



## Description of *Syllis lagunae* sp. nov. (Polychaeta: Syllidae) from the Southern Gulf of México and designation of a neotype for *Syllis mexicana* (Rioja, 1960)

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**Abstract:** *Syllis cornuta* Rathke, 1843 is commonly recorded from the Southern Gulf of México. A recent comparison of specimens from the type locality area with the description of the neotype of *S. cornuta* and other material revealed that these records refer to an undescribed species. The new species is described herein as *Syllis lagunae* sp. nov., being unique in having bidentate pseudospinigers in which pectination reaches the subdistal tooth. The ventral cirrus is long and metameric discocilia structures are present. A neotype of *Syllis mexicana* (Rioja, 1960) is designated from the type locality (Términos Lagoon, Campeche, México) and a full description of the species is given.

**Résumé :** Description de *Syllis lagunae* sp. nov. (Polychaeta : Syllidae) au sud du Golfe du Mexique et désignation d'un néotype pour *Syllis mexicana* (Rioja). *Syllis cornuta* Rathke, 1843 est une espèce commune dans la région sud du Golfe du Mexique. Des observations récentes faites pour comparer des spécimens de la localité type avec la description du néotype de *Syllis cornuta*, en plus d'autres spécimens supposés de la même espèce, ont révélé que les spécimens de cette espèce appartenaient en fait à une espèce non encore décrite. Cette nouvelle espèce, que nous décrivons ici sous le nom de *Syllis lagunae* sp. nov., se caractérise par la présence de pseudospinigères bidentés où la pectination atteint la dent subdistale. De plus, le cirre ventral est long et des structures discociliaires sont présentes. Le néotype de *Syllis mexicana* (Rioja, 1960) est désigné pour la localité type (Lagune de Términos, Campeche, México) et une description complète de cette espèce est donnée.

**Keywords:** Polychaeta • Syllidae • *Syllis cornuta* • Discocilia • Pseudospiniger

## Introduction

The family Syllidae is one of the most diverse and widely distributed families of polychaetes worldwide, comprising about 667 valid species and 77 genera (Pleijel, 2001; San Martín, 2003). Syllids are usually free-living and are common in shallow waters, either on soft bottoms, algal or coralline substrates. They are particularly abundant in cryptic environments of reef areas (Glasby, 2000; Pleijel, 2001).

On the continental shelf of the Northern Gulf of México (USA), the family of polychaetes with the highest number of species is the Syllidae (Uebelacker, 1984). In the Southern Mexican region of the Gulf, syllids are particularly common in carbonate (biogenic) sediments, such as those found in the eastern region, in the Campeche Bank (36 species). In the predominantly terrigenous (deltaic) sediments surrounding the offshore oil platforms, to the west, syllids are rare. Only three species have been recorded so far (Tovar-Hernández et al., 2002; Granados-Barba et al., 2003).

Despite their abundance, the taxonomic knowledge of the syllids occurring in the Southern Gulf of México is still very poor and doubts persist regarding previous identifications. These were made using literature and taxonomic keys from other regions of the world and the specimens identified were not compared to type or topotype material. Original descriptions used to verify identifications are often incomplete by today's standards and frequently lack figures. Subsequent illustrations may have been made from the wrong species. Finally, inadequate preservation of some specimens may have led to misinterpretations of body structures or proportions.

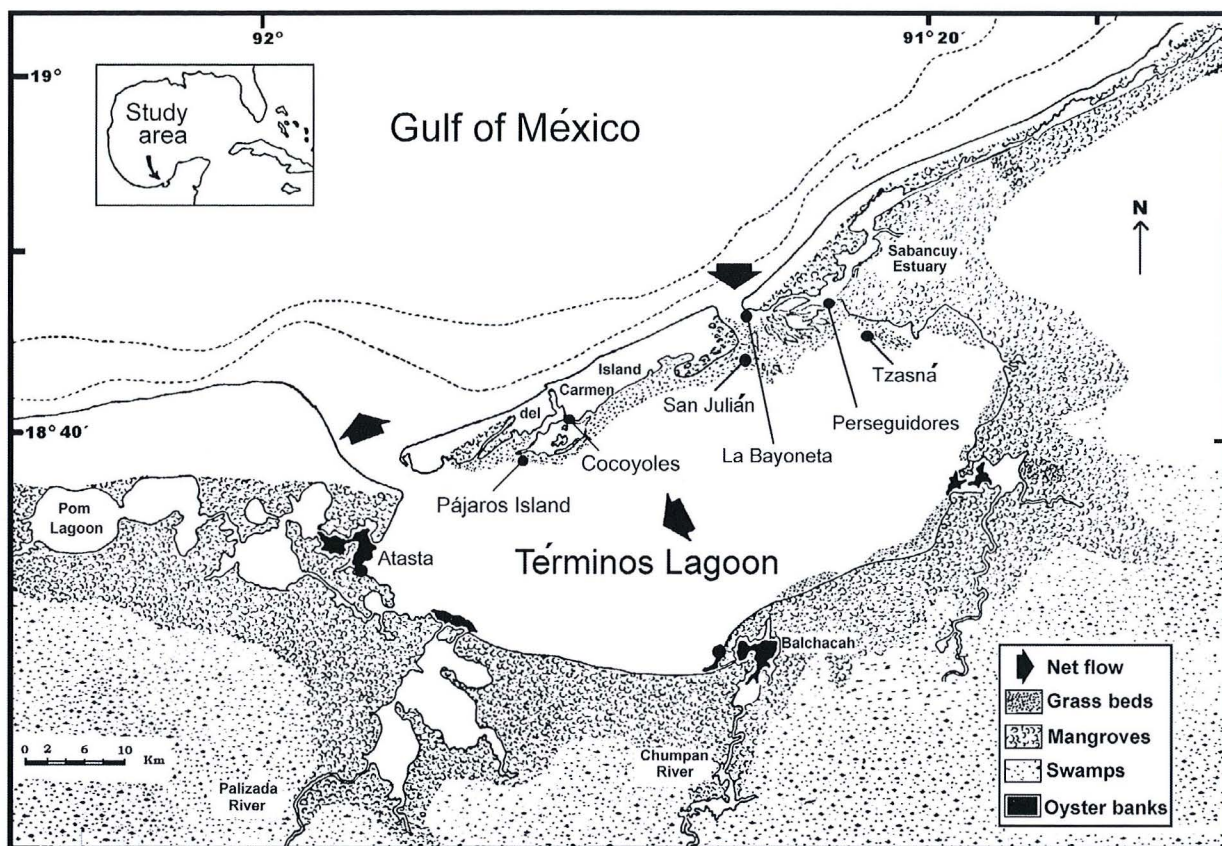
All of the above have led to misidentifications and records of species originally described from far-away localities, such as *Syllis cornuta* Rathke, 1843, a species described from Norway but regarded as having a very wide distribution. This species has been recorded from the Grand Caribbean by several authors (Salazar-Vallejo, 1996 and references therein). It has also been recorded in numerous BSc, MSc or PhD theses from the Southern Gulf of México, from soft bottoms (terrigenous and carbonate sediments) and hard bottoms (coralline substrates) in the Veracruz Reef System and the Campeche Bank Reef System since 1993 to 2000. Valuable data from these contributions were included in a study about distribution and diversity of the Syllidae from several localities in the Southern Gulf of México by Granados-Barba et al. (2003). After examination of specimens of "*S. cornuta*" from the Southern Gulf of México including their comparison with non-type material and taking into account the description of the neotype of *S. cornuta* provided by Licher (1999), we confirm that these records correspond to a new species, herein described as *Syllis lagunae* sp. nov.

