reflects the importance of the lack of pharyngeal armature (Aguado & San Martín 2009).

The anoplosyllin genera are recognized as closely related (e.g., Kudenov 1983). Faulwetter *et al.* (2008) emphasized the inconsistency of diagnostic characters among the five genera and as new species have been described or moved from one genus to another, the lines between genera have become increasingly blurred. However, based on current observations and using a narrow definition of some important characters such as "enlarged acicula", a key that reflects some of the conclusions of this study is offered below.

Key to genera of Anoplosyllinae

1A. Distal ends of acicula greatly enlarged in some setigers (dorsal simple setae of one kind) . . . . . *Streptosyllis*
1B. Distal ends of acicula never greatly enlarged, although shafts may be thicker in some setigers or tips may be slightly widened or beak-shaped in all setigers 2

2A. Dorsal simple setae of only one kind 3
2B. Dorsal simple setae of two kinds: (1) thick and/or arched dorsally in anterior setigers and (2) capilliariform in middle and posterior setigers (blades of compound setae unidentate) . . . . . *Streptospinigera*

3A. All dorsal cirri smooth, never articulated . . . . . *Anoplosyllis*
3B. At least some dorsal cirri articulated 4

4A. Blades of compound chaetae unidentate (dorsal simple setae with hoods) . . . . . *Astreptosyllis*
4B. Blades of compound chaetae bidentate (dorsal simple setae with or without hoods) . . . . . *Syllides*

Streptospinigera Kudenov, 1983

Type species: *Streptospinigera heteroseta* Kudenov, 1983.

Diagnosis. (*modified from Olivier et al. 2013*). Body small to medium with 23–49 setigers. Palps visible dorsally, fused at base, distally rounded, blunt, usually without ventrolateral accessory papillae. Anterior ventral cirri short, ovoid or globular, not extending beyond parapodial lobes; posterior ventral cirri elongated, subulate or digitiform, sometimes extending beyond parapodial lobes in far posterior setigers. Anterior parapodia short, posterior parapodia usually elongated. Bases or shafts of anterior acicula may be twice as thick as posterior ones, distal tips beak-shaped to truncate, not greatly enlarged; notoaciculum slender when present. Compound setae include unidentate falcigers and unidentate spiniger-like blades on same parapodium; blades of falcigers sometimes thick or enlarged on some anterior parapodia, becoming slender thereafter. Two types of dorsal simple setae present: distally arched, thick, on one or more anterior parapodia, becoming straight, slender, capilliariform in later setigers. Ventral simple setae present or absent. Setae with or without hoods.

Remarks. When establishing the genus *Streptospinigera*, Kudenov (1983) commented on the close relationship of the new genus to *Streptosyllis*, with enlarged anterior acicula being the most important shared character along with enlarged dorsal simple setae and the presence of compound falcigers in anterior setigers; he noted that the two genera differed most significantly in the presence of capilliform dorsal simple setae and of spinigers as well as falcigers in posterior setigers of *Streptospinigera* versus the absence of both in *Streptosyllis*. However, as figured in Kudenov (1983, Fig. 2:a–g), the acicula of *Streptospinigera* are enlarged only in the width of the shaft in setigers 2–4 and less so in setiger 5, but the tips are not greatly enlarged as they are in *Streptosyllis* species (see section on *Streptosyllis* below). In *Sts. baolingi* (Ding & Westheide, 1994) and *Sts. hainanensis* (Ding & Westheide, 1994), the distal ends of the aciculae are more similar to those of *Streptosyllis*, but these appear to be the only two with any notable enlargement of the tips, although still not comparable to that seen in *Streptosyllis*.

In contrast, Olivier *et al.* (2013: 1501) emphasized the "strong and abrupt difference between the shape of dorsal simple chaetae, compound chaetae, parapodia and ventral cirri, of some anterior segments to remaining ones". As will be demonstrated in the new species described here, this transition is not always as abrupt as seen between setigers 5 and 6 in *Sts. niuqtuut* Olivier, San Martin, & Archambault, 2013 but is often gradual over setigers 4 through 6. Character states added since Kudenov's original description include longer blades on anterior parapodia, hoods on some dorsal simple setae, the possible presence of ventral simple setae, and longer ventral cirri in far posterior setigers, thus making *Streptospinigera* less distinct from other genera in the subfamily. In addition, one species, *Sts. hainanensis* (Ding & Westheide, 1994), has some bidentate blades in anterior setigers, whereas all compound setae in all other species are unidentate. However, the presence of two types of dorsal simple setae remains key to differentiating *Streptospinigera* from other anoplosyllin genera.

Species currently assigned to *Streptospinigera* (Read & Fauchald 2025) include the four recognized by Olivier *et al.* (2013)*: Sts. alternocirra* Ohwada, 1988 from the Pacific coast of Japan; *Sts. heteroseta* from off the west coast of Florida in the Gulf of Mexico; *Sts. niuqtuut* from the Canadian Arctic and northwest Atlantic Ocean; and *Sts. templadoi* (San Martín, 1984) from the western Mediterranean and Canary Islands. Two species from the South China

Sea, *Streptosyllis baolingi* Ding & Westheide, 1994 and *Str. hainanensis* Ding & Westheide, 1994, were transferred to *Streptospinigera* by San Martín *et al.* (2021). Only one species of *Streptospinigera*, *Sts. niuqtuut*, has been described from the Atlantic coast of the United States. Three new species from deep water in the Gulf of Mexico off Louisiana and one new species from British Columbia are described below. Another species from deep water in the South China Sea off Brunei is also known (Maciolek in prep.), resulting in half of the known species being reported from intertidal or shallow depths and half from waters deeper than 100 m and extending onto the continental slope (Table 1). The morphology of soft body parts is compared for all described species of *Streptospinigera* in Table 1, and the setae are compared in Table 2. The following species are included in this study:

1. *Streptospinigera karlbansei* **sp. nov.**
2. *Streptospinigera kudenovi* **sp. nov.**
3. *Streptospinigera niuqtuut* Olivier, San Martín, & Archambault, 2013
4. *Streptospinigera nola* **sp. nov.**
5. *Streptospinigera septima* **sp. nov.**

***Streptospinigera karlbansei* sp. nov.**

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Figures 1–2

Material examined. *(7 specimens from 3 stations).* **Eastern North Pacific Ocean, British Columbia, Canada, off Ridley Island**, coll. S. A. Doner & P. S. Winchell, MV *Metlakatla Spirit*. Sta. B09, 19 Sep 2012, 54.195°N, 130.314°W, 7.5 m, **Holotype** (MCZ IZ 173675), 4 paratypes (MCZ IZ 173676); Sta. B13, 20 Sep 2012, 54.202°N, 130.323°W, 8.6 m, 1 paratype (MCZ IZ 173677); Sta. B21, 19 Sep 2012, 54.200°N, 130.312°W, 9.0 m, 1 paratype, (MCZ IZ 173678).

Description. Small species with up to 40 setigers (holotype), largest specimen measuring 3.5 mm long, 0.4 mm wide across anterior with parapodia but without setae; smallest specimens 1–1.5 mm long, 0.2 mm wide. Palps large, rounded anteriorly, fused at base, lacking medial groove, no accessory papillae (Figs 1A; 2A–C). Prostomium rectangular, wider than long, with bright golden inclusions on posterior edge (Fig. 2C); larger specimens with two pairs of red eyes with yellowish central portion in open trapezoid arrangement, sometimes an additional anterior pair of tiny eyespots present (Figs 1A; 2B–C); prostomial antennae lost on all specimens. Peristomium short, with two rows of bright golden inclusions (Fig. 2C); two pairs smooth, club-shaped tentacular cirri, dorsal pair slightly longer than ventral pair, inserted on anterior peristomium in slightly ventral position. Pharynx unarmed, light in color, with smooth rim and ca. 10 small papillae (Fig. 2B–C). Proventricle somewhat cylindrical or long-barrel-shaped, occupying five or six setigers, muscle rows obscure at anterior and posterior ends but at least 30 rows visible in middle portion; no medial raphe; light and dark bands near posterior end (Fig. 2A–B). Dorsal surface with narrow raised ridges across segments from anterior to final posterior setigers, these ridges often in anterior half of the segment (Fig. 1A), dorsum textured with small raised epidermal cells. Parapodia very short, truncate, in anterior setigers (Figs 1A; 2A–B), becoming larger after setiger 5, but still somewhat squarish or rectangular in shape through middle setigers, becoming more elongated in posterior (Fig. 2A). Dorsal cirri smooth on first two or more setigers; subsequent dorsal cirri often lost, those remaining smooth or only weakly articulated (Fig. 1A). Ventral cirri inserted mid-parapodium, globular or slightly elliptical on first five setigers, becoming increasingly larger thereafter but retaining shape, sometimes with pinched tip, or becoming digitiform in posterior setigers, do not exceed parapodial lobe. Pygidium with one digitiform medial cirrus, two very short (or incomplete) lateral cirri present on holotype (Fig. 2D), cirri lost on remaining specimens.

Acicula slender with beak-shaped tip (Fig. 1E, H, I); occasionally with double acicula in setigers 2, 4, and posterior setigers, one aciculum much thinner than the other (Fig. 2H). Setigers 1–5 each with one strongly curved, blunt, thick dorsal simple seta, serrated near rounded distal tip, 40–60 µm long (Figs 1F–G; 2G); dorsal simple seta in setiger 6 transitional, with similar but thinner shape, 80 µm long (Figs 1H; 2G); simple setae distinctly different from setiger 7, elongated with flattened proximal and middle sections narrowing into thinner tip, minutely serrated on convex side in middle portion (Figs 1I; 2G); length of seta up to 100 µm, not exceeding longest blades of compound setae. Compound setae in setigers 1–5 include tight bundle of unidentate, distinctly serrated falcigers with rounded base and blunt tip (Fig. 1B), all measuring ca. 15 µm long, plus two or three ca. 35-µm-long serrated blades (Fig.

TABLE 1. Comparison of the soft morphology of described species of *Streptospinigera*, including type localities and depths.

	***heteroseta* Kudenov, 1983 (type species)**	***alternocirra* Ohwada, 1988**	***baolingi* (Ding & Westheide, 1994)**	***hainanensis* (Ding & Westheide, 1994)**	***karlbansei* sp. nov.**	***kudenovi* sp. nov.**	***niuqtuut* Olivier, San Martin & Archambault, 2013**	***nola* sp. nov.**	***septima* sp. nov.**	***templadoi* (San Martin, 1984)**
Type Locality	Gulf of Mexico, off Florida	Aburatsubo Bay, Japan	South China Sea, Hainan Island	South China Sea, Hainan Island	British Columbia, Canada, off Ridley Island	Gulf of Mexico, off Louisiana	Canadian High Arctic and Gulf of Maine	Gulf of Mexico, off Louisiana	Gulf of Mexico, off Louisiana	western Mediterranean
Depth (m)	19	2	sublittoral	sublittoral	7.5–9	330–364	169–707	350–850	818–884	shallow, near seagrass meadow
Max Number Setigers	23	33	31	32 (incomplete)	40	49	44	33	26	42
Maximum Size Holotype; mm length/ width)	1 / 0.5	1.4 / 0.2	2.6+ / 0.18 w/o pp	3.5 / 0.17 w/o pp	3.5 / 0.4 w/o pp	5 / 0.65	3 / 0.4	2 / 0.25	2 / 0.4	4 / 0.25
Palps	Large, laterally incised, fused basally	Large, laterally incised, fused basally, distally rounded	Large, swollen, wide base, medially fused *(near base)*	Large, rounded anteriorly, fused basally	Large, rounded anteriorly, fused at base, lacking medial groove	Large, rounded anteriorly, fused basally	Broad, short, fused basally	Large, broad, rounded anteriorly, not fused (?)	Large, rounded anteriorly, fused basally	Wide, short, rounded, united at base
Accessory Papilla on Palp	No	No	Yes (ventral palpostyle)	Not mentioned	No	No	Not mentioned (none on new material)	None observed	No	Yes *(but not clear in SEM)*
Prostomium	Wider than long	Wider than long	Rounded anteriorly *(subpentagonal)*, posterior margin straight	Rounded anteriorly (*subpentagonal*), posterior margin straight	Wider than long, base with inclusions as on peristomium	Wider than long, borders between pal, pro, peri, set 1 not well demarcated.	Subpentagonal; base with inclusions as on peristomium	Subpentagonal	Wider than long, base with inclusions as on peristomium	Subpentagonal to oval, wider than long
Eyes	6: 3 pairs	6: 2 pairs + 2 eyespots	6: 2 pairs with lenses, anterior pair smaller, w/o lens	2 pairs, lensed	6: 2 pairs w/ lenses, anterior pair smaller, w/o lens	None (rarely 4 very faint)	2 pairs	2 pairs, large bar-shaped or multisegmented, w/ lens	None, or very faint	2 pairs nearly in line and 2 eyespots sometimes very small

.....continued on the next page

TABLE 1. (continued)

	***heteroseta* Kudenov, 1983 (type species)**	***alternocirra* Ohwada, 1988**	***baolingi* (Ding & Westheide, 1994)**	***hainanensis* (Ding & Westheide, 1994)**	***karlbansei* sp. nov.**	***kudenovi* sp. nov.**	***niuqtuut* Olivier, San Martin & Archambault, 2013**	***nola* sp. nov.**	***septima* sp. nov.**	***templadoi* (San Martin, 1984)**
Antennae	Smooth, median well exceeds palps	Smooth, clavate, median antenna long	Smooth, slightly club-shaped, short bases; median antenna ca. 2.7X length lateral	Slightly wrinkled, short bases, median antenna ca. 1.7X lateral	Lost	Smooth, slightly club-shaped	Smooth, club-shaped, relatively short	Lost	Smooth, club shaped, slightly longer than palps	Smooth, base narrower than tip (slightly club shaped; median antenna long (2X prost and palps)
Peristomium	Short	Short	(Looks long in figures, no inclusions mentioned)	(Looks as long as set 1 in figure, no inclusions mentioned)	Short, with inclusions	As long as prostomium, filled dorsally with large inclusions	Well-defined, filled with brown/orange iridescent granules	Shorter than prostomium, with two or more rows of inclusions	Shorter than prostomium, with irregular rows of round inclusions	Well defined, short
Tentacular Cirri	Smooth; club-shaped, dorsal longer than ventral	Smooth, clavate, dorsal slightly longer than ventral	Dorsal pair only slightly longer than ventral pair (90:76 µm)	Two pairs, dorsal pair only slightly longer than ventral pair (190:120 µm)	Two pairs smooth, club-shaped, dorsal pair slightly longer than ventral	Two pairs on cirrophores, smooth, dorsal pair twice as long as ventral	Smooth, club-shaped, dorsal pair twice as long as ventral pair	Two pairs, smooth, club-shaped	Two pairs short, smooth, club-shaped	Similar to lateral antennae, ventral pair shorter than dorsal
Pharynx (all unarmed)	Only partly extended, papillae undetermined	Distal border with 10 papillae	Distal rim with ca. 10 terminal papillae	No additional description	Light in color, smooth rim	Distal rim with 10 small papillae	With red pigment	Not everted	Distal rim with ca. 10 papillae	Wide, in 4–5 segments, dark brown
Proventricle	Barrel-shaped, 4 setigers, 30 muscle rows	Barrel-shaped, 4 setigers, ca. 30 muscle rows arranged in opposite diagonal planes	230 µm long (cylindrical, 4 setigers long in figure), ca. 48 muscle rows	320 µm long, 4.5 setigers (cylindrical in figure), ca. 40 muscle rows	Cylindrical or long-barrel-shaped, 5–6setigers, at least 30 rows	Cylindrical, sharply narrowed at posterior end, 4.5– 6 setigers, ca. 38 visible muscle rows	Barrel-shaped, 5 setigers, 35 muscle rows not well defined	Cylindrical, 4–5 setigers, ca. 35 muscle rows	Barrel-shaped, 3.5–4 setigers, ca. 26 muscle rows	5-6 segments, ca. 40 muscle rows.

.....continued on the next page

TABLE 1. (continued)

	***heteroseta* Kudenov, 1983 (type species)**	***alternocirra* Ohwada, 1988**	***baolingi* (Ding & Westheide, 1994)**	***hainanensis* (Ding & Westheide, 1994)**	***karlbansei* sp. nov.**	***kudenovi* sp. nov.**	***niuqtuut* Olivier, San Martin & Archambault, 2013**	***nola* sp. nov.**	***septima* sp. nov.**	***templadoi* (San Martin, 1984)**
Parapodia	Anterior distally truncate; posterior elongate, conical	Anterior large, distally truncate; posterior smaller, conical	Large, distally truncate in 2–4; set 1, 5, and posterior smaller, conical	Large, distally truncate in 2–5; set 1, 6, and posterior smaller, conical	Anterior very short, truncate, middle larger, squarish or rectangular, posterior more elongated	Distally truncate in set 1–4 or 5, becoming narrower and longer through posterior setigers, with distally rounded end.	Anterior broad, distally rounded; elongated, conical, distally bilobed from set 6	Shorter, bifid on anterior set 1–4; longer, narrow with rounded distal end through posterior	Shorter, bifid on anterior setigers, with long, narrow, rounded distal end through posterior	Relatively wide, rounded and short
Dorsal Cirri	Long, smooth on set 1; short, smooth set 2–5; from set 6 with 4 articles each, alternate in length	Long, smooth on set 1; short, smooth set 2, 3, 5; with 2 articulations on set 4, set 6 with 4 articles, set 7 & 8 smooth, thick, subulate, thereafter alternate smooth on even-numbered setigers and with 4–6 articles on odd-numbered setigers	Smooth on set 1–5, 7, and even-numbered setigers; set 6, and odd-numbered with (usually) 3 articles	Almost filiform on set 1-3, irregularly pseudoannulated or truly annulated. From set 4 posterior conspicuously annulated, with 4-5 articles	Smooth on first two or more setigers; subsequent dorsal cirri may alternate smooth or only weakly articulated when present	Very long, smooth, on setiger 1, smooth on setiger 2; subsequent dorsal cirri mostly lost, those remaining with a few (ca. 4–6) long articles	Club-shaped, smooth, usually shorter than body width; some longer, articulated	Smooth on set 1–2, remining ones weakly articulated with 2–3 long articles	Smooth on set 1–2, subsequent remaining dorsal cirri articulated with 6–8 long articles, each with two bottle-shaped golden inclusions	Anterior cirri smooth; set 1 longer than rest, psuedoarticulated in proventricle sets; short, smooth cirri alternate with long, pseudo-articulated
Inclusions/ Glands in Dorsal Cirri	Not mentioned	Yes	Not mentioned	Yes	Yes	No (uncertain)	Yes	Yes	Yes	Yes

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TABLE 1. (continued)

	***heteroseta* Kudenov, 1983 (type species)**	***alternocirra* Ohwada, 1988**	***baolingi* (Ding & Westheide, 1994)**	***hainanensis* (Ding & Westheide, 1994)**	***karlbansei* sp. nov.**	***kudenovi* sp. nov.**	***niuqtuut* Olivier, San Martin & Archambault, 2013**	***nola* sp. nov.**	***septima* sp. nov.**	***templadoi* (San Martin, 1984)**
Ventral Cirri	Inflated set 1–3, subulate thereafter, do not exceed parapodial lobe	Short, blunt, inflated set 1–3, elongating to set 7, subulate thereafter	Digitiform, exceed parapodial lobe	Digitiform, usually exceed parapodial lobe	Globular set 1–5 larger, w/ pinched tip or digitiform in posterior setigers, do not exceed parapodial lobe.	Small, triangular anterior, becoming longer and narrower from setiger 6 or 7, exceeding parapodial lobe in far posterior setigers	Ovoid anterior; posterior longer, digitiform	Oval anterior, digitiform posterior, exceed parapodia only in last setiger	Large, oval, becoming longer, subulate in posterior, exceeding parapodia last setiger or two	Long, wide base, pointed end, longer than the parapodial lobes, longer than setae from proventricular area
Pygidium	Short	Small	Subtriangular	Holotype incomplete	Rounded	Rounded	Rounded	Rounded	Rounded	Small
Anal Cirri	One short midventral and 2 long dorsolateral, all smooth	One short filiform midventral and 2 long lateral, all smooth	One short midventral with base and 2 long lateral	Holotype incomplete	One short midventral with base and 2 short lateral	Digitiform median cirrus and two lateral cirri seen only as small oval or round lobes	Digitiform median cirrus and two lateral cirri seen only as small lobes	One short median, one short lateral with globular inclusion	Digitiform median cirrus and two lateral cirri seen only as small oval or round lobes	Two long pseudoarticulated anal cirri, with granular inclusions and a much shorter single cirrus
Reproduction	No information	Gametes from setiger 10. Epitokes with enlarged eyes, long natatory setae	Sperm observed, no setiger noted.	Sperm from setiger 10, natatory setae from set 13	Gametes from set 9–10; no natatory setae observed	Large gametes in sets 18–31 (of 44); long natatory setae from set 12	Epigamic male with long natatory setae from set 12	Gametes from setiger 9 or 10, extruding from set 21	Gametes from setiger 7	Males with gametes from set 11, natatory setae present.

Abbreviations: ca. – approximately, m – meters, pp – parapodium/a, set – setiger, w/o – without.

TABLE 2. Comparison of the setal characteristics of described species of *Streptospinigera*.

	***heteroseta* Kudenov, 1983**	***alternocirra* Ohwada, 1988**	***baolingi* (Ding & Westheide, 1994)**	***hainanensis* (Ding & Westheide, 1994)**	***karlbansei* sp. nov.**	***kudenovi* sp. nov.**	***niuqtuut* Olivier, San Martin & Archambault, 2013**	***nola* sp. nov.**	***septima* sp. nov.**	***templadoi* (San Martin, 1984)**
Neuroacicula	Single, set 2–5 or 6 thick, distally truncate; set 1 and post-set 6 slender, distally beak-shaped	Single, set 2–5 twice as thick as following, distally truncate or with dorsally curved tips; set 1 and post-set 5 slender, distally beak-shaped	Single, set 2–4 twice as thick as others, distally truncate. Sets 1 and 5 to posterior slender, with knobbed tip	Single, set 2–5 twice as thick as others, distally truncate, slightly knobbed. Set 1 and 6 to posterior slender, with sharply bent tip	Usually single but sometimes double in posterior setigers; not enlarged, tips beaked-shaped	Often double in anterior setigers, both with blunt or slightly beaked tips; single after set 7–9, thin with flat head in far posterior setigers	Single, distally knobbed; set 2–5 distinctly longer and basally wider than remaining, set 6 slightly enlarged	Single, similar in all setigers, shaft narrowing to blunt or slightly beaked tip	Single, sturdy shaft narrowing to small blunt tip, similar but thinner with narrower tip in posterior setigers	Usually single, sometimes with a second very fine aciculum; thickest in set 2–6, truncated
Notoacicula	From setiger 7, with tuft of smooth capillaries *(natatory setae?)*	In all setigers, very slender, needle-like	Not present	Present in setigers with natatory setae	None seen	None seen	Not present	None seen	None seen	Not mentioned
Anterior Dorsal Simple Setae (set 1/2 through 5/6)	Set 1–5 enlarged, falcate, (curved) distally conical w/ ventral subterminal notch and paired lateral serrated ridges	Set 2–5 enlarged, distally falcate, short (as long as shaft of compound setae) *(no serrations mentioned)*	Set 2–4 thick-shafted, strongly curved, with 3–5 subdistal serrations	Set 2–5 thick-shafted, curved, with 6–8 subdistal serrations	Set 1–5 strongly curved, blunt, thick, serrated near rounded distal tip; longer in set 6, tip rounded, serrated	Set 1 curved, heavily serrated along middle to distal portion, tip bluntly rounded. Set 2 same shape but twice as long, narrowing into long thin tip, lightly serrated in middle portion.	Set 1–5 thick, curved dorsally, distally rounded, coarsely serrated on convex margin	Set 1–4 minimally curved, clearly serrated from bend to tip, serrations as transverse bars, tip bluntly rounded	Set 1–5 moderately curved, lightly serrated along middle portion, tip bluntly rounded	Thick, somewhat curved, end blunt, more developed on set 2–5 than on set 1

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TABLE 2. (continued)

	***heteroseta* Kudenov, 1983**	***alternocirra* Ohwada, 1988**	***baolingi* (Ding & Westheide, 1994)**	***hainanensis* (Ding & Westheide, 1994)**	***karlbansei* sp. nov.**	***kudenovi* sp. nov.**	***niuqtuut* Olivier, San Martin & Archambault, 2013**	***nola* sp. nov.**	***septima* sp. nov.**	***templadoi* (San Martin, 1984)**
Posterior Dorsal Simple Setae (from set 5, 6, or 7)	Slender, capilliform, slightly bent, transversely serrated	Long, slender capillary setae, slightly curved dorsally, finely serrated on lower curved side. Sometimes set 6 with transitional form	Slightly curved, with fine subdistal serrations, with hood	Slightly curved, with 8–12 fine subdistal serrations, with hood	Elongated with flattened proximal and middle sections narrowing into thinner tip, minutely serrated in middle portion	Becoming longer, thinner, far posterior simple setae straighter, without serrations	Slender, smooth to minutely serrated, distally blunt, with long filiform tip	From set 5, long, straight, no serrations, fine distal tip	Thinner, straighter, with finer but still blunt pointed tip though middle and posterior setigers	Thinner, with highly developed transparent cap composed of numerous very fine spines from setiger 7 (see figure)
Ventral Simple Setae	No	No	Not mentioned	Not mentioned	None seen	Yes, last set	None seen	None seen	Yes, last or next-to-last set	Not mentioned
Compound Setae: max # anterior setigers	8–10	10–11	5–7	6–8	ca. 12 set 1, ca. 24 in set 2–5	16–18 in set 1, 24–30 in set 2–10	ca. 15	14	ca. 24	8–10 in set 1; 9–12 set 2–5

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TABLE 2. (continued)

	***heteroseta* Kudenov, 1983**	***alternocirra* Ohwada, 1988**	***baolingi* (Ding & Westheide, 1994)**	***hainanensis* (Ding & Westheide, 1994)**	***karlbansei* sp. nov.**	***kudenovi* sp. nov.**	***niuqtuut* Olivier, San Martin & Archambault, 2013**	***nola* sp. nov.**	***septima* sp. nov.**	***templadoi* (San Martin, 1984)**
Compound Setae: anterior blades	Unidentate, 2–3 long and 6–7 short-bladed falcigers, all with saw-tooth margins	Unidentate, 2–4 long-bladed spinigers and 6–9 short-bladed falcigers, all with saw-tooth margins	Unidentate (2) and bidentate (3–5)	Unidentate, 6–8 short falcigers, regularly serrated	Unidentate, 2–3 long and up to 24 short-bladed falcigers in tight bundle, distinctly serrated, with rounded base and blunt tip	Unidentate, serrated at base or more, gradated in length, shortest ventral 15–20 µm, longest dorsal 110 µm. Some medium-length blades with 2–3 larger darker spines at base	Unidentate; slender, filiform, coarsely serrated basally; distally blunt. Strong dorso-ventral gradation in length (70 µm dorsal, 20 µm ventral). Dorsal blades smooth, more slender and filiform, spiniger-like.	Unidentate, deeply serrated from base nearly to bluntly rounded tip, shortest ventral 15 µm, longest dorsal 80 µm	Unidentate, minutely serrated or roughened at base, smooth at distal end; mid-length blades often with tiny knob at base. Gradated in length, shortest ventral 20 µm, longest dorsal to 90 µm	Unidentate; set 1 with 1–2 setae with long, spinigerous blades and 7–8 with short, falcigerous blades. Set 2–5 with 1–2 setae with short spinigerous blades broad at the base and 8–10 with short, wide, triangular blades.
Compound setae: anterior shafts	Thick, longer ventral face smooth, entire, rounded; dorsal superior face incised, with paired subdistal denticles or unpaired median flap. *(homogomph in figure)*	Shaft tips smooth with pointed superior branch and rounded inferior branch *(figure shows nearly homogomph set 5; others slightly hetero)*	Thick-shafted, bifid (*longer branch*), *nearly homogomph*	Thick-shafted, bifid (longer branch), *heterogomph in figure*	Heterogomph, both branches smooth	Heterogomph, weakly serrated with four or five serrations on long branch, short branch flared collar-like shelf with uneven edge	Thick, obscurely heterogomph, anterior tip pointed and rounded, shorter than posterior tip	Heterogomph, long branch smooth, short branch flared Y-shaped flange	Heterogomph, very weakly serrated with 3 or 4 minute serrations on long branch, short branch small collar-like shelf	Hemigomph, very finely bidentate end, no sheaths

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TABLE 2. (continued)

	***heteroseta* Kudenov, 1983**	***alternocirra* Ohwada, 1988**	***baolingi* (Ding & Westheide, 1994)**	***hainanensis* (Ding & Westheide, 1994)**	***karlbansei* sp. nov.**	***kudenovi* sp. nov.**	***niuqtuut* Olivier, San Martin & Archambault, 2013**	***nola* sp. nov.**	***septima* sp. nov.**	***templadoi* (San Martin, 1984)**
Compound Setae: posterior blades	2–3 superior spinigers with long, minutely serrated blades and 5–7 unidentate blades with finely serrated cutting margin, sometimes with pronounced basal spur. Becoming shorter ventrally w/in fascicle. Lengths not given.	6–9 slender setae with 2–3 superior setigers having very long finely serrated blades of similar length, 2–4 medial spinigers with long minutely serrated blades, and 2–4 rather short unidentate blades with minute serrations, medial blades sometimes with basal spur. Becoming shorter ventrally	Two types, both unidentate: narrow, longer, 20 µm in set 1 and 50 µm in set 5 and posterior, fine serrations on cutting edge. Seven to eight shorter blades (10 µm in set 1 and 14 in set 5 etc.) with finer serrations.	Two types, both unidentate: 1–-2 long, 52 µm and 5-6 with short blades 12–22 µm. Blades nearly same width base to tip, relatively large serrations at base, serrations becoming finer in middle and distal part, tips sharply hooked.	6–8 in middle setigers to as few as four in far posterior; middle and posterior blades in gradated lengths from 15 to 100 µm with shortest in ventral position, minutely serrated at least at base and middle portion, mid-length blades ca. 50 µm long with basal spur	Same as anterior	Blades smooth, unidentate, filiform, spiniger-like, 4–5 per parapodium, occasionally 6. One or 2 blades with distinct, long basal spine. Strong dorsoventral gradation in length, 100 µm dorsally to 20 µm ventrally	Similar in all setigers	Same as anterior	Unidentate; 1–2 long, spinigerous blades, ca. 80–95 µm in length, and 3–5 falcigers with blunt tip and dorso-ventral gradation in the length of the blades, 30–32 µm dorsal to 12–-20 µm ventral.
Compound setae: posterior shafts	Similar to anterior, except dorsal superior branch inconspicuously incised, generally smooth, lacking subterminal denticles	Similar to anterior, shaft tips smooth, socket for blade inconspicuous	Thin-shafted, bifid *(longer branch*); *shorter blades illustrated with more homogomph shafts, longer blade with more heterogomph shaft*	Thin-shafted, bifid *(longer branch); more obviously heterogomph shaft illustrated.*	Homogomph, both branches smooth	Same as anterior	Homogomph	Similar in all setigers	Same as anterior	Shafts longer than in anterior setigers, with transparent sheath covering edge and tip.

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TABLE 2. (continued)

	***heteroseta* Kudenov, 1983**	***alternocirra* Ohwada, 1988**	***baolingi* (Ding & Westheide, 1994)**	***hainanensis* (Ding & Westheide, 1994)**	***karlbansei* sp. nov.**	***kudenovi* sp. nov.**	***niuqtuut* Olivier, San Martin & Archambault, 2013**	***nola* sp. nov.**	***septima* sp. nov.**	***templadoi* (San Martin, 1984)**
Hoods on setae	No	No	Yes (on posterior simple setae)	Yes (on posterior simple setae)	No	No	No	No	No	Yes (on dorsal simple setae and compound setae from set 7)
Notable feature	Abrupt change in setae after setiger 5. Two kinds of dorsal simple setae: short, thick, curved anteriorly then long, capilliariform after setiger 5	Smooth dorsal cirri on even-numbered setigers and articulated with 4–6 articles on odd-numbered setigers after setiger 9	Some anterior falcigers bifid (i.e., with large subapical tooth). Dorsal simple setae in posterior with hoods.	Dorsal simple setae in posterior with hoods.	Tight dense fascicle of short-bladed compound setae emerges from distal end of parapodium in anterior setigers	Double acicula in anterior setigers, these setigers often with double dorsal simple setae as well.	Transversal line of protuberances on dorsum of each setiger, open by minute pores; function unknown.	Deep transverse serrations on DSS and falcigers (similar to those described for *heteroseta* but more numerous)	Gametes from setiger 7, natatory setae short	Posterior DSS and compound setae with transparent hood composed of very fine spines

Abbreviations: ca. – approximately, set – setiger

2B, E); setiger 1 with ca. 10–12 short-bladed falcigers, setigers 2–5 with ca. 20–24. From setiger 6, compound setae similar (Fig. 2F) but less numerous, reduced to 6–8 in middle setigers to as few as four in far posterior; middle and posterior blades in gradated lengths from 15 to 100 µm with shortest in ventral position, minutely serrated at least at base and middle portion, mid-length blades ca. 50 µm long with basal spur (Fig. 1C–E). Shafts of compound setae with longer prong smooth, oval and shorter prong similarly rounded (Fig. 1B), shaft lacking any apical or subapical teeth or flanges (Figs 1B–C; 2F, I). Distal end of shaft heterogomph on anterior setigers (Fig. 1B), becoming increasingly homogomph through setiger 11, clearly homogomph in middle and posterior setigers (Fig. 1E). All setae without hoods.

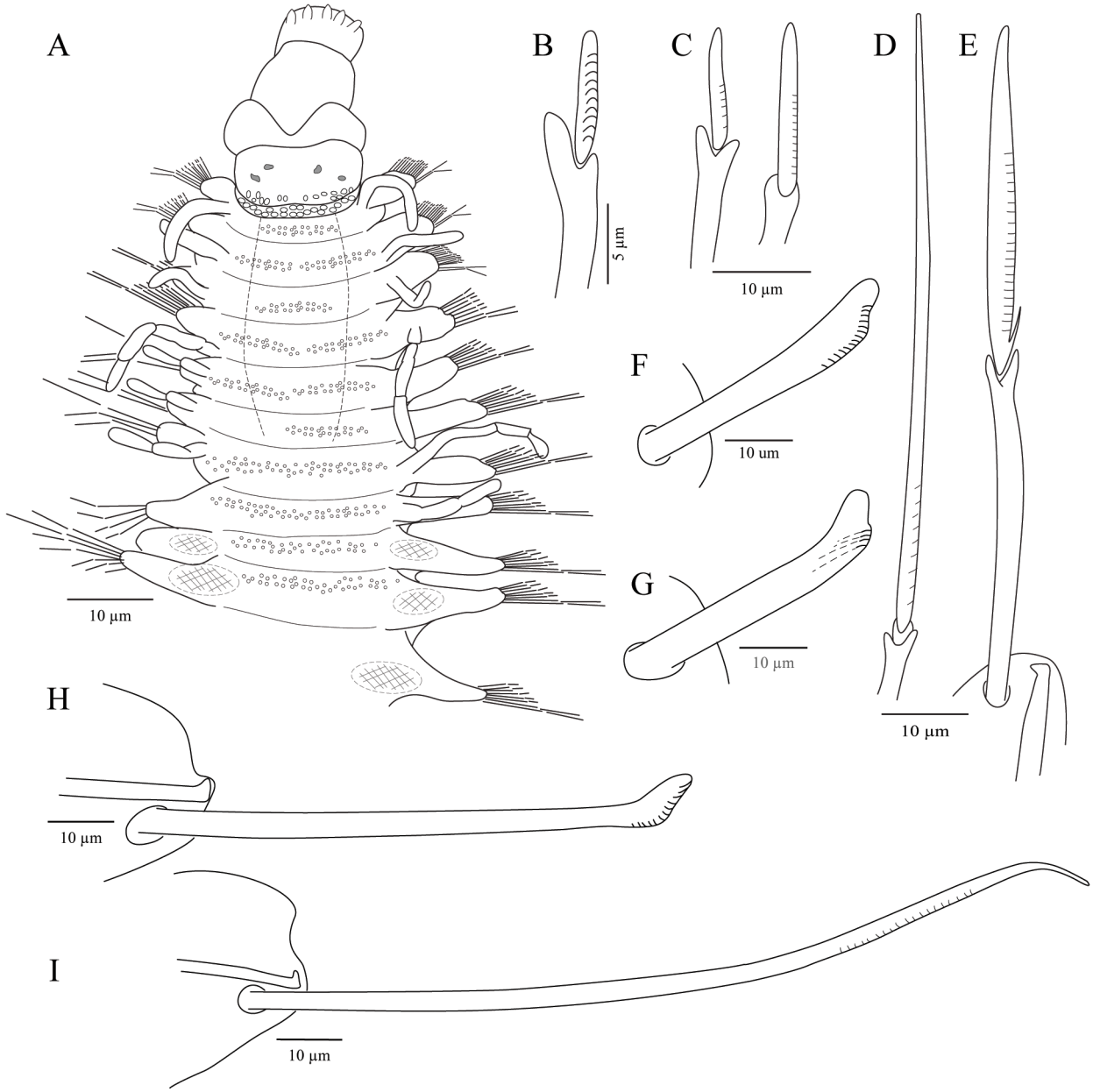

FIGURE 1. *Streptospinigera karlbansei* **sp. nov.** A, anterior end, dorsal view; B, short falciger, setiger 1; C, short ventral falcigers, setiger 17; D, longest falciger, setiger 17; E, aciculum and mid-length falciger with basal spine; F, dorsal simple seta, setiger 3; G, dorsal simple seta, setiger 4; H, aciculum and dorsal simple seta, setiger 6; I, aciculum and dorsal simple seta, setiger 10. A–I: holotype (MCZ IZ 173675).

