

Syllidae (Polychaeta) from San Quintín lagoon, Baja California, México, with the description of a new genus

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Abstract.—During a recent study of the polychaetes from San Quintín lagoon (Baja California) 514 specimens belonging to the family Syllidae (Polychaeta) were collected, but only a few species were previously reported. In this paper, we report seven species: *Syllis aciculata* (Treadwell, 1945), *Syllis gracilis* (Grube, 1840), *Syllis heterochaeta* (Moore, 1909), *Exogone* (*Exogone*) *lourei* (Berkeley & Berkeley, 1938), *Sphaerosyllis californiensis* (Hartman, 1966), *Grubeosyllis mediodentata*, a new combination, and *Cicese sphaerosylliformis*, a new genus, and species. *Grubeosyllis mediodentata* is characterized by having cylindrical, somewhat elongated papilliform dorsal cirri, a long proventriculus and pharynx, pharyngeal tooth located in front of the midline of the pharynx, and compound setae with long bidentate blades provided with long, fine spines on margin. The new genus *Cicese* is similar to the genus *Sphaerosyllis* since it has antennae, tentacular cirri and anal cirri with bulbous bases, as well as papillae on the palps and dorsum, but it has two pairs of tentacular cirri instead of a single pair.

The Syllidae is a very large family of polychaetes with a high number of described species; most species are small and usually overlooked in macrofaunal studies. Syllids of the Pacific coast of Mexico were reported in a few papers: Rioja (1941, 1947a, 1947b, 1959, 1962); the papers of Rioja (1943), Góngora-Garza (1984) and Góngora-Garza & de León González (1993) are the only ones devoted exclusively to this family. The former paper also includes a key for all the syllids known on the Pacific coast of México; a total of 49 species of Syllidae is reported in the key. Other papers treating syllids from close areas are those of Hartman (1968) and Kudenov & Harris (1995) (for California), Hartmann-Schröder (1959) (for El Salvador), Fauchald (1977), Fauchald & Reiner (1975) and López et al. (1997) (for Panamá) and Westheide (1974) (for the Galá-

pagos Islands). Other studies dealing with syllids are Day (1967) and Fauchald & Reiner (1975).

San Quintín lagoon is a highly productive coastal lagoon located between 30°24'–30°30'N and 115°57'–116°01'W on the Pacific coast of Baja California (Fig. 1). This lagoon has an area of 42 km² and around 75% of it is covered by the eelgrass *Zostera marina* (Inclán-Rivadeneira & Acosta-Ruiz 1988, Ibarra-Obando 1990). It has been exploited for many years (mariculture), but it can still be considered a relatively non-disturbed area, although intensive oyster mariculture is being considered in the near future.

The lagoon has the shape of an inverted “Y”, the western arm (Falsa Bay) has an average depth of 4 m, whereas the eastern arm (San Quintín Bay) has an average depth of 8 m. Granulometric studies show