*Syllis mexicana* (Rioja, 1960), described from Términos Lagoon (Campeche), is a species frequently recorded in the Southern Gulf of México; unfortunately, Rioja's collection has never been found after his death in 1962, and following an intensive search by one of us (VS-W) it can now be safely declared as non-existent. This makes recognition of his designated taxa (39 new species of polychaetes described) controversial at times, especially from an orthodox taxonomical point of view, and this is why it is necessary, in this case, to designate neotypes when possible.

This study deals with the description of a new species, *Syllis lagunae* sp. nov., and the designation of a neotype for *Syllis mexicana* from Términos Lagoon, the largest coastal lagoon in the country (30 x 70 km), located in the Southern coasts of the Gulf of México: 18°15'-18°49'N; 91°15'-91°55'W (Hernández-Alcántara & Solís-Weiss, 1991) (Fig. 1). This lagoon has been a preferred site for biological research for the past 30 years because of its importance, both ecologically (a large variety of natural habitats are found there, including mangroves, seagrass beds and oyster beds) and economically (it is a zone for protection and growth or exploitation of species of commercial value like shrimps, molluscs and fishes) (Cruz-Ábrego et al., 1994). The mangroves surrounding the lagoon are dominated by *Rhizophora mangle* (red mangrove), whereas the dense and extensive prairies of seagrass beds are dominated by *Thalassia testudinum* and are mostly found to the northwest of the lagoon; both have a rich polychaete fauna (Ibáñez-Aguirre & Solís-Weiss, 1986; Hernández-Alcántara & Solís-Weiss, 1991 & 1995).

## Materials and methods

Samples were collected manually from 1981 to 1984, in areas of mangrove and seagrass beds at depths of 15-50 cm in mangroves and 50-100 cm in seagrass beds. The sediment was collected with a 20 cm (inner diameter) core (Hernández-Alcántara & Solís-Weiss, 1991), and in areas of seagrass beds with a quadrat (30 cm x 30 cm) (Ibáñez-Aguirre & Solís-Weiss, 1986), and screened through a 0.5 mm sieve. The retained organisms were fixed in 4% formaldehyde and subsequently washed and transferred to 70% ethanol. We included all the available information of physical and chemical parameters such as temperature, salinity, depth, organic carbon and sediment type in the section "*Occurrence*". Materials of *Syllis cornuta* (now identified as *Syllis parapari* San Martín & López, 2000) and *Syllis beneliahuae* (Campoy & Alquézar, 1982) were examined from the collection of the Museo Nacional de Ciencias Naturales de Madrid (MNCN-CSIC). The neotype for *Syllis cornuta* was not reviewed, since Licher (1999) provided a very detailed description and illustrations (SEM



**Figure 1.** Type localities of *Syllis lagunae* sp. nov. and *Syllis mexicana* (Rioja, 1960).

**Figure 1.** Localités types de *Syllis lagunae* sp. nov. et *Syllis mexicana* (Rioja, 1960).

and line drawings) for the neotype, largely enough for the aims of this study. Comparisons with close related species were done based on original descriptions and taking into account the Licher's revision. Type material of *Syllis lagunae* sp. nov. has been deposited in the Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México (CNP-ICML, UNAM: DFE.IN.061.0598), Los Angeles County Museum of Natural History, Allan Hancock Foundation (LACM-AHF), and Museo Nacional de Ciencias Naturales de Madrid (MNCN-CSIC).

### Systematics

#### *Syllis lagunae* sp. nov.

(Figs 2-3)

*Typosyllis cornuta* - Granados-Barba et al., 2003: 340  
[non Rathke, 1843].

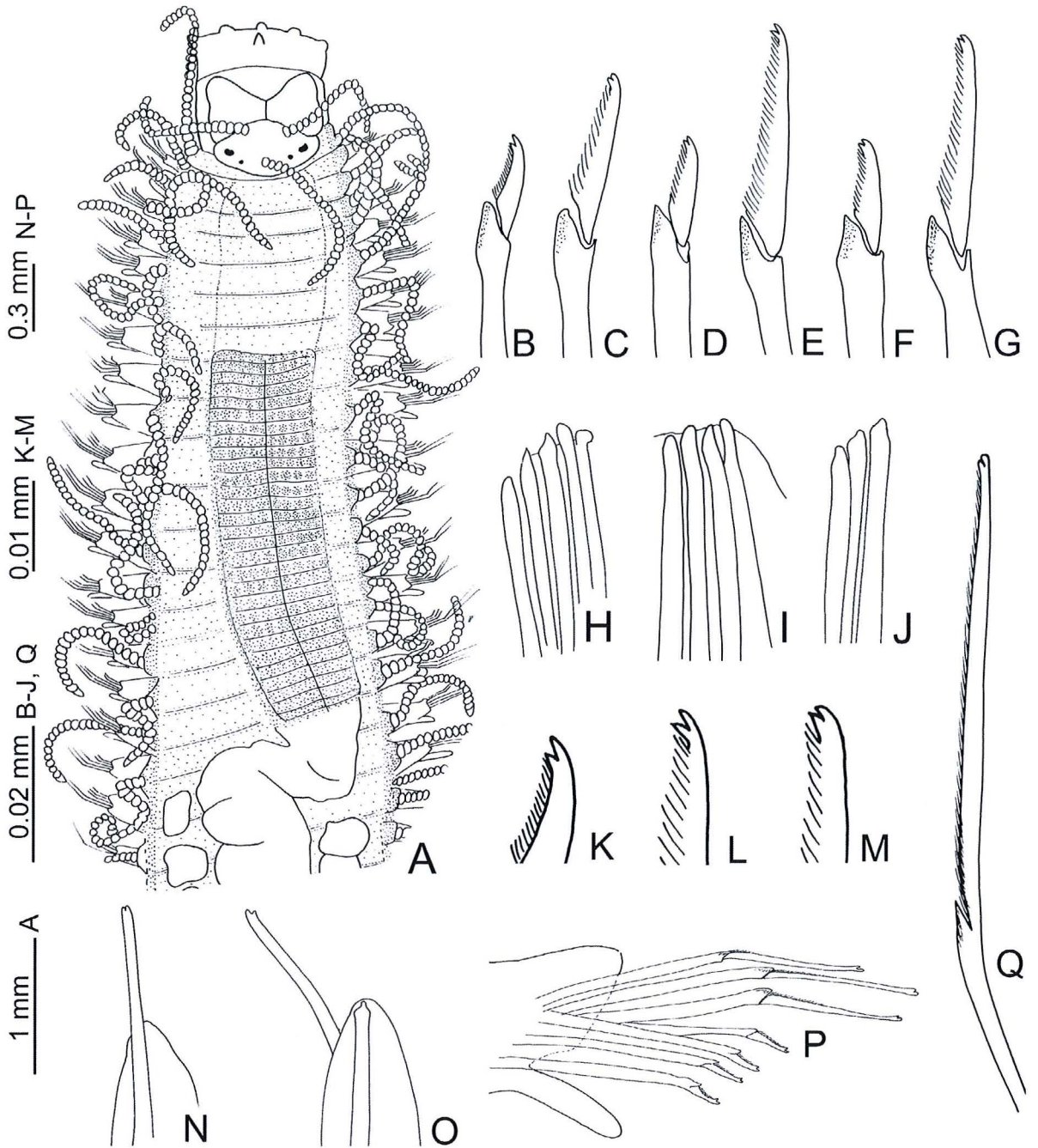
#### Material examined

**Type material.** Pájáros Island, Términos Lagoon, Campeche, México, February 10, 1982, 18°39.0'N - 91°43.4'W. [CNP-ICML, UNAM: POH-37-001, holotype],

[CNP-ICML, UNAM: POP-37-002, 6 paratypes], [MNCN-CSIC, 2 paratypes]. Topotypes [CNP-ICML, UNAM: POT-37-002] March 29, 1982 (7 specimens); June 08, 1982 (5 specimens); June 09, 1982 (1 specimen); August 16, 1982 (9 specimens); October 08, 1981 (1 specimen).