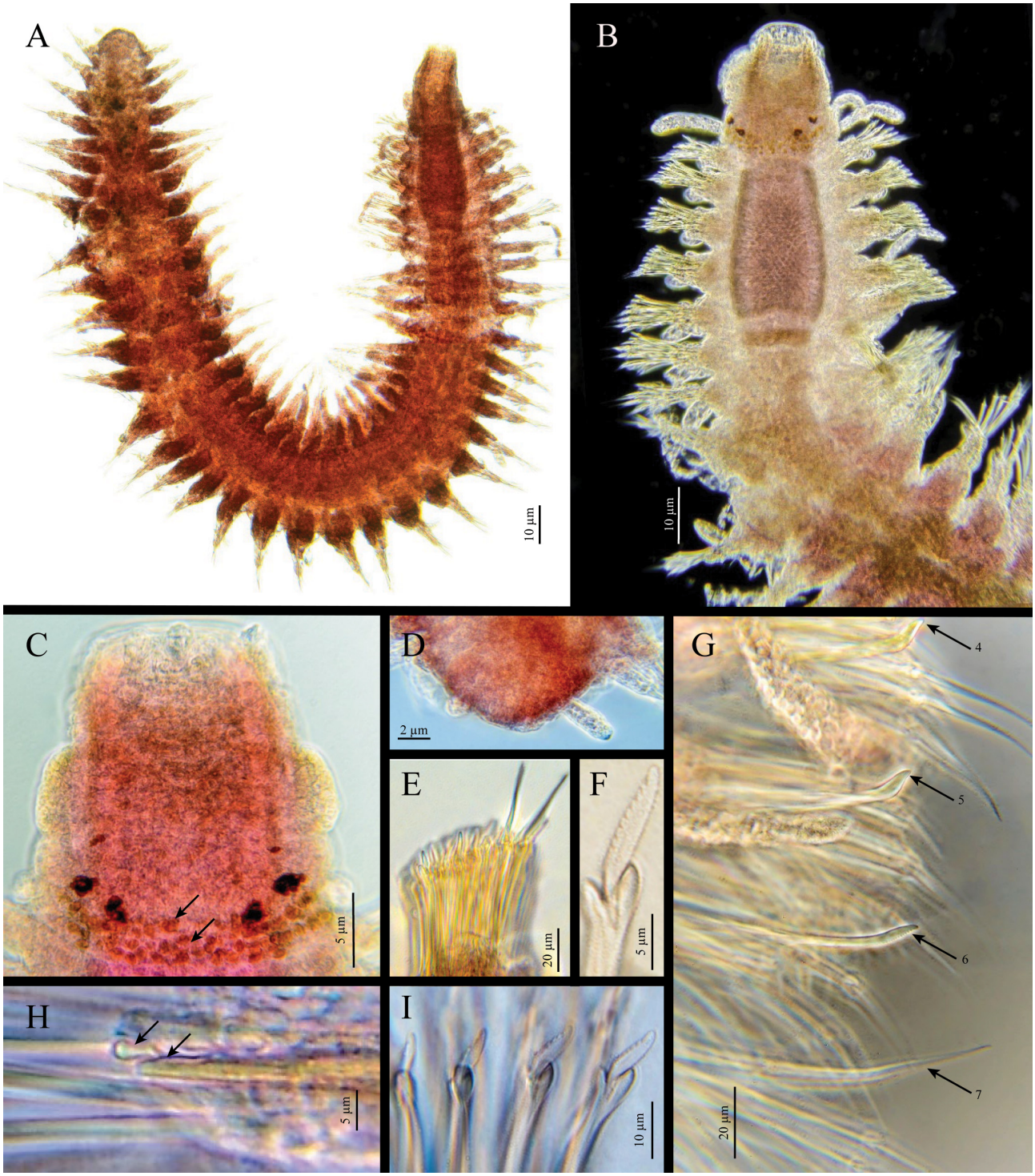

FIGURE 2. *Streptospinigera karlbansei* **sp. nov.** A, whole body, dorsal view; B, anterior end, dorsal view; C, head, dorsal view, arrows indicate large rounded inclusions in base of prostomium and peristomium; D, pygidium, dorsal view; E, setal bundle, setiger 3; F, compound seta, setiger 6; G, dorsal simple setae, setigers 4–7 as indicated by arrows; H, double acicula, as indicated by arrows, middle parapodium; I, ventral row of short-bladed compound setae, setiger 3. A, D: holotype (MCZ IZ 173675); C, G, H: paratype (MCZ IZ 173677); B, E, F, I: paratype with damaged posterior (MCZ IZ 173676).

Reproduction. Larger specimens with eggs entering parapodia from setiger 9 or 10 (Fig. 2A–B); no natatory setae observed.

Methyl Green staining pattern. MG stain generally not retained, no pattern observed; some stain held by tissue in damaged parapodia containing gametes.

Remarks. Banse (1971) described syllids from northwest Washington State, including one that he called *Syllides longocirrata* (Oersted); his record was not accepted when *Syl. longocirrata* was redescribed (Olivier *et al.* 2013; Lucas *et al.* 2018). Banse's specimens had stout dorsal simple setae in anterior segments followed by segments with thinner simple setae, thus matching the definition of *Streptospinigera* (which was not established until 1983). The specimens described here do not correspond in several details to Banse's account and thus are taken to represent a separate species. Banse's specimens from Orcas Island have a proventricle that occupies 3.5–4.5 setigers (vs. 5–6 setigers in the new species); dorsal cirri that are annulated in anterior setigers and smooth in posterior ones (vs. smooth or only weakly articulated in anterior setigers); and the first five anterior setigers have 'a dozen or more' compound setae (vs. a dense fascicle of at least 20 compound setae).

In a juvenile specimen of *Streptospinigera karlbansei* **sp. nov.** with 15 setigers plus one developing setiger and two achaetous segments the transition from stout curved dorsal simple setae and a bundle of short-bladed compound setae to longer, thinner dorsal simple setae and blades of three lengths occurred at setiger 5 rather than 6. Thus, the transition is earlier in juveniles than in larger specimens, including the one with 24 setigers and 2–3 achaetous ones in which the transition occurs at setiger 6.

Streptosyllis karlbansei **sp. nov.** differs from *Sts. niuqtuut* Olivier, San Martín, & Archambault, 2013 in the type and number of compound setae in the first five setigers: *Sts. niuqtuut* has fewer setae and the blades are of various lengths rather than being restricted to two lengths. In addition, the setae of *Sts. karlbansei* **sp. nov.** emerge as a tight bundle from near the distal end of the parapodium, whereas in other species, such as *Sts. kudenovi* **sp. nov.**, the setae emerge along the ventral face of the parapodium. A comparison of all *Streptospinigera* species of both soft morphology and setal characteristics is given in Tables 1 and 2.

Etymology. This species is named for Dr. Karl Banse (1929–2025) for his major contributions to the study of polychaetes, including an important contribution to the *Syllides* species of New England.

Habitat. The three stations where *Streptospinigera karlbansei* **sp. nov.** was found varied widely in sediment composition, with the percentage of sand ranging from 38.5% (Sta. B13) to 70.9% (Sta. B09); percent total organic carbon ranged from 0.65–1.1. The stations were located in an area formerly affected by deposition of pulp and paper mill discharges, and wood chips and other detritus were found in all samples.

Distribution and depth records. Known from the type locality near Ridley Island, British Columbia, Canada, 7.5–9 m.

Streptospinigera kudenovi sp. nov.

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Figures 3–4

Material examined. *(14 specimens from 7 stations).* **Northern Gulf of Mexico, off Louisiana.** Virgo Platform Survey, coll. J. A. Blake, Chief Scientist, 11 Nov 2008. Sta. V-4E, 29.182°N, 88.156°W, 340 m, **Holotype** (MCZ IZ 173685). Sta. V-4W, 29.182°N, 88.179°W, 339 m, 2 paratypes (MCZ IZ 173686). Sta. V-2N, 29.182°N, 88.163°W, 331 m, 2 paratypes, larger one damaged during examination (MCZ IZ 173679). Sta. V-2S, 29.178°N, 88.168°W, 364 m, 1 paratype (MCZ IZ 173680). Sta. V-2W, 29.182°N, 88.173°W, 347 m, 2 paratypes (MCZ IZ 173681). Sta. V-3N, 29.187°N, 88.168°W, 330 m, 3 paratypes (MCZ IZ 173682). Sta.V-3W, 29.182°N, 88.174°W, 345 m, 1 paratype with gametes (MCZ IZ 173683) and 2 paratypes (MCZ IZ 173684).

Description. Medium-sized species with up to 49 setigers, holotype 5 mm long, 0.65 mm wide with parapodia but without setae; smallest complete specimens 1.5–3.5 mm long. Color in alcohol creamy yellow. Palps large, rounded anteriorly, fused on basal half, no accessory papillae observed (Figs 3A; 4B–C). Prostomium rectangular, wider than long; without eyes or four very faint eyes on largest specimen; prostomial antennae mostly lost, remaining lateral antennae smooth, slightly club shaped, longer than palps (Figs 3A; 4C). Peristomium as long as prostomium, completely filled dorsally with large inclusions in irregular rows (Fig. 3A); with two pairs smooth tentacular cirri on basal cirrophores, dorsal pair twice as long as ventral pair, inserted on anterior peristomium in slightly ventral position (Figs 3A; 4A, C). Borders between palps and prostomium, between prostomium and peristomium, and between peristomium and setiger 1 not well demarcated. Dorsal surface of peristomium and setiger 1 lightly textured with small golden cells, fewer such cells present on remaining setigers, parapodia, dorsal cirri, ventral cirri, and venter. Pharynx unarmed, with ca. 10 small papillae around distal rim (Fig. 3A). Proventricle cylindrical, sharply

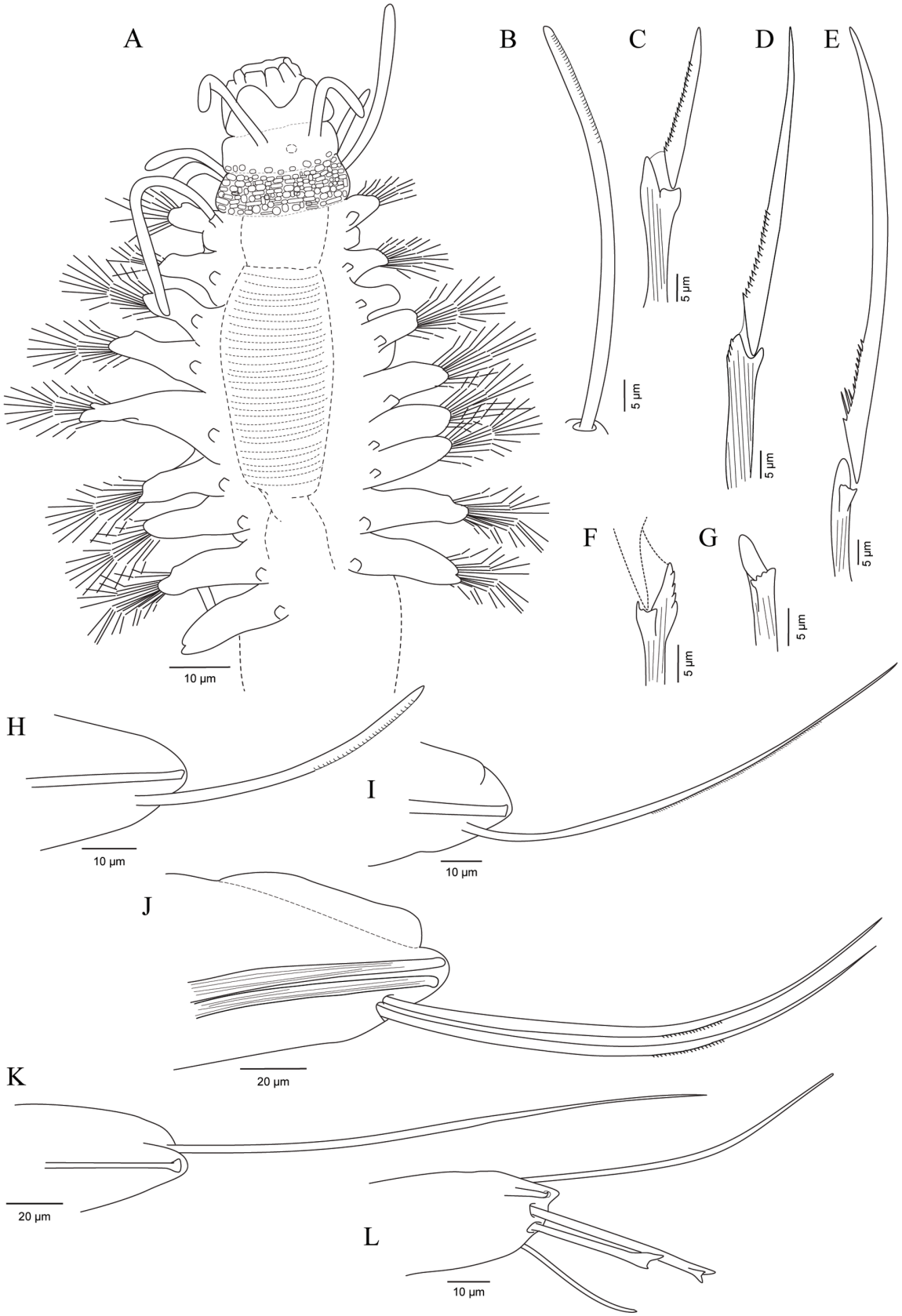

FIGURE 3. *Streptospinigera kudenovi* **sp. nov.** A, anterior end, dorsal view, median antenna indicate by dashed circle; B, dorsal simple seta, setiger 1; C, short compound seta; D, compound seta from posterior setiger; E, compound seta with larger basal serrations, posterior setiger; F, shaft of compound seta from anterior setiger; G, shaft of compound seta from posterior setiger; H, parapodium setiger 1; I, parapodium setiger 2; J, parapodium setiger 5; K, parapodium setiger 16; L, last parapodium. A, D–L: holotype (MCZ IZ 173685); B: paratype (MCZ IZ 173681); C: paratype (MCZ IZ 173679).

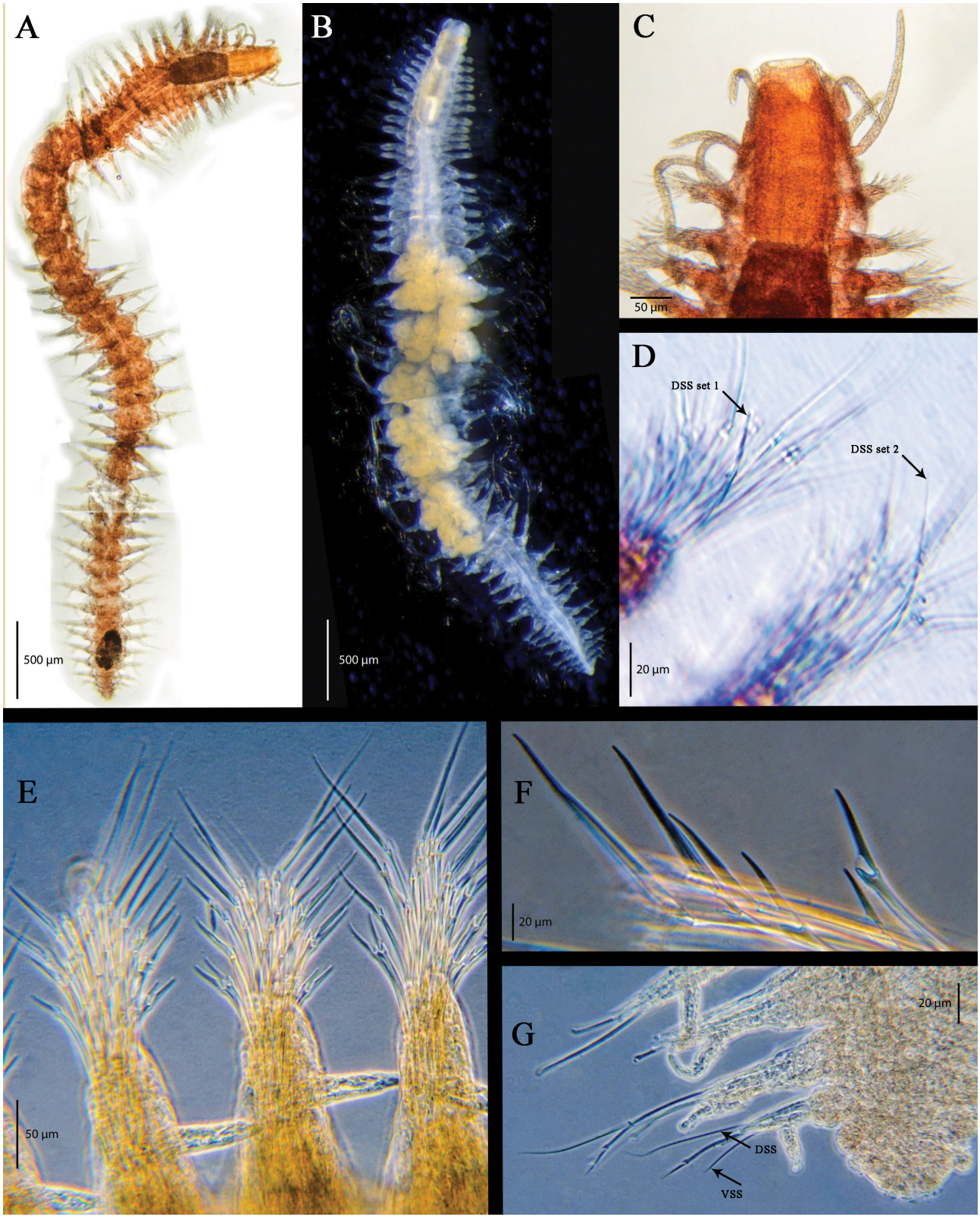

FIGURE 4. *Streptospinigera kudenovi* **sp. nov.** A, Holotype, MCZ IZ 000000, whole body, dorsal view; B, paratype, whole body with gametes, dorsal view; C, Holotype, anterior end, dorsal view; D, (Sample Virgo 2N, destroyed) setigers 1 and 2 with dorsal simple setae and compound setae; E, setigers 7–9, ventral view; F, anterior setiger, compound setae, ventral view; G, last four setigers on left side and pygidium, dorsal view, with ventral simple seta in last setiger.
A, C: holotype (MCZ IZ 173685); B: paratype (MCZ IZ 173683); D–G: paratype (MCZ IZ 173679). Abbreviations: DSS–dorsal simple seta; VSS–ventral simple seta.

narrowed at posterior end, 4.5–6 setigers in length, ca. 38 visible muscle rows, no medial raphe (Figs 3A; 4A–B). Parapodia in anterior setigers 1–4 or 5 short, distally truncate, becoming increasingly elongated through setiger 7 (Figs 3A, H–J; 4A–C, E), with area of less dense, translucent tissue as small anterior bump lending mitten-like shape to first few setigers, this area becoming large on setiger 5 (Fig. 31J) then smaller in posterior setigers; parapodia becoming narrower and longer through posterior setigers (Fig. 4A–B); bases of parapodia distorted when filled with large, creamy yellow gametes (Fig. 4B). Dorsal cirri with large basal cirrophores, cirri smooth, very long on setiger 1, smooth on setiger 2; subsequent dorsal cirri mostly lost, those remaining with a few (ca. 4–6) long articles. Ventral cirri inserted mid-parapodium; cirri small, triangular on first few setigers, becoming increasingly longer and narrower from setiger 6 or 7 (Fig. 4E), not exceeding parapodial lobe until far posterior setigers (Fig. 4G). Pygidium rounded with one digitiform ventromedial cirrus, often lost, and two lateral cirri seen only as small oval or round lobes (Fig. 4G).

Acicula in anterior setigers often double, one slightly sturdier than the other, both with blunt or slightly beaked tips (Fig. 3J); aciculum single after setiger 7–9 (depending on specimen), becoming thin with flat head in far posterior setigers (Fig. 3K). Setiger 1 with dorsal simple seta curved or arched dorsally, heavily serrated along middle to distal portion of convex side, with bluntly rounded tip, ca. 60 µm long (Fig. 3B, H). Dorsal simple setae in setiger 2 twice as long as in setiger 1, narrowing into long thin tip, lightly serrated on convex side in middle portion (Figs 3I; 4D), far posterior simple setae longer, without serrations; length ca. 120 µm in anterior setigers, up to 260 µm in posterior setigers (Fig. 3K–L), length not exceeding longest blades of compound setae. Dorsal simple setae often double in setigers with double acicula (Fig. 3J). Ventral simple seta present in last parapodium; shorter, thinner than dorsal simple seta, without serrations (Figs 3L; 4G). Compound setae with unidentate blades, numbering ca. 16–18 in setiger 1, increasing to 24–30 in setigers 2–10, then decreasing in number from ca. 18 in setiger 11 to 8–12 in middle setigers, becoming as few as 2–6 in far posterior setigers (Fig. 4G). Blades gradated in length, ventral falcigers 15–20 µm to 25–45 µm long; medium length blades 50–90 µm long; longest spiniger-like blades in dorsal position up to 110 µm long. All blades minutely serrated at least at base; serrations on shortest blades continuing in middle portion (Fig. 3C); serrations in middle and distal portions of medium-length and longest blades not observed (Fig. 3D–E); some medium length blades with two or three larger darker spines at base (Fig. 3E). Shafts heterogomph in all setigers, heavily striated (Fig. 1C–D), weakly serrated with four or five serrations on long side (Fig. 3D, F); short side forming flared collar-like shelf with uneven edge (Fig. 3F–G). All setae without hoods.

Reproduction. One paratype (MCZ IZ 173683) with long natatory setae from setiger 12 and large gametes in setigers 18 through 31 (of 44) (Fig. 4B).

Methyl Green staining pattern. MG stain generally not retained, no pattern observed.

Remarks. *Streptospinigera kudenovi* **sp. nov.** does not present an abrupt change in the shape of the dorsal simple setae after setiger 5, but after setiger 1 (see Remarks under *Sts. niuqtuut*). It also has double acicula in anterior setigers, often along with double simple setae, distinguishing it from other species in the genus. The anterior setigers also have highly dense fascicles of compound setae continuing through setiger 10 or 11. Serrations on the blades are very small and difficult to see except at the highest (1000X) power; serrations on the middle and distal portions of the medium and longest blades could not be seen, but all blades had serrations at the base.

Etymology. This species is named in honor of Dr. Jerry Kudenov, colleague and friend, former Professor of Biology at University of Alaska in Anchorage. Dr. Kudenov recognized and named the genus and first species of *Streptospinigera*.

Habitat. Sediments at the stations where *Streptospinigera kudenovi* **sp. nov.** was found were fine-grained, ranging from 4.5–9.2% sand, 36.1–41.0% silt, and 49.8–59.7 % clay. Percent total organic carbon ranged from 1.6–1.8.

Distribution and depth records. Recorded only from the type locality off Louisiana, USA, in slope depths of 330–364 m.

***Streptospinigera niuqtuut* Olivier, San Martín, & Archambault, 2013**
Figures 5–6

Streptospinigera niuqtuut Olivier, San Martín & Archambault, 2013:36, 1499–1507, figs 2–6.
Syllides longocirrata —not Örsted, 1845. Webster & Benedict 1887:717 (no figures); Pettibone 1963: in part; Banse 1971:1470, fig. 1 a–l; Riser 1997:149. —*Fide* Olivier *et al.* 2013; Eliason 1962:241, fig. 10 a–f; Hartmann-Schröder 1996:166, fig. 71.

Material examined. *(205 specimens from 6 stations)*. **Gulf of Maine.** GBMP Sta. 14A, 41º57.5′N, 68º31.0′W, 168 m, Cruise M6, R/V *Oceanus*, 19 Nov 1982, rep. 4 (1, USNM 1750441). **Massachusetts Bay**. Coll MWRA. Sta. FF04: target location: 42º17.30′N, 70º25.50′W, 90 m, Aug 1997, rep.1 (1, MCZ IZ 172028); Aug 2002, rep. 2 (85, MCZ IZ 172029); Aug 2003, rep. 3 (49, MCZ IZ 172030); Aug 2006, rep 1 (16, MCZ IZ 172031). Sta. FF05: target location: 42º08.00′N, 70º25.35′W, 65 m, Aug 2006, rep. 2 (12, MCZ IZ 172032); Aug 2006, rep. 3 (24, MCZ IZ 172033). Sta. FF07: target location: 41º57.50′N, 70º16.00′W, 39 m, Aug 2010, rep. 3 (1, MCZ IZ 172034). Sta. FF11: target location: 42º39.50′N, 70º30.00′W, 88 m, Aug 2009, rep. 3 (2, MCZ IZ 172035); rep. 4 (4, MCZ IZ 172036). Sta. FF14: target location: 42º25.00′N, 70º39.29′W, 73 m, Aug 2009, rep. 2 (10, MCZ IZ 172037).

Description *(based on new Massachusetts material)*. Small species with up to 45 setigers, largest specimens measuring 4 mm long, 0.4 mm wide across anterior with parapodia but without setae; smallest specimens 1 mm long, 0.15 mm wide. Palps large, rounded anteriorly, fused at base, lacking medial groove, no accessory papillae observed (Figs 5A; 6B–C). Prostomium elliptical, wider than long; with or without eyes (see Reproduction below); when present, two pairs of red eyes with yellowish central portion in open trapezoid arrangement, occasionally additional anterior pair of tiny eyespots present; prostomial antennae smooth, median antenna up to twice as long as lateral antennae; elliptical golden inclusions on lower portion of prostomium (Figs 5A; 6A). Peristomium a single ring filled with golden granular inclusions (Figs 5A; 6A–C), with two pairs smooth tentacular cirri, dorsal pair longer than ventral pair, inserted on anterior peristomium in slightly ventral position. Pharynx unarmed, light- or reddish-brown in color, with smooth undulating rim (Fig. 5A). Proventricle barrel-shaped, tightly narrowed at posterior end (Figs 5A; 6A–B), five to seven setigers in length depending on body size, muscle rows somewhat obscure at anterior and posterior ends but ca. 35 rows visible in middle portion; no medial raphe; caecae wrapped around base of proventricle (Figs 5A; 6B). Dorsal surface with narrow ridges across posterior portion of segments, ridges appear to have circular inclusions. Parapodia truncate or mitten-like in shape in anterior setigers (Figs 5A, B; 6B), becoming increasingly elongated after setiger 5, appearing bifid in posterior setigers due to small anterior lobe (Figs 5O; 6H). Dorsal cirri smooth on first two setigers; subsequent dorsal cirri often lost, when present may be pinched or articulated with each article containing golden inclusions (Figs 5A; 6E); articulated cirri very random in occurrence, other cirri smooth, shorter than articulated cirri. Ventral cirri inserted mid-parapodium, ovoid or globular on first two or three setigers (Figs 5B; 6B), becoming increasingly longer on setigers 3 through 10, cirrus digitiform thereafter, as long as or sometimes exceeding parapodial lobe (Fig. 5M, O). Pygidium rounded, with one digitiform medial cirrus (Fig. 5N), often lost, and two lateral cirri often lost or seen only as small dorsal ovals.

Acicula in setigers 1–5 each wider basally than those in posterior setigers, widest in setiger 5 with knobbed tip ca. 5 µm diameter (Fig. 5C, D); acicula slender with beak-shaped tip in middle and posterior setigers (Figs 4E; 6I). Setigers 1–5 each with one strongly curved or arched dorsal simple seta, serrated along convex side, as long as shafts of compound setae (Figs 5F; 6E). Dorsal simple setae from setiger 6 with slightly flattened, wider, proximal section narrowing into long thin tip (Figs 5G–I, O; 6G), length of seta rapidly increasing in length over setigers 6–9, up to 160 µm long, length not exceeding longest blades of compound setae, seta minutely serrated on convex side in middle portion (Fig. 5G–I). No ventral simple setae observed. Setae in setigers 1–5 include 12–15 compound falcigers with distinctly serrated, blunt-tipped unidentate blades ranging in length from 18 to 80 µm with shortest blade in ventralmost position and three equally long blades in dorsalmost position (Figs 5J, K; 6F). Compound setae becoming less numerous, usually four to six in mid-body and two or three in far posterior setigers; blades unidentate, minutely serrated or smooth, mid-body setigers with at least one but up to three blades per setiger with basal spur in middle of fascicle (Fig. 5L); blades from 20 to 100 µm long with shortest in ventral position. Anterior compound setae with heterogomph shafts with longer prong smooth, oval and shorter prong similarly rounded, shaft lacking any apical or subapical teeth or flanges (Fig. 5J, K). Distal end of shaft becoming increasingly homogomph from setigers 7 through 11, clearly homogomph by setiger 15 (Fig. 5L). All setae without hoods.

Reproduction. Majority of larger specimens with eggs filling the coelom from setiger 10 and entering parapodia (Figs 5M, O; 6A, D); some specimens with an empty coelom and extremely inflated parapodial bases filled with eggs 75–80 µm greatest diameter. No natatory setae observed. Large reproductive specimens with two pairs of red eyes and occasionally an anterior pair of tiny eyespots; smaller or nonreproductive specimens lacked eyes.

Methyl Green staining pattern. MG stain generally not retained, lost from anterior setigers first, then from setigers posterior to proventricle; small area on posterior side of parapodia near body retained stain longest.

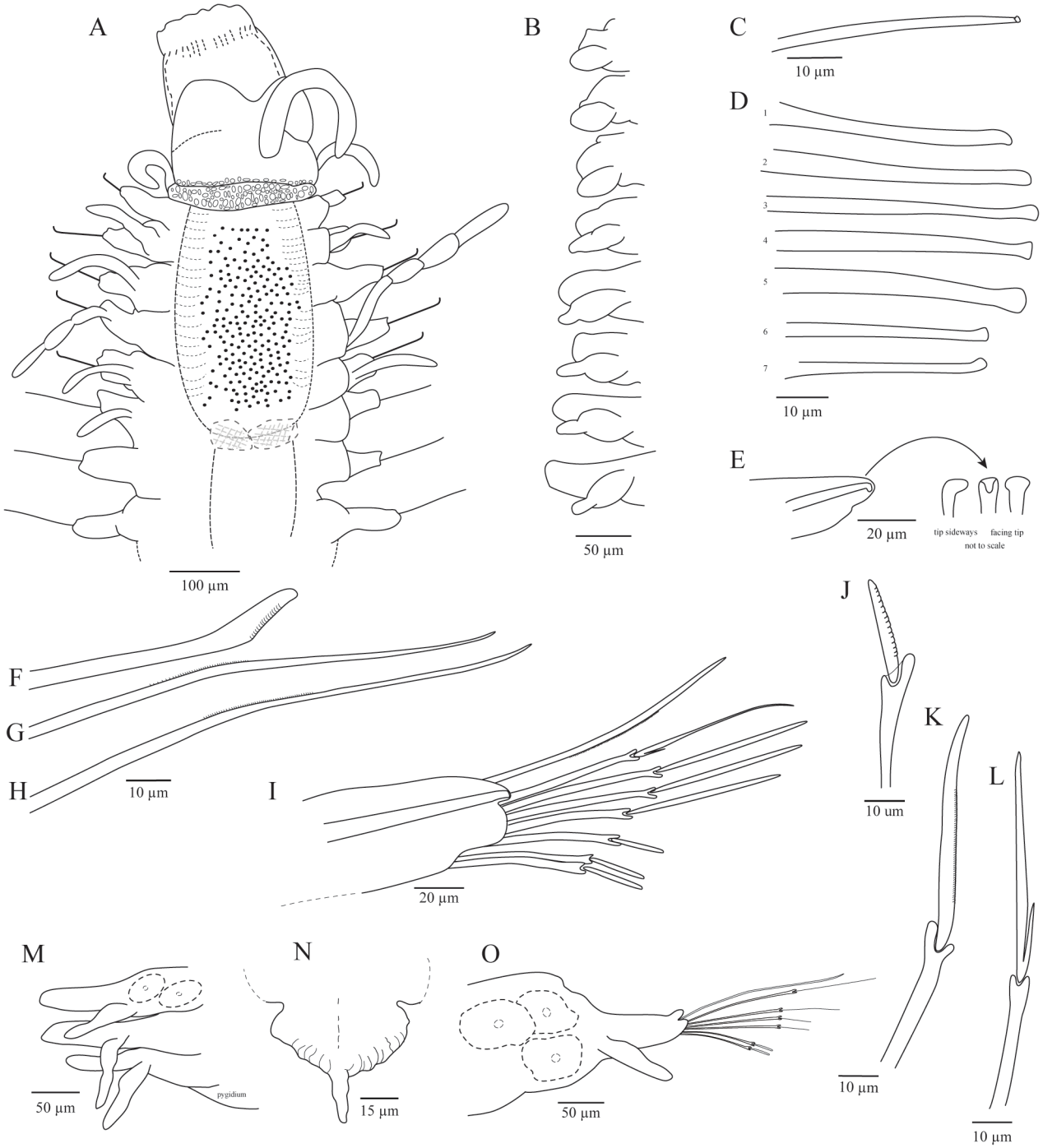

FIGURE 5. *Streptospinigera niuqtuut* Olivier, San Martín, & Archambault, 2013. A, anterior end, dorsal view; B, ventral cirri, setigers 1–8; C, aciculum from setiger 1; D, acicula from setigers 1–7; E, aciculum, setiger 14, inset not to scale; F–H, dorsal simple setae. F, setiger 3; G, setiger 11; H, setiger 30; I, setiger 11; J, compound falciger, setiger 2; K, compound falciger, setiger 5; L, compound seta with basal spine, from midbody; M, setigers 38–40; N, pygidium; O, setiger 30, with eggs. A–B, D, F–O: 40-setiger specimen (MCZ IZ 172033); C, E: 16-setiger specimen (MCZ IZ 172029).

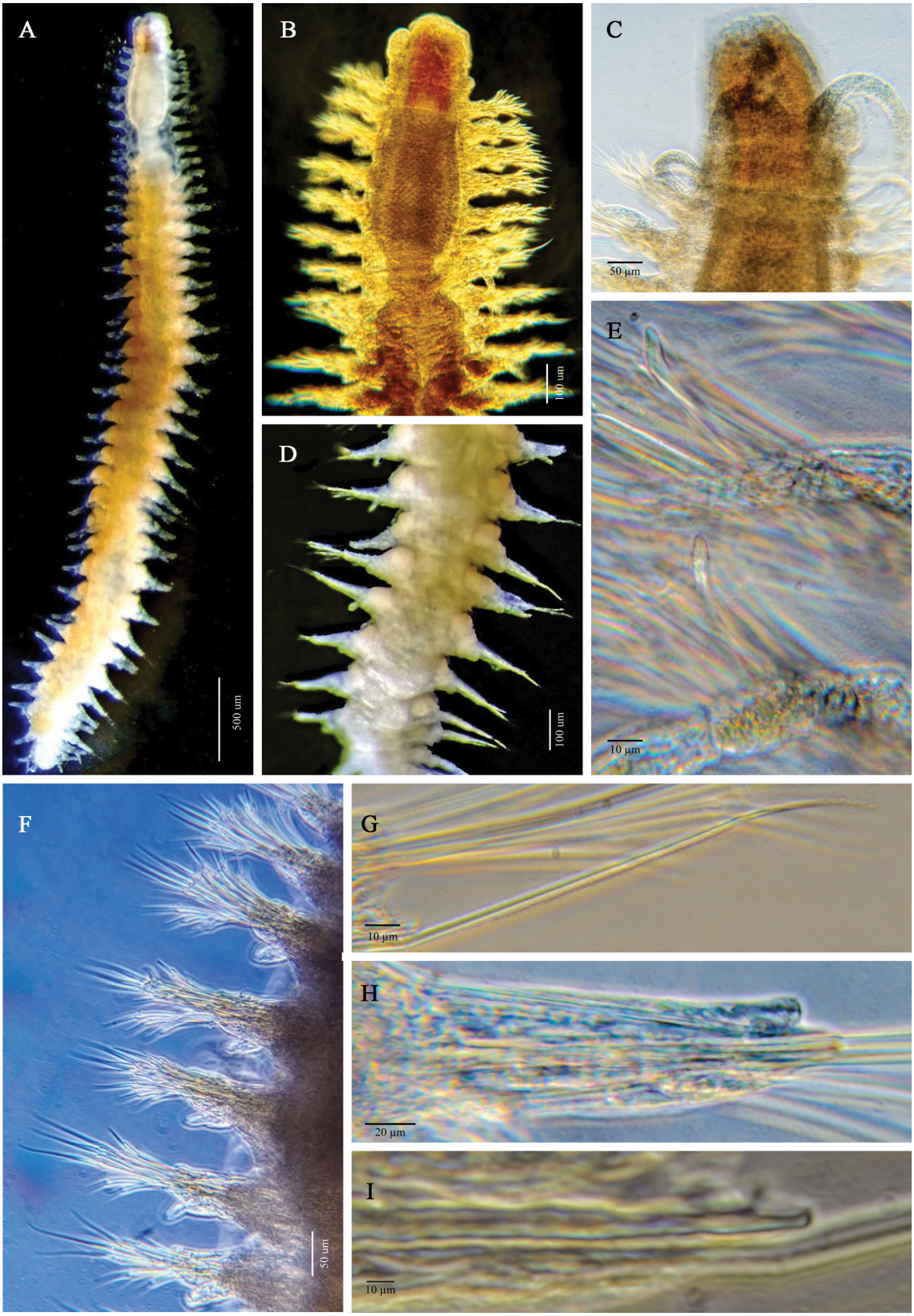

FIGURE 6. *Streptospinigera niuqtuut* Olivier, San Martín, & Archambault, 2013. A, whole body, dorsal view; B, anterior end with proventricle; C, head end with everted pharynx; D, posterior setigers, showing parapodia bulging with eggs; E, setigers 3–4, dorsal view, left side, showing arched simple setae and dorsal cirri; F, setigers 1–7, dorsal view of left side showing long blades in triples and gradated shorter blades; G, dorsal simple seta, setiger 32; H, mid-body parapodium, with anterior area of tissue lending bifid appearance to distal end; I, aciculum, setiger 32. A–I: MCZ IZ 172033.

Remarks. *Streptospinigera niuqtuut*, with anterior dorsal simple setae shaped like an Inuit bow drill (Olivier *et al.* 2013) or hockey stick, has often been erroneously reported as *Syl. longocirratus* (Örsted, 1845) from collections made off the coast of Massachusetts (Webster & Benedict 1887; Pettibone 1963; Banse 1971; Riser 1997) and recorded as such in ecological monitoring studies (*e.g.*, Maciolek *et al.* 2004). Pettibone (1963) described considerable variation in the dorsal simple setae without distinguishing anterior versus posterior shapes, saying they could taper to a slender tip or might be short and curved or straight and blunt. Because she had synonymized *Syl. longocirratus* with *Syl. convolutus* Webster & Benedict, 1884, both of which are now recognized as separate, valid species (Banse 1971; San Martín 2003; Read & Fauchald 2025), she had, at best, a mixture of at least two, and possibly three, species.

Olivier *et al.* (2013) recognized their Arctic form and similar material from the Gulf of Maine as belonging to the genus *Streptospinigera* based on the specimens having two types of dorsal simple setae with a distinct change after setiger five. The material examined as part of this study corresponds well to their description of *Sts. niuqtuut* with only two exceptions. First, the edge of the dorsal simple seta in setiger 6 and posterior is not smooth as described but minutely serrated, the serrations being most obvious in the middle portion of the seta where it bends into a long thin tip. Second, the proventricle appears narrowed or tapered posteriorly rather than ending in a simple blunt shape; this difference may be due to the position in the body when specimens were fixed. The smallest specimens tended to have a proventricle occupying five segments whereas those of larger specimens occupied up to seven segments. The dorsal protuberances described by Olivier *et al.* (2013) for an epigamic male did not appear as obvious in the Massachusetts specimens, which appeared to be female.

Larger specimens displayed a transition of the arched dorsal simple setae, which became longer and thinner over three or four anterior segments whereas smaller specimens showed a more abrupt difference between setigers 5 and 6. Also, the number of dorsal simple setae in the very smallest (1–2 mm) specimens ranged from none to two; in one case this seta in setiger 5 was very long, thin, and delicate looking compared to those in setigers 1–4. The very smallest specimens, presumed to be juveniles, had two or three achaetous prepygidial segments; such segments were not found in the larger reproductive adults.

Habitat. Olivier *et al*. (2013) reported *Sts. niuqtuut* from silty sediments; the present specimens are from somewhat shallower depths and muddy sand sediments.

Distribution and depth records. Type locality Barrow Strait and Lancaster Sound, Canadian High Arctic Archipelago; reported south to the Gulf of Maine and Massachusetts Bay; 39–150 m (this study); 169–707 m (Olivier *et al.* 2013).

