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On Some New Recorded Syllidae (*Polychaeta: Phyllodocida*) for Mediterranean Waters

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Author's contribution

This whole work was carried out by author FAAE.

Short Research Article

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ABSTRACT

Aims: This paper gives an account of the syllid species from different stations Rasheed, Domiatte, El Borrulus, Bardweel, El Aresh, also provides some information on the morphology, distribution and habitat of those species.

Study Design: Descriptive study and distribution.

Place and Duration of Study: Syllidae species were collected from the Eastern Mediterranean coast of Egypt by A cruise (El –Yarmook) in May- June 2013.

Methodology: Soft-sediment samples were collected by Van Veen grab in different depths (10, 20, 50, 100, 200m) and different habitats.

Results: A total of 47 syllid species from 221 taxa species were identified within the strategy of National Institute of Oceanography and Fishery Alexandria. In this study 17 new recorded syllid species to the Mediterranean Egyptian waters were reported, 5 of them also considered new alien species for Mediterranean. They are: *Pionosyllis mariae* San Martín & Hutchings, 2006, *Syllis ortizi* San Martin, 1992, *Exogone (Parexogone) tasmanica* Hartmann- Schröder, 1989; *Sphaerosyllis capensis* Day 1953; *Exogone (Exogone) lourei* Berkeley & Berkeley, 1938; and one new to Eastern Mediterranean. It is: *Prospaerosyllis adela* San Martín, 1984.

Conclusion: New recorded Syllidae species were reported for the first time for Egyptian Mediterranean waters, also 5 of them considered new alien species for Mediterranean.

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Keywords: *Alien polychaetes; new lessepsian migrant polychaetes; new polychaete to Eastern Mediterranean Sea; new recorded for Egyptian waters.*

1. INTRODUCTION

Alien species change the biodiversity and community structure, also affect on its function and even habitat structures [1]. Different vectors are involved in species transfer between different zoogeographical regions, but shipping and man-made canals (i.e. Suez Canal) are the most important. Although the Suez Canal is the main vector enabling Indo-Pacific species to enter Mediterranean Sea, non-native species can also enter this Sea from the Atlantic Ocean via Gibraltar and in ballast water [2,3].

The Mediterranean Sea has been largely under the influence of these two vectors and now possesses a total of 903 alien species [4].

The dominant group among alien species is molluscs (with 215 species), followed by crustaceans (159) and polychaetes (132) [5].

This study is focusing on alien syllid species. Polychaeta established in Mediterranean (34 *polychaete species*) reported by [6]; 20 casual polychaete species; 16 questionable polychaetes; beside 16 excluded polychaete species were reported by the same author [6]. Alien polychaete species reach to 129 species [2]. Twenty-eight of these non-indigenous species have been found in Egyptian waters [2]. More than 45 species are non-native polychaete species in the Egyptian Mediterranean Coast. Alien polychaetes in the Mediterranean Sea have received much attention. In Egyptian Mediterranean waters, comparatively less attention has been drawn to the study of polychaetes in general and to exotic polychaetes in particular [7].

Syllidae species were studied as a part of study of composition, distribution and biogeography of polychaetes, which collected from the Eastern Mediterranean coast of Egypt by A cruise (El –Yarmook) in May- June 2013 from soft-sediment samples.

In the Mediterranean Sea, Syllids have been studied by numerous authors in extensive taxonomic and biogeographic works. [8-17].

The syllid fauna of the Eastern Mediterranean has only recently started [8,9,11,18,19,20,21,15,22]. In Greece, polychaetes have been studied by various authors [23-30]. [11,18] Study Syllidae from the Turkish Aegean coasts. Polychaetes of the Mediterranean coast of Balastin have been studied by [31-36]. Syllids in particular [37,8,9] .

Knowledge about Syllidae Polychaetes in the Egyptian waters is still far from complete; as a result of less taxonomical studies and less sufficient data about this group. In Alexandria [38] recorded some syllid species from Alexandria coast, 39, 40, 16), add some new recorded species of Syllid Polychaetes in the North Mediterranean coast of Egypt. Also [41] recorded 6 syllid species from El Tina Bay, Balteem, Abo-khashaba and Gamasa Northeastern Mediterranean coast of Egypt, finally [7] recorded 7 syllid species from the intertidal zone of the Alexandria coast, south-eastern Mediterranean Sea.

This study is a new attempt to cover some places that have not been studied before and monitor some of the new recorded and new alien syllid species, trying to add new paving the way for other new Egyptian studies.

This paper gives an account of the syllid species from different stations Rasheed (F), Domiatte (H), El Borrulus (G), Bardweel (J), El Aresh (K), also provides some information on the morphology, distribution and habitat of those species which recorded for the first time in the study area, included alien species and the species which are new to the Eastern Mediterranean.

2. MATERIALS AND METHODS

A cruise (El -Yarmook) to the Eastern coast of Egypt was undertaken in May -June 2013 to collect benthic samples from different depths (10, 20, 50,100, 200m) and habitats, by using Van veen grab (1/4m²). Samples are fixed with a 10% formaldehyde solution. From different stations Domiatte (H), Bardweel (J), El Borrulus (G), El Aresh(K) and Rasheed (F). Habitats (coars sand, sand, Muddy- sand, Muddy) were sampled (Fig. 1). Different informations about the area of study are present in Table (1).

In the laboratory, all benthic material was washed through 0.1mm mesh, the material was sorted under a stereomicroscope and specimens were preserved in 70% alcohol. Polychaetes were identified using Optika stereo- and Olympus U.DA 9L16274 Japan compound microscopes.

Drawing with camera lucida attached with microscope. Taxa are presented in phylogenetic order with its distribution. The collected specimens were deposited at the Laboratory of taxonomy of marine organimes. References were used are Day [42], San Martin [13,43,44], Fauvel [45,46], Fauchald [47], Licher [48] and others.