**Non-type material.** [CNP-ICML, UNAM: PO-37-075] Términos Lagoon, Campeche, México: Cocoyoles, May 09, 1984, 18°40.3'N - 91°42.1'W (2 specimens). Perseguidores, October 09, 1981, 18°48.35'N - 91°25.0'W (4 specimens); February 11, 1982 (3 specimens); June 09, 1982 (2 specimens); August 06, 1981 (2 specimens). Bayoneta, August 06, 1981, 18°47.4'N - 91°30.0'W (2 specimens); February 04, 1982 (10 specimens); August 17, 1982 (17 specimens). Tzasná, August 07, 1981, 18°48.1'N - 91°23.1'W (2 specimens); June 10, 1982 (2 specimens); August 18, 1982 (2 specimens); November 17, 1983 (2 specimens); March 02, 1984 (2 specimens).

**Additional material.** *Syllis beneliahuae* [MNCN-CSIC 16.01/156]: 1 specimen from Punta del Francés, Isla de los Pinos, Cuba, identified as *Syllis mexicana*. *Syllis beneliahuae* [MNCN-CSIC 16.01/671]; 2 specimens from

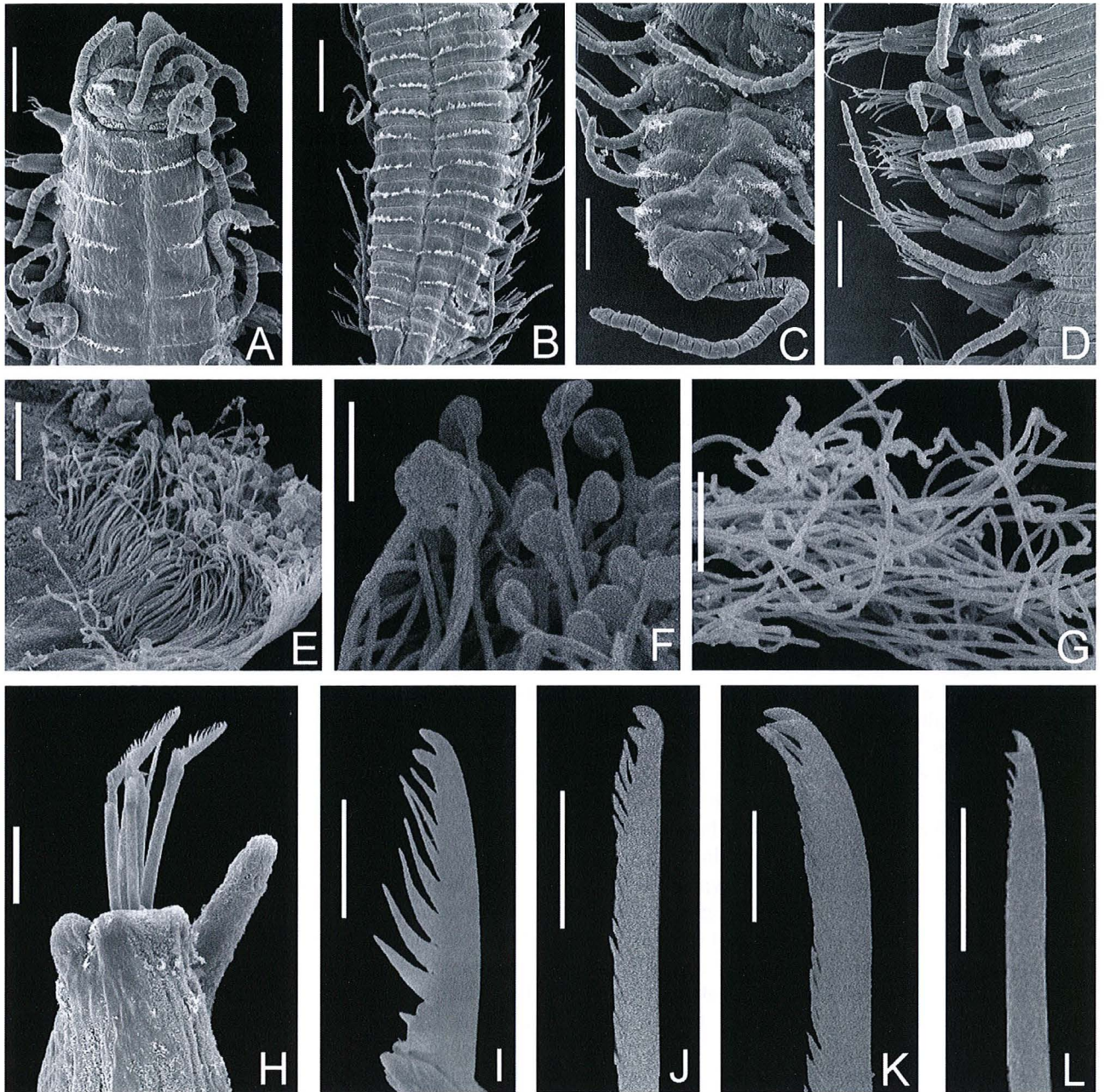


**Figure 2.** *Syllis lagunae* sp. nov. **A.** Anterior region, dorsal view. **B-C.** Ventral and dorsal falcigers from anterior segments. **D-E.** Ventral and dorsal falcigers from median region. **F-G.** Ventral and dorsal falcigers from posterior segments. **H.** Aciculae from anterior segments. **I-J.** Aciculae from median region. **K-M.** Tip of dorsal falcigers, detail. **N.** Dorsal simple chaeta from posterior segments. **O.** Dorsal simple chaeta and acicula from last segment. **P.** Parapodium from median region. **Q.** Bidentate pseudospiniger from median region. (A) [CNP-ICML, UNAM: POP-37-002], (B-G) [CNP-ICML, UNAM: POP-37-002, paratype], (H-Q) [CNP-ICML, UNAM: POH-37-001, holotype].

**Figure 2.** *Syllis lagunae* sp. nov. **A.** Région antérieure, vue dorsale. **B-C.** Falcigères ventrales et dorsales des segments antérieurs. **D-E.** Falcigères ventrales et dorsales de la région moyenne. **F-G.** Falcigères ventrales et dorsales des segments postérieurs. **H.** Acicules de la région antérieure. **I-J.** Acicules de la région moyenne. **K-M.** Pointe de falcigères, détail. **N.** Soie simple dorsale des segments postérieurs. **O.** Soie simple dorsale et acicule du dernier segment. **P.** Parapode de la région moyenne. **Q.** Pseudospinigère bidenté de la région moyenne. (A) [CNP-ICML, UNAM: POP-37-002], (B-G) [CNP-ICML, UNAM: POP-37-002, paratype], (H-Q) [CNP-ICML, UNAM: POH-37-001, holotype].

between Punta del Este and Cayo Matías, Cuba. *Syllis cornuta* [MNCN-CSIC 16.01/130]: 1 specimen with no

reference to the sampling site, identified by San Martín & Viéitez.