Streptospinigera nola **sp. nov.**

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Figures 7–8

Material examined. *(4 specimens from 3 stations).* **Northern Gulf of Mexico, off Louisiana, USA.** Virgo Platform Survey, coll. J. A. Blake, Chief Scientist, R/V *Brooks McCall*, 11 Nov 2008, Sta. V-3N, 29.187°N, 88.168°W, 330 m. **Holotype**, MCZ IZ 173687. Matterhorn Platform Survey, coll. J. A. Blake, Chief Scientist, 9 Nov 2008. Sta. M-2N, 28.746°N, 88.826°W, 825 m, 2 paratypes (MCZ IZ 173688); Sta. M-3W, 28.742°N, 88.831°W, 850 m, 1 paratype (MCZ IZ 173689).

Description. Small species, holotype complete with 29 setigers, ca. 2 mm long, 0.25 mm wide across setiger 5 with parapodia but without setae; paratype (MCZ IZ 173688) with 20 setigers, 1.5 mm long; paratype (MCZ IZ 173689) with 33 setigers, 1.25 mm long. Color in alcohol white. Palps large, broad, rounded anteriorly, fused only at very base or perhaps not fused, no accessory papillae observed (Figs 7A–C; 8D); weak boundary with prostomium. Prostomium subpentangular, wider than long (Figs 7A, C; 8A–B); two pairs large bar-shaped or multisegmented eyes with dark red outer rim and yellowish lenses (Fig. 8D); prostomial antennae lost on all specimens. Peristomium shorter than prostomium, with two or more irregular rows of round translucent golden inclusions (Fig. 8D); holotype with only one short tentacular cirrus remaining (Fig. 8D), other specimens with two pairs smooth, club-shaped tentacular cirri with obvious basal cirrophores, dorsal pair twice as long as ventral pair (Fig. 7A). Dorsal surface without external gland cells. Pharynx not everted on any specimen. Proventricle 4–5 setigers in length, cylindrical, tapered at posterior end, ca. 35 visible muscle rows, no medial raphe (Figs 7A; 8B–C). Anterior parapodia short,

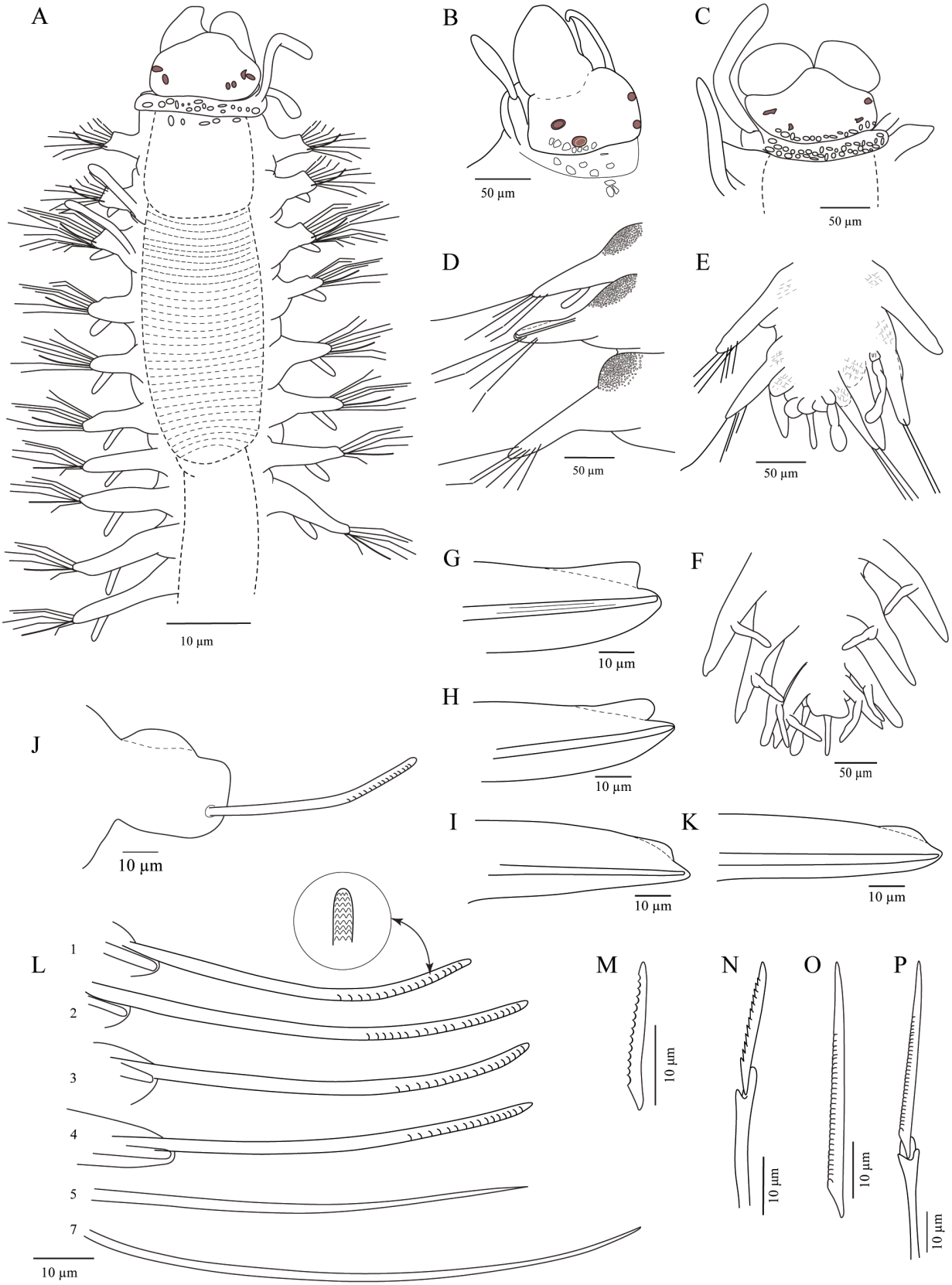

FIGURE 7. *Streptospinigera nola* **sp. nov.** A, anterior end, dorsal view; B, head, lateral view; C, head, dorsal view; D, setigers 24–26; E, posterior end, dorsal view; F, posterior end, ventral view; G, setiger 2; H, setiger 5; I, setiger 6; J, setiger 3; K, setiger 11; L, dorsal simple setae, setigers 1–5 and 7 as labeled; M, shortest blade from ventral compound seta, setiger 1; N, compound seta setiger 1; O, blade from compound seta, setiger 3; P, compound seta, setiger 3. A, J, O: paratype (MCZ IZ 173688); C, G, H, I, K, N, P: paratype (MCZ IZ 173689); B, D–F, L, M: holotype (MCZ IZ 173687).

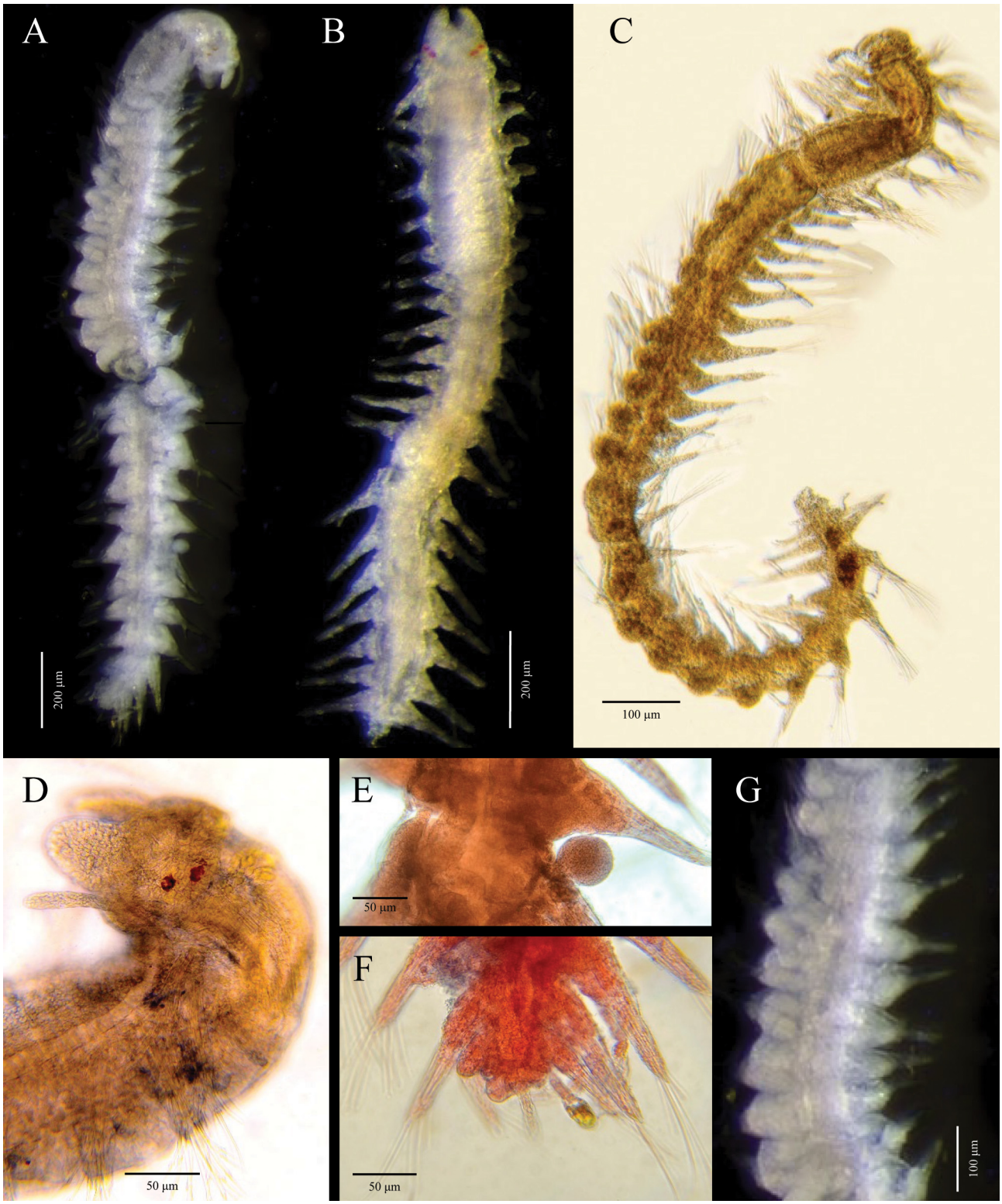

FIGURE 8. *Streptospinigera nola* **sp. nov.** A–C, three different specimens, dorsal view of entire body; D, head, lateral view; E, setiger 21 with extruding ball of ?gametes; F, pygidium and last 3–4 setigers; G, enlarged view of (A), middle setigers with gametes. A, D–G: holotype (MCZ IZ 173687); B: paratype (MCZ IZ 173688); C: paratype (MCZ IZ 173689).

squarish or rectangular with rounded distal end, appearing slightly bifid on setigers 1–4, with small anterior area of translucent tissue from setiger 3 through middle setigers (Fig. 7A, G–K); from setiger 6 parapodia elongated, narrow, with smoothly pointed distal ends (Figs 7A, D–K; 8C). Dorsal cirri smooth on setigers 1 and 2, subsequent

remaining dorsal cirri weakly articulated with two or three long articles, often with golden inclusions. Ventral cirri oval to digitiform, inserted mid-parapodium; cirri in middle and posterior setigers equal to but not exceeding parapodia in length except in last setiger or two (Fig. 7F). Pygidium rounded, with digitiform medial cirrus, holotype with one short lateral cirrus with large golden inclusion (Figs 7E–F; 8F).

Acicula in setigers 1–5 with wider shaft than in following setigers, otherwise similar in all setigers with shaft narrowing to blunt or slightly beaked tip (Fig. 7G–I, K, L). Dorsal simple setae in setigers 1–4 minimally but distinctly curved dorsally, clearly serrated from bend to distal end, serrations appearing as transverse bars across face of seta, tip bluntly rounded (Fig. 7L); dorsal simple seta in setiger 5 long, straight, with minimal serrations, with fine distal tip (Fig. 7L); remaining simple setae longer, no serrations observed, with fine tip. Simple seta ca. 50–55 µm in setiger 1, ca. 70 µm in setigers 2–4; ca. 75 µm in setiger 5, increasing to 85–90 µm in middle and posterior setigers. Ventral simple setae not observed. Anteriormost setigers with up to 14 compound setae, seven in setiger 14, reduced to four or five in posterior setigers and two in last setigers. All blades unidentate, ranging in length from shortest in ventral position to longest in dorsal position; shortest blades 15–40 µm long with several measuring 22–26 µm, medium-length blades 50–65 µm long; longest blades in dorsal position up to 80 µm long. Shorter blades deeply serrated from base nearly to bluntly rounded distal tip, longer blades with basal serrations and smooth-appearing, finer distal tips (Fig. 7 M–P). Shafts heterogomph in all setigers, long branch smooth; short branch forming flared Y-shaped flange (Fig.7P). All setae without hoods.

Reproduction. Holotype (MCZ IZ 173687) with gametes from setiger 9 or 10 (Fig. 8A, G) and extruding a ball-shaped cluster of unknown composition, possibly sperm, from parapodium 21 (Fig. 8E).

Methyl Green staining pattern. MG stain generally not retained, no pattern observed.

Remarks. *Streptospinigera nola* **sp. nov.** co-occurs with *Sts. septima* **sp. nov.** at the deeper slope stations and with *Sts. kudenovi* **sp. nov.** at the shallower slope station. It differs from *Sts. septima* **sp. nov.** in having large obvious eyes rather than lacking eyes, distinctly curved and serrated dorsal simple setae in anterior setigers rather than only slightly curved simple setae with very weak serrations, clearly serrated blades on compound setae rather than the serrations being barely perceptible, fewer compound setae (*i.e.*, 14 vs 24 in anterior setigers); and simple setae and blades of compound setae generally shorter than in *Sts. septima* **sp. nov.** *Streptospinigera nola* **sp. nov.** differs from *Sts. kudenovi* **sp. nov.** in having only single rather than double acicula in anterior setigers, large eyes rather than no eyes, and the dorsal simple seta in setiger 2 is of equal length to that in setiger 1 rather than twice as long as in setiger 1; both species have serrated simple setae, but the serrations of *Sts. nola* **sp. nov.** are even deeper and more noticeable than in *Sts. kudenovi* **sp. nov.**

Etymology. The specific name, *nola*, refers to New Orleans, Louisiana, a major city onshore of the type locality.

Habitat. Sediments at the stations where *Sts. nola* **sp. nov.** was found were fine-grained, ranging from 1.5–6.4% sand, 30.9–36.1% silt, and 57.6–62.8% clay. Percent total organic carbon ranged from 1.3–1.6.

Distribution and depth records. Recorded from the type locality off Louisiana, USA, in slope depths of 330 m and two additional stations at 825–850 m.

Streptospinigera septima **sp. nov.**

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Figures 9–10

Material examined. *(25 specimens from 11 stations).* **Northern Gulf of Mexico, off Louisiana, Mississippi Canyon.** Matterhorn Platform Survey, R/V *Brooks McCall*, coll. J. A. Blake, Chief Scientist, 10 Nov 2008, Sta. M-3W, 28.742°N, 88.831°W, 850 m, **Holotype** (MCZ IZ 173690), 4 paratypes (MCZ IZ 173699); Sta. M-1N, 28.745°N, 88.826°W, 850 m, 4 paratypes, (MCZ IZ 173691); Sta. M-1S, 28.739°N, 88.826°W, 875 m, 1 paratype (MCZ IZ 173692); Sta. M-1W, 28.742°N, 88.829°W, 851 m, 1 paratype (MCZ IZ 173693); Sta. M-2N, 28.746°N, 88.826°W, 825 m, 2 paratypes, (MCZ IZ 173694); Sta. M-2S, 28.738°N, 88.826°W, 878 m, 1 paratype (MCZ IZ 173695); Sta. M-2W, 28.742°N, 88.831°W, 853 m, 1 paratype (MCZ IZ 173696); Sta. M-3N, 28.747°N, 88.826°W, 840 m, 3 paratypes (MCZ IZ 173697); Sta. M-3S, 28.737°N, 88.826°W, 884 m, 2 paratypes (MCZ IZ 173698); Sta. M-4N, 28.752°N, 88.826°W, 821 m, 3 paratypes (MCZ IZ 173700); Sta. M-5W, 28.742°N, 88.847°W, 818 m, 2 paratypes (MCZ IZ 173701).

Description. Small species with up to 26 setigers, holotype 2 mm long, 0.4 mm wide across setiger 5 with parapodia but without setae; smallest complete specimen 0.75 mm long. Color in alcohol white. Palps large, rounded anteriorly, fused on basal half, no accessory papillae observed (Fig. 9A–B). Prostomium rectangular, wider than long; with row of inclusions at base (Fig. 10I), without eyes or sometimes very faint eyes (Fig. 9A–B); prostomial antennae smooth, club shaped, slightly longer than palps (Fig. 9B). Peristomium shorter than prostomium, with irregular rows of round inclusions (Figs 9A–B; 10I), with two pairs short, smooth, club-shaped tentacular cirri inserted on anterior edge (Figs 9A–B; 10A–B, E). Setiger 1 also with round inclusions on dorsum (Figs 9A–B; 10I). Dorsal surface with numerous scattered clumps of small cells at base of prostomium, on peristomium, in irregular rows across setigers, densest on setigers 1 and 2 and in posterior, random clumps also on parapodia especially around distal end, on tentacular and dorsal cirri (Figs 9A, C, D; 10I); venter with similar cells across ventral surface, at base of parapodia, on ventral cirri. Pharynx unarmed, with ca. 10 papillae around distal rim. Proventricle 3.5–4 setigers in length, round or barrel-shaped, tapered at posterior end, ca. 26 visible muscle rows, each with muscles set perpendicular thus appearing as distinct round or diamond shapes connected by a thin line (Figs 9A, inset, 10A–B, D), no medial raphe. Parapodia narrow rectangular lobe with rounded distal end, shorter, bifid on anterior setigers, with small anterior area of translucent tissue from setiger 8 through middle setigers (Fig. 9E); bases bulging dorsally, distorted with gametes from setiger 7 but with long, narrow, rounded distal end through posterior setigers (Figs 9A, C; 10C). Dorsal cirri smooth on setigers 1–2, subsequent remaining dorsal cirri articulated with 6–8 long articles, each with two bottle-shaped golden inclusions with narrow tips sometimes protruding through surface (Fig. 10G). Ventral cirri large, oval, inserted mid-parapodium; cirri in middle and posterior setigers longer, subulate, equal to but not exceeding parapodia in length except in last setiger or two (Fig. 9C–D). Pygidium rounded, with one digitiform medial cirrus and two lateral cirri seen only as small oval or round lobes (Fig. 9D).

Acicula with sturdy shaft narrowing to small blunt tip (Fig. 9E), similar but thinner with narrower tip in middle and posterior setigers (Fig. 9F–G). Dorsal simple setae in anterior setigers moderately curved in first five setigers, lightly serrated along middle portion of convex side, with bluntly rounded tip (Figs 9 I–K; 10E–F); simple setae gradually increasing in length from 85–90 µm in setiger 1 to 150 µm in setigers 5–7; becoming thinner, straighter, with finer but still bluntly pointed tip though middle and posterior setigers (Figs 9L, M; 10H), up to 170 µm long; shorter and thinner in last setiger or two, 110 µm in holotype. Dorsal simple setae double, each 127 µm long, in setiger 4 in one paratype (MCZ IZ 173701) (Fig. 9K). Ventral simple seta present in last or next-to-last parapodia, shorter and thinner than dorsal simple seta, ca. 65 µm long in holotype (Fig. 9D). Anteriormost setigers with up to 24 compound setae with unidentate falcigers and spiniger-like blades, ca. 18 in setigers 7–11, reduced to ca. 6 in posterior setigers and 1–3 in far posterior. Blades range in length from shortest in ventral position to longest in dorsal position; shortest blades 20/25–40 µm long with several measuring 35 µm; medium-length blades 50–65 µm long; longest blades in dorsal position 75–90 m long. All blades similar in all setigers, minutely serrated or roughened at base, possibly in middle section, appearing smooth at distal end; mid-length blades often with tiny knob at base (Fig. 9H). Shafts heterogomph in all setigers, very weakly serrated with three or four minute serrations on long branch; short branch forming small collar-like shelf (Fig. 9H). All setae without hoods.

Reproduction. All specimens except the smallest two with gametes starting in setiger 7, immediately after proventricle, and continuing to within one or two setigers of the pygidium. Short natatory setae from setiger 7 or 8 (Fig. 10C).

Methyl Green staining pattern. MG stain generally not retained, no pattern observed.

Remarks. The start of gametes from setiger 7 accompanied by short natatory setae is a notable feature of this species; in most *Streptospinigera* the gametes begin at least a few setigers farther back (Table 1), or as far back as setiger 18 as in *Sts. kudenovi* **sp. nov.**, which also has long natatory setae. Serrations on the blades on the compound setae are not apparent until 1000X, and even then the serration is only minimal.

Etymology. The species name is from the Latin *septimus*, meaning seventh; referring to the presence of gametes from the seventh setiger, it is used as a noun in apposition.

Habitat. Sediments at the stations where *Streptospinigera septima* **sp. nov.** was found were fine-grained, ranging from 1.0–2.6% sand, 30.9–39.4% silt, and 59.3–67.4% clay. Total organic carbon ranged from 1.2–1.4 percent.

Distribution and depth records. Recorded only from the type locality off Louisiana, USA, in slope depths of 818–884 m.

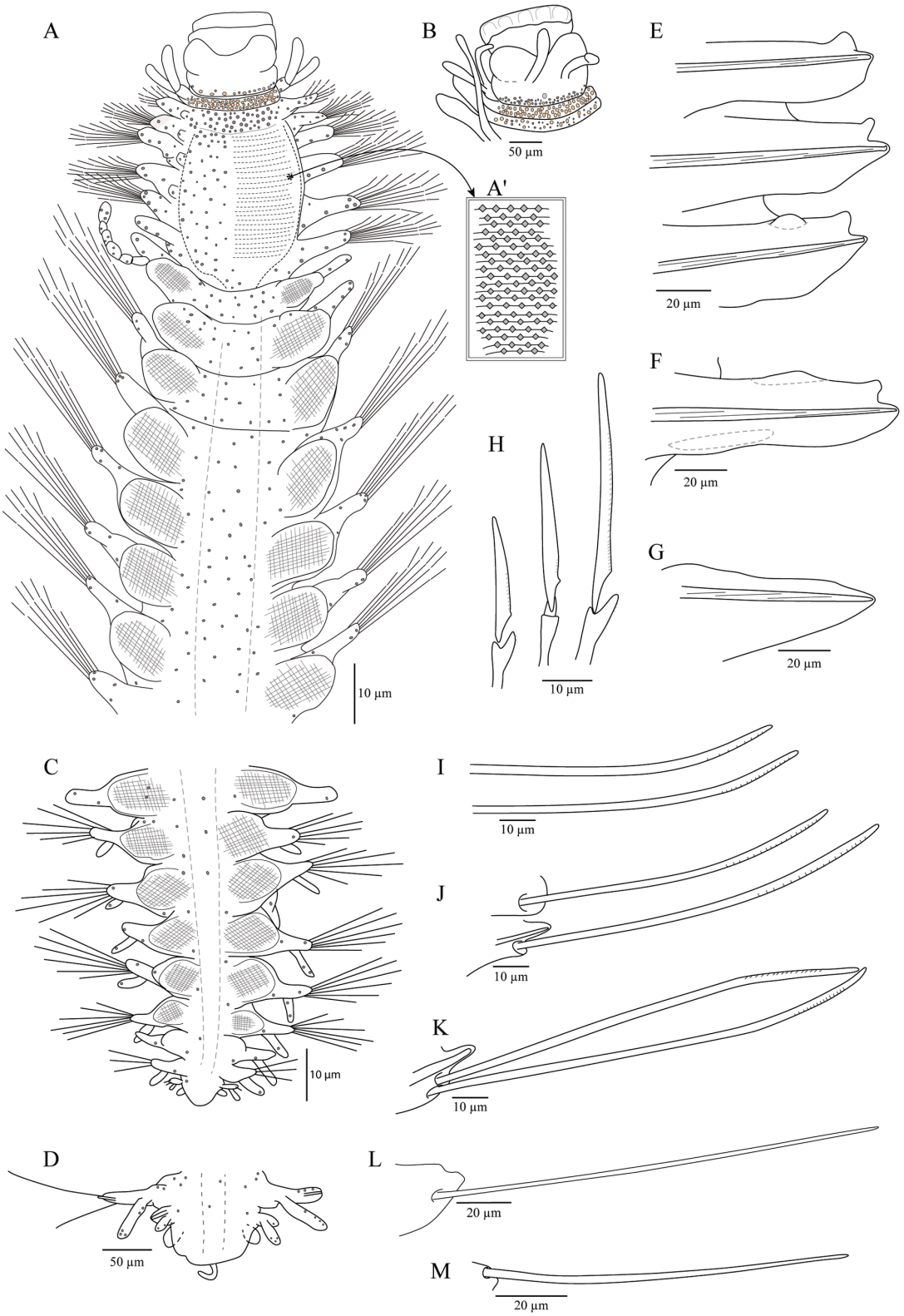

FIGURE 9. *Streptospinigera septima* **sp. nov.** A, anterior end, dorsal view, A′ (inset), proventricle, not to scale; B, head, dorsal view; C, holotype, posterior setigers, dorsal view; D, holotype, last two setigers and pygidium, ventral view; E, acicula in setigers 1–3, dorsal view, setae removed; F, aciculum in setiger 8, dorsal view, setae removed; G, aciculum in setiger 12, dorsal view, setae removed; H, setal blades, setigers 1 and 2; I, dorsal simple setae, setigers 1 and 2; J, dorsal simple setae, setigers 1 and 2; K, double dorsal simple setae, setiger 4; L, dorsal simple seta, setiger 12; M, dorsal simple seta, far posterior setiger 25 (of 26). A, C, D, M: holotype (MCAZ IZ 173690); B: paratype (MCAZ IZ 173700); E–I: paratype (MCZ IZ 173695); J–L: paratype (MCZ IZ 173701).

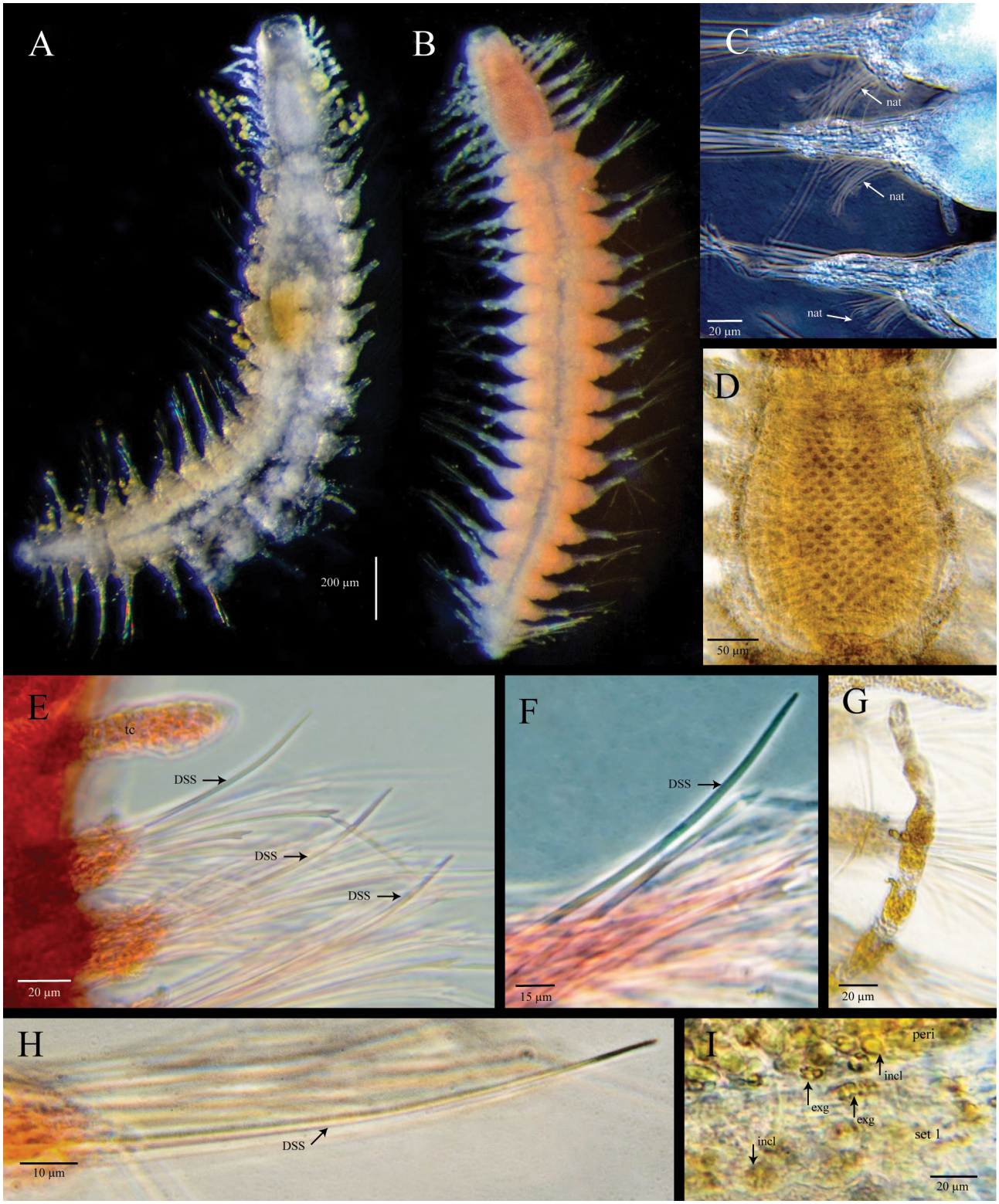

FIGURE 10. *Streptospinigera septima* **sp. nov.** A, whole body, dorsal view, holotype; B, whole body, dorsal view Sta 4N; C, natatory setae; D, proventricle; E, dorsal simple setae, setigers 1–3; F, dorsal simple seta, setiger 5; G, dorsal cirrus, setiger 4; H, dorsal simple seta, setiger 10; I, close-up of prostomium, peristomium, setiger 1. A, C: holotype (MCZ IZ 173690); B: paratype (MCZ IZ 173700); D, G, I: paratype (MCZ IZ 173699); E, F, H: paratype (MCZ IZ 173695). DSS–dorsal simple seta, exg–external gland, nat–natatory setae, peri–peristomium, incl–inclusion, set–setiger, tc–tentacular cirrus.

Streptosyllis Webster & Benedict, 1884

Type species: *Streptosyllis arenae* Webster & Benedict 1884:711

Diagnosis (emended). Palps fused at base, often turned ventrally and not visible dorsally, occasionally reduced to small papillae or may be large and rounded, visible dorsally; with small accessory papillae. Prostomial and tentacular cirri smooth or wrinkled, never articulated; anterior dorsal cirri smooth or indistinctly annulated, club-shaped to elongated; posterior dorsal cirri sometimes articulated, with glandular inclusions. Pygidium with one midventral and two dorsolateral anal cirri. Acicula with distinctly enlarged tips in variable number of parapodia from setiger 1 or 2. Compound setae with homogomph or heterogomph shafts, blades short falcigers or sometimes longer, spiniger-like; blades unidentate, bidentate or sub-bidentate; hoods on blades and shafts present or absent. Single type of dorsal simple setae present, with or without hoods; ventral simple setae present or absent in posteriormost setigers.

Remarks. The diagnosis given above differs from earlier ones (Faulwetter *et al.* 2008; Musk *et al.* 2016) in a few characters, particularly the distinctive enlargement of the tips of some acicula in all species (versus enlargement being a "sometimes" character state). The term "enlarged" in reference to acicula appears to be subjectively defined and is used loosely by various researchers; sometimes only a relatively wider base of the aciculum is considered an enlargement (see *Streptospinigera* above) and sometimes a flared and expanded tip on a sturdy but uniform stem as in *Str. arenae* and *Str. varians* Webster & Benedict, 1887 is considered "enlarged". The term should be standardized in order to stabilize the genus; I propose that "enlarged" refer to acicula with expanded tips. Descriptions of acicula for species assigned to *Streptosyllis* should include measurements of the width of tips and/or bases; similarly, measurements of hooded setae should be qualified as including the hood or only the blade itself if the hood is especially large.

Southern (1914) described a ventral simple seta for *Str. bidentata* Southern, 1914; Musk *et al.* (2016) studied *Streptosyllis* from the UK and found a small ventral simple seta in the last one or two posterior setigers of complete specimens of *Str. campoyi* Brito, Núñez & San Martín, 2000, *Str. websteri* Southern, 1914, and *Str. nunezi* Faulwetter, Vasileiadou, Papageorgiou & Arvanitidis, 2008 (UK) and formally emended the genus to include this character. A ventral simple seta was reported earlier for *Str. verrilli* (Moore, 1907) by Sardá & San Martín (1992) and was also found in both *Str. arenae* and *Str. pettiboneae* examined in this study, thus occurring in at least seven species. In the majority of *Streptosyllis* species, the palps are not visible dorsally and are often reduced to a small papilla-like structure. However, in both *Str. minuta* **n. comb.** and *Str. mallea* **sp. nov.** the palps are large, rounded, and visible dorsally, similar to those seen in the genus *Syllides*.

The genus *Streptosyllis* currently includes about 14 species (Read & Fauchald 2025), some of which are problematic and require study of the types and new materials in order to confirm their placement in this genus (Faulwetter *et al.* 2008). For example, both *Streptosyllis reducta* Hartmann-Schröder, 1960 and *Str. cryptopalpa* Hartmann-Schröder, 1960 from the Red Sea are described and illustrated as having a pharyngeal tooth, which would preclude their placement in the Anoplosyllinae.

Six species of *Streptosyllis* have been found on the Atlantic coast of the United States. One, from 800 m, is described as new (*Str. mallea* **sp. nov.**); another, *Str.* cf. *arenae*, cannot be fully characterized due to minimal material available. Apart from the single deep-water species, all species were found at 100 m or shallower. The following species are included in this study:

1. *Streptosyllis arenae* Webster & Benedict, 1884
2. *Streptosyllis* cf. *arenae*
3. *Streptosyllis mallea* **sp. nov.**
4. *Streptosyllis minuta* (Blake & Walton, 1977) **new combination**
5. *Streptosyllis pettiboneae* Perkins, 1981
6. *Streptosyllis varians* Webster & Benedict, 1887
7. *Streptosyllis verrilli* (Moore, 1907)

***Streptosyllis arenae* Webster & Benedict, 1884**
Figures 11–12

Streptosyllis arenae Webster & Benedict, 1884:711–713, figs 17–23.—Pettibone 1963:127, fig. 31l–m; Faulwetter *et al.* 2008:3–6, figs 1–3 (redescription from paratypes).

Material examined. *(90 specimens from 11 stations)* **Northwest Atlantic Ocean —off Massachusetts, Georges Bank**. GBMP Sta. 2: coll. G. Hampson, Chief Scientist, Cruise M4, R/V *Cape Henlopen*, 12 May 1982, 40°59.1′N, 66°55.9′W, 66 m, rep. 5 (22, USNM 1750450); Sta. 5, 84 m, date on label illegible (11, USNM 1750464). Sta. 5-1: coll. G. Hampson, Chief Scientist, Cruise M13, R/V *Oceanus*, 22 May 1985, 40°39.46′N, 67°46.05′W, 76 m, rep. 2 (4, USNM 1750451). Sta. 5-6: coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 40°39.4′N, 67°46.4′W, no depth recorded, rep. 2 (1, poor condition, USNM 1750452). Sta. 5-11: coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 40°39.5′N, 67°46.6′W, no depth recorded, rep. 2 (1, USNM 1750453). Sta. 5-14: coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 40°39.5′N, 67°44.7′W, no depth recorded, rep. 4 (8, USNM 1750454). Sta. 5-18: coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 40°39.4′N, 67°47.6′W, no depth recorded, rep 6 (11, USNM 1750455); Cruise M2, R/V *Oceanus*, 18 Nov 1981, 40°39.6′N, 67°47.3′W, 80 m, rep. 4 (7, USNM 1750456). Sta. 5-20: coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 40°38.5′N, 67°46.1′W, no depth recorded, rep. 4 (12, USNM 1750457), rep. 5 (2, USNM 1750458), rep. 6 (2, USNM 1750459). Sta. 10: coll. G. Hampson, Chief Scientist, Cruise M4, R/V *Cape Henlopen*, 16 May 1982, 40°42.0′N, 68°35.2′W, 62 m, rep. 6 (2, USNM 1750460). Sta. 15: coll. G. Hampson, Chief Scientist, Cruise M3, R/V *Endeavor*, 20 Feb 1982, 41°27.4′N, 68°00.5′W, 43 m, rep. 2 (4, USNM 1750461); Cruise M5, R/V *Oceanus*, 22 July 1982, 41°27.4′N, 68°00.6′W, 42 m, rep. 3 (1, USNM 1750462); Cruise M6, R/V *Oceanus*, 20 Nov 1982, 41°27.5′N, 68°00.7′W, 38 m, rep. 3 (2, USNM 1750463). **—Connecticut, Long Island Sound,** USACE Dredged Material Disposal Site Survey, Sta. CS2KW, rep. 3, 18 Feb 2000, 41°12.706'N, 72° 22.949'W, 49 m (2 juveniles, MCZ IZ 172051).

Description. Largest specimens with up to 72 setigers, 5 mm long, anterior across proventricle up to 0.4 mm wide including parapodia and setae, post-proventricular region 0.75 mm wide including elongated parapodia and setae (Fig. 12G); several specimens much smaller, up to 1.5 mm long, with 25–45 setigers. Color in ETOH creamy white or yellowish, with red eyes. Palps directed ventrally, usually not visible dorsally (Figs 11A–C; 12A), rounded, fused basally, distal tip small, conical. Prostomium round to semi-elliptical, slightly wider than long, anterior margin rounded, sometimes with small medial peak (Fig. 6C); with two pairs of eyes in semicircular line with lateral pair slightly anterior to medial pair, additional pair of eyespots located near anterior margin (Figs 11A–C; 12A); three prostomial antennae, each smooth or irregularly wrinkled, lateral antennae inserted near anterior margin of prostomium (Fig. 11C), median antenna up to three times as long as lateral antennae, inserted in middle of prostomium. Nuchal organs as ciliated grooves between prostomium and peristomium. Peristomium as long as or longer than setiger 1, lacking inclusions, with two pairs of tentacular cirri, each about as long as lateral prostomial antennae; ventral cirrus only slightly shorter than dorsal one (Fig. 11A). Pharynx unarmed, short, twisted; 8–10 large papillae distal to smooth rim of proboscis (Fig. 11C). Proventricle cylindrical, with indistinct junction with pharynx but slightly tapered at posterior end, extending through 7–8, occasionally 9, segments, with about 57 muscle cell rows, no medial raphe (Figs 11A; 12A, G). Parapodia truncate anteriorly, becoming elongated after setiger 6, rectangular posteriorly (Figs 11A, I–K; 12A, B, D, G). Anterior dorsal cirri about same length as or longer than lateral prostomial antennae, cirri on middle and posterior setigers long, smooth, digitiform (Fig. 12D), occasionally articulated with granular rounded inclusions, or only weakly articulated, becoming shorter in far posterior. Ventral cirri shortest on first setiger, rapidly becoming longer, digitiform, often with pinched or tapered tip, length may exceed parapodial lobe in anterior setigers, extending well beyond parapodial lobe in middle setigers, even longer and often curled ventrally in posterior setigers (Figs 11E, K; 12F). Complete specimens with one or two short asetigerous prepygidial segments with small cirri, may have small aciculum (Figs 11E; 12F). Pygidium rounded or somewhat triangular, with median anal cirrus robust at base, tapered to smaller tip (Fig. 12F); lateral cirri lost. Bilobed glands in middle and posterior setigers near base of parapodia (Figs 11D; 12C).