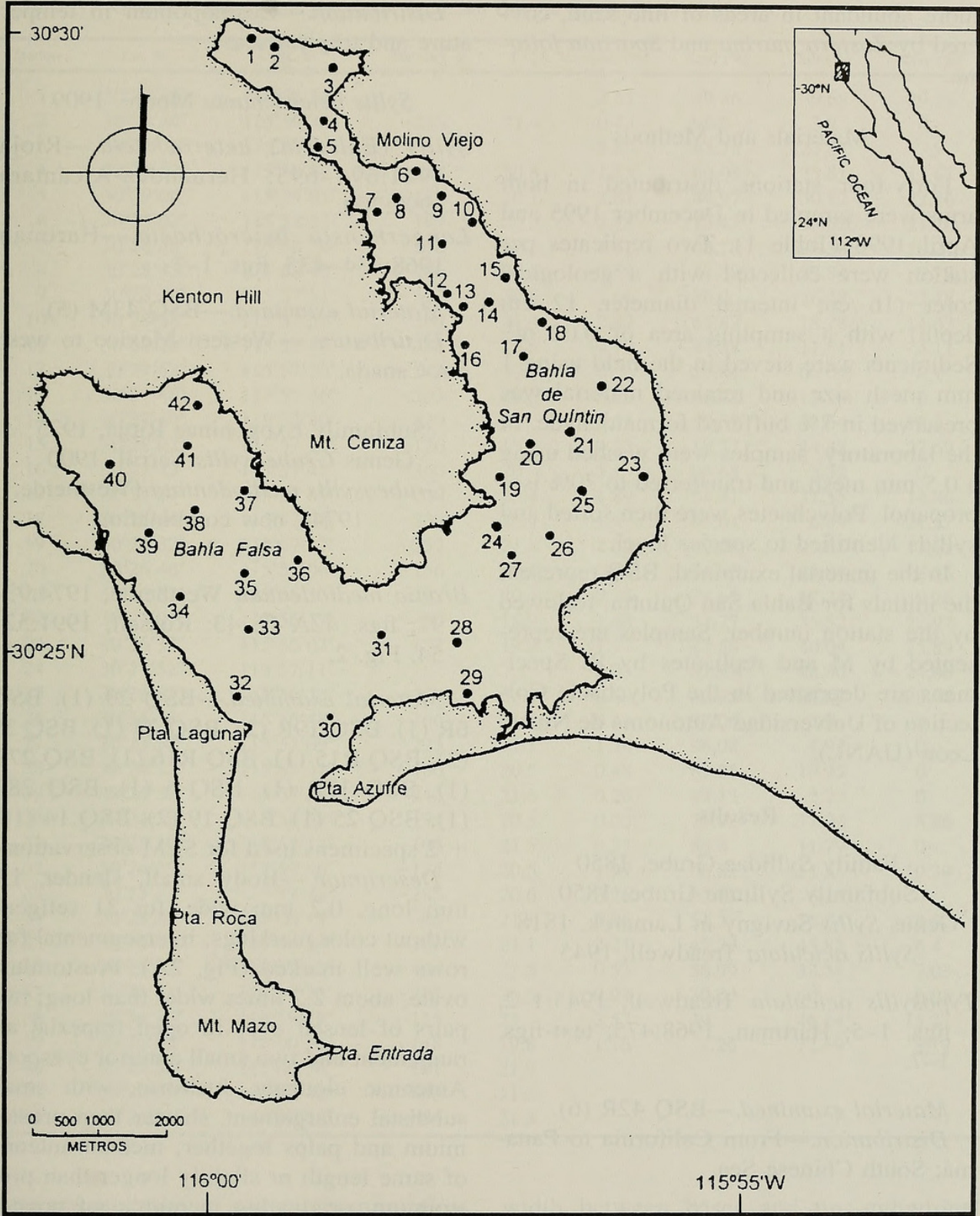


Fig. 1. Study site: sampling stations in San Quintin Bay, Baja California, Mexico.

that in shallow areas, as well as to the north of both arms, clay and silty-sand predominate, whereas near the mouth very fine sands are more abundant. The channel sediments are highly diverse, ranging from me-

dium to fine sand and silt (Barnard 1970, Calderón-Aguilera 1992). The lagoon margins present a typical saltmarsh flora with *Spartina foliosa* and *Salicornia virginica* among other vascular plants. Syllids are

more abundant in areas of fine sand, covered by *Zostera marina* and *Spartina foliosa*.

Materials and Methods

Forty-four stations distributed in both arms were sampled in December 1995 and April 1998 (Table 1). Two replicates per station were collected with a geological corer (16 cm internal diameter, 12 cm depth) with a sampling area of 0.02 m². Sediments were sieved in the field using 1 mm mesh size and retained material was preserved in 7% buffered formaldehyde. In the laboratory, samples were washed using a 0.5 mm mesh and transferred to 70% isopropanol. Polychaetes were then sorted and syllids identified to species level.

In the material examined, BSQ represent the initials for Bahía San Quintín, followed by the station number. Samples are represented by M and replicates by R. Specimens are deposited in the Polychaete Collection of Universidad Autónoma de Nuevo León (UANL).

Results

Family Syllidae Grube, 1850

Subfamily Syllinae Grube, 1850

Genus *Syllis* Savigny in Lamarck, 1818

Syllis aciculata Treadwell, 1945

Typosyllis aciculata Treadwell, 1945:1–2, figs. 1–5; Hartman, 1968:475, text-figs. 1–7.

Material examined.—BSQ 42R (6).

Distribution.—From California to Panamá; South Chinese Sea.

Syllis gracilis Grube, 1840

Syllis gracilis Grube, 1840:77, pl. 31a–l; San Martín, 1984:376, pls. 97, 98.

Syllis (*Syllis*) *gracilis*.—Fauvel, 1923:259, fig. 96F–I; Day, 1967:241, fig. 12.1m–p.

Material examined.—BSQ 14 (1), BSQ 7M (1), BSQ 7R (1).

Distribution.—Cosmopolitan in temperate and tropical seas.

Syllis heterochaeta Moore, 1909

Syllis (*Ehlersia*) *heterochaeta*.—Rioja, 1941:694–695; Hernández-Alcántara, 1992:200.

Langerhansia heterochaeta.—Hartman, 1968:434–435, figs. 1–7.

Material examined.—BSQ 43M (5).

Distribution.—Western Mexico to western Canada.

Subfamily Exogoninae Rioja, 1925

Genus *Grubeosyllis* Verrill, 1900

Grubeosyllis mediodentata (Westheide, 1974), new combination
Figs. 2–4

Brania mediodentata Westheide, 1974:93–97, figs. 42A–C, 43; Russell, 1991:52–54, Fig. 2.

Material examined.—BSQ 29 (1). BSQ 6R (1). BSQ 19R (2). BSQ 23 (1). BSQ 39 (3). BSQ R15 (1). BSQ R16 (1). BSQ 27R (1). BSQ 17R (1). BSQ 6 (1). BSQ 28R (1). BSQ 25 (1). BSQ 19 (2). BSQ 14 (18) + 2 specimens used for SEM observations.

Description.—Body small, slender, 1.9 mm long, 0.2 mm wide, for 31 setigers, without color markings; intersegmental furrows well marked (Fig. 2A). Prostomium ovate, about 2.2 times wider than long; two pairs of lensed eyes in open trapezoidal arrangement and two small anterior eyespots. Antennae elongate, fusiform, with small subdistal enlargement, shorter than prostomium and palps together; median antenna of same length or slightly longer than prostomium, originating in middle of prostomium; lateral antennae somewhat shorter than median antenna, originating in front of anterior eyes, slightly posterior to eyespots (Figs. 2A, B, 3A). Palps small, shorter than prostomium, fused along entire length, with distal notch. Tentacular segment well defined, similar in length to following segments; two ciliated lateral nuchal organs

Table 1.—Station locations and granulometry at San Quintín lagoon, Baja California.