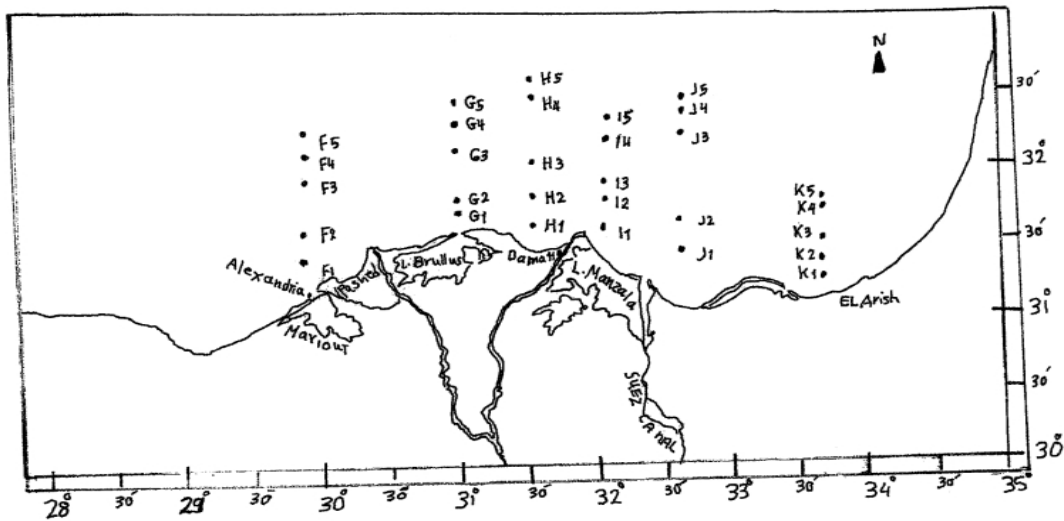


Fig. 1. Map showing locations of sampling sites

Table 1. Stations, habitat, depth, lat. and long for the study area

Stations	Habitat	Depth	Lat.	Long.
Rasheed (F)				
F2	Muddy	20m	Lat: 31°37'57"N	Long: 30°30'00"E
F3	Muddy	50m	Lat: 31°49'33"N	Long: 30°30'00"E
F4	Muddy	100m	Lat: 31°55'11"N	Long: 30°29'52"E
F5	Muddy	200m	Lat: 32°00'28"N	Long: 30°29'51"E
El Borrulus(G)				
G1	Muddy	10m	Lat: 31°38.843'N	Long:33°00.06729'E
G2	Muddy	20m	Lat: 31°41'52"N	Long: 33°00'07"E
G3	Muddy	50m	Lat: 31°53'16"N	Long: 31°00'04"E
G4	Muddy/sand	100m	Lat: 31°59'00"N	Long: 31°00'07"E
G5	Muddy/sand	200m	Lat: 32°04'22"N	Long: 31°00'00"E
Domiatte (H)				
H1	Muddy	10m	Lat: 31°32'18" N	Long: 31°29'58"E
H2	Muddy	20m	Lat: 31°38'29"N	Long: 31°30'03"E
H3	Muddy	50m	Lat: 31°46'43"N	Long: 31°30'09"E
H4	Muddy	100m	Lat: 32°01'03"N	Long: 31°29'54"E
H5	Muddy/sand	200m	Lat: 32°04'56"N	Long: 31°30'05"E
Bardweel (J)				
J1	Muddy	10m	Lat: 31°17'03"N	Long: 32°30'36"E
J2	Muddy	20m	Lat: 31°23'40"N	Long: 32°30'20"E
J3	Sandy/mud	50m	Lat: 31°42'57"N	Long: 33°29'56"E
J4	Sandy/mud	100m	Lat: 31°48'16"N	Long: 32°30'01"E
J5	Muddy/sand	200m	Lat: 31°50'40"N	Long: 33°29'53"E
El Aresh (K)				
K3	Muddy/ sand	50m	Lat: 31°22'55"N	Long: 33°30'31"E
K4	Muddy/ sand	100m	Lat: 31°29.950'N	Long: 33°30.332'E

3. RESULTS

In this study the author add 17 new recorded syllid species to Mediterranean Egyptian waters from (46 identified Syllid species), that have never been found before on the Egyptian Mediterranean coast, from the total, 5 of them are considered new for Mediterranean. They are: *Pionosyllis mariae* San Martín & Hutchings, 2006, *Syllis ortizi* San Martín, 1992, *Exogone* (*Parexogone*) *tasmanica* Hartmann- Schröder, 1989; *Sphaerosyllis capensis* Day 1953 and *Exogone* (*Exogone*) *lourei* Berkeley & Berkeley, 1938; and one new to Eastern Mediterranean. It is: *Prosphaerosyllis adelae* San Martín, 1984.

3.1 *Pionosyllis mariae* San Martín & Hutchings 2006

Pionosyllis mariae San Martín & Hutchings [44]: 340, Figs 46D-F, 70A-J, 71A-F, 72A-C.

Material examined: (Fig. 2 A-G). This species collected from Domietta (H4; H5), El-Burullus (G3; G4; G5), El-Areesh (K4), 5 specimens.

Description: Body slender, 8mm long, very thin wide, 63chaetigers. Prostomium pentagonal, 4 eyes, may be absent after fixation, median antenna longer than lateral antennae. Palps longer than prostomium, fused basally. Two transverse, small ciliated furrows on prostomium

(Fig. 2A). Tentacular cirri elongated, ventral tentacular cirri shorter than dorsal ones. Dorsal cirri usually with some fibrillar and terminal pore, dorsal cirri present on all chaetiger except number two (Fig. 2A), anterior parapodium with 1 compound chaetae with elongated blade, about 22 μ m, and 5 chaetae with shorter blades, 10-12.5 μ m.(Fig. 2C). Posterior with 2-3 short-bladed, and 1 long 17.5 μ m (Fig. 2E). Dorsal simple chaetae from midbody, smooth, distally truncate, with small, indistinct hood (Fig. 2G). Ventral simple chaetae from mid-posterior parapodia (from number 18), large, acicular, prominent, with subdistal translucent hood, bidentat, proximal tooth long, hooked, distal tooth smaller, and hooked (Fig. 2F). Anterior parapodia with 2 aciculae, one straight and the other bent at tip, the remaining with only one acicula (Fig. 2D). Pharynx through about 4 segments, with anterior tooth, Proventricle through 3-4 segments, with 32-34 muscle cell rows (Fig. 2A). Annal cirri very long, glands present from mid body (from segment number 7) (Fig. 2B). This species like in its description to San Martín's specimens.

Type locality: Australia, (Queensland, New South Wales).

Distribution: Atlantic Ocean, this species new for Mediterranean Sea and new findings from Egyptian waters.

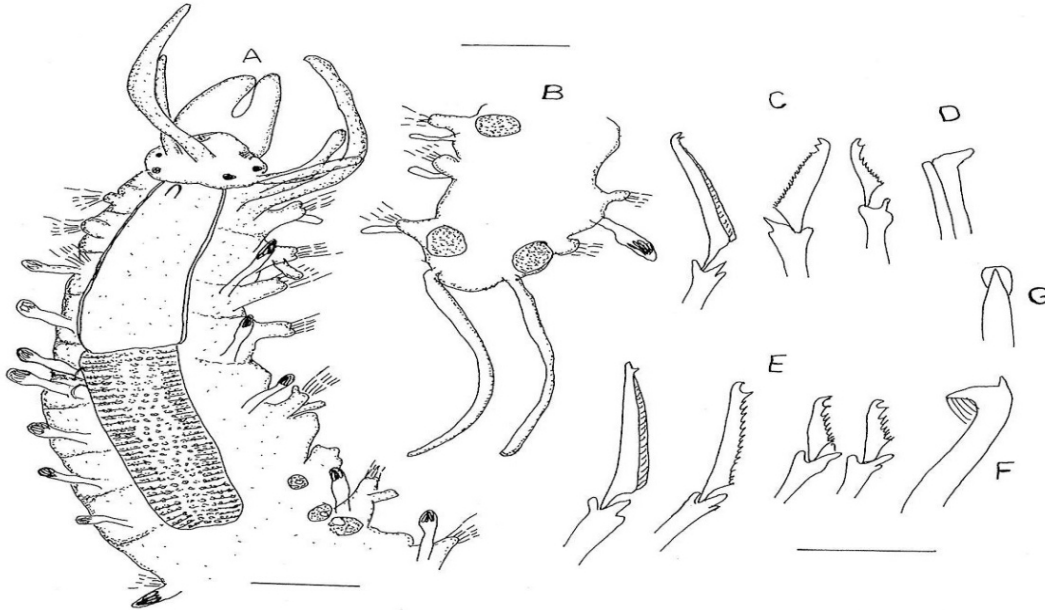


Fig. 2. *Pionosyllis mariae* (A) Anterior end, dorsal view; (B) Posterior end, dorsal view; (C) Falcigets, anterior parapodium; (D) Anterior aciculae; (E) Falcigets, Posterior parapodium; (F) Ventral simple chaete; (G) Dorsal simple chaeta. Seales: A, B 0.03mm; C-F 20 μ m

3.2 *Pionosyllis lamelligera*

Saint-Joseph 1887: figs. 30&31.