Aciculum one per parapodium, each flared at distal end with truncate or slightly rounded cap; cap small and flat on setiger 1, ca. 4 or 5 μm across; cap enlarged and slightly rounded on setigers 2–5, measuring 8–10 μm across widest part on setigers 2 and 3, 14–15 μm on setigers 4 and 5 (Fig. 11G); aciculum becoming smaller from setiger 6, widest part of distal cap 5–7 μm from setiger 6 through middle and posterior setigers (Figs 11G, I–K; 12B).

Dorsal simple setae smooth, not serrate, tip bluntly rounded but sometimes appearing frayed, with hood sometimes extending slightly onto shaft (Figs 11I–K; 12B, F); simple setae present from setiger 1 through last setiger, shortest, slightly curved in anterior setigers 1–5, becoming longer, thinner, straighter through middle and posterior setigers, length up to 70–85 μm in middle setigers, 135 μm in posterior setigers in largest specimens (USNM 1750458; Figs 11I–K; 12C, F); may become shorter again in final setigers. Very short (30 μm), thin, unhooded ventral simple seta in last setiger of complete specimens (Fig. 11K). Compound setae in first five setigers number 12–16 per fascicle arranged in irregular rows visible in ventral view (Fig. 12E), with shafts 40–60 μm long and hooded falcigerous blades 12–15 μm long including hood; compound setae becoming less numerous from setiger 6 through end of body, reduced to four to six per fascicle but with much longer shafts, up to 130 μm long in middle setigers (Fig. 11J) and longer blades 18–28 μm long including hood. Depending on angle of view, anterior blades with distinct shoulder (Fig. 11F), hood covering tip only or extending along length of blade (Fig. 11F, H–I); posterior setae with hoods extending full length of blade, hood may appear constricted or "nipped", giving bumpy appearance to edge (Fig. 11H). Shaft of compound setae ending in three smoothly rounded branches nearly equal in length, single branch thinner than either of the double branches; with delicate membrane stretched between and over tips and over shaft in posterior setigers (Fig. 11F, J–K).

Reproduction. One regenerating specimen with 38 setigers and 2 achaetous segments plus pygidium (Fig. 12D, F; USNM 1750463) with gametes in parapodia, natatory setae beginning on setiger 24. Several additional specimens with eggs measuring up to 75 μm largest diameter (e.g., USNM 1750459).

Methyl Green staining pattern. MG stain not retained.

Remarks. Faulwetter *et al.* (2008) examined five paratypes (USNM 417) of *Streptosyllis arenae* and based their redescription and illustrations on the three specimens for which they could confirm the species identification. The above description is based on new material and agrees well with their redescription, with examination of larger specimens allowing some characters to be updated. The length of the dorsal simple setae and shafts of the compound setae were longer in the present material than reported for the paratypes; the far posterior setigers had fewer compound setae (4–5 vs 10–11 in the paratypes), and a ventral simple seta was found in several complete specimens. The length of the hood on the compound setae depended on the angle in which it was viewed: hoods extended the length of the blade in all setigers except the most anterior, in which they covered only the first half of the shortest blades, and most hoods appeared to be irregularly contracted, possibly an artifact produced by storage in alcohol. (Faulwetter *et al.* 2008) described a "small tooth near (the) distal part" on longer blades in the paratypes; this tooth was not clearly observed on the present material: depending on the angle of view, a point below the tip of the blade suggested a tiny tooth but in other views this might have been the point where a contracted hood touched the blade; better views are needed to confirm the fine structure of these setae. Faulwetter *et al.* (2008) did not observe lateral anal cirri nor were those seen in the new material; these are most likely lost.

Faulwetter *et al.* (2008) also described a new species, *Streptosyllis nunezi* Faulwetter, Vasileiadou, Papageorgiou & Arvanitidis, 2008, that had previously been identified as *Str. arenae* by workers in Crete, Tuscany, and the Canary Islands. *Streptosyllis nunezi* differs from *Str. arenae* in having strongly serrated dorsal simple setae and a longer hood over the blades and shaft of the compound setae; however, this species is described as lacking "distinctively enlarged" acicula, which led the authors to suggest that this character is too variable and unreliable for generic definition. Specimens of *Str. nunezi* reported by Musk *et al.* (2016) from the UK are, however, described as having enlarged acicula in setigers 3–5, a character that by definition differentiates them from the original *Str. nunezi*. Acicula in specimens of *Str. nunezi* from the German Bight are described as having "somewhat wider knobs and slightly wider shafts" in setigers 2–5 (Ebbe *et al.* 2024); however, these were not illustrated or discussed, so the comparative notion of "somewhat" and "slightly" cannot be evaluated. As mentioned earlier, measurements of the tips of acicula would aid in clarifying the issue of whether they can be considered enlarged or not.

Habitat. On Georges Bank, 1775 specimens of *Streptosyllis arenae* were recorded over three years, with 97% coming from two stations: Sta. 2 and Sta. 5-1 at 79 and 84 m depth, respectively. Sta. 2 had an average of 16.3 individuals per 0.05-m^2 grab sample, whereas Sta 5-1 had an average of 8.0 individuals per sample. Sediment composition was similar at both stations, with coarse, medium, and fine-grained sands comprising roughly 98% of the sediment and total organic carbon less than 0.5 percent.

Distribution and depth records. Type locality: Provincetown, Massachusetts**.** Northwest Atlantic, off Massachusetts and Connecticut, subtidal to 85 m. Possibly in UK waters.

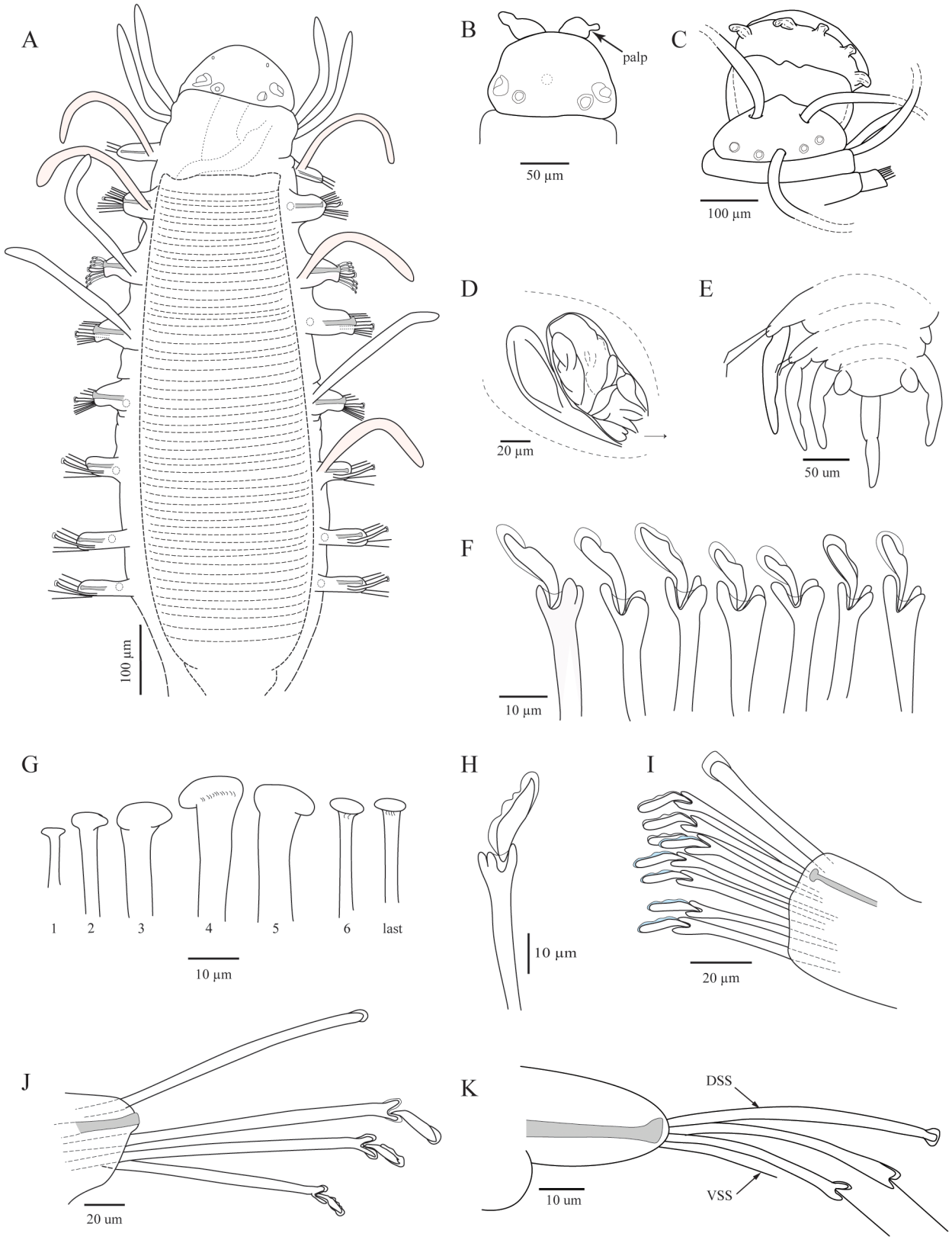

FIGURE 11. *Streptosyllis arenae* Webster & Benedict, 1884. A, anterior end, dorsal view, prostomial antennae not shown; B, prostomium and palps, dorsal view, antennae not shown; C, prostomium with antennae, everted proboscis with papillae, dorsal view; D, parapodial gland, parapodium in direction of arrow; E, pygidium and final segments, dorsal view; F, hooded falcigers, anterior setigers; G, acicula, setigers 1–6 and last; H, hooded falciger; I, setiger 7, anterior view; J, middle setiger, anterior view; K, last setiger (62), anterior view. A, H, I: USNM 1750464; B, G: USNM 1750450; C, D, J: USNM 1750458; E: USNM 1750454; F: USNM 1750460; K: USNM 1750451.

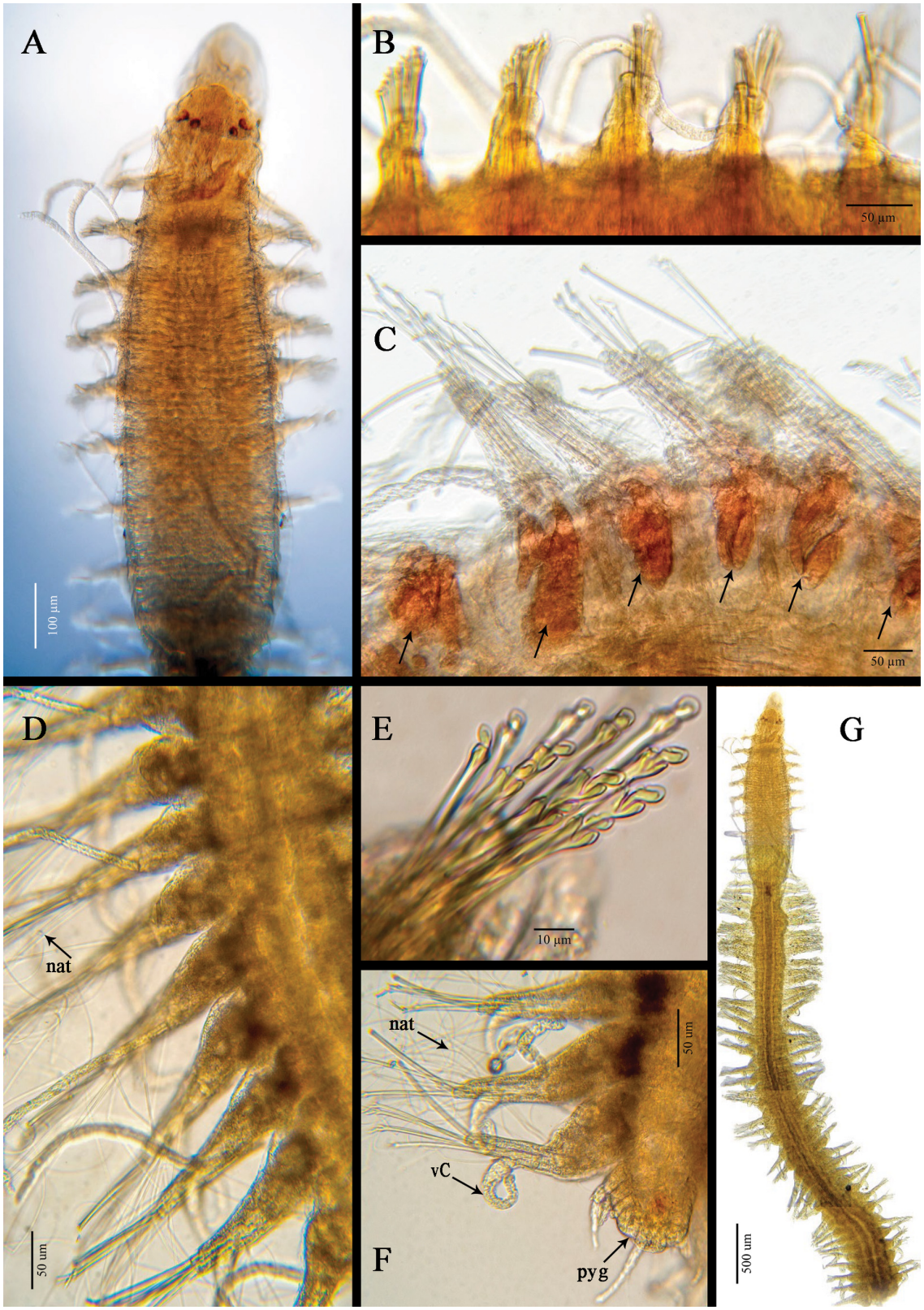

FIGURE 12. *Streptosyllis arenae* Webster & Benedict, 1884. A, anterior end, pharynx everted, dorsal view; B, setigers 2–6, right side, dorsal view; C, parapodia with internal glands, Shirlastain A, arrows indicate internal glands; D, midbody setigers of regenerating specimen, with eggs and natatory setae; E, hooded falcigers in irregular rows, setiger 4; F, posterior end of regenerating specimen, left side dorsal view, with asetigerous segments and pygidium; G, composite mosaic of entire worm, dorsal view. nat–natatory setae, pyg–pygidium, vC–ventral cirrus. A, B, G: USNM 1750464; C: USNM 1750458; E: USNM 1750450; D, F: USNM 1750462.

Streptosyllis cf. *arenae* Webster & Benedict, 1884

Material examined. *(8 specimens from 2 stations)* **Northwest Atlantic Ocean —Off Massachusetts, Georges Bank**, GBMP, Sta. 2: coll. G. Hampson, Chief Scientist, Cruise M7, R/V *Endeavor*, 7 Feb 1983, 40°59.2′N, 66°55.9′W, 71 m, rep. 1 (1, USNM 1750465); Cruise M8, R/V *Gyre*, 15 May 1983, 40°59.3′N, 66°55.9′W, 73 m, rep. 5 (3, USNM 1750466); Cruise M11, R/V *Oceanus*, 3 Feb 1984, 40°59.0′N, 66°55.8′W, 79 m, rep. 1 (1, USNM 1750467); Cruise M12, R/V *Gyre*, 4 Jun 1984, 40°59.0′N, 66°55.8′W, 79 m, rep. 3 (1, USNM 1750468). Sta. 5-14: coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, ca.18 July 1981, 40°39.4′N, 67°46.4′W, target depth 80 m, actual depth not recorded, (2, USNM 1750469).

Remarks. The eight specimens available (plus additional material from Sta. 2 that was examined in the 1980s but subsequently lost) are exceptionally small, ca. 0.5 mm long for about 20 setigers. Most of the material is in very poor condition and twisted specimens made it difficult to see morphological details, especially of the prostomium and palps, which do not appear to be visible dorsally. The species appears similar to *Streptosyllis arenae* in having hooded and non-serrated dorsal simple setae in all setigers, acicula with enlarged tips that are largest in setigers 2–5, hooded blades of similar lengths on the anterior compound setae, and very long ventral cirri in posterior setigers. It differs from *Str. arenae* in having elongated parapodia in the first few setigers rather than truncated ones through setiger 5, in lacking hoods on some or all blades in posterior setigers, and in having acicula that appear to have rounded inflated tips in posterior setigers rather than having flat nail-head tips. Also, the compound setae in anterior setigers number only five or six and have long shafts, rather than the 12–16 short-shafted setae as in *Str. arenae*. It is possible but not certain that these specimens, which are one-third the length of the smallest specimens assigned to *Str. arenae* (see above) are juvenile *Str. arenae*, since they were found at the same station where that species was recorded. Day (1973) recorded two specimens of *Str. arenae* from 5–10 m off Beaufort, North Carolina, but did not comment on them; Gardiner (1976: 134–135, fig. 11u–z) later examined one of Day's specimens (USNM 51069) and described the first five setigers as having enlarged acicula and the blades of the compound setae in far posterior setigers as "serrated, with indistinctly bifid tips not covered by membrane". The lack of hoods on the posterior blades differs from *Str. arenae*, as would an enlarged aciculum in setiger 1. Additional material from both locations is needed to form a more definitive opinion on this possible species.

Streptosyllis mallea sp. nov.

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Figures 13–14

Material examined. *(1 specimen from 1 station)* **US South Atlantic ACSAR Program**, **Off Charleston, South Carolina**, coll. J.A. Blake, Chief Scientist, Cruise SA-5, R/V *Gyre*, 19 Sep 1985, Sta. 14, 32°23.67′N, 77°01.18′W, 796 m, rep. 1, **Holotype** USNM 1750442.

Description. Holotype incomplete, about 1 mm long, 0.2 mm wide for 13 setigers. Color in ETOH white, pharynx stained bright pink from Rose Bengal used during sorting process. Palps large, cushion-like, visible dorsally and flopped ventrally, no accessory papilla observed (Figs 13A; 14 A–B). Prostomium pentagonal, nearly as wide as long (Fig. 13A); eyes lacking. Median prostomial antenna smooth, four times length of club-shaped, lateral antennae (Figs 13A; 14A). Peristomium with two pairs of smooth, club-shaped tentacular cirri inserted on anterior edge, dorsal pair twice as long as ventral pair (Figs 13A; 14B); peristomial inclusions absent. Pharynx unarmed, twisted, occupying five or more setigers (Fig. 14A–B); proventricle cylindrical, in five setigers, ca. 40 muscle rows, no medial raphe but dark internal line evident when focusing down through structure (Figs 13A; 14A, D). Parapodia short, truncate in anterior setigers with enlarged acicula, becoming elongated and tapered after setiger 5 (Figs 13A, C, E; 14A–C). Dorsal cirri mostly lost, remaining ones very long, thin, smooth, or slightly wrinkled (Figs 13A, E; 14 A–B). Ventral cirri leaflike with wide base and narrow rounded tip, same length as parapodial lobe or slightly shorter (Figs 13C, E; 14A, D). Pygidium not seen.

Acicula in setigers 1–5 with enlarged dome-shaped cap surrounded by narrow lip or rim, cap dimension 10 µm in setiger 1, 18 µm in setigers 2–4, 25 µm in setiger 5 plan view (Figs 13B–D, G; 14B–C, E); acicula in remaining setigers from setiger 6 barely visible, thin, with small tip (Fig. 14E). Compound setae in setigers 1–5 number up to 8, heterogomph shafts inflated at distal end with subapical serrations on longer side (Fig. 13C–D, F–G); blades clearly

bidentate with two large distal teeth, serrated along length (Fig. 13D, F); setiger 1 with blades measuring 8 µm long; other setigers with two blades measuring 24 µm long, remaining blades measuring 10 µm; similar but fewer setae in remaining setigers of fragment, many blades lost. Dorsal simple seta first observed on setiger 3, long, thin, slightly curved, serrated with small rounded tip (Figs 13G; 14E). All setae lack hoods.

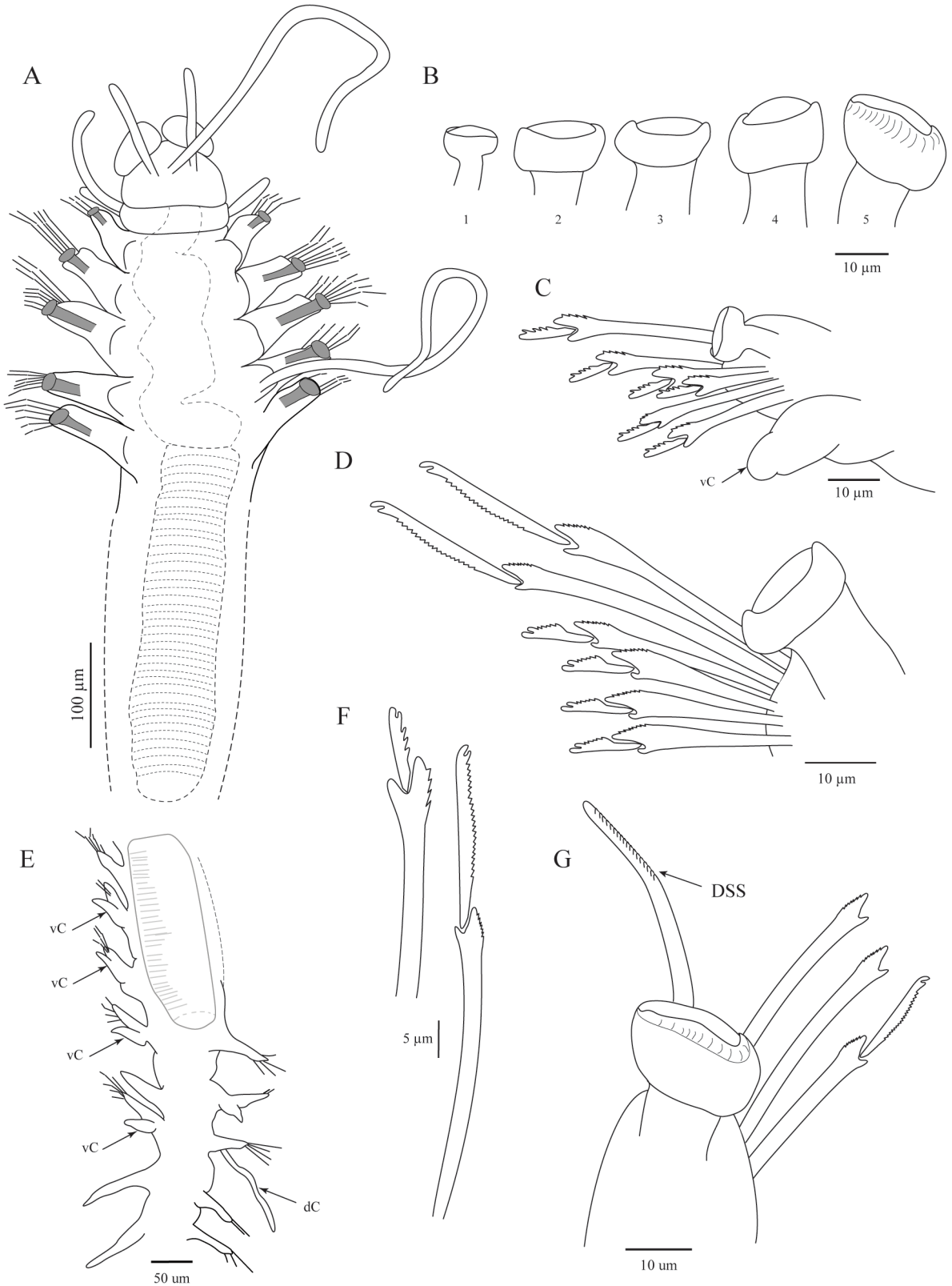

FIGURE 13. *Streptosyllis mallea* **sp. nov.** A, anterior end, dorsal view; B, acicula in setigers 1–5, as indicated; C, setiger 1, ventral view; D, setiger 3, ventral view; E, setigers 6–13, ventral view; F, compound setae, anterior setiger; G, setiger 5, ventral view. A–G: holotype (USNM 1750442).

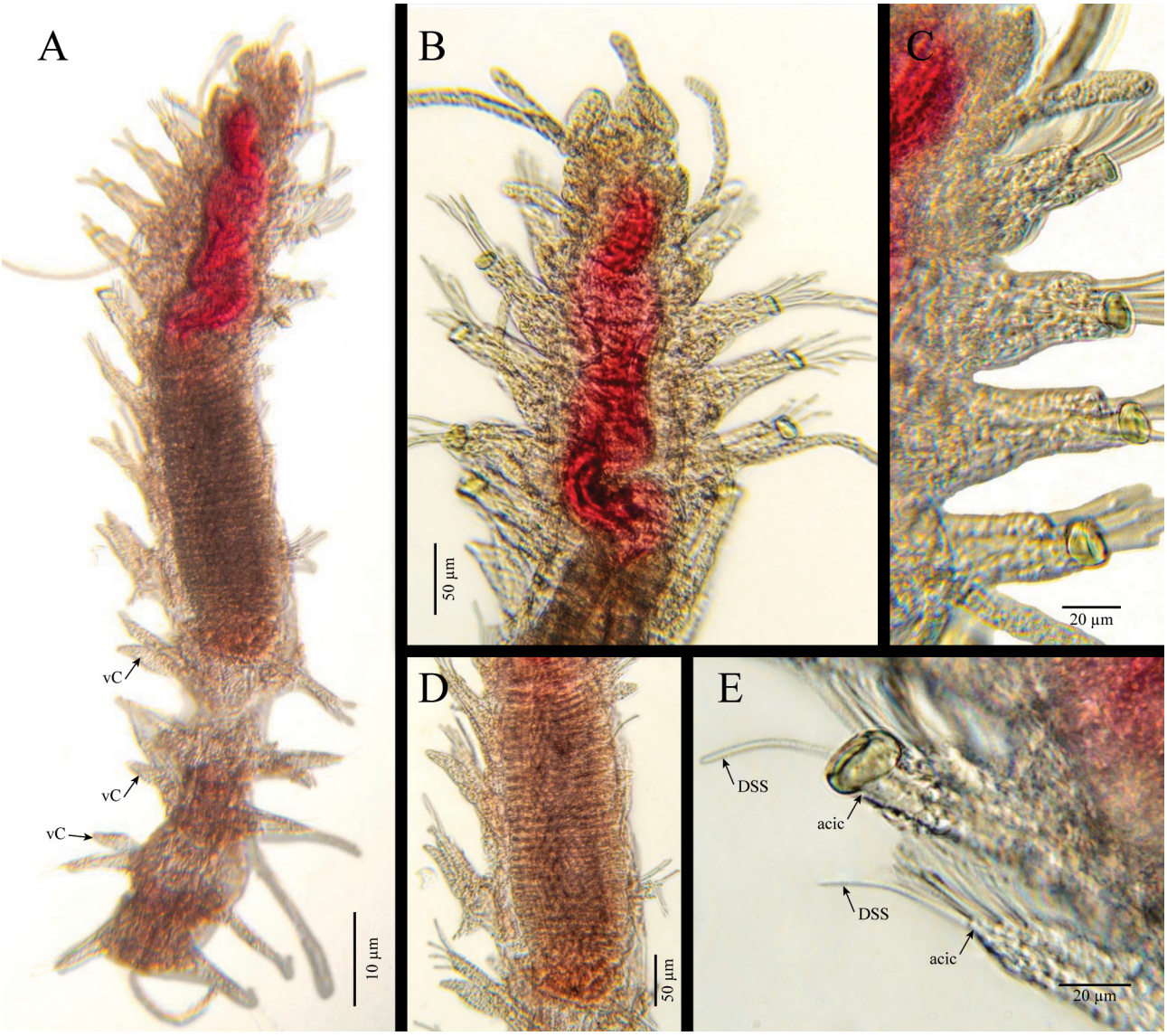

FIGURE 14. *Streptosyllis mallea* **sp. nov.** A, entire (incomplete) specimen, dorsal view; B, anterior end through setiger 6, ventral view; C, composite focused on enlarged acicula of setiger 1 and setigers 2–4, ventral view. D, proventricle; E, setigers 5 and 6. Abbreviations: acic–aciculum; DSS–dorsal simple seta, vC–ventral cirrus. A–E: Holotype USNM 1750442.

Remarks. Although there is only a single incomplete specimen available, two characteristics make this species noticeably different from other described species of *Streptosyllis*: the greatly enlarged acicula start in setiger 1 rather than setiger 2 and this is the only species in the genus known from deep water. The dorsally visible cushion-like palps of this specimen are similar to those of *Str. minuta* **n. comb**., thus differing from the conical, usually small, ventrally turned palps of other species such as *Str. arenae*, *Str. varians*, and *Str. verrilli*. *Streptosyllis mallea* **sp. nov.** is similar to *Str. varians* in the exceptional enlargement of the distal ends of the acicula in anterior setigers, but these enlarged acicula are limited to the first five setigers whereas in *Str. varians* they continue for as many as 20 to 23 setigers; both species also have an exceedingly long median prostomial antenna.

Saint-Joseph (1895) reported specimens having very large acicula in setiger 1; although he assigned the species to *Str. varians*, Southern (1914) noted that Saint-Joseph's description differed from the original description of that species by Webster & Benedict (1887) and could not be that species. Saint-Joseph's specimen had palps that were not visible from the dorsal side whereas in the present species they are large and visible dorsally. As noted above under *Str.* cf. *arenae*, Gardiner (1976) examined one of Day's (1973) specimens from shallow water in North Carolina and described the first five setigers as having enlarged acicula. The identities of Saint Joseph's and Day's specimens have not yet been resolved but would represent additional species with enlarged acicula from setiger 1.

Etymology. The species name, *mallea,* is from the Latin *malleus*, meaning mallet or maul, and refers to the enlarged heavy acicula in the first setigers of the species.

Habitat. The type locality of *Streptosyllis mallea* **sp. nov.** is in an area of high productivity and diversity, with complex local bottom currents influenced by the Gulf Stream (Blake & Grassle 1994). The area is characterized by well-mixed sediments with a water content of about 57 percent and an average mean total organic carbon of 3.67 ± 0.67 percent. The nine sediment samples taken at this station averaged 41 ± 0.7 percent sand, 33.1 ± 1.5 percent silt, and 25.87 ± 2.3 percent clay (Blake *et al.* 1987).

Distribution and depth records. Known only from the type locality off Charleston, South Carolina, 796 m depth.

Streptosyllis minuta (Blake & Walton, 1977) new combination

Figure 15

Syllides minutus Blake & Walton, 1977: 311, figs. 3a–j; 4a–c.

Material examined. *(1 specimen, holotype)* **Northeastern Pacific,** California, USA, Gulf of the Farallones, off San Francisco Bay, coll. Brown & Caldwell, Inc., 12 Feb 1974, Sta. 45-6, 37°45′N, 122°38′W, 11–19 m, sand-mud bottom, Shipek sediment sampler, **Holotype** (LACM-AHF POLY 1236).

Redescription. Body 3.5 mm long with up to 45 segments. Palps large, cushion-like, basally fused, with small papilla midway on surface (Fig. 15A, B). Prostomium subpentagonal with small medial point on anterior margin, with two pair large eyes in open trapezoid arrangement and small anterior third pair. Prostomial antennae long, smooth; median antenna slightly shorter, wider, inserted in middle of prostomium; lateral antennae inserted medial to small anterior third pair of eyes. Peristomium narrow, with oval or circular inclusions (Fig. 15C); tentacular cirri smooth, two pairs inserted ventrally near anterior edge of peristomium, dorsal pair slightly longer than ventral pair. Pharynx unarmed, terminating in several soft papillae. Proventricle cylindrical, in five or six setigers, about 50 muscle rows, no median raphe (Fig. 15A). Parapodia short, truncate anteriorly, becoming elongated posteriorly, bases swollen with gonadal products from setiger 13 (Fig. 15A, D, F). Dorsal cirri on setigers 1–5 smooth, sometimes slightly annulated or wrinkled near tip; becoming distinctly articulated after setiger 6, with 3–6, most often 5, articles and two oval inclusions in each article (Fig. 15A, D, I). Ventral cirri digitiform, becoming progressively longer through first five to seven setigers, remain constant in length through medial segments, diminish in size thereafter. Pygidium with two short simple cirri (possible third cirrus missing).

Aciculum in setiger 1 slender, pointed; acicula in setigers 2–5 with blunt enlarged tips, ca. 5 µm in setiger 4 (Fig. 15F); aciculum in setiger 6 and remaining setigers not enlarged, short, with slightly knobbed tip. Dorsal simple setae from setiger 1, short, curved, serrated, with bluntly rounded tip (Fig. 15F–G), becoming longer and thinner after setiger 6 but remaining similar in form (Fig. 15E). Setiger 1 with 7–9 composite falcigers, blades ca. 8 µm long, finely serrate, with blunt round tip, shaft with single small subdistal tooth. Setigers 2–5 with 12–15 thick unidentate falcigers, blades ca. 7–9 µm long, smooth along cutting edge (Fig. 15F), shaft with subterminal protuberance. Setigers 6–8 with seven or eight falcigers, blades ca. 12 µm long, finely serrate with unidentate or sub-bidentate tips (Fig. 15G), shaft finely serrated between tip and distinct secondary tooth. From setiger 9 blades of compound setae up to 25–35 µm long, finely serrated, subterminally broad with small point before narrowing to slightly curved unidentate tip (Fig. 15H), shafts with fewer or smaller teeth on distal end. All setae lack hoods.

Reproduction. Holotype sexually mature specimen with gametes in parapodial bases from setiger 13, with long natatory setae from about setiger 14.

Remarks. Blake & Walton (1974) placed their new species in the genus *Syllides*, commenting on the abrupt change in setal types after setiger 5. *Streptosyllis minuta* **n. comb.** has characteristics in common with several genera, including *Streptospinigera*, *Streptosyllis,* and *Syllides*. The shape of the palps, which each bear a ventrolateral accessory papilla, is similar to that seen in species of *Syllides*, as are the conspicuously articulated posterior dorsal cirri. *Syllides* is characterized by bidentate blades on the compound setae, but only some of the blades are bidentate in *Str. minuta* **n. comb**. The change in setae after setiger 5, including the elongation of the dorsal simple seta, along with the predominantly unidentate blades on the compound setae, is similar to *Streptospinigera*, but bidentate and sub-bidentate blades are also present, and the simple setae are similar in form along the body. The enlarged acicular tips in setigers 2–5 and the single type of dorsal simple seta, although much longer and thinner in posterior setigers

than in setigers 1–5, align it most closely with the genus *Streptosyllis*, which can also have both unidentate and bidentate setal blades, and it is herein transferred to that genus.

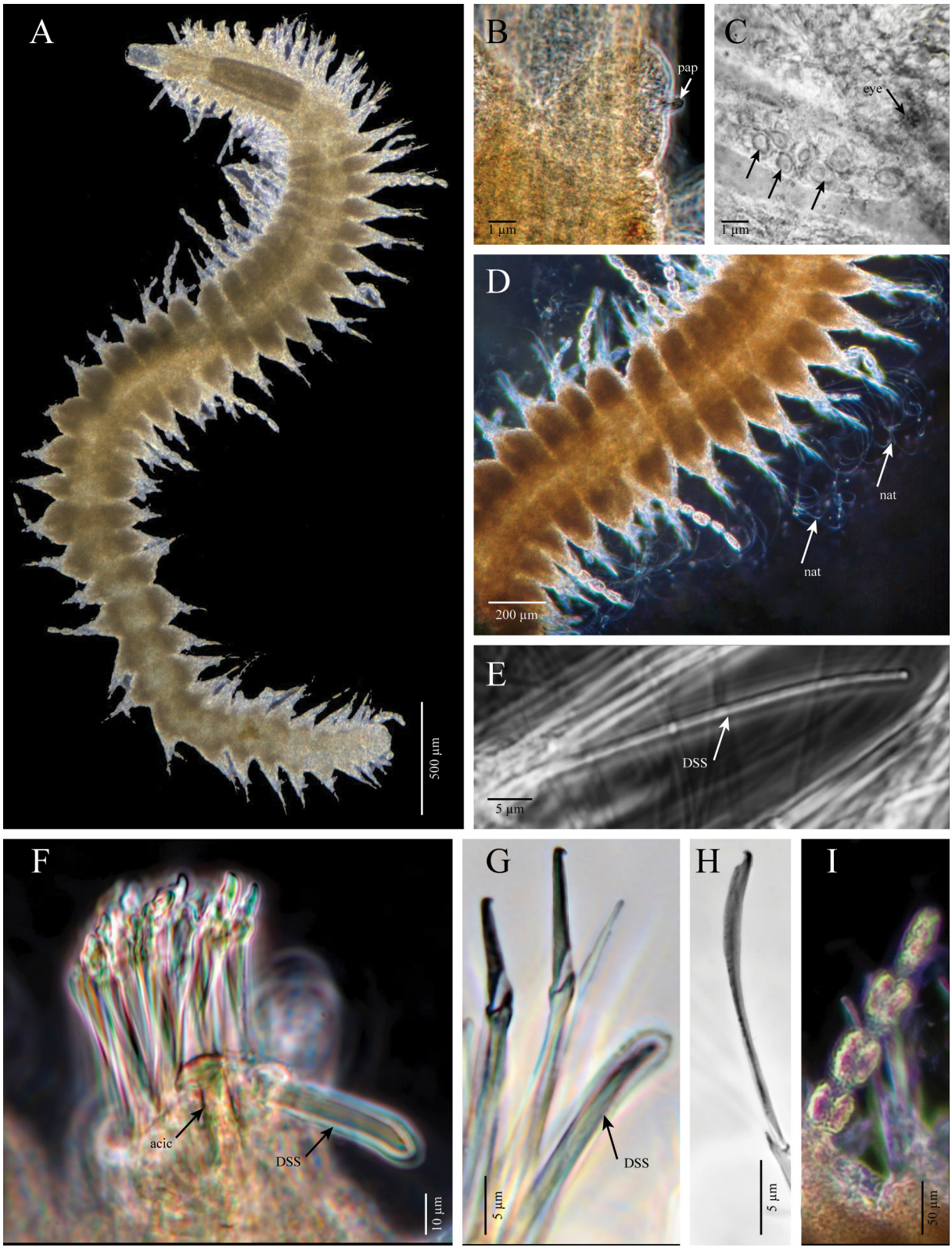

FIGURE 15. *Streptosyllis minuta* (Blake & Walton, 1977) **new combination**. A, whole body dorsal view; B, prostomium, showing accessory papilla on palp; C, peristomium, showing inclusions; D, middle setigers with gametes in parapodia and natatory setae; E, long dorsal simple seta from posterior setiger; F, setae and aciculum in setiger 3; G, sub-bidentate compound setae, setiger 7; H, long-bladed seta from posterior setiger; I, articulated dorsal cirrus with double inclusions, middle setiger. A–F: Holotype LACM-AHF POLY 1236.

