

A review of the Magelonidae (Annelida: Polychaeta) of Northeast America, including a description of a new species and re-descriptions of *Magelona riojai* and *Magelona sacculata*

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Abstract.—A new species of *Magelona* is described based on collections from off Long Island, New York that are identical to an undescribed species reported by M. L. Jones (1968) from the vicinity of Woods Hole, Massachusetts. The species is herein named (*M. brachypalpata*, new species) and described. The new species belongs to the ‘*Magelona mirabilis* group,’ possessing a rounded prostomium, lacking prostomial horns, and having specialized chaetae on chaetiger nine. The new species is most similar to *M. riojai* and *M. sacculata*, both of which are here redescribed. Additionally, a dichotomous identification key to the known magelonid species of the northeastern American coast and a worldwide pictorial identification key to the ‘*M. mirabilis*’ group of magelonids are provided.

Keywords: magelonid identification keys, mucronate chaetae, shovel head worms

Magelonidae is a relatively small family of marine annelids, consisting of 77 extant species across two genera: *Magelona* F. Müller, 1858, and the monotypic *Octomagelona* Aguirrezabalaga, Ceberio, & Fiege, 2001. Unique to magelonids are a shovel-shaped prostomium, and paired ventrolaterally inserted papillated palps. They are also recognized by distinct body regions: the head (prostomium and peristomium), a thorax consisting of an achaetous first segment followed by eight (*Octomagelona*) or nine (*Magelona*) chaetigers, an abdo-

men of many chaetigers, and terminating with the pygidium (Parapar et al. 2021).

Magelonids are distributed worldwide, both intertidally and subtidally, in muds and sands at relatively shallow depths (<100 m), although a few species are known to occur at depths over 4000 m (Hartman 1971, Aguirrezabalaga et al. 2001). In North America alone there are currently 18 accepted species (Fig. 1) However, only six of these are known from the eastern coasts of North and Central America; four from the Temperate Northwest Atlantic (sensu Spalding et al. 2007), and two from the Tropical Atlantic. Given that magelonids have been shown to

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DOI: 10.2988/0006-324X-134.1.209

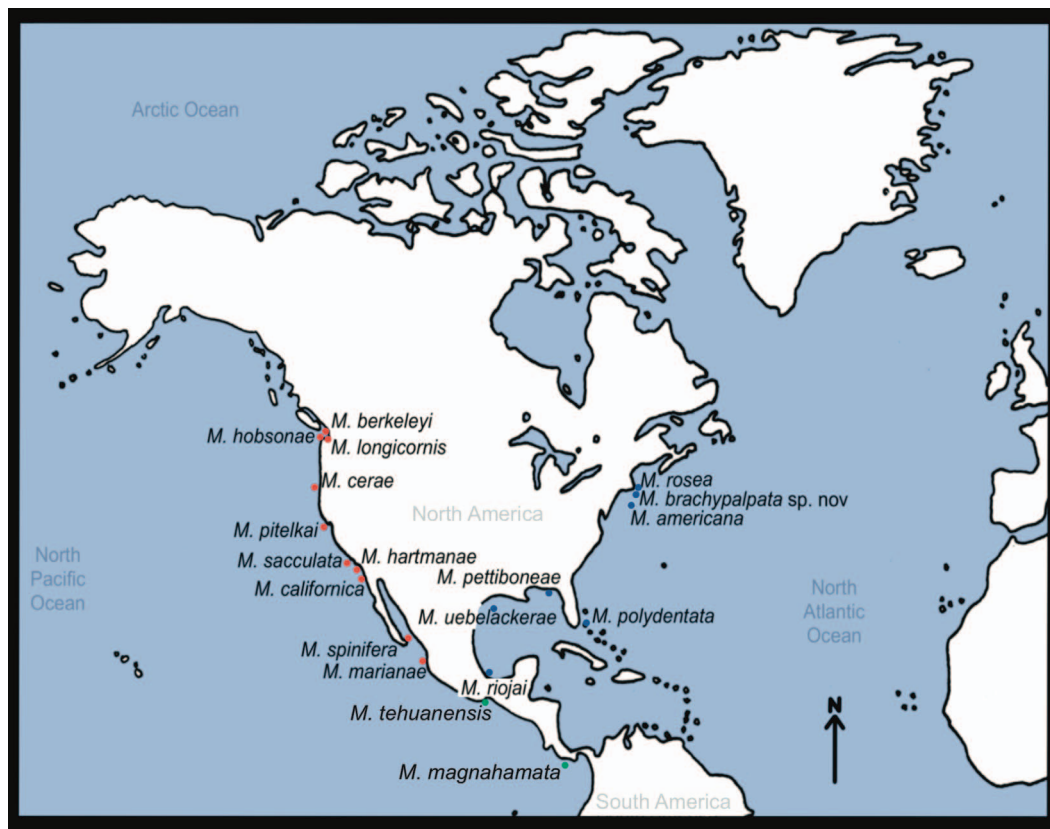


Fig. 1. Type localities of all known Magelonidae species from North and Central America.

have relatively high diversities in small geographic areas, such as ten species described from the Thai coasts of the Andaman Sea (Natewathana & Hylleberg 1991), or 13 species recognized in the Gulf of Mexico (Uebelacker & Jones 1984, Hernández-Alcántara & Solís-Weiss 2000, see below), and given the wide diversity of magelonids seen on the northwestern coast of North America (Fig. 1), it is likely that the true number of magelonid species within the region is under reported. A high proportion of sandy sediments and shallow waters off the northeastern coastline is reported by McMullen et al. (2014) and NOAA Fisheries (2020), which could provide suitable habitats for magelonid species. The lower species diversity observed, therefore, may be attributed to a lack of taxonomic work on the group

within the region. Although a review of American magelonids was undertaken in the 1960s and 1970s by the late Meredith L. Jones, this was placed on hiatus when he changed his research focus to vestimentiferans (Siboglinidae), following the discovery of the unique hydrothermal vent faunas. Since the work of Hernández-Alcántara & Solís-Weiss (2000) in the Gulf of Mexico no further magelonids have been described from this region.

The magelonid species known to occur off Northeast America are *Magelona rosea* Moore, 1907, *Magelona pettiboneae* Jones, 1963 (and the subspecies *Magelona pettiboneae lanceolata* Jones, 1963), *Magelona americana* Hartman, 1965, and *Magelona uebelackerae* (Hernández-Alcántara & Solís-Weiss, 2000). Two species also occur off eastern Central America: *Magelona*

polydentata Jones, 1963 and *Magelona riojai* Jones, 1963, as well as 11 unnamed provisional species (*Magelona* spp. A–G, I–L) reported by Uebelacker & Jones (1984) from the Gulf of Mexico (N.B. a twelfth species, *Magelona* sp. H was later described as *M. uebelackerae*).

Jones (1968) provided detailed behavioral and morphological observations on an undescribed species of *Magelona* that he had collected from sand beaches in and near Woods Hole, Massachusetts. The species was termed *Magelona* sp., and although he provided considerable detail, it was never formally named. He did, however, state that the unnamed species most closely resembled *Magelona papillicornis* F. Müller, 1858 of European workers (see also, Jones 1977), the records of which have since largely been attributed to either *Magelona mirabilis* (Johnston, 1865) or *Magelona johnstoni* Fiege, Licher, & Mackie, 2000. The unnamed species of Jones (1968), therefore, belongs in the '*Magelona mirabilis* group,' which currently includes 14 species, all characterized by having rounded prostomia lacking frontal horns and mucronate chaetae on chaetiger nine. There are representatives of this group found worldwide: *M. mirabilis* and *M. johnstoni* in Europe; *Magelona sachalinensis* Buzhinskaja, 1985 and *Magelona parochilis* Zhou & Mortimer, 2013 in the Northwestern Pacific; *Magelona obockensis* Gravier, 1905, *Magelona tinae* Nateewathana & Hylleberg, 1991, *Magelona pectinata* Nateewathana & Hylleberg, 1991 and *Magelona conversa*, Mortimer & Mackie, 2003 in the Western Indo-Pacific; *Magelona debeerei* Clarke, Paterson, Florence, & Gibbons, 2010 in Temperate Southern Africa; *Magelona crenulata* Bolívar & Lana, 1986 in Temperate South America; *Magelona sacculata* Hartman, 1961 on the Pacific coast of North America (Temperate Northern Pacific); and *M. riojai* and two unnamed species of Uebelacker & Jones (1984),

Magelona sp. A and *Magelona* sp. B from the Gulf of Mexico.

This study describes *Magelona* sp. of Jones (1968) as a new species based on recent collections from off Long Island, New York and the New York Bight. In addition, two closely related species in the '*M. mirabilis* group,' *M. sacculata* and *M. riojai*, are redescribed based on type materials. Additionally, a key to magelonid species of Northeastern America and a pictorial key to worldwide *Magelona* species possessing mucronate chaetae on the ninth chaetiger are presented.

Materials and Methods

Samples were collected from the New York Bight in the Atlantic Ocean as part of benthic surveys at several energy-related project sites, none of which were ever permitted. These projects were managed by the second author (JAB) while a consultant working in Woods Hole, Massachusetts. These projects include 1) a proposed wind park off Jones Beach, Long Island, 2) a proposed deep-water natural gas port and pipeline off Long Island, and 3) another proposed pipeline off New Jersey and Raritan Bay, New York. All benthic samples were collected using a 0.05 m² Ted Young modified Van Veen grab. Samples were live-sieved in the field using a 500 µm mesh-sieve and fixed with a 10% formalin solution. In the laboratory, the samples were re-sieved and transferred to 70% ethanol for long-term preservation. Samples were subsequently sorted and the fauna identified, usually to species level. Results from these surveys are unpublished. Survey reports, however, were available to the authors and provided details on the dates and coordinates for each sample collected.

The holotype of *Magelona sacculata* was borrowed from the Natural History Museum of Los Angeles County (LACM). The holotype and paratype material of *M.*

riojai was borrowed from the American Museum of Natural History (AMNH, N.B. one paratype from each lot was held back by AMNH prior to posting for safety and thus not observed). Additional paratypes deposited in the National Museum of Natural History (USNM) were not observed. Comparative material from Amgueddfa Cymru—National Museum Wales (NMW) collections was additionally examined. Specimens are depicted as follows: c, complete specimen; af, anterior fragment; pf, posterior fragment. Parapodial structures are described according to their shape and position, although terms utilized by Jones (e.g., VNL, DML, VML, etc.) are given for comparison. Measurements were taken as detailed in Fiege et al. (2000), and staining patterns were observed using methyl green, as detailed by Mackie & Gobin (1993). Type material of *Magelona brachypalpata* is deposited in the collections of the following institutions: NMW, Natural History Museum, London (BMNH) and Museum of Comparative Zoology, Harvard, Massachusetts (MCZ). Supplemental non-type material has also been deposited in the MCZ.

Drawings were made using a camera lucida attachment on a Leica MZ9.5 zoom microscope, or Leica DM2000 compound microscope. Individual source images of fluid preserved specimens were acquired using a Canon 70D DSLR camera attached to a Leica Z6 macroscope, whereas images of slide-mounted specimens were taken using a Canon EOS 6D 20.2 MP DSLR camera attached to a Nikon Optiphot 2 Trinocular Microscope. All were then stacked using HeliconFocus v6.22 (HeliconSoft Ltd.) extended depth of field software, with calibrated scale bars added using Syncroscopy Automontage v.5.4. The second author provided a few images using a Zeiss RA compound microscope equipped with Phase contrast optics. Photomicrographs were taken with a Nikon D7100 camera mounted on the Zeiss.

Images were edited with Photoshop CS3 software.

Systematics

Phylum Annelida

Family Magelonidae Cunningham & Ramage, 1888

Genus *Magelona* F. Müller, 1858, emended Fiege et al. (2000)

Magelona brachypalpata, new species Figs. 2–5

Zoobank LSID.—urn:lsid:zoobank.org:act:17B2B00F-B9F8-44E1-991D-C2B2A8042899

Magelona sp.: Jones 1968:272–297, Figs. 1–6,

?*Magelona* cf. *riojai*: Caracciolo & Steimle 1983:34. Not Jones, 1963.

?*Magelona papillicornis*: Day 1973:77, Fig. 11k–p. Not Müller, 1858.