Pionosyllis lamelligera: Fauvel [45]: 288, Figs. 110a–g; San Martín [12]: 105, Fig. 16, [13]: 79-82, Figs 30 A-I, 31 A-E, Çinar & Ergen [20]:774.

Material examined: It was collected from Domietta (H5) and El-Burullus (G3; G4), 6 specimens.

Type locality: France.

Distribution: Amphi-Atlantic, Mediterranean Sea and Atlantic Ocean. This species new findings from Egyptian waters.

3.3 *Eusyllis assimilis* Marenzeller 1875

Eusyllis monilicornis Saint Joseph 1887 *Eusyllis assimilis* Fauvel [45]: 294, Fig. 112a–g; Campoy [10]: p 333, Fig. 26; San Martín [12]: p 82, Fig. 10; [13]: 114, Figs 52, 53.

Material examined: This species was collected from El Borrulus (G2, G3,) also from El Aresh (K3), 3 specimens.

Type locality: Mediterranean Sea.

Distribution: Atlantic, Mediterranean, English Channel, new findings from Egyptian waters.

3.4 *Eusyllis kupfferi* Langerhans 1879

Eusyllis kupfferi: San Martín [49]: 607-609, Figs. 12-13; Núñez and San Martín [50]: 204-205, Figs. 2A-D; Çinar and Ergen [19]: 771-772, Fig. 1A-D and San Martín & Hutchings [44]: 276: Figs 13 A-G, 14 A-E.

Material examined: It was collected from El- Burullus (G3), one specimen.

Distribution: Mediterranean Sea, Atlantic Ocean: Madeira, Cuba and Cape Verde Islands, new findings from Egyptian waters.

3.5 *Prosphaerosyllis adelae*

(San Martín, 1984) *Sphaerosyllis (Prosphaerosyllis) adelae* San Martín [12]: 376, Figs 1–4.

Prosphaerosyllis adelae: San Martín [13]: 220 Fig. 116.

Material examined: (Fig. 3 A-H). It was recorded from El-Burullus (G3), one specimen.

Description: Incomplete specimen. Body small, about 2mm long, 0.2mm wide, 13 chaetigers, broad anteriorly, provided with scattered, small dorsal and ventral papillae; Prostomium rectangular to oval; 4 large eyes close to each other. Antennae small, pyriform, all similar in shape (Fig. 3A). Palps not detected with small papillae. Dorsal cirri on all segments; anterior dorsal cirri similar to antennae and tentacular cirri as long papillae form (Fig. 3A), dorsal cirri of midbody slightly longer than anterior ones. Parapodial lobes relatively long, conical. Compound chaetae are heterogomph, with smooth shafts, and unidentate, thin blades, smooth, short, one or two with fine serration (Fig. 3B). Anterior parapodium each with 6-7 compound chaetae, diminishing to 5 on posterior parapodia. Slight dorsoventral gradation in size of blades, their length 10.5µm on anterior parapodia, about 5-7.5µm on posterior parapodium (Fig. 3F). Dorsal simple chaetae from anterior segments, usually from chaetiger

1, unidentate, with curved tip and few short subdistal spines (Fig. 3D, E) Ventral simple chaetae on posterior parapodium are sigmoid, unidentate, smooth (Fig. 3G). Acicula solitary, straight with triangle tip (Fig. 3C). Pharynx long and wide, pharyngeal tooth oval, located near middle of pharynx (Fig.3 A). Proventricule with 35 muscle cell rows.

Type locality: Balearic Islands (Western Mediterranean Sea).

Distribution; Western Mediterranean Sea. New record for the Eastern Mediterranean Sea, and new findings from Egyptian waters.

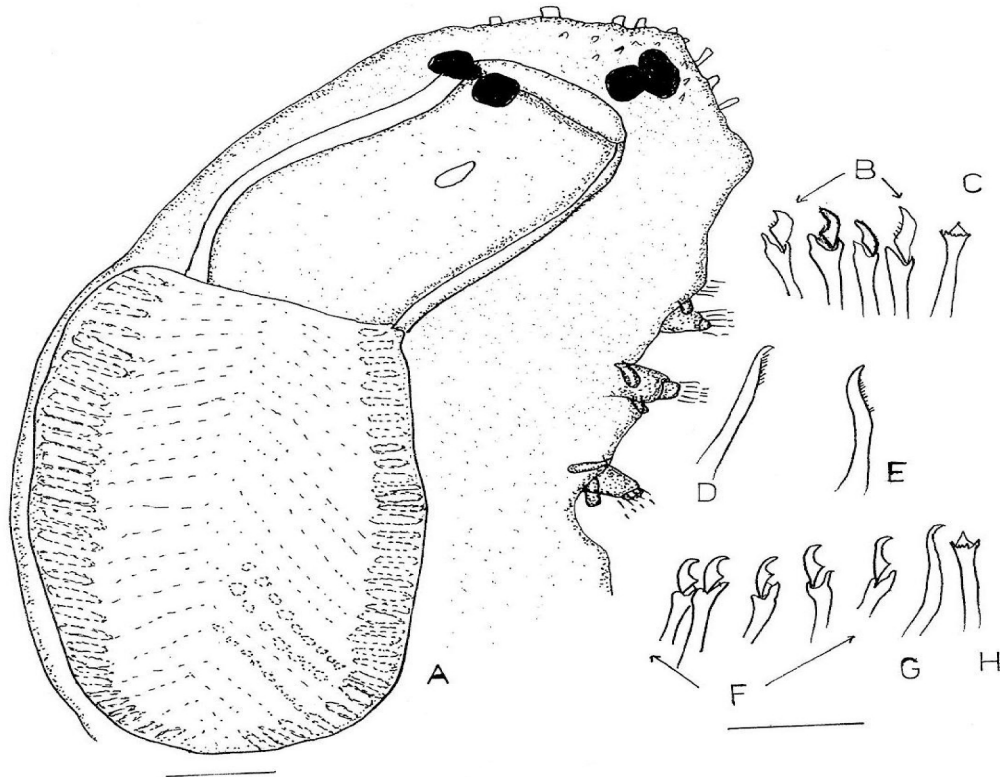


Fig. 3. *Sphaerosyllis (Prophaerosyllis) adela* (A) Anterior end, dorsal view; (B) Heterogomph chaetae, anterior parapodium (C) Acicula; (D,E) Dorsal simple chaeta (F) Heterogomph chaetae, posterior; (G) Ventral simple chaeta; (H) Acicula, posterior parapodium. Scales: A 0.03 mm; B-H 20 μ m

3.6 *Sphaerosyllis capensis* Day 1953

Sphaerosyllis capensis Day [42]: 276, Fig. 12.II.g-j; San Martin [43]:94- 95, Fig.50 A-I
Sphaerosyllis cuticulata Hartmann-Schröder [51] (in part): 41. *Sphaerosyllis capensis serrata* Hartmann-Schröder [52]: 103.