Streptosyllis minuta is similar to several other species of *Streptosyllis* that have acicula with enlarged tips in anterior setigers 2–5, but differs in details of the compound setae, especially the shape of the long falcigers in posterior setigers, which is unique to *Str. minuta*. The anterior acicula are only about 5 µm at their widest distal point, much smaller than the enlarged tips of *Str. arenae* and *Str. varians*, which can reach 15 µm in *Str. arenae* and 25 µm in *Str. varians* in anterior setigers and remain at 5–7 µm in posterior setigers. *Streptosyllis minuta* is similar to *Str. arenae* and *Str. websteri* in having 12 or more compound setae with very short blades in anterior setigers but differs from both in lacking hoods on the compound and simple setae and differs from *Str. websteri* in lacking longer-bladed setae in anterior setigers. *Streptosyllis minuta* differs from *Str. verrilli* in lacking obviously bidentate dorsal simple setae, instead having bluntly rounded tips on these setae.

Habitat. *Streptosyllis minuta* was found in mixed sand and mud sediments (Blake & Walton 1977).

Distribution and depth records. Known only from the type locality, off San Francisco, California, 11–19 m.

Streptosyllis pettiboneae Perkins, 1981 revalidated

Figures 16–17

Streptosyllis pettiboneae Perkins, 1981: 1143–1147, figs 27–28.
Streptosyllis websteri —Brito *et al.* 2000: 607 (not Southern, 1914).

Material examined. *(60 specimens from 12 stations)* **Northwest Atlantic Ocean —Georges Bank**. GBMP Sta. 15: coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 41°27.2′N, 68°00.7′W, no depth recorded, rep. 2 (1, tiny, USNM 1750445); Cruise M2, R/V *Oceanus*, 13 Nov 1981, 41°27.4′N, 68°00.5′W, no depth recorded, rep. 1 (4, tiny, USNM 1750446). coll. G. Hampson, Chief Scientist, Cruise M5, R/V *Oceanus*, 22 Jul 1982, 41°27.4′N, 68°00.5′W, 42 m, rep. 3 (13, USNM 1750447); Cruise M6, R/V *Oceanus*, 20 Nov 1982, 41°27.5′N, 68°00.7′W, 38 m, rep. 2 (1, USNM 1750448); rep. 3 (4, USNM 1750449). **—Long Island Sound, off Connecticut, ACOE Dredged Material Disposal Site program**, 18 Feb 2000**,** Sta. CS2KW, 41°12.706’N, 72° 22.949’W, 49 m, rep. 3 (1, MCZ IZ 172039). Sta. CS94, 41°12.829’N, 72° 21.822’W, 50 m, rep. 1 (1 in 2 pieces, MCZ IZ 172040). 06 July 2000, Sta. CSB92, rep. 1, 41°12.860’N, 72° 21.730’W, 48.5 m (1, MCZ IZ 172041); rep. 3, 41°12.867’N, 72° 21.801’W, 48.5 m (2, MCZ IZ 172042). —**New York/New Jersey Bight. off Jones Beach, wind park survey**, coll. I.P. Williams for ENSR, 26 Aug 2005, Sta. 28, 40°33.706’N, 73°19.441’W, 19.6 m, rep. 1 (1, MCZ IZ 172038). **Blue Atlantic pipeline project,** coll. P. Neubert for ENSR, 8 Sep 2002, Sta. BA5, 40°29.241′N, 74°0.144′W, 17.4 m, rep. 1 (1, MCZ IZ 172043). **Port Liberty offshore pipeline project**, coll. P. Neubert for AECOM, Sta. 6A, 11 Feb 2012, 40°30.972′N, 73°40.507′W, 19 m (7, MCZ IZ 172045); Sta. 8, 19 Jan 2012, 40°29.762′N, 73°38.863′W, 19.8 m (3, MCZ IZ 172046); Sta. 9A, 11 Feb 2012, 40°29.159′N, 73°38.044′W, 19.1 m (6, MCZ IZ 172047); Sta. 10, 11 Feb 2012, 40°28.555′N, 73°37.225′W, 19.1 m (11, MCZ IZ 172048); **Sta. 17**, 19 Jan 2012, 40°24.328′N, 73°31.497′W, 26 m (1, MCZ IZ 172049); Sta. 19, 10 Feb 2012, 40°23.118′N, 73°29.861′W, 27.1 m (1, MCZ IZ 172050). **—off New Jersey, LEO project,** coll. J.F. Grassle & R. Petrecca, 13 Aug 1993, Leo-15 Sta. 30, 39°28.8’ N, 74°13.29’ W, 16 m (1, MCZ IZ 172044).

Description. Largest specimen just over 2 mm long for 41 setigers (from USNM 1750447), reported up to 4.0 mm long for 48 setigers, width up to 0.5 mm; smallest specimen 1 mm long for 16 setigers. Palps reduced to papillae with cushion-like bases, tips sometimes visible dorsally (Fig. 16A), usually turned ventrally. Prostomium semicircular, rounded anteriorly and essentially straight posteriorly, with four lensed eyes in trapezoidal arrangement and two smaller anterior eyespots (Figs 16A; 17A); antennae smooth or wrinkled, usually widest in middle and slightly tapered distally (Fig. 16A) but sometimes club-shaped; lateral antennae inserted near anterior margin of prostomium, medial to anterior eyespots (Fig. 16A); median antenna longer than lateral antennae to varying degrees. Peristomium well defined, lacking inclusions, with two pairs of smooth or wrinkled tentacular cirri similar in shape to lateral prostomial antennae, dorsal pair sometimes up to twice as long as ventral pair (Figs 16A; 17A–C). Pharynx unarmed, with 10 triangular papillae with wide base distal to smooth rim of proboscis (Figs. 16A; 17A–C); proventricle extending through 5–6 segments, with about 55–60 muscle cell rows, opaque band at base of proventricle probably anchoring musculature (Figs 16A; 17A, C). Parapodia truncated, short in anterior setigers, rapidly becoming elongated, with double dorsal distal papillae in middle setigers (Fig. 16A, P–R); parapodial glands present in middle and posterior setigers (Fig. 17C). Dorsal cirri narrow, smooth or wrinkled on first five setigers, with short basal cirrophores, becoming longer in subsequent setigers, some posterior cirri with up to eight articles

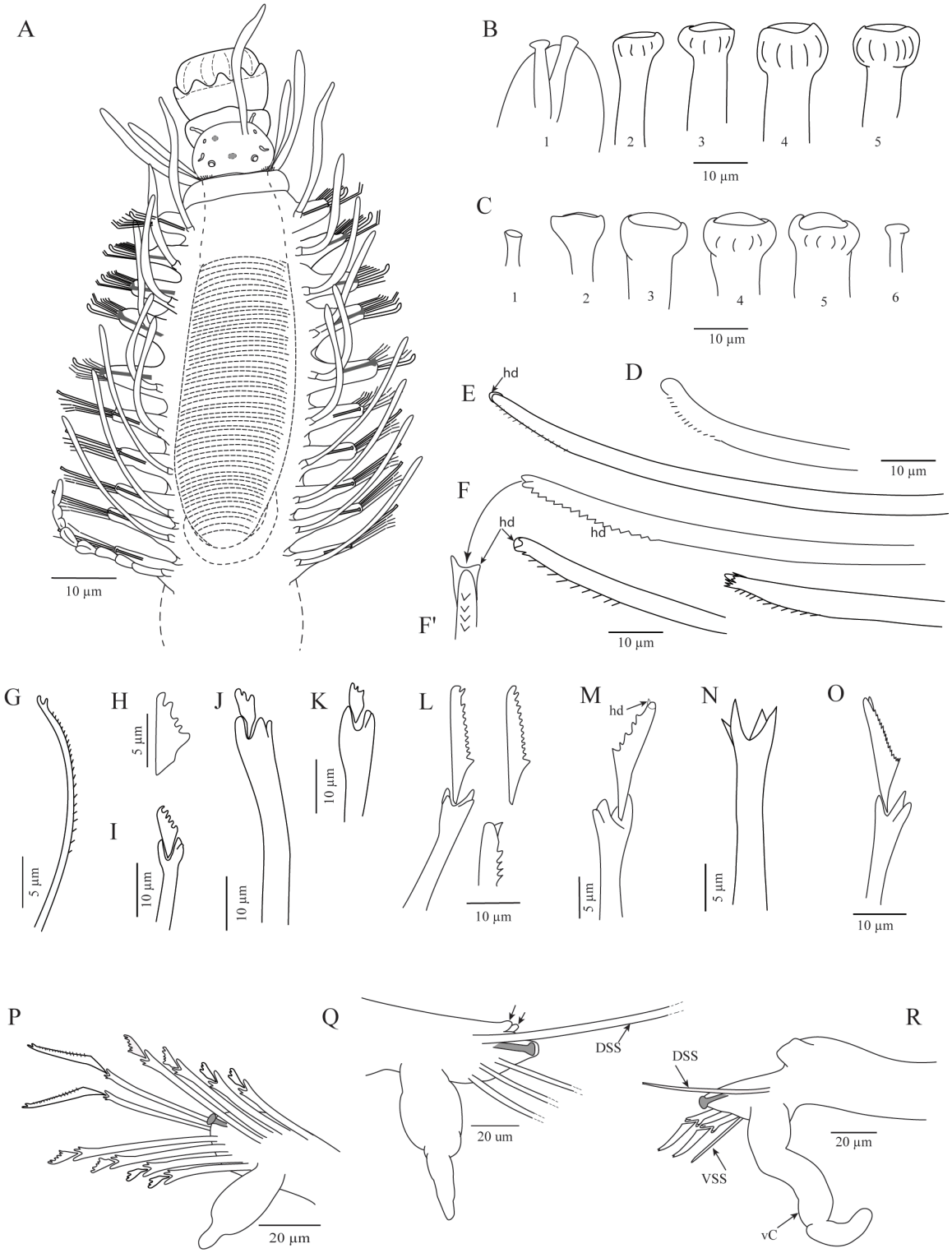

FIGURE 16. *Streptosyllis pettiboneae* Perkins, 1981. A, anterior end, dorsal view, two prostomial antennae missing; B, acicula in setigers 1–5, as indicated; C, another specimen, acicula in setigers 1–6, as indicated; D, DSS, setiger 3; E, DSS, setiger 11; F, three views of DSS from a posterior setiger, F′ inset not to scale; G, long falciger, setiger 1; H, short stout falciger, setiger 1; I, compound seta with stout falciger, setiger 1; J, compound seta, setiger 3; K, compound seta, setiger 5; L, compound seta, setiger 9, with alternate views of tip of blade; M, same (compound seta, setiger 9), showing small hood; N, shaft of compound seta, middle setiger; O, compound seta, far posterior setiger; P, setiger 1; Q, middle setiger, arrows indicate double dorsal papillae; R, last setiger, dorsal cirrus removed. Abbreviations: DSS–dorsal simple seta, hd–hood, vC–ventral cirrus, VSS–ventral simple seta. A, F–H, L–M, Q: MCZ IZ 172045; B: MCZ IZ 172050; C, D, E, N: MCZ IZ 172043; I–J: MCZ IZ 172039; K, O: MCZ IZ 172041; P: MCZ IZ 172040; R: MCZ IZ 172047.

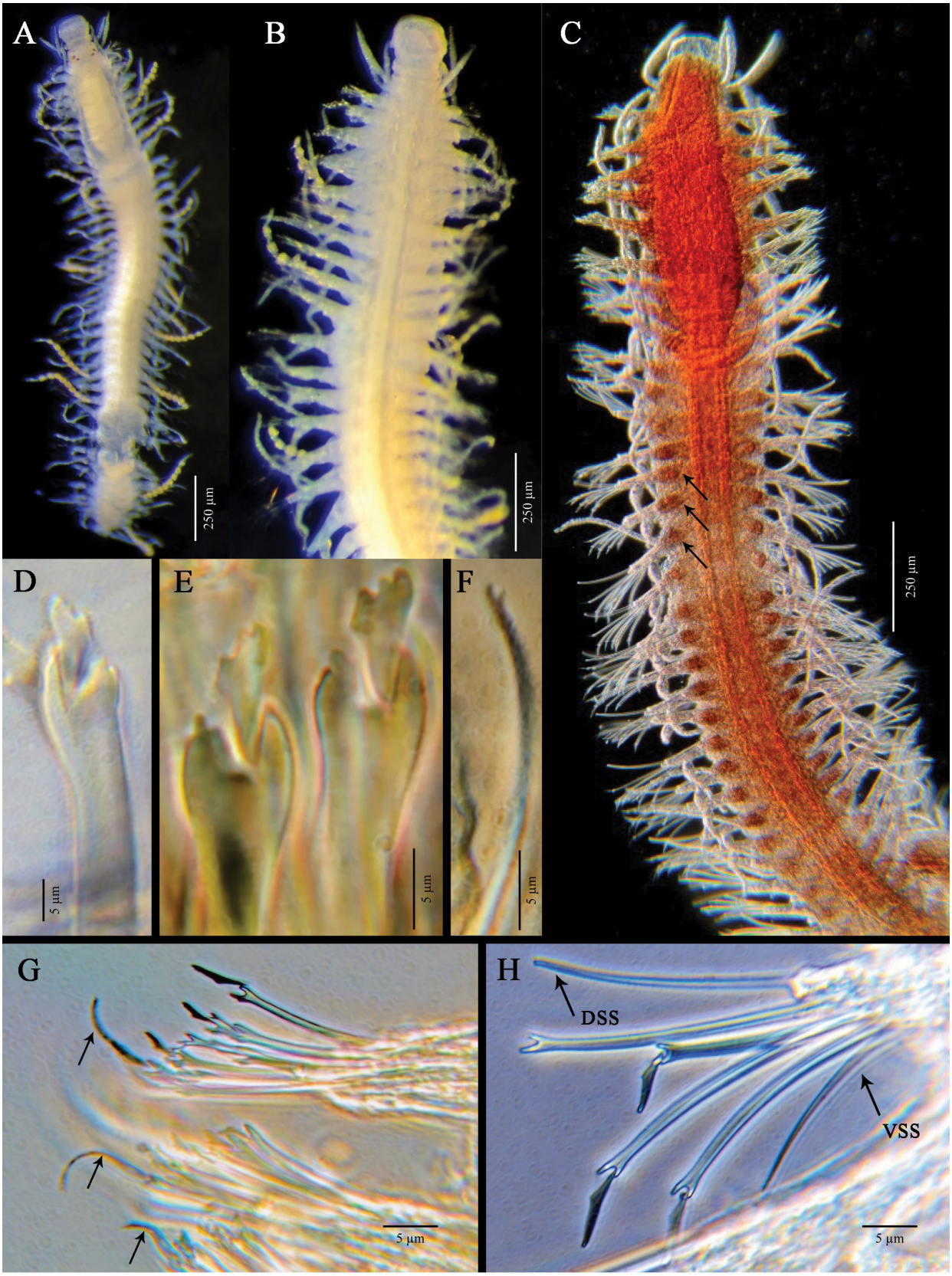

FIGURE 17. *Streptosyllis pettiboneae* Perkins, 1981. A, entire animal, dorsal view; B, anterior end, ventral view; C, composite ventral view, different specimen, stained with Shirlastain A, arrows indicate three of the segmental parapodial glands; D, short stout falciger, setiger 3; E, short stout falcigers, setiger 4; F, long curved falciger, setiger 1; G, setigers 1–3, arrows indicate long curved falcigers; H, last setiger, with dorsal and ventral simple setae, ventral view. DSS–dorsal simple seta, VSS–ventral simple seta. A–C, E–F: MCZ IZ 172045; D: MCZ IZ 172039; G: USNM 1750445; H: USNM 1750447.

with double golden inclusions, twice the width of plain, thin cirri (Figs 16A; 17A–C). Ventral cirri shortest with globular base and pinched, digitiform tip on setiger 1 (Fig. 16P), rapidly becoming longer, base remaining somewhat inflated, tip digitiform, tapered, extending beyond parapodial lobes after setiger 1 (Fig. 16Q–R). Venter with distinct medial ridge originating at setiger 1 or 2, most obvious in post-proventricular segments and continuing for length of body (Fig. 17B–C); median part densely cellular, with smooth, paler longitudinal tissue or grooves on either side Pygidium with three anal cirri; medial cirrus short, digitiform; lateral cirri often missing but long and curled when present; smallest specimens with one or two achaetous prepygidial segments.

Acicula one per parapodium, rarely two, with distally enlarged caps measuring 10–14 μm largest dimension in setigers 2–5, largest on setiger 4, thinner in setiger 1 and posterior to setiger 5 with caps up to 5 μm across (Fig. 16B–C). Dorsal simple setae from setiger 1, rounded tip curved dorsally, distinctly serrate on distal end, without hood in setigers 1–5 (Fig. 16D); after setiger 5, simple setae longer, up to 80 μm, with cup-shaped hood giving bifid or ragged appearance to unidentate tip (Fig. 16E–F). Compound setae in setigers 1–5 include two or three with long (25–30 μm) bidentate serrated falcigerous blades often appearing curved (Figs 16G; 17F–G) and 10–12 with short (5–15 μm) broad falcigerous blades with one or more rounded teeth or serrations (Figs 16H–K; 17D–E); homo- or hemigomph shafts of compound setae distally inflated on setigers 2–5, with one side smooth and one side weakly subdivided into two or three lobes (Figs 16J–K; 17E). From setiger 6, compound setae fewer, reduced to eight in middle parapodia and two to four in far posterior setigers; shafts longer, thinner, with hemigomph distal ends with four points: in ventral view, two divergent points on one side and other side with subapical tooth or flange (Fig. 16L, N); blades straighter, slightly broader than anterior blades, 15–20 or 22 μm long, serrated along length, unidentate with cup-shaped hood giving winged or bifid appearance (Fig. 16L–M, O). Ventral simple seta on far posterior setigers, very slender, ca. 50 μm long (Figs 16R; 17H).

Reproduction. Mature individuals have gametes from setiger 13 or 14 and short natatory setae from setiger 16.

Methyl Green staining pattern. MG stain not retained.

Remarks. Perkins (1981) distinguished *Streptosyllis pettiboneae* from the closely related *Str. websteri* primarily on characteristics of the compound setae, noting in particular that *Str. pettiboneae* has bidentate blades in anterior setigers rather than the rounded unidentate blades of *Str. websteri* and the blades in posterior setigers are unidentate with a bifid hood rather than lacking a hood. Additionally, some dorsal cirri in *Str. pettiboneae* are articulated, whereas they are smooth or at most pseudoarticulated in *Str. websteri*; the shafts of the posterior compound setae are not serrated in *Str. pettiboneae*; and the initial gamete-filled setigers begin farther back than in *Str. websteri*. Perkins (1981:1146, fig. 28b–c) described the tips of the dorsal simple setae in the middle and posterior setigers of *Str. pettiboneae* as having a "short, distally bifid, hyaline hood", thus giving a bifid appearance to a unidentate tip, similar to his description of the blades of the posterior compound setae. The New England material is similar; depending on the level of focus and angle of view, both dorsal simple setae and compound blades can appear bifid or Y-shaped in ventral view due to the hood flaring off to one side of the unidentate tip. Perkins (1981) did not see a ventral simple seta on his Florida specimens, but this very thin seta was observed on several complete specimens from Long Island Sound.

Southern (1914) described *Str. websteri* (as well as *Str. bidentata*) from the west coast of Ireland; the species was included in Fauvel (1923) with no additional description. Harris (1971) reported one specimen of *Str. websteri* from the Isles of Scilly and included illustrations of the compound setae indicating unidentate blades with irregular serrations. Later accounts from the North Sea (Hartmann-Schröder 1974, 1996) and Spain (Campoy 1982; San Martín 1984; Parapar *et al.* 1994) were contradictory, partly due to conflation of two or more species. Hartmann-Schröder suggested that *Str. bidentata* and *Str. websteri* (1974) and *Str. arenae* (1996) might in fact represent a single species. This synonymy was not supported by San Martin (2003) who clarified that some of the specimens he had examined earlier (San Martín 1984) were *Str. bidentata*.

Brito *et al.* (2000) examined the types of *Str. pettiboneae* and concluded they were the same as specimens they had identified as *Str. websteri* from the Canary Islands; they therefore synonymized the two species. However, it is not clear that their material actually was *Str. websteri*, given the limited and contradictory descriptions of that species. The *Str. websteri* of Brito *et al.* (2000) differs from Southern's original description in at least two important characters. As described by Southern (1914), the tips of the long blades in anterior setigers of *Str. websteri* are bluntly rounded and the shafts of the compound setae in posterior setigers are serrated; Brito *et al.* (2000) described the long blades in the anterior setigers of their material as having bidentate tips and the shafts were neither described nor

illustrated as serrated, corresponding instead to Perkins' (1981) description of *Str. pettiboneae*. San Martín's (2003) description of *Str. websteri* is based on Brito *et al.* (2000) and does not clarify the situation. Based on an evaluation of characters discussed above, including the remaining uncertainty over the setal morphology of *Str. websteri*, I prefer to remove *Streptosyllis pettiboneae* from synonymy with *Str. websteri* and retain it as a valid species.

Habitat. The type locality of *Streptosyllis pettiboneae* was in medium to coarse calcareous sand (Perkins 1981). Additional specimens from off Massachusetts and New York were in fine, medium, and muddy sand.

Distribution and depth records. Type locality: east coast of Florida in 7 m. Northwestern Atlantic Ocean: Georges Bank off Massachusetts, Long Island Sound, New York Bight, to 50 m.

Streptosyllis varians Webster & Benedict, 1887

Figures 18–20

Streptosyllis varians Webster and Benedict, 1887:718–719, pl. 2, figs 24–31, pl. 3, figs 32–34.
Streptosyllis varians—Pettibone 1963:127, figs. 31k. Not Saint Joseph 1895 *fide* Southern 1914; Not Fauvel 1923.

Material examined. *(24 specimens from 4 stations)* **Northwest Atlantic Ocean.—off Massachusetts, Georges Bank**. **GBMP** Sta. 1: coll. G. Hampson, Chief Scientist, Cruise M4, R/V *Cape Henlopen*, 12 May 1982, 41°12.4′N, 67°14.5′W, 58 m, rep. 1 (1, USNM 1750470); Cruise M10, R/V *Oceanus*, 15 Nov 1983, 41°13.0′N, 67°15.3′W, 55 m, rep. 4 (1, USNM 1750471). Sta. 10: coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 40°39.4′N, 67°46.4′W, no depth recorded, rep. 4 (10, USNM 1750472); coll. G. Hampson, Chief Scientist, Cruise M3, R/V *Endeavor*, 12 Feb 1982, 40°42.0′N, 68°35.1′W, 62 m, rep. 3 (1, USNM 1750473); Cruise M4, R/V *Cape Henlopen*, 16 May 1982, 40°42.0′N, 68°35.2′W, 62 m, rep. 6 (2, USNM 1750474); Cruise M6, R/V *Oceanus*, 25 Nov 1982, 40°42.0′N, 68°35.1′W, 58 m, rep. 1 (7, tiny, USNM 1750475).—**New York/New Jersey Bight:** coll. NOAA, Ocean Pulse Sta. 8, 40°21.8' N, 73°51.6'W, 24 m (1, MCZ IZ 172052). Port Liberty pipeline survey, coll. P. Neubert for AECOM, 19 Jan 2012, Sta. 17, 40°24.328′N, 73°31.497′W, 26 m (1, incomplete, MCZ IZ 172053).

Description *(based on new material).* Largest specimens with up to 63 setigers, 5 mm long, first few setigers narrow, 0.4 mm wide, middle region twice as wide up to 0.8 mm including parapodia, tapered again toward posterior end; juvenile specimens 1–1.5 mm long. Color in ETOH creamy white or yellowish, eyes red. Palps with broadly rounded, wide bases fused on proximal half, smaller conical section with tapered distal tip (Fig. 18A); distal sections may be turned ventrally leaving only basal portion visible dorsally (Fig. 18B); large accessory papilla on basal portion near beginning of conical section (Fig. 18B). Prostomium rectangular, nearly twice as wide as long, with small anterior medial peak and corresponding posterior indentation; four dark red eyes arranged in open square, anterior pair close to base of palps, usually smaller than posterior pair (Fig. 18A). Median prostomial antenna smooth or slightly wrinkled, reaching to setigers 8–10, up to 3–5 times length of club-shaped, lateral antennae (Figs 18A; 20B). Peristomium clearly demarcated, shorter than setiger 1, with two pairs smooth tentacular cirri similar to lateral prostomial antennae, ventral pair slightly wider, shorter, than dorsal pair (Fig. 18B). Pharynx unarmed, sometimes dark (Fig. 18A, B), without papillae but sometimes with thickened nodes of tissue near rim of proboscis (Fig. 18B). Proventricle cylindrical, with indistinct junction with pharynx (Figs 18A; 20A, B) but slightly tapered at posterior end, extending through 8–11 setigers (depending on size of specimen), with about 60–80 indistinct muscle cell rows, no medial raphe (Fig. 18A, B). Parapodia short, square, blunt in first few setigers (Figs 18A, C; 20B), becoming longer, rectangular, through middle setigers, slightly narrowed distally in posterior setigers; with small clear lobe or papilla on distal dorsal edge, largest in middle setigers (Figs 18D; 20D). Dorsal cirri short, club-shaped, smooth, for at least half or more of body (Fig. 18A, D) but some posterior cirri with 4–5 articles, each with one or two dark golden inclusions (Fig. 18G; 20A). Ventral cirri inserted in middle of parapodium, with wide base and tapered, digitiform tip, shortest on setiger 1, rapidly increasing in length over next setigers, extending beyond parapodia throughout (Fig. 18C, D, F). Pygidium rounded or somewhat triangular, with short median cirrus robust at base, tapering to tip (Fig. 18F, G); lateral anal cirri exceedingly long, curled, twisted, often lost (Fig. 18G). Internal glands in middle and posterior setigers near base of parapodia (Fig. 20E).

Acicula one per parapodium, distinctively enlarged in anterior third of body, setigers 2 through 20–23 with dome-shaped cap surrounded by narrow lip or rim (Figs. 18C; 20C, D); in 55-setiger specimen (USNM 1750470) largest cap dimension 8 µm in setiger 1, 13–14 µm in setigers 2–3, 20 µm in setigers 4–11, 23–24 µm in setigers 12–18, 20 µm in setiger 19–20; thereafter becoming smaller, thinner, with flat oval cap measuring 10 µm across

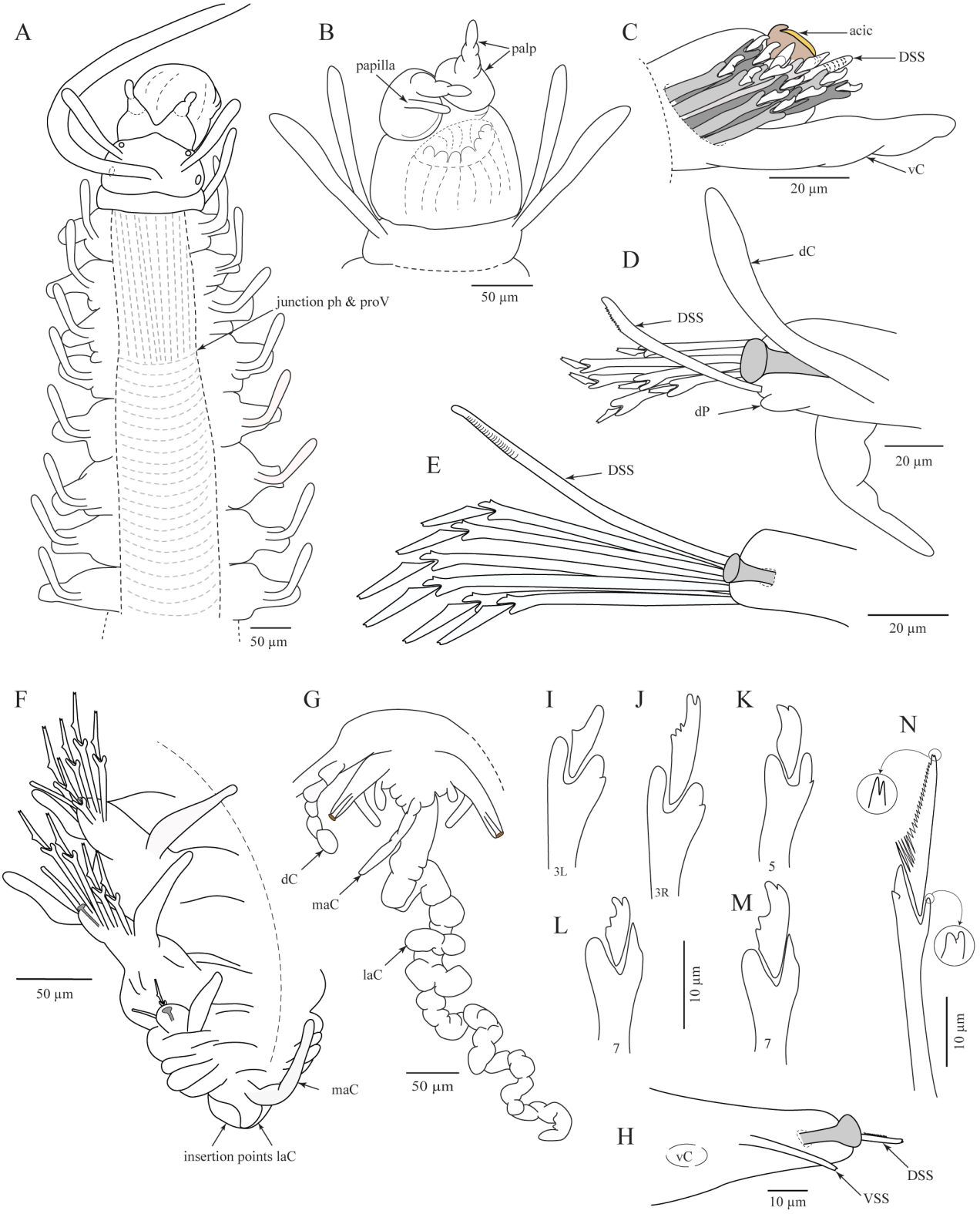

FIGURE 18. *Streptosyllis varians* Webster and Benedict, 1887. A, anterior end, dorsal view; B, prostomium and peristomium, ventral view; C, setiger 5, ventral view; D, setiger 23, dorsal view; E, setiger 38, dorsal view (cirri not shown); F, setigers 53–55 and pygidium, dorsolateral view; G, pygidium and anal cirri (one lateral cirrus lost); H, last parapodium with ventral simple seta, dorsal view; I–M, compound setae, lateral view, setigers indicated; N, compound seta, middle setiger 39. Abbreviations: acic–aciculum, dC–dorsal cirrus, dP–dorsal papilla, DSS–dorsal simple seta, ph–pharynx, proV–proventricle, L–left side, laC–lateral anal cirrus, maC–median anal cirrus, R–right side, set–setiger, vC–ventral cirrus, VSS–ventral simple seta. A: USNM 1750470; B, I–M: MCZ IZ 172052; C–G, N: USNM 1750471.

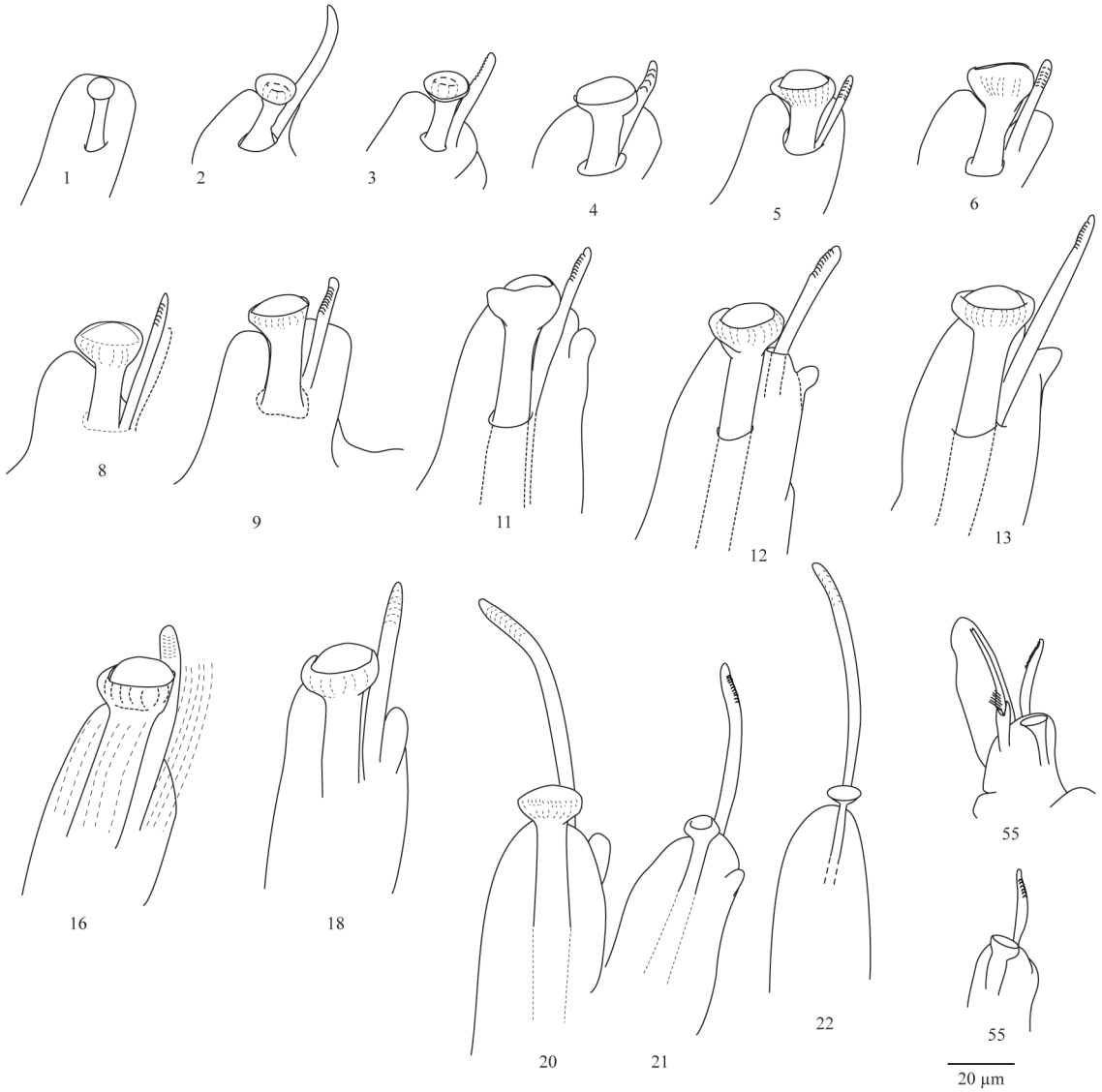

FIGURE 19. *Streptosyllis varians* Webster and Benedict, 1887. Acicula and dorsal simple setae from setigers as indicated. All from USNM 1750470.

through remaining setigers (Fig. 19). Dorsal simple setae present in all setigers from setiger 1, positioned in close association with acicula (Figs 18C–E; 19); one (rarely two) per setiger, thick, with blunt tip, clearly serrated on distal half; measuring 30 µm in first several setigers, gradually becoming longer, thinner, up to 75–80 µm in middle and posterior setigers, 20–30 µm in pre-pygidial setigers; with minute bifid tip in posterior setigers. Ventral simple seta in last setiger of some specimens, similar to dorsal simple seta, with minute bifid tip (Fig. 18H). Compound setae numbering 12–16 per fascicle in setigers with enlarged acicula (Fig. 18C), reduced to 4–6 per fascicle in setigers with smaller acicula (Fig. 18D, E). Shafts of compound setae shorter, homogomph or nearly so in anterior setigers, up to 50 µm long, one prong with small subdistal tooth, opposite prong oval, smoothly rounded (Fig. 18I–M); posterior setigers with longer, thinner, hetero- or hemigomph shafts up to 80 µm long, with small subdistal tooth or flange, flange more pronounced in posterior setigers (Fig. 18N); opposite shorter prong with two very small side-by-side points or teeth, not visible in lateral view (Fig. 18N, inset). All compound setae with short falcigerous blades; anterior blades up to 10 µm long, middle third of body with blades mostly 20 µm long (some 12–16 µm), posterior blades up to 25–26 µm long; blades in first setigers may appear smooth or with minute serrations, with one smaller distal tooth on convex side slightly below tip (Fig. 18I–M); posterior blades with deep basal and short distal serrations, subequal distal teeth side-by-side (Fig. 18N, inset). All setae lack hoods.

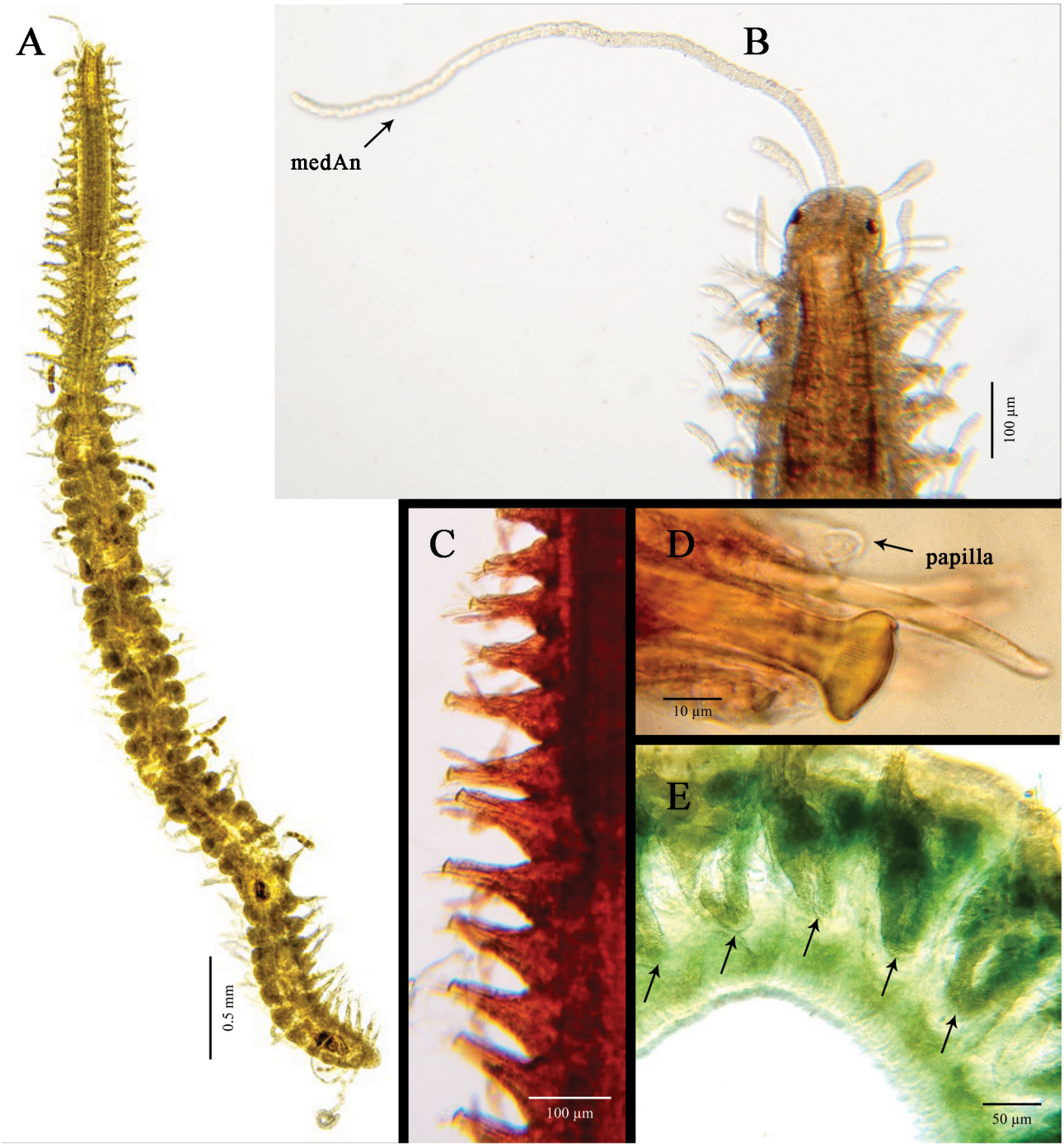

FIGURE 20. *Streptosyllis varians* Webster and Benedict, 1887. A, 55-setiger specimen, dorsal view, montage of entire worm; B, 63-setiger specimen, dorsal view, anterior end with long medial prostomial antenna; C, acicula, setiger 2 to setiger 13, dorsal view, left side of specimen; D, setiger 8, dorsal papilla, dorsal simple seta, and aciculum; E, middle setigers, stained with Methyl Green, unlabeled arrows indicate internal glands. A—D stained with Shirlastain A. Abbreviations: medA–median antenna. A, C–D: USNM 1750470; B: USNM 1750471; E: USNM 1750472.