**Figure 3.** *Syllis lagunae* sp. nov. **A.** Anterior region, dorsal view. **B.** Posterior region, dorsal view. **C.** Pygidium. **D.** Chaetigers from median region, dorsal view. **E-F.** Discocilia from the third segment. **G.** Typical cilia without heads from last segment. **H.** Parapodium from median region. **I.** Dorsal falciger from anterior region. **J-K.** Bidentate pseudospinigers from median region, different views. **L.** Dorsal, simple, bidentate chaeta. Scale bars: (A-D) 100  $\mu\text{m}$ ; (E) 5  $\mu\text{m}$ ; (F-G) 1  $\mu\text{m}$ ; (H) 20  $\mu\text{m}$ ; (I-K) 5  $\mu\text{m}$ ; (L) 10  $\mu\text{m}$ . (A-L) [CNP-ICML, UNAM: POT-37-002].

**Figure 3.** *Syllis lagunae* sp. nov. **A.** Région antérieure, vue dorsale. **B.** Région postérieure. **C.** Pygidium. **D.** Setigères de la région moyenne, vue dorsale. **E-F.** Structures discociliaires du troisième segment. **G.** Ciliation typique sans tête du dernier segment. **H.** Parapode de la région médiane. **I.** Falcigère dorsale de la région antérieure. **J-K.** Pseudospinigère bidenté de la région moyenne, vues de différents côtés. **L.** Dorsal, soie simple, bidentée. Echelle: (A-D) 100  $\mu\text{m}$ ; (E) 5  $\mu\text{m}$ ; (F-G) 1  $\mu\text{m}$ ; (H) 20  $\mu\text{m}$ ; (I-K) 5  $\mu\text{m}$ ; (L) 10  $\mu\text{m}$ . (A-L) [CNP-ICML, UNAM: POT-37-002].

*Description (based on the holotype, variations found in additional type material are included in parentheses)*

Holotype complete, body length 10 mm (1-10 mm), width 0.8 mm (0.3-1.0 mm), 68 (42-120) chaetigers. Body long, anteriorly broad and posteriorly slender, tegument thick (Figs 2A & 3A-B). Prostomium subhexagonal, wider than long (Fig. 2A). Two nuchal organs at the base of prostomium with cilia around each one, bulb-shaped type (Fig. 3A). Two bands of cilia in anterior region of prostomium, just at base of lateral antennae (Fig. 3A). Two pairs of eyes in trapezoidal arrangement: anterior pair reniform, at base of median antenna, posterior pair rounded at posterior region of prostomium (Fig. 2A); two ocular rounded spots in anterior region of prostomium, and at internal edge of the lateral antennae. Median antenna inserted at base of prostomium, between posterior pair of eyes, with 23 articles (18-26). Lateral antennae with 20 articles (16-20) inserted medially on prostomium. Palps conical, fused for a third of their length, with apex directed outwards and oblique furrow, seemingly composed by two articles (Figs 2A & 3A). Dorsal tentacular cirri with 26 articles (26-36), ventral pair with 14 articles (12-24). Pharynx long with ten globular terminal papillae and sub-terminal conical thick tooth middorsally extending through seven chaetigers (four to eight in paratypes). Proventricle longer than pharynx, extending through ten chaetigers (9-15) with 32 rows of transverse muscle bands (27-32). Dorsal cirri long, alternating in length (Fig. 3D): in anterior region, short ones with 18 articles (13-18), long ones with 28 (20-32); in median region, short ones with 20 articles (14-20), long ones with 34 articles (24-34); in posterior region, short ones with 16 articles (10-16), long ones with 26 articles (18-26). Ventral cirri slender, digitiform, longer than parapodial lobes (Fig. 3H). A ciliary band present on dorsal side of each segment (Fig. 3A-B); in the first three segments, cilia are of the "discocilia" type with discus totally closed (Fig. 3E-F); in all other segments, typical cilia without heads (kinocilia-type) present (Fig. 3G). The bands which form these sensorial organs are difficult to observe with the microscope and are probably contractile, which is why they are not visible in all of the observed specimens, even with the scanning electron microscope (SEM). Parapodia elongate, conical with two kinds of chaetae (Figs 2P & 3H): superior chaetae three long bidentate pseudospinigers with lateral pectination, reaching the subdistal tooth (Figs 2Q & 3J-K); superior pseudospiniger up to five times longer than inferior bidentate falcigers; in later chaetigers they are up to seven times longer than inferior falcigers. Inferior chaetae four ventral bidentate falcigers with short blades and pectination as long as subdistal tooth (Fig. 2B, D & F) and four dorsal falcigers bidentate with long blades and pectination as long as subdistal tooth (Figs 2C, E, G, K-M & 3I). Dorsal simple

chaetae bidentate, straight (Figs 2N & 3L). Ventral simple chaetae bent, bidentate (Fig. 2O). Dorsal and ventral simple chaetae with distal tooth longer than subdistal. Number of aciculae changing along the body: from chaetiger one to ten, four aciculae present (Fig. 2H-I), broad, straight, subterminally expanded with acute tips; from chaetiger 11-14, three aciculae (Fig. 2J): two subterminally expanded with acute tips, one bent subdistally; from chaetiger 15-28, one or two distally triangular aciculae and from chaetiger 29 to last chaetigers (Fig. 2O). Pygidium with two anal cirri (Fig. 3C) and 18 articles (16-28).

#### Remarks

*Syllis lagunae* sp. nov., is closely related to *S. beneliahuae*, described from Spain, *S. botosaneanui* (Hartmann-Schröder, 1973), described from Cuba, *S. cornuta*, described from Norway, *S. garciai* (Campoy, 1982) from Spain and *S. magna* (Westheide, 1974) from Galápagos Islands (Table 1). These six species have bidentate pseudospinigers; however, *S. lagunae* sp. nov., is unique by having pseudospinigers whose pectination reaches the subdistal tooth (not reaching the subdistal tooth in *S. beneliahuae*, *S. botosaneanui*, *S. cornuta*, *S. garciai* and *S. magna*). In *S. botosaneanui*, *S. cornuta* and *S. garciai* the ventral cirrus is as long as the length of the parapodium (longer than parapodium in *S. beneliahuae*, *S. lagunae* sp. nov. and *S. magna*). In *S. beneliahuae* and *S. cornuta*, the pectination of falcigers is shorter than subdistal tooth; in *S. garciai* pectination exceeds the subdistal tooth; in *S. magna* and *S. lagunae* sp. nov., it is as long as the subdistal tooth; and in *S. botosaneanui* it is as long as subdistal tooth or slightly short. In *S. botosaneanui* pharynx extends five chaetigers (6-7 chaetigers in *S. garciai* and *S. lagunae* sp. nov.; 9 in *S. cornuta*; 10 in *S. beneliahuae* and 12 in *S. magna*). In *S. cornuta* one acicula is notably longer and broader than others in the same parapodium, all with pointed tips; *S. botosaneanui* has broad aciculae with pointed or bent tips; *S. garciai* and *S. magna* have thin and broad aciculae with pointed, rounded, triangular or bent tips; *S. beneliahuae* has broad and thin aciculae with pointed, triangular or bent tips; and in *S. lagunae* sp. nov., aciculae are broad and straight, with acute, triangular or bent tips. There are also, minor variations such as number of articles in antennae and tentacular cirri, those are presented in Table 1.