Material examined: (Fig.4A-F). It is recorded from El-Burullus (G4), one specimen.

Description: Body small, short, 2mm long, 0.15 mm wide, 20 chaetigers, and dorsum covered with small papillae (Fig. 4A). Prostomium rectangular; 4 eyes. Antennae similar in

length to prostomium or slightly longer, all similar, with bulbous bases and moderate tips, inserted anteriorly (Fig. 4A). Tentacular cirri similar to antennae but shorter. Dorsal cirri short, similar to tentacular cirri (Fig. 4A), slightly elongate from midbody (Fig. 4A). Parapodial glands present from chaetiger 3, large, distinct, with fibrillar material (Fig. 4A).

Anterior parapodia each with about 6–8 compound chaetae, blades unidentate, provided with moderately long marginal spines (Fig. 4B), with a subdistal spine longer than others, and marked dorsoventral gradation in length, about 21.5µm above, 10µm below. Progressively posteriorly number of compound chaetae on each parapodium decreasing to 5–6, with larger shafts and shorter blades, about 12.5-10µm long, slightly hooked, smooth or provided with short marginal spines (Figs.4D). Dorsal simple chaetae from chaetiger 1, unidentate, provided with moderately long marginal spines (Fig. 4C). Ventral simple chaetae on posterior parapodia are sigmoid, unidentate, smooth (Fig. 5F). Acicula solitary, with tips bent at right angle (Fig. 4E). Pharynx slender, through 4 segments; pharyngeal tooth anteriorly located. Proventricle small, extending through 2 segments, with 19 muscle cell rows.

Type locality: Suez Canal, Red Sea.

Distribution; South Africa, Red Sea, Australia. It is new to Mediterranean Sea and new findings form Egyptian waters.

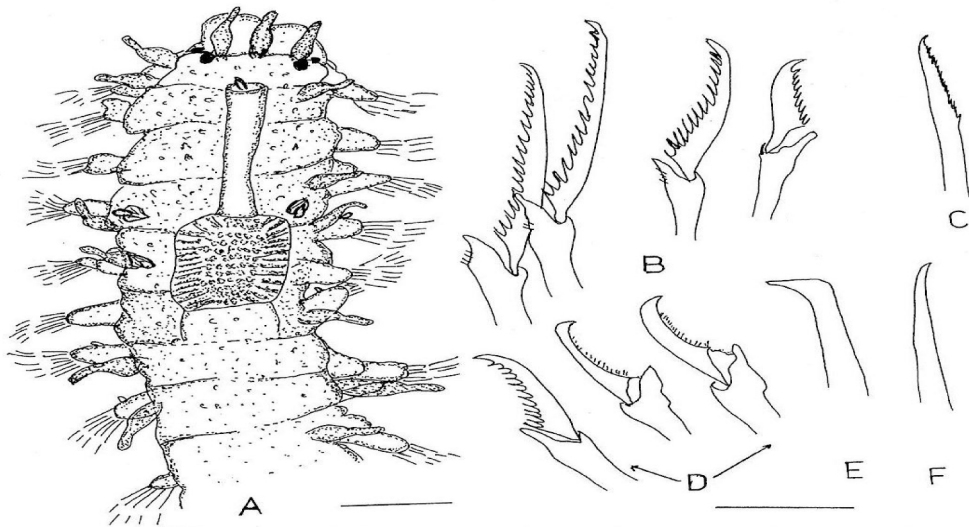


Fig. 4. *Sphaerosyllis capensis* (A) Anterior end, dorsal view; (B) chaetae, anterior parapodium (C) Dorsal simple chaeta; (D) chaetae, posterior; (E) Acicula; (F) Ventral simple chaeta; Scales: A 0.03 mm; B-F 20µm

3.7 *Exogone (Parexogone) tasmanica* Hartmann- Schröder 1989

Exogone obtusa tasmanica Hartmann-Schröder [53]: 31, Figs. 38–43. *Exogone (Parexogone) tasmanica*, San Martín [43]:118 Figs. 69A–D, 70A–H.

Material examined; (Fig. 5 A-F). This species was collected from muddy bottom, Domiatte (H4, Rasheed; F4) and from; Bardweel (J5); El- Burullus (G3; G4, G5), 9 specimens.

Description: Body long, slender, 4mm long, 0.2 mm wide and 35 chaetigers. Prostomium ovate, wider; 4 eyes, 2 anterior eyespots; median antenna, long, cylindrical, slightly long (Fig. 5A); lateral antennae, much shorter than median antenna (Fig. 5A). Palps broad, longer than prostomium, completely fused (Fig. 5A). Dorsal cirri minute, papilliform, absent on chaetiger 2 (Fig. 5A); parapodial lobes with 1–2 compound chaetae provided with elongate, spiniger-like blades, unidentate with short marginal spines (Fig. 5B), 31.5µm long; in addition 6–7 compound chaetae with short, bidentate falcigers 8–10.5µm (Fig. 5B), posterior parapodium each with 5–6 compound chaetae, with curved blades, marginal spines, (Fig. 5D), 21.5µm above, 10.5µm below; anterior dorsal simple chaetae slender, provided with a subdistal teeth and short marginal spines (Fig. 5C). Ventral simple chaetae on posterior parapodium are sigmoid, smooth, slightly bidentate (Fig. 6F). Acicula solitary, rounded (Fig. 5E). Pharynx extending through 4 segments; pharyngeal tooth on anterior rim (Fig. 5A). Proventricle extending through 2–3 segments, with about 24 muscle cell rows.

Type locality: Australia, Parson's Cove, Tasmania.

Distribution: Australia. It is new for Mediterranean. Also it is new findings from Egyptian waters.