Reproduction. Reproductive individuals with larger eyes, sometimes doubled in size. No natatory setae were observed, although such setae were noted for both males and females by Webster & Benedict (1887:719).

Methyl Green staining pattern. MG stain generally not retained, small glandular areas at base of parapodia retain stain the longest. No stain associated with pharynx or proventricle.

Remarks. *Streptosyllis varians* is unique among *Streptosyllis* species, having acicula with greatly enlarged tips in 20 or more setigers, roughly the anterior third of the body, rather than those being restricted to four or five

anterior setigers. The acicula, which have an elevated dome-like central area surrounded by an obvious rim, are golden in color and are so large in relation to the parapodia that they are obvious even at low power on a dissecting microscope, especially if the animal is viewed laterally. Also, the middle prostomial antenna is exceedingly long, as are the lateral anal cirri. In the original description, Webster & Benedict (1887:719) described the pharynx as "terminat(*ing*) in front in a circle of triangular papillae"; however, in the present study, papillae were not observed on the several specimens in which the pharynx was everted, although some areas of puckering or thickened tissue were noted. Apart from this detail of the proboscis and the lack of natatory setae, the new material agrees well with the description and illustrations by Webster & Benedict (1887).

The record of this species from France (Saint-Joseph 1895) was rejected by Southern (1914) because, among other distinguishing characteristics, it has "very thick" acicula in the first setiger and those thick acicula are limited to only a few anterior setigers, unlike *Str. varians* where they start from setiger 2 and continue for several setigers. Fauvel (1923), however, repeated Saint Joseph's record. Based on a single report (Marinov 1966), *Str. varians* was implicated as an invasive species in the Black Sea (Skolka & Preda 2010) or cryptogenic (Băncilă *et al.* 2022); as with *Str. arenae* (see Faulwetter *et al.* 2008 re *S. nunezi*), single distant reports are probably a misidentification.

Habitat. The type locality of *Streptosyllis varians* was reported as coarse sand and gravel (Webster & Benedict 1877) and the new material is from similarly sandy sediments.

Distribution and depth records. Type locality: West Quoddy, Maine, low water. Reported from Gulf of St. Lawrence, Gulf of Maine, Georges Bank off Massachusetts, Long Island Sound (New York), low water to 66 m.

Streptosyllis verrilli (Moore, 1907)

Figures 21–22

Syllides verrilli Moore, 1907:448–451, figs 1–2. —McIntosh 1911; Banse 1971: 1475–1476, fig. 4.
Streptosyllis verrilli (Moore, 1907): Sardá & San Martín 1992: 408–412, figs 1–3.
Syllides setosa—Pettibone 1963: 126 (not *S. setosa* Verrill, 1882). *Fide* Banse 1971.

Material examined. *(5 specimens from 3 stations)* **Northwest Atlantic Ocean. —New York/New Jersey Bight, Raritan Bay, off New Jersey.** coll. AECOM, 15 August 2008, Sta. 5A, 40°28.651′N, 74°11.233′W, 6 m, (2, MCZ IZ 172054). Sta. 7A, 40°28.931′N, 74°09.006′W, 6 m (2, MCZ IZ 172055). Sta. 9B, 40°28.684′N, 74°06.749′W, 6.8 m, (1, MCZ IZ 172056).

Description *(based on new material).* Body very small, complete specimens 1.5–2 mm long, 0.3 mm wide with parapodia for 25–26 setigers. Palps exceedingly small, not visible dorsally, reduced to two tiny papillae on ventral side of prostomium (Figs 21A; 22A). Prostomium only slightly wider than long, with rounded corners and anterior margin, straight posterior margin; four large, lensed eyes in open trapezoidal arrangement and two smaller anterior eyespots near bases of lateral antennae (Fig. 21A). Antennae short, club-shaped, roughly wrinkled; median antenna slightly longer than lateral antennae. Peristomium with two pairs of club-shaped tentacular cirri inserted on basal cirrophores at anterior edge, ventral pair slightly shorter than dorsal pair (Fig. 21A); peristomial inclusions few and indistinct. Nuchal organs visible dorsally as heavily ciliated area between prostomium and peristomium. Pharynx unarmed, occupying about three setigers, with 10 large, rounded papillae surrounding mouth; proventricle in four or five segments, barrel-shaped, muscle cell rows indistinct, ca. 46–50, junction with pharynx indistinct, slightly pinched at point where it meets the intestine, no medial raphe (Figs 21A; 22A). Parapodia rectangular, becoming elongated in middle and posterior setigers (Fig. 22B), distal bump or papilla providing somewhat pointed appearance to anterior edge of middle setigers. Dorsal cirri with basal cirrophore, relatively short, club-shaped, mostly smooth or wrinkled, some posterior cirri distinctly articulated, with dark golden inclusions. Ventral cirri inserted midway to distally along parapodium, broad at base, tapered distally, as long as or slightly longer than parapodial lobe (Fig 21E). Venter with row of small circular patches between parapodial bases on setigers 1–13 or 14 (Fig. 22E). Pygidium with one short medial ventral cirrus and two long lateral cirri.

Acicula one per parapodium, each with distally expanded tip, thickened and enlarged on setigers 2–6, cap width measuring ca. 3 µm in setiger 1, ca. 5 µm in setiger 2, ca. 7 µm in setigers 3–5; ca. 4 µm in setiger 6, acicula thereafter becoming thinner, with cap measuring ca. 3–4 µm through remaining setigers (Fig. 21B). Dorsal simple seta from setiger 1, one per parapodium, serrated subdistally, strongly bidentate with equally large, rounded teeth at oblique angle (rather than teeth side-by-side or above/below), seta thicker and more clearly bifid in anterior setigers,

longer and thinner in posterior setigers (Fig. 21C–G). Compound setae hemigomph, shafts with distinct subdistal tooth on longer side, numbering 8–10 in setiger 1, 15–20 in setigers 2–6, gradually reduced thereafter to 8–12 in middle setigers and 2–6 in far posterior setigers. All parapodia with two or three setae with long spiniger-like blades 55–70 µm in length, remainder with shorter falcigerous blades 16–24 µm long in anterior setigers, 20–35 µm long in posterior setigers; all blades serrated along entire length, with slightly truncate, bidentate tips. Ventral simple seta on last setiger, slender, bifid, ca. 50 µm long. All setae lack hoods.

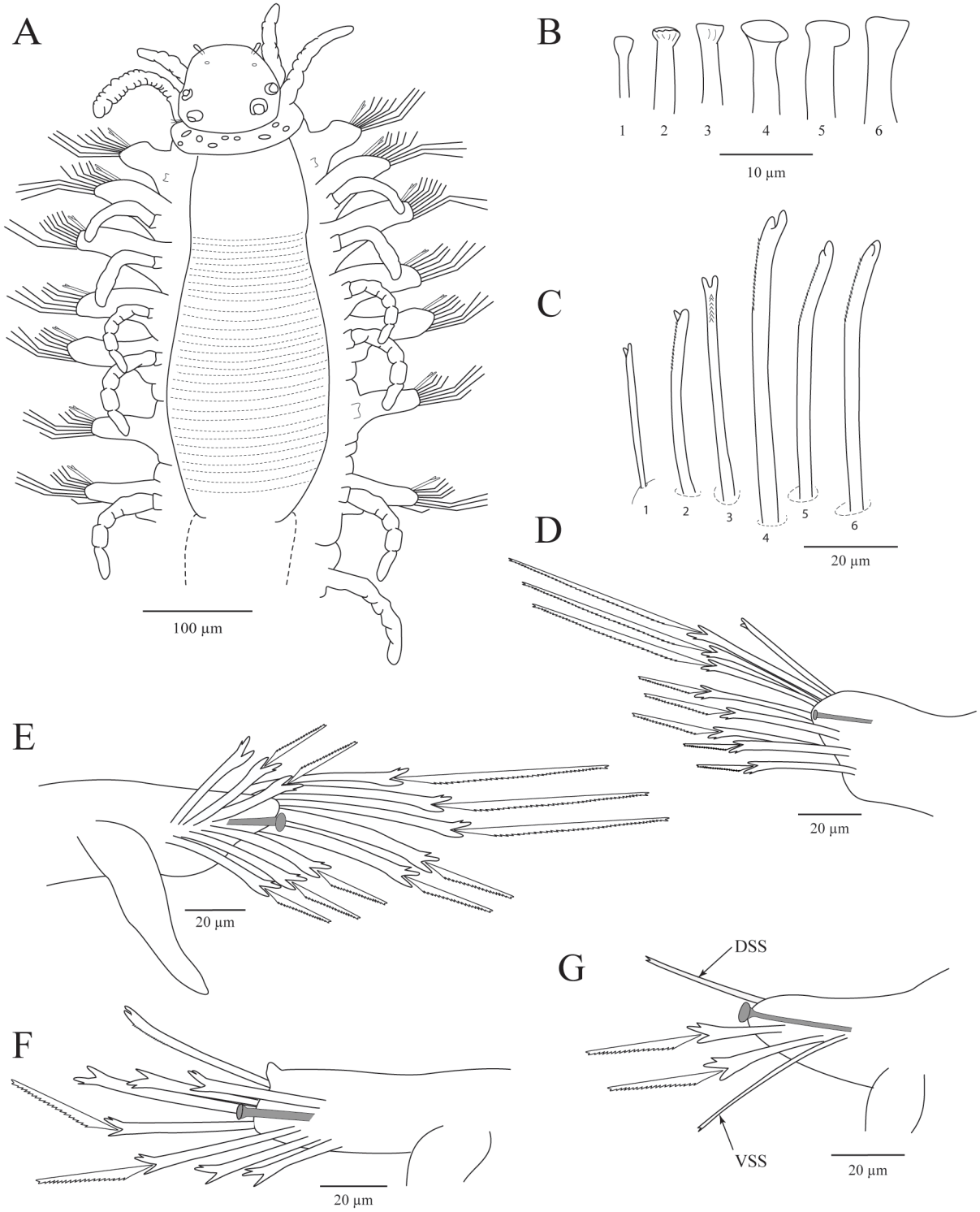

FIGURE 21. *Streptosyllis verrilli* (Moore, 1907). A, anterior end, dorsal view, prostomial antennae not shown; B, acicula setigers 1–6 as labeled; C, dorsal simple setae, setigers 1–6 as labeled; D, setiger 1, ventral view; E, setiger 2, ventral view; F, setiger 11, ventral view; G, last segment, setiger 25, ventral view. A–G: MCZ IZ 172054.

FIGURE 22. *Streptosyllis verrilli* (Moore, 1907). A, anterior end, dorsal view; B, middle parapodia, right side, dorsal view; C–D, distal tips of dorsal simple setae; E, ventral view, anterior end showing rows of "dots" between parapodial bases, stained with MG. A–E: MCZ IZ 172054.

Reproduction. Gametes present from post-proventricular segments. Sardá & San Martín (1992) documented a one-year monotelic life cycle for this species in a Massachusetts salt marsh.

Methyl Green staining pattern. MG dissipates almost entirely except for areas at the base of the parapodia in middle setigers and rows of small circular patches between parapodial bases on setigers 1–13 or 14 of ventral surface. Shirlastain A also highlights these small patches.

Remarks. *Streptosyllis verrilli* was originally placed in the genus *Syllides* by Moore (1907), who described it from a specimen taken near Woods Hole, Massachusetts. It was synonymized by Pettibone (1963) with *Syllides setosa* Verill, but that synonymy was rejected by Banse (1971), who redescribed the species from new material. Based on the enlarged acicular tips in setigers 2–6, Sardá & San Martín (1992) transferred it to *Streptosyllis*. Sardá & San Martín (1992) considered the species endemic to the area south of Massachusetts, given that earlier reports of the species were limited to that area (e.g., Banse 1971; Whitlatch 1977); the current records support that distribution.

Some minor differences exist among the various descriptions of this limited material. Although Moore described the peristomium as nearly indistinguishable dorsally, both Banse (1971) and Sardá & San Martín (1992) found the

peristomium to be well defined, with inclusions that sometimes extended dorsally to the prostomium; in the present specimens the anterior margin of the peristomium is distinct, but inclusions are few and faint. Moore (1907:450) described the distal end of the compound shafts as "deeply unequally bifid" (*i.e.*, heterogomph) whereas Sardá & San Martín (1992) labeled them hemigomph or with slightly unequal prongs; those of the present material appeared hemigomph when viewed laterally. Sardá & San Martín (1992) illustrated slightly larger acicular tips than measured in this study and reported a few more muscle cell rows (55) compared to the estimated 46–50 in the present material. Additionally, using SEM, Sardá & San Martín (1992) documented a double papilla on the distal end of the middle parapodia rather than the single papilla seen here in lateral view. The ventral areas that might be glandular patches are newly reported here.

Streptosyllis verrilli is easily separated from other current members of the genus in having obviously bidentate dorsal simple setae. At low magnifications, these setae appear to have a "fishtail" distal end, but under higher power (1600X), the tip is seen to have two teeth at an oblique angle to each other. Sardá & San Martín (1992, p. 411, fig. 3-6) provided an SEM of this seta showing this angle more clearly than can be seen in light microscopy.

Habitat. *Streptosyllis verrilli* is found in salt marshes and silty-sand sediments in low water.

Distribution and depth records. Type locality: Woods Hole, Massachusetts. Reported from south of Cape Cod, Massachusetts, and the New York Bight off New York; intertidal to ca. 7 m.

Syllides Örsted, 1845

Type species: *Syllides longocirratus* Örsted, 1845.

Diagnosis *(modified from San Martín 2003)***.** Palps large, rounded, fused basally, visible dorsally, with accessory papilla midway on ventrolateral surface. Pharynx unarmed, with or without papillae subdistal to smooth rim. Nuchal organs as ciliated grooves between prostomium and peristomium. Prostomial antennae, tentacular cirri, and dorsal cirri of setigers 1 and 2 smooth, club-shaped or fusiform; dorsal cirri from setiger 3 onward may be distinctly articulated or nearly smooth, often with glandular inclusions in articles. Ventral cirri leaflike or digitiform, sometimes long, especially posteriorly. Acicula not enlarged, with flattened or narrowly pointed tips. Compound setae heterogomph with bidentate blades. Dorsal simple setae present, of one shape; ventral simple setae present or absent. Hoods absent on blades of compound setae, may be present on dorsal simple setae. Reproduction by epigamy; some species brood eggs ventrally.

Remarks. *Syllides longocirratus* Örsted, 1845, the type-species of the genus, was based on a specimen from the Oslo Fjord in Norway but initially was incompletely described. In spite of the lack of a good description, or perhaps because of this, the species was widely reported from Europe (e.g., Langerhans 1879; Saint Joseph 1887; Fauvel 1923; Eliason 1962; Hartmann-Schröder 1996) as well as Australia (Augener 1913; Haswell 1920), South Africa (Day 1960, 1967), and the east coast of the United States (Webster & Benedict 1887; Pettibone 1963). Most of those records were rejected by Banse (1971), who accepted only the records of Eliason (1962) from the Skagerrak and Webster & Benedict from Maine, USA; he also reported *Syl. longocirratus* from Washington State in the northeastern Pacific. Lucas *et al.* (2018) obtained new material from near the type locality and provided a definitive description; they rejected most previous records, including Banse's (1971) from Maine and Washington State and restricted the distribution of the species to Norway and Sweden. Several records of *Syl. longocirratus* from Canada and the northeast coast of North America were shown to belong to a different genus and species (Olivier *et al.* 2013, see *Streptospinigera*, above). Currently, about 22 species are considered valid in the genus *Syllides*, which, according to a note in WoRMS, is a masculine gender and requires a masculine ending to species names (Read & Fauchald 2025).

Four species were originally described from New England and two species*, Syl. bansei* Perkins, 1981 and *Syl. floridanus* Perkins, 1981, were described from farther south along the U.S. Atlantic coast. Although *Syl. japonicus* Imajima, 1966 has been reported locally since Banse (1971) referred some New England specimens to that species, Perkins (1981) thought they might represent a distinct species and Riser (1997) thought those records were referable to *Syl. setosus* Verrill, 1882. Based on available published information and new material, Riser's (1997) conclusion is the more likely and *Syllides setosus* is redescribed below. A new species, *Syllides profundus* **sp. nov.**, is described from deep water off North Carolina. The following species are included in this study:

1. *Syllides benedicti* Banse, 1971
2. *Syllides convolutus* Webster & Benedict, 1884
3. *Syllides eburneus* Riser, 1997
4. *Syllides profundus* **sp. nov.**
5. *Syllides setosus* Verrill, 1882

***Syllides benedicti* Banse, 1971**

Figures 23–24

Syllides benedicti Banse, 1971: 1478–1479, fig. 6—Riser 1997; ?San Martín 2003.
Syllides sp. A.—Maciolek-Blake *et al.* 1985.

Material examined. *(Holotype plus 321 new specimens from 23 stations)* **Northwest Atlantic Ocean—Maine**. **Holotype** (USNM 384).—**Massachusetts Bay**. coll. AECOM for MWRA, Sta. NF13, target location: 42°23.40′N 70°49.35′W, 33.8 m, August 2009 (4, MCZ IZ 172057).—**New York/New Jersey Bight.** Port Liberty offshore pipeline project, coll. P. Neubert for AECOM, Sta. 27B, Aug 2008, 40°21.515′N, 73°54.353’W, 21 m (9, MCZ IZ 172058); 11 Feb 2012, Sta. 13, 40°26.74′N, 73°34.77′W, 23.9 m (1, MCZ IZ 172059); Sta. 15A, 40°25.535′N, 73°33.132′W, 25.4 m (1, MCZ IZ 172060); Sta. 19, 40°23.118′N, 73°29.861′W, 27.1 m (1, MCZ IZ 172061); Sta. 23, 40°20.70′N, 73°26.59′W, 31.8 m (2, MCZ IZ 172062); Sta. 25, 40°20.45′N, 73°24.42′W, 31.0 m (4, MCZ IZ 172063); Sta. 28, 40°20.00′N, 73°25.54′W, 32.9 m (5 plus pf, MCZ IZ 172064);—**off Jones Beach,** wind park survey, coll. I.P. Williams for ENSR, 26 Aug 2005, Sta. 28, 40°33.71’N, 73°19.44’W, 19.6 m, rep. 1 (2, MCZ IZ 172065).—**off Massachusetts, Georges Bank**. GBMP Sta. 1, coll. M. Rawson, Chief Scientist, Cruise M1, R/V Eastward, Jul 1981, 41°13.0′N, 67°15.3′W, depth not recorded, rep. 1 (1, USNM 1750484); coll. G. Hampson, Chief Scientist, Cruise M10, R/V *Oceanus*, 15 Nov 1983, 41°13.0′N, 67°15.3′W, 55 m, rep. 3 (1, USNM 1750485), Cruise M11, R/V *Oceanus*, 3 Feb 1984, 41°13.0′N, 67°15.3′W, 70 m, rep. 1 (1, USNM 1750486). Sta. 2, 79 m, coll. M. Rawson, Chief Scientist, Cruise M2, R/V *Oceanus*, 14 Nov 1981, 41°00.0′N, 67°57.4′W, depth not recorded, rep. 1 (4, USNM 1750487); coll. G. Hampson, Chief Scientist, Cruise M4, R/V *Cape Henlopen*, 12 May 1982, 40°59.1′N, 66°55.9′W, 66 m, rep. 2 (4, USNM 1750488), Cruise M6, R/V *Oceanus*, 21–22 Nov 1982, 40°59.2′N, 66°55.9′W, 71 m, rep. 4 (1, USNM 1750489), rep. 6 (2, USNM 1750490); Cruise M9, R/V *Gyre*, 14 Jul 1983, 40°59.0′N, 66°55.8′W, 79 m, rep. 1 (1, USNM 1750491), rep. 2 (1, USNM 1750492); Cruise M10, R/V *Oceanus*, 15 Nov 1983, 40°59.0′N, 66°55.8′W, 79 m, rep. 1 (3, USNM 1750493), rep. 2 (4 plus pf, USNM 1750494), rep. 3 (1 in 2 pieces, USNM 1750495), rep. 4 (3, USNM 1750496), rep. 5 (4, USNM 1750497); Cruise M11, R/V *Oceanus*, 3 Feb 1984, 40°59.0′N, 66°55.8′W, 79 m, rep. 1 (1 in 2 pieces, USNM 1750498), rep. 6 (1, USNM 1750499); Cruise M12, R/V *Gyre*, 4 Jun 1984, 40°59.0′N, 66°55.8′W, 79 m, rep. 2 (3, USNM 1750500), rep. 6 (1, USNM 1750501). Sta. 3, coll. G. Hampson, Chief Scientist, Cruise M4, R/V *Cape Henlopen*, 12 May 1982, 40°53.7′N, 66°46.5′W, 90 m, rep. 5 (1, USNM 1750502), rep. 6 (2, USNM 1750503); Cruise M5, R/V *Oceanus*, 23 Jul 1982, 40°53.7′N, 66°46.5′W, 93 m, rep. 4 (2, USNM 1750504), rep. 5 (2 + pf, USNM 1750505); Cruise M9, R/V *Gyre*, 15 Jul 1983, 40°53.7′N, 66°46.5′W, 100 m, rep. 6 (2, USNM 1750506); Cruise M10, R/V *Oceanus*, 15 Nov 1983, 40°53.7′N, 66°46.5′W, 100 m, rep. 1 (6, USNM 1750507), rep. 3 (1, USNM 1750508); Cruise M12, R/V *Gyre*, 4 Jun 1984, 40°53.7′N, 66°46.5′W, 100 m, rep. 4 (2, USNM 1750509), rep. 5 (1, USNM 1750510). Site-specific array: Sta. 5 (5-1), coll. G. Hampson, Chief Scientist, Cruise M10, R/V *Oceanus*, 16 Nov 1983, 40°39.5′N, 67°46.2′W, 84 m, rep. 4 (11, USNM 1750511); Cruise M12, R/V *Gyre*, 5 Jun 1984, 40°39.5′N, 67°46.2′W, 84 m, rep. 5 (5, USNM 1750512); Cruise M13, R/V *Oceanus*, 22 May 1985, rep. 1, 40°39.5′N, 67°46.05′W, 76 m (12, USNM 1750513), rep. 2, 40°39.4′N, 67°46.02′W, 76 m (13, USNM 1750514), rep. 4, 40°39.4′N, 67°46.03′W, 76 m (3 [g], USNM 1750515). Sta. 5-2, coll. G. Hampson, Chief Scientist, Cruise M6, R/V *Oceanus*, 22–23 Nov 1982, 40°39.6′N, 67°45.6′W, 78 m, rep. 3 (2, USNM 1750516); Cruise M8, R/V *Gyre*, 17 May 1983, 40°39.6′N, 67°45.9′W, 80 m, rep. 1 (3 [g], USNM 1750517); rep. 6 (2 specimens, USNM 1750518). Sta. 5-4, coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 40°39.5′N, 67°46.5′W, depth not recorded, rep. 1 (1, USNM 1750519); Cruise M2, R/V *Oceanus*, 19 Nov 1981, 40°39.5′N, 67°46.5′W, depth not recorded, rep. 3 (3, USNM 1750520), rep. 4 (4, USNM 1750521), rep. 5 (2 specimens, USNM 1750522), rep. 6 (5, USNM 1750523); coll. G. Hampson, Chief Scientist, Cruise M3, 15–16 Feb 1982, 40°39.5′N, 67°46.5′W, 80 m, rep. 1 (16, USNM 1750524), rep. 2 (4, USNM 1750525), rep 5 (3, USNM 1750526). Sta. 5-8, coll. G. Hampson, Chief Scientist, Cruise M10, R/V *Oceanus*, 16 Nov 1983,

40°40.1′N, 67°46.1′W, 80 m, rep. 3 (1 [g], USNM 1750527). Sta. 5-9, coll. G. Hampson, Chief Scientist, Cruise M4, R/V *Cape Henlopen*, 14 May 1982, 40°39.9′N, 67°46.5′W, 65 m, rep. 3 (14, USNM 1750528). Sta. 5-10, Cruise M8, R/V *Gyre*, 18 May 1983, 40°39.4′N, 67°46.9′W, rep. 2 (2, USNM 1750529), rep. 4 (3, USNM 1750530). Sta. 5-11, coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 40°39.5′N, 67°46.6′W, depth not recorded, rep. 2 (4, USNM 1750531). Sta. 5-14, coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 40°39.5′N, 67°44.7′W, depth not recorded, rep. 4 (1, USNM 1750532). Sta. 5-16, coll. G. Hampson, Chief Scientist, Cruise M8, R/V *Gyre*, 18 May 1983, 40°39.6′N, 67°47.6′W, 82 m, rep. 6 (4, USNM 1750533). Sta. 5-18, coll. G. Hampson, Chief Scientist, Cruise M4, R/V *Cape Henlopen*, 15 May 1982, 40°39.6′N, 67°47.6′W, 70 m, rep. 2 (6, USNM 1750534); Cruise M8, R/V *Gyre*, 18 May 1983, 40°39.6′N, 67°47.6′W, 82 m, rep. 3 (7 [2 n], USNM 1750535); Cruise M10, R/V *Oceanus*, 17 Nov 1983, 40°39.6′N, 67°47.6′W, 84 m, rep. 3 (7, USNM 1750536). Sta. 5-20, coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 40°38.5′N, 67°46.1′W, depth not recorded, rep. 4 (1, USNM 1750537), rep. 5 (1, USNM 1750538). Sta. 5-28, coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 40°39.5′N, 67°41.9′W, depth not recorded, rep. 2 (2, USNM 1750539). Sta. 6, coll. G. Hampson, Chief Scientist, Cruise M11, R/V *Oceanus*, 4 Feb 1984, 40°34.3′N, 67°45.3′W, 102 m, rep.1 (1, USNM 1750540). Sta. 7, coll. M. Rawson, Chief Scientist, Cruise M2, R/V *Oceanus*, 11 Nov 1981, 40°28.8′N, 67°43.2′W, depth not recorded, rep. 3 (1, USNM 1750541); coll. G. Hampson, Chief Scientist, Cruise M3, R/V *Endeavor*, 17 Feb 1982, 40°28.8′N, 67°43.2′W, 152–181 m, rep. 6 (1, USNM 1750542). Sta. 8, coll. M. Rawson, Chief Scientist, Cruise M2, R/V *Oceanus*, 11 Nov 1981, 40°27.1′N, 67°37.4′W, depth not recorded, rep. 4 (1, USNM 1750543); coll. G. Hampson, Chief Scientist, Cruise M5, R/V *Oceanus*, 23–24 July 1982, 40°27.1′N, 67°37.4′W, 140 m, rep. 3 (1, USNM 1750544); Cruise M8, R/V *Gyre*, 16 May 1983, 40°27.1′N, 67°37.4′W, 146 m, rep. 1 (1, USNM 1750545); Cruise M11, R/V *Oceanus*, 3 Feb 1984, 40°27.1′N, 67°37.4′W, 152 m, rep. 6 (1, USNM 1750546). Sta. 10, coll. M. Rawson, Chief Scientist, Cruise M2, R/V *Oceanus*, 12 Nov 1981, 40°42.0′N, 68°35.3′W, depth not recorded, rep. 2 (3, USNM 1750547); coll. G. Hampson, Chief Scientist, Cruise M8, R/V *Gyre*, 20 May 1983, 40°42.0′N, 68°35.3′W, 62 m, rep. 5 (1, tiny, USNM 1750548); Cruise M9, R/V *Gyre*, 19 Jul 1983, 40°42.0′N, 68°35.3′W, 66 m, rep. 3 (1 af, USNM 1750549); Cruise M10, R/V *Oceanus*, 14 Nov 1983, 40°42.0′N, 68°35.3′W, 66 m, rep. 3 (2 tiny af, USNM 1750550); Cruise M12, R/V *Gyre*, 40°42.0′N, 68°35.3′W, 66 m, rep. 2 (1 small, USNM 1750551), rep. 4 (1, USNM 1750552). Sta. 12, coll. M. Rawson, Chief Scientist, Cruise M2, R/V *Oceanus*, 12 Nov 1981, 40°22.2′N, 68°30.2′W, depth not recorded, rep. 4 (1, USNM 1750553); coll. G. Hampson, Chief Scientist, Cruise M4, R/V *Cape Henlopen*, 16 May 1982, 40°22.2′N, 68°30.2′W, 110 m, rep. 4 (1, USNM 1750554); Cruise M5, R/V *Oceanus*, 27 July 1982, 40°22.2′N, 68°30.2′W, 98 m, rep. 1 (1, USNM 1750555), rep. 2 (1, USNM 1750556); Cruise M6, R/V *Oceanus*, 26 Nov 1982, 40°22.2′N, 68°30.2′W, 103 m, rep. 2 (1, USNM 1750557). Sta. 16, coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 40°34.2′N, 67°12.3′W, depth not recorded, rep. 4 (3, USNM 1750558), rep. 6, (1 specimen, USNM 1750559). Cruise M2, R/V *Oceanus*, 18 Nov 1983, 40°34.2′N, 67°12.3′W, 137 m, rep. 3 (1, USNM 1750560), rep. 4 (1, USNM 1750561), rep. 5 (1 af, USNM 1750562), rep. 6 (1, USNM 1750563); coll. G. Hampson, Chief Scientist, Cruise M3, R/V *Endeavor*, 17 Feb 1982, 40°34.3′N, 67°12.5′W, 141 m, rep. 2 (4, USNM 1750564), rep. 6 (1, USNM 1750565); Cruise M4, R/V *Cape Henlopen*, 12–13 May 1982, 40°34.3′N, 67°12.4′W, 140 m, rep. 2 (1, USNM 1750566), rep. 3 (1, USNM 1750567, plus 2 lost), rep. 4 (1 [g], USNM 1750568), rep. 5 (2 [1 g], USNM 1750569), rep. 6 (3 [1 g], USNM 1750570). Cruise M5, R/V *Oceanus*, 23 July 1982, 40°34.3′N, 67°12.4′W, 133 m, rep. 1 (1, USNM 1750571), rep. 2 (1, USNM 1750572), rep. 6, (1, tiny, USNM 1750573); Cruise M6, R/V *Oceanus*, 21 Nov 1982, 40°34.3′N, 67°12.4′W, 138 m, rep. 2 (1 af, USNM 1750574), rep. 3 (2, g, n, USNM 1750575), rep. 4 (1, tiny, USNM 1750576), rep. 6 (2 g, USNM 1750577); Cruise M7, R/V *Endeavor*, 9 Feb 1983, 40°34.3′N, 67°12.4′W, 143 m, rep. 1 (1, USNM 1750578), rep. 3 (1, USNM 1750579); Cruise M8, R/V *Gyre*, 16 May 1983, 40°34.3′N, 67°12.4′W, 139 m, rep. 5 (1, USNM 1750580); Cruise M9, R/V *Gyre*, 15 Jul 1983, 40°34.2′N, 67°12.3′W, 142 m, rep. 3 (2, USNM 1750581), rep. 4 (2, USNM 1750582). Cruise M10, R/V *Oceanus*, 15 Nov 1983, 40°34.2′N, 67°12.3′W, 142 m, rep. 3 (2, USNM 1750583). Cruise M11, R/V *Oceanus*, 3 Feb 1984, 40°34.2′N, 67°12.3′W, 142 m, rep. 1 (3 [1 g], USNM 1750584, plus 2 tiny, lost), rep. 6 (1, USNM 1750585); Cruise M12, R/V *Gyre*, 5 Jun 1984, 40°34.2′N, 67°12.3′W, 142 m, rep. 1 (1, USNM 1750586), rep. 4 (2, 1 af, USNM 1750587), rep 5 (1, g, USNM 1750588), rep. 6 (1, USNM 1750589). Sta. 17, coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 40°35.0′N, 67°11.7′W, depth not recorded, rep. 2 (2, USNM 1750590), rep. 6 (1 af, USNM 1750591); coll. G. Hampson, Chief Scientist, Cruise M3, R/V *Endeavor*, 18 Feb 1982, 40°34.9′N, 67°11.1′W, 142–145 m, rep. 3 (1 (g), USNM 1750592); Cruise M4, R/V *Cape Henlopen*, 12 May 1982, 40°35.0′N, 67°11.3′W, 130 m, rep. 2 (1, USNM 1750593), rep. 4 (1, USNM 1750594), rep. 5 (2, USNM

1750595); Cruise M5, R/V *Oceanus*, 23 Jul 1982, 40°35.0′N, 67°11.2′W, 135 m, rep. 4, (1, USNM 1750596), rep. 5 (1, USNM 1750597); Cruise M6, R/V *Oceanus*, 21 Nov 1982, 40°35.0′N, 67°11.2′W, 140 m, rep. 2 (1, USNM 1750598), rep. 5 (1, USNM 1750599); Cruise M7, R/V *Endeavor*, 9 Feb 1983, 40°35.0′N, 67°11.3′W, 144 m, rep. 4 (2, each in 2 pieces, USNM 1750600). Sta. 18, coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 40°33.5′N, 67°13.7′W, depth not recorded, rep. 6, (1, USNM 1750601); coll. G. Hampson, Chief Scientist, Cruise M3, R/V *Endeavor*, 17–18 Feb 1982, 40°33.5′N, 67°13.4′W, 145–147 m, rep. 2, (1, USNM 1750602), rep. 5 (1, USNM 1750603); Cruise M4, R/V *Cape Henlopen*, 13 May 1982, 40°33.5′N, 67°13.6′W, 150 m, rep. 6 (1, USNM 175064); Cruise M6, R/V *Oceanus*, 21 Nov 1982, 40°33.5′N, 67°13.6′W, 144 m, rep. 6 (1 af, USNM 1750605); Cruise M7, R/V *Endeavor*, 9 Feb 1983, 40°33.5′N, 67°13.5′W, 147 m, rep. 1 (1 af, USNM 1750606); Cruise M8, R/V *Gyre*, 16 May 1983, 40°33.5′N, 67°13.5′W, 141 m, rep. 5 (1, USNM 1750607).

Description. Type specimen 6.5 mm long, 0.4 mm wide, up to 70 segments; largest new material 5 mm long for 50 setigers (Georges Bank, Sta. 5-9, USNM 1750528), additional specimens 2 mm long, 0.3 mm wide for 31–34 setigers, small specimens 1–1.5 mm long, 0.2 mm wide for 14–27 setigers, smallest 0.5 mm long. Color in alcohol creamy white, some specimens with very dark purplish-red pharynx and similarly colored band at base of proventricle. Palps visible dorsally, large, broad, basally fused, with ventrolateral papilla about midway on exterior edge (Figs 23A; 24A, B). Prostomium rectangular, wider than long; two pairs large eyes, each with red rim and yellowish lens, or eyes may be smaller or faded in alcohol, absent on smallest specimens; largest reproductive specimens with additional pair of small eyespots present on anterior edge of prostomium near palps (Figs 23A; 24A, B); prostomium with three antennae, median antenna inserted between medial pair of eyes close to base of prostomium, much longer than lateral antennae, extending to setiger 4 on largest specimen; all antennae smooth or wrinkled, not articulated. Peristomium distinct, with round or oval inclusions; base of prostomium often also with inclusions; tentacular cirri two pairs, inserted on anterior edge of peristomium in slightly ventral position, dorsal pair slightly longer and thinner than ventral pair, both pairs with basal cirrophores, cirri plain or slightly wrinkled, not articulated (Figs. 23A; 24A, B, F). Dorsum and venter with anterior segments weakly triannulate (Fig. 24F), becoming biannulate after proventricle. Pharynx unarmed, often with reddish-brown pigment (Fig. 24B), with smooth rim and ca. 10 low, widely spaced papillae proximal to rim, these often not obvious even on everted proboscis. Proventricle cylindrical, in five to eight setigers depending on size of specimen, with ca. 50 muscle rows, no medial raphe, often with reddish-brown pigmented band at base (Figs 23A; 24A, B, E). Parapodia rectangular, shorter in anterior setigers, becoming larger, elongated, with bluntly rounded distal end (Figs 23A, H; 24B, D, G) developing anterior bump or protuberance from setiger three, this largest in middle setigers, persistent but less noticeable in posterior setigers (Fig. 24D). Dorsal cirri with basal cirrophores, cirri smooth on setigers 1–2 (through setigers 3 or 4 on smaller specimens); subsequent cirri may be articulated, with long proximal article and 8–12 additional articles with one or two golden inclusions per article (Figs 23A; 24A). Ventral cirri oval anteriorly, becoming longer, elliptical, then digitiform, straight with rounded tip, may exceed parapodia in last few setigers of larger specimens (Figs 23H; 24G). Pygidium rounded, with one short medial and two longer, curled lateral cirri, these often lost (Fig. 24G).

Aciculum one per parapodium, with flat tip ca. 3 μm wide in all setigers (Fig. 23B). Compound setae number 8–10 in anterior setigers, reduced to four to six in posterior setigers; all setae with heterogomph shafts with one or often two subapical spines on longer side (Fig. 23D–G); blades within one fascicle range from 15–28 μm in ventral position up to 65–75 μm in dorsal position; each fascicle with groups of two or three setae with blades of similar length (e.g., two or three short, two medium, and two long) (Fig. 23F); shortest blades serrated along length, with obvious bifid tip, slightly broader at base than other blades (Fig. 23F, G); medium length blades 40–50-μm long, some serrated at base, others with basal spine (Figs 23D; 24C); longest blades smooth or with minutely roughened edge (Fig. 23E); tips of medium and longest blades bifid, less pronounced than on shortest blades. Dorsal simple seta present from setiger 1, one, rarely two, per setiger, clearly serrated on distal third to half, ending in slightly rounded tip covered by small hood, hood appearing pleated or folded (Fig. 23C); simple seta up to 60 μm long in first few anterior setigers, becoming straighter and longer, up to 90–110 μm in middle setigers, becoming thinner, shorter, up to 40 μm in posterior setigers, without obvious hood in last setiger. Ventral simple seta observed in last setiger of complete specimens, much smaller and thinner than dorsal simple seta, with miniscule slightly rounded or pointed tip (Fig. 23H).

Reproduction. Reproductive specimens (n=9) from 80 m depth with gametes packed into greatly swollen bases of parapodia from setigers 11–15 (Fig. 24A, D), natatory setae beginning a setiger or two before the gametes

in setigers 10–11 or not present; specimens (n=9) from deeper stations (140–165 m) with gametes from setigers 8–10 (most often setiger 9), natatory setae from setiger 8, sometimes 9, or not present. Some mature specimens with additional pair of anterior eyespots not present in smaller specimens.