Station	Lat. N.	Long. W.	Eh(mV)	T°C	O.M. (%)	Sand (%)	Silt (%)	Clay (%)
1	30°29'20"	115°59'35"			2.35	39.86	30.68	29.28
2	30°29'34"	115°59'34"	−255	21.4	0.43	96.8	3.2	0
3	30°29'06"	115°59'02"			1.86	63.78	23.64	7.9
4	30°29'23"	115°58'57"	−184	20.8	1.33	60.08	25.81	13.61
5	30°29'06"	115°59'01"	−127	20.1	2.81	44.97	30.12	22.46
6	30°29'02"	115°58'37"	103	20.5	2.78	13.42	65.52	21.26
7	30°28'38"	115°58'26"	−150	20.5	1.91	63.79	23.38	10.21
8	30°28'45"	115°58'10"	−280	20.4	0.58	71.88	27.84	0.77
9	30°28'50"	115°57'51"	−322	20.6	2.66	36.2	36.38	22.78
10	30°28'28"	115°57'29"	168	21.4	2.37	65.82	18.78	14.63
11	30°28'18"	115°57'46"	−294	20.5	0.79	84.38	11.51	4.11
12	30°27'52"	115°57'50"	−145	19.1	0	25.84	66.09	8.1
13	30°27'48"	115°57'46"	−203	20.5	0.58	86.72	13.28	0
14	30°27'49"	115°57'30"	−320	21	1.55	50.59	35.64	12.8
15	30°28'02"	115°57'11"	−126	19.9	3.33	19.77	44.88	27.69
16	30°27'33"	115°57'41"	−360	20	3.1	96.68	3.32	0
17	30°27'21"	115°57'09"	−230	20.4	1.89	54.51	31.55	14.86
18	30°27'46"	115°57'06"	−200	20.4	1.4	69.61	6.59	21.57
19	30°26'32"	115°57'17"	−252	21.4	2.03	60.08	25.81	13.61
20	30°26'46"	115°57'00"	−156	20.1	0.62	74.65	25.04	2.36
21	30°26'52"	115°56'37"	−297	20.3	0.76	78.61	12.34	9.26
22	30°27'07"	115°56'17"	−30	18.9	1.68	37.77	35.52	22.97
23	30°26'33"	115°56'03"	152	19.3	1.27	42.58	40.04	25.89
24	30°25'52"	115°57'11"			2.23	31.95	28.86	24.06
25	30°26'22"	115°56'33"	−257	20.7	0.89	52.38	24.01	20.78
26	30°25'58"	115°56'48"	−166	21.6	0.43	97.06	2.9	0
27	30°25'50"	115°57'09"	−223	21.1	1.38	98.08	1.92	0
28	30°25'12"	115°57'31"	−136	20.5	0.48	89.05	10.95	0
29	30°24'32"	115°57'29"	−242	21.6	0.28	98.13	2.25	0
30	30°24'29"	115°58'38"	−94	20.5	0.05	71.78	17.04	8.86
31	30°25'10"	115°58'12"	−104	21.5	0.37	88.4	11.79	0
32	30°24'39"	115°59'46"	−174	20.5	1.99	66.82	21.8	10.39
33	30°25'12"	115°59'44"	−285	20.6	0.26	93.75	6.25	0
34	30°25'32"	115°00'14"	−84	21.1	2.96	51.3	36.54	12.52
35	30°25'42"	115°59'44"	−326	21.1	2.21	42.27	45.83	6.4
36	30°25'52"	115°59'12"	−104	21.5	0.53	58.99	33.54	7.03
37	30°26'21"	115°59'33"	−205	20.6	0.93	30.03	60	6.05
38	30°26'10"	115°59'58"	−115	21	2.57	39	46.14	15.27
39	30°26'00"	115°00'26"	−148	19.8	1.16	7.26	72.59	8.17
40	30°26'32"	115°00'36"	181	21.9				
41	30°26'42"	115°00'42"	100	21.6				
42	30°26'54"	115°59'55"	−86	21.3				

between prostomium and peristomium (Fig. 3A); two pairs of tentacular cirri, short, smaller than antennae, ovate to conical, somewhat larger at bases (Figs. 2A, B, 3A, B). Dorsal cirri on all setigers; anterior dorsal cirri similar in shape to dorsal tentacular cirri but somewhat longer, shorter than parapodial lobes, but progressively longer and slender with very small difference in

width between bases and tip, cylindrical (Fig. 2A, B, D); dorsal cirri of midbody somewhat longer than parapodial lobes (Fig. 2C); from midbody posteriorly, dorsal cirri progressively smaller. Parapodial lobes conical, with presetal papilla (Fig. 2C). Ventral cirri digitiform, shorter than parapodial lobes. Compound setae heterogomph, with short, fine subdistal spines on