Material examined.—Northeastern U.S.A., Atlantic Ocean off Jones Beach, Long Island, New York, wind park benthic survey, coll. Isabelle P. Williams, Sta. 37-1, 26 Aug 2005, 40°33.9938'N, 73°21.0607'W, 57.9 m, holotype (NMW.Z.2021.002.0001, c), dissected paratype (prostomium to chaetiger 12, chaetigers 43–44 slide mounted, chaetigers 13–42 fluid preserved, NMW.Z.2021.002.0002, c), paratypes (NMW.Z.2021.002.0003, 23c, 11af, 4f, 7pf), paratypes (BMNH.2021.54–63, 7c, 3af); Sta. 02-1, 27 Aug 2005, 40°32.8921'N, 73°26.7373'W, 53.6 m, 1 paratype (MCZ 161704); Sta. 04-1, 27 Aug 2005, 40°32.2574'N, 73°26.2046'W, 61.4 m, 5 paratypes (MCZ 161705); Sta. 11-1, 27 Aug 2005, 40°33.1763'N, 73°25.2153'W, 67.1 m, 6 paratypes (MCZ 161706); Sta. 18-1, 27 Aug 2005, 40°34.4606'N, 73°20.5860'W, 62.1 m, 4 paratypes (MCZ 161707); Sta. 20-1, 26 Aug 2005, 40°32.5438'N, 73°23.8709'W, 55.7 m, 4 paratypes (MCZ 161708); Sta. 29-1, 26 Aug 2005, 40°32.5809'N, 73°22.4416'W, 65.0 m, 1 paratype (MCZ

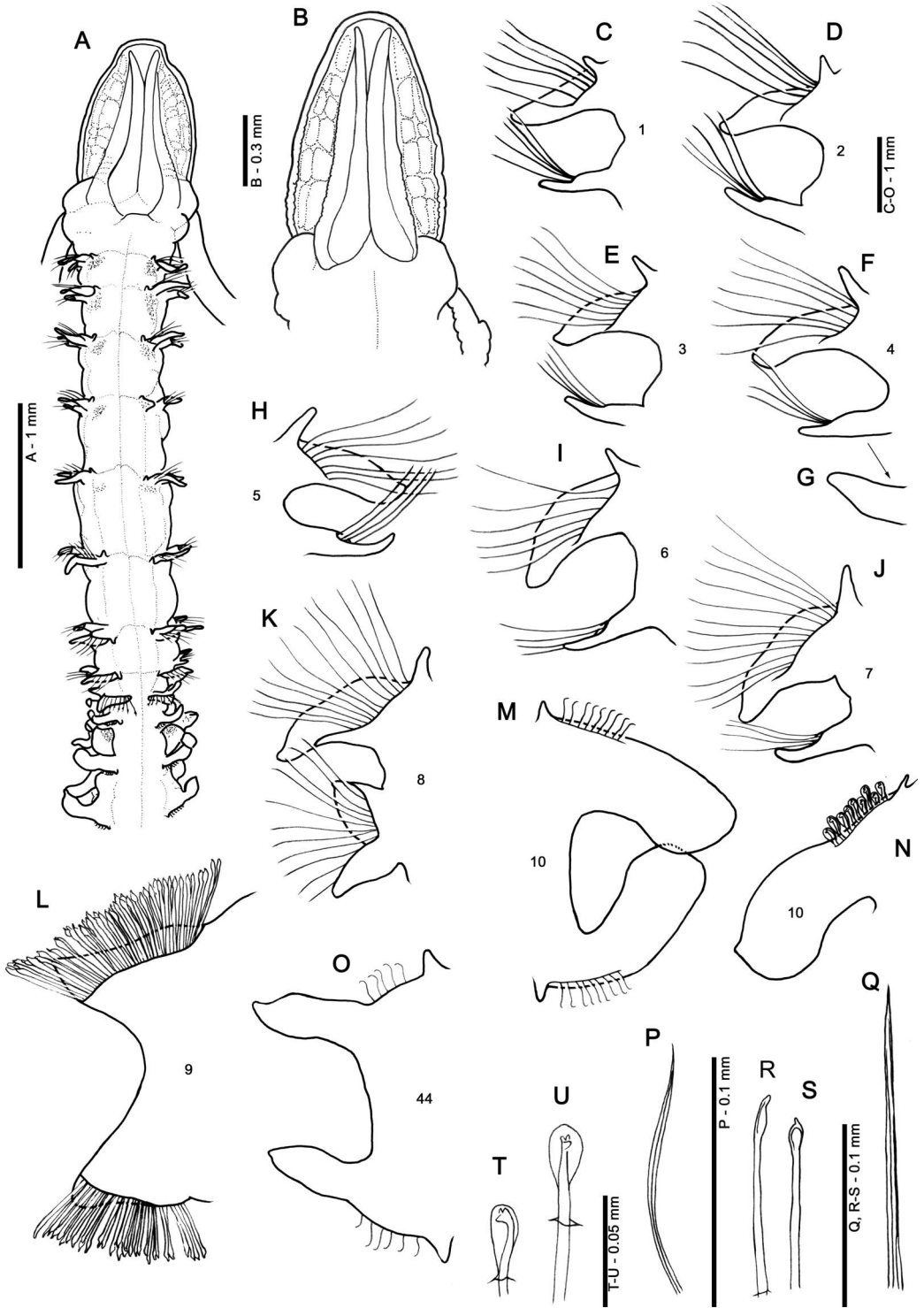


Fig. 2. *Magelona brachypalpata* (A, Holotype; B–U, 44 chaetiger paratype). A, anterior region (dorsal view); B, prostomium (dorsal view); C–F, parapodia of chaetigers 1–4, respectively (anterior views); G, neuropodial lamellae of chaetiger 4 (ventral view); H–M, parapodia of chaetigers 5–10, respectively (anterior views); N, neuropodial lamellae of chaetiger 10 (ventral view); O, neuropodial lamellae of chaetiger 44 (ventral view); P, seta of chaetiger 10; Q, seta of chaetiger 44; R, seta of chaetiger 10; S, seta of chaetiger 44; T, seta of chaetiger 10; U, seta of chaetiger 44.

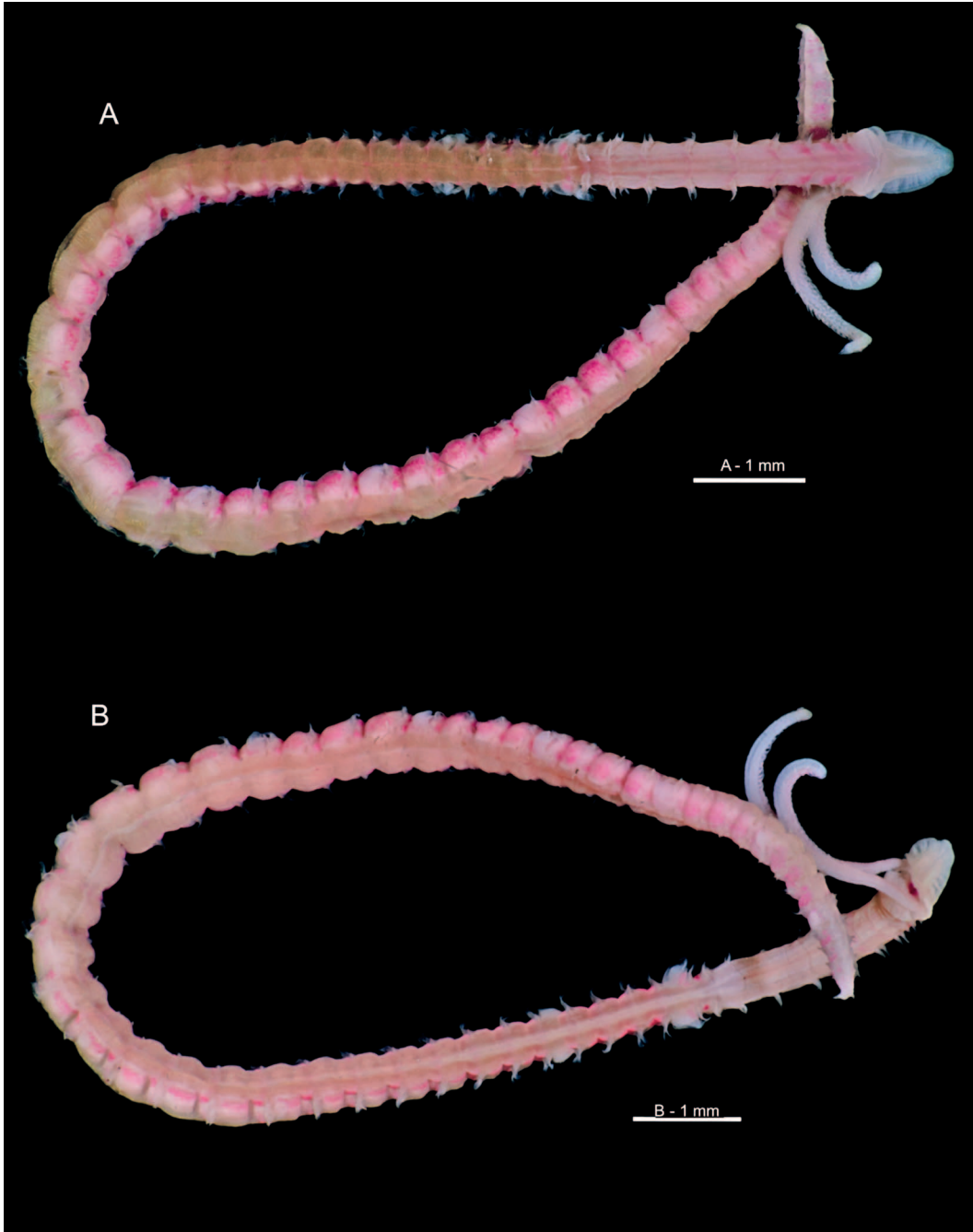


Fig. 3. *Magelona brachypalpata* (Holotype). A, complete specimen, dorsal view; B, complete specimen, ventral view. (Stained with Rose Bengal).

←
 views); N, right notopodia of chaetiger 10 (anterior view); O, right parapodia of chaetiger 44 (anterior view); P, outermost capillary notochaeta of chaetiger 1 (lateral view); Q, capillary notochaeta from mid neuropodium of chaetiger 8; R, outermost mucronate notochaeta of chaetiger 9; S, mid notochaeta of the same parapodium; T–U, tridentate hooded hooks from chaetigers 10 and 12, respectively (oblique lateral and frontal views).

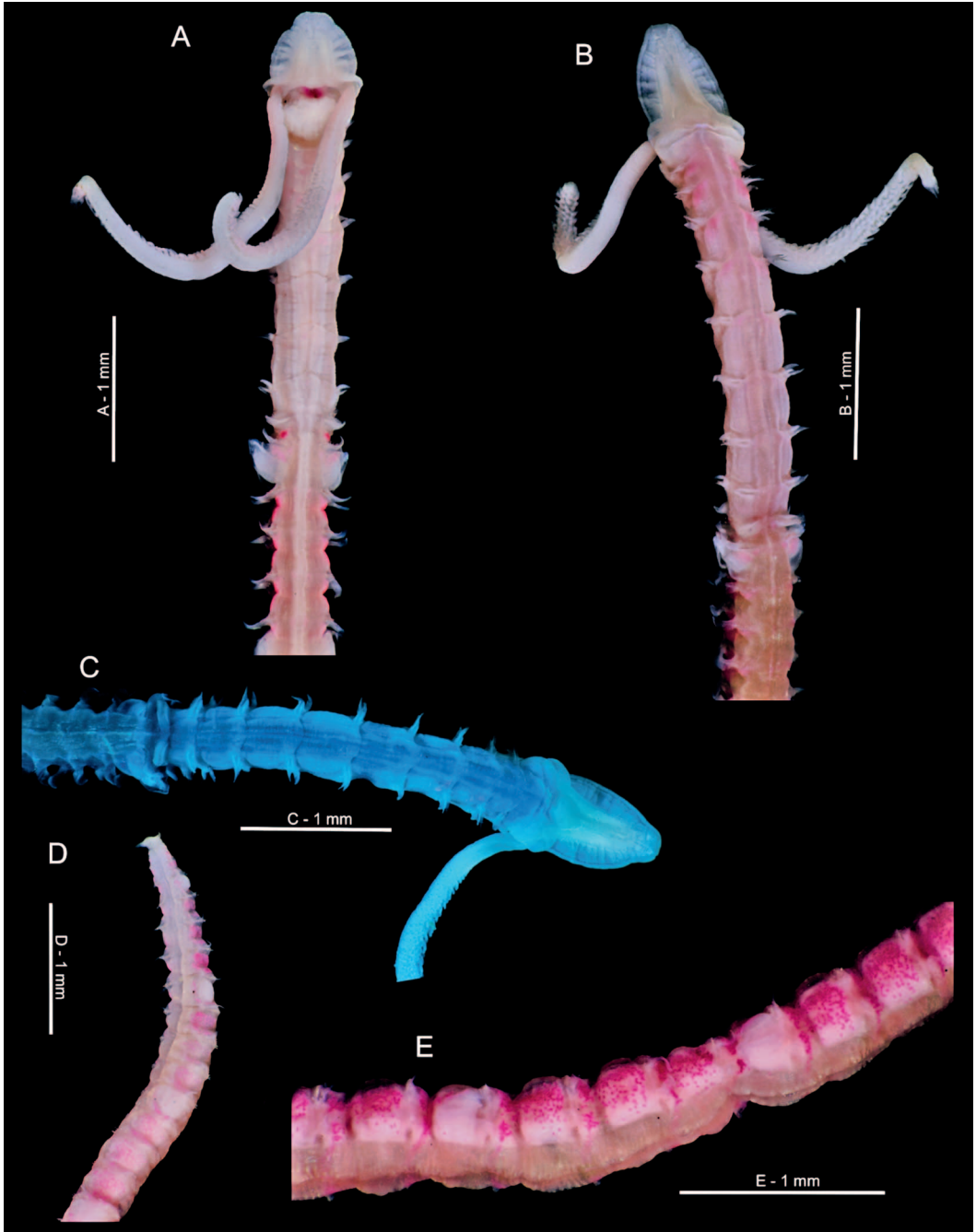


Fig. 4. *Magelona brachypalpata* (Holotype). A, anterior region (ventral view); B, anterior region (dorso-lateral view); C, anterior region (dorsal view); D, posterior region showing pygidium (ventral view); E, abdominal section, showing posteriorly open pouches (lateral view). (A, B, D, E stained with Rose Bengal, C stained with methyl green.)