Methyl Green staining pattern. MG stain not retained.

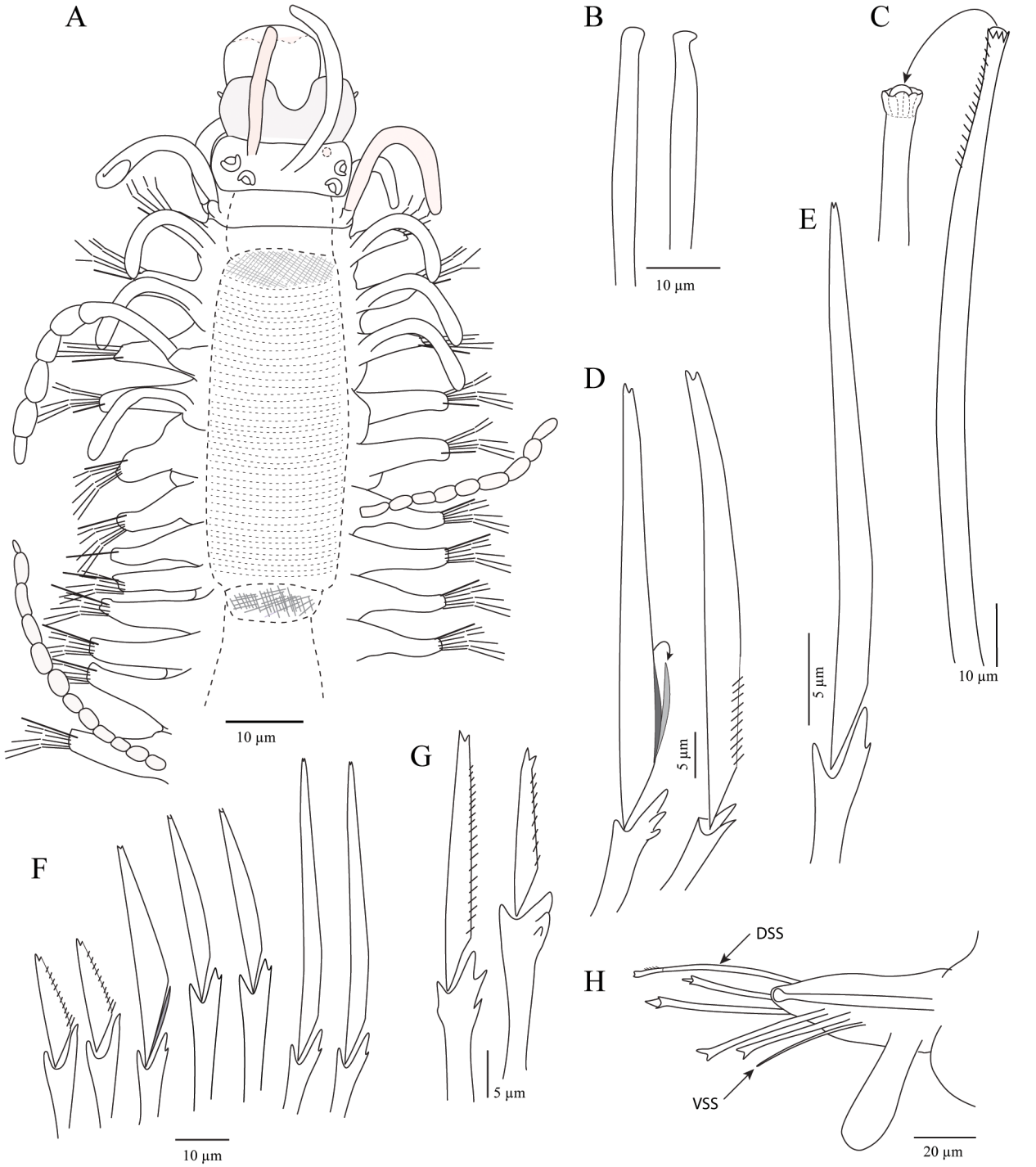

FIGURE 23. *Syllides benedicti* Banse, 1971. A, Anterior end, dorsal view; B, acicula, setiger 6 (left) and middle setiger (right); C, dorsal simple seta from middle setiger, inset not to scale; D, medium length blades; E, longest blade; F, fascicle of compound setae; G, shortest blades; H, setiger 50 of 50, ventral view, blades of compound setae not indicated. Abbreviations: DSS–dorsal simple seta, VSS–ventral simple seta. A, B, D, G: USNM 1750536; C: USNM 1750528; E–F: USNM 1750527; H: USNM 1750511.

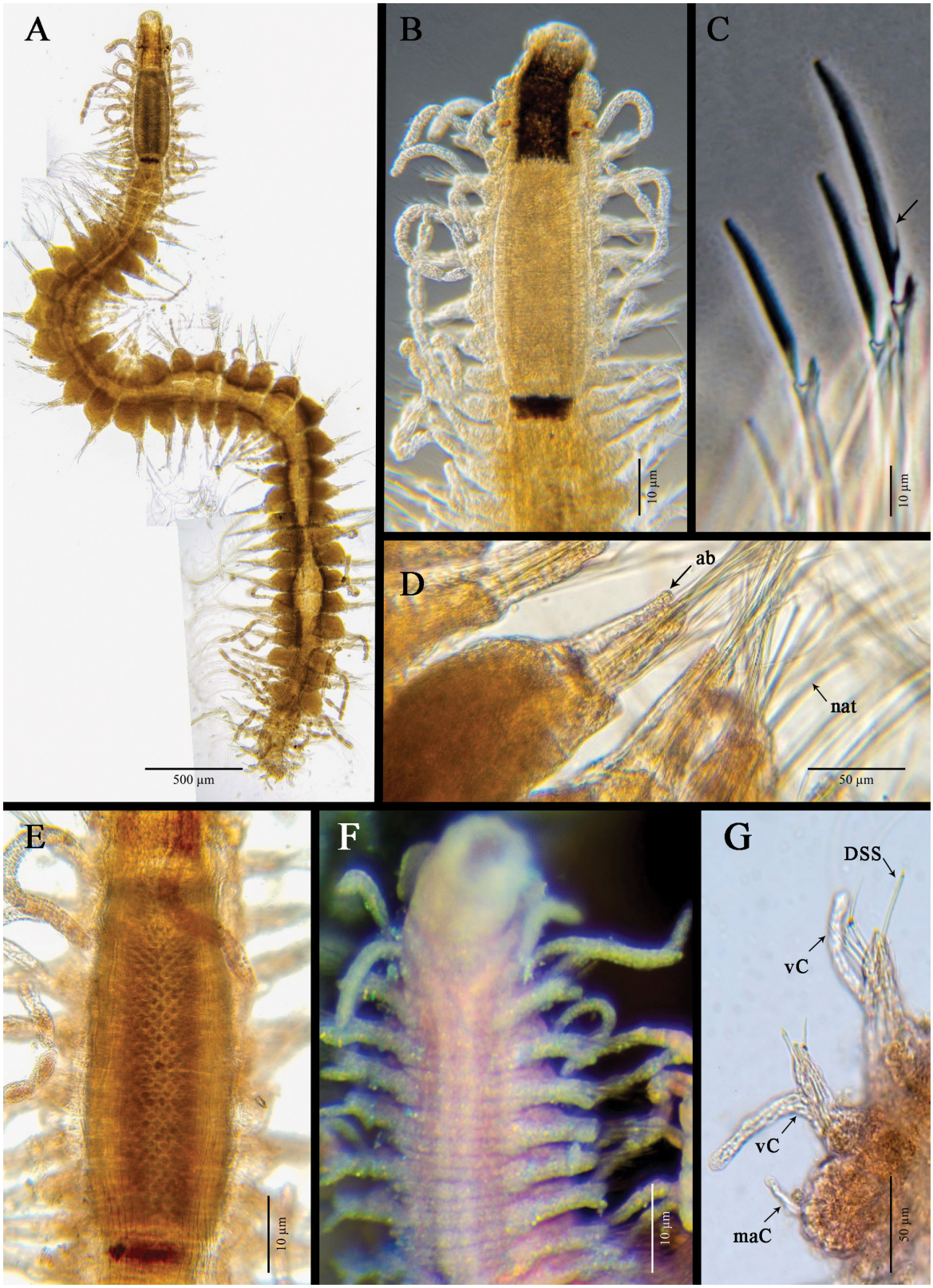

FIGURE 24. *Syllides benedicti* Banse, 1971. A, whole body, dorsal view, montage of entire specimen; B, anterior end, dorsal view, showing dark pharynx and band at base of proventricle; C, compound setae, setiger, arrow indicates basal spine/thickened edge of blade; D, setigers 19–22, arrow indicates anterior/dorsal bump or protuberance on setiger 21; E, proventricle; F, anterior end, ventral view, triannulate setigers; G, last two setigers and pygidium, lateral cirri lost. Abbreviations: ab–anterior bump, nat–natatory setae, vC–ventral cirrus, maC–median anal cirrus. A, D, E, G: USNM 1750528; B–C: USNM 1750498; F: USNM 1750534.

Remarks. Banse (1971) described *Syllides benedicti* from a specimen collected in Eastport, Maine, by Webster & Benedict (1887), who had identified it as *Syl. convolutus*, thinking that it differed from their Provincetown specimens only in size. *Syllides benedicti* is an overall larger species with a longer proventricle but also a much wider range of blade lengths on the compound setae: the longest blades in *Syl. benedicti* measure 70–75 µm and are longer than the shortest blades by a factor of four, whereas in *Syl. convolutus* the longest blades are 35–40 µm and differ in length from the shortest blades by a factor of two. The dorsal simple setae of *Syl. benedicti*, while very similar to those of *Syl. convolutus*, are heftier with little or no taper at the distal end; in both species the tip of this seta has a small hood that appears to have folds or pleats on the sides and often is not visible across the very top of the seta. Banse (1971) described the tip as rounded in smaller specimens but with irregular 'spines' sometimes connected by a membrane in larger mounted specimens; Riser (1997) thought the appearance of 'spines' was due to the complete hood not being visible, either due to desiccation or breakage. In the new material examined, a hood that appeared flared on the sides with simple folds or pleats in the membrane was consistently seen; in transmitted light the slightly darker areas of the folds give a striated or 'spinous' look to the hood, but there are no true hard spines in the structure.

Banse (1971) and Riser (1997) described *Syl. benedicti* as lacking serrations on the blades of the compound setae. In the present study, serrations were clearly visible on the shortest blades and often on medium-length blades as well; however, the highest power (1400–1600X) of light microscopy was needed to see the serrations on the medium-length blades and they were clearest on the largest specimens—at lower magnifications the serrations are difficult if not impossible to see, especially on small (1–2 mm) specimens. Banse (1971) also mentioned a basal spur on medium-length blades, but Riser (1997) thought this spur was an optical illusion produced by a thickening of the blade along the edge. In the present study, the basal spine was seen only if the seta was oriented properly, otherwise it appeared as the 'thickened edge' described by Riser (1997). Using SEM, San Martín (2003) documented a long basal spine on medium-length blades in material he reported as *Syl. benedicti* from Spain, thus demonstrating that this structure is a valid morphological feature.

The material from the deeper Georges Bank stations (Stas. 7, 8, 16, 17, 18; 140–165 m) was originally (Maciolek-Blake *et al.* 1985) thought to be a separate species because of smaller body size and the earlier start of gametes and natatory setae, but the compound setae, dorsal simple setae, and other morphological features are indistinguishable from specimens from shallower depths. Therefore, all of the Georges Bank material has been treated here as a single species. However, the eastern Atlantic specimens of *Syl. benedicti* recorded by San Martín *et al*. (1985) and San Martín (2003) from northwestern Spain bear reexamination, given longer blade lengths of up to 90 µm compared with the western Atlantic material in which the longest blades never exceed 70 or 75 µm. Riser (1997) thought San Martín's specimens represent a distinct species, also citing the differences in the length of the largest falciger blades as well as the pharynx/proventriculus length ratio.

Syllides bansei Perkins, 1981, described from shallow water on the east coast of Florida, is similar to *Syl. benedicti* in general shape as well as the shape of the blades of the compound setae. However, the two differ in size: *Syl. bansei* is much smaller (2.5 mm length vs. 6.5 mm), has fewer segments (30 vs. 70), as well as a proventricle that occupies maximally five segments vs. eight, with fewer muscle rows (35 vs. 50); the hood on the dorsal simple seta is a bit longer and smooth, rather than flared and folded; although these measurements may be due to younger age/smaller size of the specimens, and the palps of *Syl. bansei* are separate rather than fused and there are twice as many articles on the dorsal cirri.

Habitat. Sediments on Georges Bank were sandy at all stations where *Syllides benedicti* was found, with gravel, coarse, medium, and fine-grained sands comprising up to 98% of the sediment and total organic carbon less than 0.5 percent at the stations where it was most common (Stas. 2 and 5-1). The deeper stations (Stas. 7, 8, 16, 17, 18) had less gravel and slightly higher percentages of finer sediments (Maciolek-Blake *et al.* 1985). Sediments at stations in Massachusetts Bay and the New York Bight were also comprised of coarse to fine-grained sands with total organic carbon levels as low as 0.05 percent.

Distribution and depth records. Type locality: Eastport, Maine, USA. Offshore New England (both north and south of Cape Cod); intertidal to 165 m. Reported from Skagerrak (W Sweden), NW Spain, Norway (*fide* Lucas *et al.* 2018).

Syllides cf. *benedicti* Banse, 1971

Figure 25

Material examined. *(1 specimen from 1 station)* **Massachusetts Bay**. coll. Normandeau for MWRA, Sta. NF22, target location: 42°20.87′N, 70°48.90′W, 30 m, August 2011 (1, MCZ IZ 173674).

Remarks. This 2-mm-long specimen from 30 m in Massachusetts Bay corresponds to *Syllides benedicti* in the morphology of soft tissue parts, including the deep pigmentation of the pharynx, and almost all setal characteristics. However, at least in the anterior and middle setigers, there are two acicula per parapodium, one with a thick striated golden shaft, the other much thinner and often hidden behind the thicker one; both have an enlarged distal tip, much like a helmet or mitt fitted over the end (Fig. 25A–B). This shape is unlike that seen in *Syl. benedicti* and also does not correspond to the expanded acicular tip of *Streptosyllis* species. Acicula in the posterior setigers are single and without the helmet-like distal end. The dorsal simple setae are the same in all setigers and are identical to those found in *Syl. benedicti.* More material is needed to determine whether this character is consistent and truly differentiates a separate species. Because only one specimen has been collected over more than 30 years of sampling in the area, it is likely that this was an 'accidental tourist' in the area, originating from elsewhere and deposited in or near one of the shipping channels into the port of Boston.

Habitat. Sediments at this station were 47% silt-clay and 51.5% sand.

Distribution and depth records. Known only from the type locality, Massachusetts Bay, 30 m.

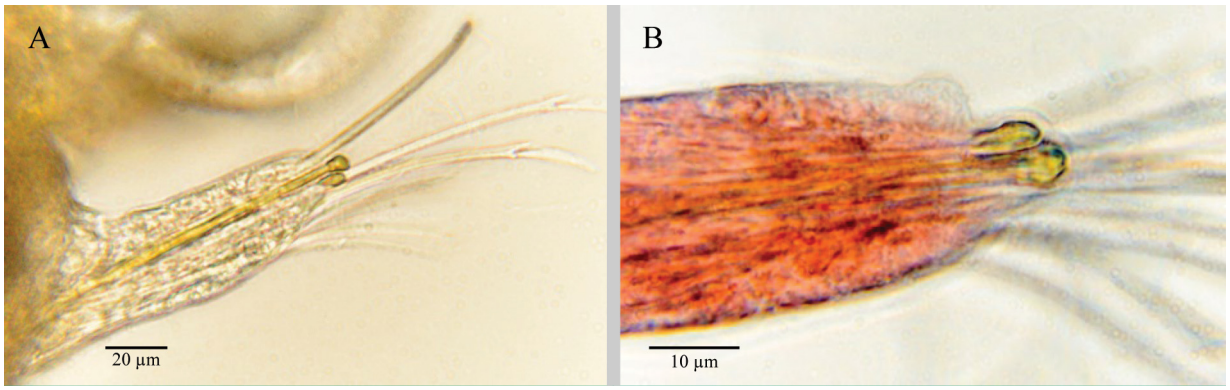

FIGURE 25. *Syllides* cf. *benedicti* Banse, 1971. A, setiger 1; B, setiger 5. A–B: MCZ IZ 173674.

Syllides convolutus Webster & Benedict, 1884

Figures 26–27

Syllides convoluta Webster & Benedict, 1884: 709.
Syllides convoluta: Banse 1971: 1474–1475, fig. 3; Riser 1997.
Syllides longocirrata—Pettibone 1963 (in part, not *Syllides longocirratus* Örsted, 1845).

Material examined. *(254 specimens from 20 stations)* **Northwest Atlantic Ocean—Maine.** Reid State Park, Coll/det. N. Riser, 8 Oct 1975, intertidal, coarse sand **(**USNM 53209).—**off Massachusetts, Georges Bank**. GBMP Sta. 2, coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 41°00.0′N, 66°57.4′W, depth not recorded, rep. 3 (2, USNM 1750608); Cruise M2, R/V *Oceanus*, 14 Nov 1981, 40°59.2′N, 66°55.9′W, depth not recorded, rep. 1 (2, USNM 1750609), rep. 2 (1 in two pieces, USNM 1750610); coll. G. Hampson, Chief Scientist, Cruise M4, R/V *Cape Henlopen*, 12 May 1982, 40°59.1′N, 66°55.9′W, 66 m, rep. 1 (21, USNM 1750611), rep. 2 (4, USNM 1750612); Cruise M6, R/V *Oceanus*, 21–22 Nov 1982, 40°59.2′N, 66°55.9′W, 71 m, rep. 5 (2, USNM 1750613), rep. 6 (2, USNM 1750614); Cruise M7, R/V *Endeavor*, 7 Feb 1983, 40°59.2′N, 66°55.9′W, 71 m, rep. 1 (27, USNM 1750615), rep. 3 (23, USNM 1750623), rep. 6 (1, tiny, USNM 1750617); Cruise M8, R/V *Gyre*, 15 May 1983, 40°59.3′N, 66°55.9′W, 73 m, rep. 3 (11, USNM 1750618), rep. 4 (7, USNM 1750619), rep. 5 (19, USNM 1750620); Cruise M9, R/V *Gyre*, 14 Jul 1983, 40°59.3′N, 66°55.8′W, 79 m, rep. 1 (2 plus pf, USNM 1750621), rep. 2 (10 plus 2 frag, USNM 1750622), rep. 3 (6, USNM 1750623); Cruise M10, R/V *Oceanus*, 15 Nov 1983, 40°59.0′N, 66°55.8′W, 79 m, rep. 2 (1, USNM 1750624), rep. 3 (10, USNM 1750625), rep. 6 (8, USNM 1750626); Cruise

M11, R/V *Oceanus*, 3 Feb 1984, 40°59.0′N, 66°55.8′W, 79 m, rep. 1 (3 plus pf, USNM 1750627), rep. 6 (5, USNM 1750628); Cruise M12, R/V *Gyre*, 4 Jun 1984, 40°59.0′N, 66°55.8′W, 79 m, rep. 1 (3, USNM 1750629), rep. 2 (6, USNM 1750630), rep. 3 (4, USNM 1750631), rep. 6, (1, poor condition, USNM 1750632). Sta. 3, coll. G. Hampson, Chief Scientist, Cruise M8, R/V *Gyre*, 16 May 1983, 40°53.7′N, 66°46.6′W, 97 m, rep. 4 (1, USNM 1750633). Site-specific array: Sta. 5 (5-1), coll. G. Hampson, Chief Scientist, Cruise M7, R/V *Endeavor*, 10 Feb 1983, 40°39.5′N, 67°45.9′W, 81 m, rep. 2 (2, USNM 1750634), Cruise M9, R/V *Gyre*, 16 Jul 1983, 40°39.5′N, 67°46.2′W, 84 m, rep. 6 (1, USNM 1750635), Cruise M13, R/V *Oceanus*, 22 May 1985, 40°39.4′N, 67°46.0′W, 76 m, rep. 2 (1, USNM 1750636). Sta. 5-3, coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 40°39.4′N, 67°46.4′W, depth not recorded, rep.1 (1, USNM 1750637), rep. 3 (1 specimen, USNM 1750638); Sta. 5-4, coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 40°39.5′N, 67°46.5′W, depth not recorded, rep. 3 (6, tiny, USNM 1750639), coll. G. Hampson, Cruise M3, R/V *Endeavor*, 15–16 Feb 1982, 40°39.6′N, 67°46.2′W, 80 m, rep. 1 (1, USNM 1750640), rep. 4 (1, USNM 1750641). Sta. 5-6, coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 40°39.5′N, 67°45.4′W, depth not recorded, rep. 1 (2, tiny, USNM 1750642), rep. 2 (2, USNM 1750643). Sta. 5-9, coll. G. Hampson, Chief Scientist, Cruise M4, R/V *Cape Henlopen*, 14 May 1982, 40°39.9′N, 67°46.5′W, 65 m, rep. 3 (6, USNM 1750664). Sta. 5-10, coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 40°39.4′N, 67°46.9′W, depth not recorded, rep. 1 (2, USNM 1750644), rep. 2 (1, USNM 1750645). Sta. 5-11, coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 40°39.5′N, 67°46.6′W, depth not recorded, rep. 2 (2, tiny, USNM 1750646), coll. G. Hampson, Chief Scientist, Cruise M6, R/V *Oceanus*, 23 Nov 1982, 40°39.2′N, 67°46.6′W, 80 m, rep. 3 (3 n, g, USNM 1750647). Sta. 5-16, coll. G. Hampson, Chief Scientist, Cruise M6, R/V *Oceanus*, 23–24 Nov 1982, 40°40.6′N, 67°46.1′W, 77 m, rep. 5 (9 n, g, USNM 1750648). Sta. 5-22, coll. G. Hampson, Chief Scientist, Cruise M8, R/V *Gyre*, 19 May 1983, 40°39.5′N, 67°43.2′W, 79 m, rep. 1 (1, USNM 1750649). Sta. 5-25, coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 40°39.5′N, 67°49.0′W, depth not recorded, rep. 1 (1, poor, USNM 1750650). Sta. 5-28, coll. G. Hampson, Chief Scientist, Cruise M10, R/V *Oceanus*, 18 Nov 1983, 40°39.5′N, 67°41.7′W, 84 m, rep. 6 (3, USNM 1750651). **Sta.** 5-29, coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 40°39.5′N, 67°50.4′W, depth not recorded, rep. 1 (, USNM 1750652). Sta. 6, coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 40°34.1′N, 67°45.0′W, no depth recorded (target depth 102 m), rep. 1 (1, USNM 1750653); Cruise M2**,** R/V *Oceanus*, 14 Nov 1981, 40°34.1′N, 67°45.0′W, rep. 2 (1, tiny, USNM 1750654). Sta. 7, coll. G. Hampson, Chief Scientist, Cruise M4, R/V *Cape Henlopen*, 13 May 1982, 40°28.8′N, 67°43.2′W, 130 m, rep. 4 (1, USNM 1750655). Sta. 10, coll. G. Hampson, Chief Scientist, Cruise M11, R/V *Oceanus*, 2 Feb 1984, 40°42.0′N, 68°35.3′W, 66 m, rep. 3 (1, USNM 1750656); rep. 4 (3, USNM 1750657); rep. 5 (2, USNM 1750658). Sta. 15, coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 41°27.2′N, 68°00.7′W, no depth recorded, rep. 2 (7, USNM 1750659), rep. 4 (1, USNM 1750660); Cruise M2, R/V *Oceanus*, 13 Nov 1981, 41°27.5′N, 68°00.7′W, no depth recorded, rep. 3 (5, USNM 1750661); coll. G. Hampson, Chief Scientist, Cruise M4, R/V *Cape Henlopen*, 11 May 1982, 41°27.5′N, 68°00.7′W, 40 m, rep. 3 (2, USNM 1750662); Cruise M6, R/V *Oceanus*, 20 Nov 1982, 41°27.5′N, 68°00.7′W, 38 m, rep. 3 (2, USNM 1750663).—**New York/New Jersey Bight, Raritan Bay.** Port Liberty offshore pipeline project, coll. P. Neubert for AECOM, 11 Feb 2012, Sta. 6A, 40°30.972′N, 73°40.507′W, 19 m (1, MCZ IZ 172066); 19 Jan 2012, Sta. 14, 40°26.140′N 73°33.951′W, 25.8 m (1 af, 1 mm, with eggs, MCZ IZ 172067). *Additional material available in USNM Accession number 359235 as Syllides sp. A or Syllides sp. F from GBMP site-specific stations.*

Description. Largest new material 2 mm long, ca. 0.25 mm wide without parapodia, with 27–30 setigers; many specimens barely 1–1.5 mm long, ca. 15 µm wide without parapodia, 18–24 setigers; smallest complete specimen 0.5 mm long for 14 setigers. Body threadlike, without color in ETOH (Fig. 27A). Palps large, basally fused, visible dorsally but often with lateral edges turned medially, giving pincer-like look, with small ventrolateral papilla at midpoint (Figs 26A–C; 27A–B). Prostomium rectangular, wider than long, with two pairs of large eyes arranged in open trapezoid and additional pair of small dark eyes on anterior edge of prostomium, often appearing to be on margin between prostomium and palps (Figs 26A–C; 27A–C); prostomium with three antennae, median antenna inserted near base of prostomium between medial pair of eyes, longer than lateral antennae; all antennae smooth or wrinkled, not articulated. Peristomium distinct, with round or oval inclusions (Figs 26B; 27B). Tentacular cirri two pairs, with basal cirrophores, inserted on anterior edge of peristomium in slightly ventral position; dorsal pair slightly longer than ventral pair, both pairs smooth or slightly wrinkled, not articulated (Figs 26B; 27A). Pharynx unarmed, with smooth rim and a few (ca. 6) small papillae proximal to rim. Proventricle in 3.5–4 (max 5) setigers, with ca. 35 muscle rows, no medial raphe (Figs 26A; 27A). Parapodia elongated, rectangular, with rounded distal end (Figs

26A, F; 27A, F). Dorsal cirri with basal cirrophores, smooth on setigers 1–2, after that may be articulated, smallest specimens with two to four articles, larger specimens with seven or eight; articles with one or two golden inclusions, some with nipple tips extending externally (Fig. 27E, G). Ventral cirri inserted mid-parapodium, not exceeding parapodia in length (Fig. 26A, E–F). Smallest specimens (juveniles) with one or more achaetous segments before pygidium. Pygidium rounded, with one short medial and two longer lateral cirri.

Aciculum one per parapodium, with slightly expanded tip often enveloped by bubble of tissue (Figs 26F; 27D). Dorsal simple seta in all setigers from setiger 1, one per setiger; with small serrations distally; tapered at distal end, ending in small, rounded knob-like tip with small hood; length up to 90 µm; last setiger with small, plain dorsal seta (Figs 26E–H; 27H). Ventral simple seta in last setiger. Compound setae maximally five to seven per fascicle, smaller specimens with four or five in anterior setigers, reduced to two or three in posterior, with heterogomph shafts with subapical spine on longer side; blades within one fascicle range in length from 10–15 µm in ventral position to 20–35 µm in dorsal position; blades serrated, base of blade with very small tooth, tips minutely bidentate with teeth more or less equal and parallel, or tooth on serrated face shorter (Fig. 26D–F, I).

Reproduction. Very small (ca. 1.5 mm long) specimens filled with gametes from setiger 7 or 8 and with natatory setae were found in numerous samples from Georges Bank. Body segments diamond-shaped when filled with gametes (Fig. 26A).

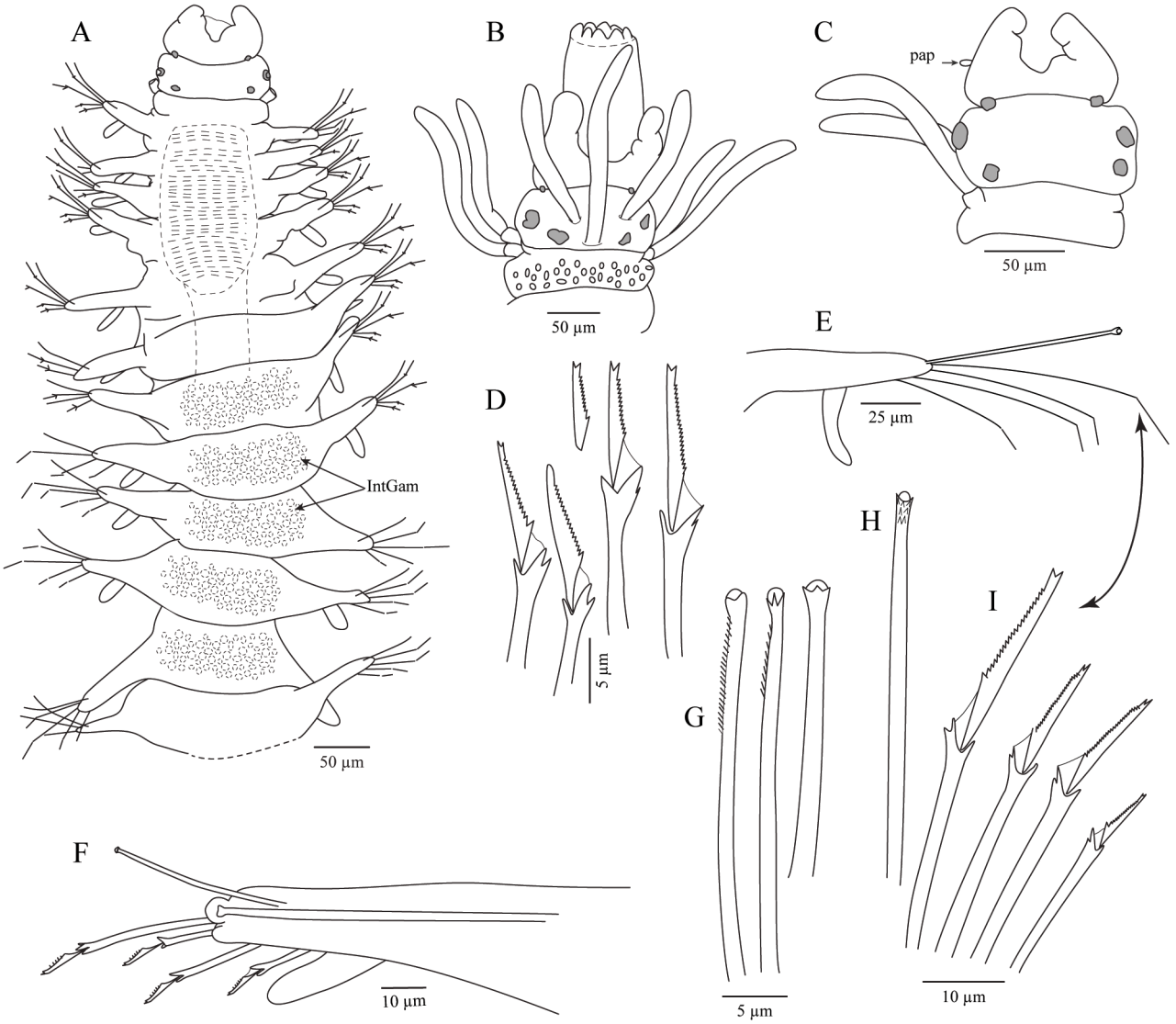

FIGURE 26. *Syllides convolutus* Webster & Benedict, 1884. A, anterior end, dorsal view, antennae and cirri not shown; B, head, dorsal view; C, head, dorsal view, prostomial antennae not shown; D, compound setae; E, middle parapodium, anterior view; F, setiger 5, anterior view; G, dorsal simple setae; H, dorsal simple seta; I, compound setae, middle setiger. Abbreviations: pap—papilla, IntGam –internal gametes. A: USNM 1750657; B, D, G: USNM 53209; C, E, H, I: USNM 1750609; F: USNM 1750624.

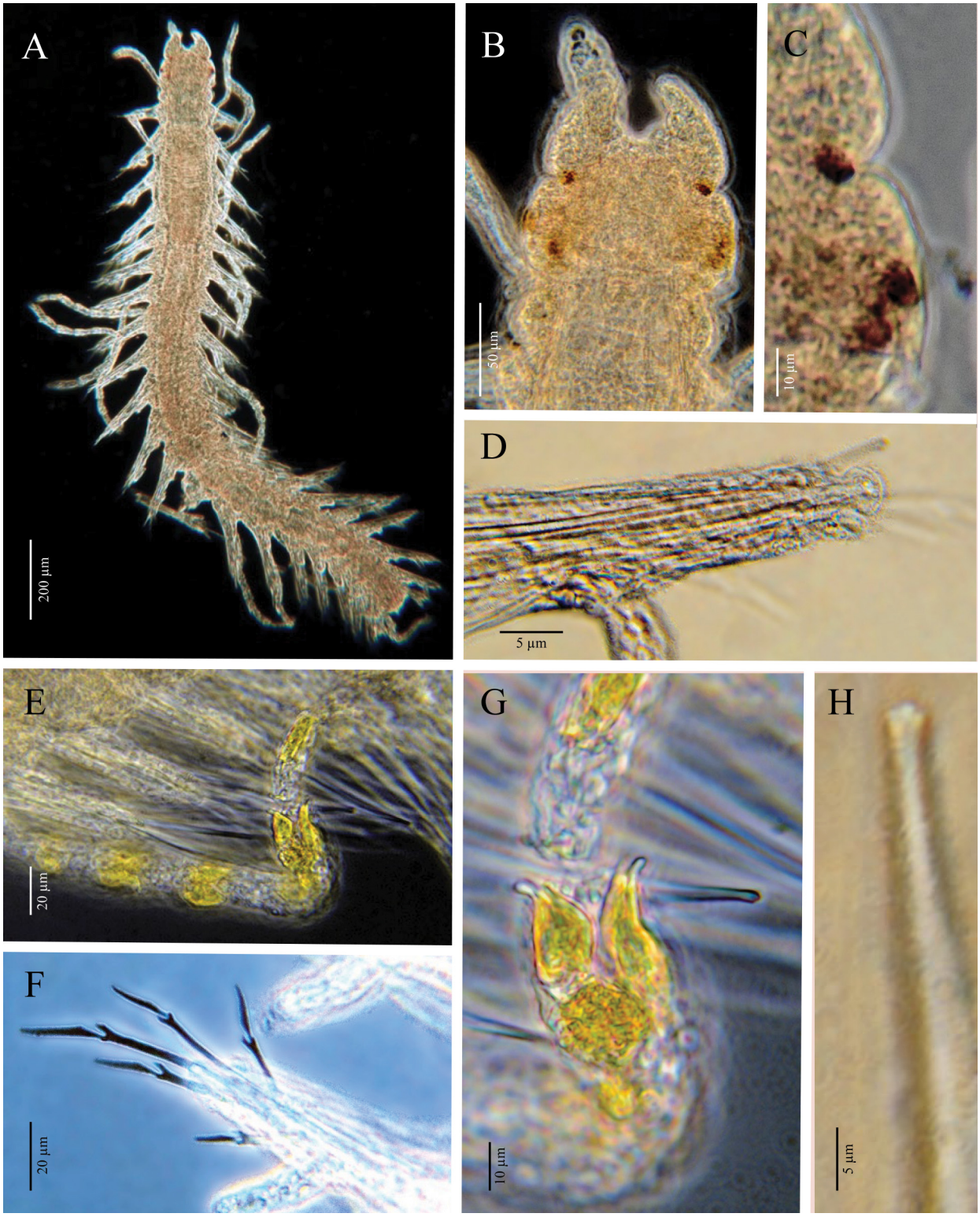

FIGURE 27. *Syllides convolutus* Webster & Benedict, 1884. A, entire worm, dorsal view; B, closer view of palps, prostomium, and one lateral antenna; C, even closer view of palp and prostomium, showing location of eyes; D, parapodium, setiger 9, ventral view; E, dorsal cirrus, middle setiger; F, setiger 22, ventral view; G, close-up of inclusions in article of dorsal cirrus; H, dorsal simple seta, setiger 9. A–D, H: USNM 1750624; E, F, G: USNM 1750657.

Methyl Green staining pattern. MG stain not retained.

Remarks. Pettibone (1963) synonymized *Syllides convolutus* with *Syl. longocirrata* Örsted, but Banse (1971) rejected that synonymy. In his description of the slide-mounted syntypes of *Syl. convolutus*, Banse (1971) noted that the maximum length of 25 mm given in Webster & Benedict (1884) was most likely an error and should have been 2.5 mm, which is in keeping with the size of the present material. Banse (1971) also said the long dorsal cirri had about 12 articles and the ventral cirri reached slightly beyond the setigerous lobes; the smaller specimens examined here had fewer articles in the dorsal cirri and the ventral cirri never exceeded the parapodial lobes. Some of the details of Banse's redescription were updated by Riser (1997), who examined living material and in particular noted the presence of a hood over the tip of the dorsal simple seta, which, along with the constriction of the shaft near the distal end, resulted in a ball-like shape to the tip. San Martín (2003) noted serrations on the cutting edge of the blades in specimens he recorded as *Syl. convolutus* from Spain; these are present but hard to see in light microscopy, especially on the smallest specimens.

Syllides convolutus is generally much smaller in body size than *Syl. benedicti*, with which it often co-occurs on Georges Bank. The two species differ in the number of segments occupied by the proventricle (3.5–4 in *Syl. convolutus*, 5–7 in *Syl. benedicti*), the location of the anterior pair of eyespots, which are consistently seen and are so high on the prostomium that they sometimes appear to be on the palps in *Syl. convolutus* while they are often absent in *Syl. benedicti*; the shape of the palps, which appear pincer-like in *Syl. convolutus* but are broad and flatter in *Syl. benedicti*, the shape of the parapodia, with those of *Syl. convolutus* lacking the anterior bump or papilla on the distal end seen in *Syl. benedicti*; and especially the range of blade lengths of the compound setae (by a factor of two in *Syl. convolutus* and a factor of four or more in *Syl. benedicti*), with the maximum blade length being 35–40 µm in *Syl. convolutus* vs. 65–75 µm in *Syl. benedicti*.

Perkins (1981) compared his new species, *Syllides bansei*, to *Syl. benedicti* but not to *Syl. convolutus*, to which it is more similar. Both are small species with laterally turned palps and a pair of small eyespots on the anterior prostomium, but the palps are basally fused in *Syl. convolutus* and described as separate in *Syl. bansei*; with such small specimens it is sometimes difficult to tell if the anterior part of the prostomium is obscuring the base of the palps, although the fusion is very clear in *Syl. convolutus*. The dorsal simple seta is slightly tapered near the distal end before the rounded tip in *Syl. convolutus* and appears to lack a similar taper in *Syl. bansei*. The setal blades are also much shorter in *Syl. convolutus* than in *Syl. bansei*, and there are many fewer articles in the dorsal cirri.

Habitat. On Georges Bank, *Syllides convolutus* was most common at Sta. 2 and the site-specific station array around Sta. 5, with gravel, coarse, medium, and fine-grained sands comprising up to 98% of the sediment and total organic carbon less than 0.5 percent (Maciolek-Blake *et al.* 1985).

Distribution. Type locality: Provincetown, Massachusetts, low water. Northwestern Atlantic, Massachusetts, New York Bight, low water to 80 m. Reported from Spain (Parapar *et al.* 1991; San Martín 2003).

Syllides eburneus Riser, 1997

Syllides eburneus Riser (1997): 143–147, figs 1–5, 7.