shafts, and blades strongly bidentate, both teeth similar in length and shape or proximal tooth somewhat shorter than distal tooth, well separated from each other, elongate, provided with long, upwardly projecting spines on margin, especially on most anterior and dorsal setae (Figs. 2E, H, 4A–C). Anterior parapodia each with about 10 compound setae, with marked dorsoventral gradation, 28 μm blades on dorsalmost setae, 18 μm blades on ventralmost ones (Fig. 2E); progressively decreasing number of compound setae on each parapodium, posterior parapodia each with about 5 compound setae, blades 32 μm dorsally, 14 μm ventrally (Fig. 2H). Solitary dorsal simple seta from anterior parapodia, thick, strongly bidentate, with large, triangular proximal tooth, forming about a 45° angle with the distal tooth, smooth on anterior parapodia (Fig. 2F), progressively provided with more spines on margin (Fig. 2I), forming several rows of spines (observations by SEM) (Fig. 4D). Solitary ventral simple seta on each posterior parapodium, sigmoid, similar to dorsal simple seta but slender, smooth (Fig. 2J) or provided with few short spines on margin (SEM observations) (Fig. 4E). Anterior parapodia each with two slender aciculae, one straight and other acuminate (Fig. 2G), provided with subdistal enlargement and conical tip; single aciculum on each middle and posterior parapodium, acuminate (Fig. 2K). Pharynx long and wide, through about 5–6 segments (Fig. 2A); mouth opening provided with circle of cilia and about 10 soft, very small papillae (Fig. 3B); pharyngeal tooth very small, inconspicuous, conical, located just in front of middle of pharynx, far from anterior margin of pharynx (Fig. 2A, B). Proventriculus similar in length to pharynx, through about 5 segments, with about 27 rows of muscle cells (Fig. 2A). Females carrying eggs on dorsolateral position of midbody; eggs attached to body by means of thin notosetae (Fig. 3C, D).

Remarks.—Most of the species of the genus *Grubeosyllis* have fusiform dorsal cirri,

with bulbous bases and long, pointed tips; however, a few species of this genus have cylindrical, digitiform dorsal cirri, as in *G. mediodentata*. This species has a body very similar to *G. swedmarki* (Gidholm, 1962), from the North Atlantic, but the compound setae are completely different being short and unidentate in *G. swedmarki* (Gidholm 1962, Parapar et al. 1993) and long and bidentate in *G. mediodentata*. *Grubeosyllis celiae* (Parapar & San Martín, 1992), from Ceuta (North West Africa) has longer dorsal cirri, a longer proventriculus, compound setae with shorter blades than those of *G. mediodentata* and the dorsal simple setae are unidentate (Parapar & San Martín 1992).

This species reproduces by external gestation, as many others of the same genus and the subfamily Exogoninae. The eggs are attached to the body by means of epitokous setae (Fig. 3C), as recently reported by Kuper & Westheide (1998) for other similar species.

Distribution.—Galápagos Islands, Belize. This species is newly recorded for México.

Cicese, new genus

Diagnosis.—Body small, cylindrical. Prostomium with two pairs of lensed eyes and two eyespots. Palps fused along entire length. Peristomium well defined, not fused to prostomium, with two pairs of tentacular cirri. Dorsal and ventral cirri on all parapodia. Antennae, tentacular cirri, anal cirri and, at least, some dorsal cirri with bulbous bases and slender tips. Palps, pygidium and dorsum provided with papillae. Two anal cirri. Pharynx provided with an anterior middorsal tooth and a crown of papillae. Parapodia each with several compound setae, and dorsal and ventral simple setae on some parapodia. Aciculae acuminate. Females carrying eggs dorsally by means of notosetae and mature males provided with long natatory setae.

Remarks.—The new genus is close to a group of species of the genus *Sphaerosyllis*,