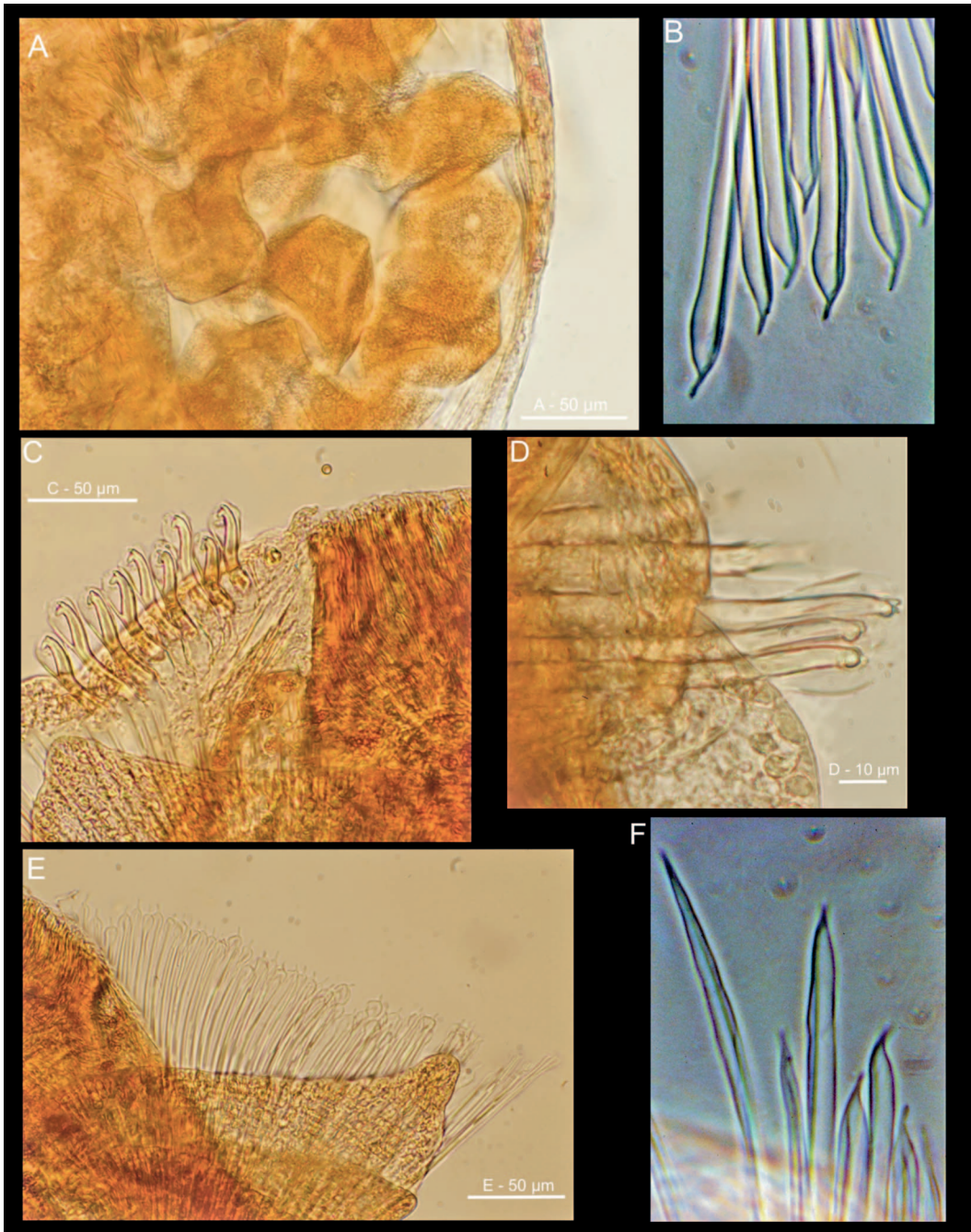


Fig. 5. Eggs and chaetae of *Magelona brachypalpata* (NMW.Z.2021.002.0002). A, visible eggs in chaetiger 43; B, outermost mucronate notochaetae of chaetiger 9; C, tridentate hooded hooks of chaetiger 10; D, tridentate hooks of chaetiger 12; E, mucronate chaetae of chaetiger 9; F, outermost mucronate notochaetae of chaetiger 9.

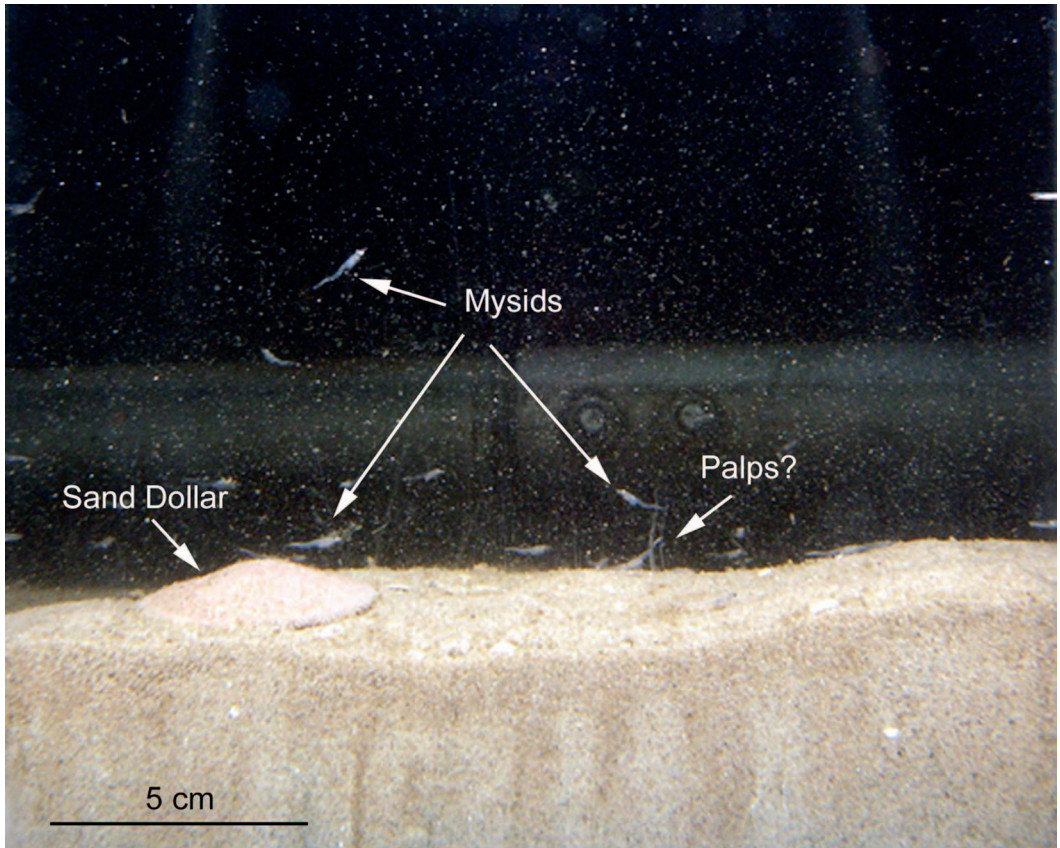


Fig. 6. Sediment Profile Image of Stn 37.1, where the holotype of *Magelona brachypalpa* was sampled, showing sand dollar, mysids and presumed palps of *M. brachypalpa*.

161709); Sta. 31-1, 26 Aug 2005, 40°33.5602'N, 73°22.1581'W, 58.6 m, 1 paratype (MCZ 161710); Sta. 32-1, 27 Aug 2005, 40°34.0382'N, 73°22.0921'W, 60.0 m, 24 paratypes (MCZ 161711); Sta. 40-1, 26 Aug 2005, 40°33.5142'N, 73°20.2790'W, 62.9 m, 7 paratypes (MCZ 161712); Sta. 61-1, 27 Aug 2005, 40°33.3697'N, 73°23.7731'W, 60.0 m, 27 paratypes (MCZ 161713). New York Bight, off Long Island, Port Liberty, pipeline survey, coll. Pamela L. Neubert, Sta. 3A, 15 Feb 2012, 40°32.6964'N, 073°43.0104'W, 17.3 m (6, JAB); Sta. 04, 15 Feb 2012, 40°32.1864'N, 073°42.1500'W, 18.2 m (8, JAB); Sta. 10, 15 Feb 2012, 40°28.5787'N, 073°37.2364'W, 20.3 m, (1, MCZ 161714); Sta. 13, 15 Feb 2012, 40°26.7516'N,

073°34.7894'W, 23.9 m (1, MCZ 161715); Sta. 17, 14 Feb 2012, 40°24.3545'N, 073°31.4878'W, 26 m (1, MCZ 161716); Sta. 18A, 14 Feb 2012, 40°23.7459'N, 073°30.6899'W, 26.6 m (1, MCZ 161717). New York Bight, off Raritan Bay, Blue Atlantic pipeline survey, coll. Pamela L. Neubert, Sta. BA-3-1, 07 Sep 2002, 40°28.1911'N, 73°56.9703'W, 28 m (1, MCZ 16171).

Diagnosis.—Prostomium anteriorly rounded, without prostomial horns. Chaetigers one to eight with smooth-edged slender foliaceous notopodial lamellae with superior dorsal lobes, and slender triangular ventral neuropodial lamellae, those of the chaetiger eight with additional triangular postchaetal lamellae. Chaetiger

nine with broad, triangular lamellae in both rami. Chaetigers one to eight with capillary chaetae, those of chaetiger nine mucronate. Hooded hooks tridentate, unidirectional. Anteriorly and posteriorly open pouches present.

Description.—Holotype (Figs. 2A, 3, 4) complete, prostomium 0.95 mm long, 0.6 mm wide; thorax (including prostomium) 3.7 mm long, 0.5 mm wide at widest point; abdomen 15.3 mm long, 0.55 mm wide; total length 19 mm for 57 chaetigers. Other complete paratypes 9.5–23.6 mm long with 46–70 chaetigers. A moderately sized species, thorax of similar width to abdomen, but marginally thinner when viewed dorso-ventrally. Prostomium elongate, longer than wide (L:W ratio 1.54–1.58), without prostomial horns. Anterior margin smooth and rounded, eyes absent (Figs. 2B, 4B, C), distal portion of prostomium marginally indented in comparison to proximal part. Two pairs of prominent longitudinal dorsal muscular ridges, outer pair (marginally shorter) abutting inners for entire length, inner pair almost reaching distal tip of prostomium, diverging only very slightly at distal ends. Fairly distinct quadrangular areas present on either side of muscular ridges, appearing in two rows. Buccal region on ventral side of prostomium, distinct, one large lip above two smaller lips. Burrowing organ fully everted in one specimen, heart-shaped, and partially everted in 20 specimens, oval, longitudinally ridged, upper surface, pad-like, with much lighter ridging. Palps present on 34 specimens, arising ventro-laterally from base of prostomium, slender and quite short on all specimens but appearing entire. Palps reaching chaetiger 13 (but more generally chaetigers 8–11) if folded backwards, non-papillated region long, reaching chaetigers three to four (Figs. 3, 4). Papillae short proximally, increasing slightly in size to distal tips, ampulliform in shape. Proximally two to three rows of papillae on either side of inconspicuous ventral longitudinal region

(previously termed the groove), medially two, and distally one row either side.

Achaetous region behind prostomium, about twice size of chaetiger one (Fig. 2A). Chaetigers one to seven similar; parapodia biramous (Fig. 2C–J). Notopodial prechaetal lamellae low triangular, confluent with larger slender foliaceous postchaetal lamellae, which increase slightly in size along thorax. Point of connection between pre- and postchaetal lamellae becoming closer to distal lamellar tips in the posterior thorax. Upper edges of notopodial postchaetal lamellae smooth. Slender, digitiform prechaetal superior dorsal lobes (SDL) present on all thoracic chaetigers (except chaetiger nine), increasing in size along thorax. Those of chaetiger one relatively small. Neuropodia of chaetigers one to seven with slender triangular lamellae underneath chaetae (VNL) with low pre- and postchaetal ridges.

Chaetiger eight (Fig. 2K): notopodial prechaetal lamellae well developed, confluent with slightly larger, rounded foliaceous postchaetal lamellae. Point of connection near distal tips, thus appearing almost subchaetal, somewhat U-shaped under chaetal bundle. Prechaetal superior dorsal processes (SDL) longer than on preceding chaetigers. Neuropodial lamellae digitiform in a distinctly prechaetal position, confluent with triangular postchaetal lamellae. Chaetae of chaetigers one to eight simple bilimbate winged capillaries with smooth edges (Fig. 2P, Q).