In *S. lagunae* sp. nov., clearly bidentate compound pseudospinigers are present, in which the anterior pectination is longer than the subdistal tooth; this characteristic is different from the second species attended in this contribution, *S. mexicana*, which have unidentate compound pseudospinigers with fine and short anterior pectination.

Our SEM observations on *Syllis lagunae* clearly show dorsal ciliary bands shaped as discocilia structures.

**Table 1.** Selected characters of *Syllis lagunae* sp. nov. and close related species with bidentate pseudospinigers.**Tableau 1.** Sélection de caractères de *Syllis lagunae* sp. nov. et d'espèces apparentées possédant des pseudospinigères bidentés.

Character	<i>S. beneliahuae</i>	<i>S. botosaneanui</i>	<i>S. cornuta</i>	<i>S. garciai</i>	<i>S. lagunae</i> sp. nov.	<i>S. magna</i>
Prostomium	Subpentagonal to oval	Subpentagonal	Triangular to oval	Subpentagonal to oval	Subhexagonal, wider than long	Subhexagonal, wider than long
Palps	Stout, triangular, separated along most	Stout, triangular, fused basally	Long, triangular, blunt anteriorly, fused basally	Fused basally	Fused for a third of their length, conical with apex directed outwards	Fused for a third of its length
Median antenna	18 articles	10 articles	28-32 articles	19-20 articles	26 articles	24-31 articles
Lateral antennae	15 articles	5-6 articles	18-23 articles	11 articles	20 articles	18-21 articles
Dorsal tentacular cirrus	20 articles	6-8 articles	20-22 articles	20-22 articles	26-36 articles	21-33 articles
Ventral tentacular cirrus	12 articles	4-6 articles	13-14 articles	12 articles	12-24 articles	16-18 articles
Dorsal cirri	18-20 as well as 10-11 articles	10-12 as well 6-8 articles	17-34 as well as 13-14 articles	15-17 as well 12-14 articles	20-34 as well as 10-18 articles	25-48 as well as 20-40 articles
Ventral cirri	Longer than parapodial lobe	As long as parapodial lobe	As long as parapodial lobe	As long as parapodial lobe	Longer than parapodial lobe	Longer than parapodial lobe
Pharynx extension	10 chaetigers	5 chaetigers	9 chaetigers	6-7 chaetigers	7 chaetigers	12 chaetigers
Proventricle extension/ muscular rows	6-7 chaetigers/36 rows	5-6 chaetigers/35-44 rows	4-7 chaetigers/44 rows	5-6 chaetigers/35-37 rows	10 chaetigers/32 rows	6 chaetigers/35 rows
Falcigers	Bidentate, pectination shorter than subdistal tooth	Bidentate with a short subdistal tooth, broad, pectination shorter or as long as subdistal tooth	Bidentate, stout pectination shorter than subdistal tooth	Bidentate with a short distal tooth, long pectination that exceeds subdistal tooth	Bidentate, with pectination as long as subdistal tooth	Bidentate, pectination as long as subdistal tooth
Pseudospinigers	Bidentate, pectination not reaches the subdistal tooth	Bidentate, with a very small subdistal tooth, pectination not reaches subdistal tooth	Bidentate, subdistal tooth short, tip button-shaped, pectination not reaches subdistal tooth	Bidentate, pectination not reaches subdistal tooth	Bidentate, pectination longer than subdistal tooth	Slightly bidentate pectination not reaching subdistal tooth
Simple chaetae	Dorsal thin, bidentate with a short lateral tooth; ventral bidentate	Dorsal bidentate with a long subdistal tooth and lateral pectination; ventral bent, bidentate, with both teeth equal-sized	Dorsal stout with rounded tip; ventral slightly bent, thin, bidentate	Dorsal stout, bidentate with a small lateral tooth; ventral bent, bidentate	Dorsal bidentate, straight; ventral bent, bidentate	Dorsal straight and blunt; ventral bidentate

Table 1 (continued)

Character	<i>S. benelihuae</i>	<i>S. botosaneanui</i>	<i>S. cornuta</i>	<i>S. garciai</i>	<i>S. lagunae</i> sp. nov.	<i>S. magna</i>
Aciculae	Thin and broad, tips pointed, triangular or bent	Broad, tips pointed or bent	One notably longer and broader than others in the same parapodium, tips pointed	Thin and broad, tips pointed, rounded, triangular or bent	Broad and straight, tips acute, triangular or bent	Broad and thin, tips pointed, rounded or triangular
Discocilia	No recorded	No recorded	No recorded	No recorded	First three segments with discocilia-type cilia. Other segments with kinocilia-type	No recorded
Type locality	Playa del Arroz, Spain	Playa Juraguá, Cuba	Kristiansund, Norway	Cala Cerrada, Aguilas Murcia, Spain	Pájaros Island, Términos Lagoon, Campeche, México	Academia Bay, Santa Cruz, Galápagos Islands

Although dorsal ciliary bands are common in syllids, the cilia are disrupted and break off with normal fixation methods, making it impossible to observe them. Thus, dorsal ciliary bands had been described only for *Syllis barbata* (San Martín, 1992) and some specimens of *Paraehlersia ferrugina* and several species of the *Autolytus* genus (San Martín, 2003): *A. benazzi*, *A. convoluta*, *A. inermis*, *A. prolifera* and *A. dentalia*, although all these species were transferred to the genus *Myrianida* by Nygren (2004).

Ciliary bands have also been described in other polychaete families such as the nephtyids *Aglaophamus longicirrata* (Pérez-Torrijos et al., 2009, and *Nephtys bucera* (Coonfield, 1931 & 1934). The physiological tests performed by Coonfield, indicated that the cilia were grouped into small tufts and each ciliated cell was independent of the nervous system, regulating its own activity. Heimler (1983) studied the cilia in the terebellid *Lanice conchilega* (Pallas) and commented on their organization, emphasizing that they could probably be considered remnants of larval stages. Some species of the sabellid genus *Megalomma* Johansson have a caruncle placed dorsally above the mouth (Tovar-Hernández & Salazar-Vallejo, 2008). The caruncle is covered by longitudinal ciliated bands; the cilia are hypertrophied, wider distally, tongue-like, forming a ciliated curtain or membranella. These ciliary bands could have different functions such as to generate water currents or transport food particles towards the mouth, but further investigation is needed. Dorsal ciliated organs may be of different kinds and not all of them are necessarily sensory; they may serve in spermatophore formation and transfer, or simply generate water currents (Purschke, 2005). For example, in the spionid *Pygospio elegans* Claparède, these organs are neither sensory nor have a common origin with nuchal organs but probably play a role in sperm transfer (Schlötzer-Schrehardt, 1991).

#### Occurrence

*Syllis lagunae* sp. nov., was collected in mangroves and seagrass beds off southern Carmen Island, and seagrass beds off northeastern Términos Lagoon. In mangroves: 15-35 cm, temperature 23.5-29.0°C, salinity 20-36, 0.39-3.64% organic carbon, in muddy sands and sandy muds. In seagrass beds: 0.5-100 cm, temperature 28.5-33.0°C, salinity 18.4-35.1, sands, sandy mud and muddy sand bottoms.