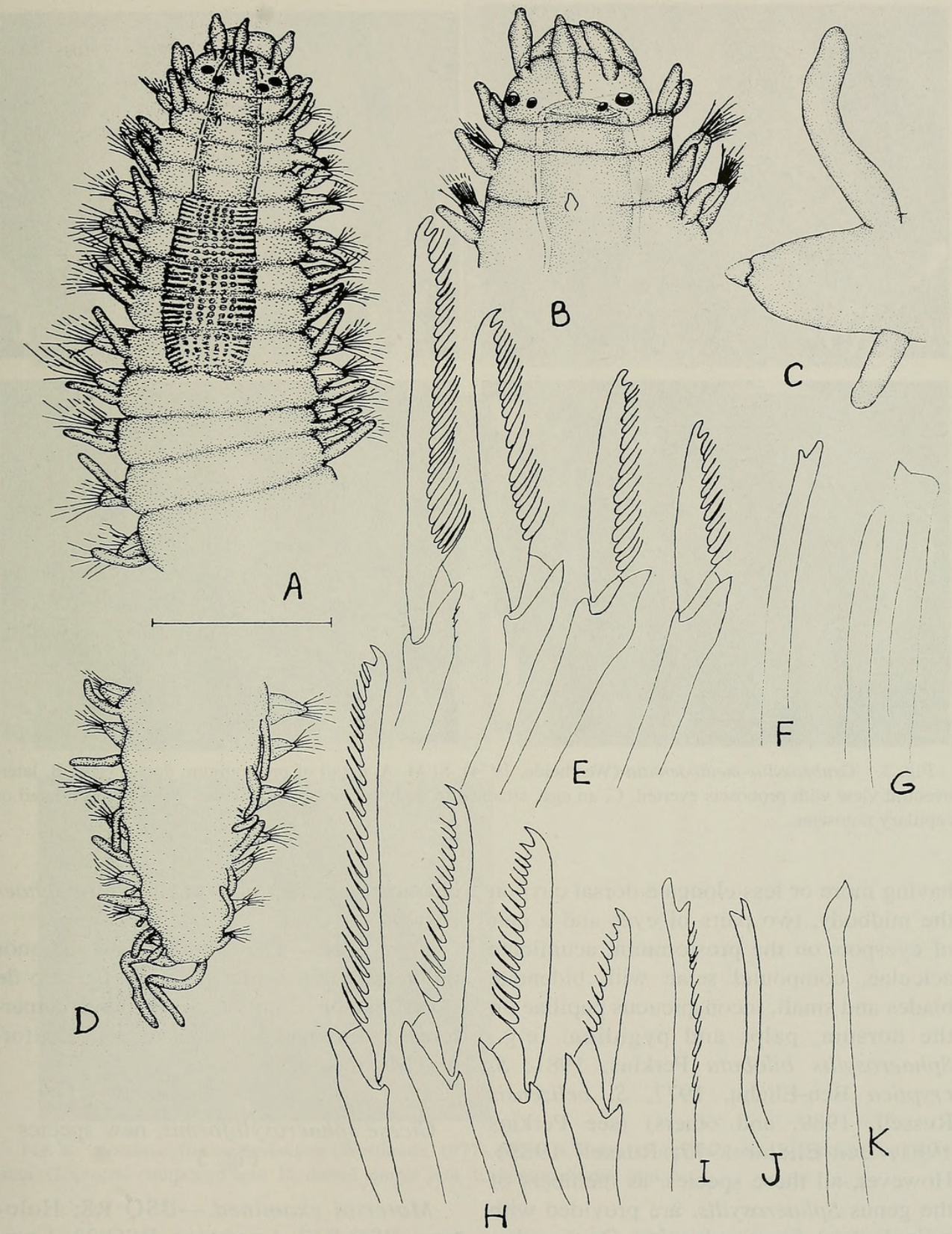


Fig. 2. *Grubeosyllis mediodentata* (Westheide, 1974). A, anterior end, dorsal view. B, detail of prostomium and anterior setigers. C, midbody parapodium. D, posterior end, dorsal view. E, compound setae, anterior parapodium. F, dorsal simple seta, anterior parapodium. G, aciculae, anterior parapodium. H, compound setae, posterior parapodium. I, dorsal simple seta, posterior parapodium. J, ventral simple seta. K, aciculum, posterior parapodium. Scale: A, D—0.14 mm; B—0.6 mm; E—K—15 μ m.