Chaetiger nine (Figs. 2A, 3, 4A–C): shorter than preceding chaetigers. Lamellae broad and low, prechaetal lamellae rounded and smooth, confluent with higher rounded triangular postchaetal lamellae in both rami (Fig. 2L). Superior dorsal lobes (SDL) absent. Chaetae mucronate (Figs. 2R, S, 5B, E, F), arranged in arcs; chaetae longer but with narrower distal tips towards margins of each fan (Figs. 2L, 5E). A distinct longitudinal groove along one edge. Thoracic interparapodial margins generally straight, not bulbous (Figs.

2A, 3, 4A–C). No ventral markings or swellings of thoracic region, or dorsal grooves observed (Fig. 4A, B).

Abdominal chaetigers (Fig. 2M–O) with spatulate lateral lamellae, of about equal size in both rami. Lateral lamellae marginally overlapping in the anterior abdomen only. Slight postchaetal extension of lateral lamellae behind chaetal rows observed for chaetiger ten (Fig. 2M); however, not observed on other chaetigers, chaetae emerging from distinct ridge. Dorsal and ventral processes (DML and VML) at inner margins of chaetal rows present but fairly small.

Abdominal chaetae (Figs. 2T, U, 5C, D) tridentate hooded hooks of similar size (no smaller hook at the base of lamellae observed), superior two fangs parallel, above main fang. Hooks in each ramus unidirectional (Fig. 2M–O), main fangs pointing laterally. Initially around ten hooks per ramus, decreasing to approximately eight hooks per ramus by chaetiger 34 and six by chaetiger 44. A few hooks towards the extreme posterior appear almost vis-à-vis in orientation.

Paired anteriorly open pouches present on holotype between chaetigers 10–11, 14–15 (Σ configuration pouches sensu Fiege et al. (2000): well developed, large membrane bounded between two cuticular flaps) (Figs. 3, 4A–C). Variation between number and location of anteriorly open pouches observed, some pouches unpaired, e.g., present between chaetigers 10–11LR, 14–15R, 15–16L, 18–19R, 19–20L on one specimen, and between chaetigers 10–11LR and 14–15L on another. Unpaired posteriorly open pouches present in mid and posterior abdomen, on alternate chaetigers, and alternating from one side of the body to the other [C configuration pouches sensu Fiege et al. (2000)] (Figs. 3, 4D, E), simple and pocket-like, edges of which are smooth. On holotype posteriorly open pouches occurring on chaetigers 21L, 23R, 25L, 27R, 29L, 31R, 33L, 35R, 37L, 39R, 41L, 43R, 45L, 47R, 49L,

51R, 53L, 55R. Other paratypes following a similar pattern of pouch locations for posteriorly open pouches.

Two long anal cirri present laterally on pygidium, anus ventral (Figs. 3B, 4D).

Several ovigerous specimens (e.g., NMW.Z.2021.002.0002), eggs 60–80 μ m in diameter (Fig. 5A). No tubes observed associated with any specimens. Balls of sediment observed in the gut of the 34 chaetiger paratype (NMW.Z.2021.002.0003), as noted previously for *Magelona alleni* Wilson, 1958 (Mills & Mortimer 2019).

Color.—No live specimens observed; all specimens stained with Rose Bengal show a consistent pattern. Spots at the bases of the palpal papillae and distinct speckles around the buccal region noted (Fig. 4A), the latter of which is seen dorsally through the body wall. Dorsally, speckled areas noticeable adjacent to the parapodia, almost joining to form dorsal stripes (Fig. 4B). Those of the anterior thoracic region darker, whereas those of the posterior thorax are more arched. Stripes continuing into the abdominal region, but becoming paler towards the pygidium (Fig. 3B). Ventrally, staining pattern similar but not as distinct as that observed on the dorsal surface (Fig. 4A). Abdominally, ventral speckled areas are noticeable, level with parapodia and occurring either side of the mid-ventral line (Fig. 4A). Darker patches between chaetigers nine and ten (Fig. 4A). Interparapodial patches present abdominally (Fig. 4E) and some lightly speckling on flaps of anteriorly open pouches (Fig. 4B).

Methyl green staining shows no specific pattern, just an overall diffuse stain (Fig. 4C). However, after much of the stain has dissipated, stain is retained as speckles on the achaetous first segment, over the surface of the papillae, and as a darker stain between chaetigers four and six. Specimens observed some weeks later, still carrying slight speckling across thorax.

Etymology.—The specific name is derived from the Greek ‘*brachys*’, meaning short, and the Latin ‘*palpatus*’ referring to the presence of palps, together denoting the unusually short palps observed in this species.

Remarks.—*Magelona brachypalpata* described herein from off Long Island is the same as that from Woods Hole mentioned and used by Jones (1968) in his comprehensive morphological and behavioral account of *Magelona* sp.

Magelona brachypalpata belongs to the ‘*Magelona mirabilis* group’ of species that all possess mucronate chaetae of the ninth chaetiger and rounded prostomia lacking prostomial horns (Table 1). There are 14 clear members of this group: *M. mirabilis*, *M. obockensis*, *M. sacculata*, *M. riojai*, *M. sachalinensis*, *M. crenulata*, *M. pectinata*, *M. tinae*, *M. johnstoni*, *M. conversa*, *M. debeerei*, *M. parochilis*, and two unnamed species (*Magelona* sp. A and *Magelona* sp. B) of Uebelacker & Jones (1984).

Magelona brachypalpata differs from *Magelona* sp. A, *M. sachalinensis*, and *M. conversa* in possessing tridentate and not bidentate abdominal hooded hooks, and in the absence of an additional prechaetal neuropodial lobe on chaetiger nine, which these three species have. In possessing smooth notopodial thoracic lamellae, *M. brachypalpata* differs from the following species in which they are crenulate, pectinate or bi-lobed: *M. johnstoni*, *M. pectinata*, *M. tinae*, *M. obockensis*, *M. crenulata*, and *Magelona* sp. B. *Magelona johnstoni* further differs in possessing superior dorsal lobes on chaetigers four to eight only (unlike the new species in which they are present on chaetigers one to eight), a characteristic shared with *M. debeerei*. Additionally, *M. pectinata*, *M. tinae*, and *M. obockensis* possess an additional prechaetal neuropodial lobe on chaetiger nine, not present in *M. brachypalpata*. *Magelona mirabilis* differs from *M. brachypalpata* and all other mucronate species in lacking both superior dorsal lobes of the thoracic

region and paired anteriorly open pouches of the anterior abdomen. *Magelona brachypalpata* differs from *Magelona* sp. A, *M. tinae*, *M. obockensis*, *M. crenulata*, and *Magelona* sp. B in possessing abdominal hooded hooks in a predominately unidirectional orientation as opposed to vis-à-vis. *Magelona parochilis* differs in the nature of both the notopodia and neuropodia of chaetiger nine. The notopodia of *M. parochilis* is developed subchaetally, and an additional prechaetal process is present in the neuropodia (which is absent in the new species).

Magelona brachypalpata most closely resembles *M. riojai*, originally described from the Gulf of Mexico, and *M. sacculata*, described from the Pacific Ocean off California. However, it differs from both species in possessing distinctly shorter palps (assumed from original description for *M. sacculata*, since they are partially broken for the holotype, see below). *Magelona brachypalpata* further differs from *M. sacculata* in possessing superior dorsal lobes on chaetigers one to eight, whereas in the latter species they occur on chaetigers four to eight only. Additionally, *Magelona sacculata* is described from the Pacific coast of America, well outside the type locality of *M. brachypalpata* in the Temperate Northern Atlantic. *Magelona brachypalpata* differs from *M. riojai* in the notopodial lamellae of chaetiger eight, which in *M. riojai* are much more subchaetal than in *M. brachypalpata* (both the prechaetal and postchaetal lamellae being of a similar height). The two species additionally differ in the nature of the chaetae of the eighth and ninth chaetigers. Brasil (2003) highlighted *M. riojai* to possess bilimbate chaetae with irregular blades, something also noted for *M. variolamellata* Bolívar & Lana, 1986, *M. pacifica* Monro, 1933, and *M. pitelkai* Hartman, 1944. Examination of the type material of *M. riojai* shows this is correct (see below), particularly for chaetiger eight, and thus differs from *M. brachypal-*

Table 1.—Pictorial table key displaying all mucronate species of *Magelona* (*Magelona mirabilis* group). Abbreviations: a = requires confirmation, b = those of the last chaetiger often small to minute, SDL = superior dorsal lobes, VNL = ventral neuropodial lamellae, subchaeta (often slender triangular); Σ , C = configuration pouches sensu Fiege et al. (2000); 1–8, 11–12, (...) = chaetigers 1–8, 11–12, (...).


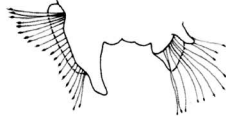
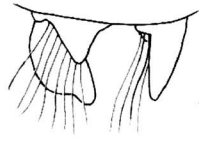
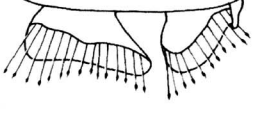
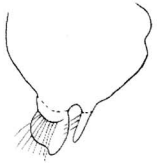

Abdominal hook dentition	Thoracic notopodial lamellae	Mid thoracic parapodia	SDL present	Abdominal hook orientation	9th chaetiger parapodia	Abdominal pouches	Additional distinguishing features	Ecoregion (sensu Spalding et al. 2007)	Species
Bi-	Bilobed		1–8	Vis-à-vis		Σ 11–12; C alternating from chaetiger 26		Temperate Northern Atlantic	<i>Magelona</i> sp. A Uebelacker & Jones, 1984
Bi-	Foliaceous		1–8*	Unidirectional? (assumed from original figure)		Σ 11–12; C(?) singularly or paired, irregular pattern	SDL of anterior thorax appearing relatively small	Temperate Northern Pacific	<i>Magelona sachalinensis</i> Buzhinskaja, 1985
Bi-	Foliaceous		5–8	Unidirectional		Σ often on 11, 14, 17, 20; C alternating from chaetiger 23	Long prechaeta neuropodial lamellae of the thorax	Western Indo-Pacific	<i>Magelona conversa</i> Mortimer & Mackie, 2003

Table 1.—Continued.




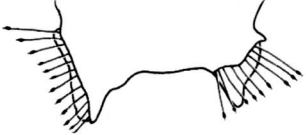

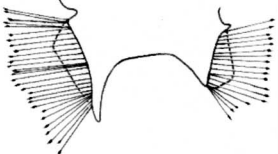
Abdominal hook dentition	Thoracic notopodial lamellae	Mid thoracic parapodia	SDL present	Abdominal hook orientation	9th chaetiger parapodia	Abdominal pouches	Additional distinguishing features	Ecoregion (sensu Spalding et al. 2007)	Species
Tri-	Crenulate		4-8	Unidirectional		Σ 10-11, also may be present on 13-19; C alternating from ~20		Temperate Northern Atlantic	<i>Magelona johnstoni</i> Fiege, Licher & Mackie, 2000
Tri-	Pectinate		1-8	Unidirectional? (assumed from original figure)		Σ present between chaetigers 11-12, 13-14 (sometimes 10-11, 12-13); Pouches reported in posterior region		Western Indo-Pacific	<i>Magelona pectinata</i> Nateewathana & Hylleberg, 1991
Tri-	Crenulate, distinctly bilobed on 8		1-8	Vis-à-vis		Σ 11-12; C alternating from chaetiger 22	Smaller than <i>M. obockensis</i> , less foliaceous, abdominal postchaetal expansion less well developed	Western Indo-Pacific	<i>Magelona tiniae</i> Nateewathana & Hylleberg, 1991

Table 1.—Continued.


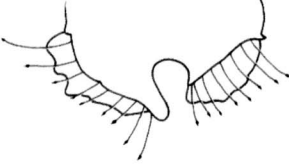

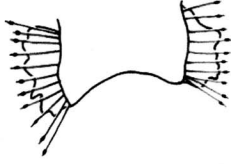
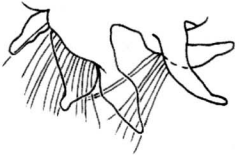
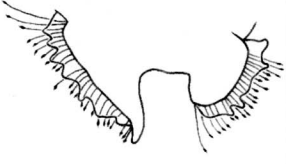
Abdominal hook dentition	Thoracic notopodial lamellae	Mid thoracic parapodia	SDL present	Abdominal hook orientation	9th chaetiger parapodia	Abdominal pouches	Additional distinguishing features	Ecoregion (sensu Spalding et al. 2007)	Species
Tri-	Crenulate, distinctly bilobed on 6		1-9 ^b	Vis-à-vis		Σ 11-12; C alternating from chaetiger 16; Graduation between pouch morphologies suggested	See Mortimer (2010)	Western Indo-Pacific	<i>Magelona obockensis</i> Gravier, 1905
Tri-	Bilobed		1-8	Vis-à-vis		Paired 11-12; Unpaired 20, 28		Temperate South America	<i>Magelona crenulata</i> Bolívar & Lana, 1986
Tri-	Bilobed		1-8	Vis-à-vis		Σ 11-12; C alternating from chaetiger 18	Many similarities with <i>M. crenulata</i>	Temperate Northern Atlantic	<i>Magelona</i> sp. B Uebelacker & Jones, 1984

Table 1.—Continued.