Material examined. None.

Description *(adapted from Riser's (1997) diagnosis and observations)***.** Small species less than 5 mm, up to 30 setigers. Prostomium hemispherical, slightly broader than long, projecting anteriorly beyond bases of lateral antennae; with two pairs of eyes, one pair at bases of lateral antennae, second pair, approximately same size as anterior pair, at posterior ventrolateral corners of prostomium. Palps approximately same length as prostomium, with digitiform ventral papilla measuring 12–17 µm. Peristomium with many large vacuoles, greenish in living specimens. Antennae, tentacular cirri, and dorsal cirri of first three setigers pseudoarticulate; dorsal cirri of following setigers with up to 14 articles, with large ivory-white vacuoles in each article, these appearing golden in fixed specimens in transmitted light. Antennae, tentacular cirri and dorsal cirri about same length, caudal cirri longer. Ventral cirri digitiform, extending slightly beyond setal lobe. Lips of pharynx nipple-like with large vacuole in base. Pharynx/proventriculus length ratio ca. 1:1.4, proventriculus width to length ratio ca. 1:1.9; ventriculus in 5 (*segments*) with no apparent caeca. Muscles of proventriculus thin, lattice-like, approximately 35 rows posterior to proventricular organ, muscles not in rows anterior to organ. Pygidial stylus 16 µm long, with stereocillium at either side of the tip.

Aciculum tapered slightly to rounded apex; (*additional*) thin, curved, pointed aciculum also present in parapodia of reproductive setigers. Simple setae denticulated on convex surface toward hemispherical apex, usually only one per setiger, one or two thin, pointed, simple setae in last three setigers. Compound setae with unidentate falciger blades, blades hooked at tip but without subapical tooth; three to six in each parapodium, in three distinct sizes: large blades ca. 48 µm long, serrated at base, medium blades ca. 36 µm long, shortest blades ca. 14 µm long; shafts with apical end as single pointed prong sometimes with subapical tooth, articular side with flat termination that may be slightly elevated to either side; shafts of falcigers and simple setae of first three setigers thinner than those of following setigers.

Reproduction. Gonads begin in setigers 7–9; 1–2 yolky, pink ova, 65 µm diameter, per gonad; sperm 8 µm long, pear-shaped with pointed aerosome constituting about one-tenth of that length. Capillary (swimming) setae begin on setiger 10.

Remarks. Riser (1997) described *Syllides eburneus* from living material, noting that, especially when preserved, this species is nearly impossible to differentiate from *Syl. convolutus*. Comparing Riser's description with the new material of *Syl. convolutus* described above, a few morphological differences can be noted: *Syl. eburneus* is larger than *Syl. convolutus*, measuring up to 5 mm for 30 setigers vs. 2 mm for 30 setigers; the blades of the compound falcigers differ (unidentate and three lengths, maximum 48 µm, in *Syl. eburneus* vs. minutely bidentate and two lengths, maximum 35 µm, in *Syl. convolutus*); and the dorsal cirri may have up to 14 articles in *Syl. eburneus* vs. eight in *Syl. convolutus*. Riser (1997) considered the two pairs of eyes a primary character for *Syl. eburneus*, describing the anterior pair as "relatively large, compared with the ocelli of most other species"; the posterior pair is located at the ventrolateral corners of the prostomium but a posterior dorsal pair is absent. *Syllides convolutus* has two pairs of eyes in an open trapezoid arrangement near the posterior margin of the prostomium, corresponding to the ventrolateral and dorsal posterior positions, plus an anterior pair of smaller eyes or eyespots corresponding to the first large pair in *Syl. eburneus*. There may be additional differences between the two species, but to my knowledge, *Syl. eburneus* has not been reported since Riser's original description and additional material has not been available for study.

Distribution and depth records. Type locality: Nahant, Massachusetts in 10 m; Robbinston, Maine and St. Andrews, New Brunswick, Gulf of Maine, intertidal to 30 m.

Syllides profundus sp. nov.

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Figure 28

Material examined. *(2 specimens from 1 station)* **US South Atlantic ACSAR Program**, **off Cape Hatteras, North Carolina**, coll. J.A. Blake, Chief Scientist, Cruise SA-5, R/V *Gyre*, 19 Sep 1985, Sta. 9, target location: 35°28.3'N, 74°47.6'W, 604 m, rep. 3, **Holotype** USNM 1750443, paratype USNM 1750444.

Description. Holotype and paratype both anterior fragments; holotype ca. 3 mm long, nearly complete with 32 setigers, now in two pieces, 0.35 mm wide without parapodia; paratype with 17 setigers. Palps large, not fused medially, anterior edge smoothly rounded, visible dorsally, curled ventrally in paratype, paratype with small ventrolateral papilla midway on each palp, papillae not seen on holotype (Fig. 28A–B). Prostomium subpentagonal to hemispherical, without eyes; all prostomial antennae lost. Peristomium distinct, shorter than setiger 1, with bright round or oval inclusions; base of prostomium also with inclusions (Fig. 28A). Tentacular cirri lost. Pharynx unarmed. Proventricle in 4.5 to 5 setigers, with ca. 48 muscle rows, anterior margin at juncture with pharynx straight, distal end also straight with only minor taper into intestine. Prostomium and peristomium with densely textured epidermis, with small clumps of golden yellow cells; scattered single cells or clumps in irregular rows across dorsal surface of each subsequent segment, isolated cells or small clumps on parapodia, remaining dorsal cirri, ventral cirri, and on venter. Parapodia short, truncate, with broad distal ends in anterior setigers (Fig. 28A, C–E), becoming elongated starting around setiger 10, not as long as body width, with small clear distal area from setiger 1 visible only under high power (Fig. 28C), becoming protruding lump giving distal end a bifid appearance from setiger 15 (Fig. 28F), smaller in posterior setigers. Dorsal cirri with large basal cirrophores; all cirri on holotype lost except on setiger 7, that cirrus with ca. 10 articles (Fig. 28E); paratype with wrinkled dorsal cirrus on setiger 2, articulated cirrus on setiger 8 with ca. 10 articles. Ventral cirri triangular, wide at base, tapered distally (Fig. 28C–D); becoming longer posteriorly, extending to tip of or beyond parapodium in posterior setigers. Pygidium lost.

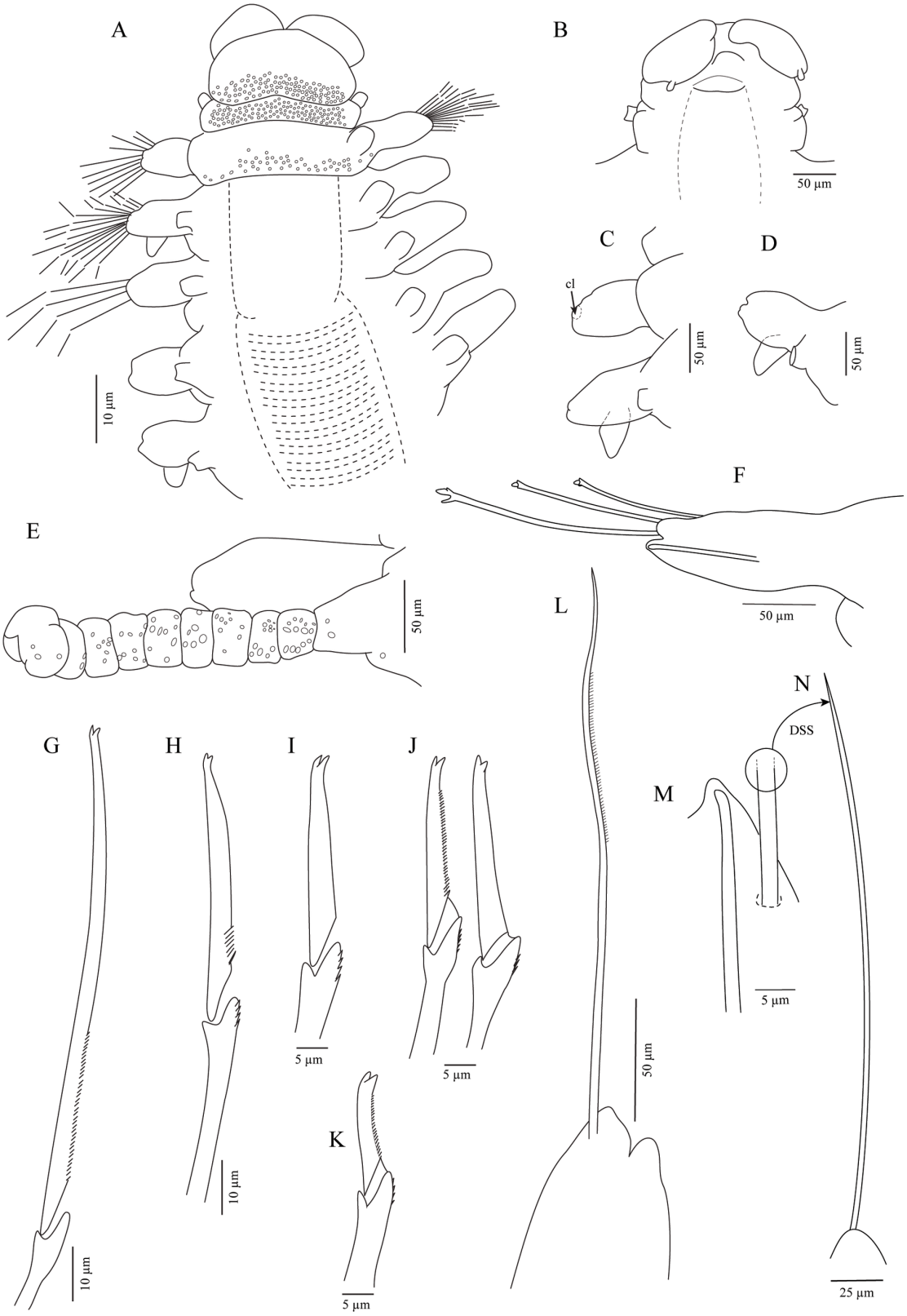

FIGURE 28. *Syllides profundus* **sp. nov.** A, anterior end, dorsal view; B, palps, ventral view; C, setigers 1 and 2, dorsal view; D, setiger 5 , dorsal view; E, dorsal cirrus, setiger 7; F, setiger 15, dorsal view; G, setiger 6, compound seta with long spiniger-like blade with basal serrations; H, setiger 6, compound seta with medium-length blade with distinct basal serrations; I, setiger 6, compound seta with short blade; J, setiger 3, compound setae with short blade; K, setiger 4, compound seta with short blade; L, dorsal simple seta, setiger 16; M, aciculum, setiger 20; N, dorsal simple seta, setiger 20. A, C–N: holotype (USNM 1750443); B: paratype (USNM 1750444).

Aciculum similar in all setigers, distal end narrowing to blunt, sometimes slightly bent, tip (Fig. 28M). Compound setae number 16–20 in first ten or eleven setigers, reduced to 10–12 setae by setiger 15, through end of fragment. All setae with heterogomph shafts, smooth or with 3–5 very weak serrations on longer side (Fig. 28G); shorter side forming shelf, wider than longer side in plan view. All blades distinctly bifid, lower tooth larger, heavier than apical tooth; each fascicle with groups of two or three setae with blades of similar length, ranging from 15–34 µm in ventralmost position, 50–70 µm in middle of fascicle, up to 94 µm in dorsalmost position; shortest blades serrated along length, no knob or long spines at base (Fig. 28K); medium length blades serrated at base, some with long basal spines (Fig. 28H); longest blades serrated at base, without basal spines, serrations not always visible depending on angle of view of seta (Fig. 28G). Dorsal simple seta flattened along lower third, serrated in middle portion, drawn out into long, fine tip (Fig. 28L, N); simple seta 45 µm on setiger 16 in holotype, up to 275 µm in posterior setiger; longest simple seta in paratype 235 µm. Ventral simple seta not seen. All setae without hoods.

Reproduction. Holotype with gametes from setiger 8.

Methyl Green staining pattern. MG stain not retained.

Remarks. *Syllides profundus* **sp. nov.** is similar to *Syl. setosus* in the shape of the dorsal simple seta although it differs slightly in length (longest in *Syl. setosus* is 220 µm; longest *in Syl. profundus* **sp. nov.** is 275 µm). When comparing *Syllides profundus* **sp. nov.** side-by-side with the neotype of *Syl. setosus*, the new species is wider anteriorly with a generally heftier appearance and shorter, broader parapodia; *Syl setosus* appears slim and threadlike in comparison. In addition to body proportions, the biggest difference is in the structure of the apical teeth on the compound blades: in *Syl. profundus* **sp. nov.** the subapical tooth is larger than the apical one in blades of all lengths, whereas it is smaller in *Syl. setosus*. The shortest blades in *Syl. profundus* **sp. nov.** do not have a boss at the base as they do in *Syl. setosus*. Other differences between the two species are also related to the compound setae: *Syl. setosus* has a few more setae in anterior setigers and these are reduced in number in posterior setigers to as few as two in the far posterior region whereas the numbers in *Syl. profundus* **sp. nov.** are reduced from 16–20 to ca. 10 in all posterior setigers. The shortest (ventral) and longest (dorsal) blades of the compound setae of *Syl. profundus* **sp. nov.** are slightly shorter than those of *Syl. setosus*, although the mid-length blades are similar.

Although the only two specimens available are incomplete and the morphological differences between *Syllides profundus* **sp. nov.** and *Syl. setosus* (and *Syl. floridanus*) are seemingly minor, the type locality of *Syllides profundus* **sp. nov.** at 600 m precludes assigning these specimens to a previously described species; syllids are rarely found at slope depths and it is unlikely that this species is the same as any found in shallow depths.

Habitat. *Syllides profundus* **sp. nov.** occurred at a slope station with 42.5 percent sand that was a mixture of planktonic foraminiferan tests and quartz sand. The area is on a very steep (16˚) slope that experiences swift current flows (Blake *et al.* 1987).

Distribution and depth record. Known only from the type locality off Cape Hatteras, North Carolina, 600 m.

Syllides setosus Verrill, 1882

Figures 29–30

Syllides setosa Verrill, 1882:369.
Syllides setosa—Hartman 1944:339, pl. 24 (56), fig. 11.
Syllides setosus—Pettibone 1963: (in part, not *Syllides verrilli* Moore, 1907 [=*Streptosyllis verrilli* (Moore, 1907)])
S*yllides japonicus*—Banse 1971: (in part); ?Michael *et al*. 1983; Maciolek *et al*. 1985, 2004; Not Imajima 1966.

Material examined. *(41 specimens from 14 stations)*. **off Massachusetts, Georges Bank**. GBMP Sta. 13A, coll. G. Hampson, Chief Scientist, Cruise M11, R/V *Oceanus*, 1 Feb 1984, 40˚30.0′N, 71˚00.5′W, 80 m, rep. 6 (**Neotype**, USNM 1750476) (2, USNM 1750477); M12, R/V *Gyre*, 2 June 1984, 40˚30.0′N, 71˚00.5′W, 80 m, rep. 2 (2, USNM 1750478). Sta. 6, Cruise M3, R/V *Endeavor*, 16 Feb 1982, 40˚34.3′N, 67˚45.3′W, 99 m, rep. 6 (1, USNM 1750479). Sta. 13: 40˚29.5′N, 70˚12.6′W, 70 m, Chief Scientist, Cruise M3, R/V *Endeavor*, 11 Feb 1982, rep. 2 (1, USNM 1750480); Cruise M10, R/V *Oceanus*, 14 Nov 1983, rep. 1 (1, USNM 1750481); Cruise M12, R/V *Gyre*, 2 June 1984, rep. 5 (1, USNM 1750482). Sta. 14: coll. M. Rawson, Chief Scientist, Cruise M1, R/V *Eastward*, Jul 1981, 41˚34.2′N, 68˚59.0′W, no depth recorded (target depth 40.5 m), rep. 1 (1, USNM 1750483).—**Massachusetts Bay**. Coll. ENSR/AECOM for MWRA. Sta. FF04: target location: 42º17.30′N, 70º25.50′W, 90 m, date not recorded,

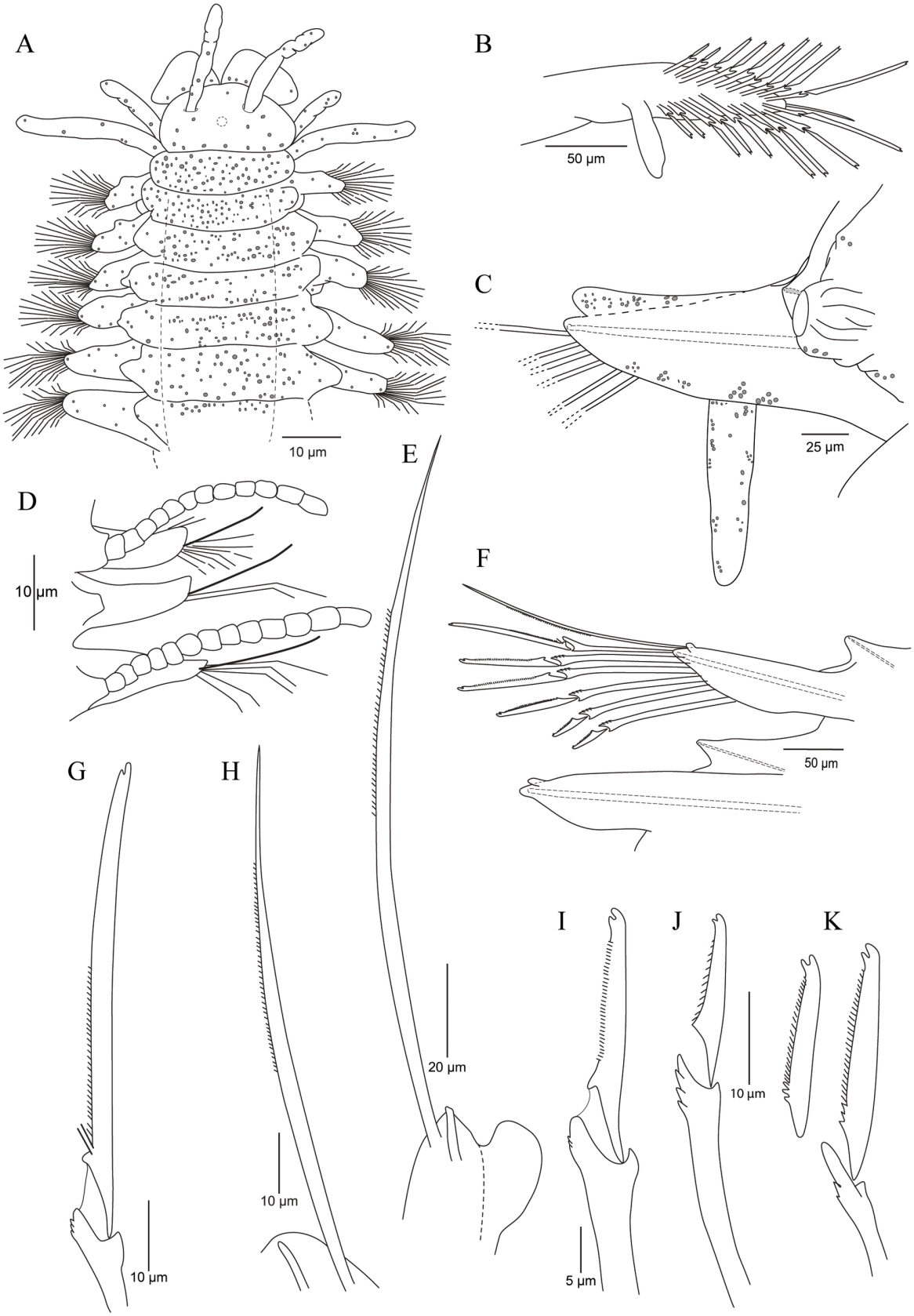

FIGURE 29. *Syllides setosus* Verrill, 1882. A, anterior end, dorsal view; B, setiger 2, ventral view; C, setiger 13, anterior view; D, setigers 8–10, dorsal view; E, dorsal simple setae and distal tip of parapodium, anterior view; F, setigers 24–25, anterior view; G, bidentate seta with knob and basal spines, setiger 5; H, dorsal simple seta, setiger 2, dorsal view; I compound seta with basal knob, setiger 5; J–K, compound seta without basal knob, setiger 1. A, D: USNM 1750480; B: USNM 1750476; C, E: MCZ IZ 172078; F, H, J, K: MCZ IZ 172074; G, I: MCZ IZ 172082.

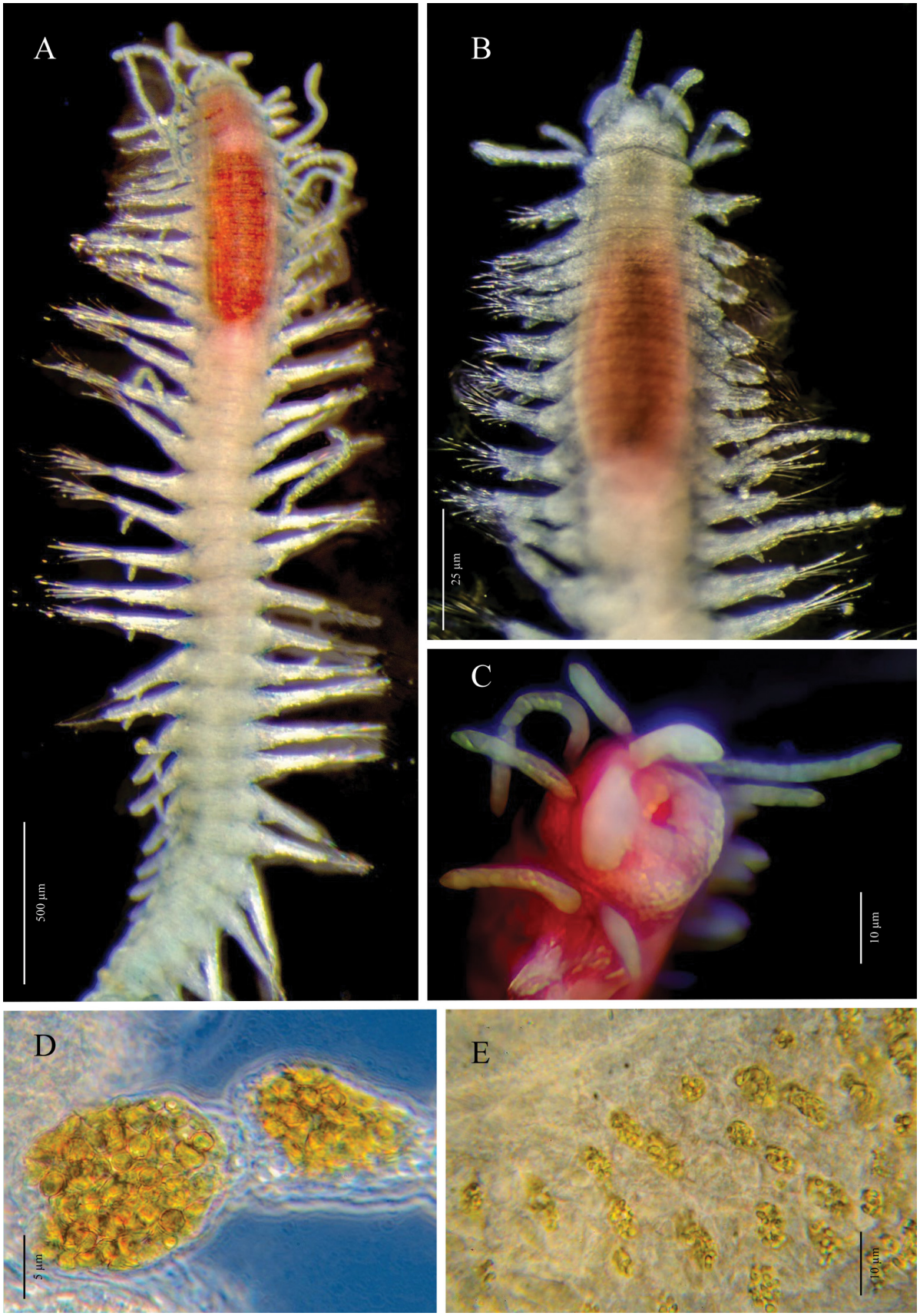

FIGURE 30. *Syllides setosus* Verrill, 1882. A, entire animal, dorsal view; B, anterior end, dorsal view; C, presetiger region, dorsolateral view (palps, antennae, tentacular cirri); D, dorsal cirrus with golden inclusion; E, glandular clumps on dorsal surface of setiger 1. A–C Stained with Shirlastain A. A: USNM 1750477; B–C: USNM 1750480; D: MCZ IZ 172080; E: MCZ IZ 172077.

rep. 2 (2, MCZ IZ 172068). Sta. FF05: target location: 42º08.00′N, 70º25.35′W, 65 m, Aug 2003, rep. 3 (3, MCZ IZ 172069). Sta. FF07: target location: 41º57.50′N, 70º16.00′W, 39 m, Aug 2010, rep. 3 (1 af, damaged after proventricle, MCZ IZ 172070). Sta. FF11: target location: 42º39.50′N, 70º30.00′W, 88 m, Aug 2002, rep. 1 (5, MCZ IZ 172071); Aug 2009, rep. 1 (1, MCZ IZ 172072), rep. 3 (2, MCZ IZ 172073). Sta. FF14: target location: 42º25.00′N, 70º39.29′W, 73 m, Aug 2009, rep. 2 (8, MCZ IZ 172074). Sta. NF 07: target location: 42°24.60′N, 70°48.89′W, 30 m, Aug 2005 (1, MCZ IZ 172075). Sta. NF 10: target location: 42°23.57′N, 70°50.29′W, 32.9 m, Aug 2009 (1, MCZ IZ 172076). Sta. NF 12: target location: 42°23.40′ N, 70°49.83′W, 34.9 m, Aug 2002, rep. 2 (3, MCZ IZ 172077); Aug 2003, rep. 2 (2, MCZ IZ 172078); Jul 2008, rep. 2 (1, MCZ IZ 172079); Aug 2009, rep. 2 (3, MCZ IZ 172080). Sta. NF 16: target location: 42°22.70′N, 70°50.26′W, 31.1 m, Aug 2002, rep. 1 (1, MCZ IZ 172081). Sta. NF 22: target location: 42°20.87′N, 70°48.90′W, 30 m, Aug 2006, rep. 1 (2, MCZ IZ 172082).
Additional material available, not examined: 43 lots (USNM Accession number 359235) archived as Syllides japonicus *from several stations sampled during the GBMP.*

Description. Largest specimens 3.5–4.5 mm long for 38–40 setigers, anterior 0.3–0.5 mm wide without parapodia, posterior 1.0–1.5 mm wide with parapodia and setae; additional complete specimens include juveniles 1 mm long with 15 setigers and more developing. Palps large, anterior edge smoothly rounded, sometimes curled ventrally (Figs 29A; 30B–C), with small ventrolateral papilla midway on each; palps not fused medially (Fig. 30B–C), separated laterally from prostomium. Prostomium subpentagonal to hemispherical, smaller specimens without eyes (Figs 29A; 30B) but two pairs of large eyes often present in reproductive specimens; prostomium with three antennae, median longer than lateral antennae, all antennae deeply wrinkled, sometimes appearing pseudoarticulated (Fig. 30A–C). Nuchal organs between prostomium and peristomium. Peristomium distinct, as long as or longer than setiger 1 (Figs 29A; 30B), with bright round or oval inclusions; base of prostomium also with inclusions. Tentacular cirri two pairs, inserted on anterior edge of peristomium in slightly ventral position, dorsal pair equal in length to lateral antennae, ventral pair shorter than dorsal pair, cirri club-shaped, wrinkled, sometimes appearing pseudoarticulated (Figs 29A; 30A–C). Pharynx unarmed, pale reddish-brown in larger specimens, with smooth rim and several small papillae on everted proboscis. Proventricle in five or six setigers, with ca. 40–50 muscle rows, anterior margin where it joins the pharynx straight, distal end also straight with only minor taper to intestine (Fig. 30A–B).

Anterior setigers dorsally triannulate (Fig. 30B). Clumps of golden yellow epidermal cells (Fig. 30E) especially dense on peristomium and first one or two setigers, also in single row along base of prostomium as well as scattered single cells or clumps on anterior prostomium, palps, antennae, and tentacular cirri, in irregular rows across dorsal surface of each subsequent segment, isolated cells or small clumps on parapodia, dorsal cirri, ventral cirri (Fig. 29A, C) and on venter at base of parapodia and near midline. Parapodia short, truncated in first few setigers, becoming elongated, elliptical, as long as body width, tapering to pointed distal end (Figs 29A–F; 30A– B), with anterior possibly glandular protuberance starting from setiger 1, largest and most pronounced in middle setigers, giving bifid appearance to parapodium (Fig. 29C, E–F), continuing through posterior setigers. Dorsal cirri with large basal cirrophores (Fig. 20C); cirri on setigers 1 and 2 club-shaped, smooth or deeply wrinkled, sometimes appearing pseudoarticulated; all remaining subsequent cirri articulated, each article a rounded square to almost moniliform (Figs 29D; 30B), with single clump of bright golden inclusions (Fig. 30D); shortest remaining cirrus with five articles, longest with 16, randomly arranged, with no pattern of long vs short. Ventral cirri elliptical, short anteriorly, becoming longer, extending to tip of or just beyond parapodium in middle and early posterior setigers (Fig. 29B, C), extending well beyond parapodial lobe in far posterior setigers. Posterior end rounded, cylindrical; pygidium with one short medial cirrus, two lateral cirri expected but not present on any specimens.

Neuroaciculum similar in all setigers, narrowing slightly at distal end before ending in flat or slightly beaked ca. 3 µm tip (Fig. 29C, E, F, H); reproductive specimens with notoacicula starting around setiger 8 (Fig. 29C, F). Compound setae number 18–20 in first six or seven setigers, reduced to 10–14 by setiger 9 or 10, further reduced to 6–8 in middle setigers, and 2–6 in last few setigers; all setae with heterogomph shafts with three or sometimes four weak serrations on longer side, these sometimes not visible depending on angle of view (Fig. 29G, I–K), shorter side forming shelf, wider than longer side. All blades distinctly bifid, each fascicle with groups of two or three setae with blades of similar length Fig. 29B, F), ranging from 20–35 µm in ventralmost position, 55–70 in middle of fascicle, up to 110 µm in dorsalmost position; shortest blades serrated along length, some with distinct enlargement or boss but no long spines at base, medium length blades serrated, some with basal spines; longest blades minutely serrated if at all, sometimes with basal spines (Fig. 29G, I–J). Dorsal simple setae present from setiger 1, serrated in middle

portion, wider, slightly flattened at base, slightly flexed at midpoint, drawn out into long, fine or slightly blunt tip (Fig. 29E, H); simple seta in setigers 1–2 ca. 90 µm, about the length of shaft of compound setae, becoming longer, up to 120–160 µm in middle and posterior setigers, longest 220 µm. Ventral simple seta in last or next-to-last setiger of complete specimens, much shorter than dorsal simple seta. All setae without hoods.

Reproduction. Ten of the 41 specimens had gametes starting from setigers 12–16, three of these also had natatory setae from setiger 11, with notoacicula from setiger 8. One specimen with gametes from setiger 13/14 did not have natatory setae. Riser (1997) noted that the sperm differed from other *Syllides* he had studied, having a nearly round head and a small, pointed acrosome.

Methyl Green staining pattern. MG stain retained only at distal ends of parapodia.

Remarks. Verrill's (1882) description of *Syllides setosus* was based on living, presumably reproductive, specimens taken at the water's surface near Woods Hole, Massachusetts, in the summers of 1881 and 1882. The illustrations of this species (published by Hartman 1944, plate 56, fig. 11a–c) were prepared by J. H. Emerton and do not correspond exactly to Verrill's text, resulting in confusion about some of the characters of this species. For example, Verrill (1882:369) said the pharynx was *"apparently unarmed, but sometimes showing a pale oblong spot, that might be taken for a feeble tooth"*; Emerton, however, figured a distinct tooth in the pharynx, which species of *Syllides* do not have.

Pettibone (1963:126, fig. 36a) recognized *Syl. setosus* but synonymized it with Moore's (1907) *Syl. verrilli*, including only a brief description and conflating the characters of the two species; for example, making the simple seta bifid as it is in *Syl. verrilli* rather than finely tipped as it is in *Syl. setosus*. Banse (1971) rejected Pettibone's synonymy, retaining *Syl. verrilli* as a valid separate species that is currently accepted in the genus *Streptosyllis* (see above). After searching for the type specimens at all likely repositories, including Yale University, MCZ, USNM, PA, AMNH, and the Gray Museum, which at the time was associated with the MBL in Woods Hole, Massachusetts, Banse (1971) declared all type specimens of *Syl. setosus* as lost. Additionally, he referred a non-type specimen identified by Verrill as "*Syllides setosa"* collected in 1883 from off Martha's Vineyard (USNM 10080) and a specimen collected by Pettibone from Cape Cod Bay and identified by her as *Syl. longicirrata* (USNM 33152) to *Syllides japonicus* Imajima, 1966, thus introducing that name to the New England fauna. Banse (1971:1478) did not consider Verrill's specimen from Massachusetts (USNM 10080) to be *Syl. setosus* "*primarily because of the absence of subapical spines on the shaft endings of the compound setae*" and because the natatory setae started on setiger 10 rather than 8 (as he interpreted Verrill's original description). Verrill (1882) did not describe the shaft endings, but Emerton's figure shows one small subapical spine; Banse's illustration of the Cape Cod specimen (Banse 1971, Fig. 5d) suggests that three weak serrations are present. However, the assignment of the New England material to *Syl. japonicus* is puzzling because there are significant differences from the original description of *Syl. japonicus*, including the number of compound setae in each fascicle, the length of the blades on the compound setae as well as the range of blade lengths within one fascicle, the number of articulations in the dorsal cirri, and the length of the simple setae. Nonetheless, specimens of *Syllides* from New England with long, thin, finely tipped simple setae have usually been called *Syllides japonicus* in local monitoring program checklists (e.g., Michael *et al*. 1983; Maciolek *et al*. 1985, 2004).

Perkins (1981:1154, tab. 1) tabulated differences between *Syl. japonicus* from Japan and those identified from New England and other locations, suggesting that these were not in fact all the same species and rejecting the notion of *Syl. japonicus* occurring in New England; however, he did not consider *Syl. setosus* in his discussion. Riser (1997) suggested that Emerton misunderstood or ignored Verrill's statement that there is no pharyngeal tooth, focusing instead on the mention of a "pale oblong spot" as evidence of a tooth. Riser (1997) examined USNM 10080 and disagreed with Banse's identification, concluding instead that it was *Syl. setosus* as originally identified by Verrill; he also stated that local ecologists had routinely misidentified *Syl. setosus* as *Syl. japonicus*. His measurements of more than 40 specimens from Nahant Bay, Massachusetts, documented a wide range of sizes of mature specimens, leading to a speculation of repeated spawning seasons; he also noted that the sperm of this species differed from that of other *Syllides* he had studied (Riser 1997).

Based on the new material described here as well as the earlier notes and descriptions by Verrill (1882) and Riser (1997), *Syl. setosus* appears to be a valid species. Because this species is common offshore New England, regularly collected, and previously misidentified, and because all of the type specimens have been declared lost (Banse 1971), a neotype is herein established according to Article 75 of the ICZN (ICZN, 4th edition). *Syllides setosus* is similar to *Syl. floridanus* Perkins, 1981 described from 10 m depth off the east coast of Florida, S*yl. japonicus* Imajima, 1966,

from Japan, and *Syl. profundus* **sp. nov.** from 600 m off the South Carolina coast, in having dorsal simple setae that are drawn out into a long, fine, unhooded tip. Differences from *Syl. profundus* **sp. nov.** are discussed above; *Syl. setosus* differs from *Syl. floridanus* and *Syl. japonicus* in having up to twice as many compound setae in the anterior setigers than are found in the other species and in the longer lengths of compound blades. *Syllides floridanus* also has a shorter peristomium; fewer articles in the dorsal cirri, which have two discrete inclusions rather than one; and fewer areas of textured epidermis. *Syllides setosus, Syl. floridanus*, and *Syl. tam* San Martín & Hutchings, 2006, as well as *Syl. japonicus* from Australia (San Martín & Hutchings 2006) all have a textured epidermis (described as 'inclusions' by San Martín & Hutchings (2006) but which appear to be surficial rather than under the epidermis in *Syl. setosus* and *Syl. floridanus)*.

Habitat. The original specimens of *Syllides setosus* were collected in plankton samples taken south of Cape Cod, Massachusetts. The present material was collected both north and south of Cape Cod, with the selected neotype coming from a station (Sta. 13A) that had up to 95% silt+clay. Some of the stations in Massachusetts Bay where this species was present (e.g., Stas. NF12, NF16, FF07) also had high percentages of fine sands and silt, whereas other stations (e.g., Stas. FF04, FF05, NF10) had sediments comprised of coarse, medium, and fine sands (Maciolek *et al.* 2010).

Distribution and depth records. Western North Atlantic, off New England, 30–90 m.

Final comment

Several authors have commented on the confusion surrounding the definition of genera within the Anoplosyllinae (Faulwetter *et al*. 2008; Musk *et al*. 2016). Much of this confusion may be due to (1) earlier incorrect assignments of new species to genera, (2) vague or ill-defined morphological terms or descriptions, (3) gradual transitions in characters rather than abrupt changes that were initially used to define genera. For example, the defining feature of the Anoplosyllinae is the lack of pharyngeal armature, but some species (e.g., S*yllides japonicus, Streptosyllis reducta* and *Str. cryptopalpa*) have been described as having a pharyngeal tooth; such discrepancies will be resolved only with further studies of type specimens and/or new materials to confirm the characteristics of those species. Morphological terms such as "enlarged" in reference to acicula can lead to conflicting interpretations by different researchers; differentiating between enlarged distal ends as in *Streptosyllis* and enlarged stems with narrow distal tips as in *Streptospinigera*, accompanied by detailed descriptions and measurements, would allow a clearer understanding of differences or lack thereof between genera. Characters originally used to differentiate genera such as an abrupt change in the shape of dorsal simple setae after setiger 5 can actually transition over several setigers. Molecular studies of properly identified species will also add additional characters to be considered, although such studies are not possible for museum specimens preserved in formalin.

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was managed by Dr. J.A. Blake and the collection of benthic samples was by Ms. Stacy A. Doner and Ms. Paula S. Winchell.

Over the years, many field and lab technicians at Battelle, WHOI, ENSR, AECOM, and Cove Marine Laboratory carefully processed the several hundred benthic samples that yielded the polychaete material. Senior polychaete taxonomists, including Mr. Tom Biksey, Mr. Bill Kennedy, and the "Gang of Six", who dealt with polychaetes from the GBMP site-specific stations, provided the majority of the initial syllid identifications from Georges Bank samples. Ms. Nancy Mountford and Mr. Tim Morris of Cove Marine Laboratory contributed to the identifications of polychaetes from several of the nearshore projects. Ms. Katherine Ahlfeld (USNM) and Mr. Adam Baldinger (MCZ) provided the curation of the materials used in this study and assignment of catalog numbers. The efforts of all contributing field technicians, sorters, identifiers, and curators are deeply appreciated. I thank Dr. Victor Surugiu for discussing invasive and cryptogenic species in the Black Sea. I am grateful to Dr. James Blake for comments on the manuscript and to Dr. Guillermo San Martín and an anonymous reviewer for their detailed reviews.

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