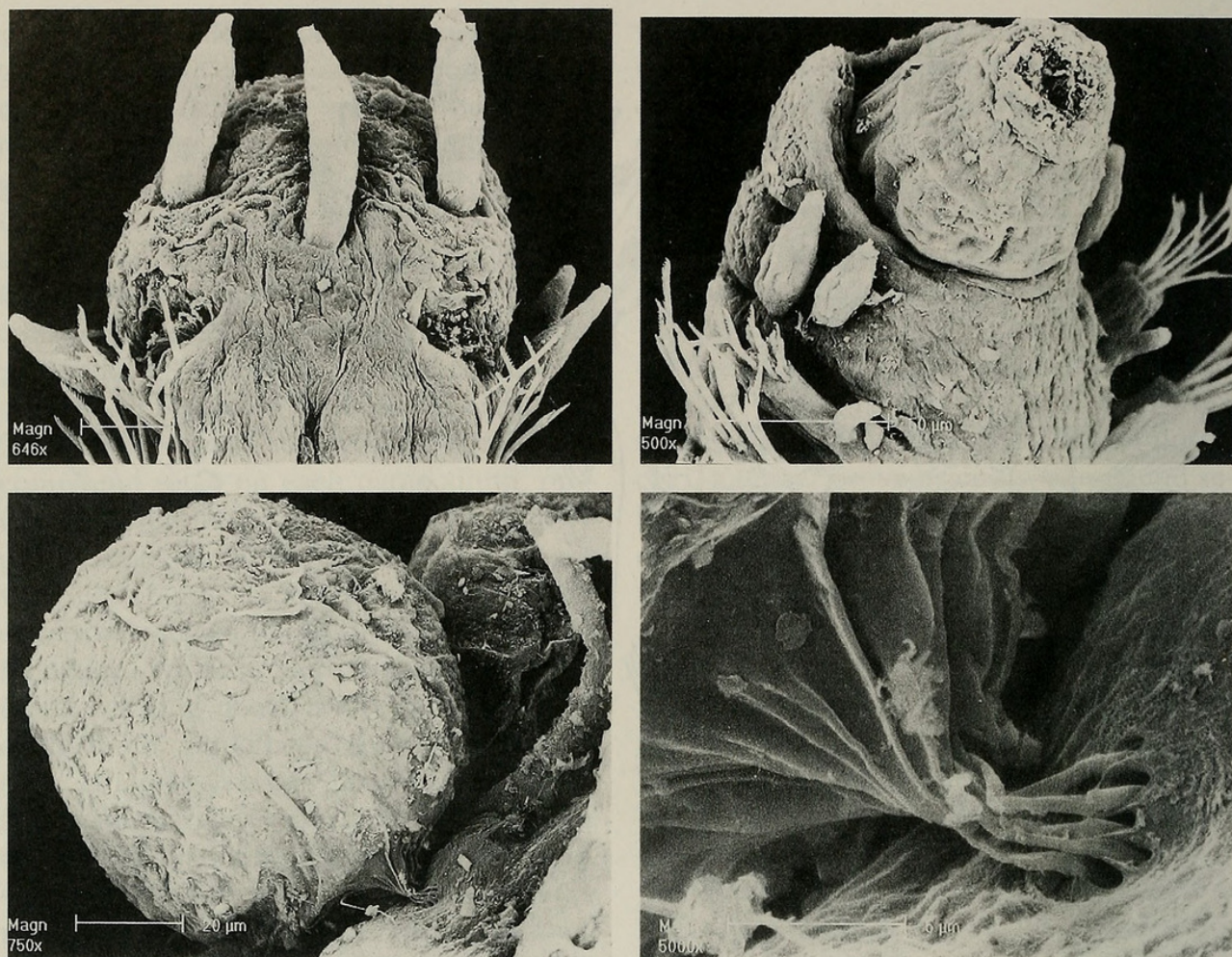


Fig. 3. *Grubeosyllis mediodentata* (Westheide, 1974). SEM. A, detail of prostomium, dorsal view. B, latero-ventral view with proboscis everted. C, an egg, attached to body by means of capillary notosetae. D, detail of capillary notosetae.

having more or less elongate dorsal cirri on the midbody, two pairs of eyes and a pair of eyespots on the prostomium, acuminate aciculae, compound setae with bidentate blades and small, inconspicuous papillae on the dorsum, palps and pygidium (e.g., *Sphaerosyllis bilobata* Perkins, 1981, *S. cryptica* Ben-Eliahu, 1977, *S. belizensis* Russell, 1989, and others) (see Perkins 1981, Ben-Eliahu 1977, Russell 1989). However, all these species, as members of the genus *Sphaerosyllis*, are provided with a single pair of tentacular cirri. On the other hand, *Cicese* is also closely related to *Grubeosyllis* (Verrill, 1900), sharing the shape of the aciculae, similar setae, and having two pairs of tentacular cirri. However, *Cicese* has papillae, whereas *Grubeosyllis* has a smooth dorsum, palps and pygidium, a

character considered as exclusive to *Sphaerosyllis*.

Etymology.—The name is given in honor of the research center CICESE (Centro de Investigación Científica y Estudios Superiores de Ensenada) located in Baja California, México.

Cicese sphaerosylliformis, new species
Fig. 5

Material examined.—BSQ R8; Holotype. BSQ R17; 1 paratype. BSQ 23; 1 paratype.

Description.—Body small, short, holotype complete mature female 1.5 mm long, 0.2 mm wide, for 29 setigers, without color markings; dorsum covered with very small papillae, longer on posterior part of body