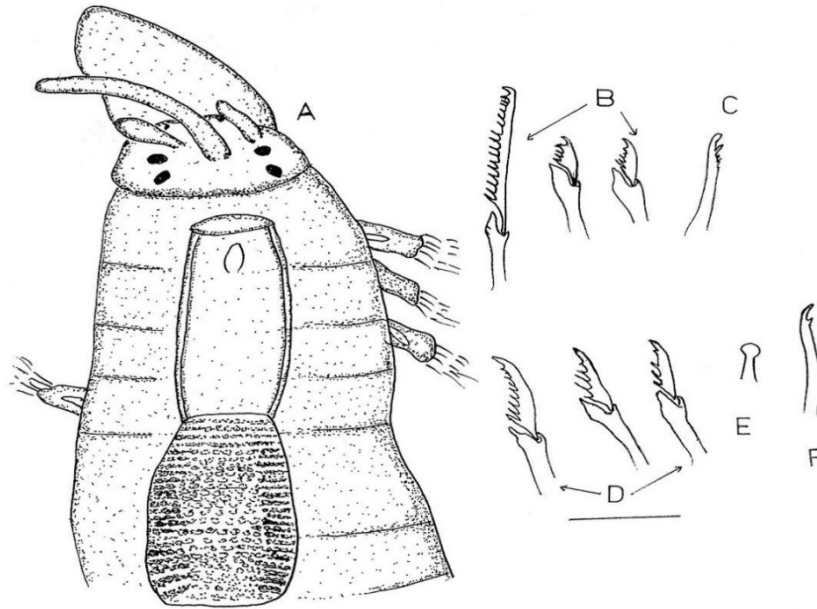


Fig. 5. *Exogone (Parexogone) tasmanica* (A) Anterior end, dorsal view; (B) chaetae, anterior parapodium (C) Dorsal simple chaeta; (D) chaetae, posterior; (E) Acicula; (F) Ventral simple chaeta; Scales: A 0.03mm; B-F 20µm

3.8 *Exogone (Exogone) lourei* Berkeley & Berkeley 1938

Exogone lourei Uebelacker [54]: 30-39, fig. 30-34a-f. *Exogone (Exogone) lourei* San Martín [55]: 728, 735; Núñez et al. [56]: 45, Fig. 2; Kudenov & Harris [57]: 15, Fig. 1.3; San Martín [43]: 129-130, Fig. 78 a-j.

Material examined: (Fig. 6 A-I). This species was collected from muddy bottom, Domiatte (H4), El Borrulus (G3, G4), 4 specimens.

Description: Body long and slender, 4.5-5mm long, 0.2mm wide, about 40 chaetigers. Prostomium pentagonal; 4 large eyes; median antenna with narrow tip, much longer than lateral antennae; lateral antennae ovate, short (Fig. 6A). Palps long, fused along their length, triangular (Fig. 6A). Dorsal cirri ovate. Anterior parapodium each with 1 compound spinigerlike chaeta, with unidentate, long and slender blade, 45 μ m long, short marginal spines of blade and few subdistal spines on shaft (Fig.6C); in addition 4–5 falcigers with long subdistal tooth and short distal tooth, moderately long marginal spines (Fig. 6D), 8–10 μ m long. Spiniger-like chaetae of chaetiger 2 with thick shafts, provided with a triangular process with minute spines on surface, and long, about 45.5 μ m long, distally bifid blade, with moderate to short marginal spines (Fig. 6B). Compound chaetae posteriorly with shorter spines and shorter blades 7 μ m; posterior parapodium each with 1 spiniger-like (Fig. 6F), blades 24.5 μ m long. Dorsal simple chaetae anteriorly, with rounded tips and finely spinulose subterminally (Fig. 6E), thicker posteriorly (Fig. 6G). Ventral simple chaetae on posterior parapodium, smooth, bidentate, subdistal tooth long and broad, distal tooth small (Fig. 6I). Acicula solitary, slender, distally rounded (Fig. 6H). Pharynx long, slender; pharyngeal tooth on anterior margin, through about 5 segment (Fig. 6A); Proventricle, extending through 3.5 segments, with about 23 muscle cell rows.

Distribution: Pacific Ocean, Eastern Atlantic (Canary Islands). Australia (Western Australia). It is new for Mediterranean Sea and new findings from Egyptian waters.

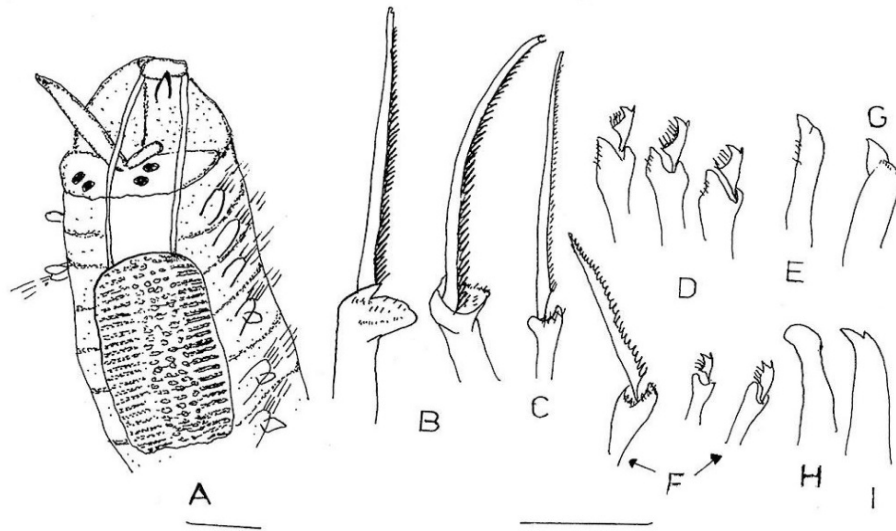


Fig. 6. *Exogone (Exogne) lourei* (A) Anterior end, dorsal view; (B) Modified chaetae, chaetiger 2; (C) Compound, spinger-like chaeta; (D) Faleegers, anterior paraodium; (E) Dorsal simple chaeta anterior parapodium; (F) Chaete posterior parapodium; (G) Dorsal simple chaeta, posterior parapodium (H) Acocila; (I) Ventral simple chaete; Scales: A 0.03 mm; B-I 20 μ m

3.9 *Exogone (Parexogone) meridionalis* (Cognetti 1955)

Exogone hebes meridionalis Cognetti [58]: p 61, Fig. 11b. *Exogone parahomoseta mediterranea* San Martín [12]: p 204–208, Fig. 45; San Martín [55]: p 728, Fig. 7h, i; Çınar et al. [20]: p 749. *Exogone mediterranea* San Martín [13]: p 239–241, Figs. 127, 128.

Material examined; It was collected from El Borrulus (G3), one specimen.

Notes: 1.3 mm long, 0.1mm wide, for 28 chaetigers. Palps completely fused. Pair of digitiform tentacular cirri present on peristomum. Dorsal cirri small, digitiform, absent on chaetiger 2. Parapodia conical. 5-6 falcigers on anterior parapodia, bidentate; blades with four to six coarse spines on cutting edges, 7-10.5µm long. Dorsal simple chaeta solitary, from chaetiger 1, with a strong subdistal tooth, serrated subdistally. Ventral simple chaeta solitary, only seen on posterior-most parapodia, sigmoid, strongly bidentate, serrated subdistally. Acicula numbering one per parapodium, distally rounded. Proventricle, occupying 4 segments, with 28 muscle cell rows. Pharynx, with papillae at opening; pharyngeal tooth large, triangular, placed just behind opening of pharynx.

Remarks; *Exogone (Parexogone) meridionalis* is similar to Çınar specimens but less in the number of muscle cell rows where they have 35 cell rows, also here cannot numbering the segment equiped by pharynx because it expanded out and bented.

Distribution: Western Mediterranean; Gulf of Naples, Balearic Islands, Cala Cerrada, Murcia, Eastern Mediterranean; Izmir Bay, Aegean Sea and Cyprus .Western Atlantic; Florida. This species new findings form Egyptian waters.