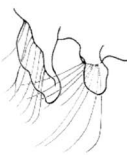
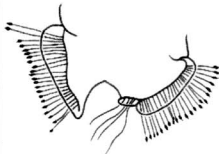

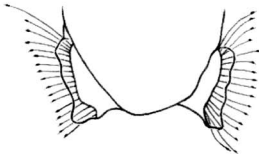



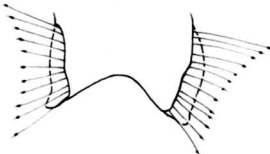

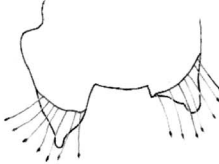

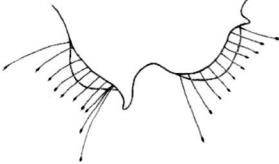
Abdominal hook dentition	Thoracic notopodial lamellae	Mid thoracic parapodia	SDL present	Abdominal hook orientation	9th chaetiger parapodia	Abdominal pouches	Additional distinguishing features	Ecoregion (sensu Spalding et al. 2007)	Species
Tri-	Foliaceous		Absent	Unidirectional		C alternating from chaetiger ~78		Temperate Northern Atlantic	<i>Magelona mirabilis</i> (Johnston, 1865)
Tri-	Foliaceous		1-8	Unidirectional		Σ 11-12, 15, 16; C from chaetiger 21, alternating		Tropical Atlantic	<i>Magelona riojai</i> Jones, 1963
Tri-	Triangular		1-8	Unidirectional		Σ 10-11, ~14-20; C alternating from chaetiger 21		Temperate Northern Atlantic	<i>Magelona brachypalpata</i>

Table 1.—Continued.

Abdominal hook dentition	Thoracic notopodial lamellae	Mid thoracic parapodia	SDL present	Abdominal hook orientation	9th chaetiger parapodia	Abdominal pouches	Additional distinguishing features	Ecoregion (sensu Spalding et al. 2007)	Species
Tri-	Triangular		4–8	Unidirectional		Σ 10–11; C alternating from chaetiger 22		Temperate Northern Pacific	<i>Magelona sacculata</i> Hartman, 1961
Tri-	Spatulate		4–8	Unidirectional		Σ 10–11, 14–15 (some 13–14); C?		Temperate Southern Africa	<i>Magelona debeerei</i> Clarke, Paterson, Florence & Gibbons, 2010
Tri-	Spatulate		1–8	Unidirectional		Σ 11–12, 14–15 (some 17–18); C alternating from chaetiger 21	Presence of VNL on chaetiger 9	Temperate Northern Pacific	<i>Magelona parocholis</i> Zhou & Mortimer, 2013

pata in which the thoracic chaetae are smooth. Furthermore, the two species differ in the mucronate chaetae of chaetiger nine. Jones (1963) stated that the specialized chaetae of *M. riojai* "are not mucronate, but bear asymmetrical expanded subterminal limbations," although later noting the limbations were variously modified and those in the most medial region possessed mucronate tips. As shown by his figure of the medial chaetae (Jones 1963: Fig. 32), *M. riojai* possesses some mucronate chaetae in the mid ramus, but they are not the predominate form for chaetiger nine as for *M. brachypalpata*. *Magelona brachypalpata* is described from the Temperate Northern Atlantic bioregion, whereas *M. riojai* is described from the Tropical Atlantic. The similarity of *M. riojai* and *Magelona* sp. of Jones (1968) (the species herein formally described as *M. brachypalpata*) was highlighted in Day (1973). The survey of polychaetes off North Carolina highlighted the presence of four magelonids, including a species identified as *M. papillicornis*. Day (1973) stated that discussions with Jones suggested that these specimens were likely to be *Magelona* sp. of Jones (1968), and thus *M. brachypalpata*. Jones was additionally quoted as saying that although morphologically similar, *M. riojai* and *Magelona* sp. differed in the shape of the prostomium and the chaetae of chaetiger nine, as highlighted herein.

A pictorial key to all known mucronate magelonid species is provided in Table 1, highlighting the differences noted above.

Distribution and habitat.—Found in sand off Long Island, with the sand dollar *Echinarachnius parma* (Lamarck, 1816), mysids, the polychaete *Polygordius jouinae* Ramey, Fiege, & Leander, 2006, the amphipod *Pseudunciola obliquua* (Shoemaker, 1949), paraonids, and syllids (Fig. 6). Currently, the only verified records of the species are from off Long Island and other locations in the New York Bight (see Material Examined) and at various loca-

tions in and around Woods Hole, Massachusetts, reported by Jones (1968), including the sand beach in front of the Marine Biological Laboratory and the Buzzards Bay side of Naushon Island. All samples were from sandy sediments, from the low intertidal.

However, records of a mucronate species approaching *M. riojai* by Day (1973) suggest the species may be present in North Carolina, although, verification of the records are needed, particularly in light of the morphological similarity with *M. riojai*.

Magelona riojai Jones, 1963

Fig. 7

Magelona riojai Jones, 1963:9–15, Figs. 22–35.

Material examined.—Southern Gulf of Mexico, Mexico, Antón Lizardo, state of Veracruz, low intertidal to shallow subtidal, coll. sand substrate, 09 Aug 1962: holotype (AMNH 3641; c), paratypes (AMNH 3642; 4af, 14f, 5pf, 4 palps, several specimens clearly dissected). Not AMNH 3643 and AMNH 3644 (see discussion below).

Diagnosis.—Long prostomium without prostomial horns. Thoracic notopodial lamellae slender foliaceous, smooth edged, neuropodial lamellae slender triangular. Superior dorsal lobes (SDL) present from chaetigers one to eight. Capillary chaetae from chaetigers one to eight, those in the posterior thoracic with irregular blades. Mid-ramus chaetae of chaetiger nine mucronate. Abdominal lamellae spatulate with triangular DML and VML. Abdominal hooded hooks tridentate, unidirectional. Anteriorly and posteriorly open pouches present.

Description.—Holotype (Fig. 7A), a moderate, complete specimen (highly curled), abdomen of a similar width to thorax. Prostomium approximately 0.59 mm long, 0.48 mm wide (measurements approximate due to prostomial damage);

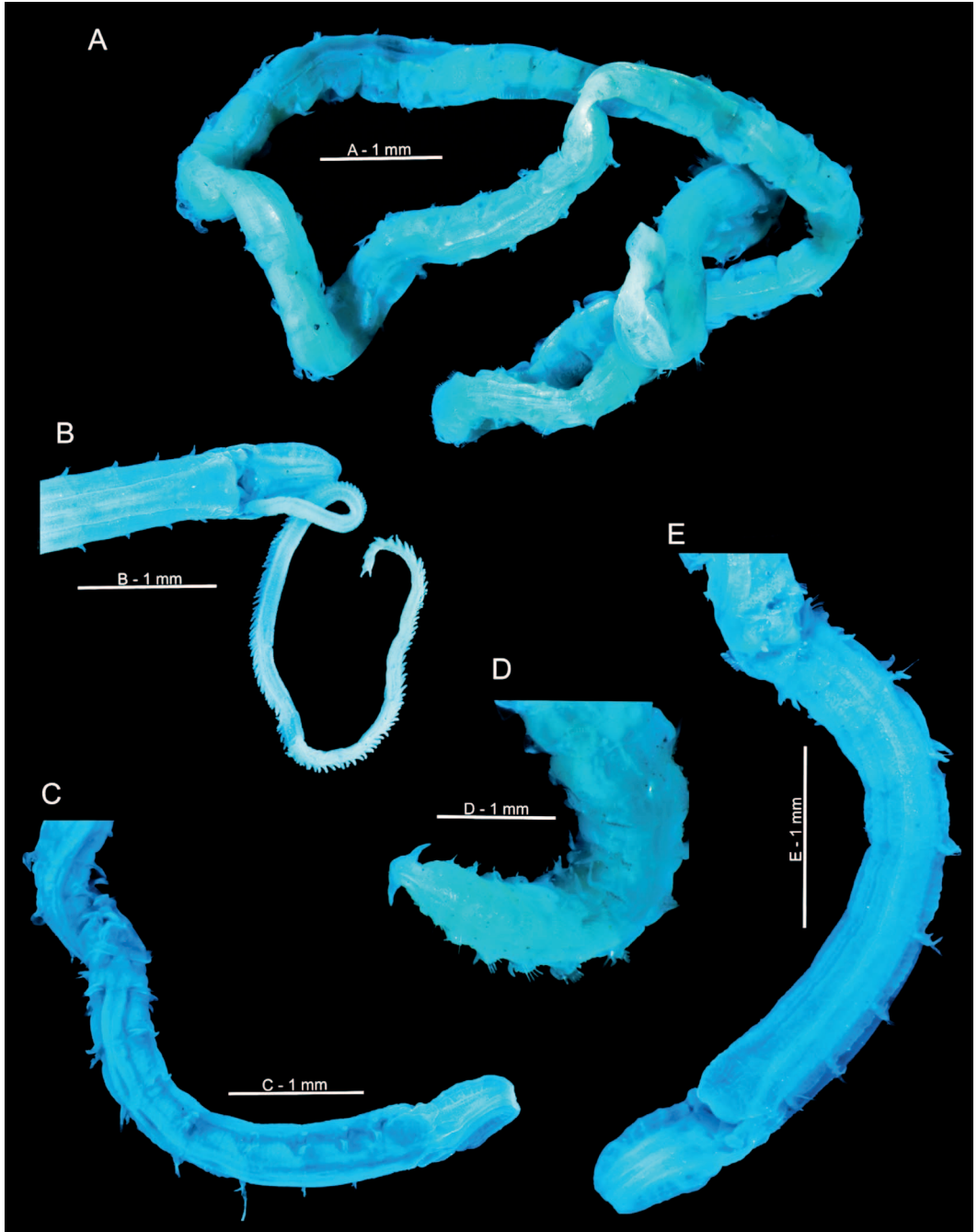


Fig. 7. *Magelona riojai* (A, Holotype; B–E, Paratypes AMNH 3642). A, complete animal; B, anterior region (ventral view); C, anterior region (dorso-lateral view); D, posterior region (ventral view); E, anterior region (ventral view). (Stained with methyl green.)

thorax (including prostomium) 3.3 mm long, 0.45 mm wide at widest point; abdomen 0.45 mm wide; total length \sim 22 mm for 68 chaetigers (N.B. holotype measurements approximate due to curled body). Other specimens, all posteriorly incomplete (AMNH 3642, N.B. posterior fragments present in vial, possibly previously dissected by Jones) with 2–51 chaetigers; larger specimens measuring 13–19.3 mm long.

Prostomium longer than wide (L:W ratio 1.4–1.6), spatulate, without prostomial horns, anterior margin smooth and straight to marginally rounded, eyes absent (Fig. 7C) (N.B. LH margin of holotype damaged). Two pairs of slender longitudinal dorsal muscular ridges, outer pair (slightly shorter, longitudinally ridged) abutting inners for entire length, inner pair reaching distal tip of prostomium. Indistinct markings present on either side of muscular ridges. Burrowing organ not everted on any specimens. Palps retained on one paratype specimen (AMNH 3642; 4 chaetiger af), arising ventro-laterally from base of prostomium, 6.2 mm long reaching the equivalent of chaetigers 18–20. Non-papillated region long, reaching chaetiger three. Papillae occurring in two rows either side of indistinct longitudinal ventral line proximally and medially, reducing to one row either side distally.

Achaetous region posterior to prostomium approximately twice the size of chaetiger 1 (Fig. 7C). Buccal region on ventral side of prostomium, comprised of a larger upper lip above two smaller lips (Fig. 7B). Chaetigers one to eight similar; parapodia biramous (Fig. 7C; see Figs. 23, 24 of Jones 1963). Notopodia prechaetal lamellae low triangular, increasing in size and becoming well developed by chaetiger five, confluent with larger slender foliaceous postchaetal lamellae. Point of connection between pre- and postchaetal lamellae becoming closer to distal lamellar tips toward the posterior thorax. Upper

edges of notopodial postchaetal lamellae relatively smooth. Slender, tapering cirri-form prechaetal superior dorsal processes (SDL) present on all thoracic chaetigers, except chaetiger nine, those of chaetiger one minute. Neuropodia of chaetigers one to seven with slender triangular lamellae directly ventral to chaetal bundle (VNL). Lamellae becoming marginally longer and broader along thorax. Pre- and postchaetal lamellae low.