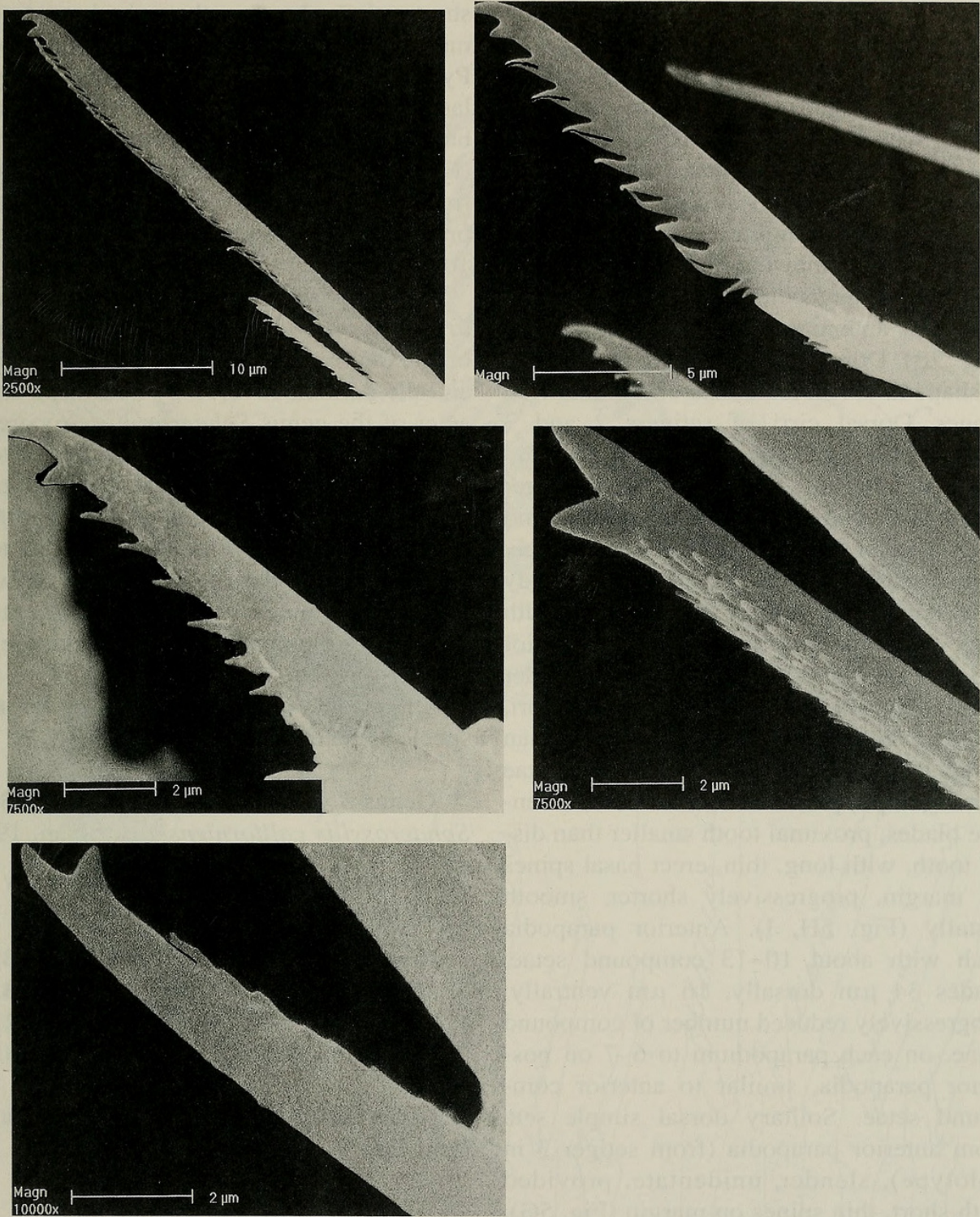


Fig. 4. *Grubeosyllis mediodentata* (Westheide, 1977). SEM. A, dorsal compound seta. B, median compound seta. C, ventral compound seta. D, dorsal simple seta. E, ventral simple seta.

(Fig. 5D, E). Prostomium ovate, more than twice as wide as long (Fig. 5A); two pairs of large, lensed eyes in very open trapezoidal arrangement, nearly on line, anterior pair larger than posterior pair, and two anterior eyespots. Median antenna longer than

prostomium and palps together, large at base, enlarged at midlength and with slender tip, originating between posterior eyes; lateral antennae onion-shaped, with bulbous bases and short, slender tips, shorter than median antenna, originating close to eye-

spots. Palps short, fused along entire length, with indistinct dorsal furrow, provided with few very small, papillae dorsally. Tentacular segment shorter than following segments, well defined, covering dorsal posterior part of prostomium, dorsally bilobed; dorsal tentacular cirri similar in length to median antenna, similar in shape to lateral antennae but somewhat more elongate (Fig. 5A); ventral tentacular cirri similar in shape to lateral antennae, but somewhat smaller (Fig. 5B). Dorsal cirri of setiger one similar in shape to dorsal tentacular cirri, somewhat longer. Dorsal cirri of setigers 2 and 3 small, with strongly bulbous bases and short, slender tips. Dorsal cirri from setiger 3 elongate, with slightly enlarged bases and long, slender tips (Fig. 5C), progressively longer and slender; dorsal cirri on midbody only somewhat shorter than body width (Fig. 5A); dorsal cirri from mid-posterior setigers shorter, less elongate, with wider bases (Fig. 5D). Parapodial lobes short, conical; ventral cirri digitiform, shorter than parapodial lobes (Fig. 5C). Compound setae heterogomph, provided with slender, bidentate blades, proximal tooth smaller than distal tooth, with long, thin, erect basal spines on margin, progressively shorter, smooth distally (Fig. 5H, I). Anterior parapodia each with about 10–13 compound setae, blades 34 μm dorsally, 16 μm ventrally; progressively reduced number of compound setae, on each parapodium to 6–7 on posterior parapodia, similar to anterior compound setae. Solitary dorsal simple seta from anterior parapodia (from setiger 3 in holotype), slender, unidentate, provided with short, thin spines on margin (Fig. 5G). Solitary ventral simple seta on far posterior parapodia, slender, sigmoid, bidentate, smooth. Acicula solitary, slender, acuminate, provided with a subdistal enlargement and a long, filiform tip (Fig. 5F). Pharynx slender, everted in holotype (Fig. 5A), with pharyngeal tooth located anteriorly, surrounded by crown of about 10 small soft papillae; a few, probably 5, subdistal papillae on pharynx (Fig. 5B). Proventriculus

shorter than pharynx, through about 4 segments, with about 17 rows of muscle cells. Pygidium small, provided with small papillae and two long anal cirri, with bulbous bases, longer than posterior dorsal cirri (Fig. 5D). Holotype carrying eggs dorsally from setiger 11; one paratype mature male, provided with natatory setae from setiger 10.

Remarks.—Rioja (1943) described *Brania limbata arenacea* from the Pacific coast of México with two pairs of tentacular cirri and the dorsum covered by detritus, a character of the genus *Sphaerosyllis*. Apparently, *Brania limbata arenacea* (Rioja, 1943) is a member of *Cicese*, new genus. However, it differs from *Cicese sphaerosylliformis*, new species, by having antennae, tentacular cirri and dorsal cirri all similar, with small differences in lengths, unidentate blades of compound setae and lacking eyespots.

Etymology.—Meaning the form of this species resembles that of *Sphaerosyllis*.

Genus *Sphaerosyllis* Claparède, 1863
Sphaerosyllis californiensis Hartman, 1966
Sphaerosyllis californiensis.—Kudenov & Harris, 1995:28–30, Fig. 1.8.

Material examined.—BSQ 6M (1). BSQ 7R (1). BSQ 8R (1). BSQ 11M (1). BSQ 12M (1). BSQ 14M (4). BSQ 14R (1). 21M (2). BSQ 26R (1). BSQ 28M (2). BSQ 31M (1).

Distribution.—Southern California to Baja California.

Genus *Exogone* Örsted, 1845
 Subgenus *Exogone* Örsted, 1845
Exogone (Exogone) lourei Berkeley & Berkeley, 1938

Exogone (Exogone) lourei San Martín, 1991:735–737; Kudenov & Harris, 1995:15–17, Fig. 1.3.