#### Etymology

The specific name refers to the type locality, Términos Lagoon, Campeche, México.



*Syllis mexicana* (Rioja, 1960)

(Figs 4-5)

*Ehlersia mexicana* Rioja, 1960: 291-295, figs 4-11; Rullier, 1974: 22; Fauchald & Reimer, 1975: 84; Ibáñez-Aguirre & Solís-Weiss, 1986: 41; Hernández-Alcántara & Solís-Weiss, 1991: 957.

*Langerhansia mexicana* - Hartman, 1965: 30; Fauchald, 1977: 20; Ibarzábal, 1989: 6.

*Syllis mexicana* - San Martín, 1992: 183, figs 6d-f.

*Non Typosyllis mexicana* - Licher, 1999: 51-52, figs 24A-M.

*Material examined*

Type material. San Julián, Términos Lagoon, Campeche, México, November 16, 1983, 18°47.4'N - 91°30.5'W. [CNP-ICML, UNAM: PON-37-001, neotype], [LACM-AHF, 2 paratypes], [MNCN-CSIC, 2 paratypes]. Topotypes [CNP-ICML, UNAM: POT-37-001] May 18, 1983 (2 specimens); May 08, 1984 (2 specimens).

Non-type material. [CNP-ICML, UNAM: PO-37-046] Términos Lagoon, Campeche, México: Tzasaná, August 01, 1983 - 18°48.1'N, 91°23.1'W (1 specimen); La Bayoneta, February 04, 1982, 18°47.4'N - 91°30'W (8 specimens), August 06, 1981 (5 specimens); Perseguidores, October 09, 1981 (5 specimens).

Additional material. *Syllis cornuta* [MNCN-CSIC 16.01/130 now identified as *Syllis parapari* San Martín & López, 2000]: 1 specimen with no reference to the sampling site, identified by San Martín and Viéitez. *Syllis beneliahuae* (Campoy & Alquézar, 1982) [MNCN-CSIC 16.01/156]: 1 specimen from Punta del Francés, Isla de los Pinos, Cuba, identified as *Syllis mexicana* (Rioja, 1960). *Syllis beneliahuae* [MNCN-CSIC 16.01/671] two specimens from between Punta del Este and Cayo Matías, Cuba.

*Description (based on the neotype, variations found in additional type material are included in parentheses)*

Neotype complete, body length 17 mm (4.5-20 mm), width 1 mm (0.5-1.2 mm), 108 (48-108) chaetigers. Body long, anteriorly broad and posteriorly slender, tegument thick. Prostomium subhexagonal, wider than long (Figs 4A & 5A), two pairs of eyes in trapezoidal arrangement: anterior pair reniform, at base of median antenna; posterior pair small, rounded at posterior end of prostomium; two rounded ocular spots in anterior end of prostomium, at internal edge of the lateral antennae (Fig. 4A). Median antenna with 20 articles (19-32), inserted at prostomium base, between posterior pair of eyes (Fig. 4A). Lateral antennae with 19 articles (14-22) medially inserted (Figs 4A & 5A). Palps conical, fused for a third of their length, with apex directed outwards and oblique furrow (Fig. 4A). Dorsal tentacular cirri with 16 articles (16-30), ventral pair

with 12 articles (12-24). Pharynx long, middorsally extending through nine chaetigers (6-10), with ten globular terminal papillae (Fig. 4A) and subterminal conical thick tooth. Proventricle longer than pharynx, extending to chaetiger 12 (8-18) with 42 rows of transverse muscle bands (26-42). Dorsal cirri long, alternating in length: in anterior region, short ones with 18 articles (18-26), long ones with 20 (22-34); in median region, short ones with 20 articles (18-22), long ones with 26 articles (22-34); in posterior region, short ones with 18 articles (14-22), long ones with 22 articles (18-28). Ventral cirri slender, digitiform, slightly longer than parapodial lobes (Fig. 4L), when treated for SEM, tissue is slightly contracted and the length of ventral cirri is as long as that of the parapodial lobes (Fig. 5D). Parapodia elongated, conical, with two kinds of chaetae (Fig. 4L): inferior chaetae four ventral bidentate falcigers with short blade and pectination that does not reach the subdistal tooth (Figs 4B, D, F & 5E), remainder four dorsal falcigers with a dorso-ventral gradation in the length of the blades and pectination does not reach the subdistal tooth (Figs 4C, E, G & 5F). Superior chaetae: two very elongate, unidentate pseudospinigers with lateral pectination (Figs 4O & 5C, H); in first chaetiger, these pseudospinigers are up to five times longer than inferior bidentate falcigers; in later chaetigers, they are up to seven times longer than inferior falcigers. Dorsal simple chaetae from posterior region stout, bidentate, both teeth equal-size (Fig. 4M); ventral simple chaetae slightly bent, bidentate, distal tooth longer than subdistal tooth (Figs 4N & 5G). Aciculae broad, straight, subterminally expanded with acute tips, number changing along body region (Fig. 4H-K): 4-5 anteriorly, three in median region, two in posterior region and only one in last parapodia. Pygidium with two anal cirri with 32 articles (16-28) and one middle ventral cirrus, short and smooth (Fig. 5B).