3.10 *Xenosyllis Scabra* Ehlers 1864

Xenosyllis scabra: Fauvel [45]: 272, Figs. 102a–c; Campoy [10]:350; San Martín [12]: 267–270, fig. 61; Núñez et al. [56]: 113, Figs. 1c–f. Çınar & Ergen [19]: 791; San Martín [13]: 303–307, Figs. 167A-I, 168A-H.

Material examined: It was recorded from El-Burullus (G3, G4, G5) and from El-Areesh (K3), 6 specimens.

Notes: Largest one 1.3mm wide, 5mm long for 45 chaetigers. Antennae with 4-5 joints. Tentacular cirri, with 3-5 joints. Dorsal cirri, with 6-5 joints on anterior parapodia, 5-4 and 4-3 joints on middle and posterior ones, respectively. Blades of falcigers (7-8 in number) bidentate, 12.5-7.5µm long on anterior parapodia, 10.5-7.5µm long on middle and posterior ones with no serration for two of them. Aciculum thick straight, protruding from parapodial lobes. Ventral simple chaeta, bidentat. Proventriculus, occupying 4 segments, with 17 muscle cell rows. Pharynx extending through 7-8 segments.

Distribution: Mediterranean Sea and Atlantic Ocean. It is considered new findings form Egyptian waters.

3.11 *Haplosyllis chamaeleon* Laubier 1960

Haplosyllis depressa chamaeleon Alós [59]: 359, Figs 71, 72; Baratech & San Martín [60]: 45, Figs 8,9. *Haplosyllis chamaeleon* López et al. [61]: 108, Fig. 2; San Martín [13]: 320-323, Figs.177 A-L, 178 A-B.

Material examined: It was collected from El- Burullus (G2, G3, G4), 6 specimens.

Notes: Length 4mm, width 2mm, 37setigers; median antenna inserted in the middle of prostomium, twice the length of lateral antennae, with about 19 articles, lateral antennae with 12-13 articles; dorsal tentacular cirri with 28 articles; Dorsal cirri with 12-28 articles. Anterior setigers with four setae and three acicula, one with oblique and subdistally knobbed tip and the other straight; become moderately thick in the midbody, also with 4-5 chaetae, posterior parapodia with three setae, and one acicula with oblique and subdistally knobbed tip. Pharynx short and broad, extending throughout 3 segments; small, piriform dorsal tooth and a crown of ten soft papillae. Proventriculus, extending throughout 6 setigers, with 30 muscle cell rows.

Type locality: Mediterranean, Alborán Sea.

Distribution: Endemic Mediterranean, West Mediterranean, new findings from Egyptian waters.

3.12 *Syllis tyrrhena* Licher & Kuper 1998

Typosyllis tyrrhena Licher and Kuper [62]: 228, Figs 1-4; Licher [48]: 140, Figs 2, 14-16, 62-63; Kuper [63]: 58, Figs 1a-b, 20-24. Amaral et al. [64]: 162, Figs a-f on same page. Faulwetter et al. [30].

Syllis tyrrhena: San Martín [13]: 379, Fig. 207.

Material examined; It was recorded from El- Burullus (G3) and from Al-Areesh (K3), two specimens.

Notes: Body long, thin about 8mm long, 64 segments. Lateral antennae with 12 joints and the median one with 11 joints. Dorsal tentacular cirri with 13 joints, while ventral ones with 10 joints. Dorsal cirri with 10-13 short articles. Anal cirri with 8 joints. Anterior parapodia with compound falcigers, bidentate blades (7.5-15µm). Posterior compound chaetae slightly short bidentate blades (6.25-10.5µm) also all shafts with distal spines. Anterior parapodia with 2 aciculae, straight, stout, with truncate tip. Midbody and posterior parapodia with 1 acicula as anterior ones but thick. Dorsal simple setae, slightly bidentate. Ventral simple chaetae, bidentate and curved slightly. Pharynx extending through 6 segments, pointed tooth on the middle anteriorly. Proventricle extending through 2 segments with about 14 rows of muscular cells.

Type locality; Island of Elba, Italy (western Mediterranean Sea).

Distribution; Atlantic Ocean, Mediterranean Sea: WB, AS recorded for the Eastern Mediterranean Sea by Faulwetter et al. [30]. It is new for Egyptian waters.

3.13 *Syllis pontxioi* San Martín & López 2000

Typosyllis gerlachi Compoy [10]: 410-411, Parapar et al. [65]: 59. San Martín & López [66]: 429-430 Figs 3 A-J. San Martín [13]: 417-419, Figs 228, 229 A-J.

Material examined: It was recorded from El-Burullus (G3, G4) and from Al-Areesh (K3). one specimen.

Notes: 1.3mm long, 0.2.5mm wide, 54 chaetigers; prostomium oval, median antenna with 14 articles; lateral antennae 9-12 articles, ventral tentacular cirri shorter than dorsal one with 8-9 articles. Anterior parapodia with 7-10 chaetae, with thin bidentate blades, shafts with thin subdistal spines. Median and posterior blades shorter and broader, strongly bidentate. Solitary dorsal simple chaeta only on posterior chaetigers, unidentate, bearing short subdistal spines, solitary ventral simple chaeta, strongly bidentate. Anterior parapodia with 4 aciculae, 3 straight, with truncate tip, the other thinner, with curved tip, number decreasing, 2 in midbody and one posteriorly very stout, tip with a concave edge and at the opposite a convex one. Pharynx long through 7-8 segments with anterior tooth. Proventriculus extending through 5.5 segments with 33-35 rows of muscle cells.

Type locality: Bay of Biscay, Spain, Basque Country, Zumaya

Distribution: Atlantic Ocean, Aegean Sea, Ionian sea, Adriatic Sea, East Mediterranean, Western Mediterranean. It is new findings from Egyptian waters.

3.14 *Syllis ortizi* San Martín 1992

Syllis (Typosyllis) sp. A. Uebelacker [54]: 30-134; Fig. 30-126a-il. *Syllis Ortizi* San Martín [67]: 183-185, Fig. 7 A-H.

Material examined: (Fig. 7). El-Burullus (G3, G4) and from Al-Areesh (K3), 3 specimens.

Description: Body slender, 5 mm long, 0.2 mm wide for 55 setigers. Prostomium rounded to pentagonal, with 4 small eyes, 2 eyespots. Median antenna absent, lateral antennae with about 12 articles. Dorsal tentacular cirri with about 25 articles. Dorsal cirri slender, alternating long and short; long dorsal cirri of midbody with about 13-22 articles, slightly longer than body width; short dorsal cirri of midbody with about 6-9 articles. Ventral cirri digitiform, anteriorly longer than parapodiallobes (Fig. 7A) decreasing in length posteriorly. Blades of compound setae each with small, hooked distal tooth and thicker, triangular, acute proximal tooth, anterior parapodia each with about 9 compound setae, with long, slender blades, provided with thin, relatively short spines on cutting margin, except distally, directed upwards, blades of uppermost setae 22.5µm long (Fig. 7B), those of lower most 17.5µm long (Fig. 7 E, G). Compound setae progressively with thicker shafts and wider blades, especially ventrally, with longer and more hooked proximal tooth and longer spines on cutting margin. Posterior setigers each with 1-2 compound setae similar to anterior setae, about 25 µm long; and 2-3 compound setae with strongly enlarged shafts, and massive, long, strongly hooked blades, with small distal tooth and very large and long proximal tooth, about 17.5µm long, with few, long spines on cutting margin directed upwards (Fig. 7H). Solitary dorsal simple setae on posterior setigers, thin, bifid, with short spines distally (Fig. 7D). Solitary ventral simple setae in far posterior setigers, thick, similar to blades of massive compound setae, and provided with long, thin, spines distally (Fig. 7F). Solitary aciculae in middle and

posterior setigers acuminate (Fig. 7 I); 2 aciculae anteriorly, one acuminate and 1 rounded (Fig.7C). Pharynx through about 4 segments; pharyngeal middorsal tooth located on anterior rim; proventriculus through about 3.5 segments, with about 31 rows of muscle cells (Fig. 7A).