Material examined.—BSQ 3R (6). BSQ 5M (9). BSQ 5R (5). BSQ 6M (47). BSQ 6R (4). BSQ 8M (2). BSQ 8R (14). BSQ

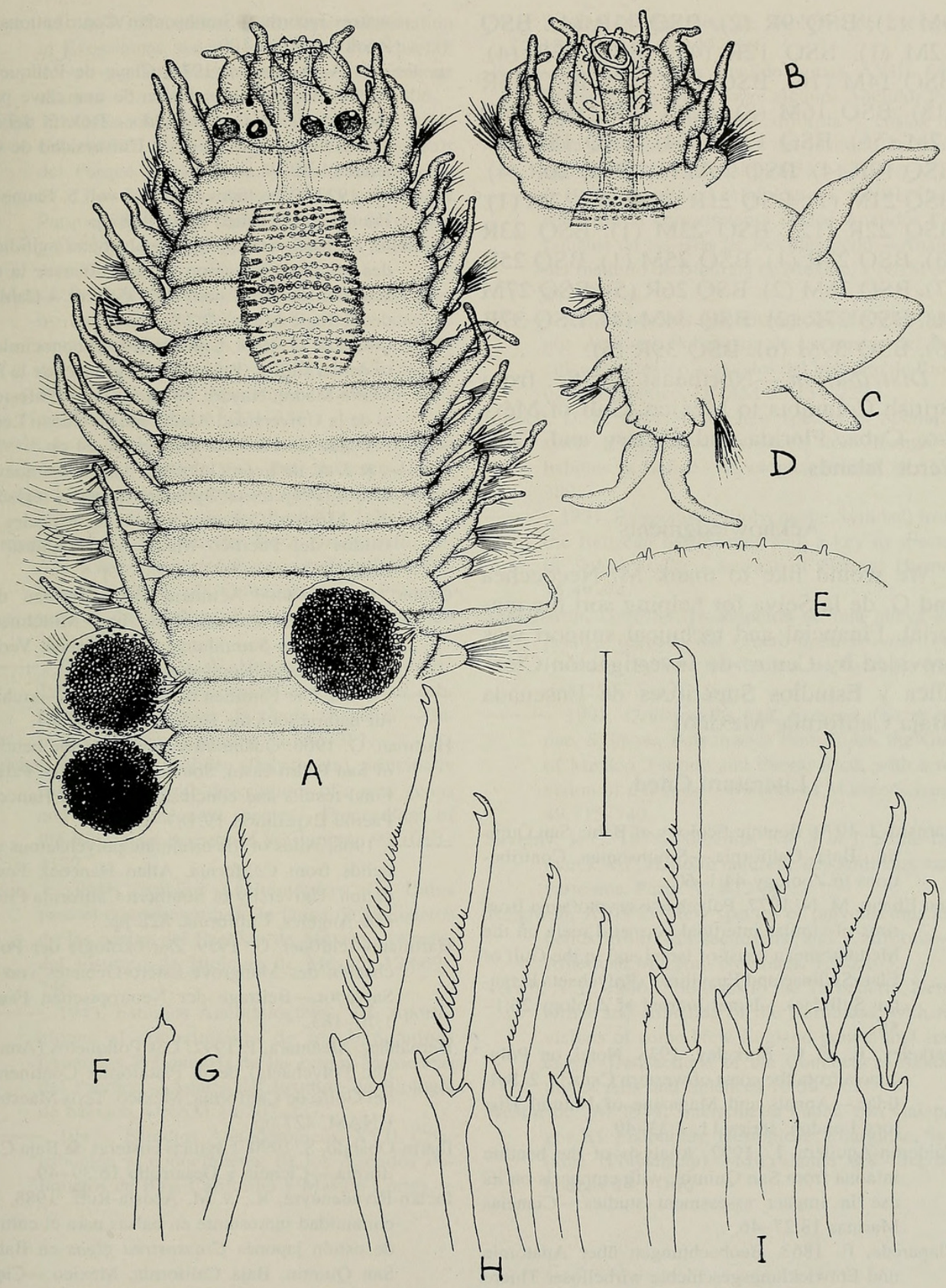


Fig. 5. *Cicese sphaerosylliformis*, new genus, new species. A, anterior end, dorsal view. B, anterior end, ventral view. C, mid-posterior parapodium. D, posterior end, dorsal view. E, detail of surface of dorsum, mid-posterior segments. F, aciculum. G, dorsal simple seta. H, compound setae, anterior parapodium. I, compound setae, posterior parapodium. A, B, F–I, from holotype; C–E, from paratype. Scale: A–E—0.65 mm; F–I—15 μ m.

9M (2). BSQ 9R (2). BSQ 11R (4). BSQ 12M (1). BSQ 12R (48). BSQ 13R (4). BSQ 14M (16). BSQ 14R (17). BSQ 15R (18). BSQ 16M (8). BSQ 16R (16). BSQ 17M (56). BSQ 17R (104). BSQ 18R (1). BSQ 19R (4). BSQ 20M (1). BSQ 20R (4). BSQ 21M (1). BSQ 21R (2). BSQ 22M (1). BSQ 22R (12). BSQ 23M (1). BSQ 23R (3). BSQ 24R (1). BSQ 25M (1). BSQ 25R (7). BSQ 26M (2). BSQ 26R (5). BSQ 27M (1). BSQ 27R (2). BSQ 34M (4). BSQ 37R (6). BSQ 39M (6). BSQ 39R (6).

Distribution.—Northeast Pacific, from British Columbia to México. Gulf of México, Cuba, Florida and Canary and Cape Verde Islands.

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