Chaetiger eight (see Fig. 24 of Jones 1963. N.B. drawing is an anterior view not posterior as stated) with well-developed notopodial prechaetal lamellae, confluent with postchaetal lamellae of a similar size. Point of connection between lamellae, near distal tips, thus somewhat subchaetal. When viewed laterally, lamellae form a U-shaped structure around chaetae. Superior dorsal processes digitiform (SDL). Neuropodial lamellae broader than on preceding chaetiger in a distinctly prechaetal position, postchaetal lamellae slightly larger than on preceding chaetigers and marginally triangular. Chaetae of chaetigers one to eight unilimbate and bilimbate winged capillaries (Figs. 28, 29 of Jones 1963), slightly longer in notopodia than neuropodia. Majority of capillaries with smooth blades, but those of posterior thorax (particularly chaetiger eight) with irregular blades. Chaetae of chaetiger eight characteristically splayed, particularly in the neuropodia.

Chaetiger nine: shorter than preceding chaetigers (Fig. 7E). Noto- and neuropodia similar, prechaetal lamellae low, smooth, confluent with slightly higher rounded postchaetal lamellae, slightly pointed tips (Fig. 25 of Jones 1963). Superior dorsal processes (SDL) absent. Chaetae, arranged in splayed arcs; chaetae long at the outer margins of each fan. Chaetae of mid-ramus mucronate, those on either side with narrower tips and irregular blades (well-illustrated by Jones 1963: Figs. 30–32). Chaetae marginally

shorter in comparison to preceding chaetigers.

Thoracic interparapodial margins straight, no thoracic dorso-lateral grooves. No ventral thoracic swellings or markings present.

Abdominal chaetigers with spatulate lateral lamellae, of about equal size in both rami, bluntly rounded (Figs. 26, 27 of Jones 1963). Lateral lamellae marginally overlapping in anterior abdomen only. No postchaetal extension of lateral lamellae behind chaetal rows. Triangular dorsal and ventral processes (DML and VML) at inner margins of chaetal rows present, longer in posterior chaetigers. Abdominal chaetigers marginally longer than wide.

Abdominal chaetae tridentate hooded hooks of similar size, superior two fangs parallel, above main fang (Figs. 33, 34 of Jones 1963). Hooks in each ramus unidirectional, main fangs pointing laterally (Figs. 26, 27 of Jones 1963). In extreme posterior chaetigers, hooks appearing vis-à-vis as noted for *M. brachypalpata*. Approximately ten to twelve hooks per rami. No aciculae observed. Hook adjacent to lateral lamellae of similar size to remaining hooks, no enlarged chaetae or spines present.

Paired anteriorly open pouches present between chaetigers 10–11 on holotype and additionally on chaetigers 15L and 16R for 30 chaetiger paratype (Σ configuration pouches sensu Fiege et al. 2000: well-developed, bag-like membrane, bounded between two cuticular flaps) (Fig. 7E). Unpaired posteriorly open pouches present in mid and posterior abdomen, on alternate chaetigers and alternating from one side of the body to the other (C configuration pouches sensu Fiege et al. 2000) (Fig. 7A). Pouches observed on chaetigers 15L, 16R, 21L, 23R, 25L, 27R, 29L, large often folded medially for 30 chaetiger paratype (AMNH 3642).

Pygidium triangular, with long tapering cirri on either side, anus triangular in shape, ventrally placed (Fig. 7D).

Paratype (AMNH 3642; 51 chaetiger af) ovigerous. No tubes noticeable on any specimens.

Color.—No live specimens observed originally, all preserved. Most specimens originally stained with Rose Bengal, now faded; cream-white in alcohol, no pigment band. Brown pigment present at distal tips of loose palps, as noted by Jones (1963). Staining with methyl green diffuse; however, when much of the stain has dissipated light staining of the prostomium and achaetous region to chaetiger three noticeable. Additional speckled areas on pouch flaps and as interparapodial patches.

Remarks.—Of all known magelonid species, *M. riojai* most closely resembles *M. brachypalpata* as noted in the remarks above. It additionally resembles *M. sacculata* but varies in possessing superior dorsal lobes on chaetigers one to eight. The similarities and differences between *M. riojai* and all other mucronate magelonid species are highlighted in Table 1.

It is unclear which specimens Jones used for illustrations in the original description of the species; however, it is unlikely to be the holotype, which is highly coiled (Fig. 7A) and the anterior drawing does not appear to be any of the paratypes observed in the current paper [however, as noted above, the museum (AMNH) retained one paratype from each vial before posting for safety purposes]. Based on information in Jones (1963), the original description does not appear to be based on the specimens retained at the Smithsonian. However, there are several dissected paratypes (AMNH 3642) that may be the basis of some of the original drawings, particularly those of the pygidial region (compare Fig. 7D with Fig. 35 of Jones 1963). The accuracy of the original drawings and description is good; however, additional features that now form part of the standards of modern magelonid species descriptions, and that are necessary for delimitation of species, have been added.

One variation between this redescription and the original is the shape of the prostomial margin, which Jones (1963: Fig. 22) drew as distinctly straight. It should be noted that there is some variation within the material, and in some specimens it is much more rounded (Fig. 7B).

Observation of the type material revealed that there is more than one species present. The holotype and one paratype lot (AMNH 3642) are the same species and are the basis of the redescription herein presented. The paratype lot (AMNH 3643) collected close to the breakwater near the Marine Biological Station of the Technological Institute of Veracruz on 06 Aug 1962, lack lateral abdominal pouches between chaetigers 10–11 (Fig. 8), as noted by Jones but which are present on the holotype of *M. riojai*. Knowledge and understanding of lateral pouches in the 1960s were lacking and was mostly limited to recording presence or absence. It was not until the review of Fiege et al. (2000) that lateral pouches were better understood and gained taxonomic relevance (see also Mortimer & Mackie 2014); thus, the significance of the absence of pouches in the material collected from the Institute of Veracruz was not recognized at the time. The specimens resemble *Magelona pulchella* Mohammad, 1970 originally described from Kuwait (Persian Gulf) and which show a comparable striped methyl green staining pattern, with a similarly shaped prostomium (Fig. 8A). These specimens do not match any known species within the region. Thus, it is likely to correspond to a new species. Unfortunately, the lack of additional material prevents description at this time. We suggest that these specimens should be considered as *Magelona* cf. *pulchella* until they can be formally described.

The ovigerous paratype lot (AMNH 3644) collected from Indian Pass, Gulf

County, Florida on 21 Nov 1959, also shares similarities with *M. riojai* and *M. brachypalpata* described herein but is a much larger specimen, being approximately 0.7 mm wide (Fig. 9). This specimen differs from *M. riojai* in having more densely papillated palps and paired anteriorly open pouches between chaetigers 16–17 in addition to those between 10–11. It further differs in the mucronate chaetae of chaetiger nine (which are predominately mucronate) and in possessing smooth capillary chaetae of chaetiger eight without irregular blades. Furthermore, the superior dorsal lobes of the thoracic region are very small (especially in comparison to the size of the specimen), in particular those of chaetigers one and two. The lack of additional material prevents further identification, but the variations within are sufficient enough to suggest it represents a different species, here termed *Magelona* sp. Fl (Florida). Due to this issue, care must be taken when considering details based around two of the paratype lots (AMNH 3544 and 3644) in the original description.

A description of *M. riojai* specimens from off Brazil was provided by Bolívar & Lana (1986), but slight differences are noted between their description and the re-description herein. Namely, the abdominal hooks that are described in the Brazilian material to be predominately vis-à-vis apart from chaetiger ten, whereas those of the type material are predominately unidirectional with only those towards the pygidium being vis-à-vis (as noted also in *M. brachypalpata*). This change in abdominal hook orientation is something that warrants further investigation in other mucronate species.

Distribution and habitat.—Type specimens recorded from the low intertidal to barely subtidal, from a sand substrate (holotype and paratype AMNH 3642).

Type locality.—Mexico, Antón Lizardo, Gulf of Mexico.

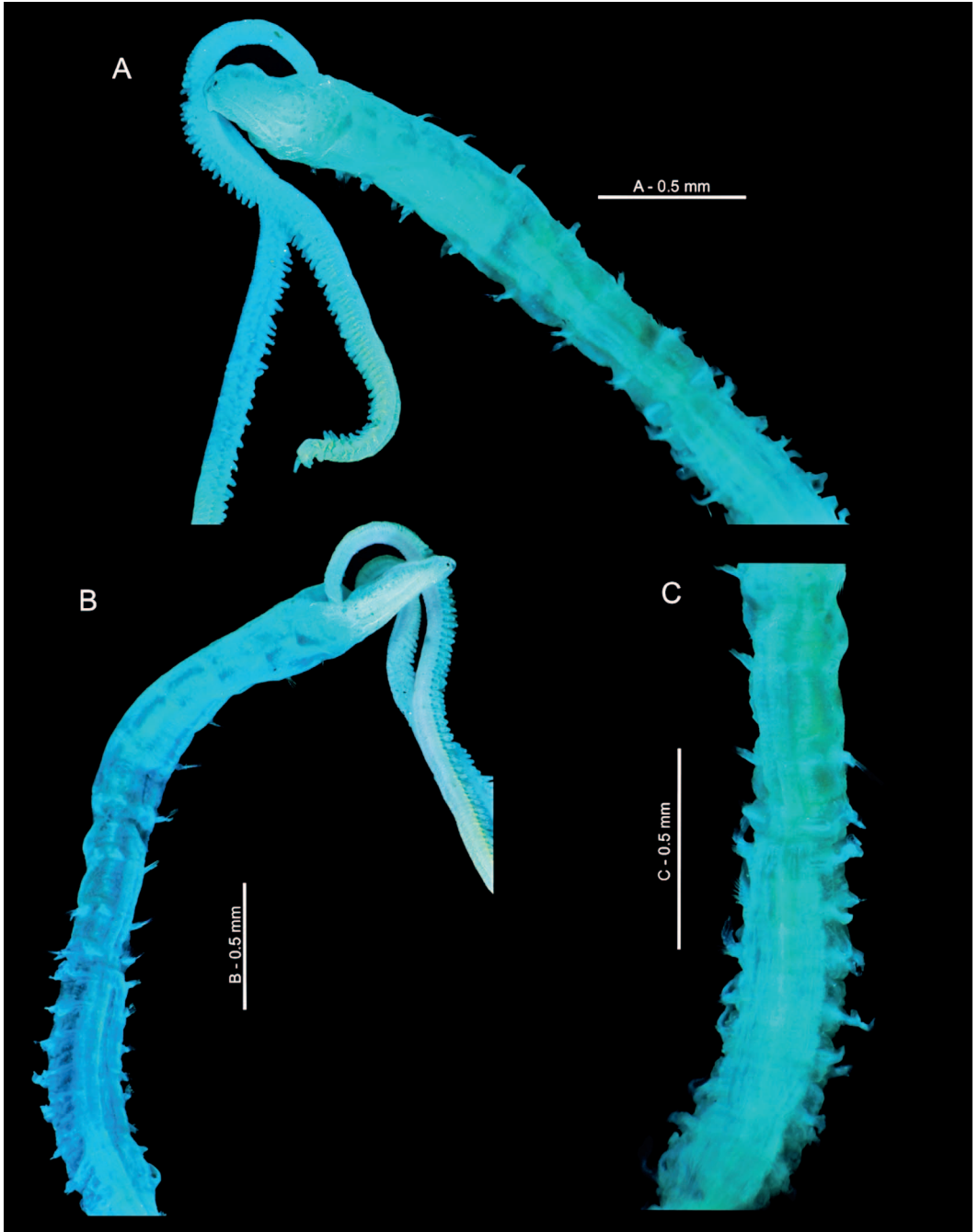


Fig. 8. *Magelona* cf. *pulchella* (AMNH 3643, as a paratype of *M. riojai*). A, anterior region (dorso-lateral view); B, anterior region (dorso-lateral view); C, thorax (dorso-lateral view). (Stained with methyl green.)



Fig. 9. *Magelona* sp. F1 (Florida) (AMNH 3644 as a paratype of *M. riojai*). A, B, anterior region (dorsal views). (B stained with methyl green.)

The species is additionally reported from North Carolina (34.6°N, 77.4°W) to South East Brazil (26.9°S, 48.6°W) from depths up to 32 m (GBIF Secretariat 2019b). However, northern records of *M. cf. riojai* may correspond to *M. brachypalpata*, and note also the comments above about variations in abdominal chaetae in Brazilian specimens. Several records well outside the known distribution have been made: south of South Georgia and the South Sandwich Islands (57.5°S, 38.0°W, GBIF Secretariat 2019b), and off Jaco, Costa Rica (9.37°N, 84.38°W, Fauchald 1973). Fauchald (1973) noted several differences for the Costa Rican material, such as a more truncate anterior end and more slender mucronate tips on chaetiger nine, and both records from Antarctic and Costa Rican waters warrant clarification, given their great distance from the type-locality of *M. riojai*.

Magelona sacculata Hartman, 1961
Figs. 10, 11

Magelona sacculata Hartman, 1961:101–102, pl. 18, Figs. 1–7, 1963:47, 1966:403, 1969:197, 7 Figs.—Blake 1975:216, Fig. 254, 1996:259–260, Fig. 7.3.—Hobson & Banse 1981:46–47, Fig. 7q–u.—Blake & Ruff 2007:377, Pl. 87, Fig. D–G.