Remarks: *S. ortizi* San Martin, 1992. Likes this specimen, differs in number of articulations of tentacular cirri and dorsal cirri.

Distribution: Cuba. Gulf of Mexico. This species considered new findings from Egyptian waters.

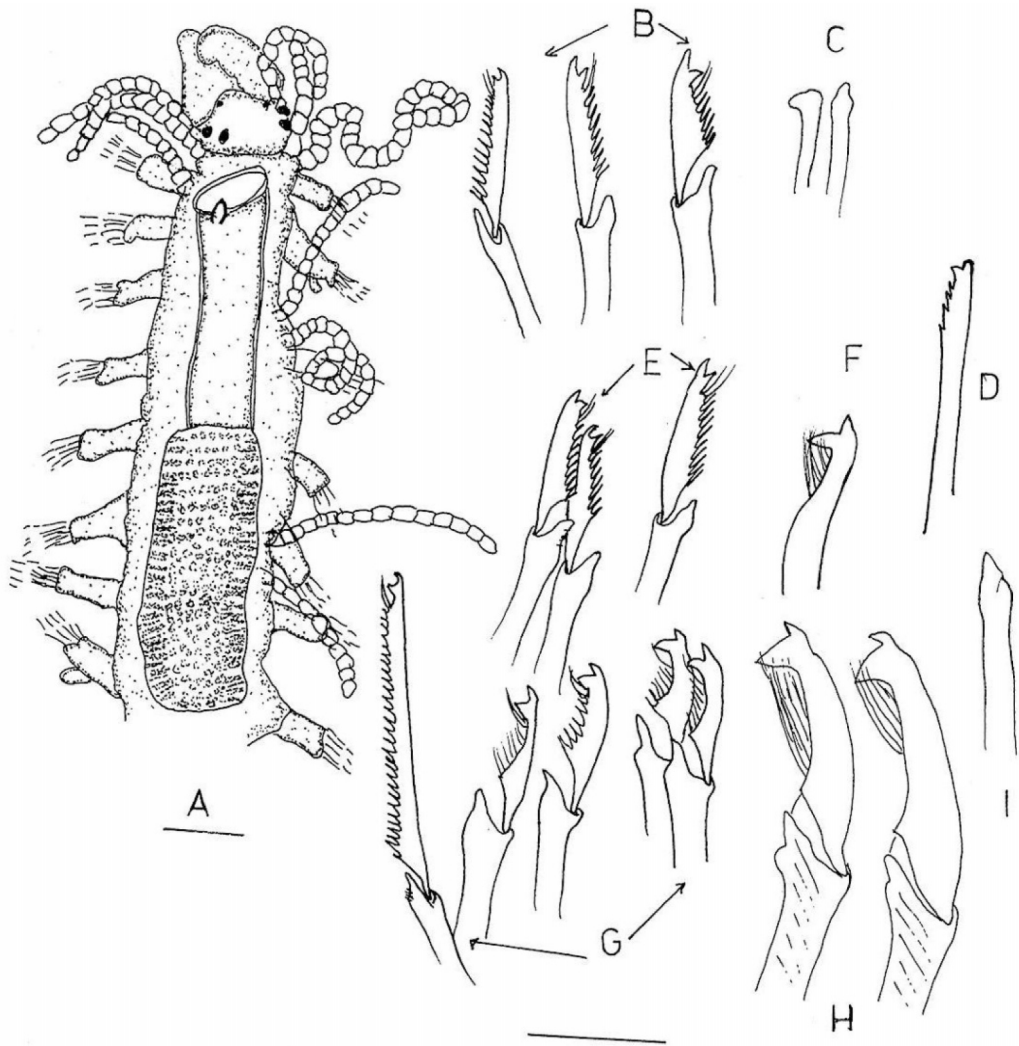


Fig. 7. *Syllis ortizi* (A) Anterior end, dorsal view; (B) chaetae, anterior parapodium; (C) acicula, anterior parapodium; (D) Dorsal simple chaeta; (E) chaetae, Modified parapodium; (F) Ventral simple chaete; (G) chaetae, posterior parapodium (H) Acocila; posterior parapodium; Scales: A 0.03 mm; B-I 20 μ m

3.15 *Syllis (Typosyllis) gerundensis* (Alós & Campoy 1981)

Typosyllis gerundensis Alós and Campoy [68]: 21-26, Figs. 1-3; Campoy [10]: 446-449, Figs. 55-56. Çinar and Ergen [19]: 783-784; San Martín [13]: 419-423, Figs. 230A-M, 231 A-G.

Material Examined: It was collected from El- Burullus (G4), one specimen

Notes: Specimen with 0.25mm wide, 7mm long for 42 chaetigers. Median antenna with 6 joints, lateral antennae with 11 joints. Tentacular cirri with 10-11 joints. Dorsal cirri slender, with 4-7 joints on anterior parapodia, 5-7 and 4-6 joints on middle and posterior ones, respectively. Blades of falcigers strongly bidentate, 17.5-12.5 µm long on anterior parapodia, 10-12.5 µm and 7.5-12.5 µm long on middle and posterior ones, respectively. Solitary dorsal simple chaeta undentate, with subdestal spines, thicker than shafts of falcigers. Ventral simple chaeta, bidentate, sigmoid, as thick as dorsal simple chaeta. Acicula numbering 2 on anterior parapodia. One on midbody and posterior ones; subdistally enlarged, bending at a right angle at tip, slightly thick with prototred tips. Proventriculus, almost extending through 5.5 segments, with 31 muscle cell rows. Pharynx occupying up to 5 segments.

Distribution: Mediterranean Sea. This species new findings from Egyptian waters.

3.16 *Procerastea halleziana* Malaquin, 1893

Procerastea halleziana Fauvel [45]: 325-326, Fig. 126D-H; Gidholm [69]: 208-209, Fig. 29A-F; Alós [70]: 330-333, Figs 1-3; Hartmann-Schröder [71]: 191-193, Fig. 83A-B; Genzano & San Martín [72]: 165-170, Figs 1A-I, 2A-G, 3A-C; San Martín [13]: 453-456, Figs 248A-I, 249A-F.

Material examined: It was recorded from El-Bardaweel (J5), one specimen.