*Remarks*

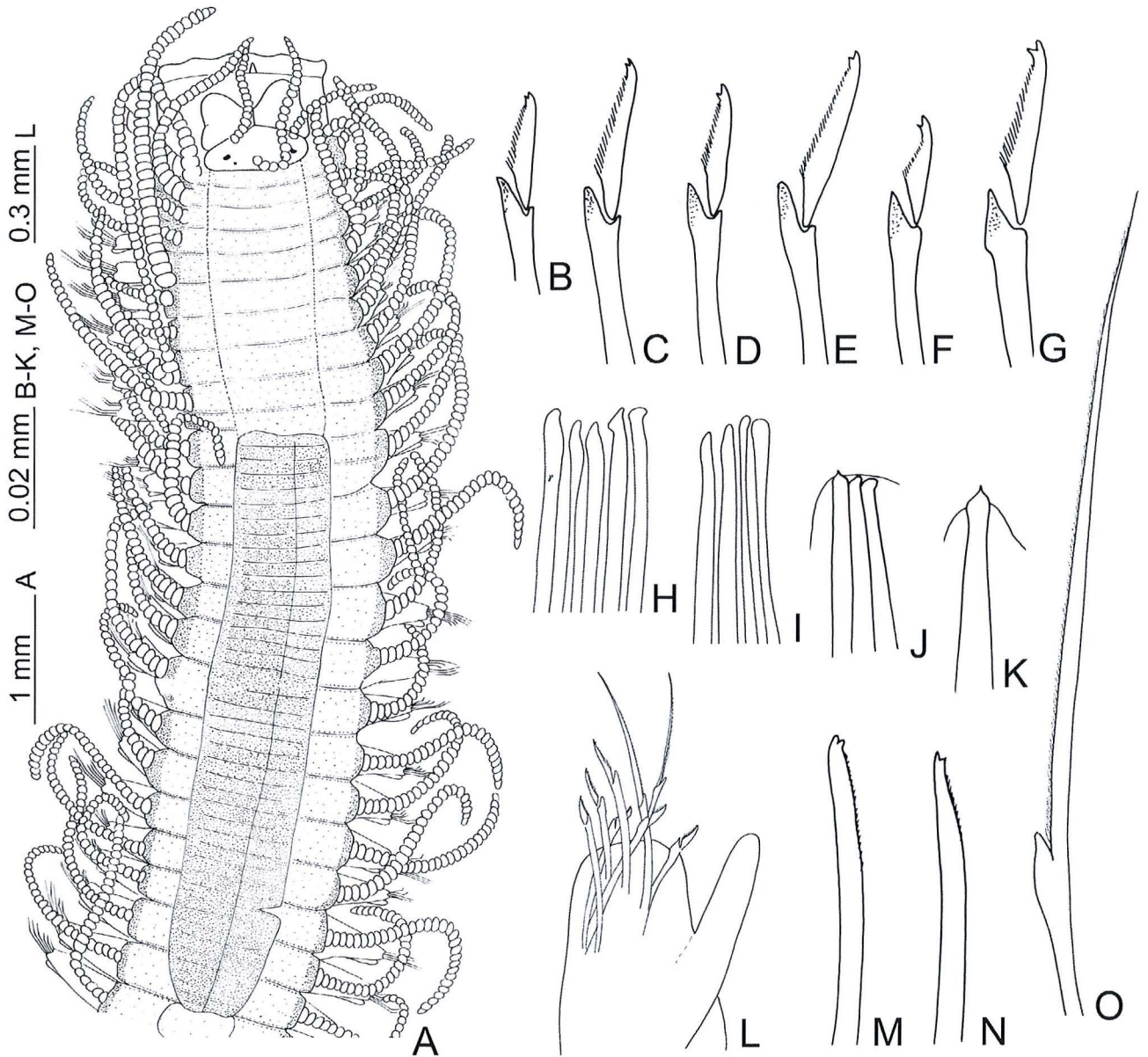
In the present study, the designation of the neotype of *Syllis mexicana* is presented according to Article 75.3.1 of the International Commission on Zoological Nomenclature (1999). The taxonomic identification of *S. mexicana* has led to confusion in the past records of the Gulf of México and Caribbean. It is thus necessary to define the nominal taxon objectively and assign to it a type to carry the specific name. *Syllis mexicana* was originally described as having eight marginal papillae, and ventral cirri equal to, or slightly exceeding, the first half of the parapodial lobe. However, in this redescription, based on the neotype and paratypes, we observed ten marginal papillae in the pharyngeal opening; in addition, the ventral cirri are slightly longer than the parapodial lobes.

*Syllis mexicana* differs from *S. lagunae* sp. nov., in the following ways: 1) very elongate, unidentate

pseudospinigers (bidentate in *S. lagunae* sp. nov.); 2) pectination of pseudospinigers and falcigers that do not reach the subdistal tooth (it reaches the subdistal tooth in *S. lagunae* sp. nov.); 3) the ventral cirrus shorter than in *S.*

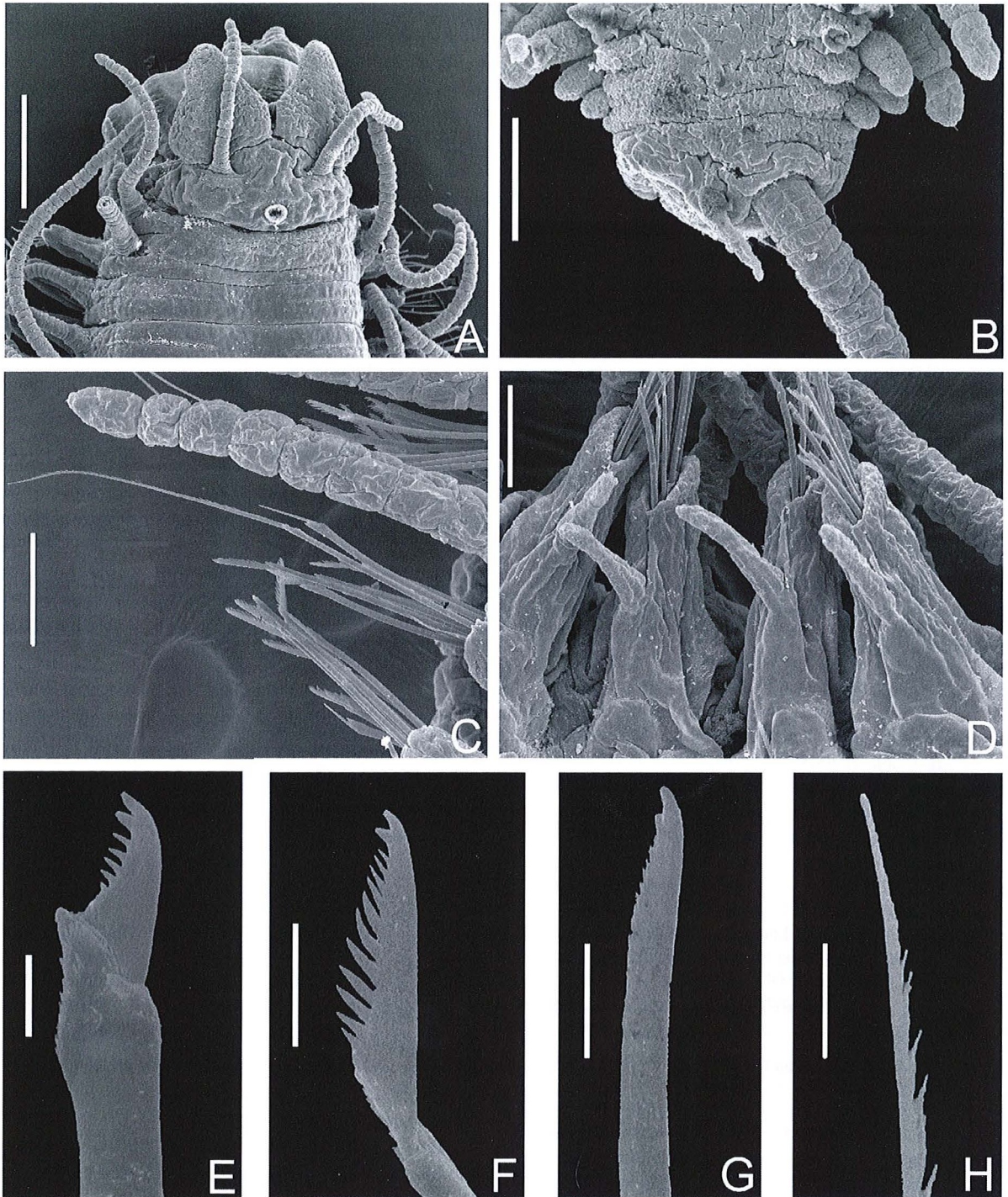
*lagunae* sp. nov.; 4) lack of the discocilia structures (present in *S. lagunae* sp. nov.).

According to Licher (1999), the “*mexicana*” complex includes three species with bidentate pseudospinigers: *S.*



**Figure 4.** *Syllis mexicana* (Rioja, 1960). **A.** Anterior region, dorsal view. **B-C.** Ventral and dorsal falcigers from anterior segments. **D-E.** Ventral and dorsal falcigers from median region. **F-G.** Ventral and dorsal falcigers from posterior segments. **H.** Aciculae from anterior segments. **I-J.** Aciculae from median region. **K.** cicula from posterior segments. **L.** Parapodium from median region. **M-N.** Dorsal and ventral simple chaetae from posterior segments. **O.** Unidentate pseudospiniger from median region. (A-H) [CNP-ICML, UNAM: PON-37-001, neotype].