Material examined.—Holotype (LACM-AHF POLY 596; c), 6 miles SE x E (124° T) from Long Beach Breakwater Light, Los Angeles County, California, 33°40'00"N, 118°05'08"W, 12 fm (22 m), hard-packed grey sand, grab, R/V *Velero* IV Stn 2311-53, Allan Hancock Foundation, 16 May 1953. Other material (NMW.Z.1989.115.0003; 2af), collected from outside the Trevor Channel, Barkley Sound, Vancouver Island, 27 m, medium fine sand by A.S.Y. Mackie & A. Woodham, 14 Aug 1989.

Diagnosis.—Prostomium rounded without prostomial horns. Thoracic lamellae slender triangular, smooth edged. Superior

dorsal lobes present from chaetigers four to eight. Thoracic chaetae all capillary, except those mucronate chaetae of chaetiger nine. Abdominal lamellae spatulate, hooded hooks tridentate, unidirectional. Anteriorly and posteriorly open pouches present.

Description.—Holotype, juvenile, complete, abdomen slightly narrower when viewed dorsally but thicker than thorax when viewed laterally (Figs. 10A, 11B). Prostomium 0.4 mm long, 0.35 mm wide; thorax (including prostomium) 1.5 mm long, 0.45 mm wide at widest point; abdomen 0.4 mm wide; total length 6.5 mm for 43 chaetigers. Non-examined paratype material recorded as much larger, 20–30 mm long for 100+ segments Hartman (1961). (N.B. prostomial length approximate due to anterior margin curling upwards, Fig. 10A. Holotype damaged and bent in mid thorax, Figs. 10A, 11A, C, D). Specimen from Vancouver Island: Prostomium 1.0 mm long, 0.8 mm wide; thorax (including prostomium) 4.0 mm long, 0.8 mm wide; abdomen 0.75 mm wide.

Prostomium marginally longer than wide (L:W ratio 1.14), rounded triangular, without prostomial horns, anterior margin smooth, rounded, eyes absent (Figs. 10A, 11C). Two pairs of longitudinal dorsal muscular ridges, outer pair (slightly shorter) abutting inners for entire length, inner pair almost reaching distal tip of prostomium, diverging slightly. Prostomium appearing relatively smooth on either side of muscular ridges, but faint indistinct markings present (these may be more obvious in larger specimens, as originally drawn by Hartman 1961: pl. 18, Fig. 1). Burrowing organ not everted on holotype (described as subspherical on paratype material, presumably when partially everted). Palps of holotype very short and clearly broken (Figs. 10A, 11A), arising ventro-laterally from base of prostomium, reaching approximately chaetiger eight (detached palp present in holotype vial, too large to belong to holotype).

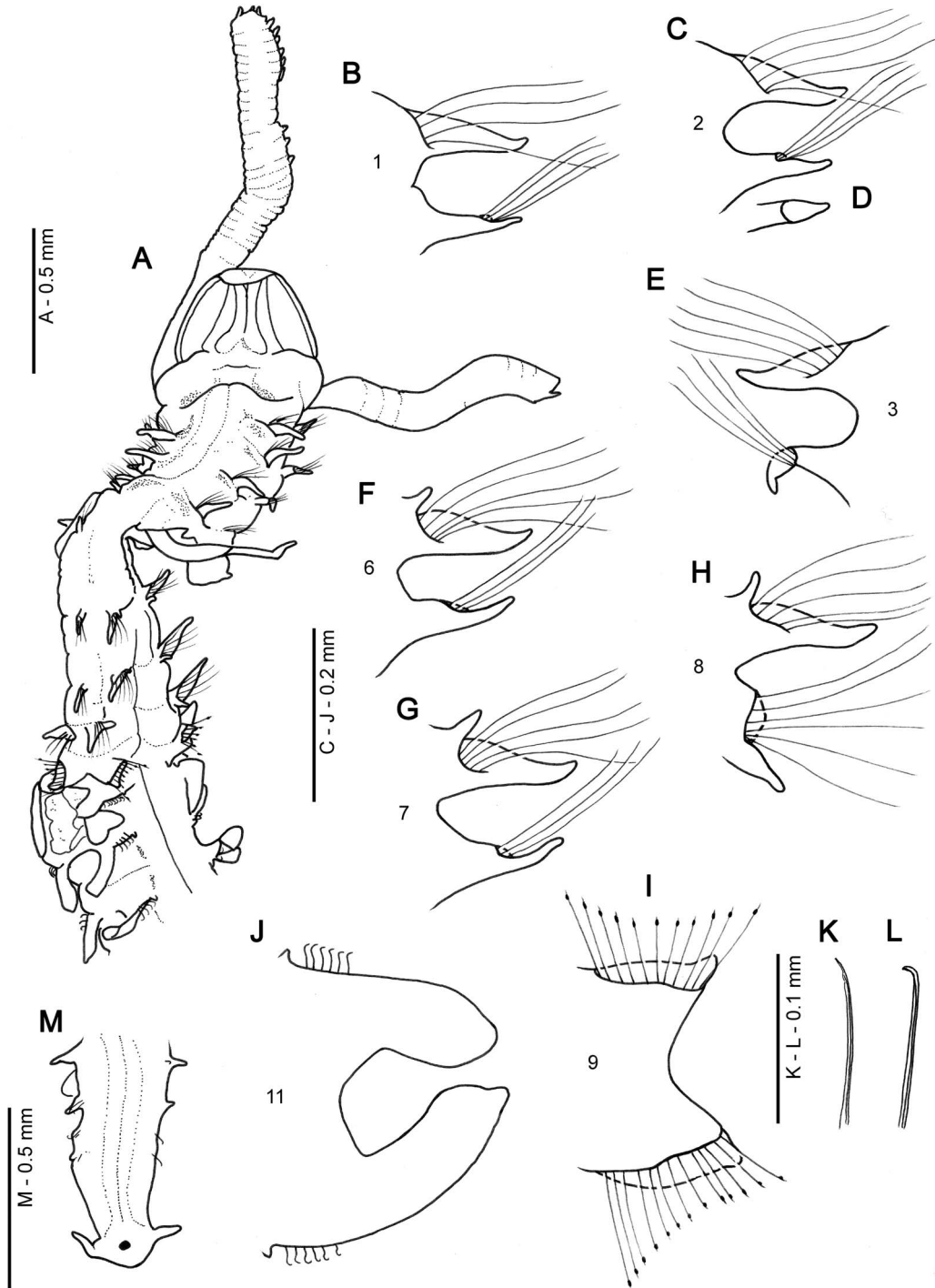


Fig. 10. *Magelona sacculata* (Holotype, LACM-AHF POLY 596). A, anterior region (dorsal view); B, C, right parapodia of chaetigers 1 and 2 (anterior views); D, neuropodial lamellae of chaetiger 2 (ventral view); E, left parapodium of chaetiger 3 (anterior view); F–J, right parapodia of chaetigers 6–9, 11, respectively (anterior views); K, neurochaeta from eighth chaetiger with hooked end; L, outer chaeta from chaetiger nine showing irregular blade; M, posterior region and pygidium (ventral view).

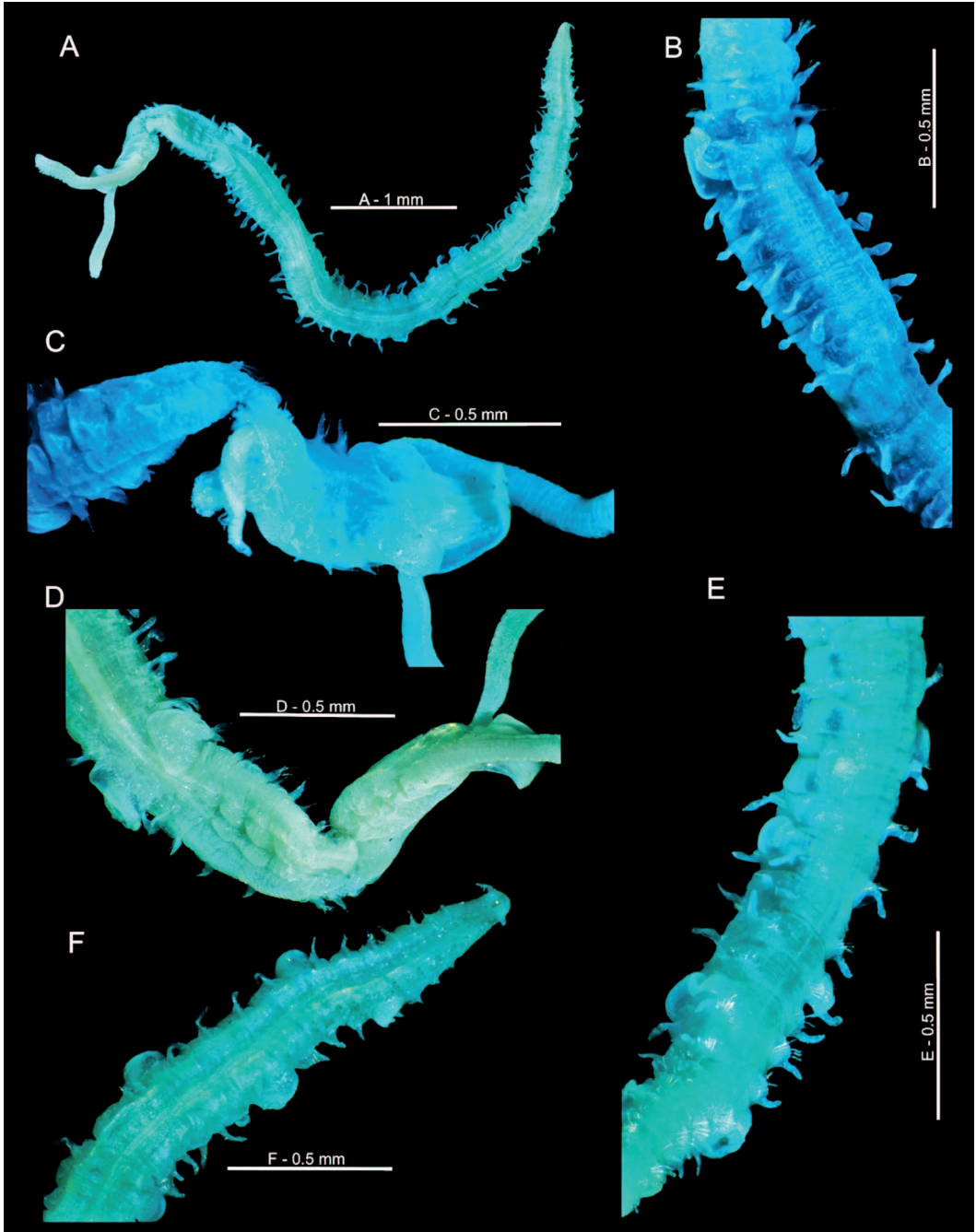


Fig. 11. *Magelona sacculata* (Holotype). A, complete specimen; B, thoracic/abdominal junction showing anteriorly open pouches between chaetigers 10–11 (lateral view); C, anterior region (dorsal view); D, anterior region, showing anteriorly open pouches (ventral view); E, mid abdominal region, showing posteriorly open pouches (dorsal view); F, posterior region, showing pygidium (ventral view). (Stained with methyl green.)

Original drawing (Hartman 1961: pl. 18, Fig. 1) shows long palps, reaching at least chaetiger 20. Non-papillated region long, reaching chaetiger four. Papillae occurring in two rows on either side of longitudinal ventral line, which is distinct within non-papillated region.

Achaetous region behind prostomium, approximately twice size of chaetiger one (Fig. 10A). Chaetigers one to eight similar; parapodia biramous (Fig. 10B–H). Notopodial prechaetal lamellae low triangular, confluent with smooth-edged, slender triangular postchaetal lamellae, becoming marginally longer and wider by posterior thorax. Upper edges of notopodial postchaetal lamellae smooth. Slender cirriform prechaetal superior dorsal lobes (SDL) present on chaetigers four to eight (difficult to observe on chaetiger five of holotype due to condition of mid thorax). Neuropodia of chaetigers one to eight with slender triangular lamellae (with pointed tips) directly underneath chaetae (VNL) of similar length to notopodia (Fig. 10D); lamellae marginally longer in posterior thorax, and those of chaetiger eight in a prechaetal position. Pre- and postchaetal neuropodial lamellae not developed; however, those of chaetiger eight marginally expanded, rounded triangular (Fig. 10H). Chaetae of chaetigers one to eight smooth unilimbate capillaries. Noto- and neurochaetae of a similar length. Neurochaetae of chaetiger eight splayed, with tips of some hooked (Fig. 10L).

Chaetiger nine (Fig. 10A): narrower than preceding chaetigers. Prechaetal lamellae rounded and smooth, confluent with higher rounded triangular postchaetal lamellae (Fig. 10I), albeit shorter than on preceding chaetigers. Those of notopodia slightly pointed on lateral-most edge. Superior dorsal lobes and ventral neuropodial lobes absent. Chaetae mucronate, arranged in arcs; chaetae longer but with narrower distal tips toward margins of each fan (as noted by Hartman 1961), the tips of the latter crenulate (Fig. 10L).