Notes: incomplete specimen, in bad form, about 2 mm, 0.2mm wide, with 20 chaetigers. Palps small. Chaetal fascicle with 5-7 chaetae, anterior parapodium, 4 chaetigers with uni and bidentate simple chaetae, together, and single bayonet chaeta; following chaetigers with bidentate compounds. Both simple and compounds with small distal tooth; without serration. Single bayonet chaetae, distally with spines, one of them more long. Trepan of Pharynx in chaetiger 1 with 18 equal small teeth. Proventricle extending through 2 segments with 28 rows of muscle cells.

Distribution: Atlantic coast of Europe. Atlantic coast of Argentina. This species considered new findings from Egyptian waters.

3.17 *Autolytus benazzii* Cognett 1953

Myrianida brachycephala (Marenzeller 1874) *Autolytus benazzii* San Martin [13]: 478-480 Figs 261 A-E, 262 A-D; Nygren [73]: 120-122.

Autolytus punctatus Fauvel [45]: 318, Fig. 122 L-M. *Autolytus brachycephalus* Fauvel [45]: 316-317, Fig 121G-H.

Material examined: El- Burullus (G3, G4), two specimens.

Notes: Length 5 mm for 33 chaetigers, width 0.25mm. Palps fused. Median antenna long. Lateral antennae and dorsal tentacular cirri, length $\frac{1}{2}$ of median antenna. First dorsal cirri as long as median antenna. Dorsal cirri from chaetiger 3 alternate in length. Parapodial lobes rounded, medium to large in size. Chaetal fascicle with 6-10 compounds in anterior chaetigers, 4-5 in median and posterior. Compound chaetae with small distal tooth; serration present. Single thin bayonet chaetae, beginning at chaetiger 8-20. Trepan of the Pharynx in chaetiger 1, with 24 equal teeth, arranged in one ring. Proventricle through 3 segments with 31-32 rows of muscle cells. Type locality: Mediterranean Sea, Gulf of Naples.

Distribution: North Atlantic, Mediterranean. This species considered new findings from Egyptian waters.

4. DISCUSSION

Several species of syllids have been considered introduced in the Mediterranean Sea. The presence of the new recorded species in the Mediterranean coasts is more difficult to explain. Aguado & San Martín [21], mentioned that alien Polychaete species probably could have migrated by fouled ships. The maritime traffic is quite abundant between all seas and it is responsible, in many cases, of the introduction of maritime foreign species (Stigzelius et al. [74]; Çinar et al. [75,1]; Çinar & Ergen [76]. Musco & Giangrande [14] suggested the possibility of a general "tropicalization" trend of the Mediterranean fauna. This has been advocated as a possible explanation for the current presence of several species.

The opening of the Suez Canal in 1869 connected the two different zoogeographical units, the Red Sea and Mediterranean Sea, resulting lessepsian species which has been recorded from different basins of the Mediterranean Sea [76]. Within Polychaeta, more reliable evidence of Lessepsian migration is only known in Nereidae and Serpulidae. Records of alien species within the families Syllidae, Cirratulidae, Maldanidae, Terebellidae seem to be speculative. Another possibility, that should not be neglected, is that the seemingly Indo-Pacific species recognized in the Mediterranean might be Miocene relicts [6]. Streftaris et al. [77] estimated that 52% of introductions in the Mediterranean Sea were Lessepsian migrants.

The present study yielded a number of species reported for the first time in the Egyptian Mediterranean waters. 5 of the total Syllids collected are considered new for Mediterranean. They are: *Pionosyllis mariae* San Martín & Hutchings, 2006, *Exogone (Parexogone) tasmanica* Hartmann- Schröder, 1989, *Exogone (Exogone) lourei* reported by San Martín [44]; their type locality are Australia; *Sphaerosyllis capensis* Day 1953 recorded in Red Sea and Suez Canal. The four species considered Lessepsian migrant species. While the type locality of *Syllis ortizi* San Martín, 1992, is Gulf of Mexico, therefore they may be alien species.

Prosphaerosyllis adela San Martín, 1984, considered new to Eastern Mediterranean. These species are considered new additions belong to the subfamily Exogoninae, while *Pionosyllis mariae* under subfamily Eusyllinae.

Pionosyllis mariae reported by San Martín [44] as a new species in Australia which characterized by the absent of dorsal cirri on chaetiger 2 and its small size, while *Pionosyllis species* of Mediterranean are relatively long and dorsal cirri are always present [13], her dorsal cirri lack on chaetiger 2, which make us sure that this species is considered lessepsian migrant species, new for Mediterranean Sea.

Four species belonging to Subfamily Exogoninae, This subfamily small-sized individuals which might lost during study the syllid fauna which report only very few or no Exogoninae species at all [e.g. 34,32,23,77]. While by using small mesh size than 0.5mm, some Exogoninae species are added to Mediterranean. The Exogoninae genus *Prosphaerosyllis*, which has recently been raised from subgeneric to generic level by San Martín [12,43], has a difficult and confused taxonomy and several species have recently been described or transferred to the genus [78,79,30]. *Prosphaerosyllis adela* reported before by San Martín [13] in the Western Mediterranean, her reported in Eastern Mediterranean for the first time. 11 from currently 31 species of this genus are reported in the Mediterranean Sea [30], including an unnamed one [13], this species was recorded in Egyptian water by Abd-Elnaby [15] with sand in El Burrulus area. The appearance of *Prosphaerosyllis* species in Eastern Mediterranean may be due to shipping or came under the effect of current.

The type locality of *Sphaerosyllis capensis* Day, 1953 was Red Sea, it was reported from Australia by San Martín [44]. It is considered lessepsian migrant species and agree with the Australian ones in their description, but differs in the length of chaetae.

Zenetos et al. [2] reported 129 new recorded Polychaete species for Mediterranean rased to 132 species [5], Dorgham et al. [7] added new one. Twenty-eight of these non-indigenous species have been found in Egyptian waters [2]. By adding the 5 species newly recorded during the present study.

The total number of non-native polychaete species in the Egyptian Mediterranean Coast has increased to 55 species. Only *Syllis ortizi* San Martín 1992, was reported her as a new recorded species for Mediterranean, but recorded before from Gulf of Mexico, therefore it considered alien species. Detecting new aliens depends on accurate taxonomic identifications and the knowledge of local biodiversity [75]. However, the lack of knowledge on this issue is, effectively, one of the principal problems in understanding patterns of syllid distribution [18,19,20,14].

5. CONCLUSION

This study is focusing on alien syllid species. In this study the author add 17 new recorded syllid species to Mediterranean Egyptian waters from (46 identified Syllid species), that have never been found before on the Egyptian Mediterranean coast, from the total, 5 of them are considered new for Mediterranean. They are: *Pionosyllis mariae* San Martín & Hutchings, 2006, *Syllis ortizi* San Martín, 1992, *Exogone* (*Parexogone*) *tasmanica* Hartmann- Schröder, 1989; *Sphaerosyllis capensis* Day 1953 and *Exogone* (*Exogone*) *lourei* Berkeley & Berkeley, 1938; and one new to Eastern Mediterranean. It is: *Prosphaerosyllis adela* San Martín, 1984.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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