**Figure 4.** *Syllis mexicana* (Rioja, 1960). **A.** Région antérieure, vue dorsale. **B-C.** Falcigères ventrales et dorsales des segments antérieurs. **D-E.** Falcigères ventrales et dorsales de la région moyenne. **F-G.** Falcigères ventrales et dorsales des segments postérieurs. **H.** Acicules des segments antérieurs. **I-J.** Acicules de la région moyenne. **K.** Acicule des segments postérieurs. **L.** Parapode de la région moyenne. **M-N.** Soie simple dorsale et ventrale des segments postérieurs. **O.** Pseudospinigère unidenté de la région moyenne. (A-H) [CNP-ICML, UNAM: PON-37-001, neotype].



**Figure 5.** *Syllis mexicana* (Rioja, 1960). **A.** Anterior region, dorsal view. **B.** Pygidium. **C.** Chaetiger from median region, dorsal view. **D.** Chaetigers from median region, ventral view. **E.** Ventral falciger from anterior region. **F.** Dorsal falciger from anterior region. **G.** Simple, bidentate chaeta. **H.** Unidentate tip of a pseudospiniger from median region. Scale bars: (A) 100  $\mu\text{m}$ , (B-D) 50  $\mu\text{m}$ , (E-H) 5  $\mu\text{m}$ . (A-H) [CNP-ICML, UNAM: PO-37-046].

**Figure 5.** *Syllis mexicana* (Rioja, 1960). **A.** Région antérieure, vue dorsale. **B.** Pygidium. **C.** Sétigère de la région moyenne, vue dorsale. **D.** Sétigères de la région médiane, vue ventrale. **E.** Falcigère ventrale de la région antérieure. **F.** Falcigère dorsale de la région antérieure. **G.** Soie simple bidentée. **H.** Pointe unidentée d'un pseudospinigère de la région moyenne. Echelle: (A) 100  $\mu\text{m}$ , (B-D) 50  $\mu\text{m}$ , (E-H) 5  $\mu\text{m}$ . (A-H) [CNP-ICML, UNAM: PO-37-046].

**Table 2.** Selected characters of *Syllis mexicana* (Rioja, 1960) and close related species with unidentate pseudospinigers.**Tableau 2.** Sélection de caractères de *Syllis mexicana* (Rioja, 1960) et d'espèces apparentées possédant des pseudospinigers unidentés.

Character	<i>S. broomensis</i>	<i>S. mexicana</i>	<i>S. parateinoptera</i>	<i>S. rosea</i>
Prostomium	Subpentagonal	Subhexagonal, wider than long	Triangular	Oval nearly circular
Palps	Fused basally	Fused for a third of their length, conical with vertices directed towards outside	Fused basally	Fused basally
Median antenna	22-28 articles	19-32 articles	22 articles	23 articles
Lateral antennae	14-17 articles	14-22 articles	16-18 articles	14 articles
Dorsal tentacular cirrus	16-18 articles	16-30 articles	13-14 articles	11-12 articles
Ventral tentacular cirrus	11-13 articles	12-24 articles	9-10 articles	7 articles
Dorsal cirri	17-28 as well 17-19 Articles	18-26 as well 22-34 articles	10-14 articles	20 as well 12-14 articles
Ventral cirri	As long as parapodial lobe	Slightly longer than parapodial lobe	Longer than parapodial lobe	Slightly longer than parapodial lobe
Pharynx extension	11-12 chaetigers	9 chaetigers	3-4 chaetigers	7-8 chaetigers
Proventricle extension/ number of muscular rows	6 chaetigers/13-23 rows	12 chaetigers/42 rows	10 chaetigers/?	4 chaetigers/30 rows
Falcigers	Bidentate, with a long distal tooth, long pectination but not exceeds the subdistal tooth	Bidentate with long pectination that does not reach the subdistal tooth	Unidentate with short pectination	Bidentate, with a short distal tooth and long pectination that not exceeds the subdistal tooth
Pseudospinigers	Unidentate with fine and short pectination	Unidentate with fine and short pectination	Unidentate with fine and short pectination	Transitional states from slightly bidentate to unidentate in posterior segments
Simple chaetae	Dorsal bidentate with a broader tooth and a small subdistal tooth; ventral bent, bidentate	Dorsal stout, bidentate, both teeth equal-size; ventral slightly bent, bidentate, distal tooth longer than subdistal	?	Dorsal ones stout, truncated, slightly bidentate; ventral slightly bent, bidentate
Aciculae	Thin and broad, tips pointed or bent	Broad, straight, tips expanded, acute or triangular	Broad, distally rounded	Broad, tips bent
Discocilia	No recorded	No recorded	No recorded	No recorded
Type locality	Broome, Australia	Punta del Cayo, Términos Lagoon, Campeche, México	Bei, New England, USA	Madeira, Portugal

*beneliahuae* from Playa del Arroz, Spain, *S. magna* from Academia Bay, Santa Cruz, Galápagos Islands, and *S. mexicana* from Punta del Cayo, Términos Lagoon, Campeche, México. Licher (1999) recorded and illustrated bidentate pseudospinigers for specimens labelled as *S. mexicana* from Galeta, Panamá; unfortunately no

comparison with type or topotype materials was done. Based on the revision of topotype material and on the designation of the neotype for *S. mexicana* provided here, in this contribution we confirm that *S. mexicana* has only unidentate pseudospinigers. The “*mexicana*” complex as designated by Licher has no meaning since *Syllis mexicana* differs from *S.*

*beneliahuae* and *S. magna* by having unidentate pseudospinigers (bidentate in *S. beneliahuae* and *S. magna*).

Other species with unidentate pseudospinigers are *S. parateinopteron* (Hartman & Fauchald, 1971) described from Bei, New England, USA, *S. rosea* (Langerhans, 1879) from Madeira, Portugal, and *S. broomensis* (Hartman-Schröder, 1979) from Broome, Australia (Table 2). In *S. parateinopteron* the falcigers are unidentate (bidentate in *S. broomensis*, *S. mexicana* and *S. rosea*). In *S. parateinopteron* the pharynx extends 3-4 chaetigers, while it extends to chaetigers 7-8 in *S. rosea*, chaetiger 9 in *S. mexicana* and chaetigers 11-12 in *S. broomensis*. The pseudospinigers in *S. rosea* have transitional states from slightly bidentate to unidentate in posterior segments (all unidentate in *S. mexicana*). In *S. broomensis* the ventral cirri are as long as parapodial lobes while in *S. mexicana* and *S. rosea* these are slightly longer than parapodial lobe. In *S. mexicana* the prostomium is subhexagonal (subpentagonal in *S. broomensis*, triangular in *S. parateinopteron* and oval, nearly circular in *S. rosea*). Aciculae in *S. parateinopteron* are broad with rounded tips; broad with bent tips in *S. rosea*; thin and broad with pointed or bent tips in *S. broomensis* and aciculae broad, straight with acute expanded or triangular tips in *S. mexicana*.

#### Occurrence

*Syllis mexicana* was collected in mangroves and seagrass beds off the northeastern shores of Términos Lagoon, Campeche. In mangroves: 10-50 cm, temperature 29-34°C, salinity 27-38, 0.34-0.84% organic carbon; in muddy sands. In seagrass beds: 0.5-95 cm, temperature 29.0-29.6°C, salinity 19.1-34.5; in sandy muds.

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