No thoracic ventral swellings or markings observed (Fig. 11D), thoracic interparapodial margins relatively straight, thoracic dorsal grooves absent.

Abdominal chaetigers with spatulate lateral lamellae (Fig. 10J), of about equal size in both rami, some with pointed tips. Lateral lamellae not overlapping between rami and without an obvious basal constriction. No postchaetal extension of lateral lamellae behind chaetal rows. Dorsal and ventral processes (DML and VML) at inner margins of chaetal rows minute.

Abdominal chaetae tridentate hooded hooks of similar size, superior two fangs parallel, above main fang. Hooks in each ramus unidirectional, main fangs pointing laterally (Fig. 10J). Those of the last few chaetigers before pygidium, appearing almost vis-à-vis. Around six hooks per rami. No aciculae or enlarged chaetae observed, hook adjacent to lateral lamellae of similar size to remaining hooks in each ramus.

Paired anteriorly open pouches present between chaetigers 10–11 (Σ configuration pouches sensu Fiege et al. (2000); well-developed, large membrane, extruded, bounded between two cuticular flaps) (Fig. 11A, B, D). Unpaired posteriorly open pouches present in mid and posterior abdomen, on alternate chaetigers, alternating from one side of body to other (C configuration pouches sensu Fiege et al. (2000); simple and pocket-like) (Fig. 11E, F). Posteriorly open pouches quite large, often folded medially. Pouches observed for holotype on chaetigers 22L, 23R, 26L, 28R, 30L, 32R, 34L, 36R, 38L, 40R.

Two long lateral anal cirri present, pygidium rounded, anus ventral (Figs. 10M, 11F).

No tube observed associated with holotype, nor referred to by Hartman (1961).

Color.—No live specimens observed, holotype preserved, cream to white in alcohol. Originally described in life by Hartman (1961:102) as having “paired lavender spots on the dorsum, more intense in the anterior region, and usually within

and over the parapodial bases.” This pigment is now faded. Staining with methyl green diffuse (Fig. 11); however, when much of the stain has dissipated, light transverse dorsal stripes occur on thoracic chaetigers between the parapodia, those of the posterior thorax being slightly arched. No obvious interparapodial staining or patches.

Remarks.—As stated previously, *M. sacculata* most closely resembles *M. brachypalpata* and *M. riojai* as noted above. It can be separated from all mucronate magelonid species as noted in Table 1.

It would be interesting to know the reasoning behind why this particular specimen was chosen as the holotype, in light of its juvenile status and being considerably shorter in terms of number of chaetigers and overall length than other specimens described. Presumably, it was the only entire specimen, although this is not discussed within the paper.

While it is unknown what specimen was drawn in the original description, it is clearly not the holotype due to the presence of an intact thorax and long entire palps. The prostomial drawing included in the original description shows a medial lump of the anterior margin that is not representative of the prostomium of the holotype. It is likely that the prostomial lateral margins of the specimen drawn were curled backwards, making the prostomial ridges look more prominent. (compare Fig. 10A with pl. 18, Fig. 1 of Hartman 1961). Several other issues in Fig. 1, pl. 18 of Hartman (1961) are highlighted, such as capillary chaetae occurring into the abdomen, and the first set of pouches that have been drawn as anteriorly open and pocket-like, both of which have now been shown to be incorrect. Additionally, the abdominal lamellae in Hartman’s Fig. 7 (pl. 18) look larger than those drawn here for the holotype (Fig. 10J), but given the juvenile status of the holotype this may well be related to size. The original pygidium drawing (Fig. 2) makes the anus look almost terminal (a situation recently

described for other magelonids such as *Magelona alleni* and *M. equilamellae* (Mills & Mortimer 2019, Mortimer et al. 2020); however, as is highlighted herein (Fig. 10M) it is indeed ventral. The original description makes no mention of the thoracic superior dorsal lobes, which are now known to occur in the mid to posterior thorax. Two additional changes to the original description relate to the lateral abdominal pouches. First, the location of the first pair, which was originally described as being first present behind the ninth segment, as well as occurring between chaetigers 10 and 11 is not the case for the holotype. Second, the pouches were also described as occurring between successive parapodial outgrowths. Whereas pouches occur on consecutive chaetigers in some magelonid species, this is not the case for *M. sacculata*.

Distribution and habitat.—The species is recorded in the eastern Pacific Ocean, from Alaska (56.4°N, 161.1°W) to Mexico (23.2°N, 106.4°W), at depths of up to 135 m (GBIF Secretariat 2019a). Material from Vancouver Island in the collections of NMW (NMW.Z.1989.115.0003) conform well with, but is considerably larger, than the juvenile holotype (Fig. 12).

Key to accepted adult species of
Magelonidae in Temperate and Tropical
Northwestern Atlantic waters of North and
Central America

In addition to the described species included in the following key, several undescribed species (*Magelona* sp. A–L) are known from the Gulf of Mexico, a key to which can be found in Uebelacker & Jones (1984). Note that *Magelona* sp. D and *Magelona* sp. H were later described as *M. spinifera* and *M. uebelackerae*, respectively.

- 1. Abdominal hooded hooks polydentate..... *M. polydentata*
- Abdominal hooded hooks bidentate or tridentate 2

2. Prostomial horns present..... 3
- Prostomial horns absent 4
3. Large hooded, recurved spines on abdominal chaetigers present
..... *M. uebelackerae*
- Large hooded, recurved spines on abdominal chaetigers absent
..... *M. americana*
4. Abdominal hooded hooks tridentate. Chaetiger nine with mucronate chaetae. Anteriorly open pouches in the anterior abdomen present 5
- Abdominal hooded hooks bidentate. Chaetiger nine without mucronate chaetae. Anteriorly open pouches of the anterior abdomen absent..... 6
5. Short palps. Postchaetal notopodial lamellae of chaetiger eight higher than prechaetal lamellae. Chaetae of chaetigers one to eight, smooth. Chaetae of chaetiger nine, predominantly mucronate... *M. brachypalpata*
- Long palps. Postchaetal notopodial lamellae of chaetiger eight of similar height to prechaetal lamellae. Chaetae of posterior thorax, particularly chaetiger eight with irregular blades. Mucronate chaetae of chaetiger nine restricted to mid-ramus *M. riojai*
6. Chaetigers one to eight with notopodial lamellae broader than neuropodial lamellae, neuropodial lamellae below chaetae. Chaetiger nine with additional ventral cirri beneath chaetal bundle in addition to postchaetal lamellae *M. rosea*
- Chaetigers one to eight with notopodial and neuropodial lamellae of a similar size, distinctly postchaetal. No ventral cirri on the neuropodia of chaetiger nine in addition to postchaetal lamellae..... 7
7. Anterior thoracic lamellae dorso-laterally placed. Abdominal lamellae oval. Thoracic chaetae finely limbate. Abdominal hooded hooks with a curved, narrow shaft.... *M. pettiboneae*

- All thoracic lamellae laterally placed. Anterior abdominal lamellae lanceolate with acute tips. Thoracic chaetae with a wide limbation. Abdominal hooded hooks straight-shafted and heavy..... *M. pettiboneae lanceolata*

Discussion

At present, all but one magelonid species reside in the genus *Magelona*. Despite the analyses of Brasil (2003) proposing eight clades within the family, no formal classifications for the group were made. A '*Magelona mirabilis* group' has long been recognized by workers such as Fiege et al. (2000) and Mortimer & Mackie (2003) and additionally supported by Brasil (2003); however, to date all species remain part of *Magelona*. A forthcoming review of the phylogenetic hypotheses under Magelonidae may shed light on this 'group' of species possessing specialized chaetae of the ninth chaetiger.

In comparison to many other species of Magelonidae, *Magelona brachypalpata* possesses considerably shorter palps, a factor that may be linked to the environment in which it was sampled. The sediments off Long Island have high sand contents that are relatively tightly packed, which may preclude deep burrowing. Furthermore, a strong long-shore North-South current occurs off Long Island that may be an attributing factor.

Dedication

This contribution in the capstone edition of this journal is in honor of the late Dr. Meredith L. Jones, who added greatly to the knowledge and understanding of the Magelonidae. Jones' series of papers (1963, 1971, 1977, 1978, the latter of which also appeared in the Proceedings of the Biological Society of Washington) introduced the majority of characters that we still recognize today as important in separating and

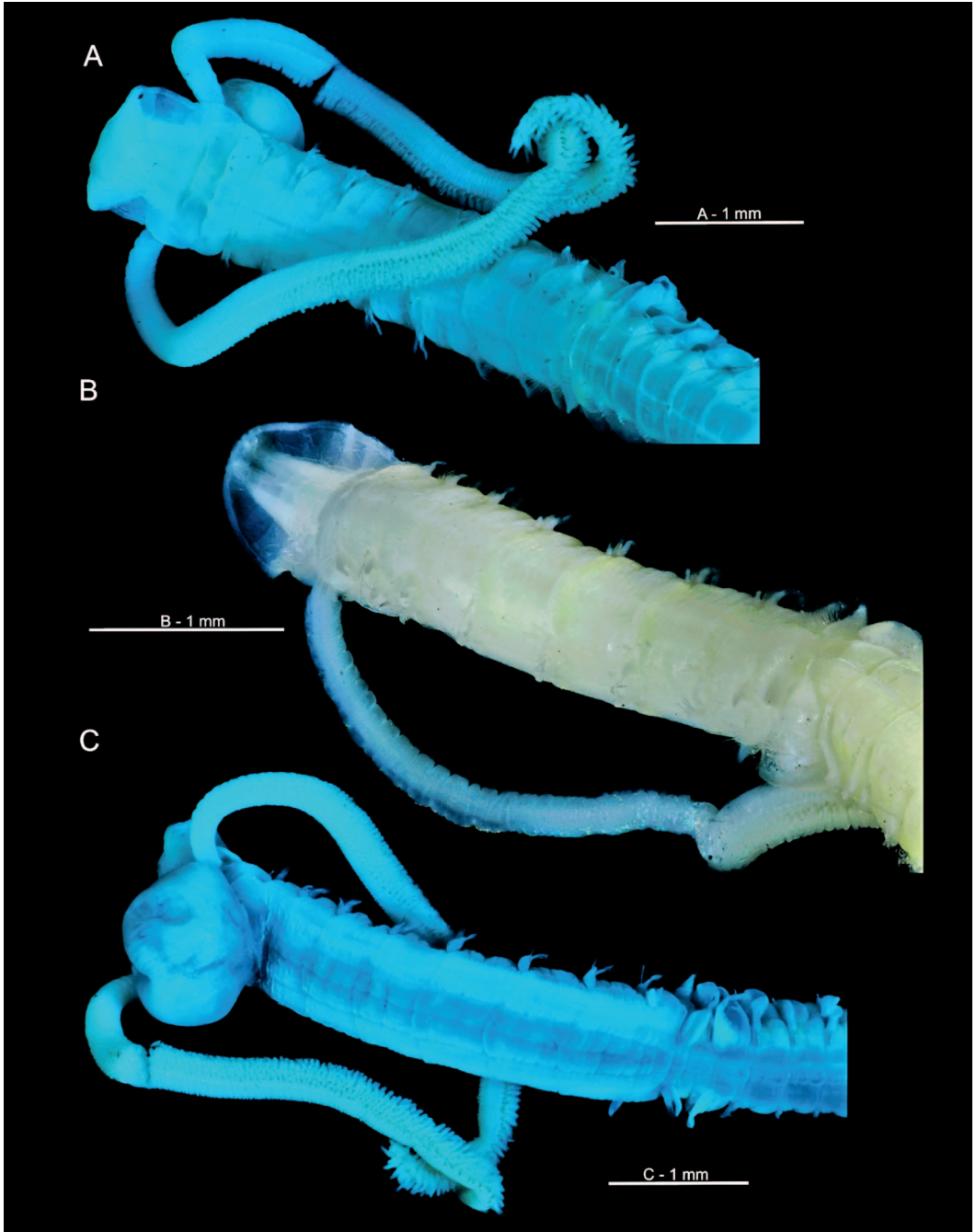


Fig. 12. *Magelona sacculata* (NMW.Z.1989.115.0003). A, anterior region (dorsal view, burrowing organ everted); B, anterior region (dorsal view); C, anterior region (ventral view, burrowing organ everted). (A, C stained with methyl green.)

identifying species. He set the standard that should be attained and was the first person to recognize the importance of drawing and describing all thoracic chaetigers in species descriptions.

Acknowledgments

The surveys off New York from which *Magelona brachypalpata* was collected were managed by Pamela L. Neubert and Isabelle P. Williams, both colleagues of the second author (JAB), and whose expertise in field sampling and attention to detail is greatly appreciated. The authors also thank Lily Berniker and Estefania Rodriguez (American Museum of Natural History) and Leslie Harris (Natural History Museum of Los Angeles County) for help with the loan of type material utilized in this paper. They would also thank Teresa Darbyshire (NMW), Emma Sherlock (Natural History Museum, London), and Jennifer Trimble (Museum of Comparative Zoology, Harvard) for help with depositing type material in museum collections. The authors additionally thank James Turner (NMW) for help in imaging of specimens and the two reviewers whose comments added greatly to the paper.

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