

## New records of marine Annelida (Polychaeta) in the Egyptian coast, eastern Mediterranean Sea

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### ABSTRACT

The current work aims to study the biodiversity of marine fouling organisms in Marina El-Alamein Resort, to discover the newly recorded Polychaeta species. In February, April, July, September, and November 2017, samples of marine fouling were collected from the area of study. A total of 61 fouling taxa were identified in the samples. Polychaeta was the most diverse group, represented by fifteen species, constituting 25% of the total number of recorded taxa. Three of them were first recorded in the Egyptian Mediterranean Sea, including one sedentarian species (*Protoaricia oerstedii*) and two errantian species (*Myrianida brachycephala* and *Syllis jorgei*). These species extend through the Atlantic Ocean and the Mediterranean Sea, but the distribution of *P. oerstedii* in the Red Sea may indicate its anti-Lessepsian behavior. A concise re-description provided with illustrative photos, remarks, and distribution of these species are given.

### INTRODUCTION

Polychaeta represent a major component of benthos in the marine environment, and their taxonomical studies are crucial for biodiversity information and to understand ecosystem functioning (Dorgham *et al.*, 2014), as well as, monitoring new species and records that improve the known biodiversity of the region. The Mediterranean Sea is a semi-enclosed basin; although it is considered one of the best seas in terms of environmental biodiversity, there are insufficient studies, to cover all habitats, and several taxonomic groups are still poorly known (Coll *et al.*, 2010). Additionally, several factors threatening biodiversity, such as climate change, alien species, and human activities, which led to habitat loss, pollution, importing new diseases, replace harvested native species, and eutrophication that makes great changes in different groups. These factors affect the marine biodiversity (Di Camillo and Cerrano, 2015).

For example and not as a limitation, there are many studies, such as Ergen, 1976; Ben Eliahu, 1995; Arvanitidis, 2000; Simboura and Nicolaidou, 2001; Çinar, 2005, who added 19 new recorded species of Polychaeta to the eastern Mediterranean.

Recently, **Çinar and Dagli (2021)** studied the polychaetes that bore into limestone rocks along the east coast of the Aegean Sea (Eastern Mediterranean), and added *Dipolydora giardi* (**Mesnil, 1893**), as news species to the marine fauna of Turkey.

Other authors were interested in invasive species to Mediterranean Sea and published many articles such as **Çinar and Ergen, 2003; Simboursa and Zenetos, 2005; Zenetos et al., 2005; Aguado and San Martín, 2007; Çinar, 2009; Şahin and Çinar, 2009; Faulwetter et al., 2011; Çinar and Dagli, 2012; Çinar et al., 2012 and Bailly et al., 2016.**

There are many publications concerned with Polychaeta fauna in the Egyptian Mediterranean waters, but the regular monitoring and investigation of un-surveyed areas may enhance the chance to find new records and new species, such as **Selim, 2006; Abd Elnaby and Gab-Alla, 2007; Selim, 2007, 2008; Abd Elnaby, 2008, 2009, 2010, 2014, 2017a, b, 2019, 2020a, b, c; Abd Elnaby and San Martín, 2010, 2011; Selim et al., 2012; Belal and Ghobashy, 2012; Dorgham et al., 2013.** So the current work aims to explore the biodiversity of marine fouling organisms in Marina El-Alamein Resort, which has never been studied before, to discover the newly recorded polychaeta.

## MATERIALS AND METHODS

### 1. Area of study

Marina El-Alamein Resort is located approximately 94 km west of Alexandria City. The length of the coast of Marina El-Alamein Tourist Center extends approximately 17 km along the Mediterranean coast. The area of the resort is ~3952 acres, 1260 of which includes artificial lakes with direct connections to the open sea.

### 2. Sample collection and preservation

In February, April, July, September, and November 2017, specimens of marine fouling were collected from three locations (Stations 1–3; Figure 1) where concrete blocks were confined, in the area of study. Table (1) show the coordinates of the sampling locations. Using (40 × 25 cm quadrat frames), samples were collected by scraping using a metal knife.

Samples were preserved by anesthetizing the organisms in isotonic MgCl<sub>2</sub> solution and then stored in a 10% solution of formalin in seawater for careful examination in the laboratory.

Polychaeta specimens, were studied under a compound microscope (BEL Bio-1-T; total magnification, up to 1000×) and photographed using a digital camera (Nikon D3200) adapted to attach to the microscope.

Relevant references were consulted to identify the recorded taxa to the species level whenever was possible. The World Register of Marine Species (WoRMS) was also searched for the appropriate nomenclature.



**Figure 1.** Sampling locations at Marina El-Alamein Resort (modified from Google Earth).

**Table 1.** Coordinates of the sampling locations.

Location	Latitude	Longitude
1	30°49.6' N	29°01.3' E
2	30°50.2' N	28°59.3' E
3	30°50.9' N	28°57.1' E

## RESULTS AND DISCUSSION

### 1. Diversity of Polychaeta in Marina El-Alamein Resort

In the area of study, fifteen taxa of marine Polychaeta were recorded, representing by the two subclasses Errantia and Sedentaria. Errantia was represented by nine species namely: *Schistomeringos rudolphi* (delle Chiaje, 1828), *Ceratonereis costae* (Grube, 1840), *Perinereis cultrifera* (Grube, 1840), *Neanthes kerguelensis* (McIntosh, 1885), *Syllis variegata* Grube, 1860, *Myrianida brachycephala* (Marenzeller, 1874), *Pseudonereis anomala* Gravier, 1899, *Branchiosyllis exilis* (Gravier, 1900), and *Syllis jorgei* San Martín & López, 2000, meanwhile, Sedentaria by six taxa namely: *Branchiomma lucullanum* (delle Chiaje, 1828), *Polyophthalmus pictus* (Dujardin,

1839), *Nainereis laevigata* (Grube, 1855), *Protoaricia oerstedii* (Claparède, 1864), *Potamilla torelli* (Malmgren, 1866), and *Proscoplos* sp.

## 2. New records in the Egyptian Mediterranean Sea

Three species of Polychaeta were first recorded in the Egyptian Mediterranean Sea, including one sedentary species (*P. oerstedii*) and two errant species (*M. brachycephala* and *S. jorgei*).

### 2.1. *Protoaricia oerstedii* (Claparède, 1864)

#### POLYCHAETA

Subclass Sedentaria Lamarck, 1818

Infraclass Scolecida Rouse and Fauchald, 1997

Family Orbiniidae Hartman, 1942

Genus *Protoaricia* Czerniavsky, 1881

*Protoaricia oerstedii* (Claparède, 1864)

(Figure 2)

#### Synonyms:

*Theostoma oerstedii* Amoureux *et al.*, 1978: 118; Fauvel, 1927: 24, Fig. 8 h-s.

*Protoaricia oerstedii* Hartman, 1959: 368.

**Materials examined:** One specimen.

#### Diagnosis:

Body: large, flattened, 15 mm, with 55 setigers. Prostomium: rounded, provided with 2 eyes. Anterior buccal segment enlarged, flattened dorsally, 10 thoracic segments, gills from 1–12 segments (Figure 2 a). Pygidium: Elongated anal segment, terminated by 4 slightly long cirri (Figure 2 b). Chaetae of different types: Anteriorly, crenellated capillary, some thin and others strong (Figure 2 c); from the 7<sup>th</sup> segment, it is mixed with forked setae with tapered branches, ciliated internally; crenellated pointed setae and hook-like setae (Figure 2d). Posteriorly, crenellated capillary chaetae only present.

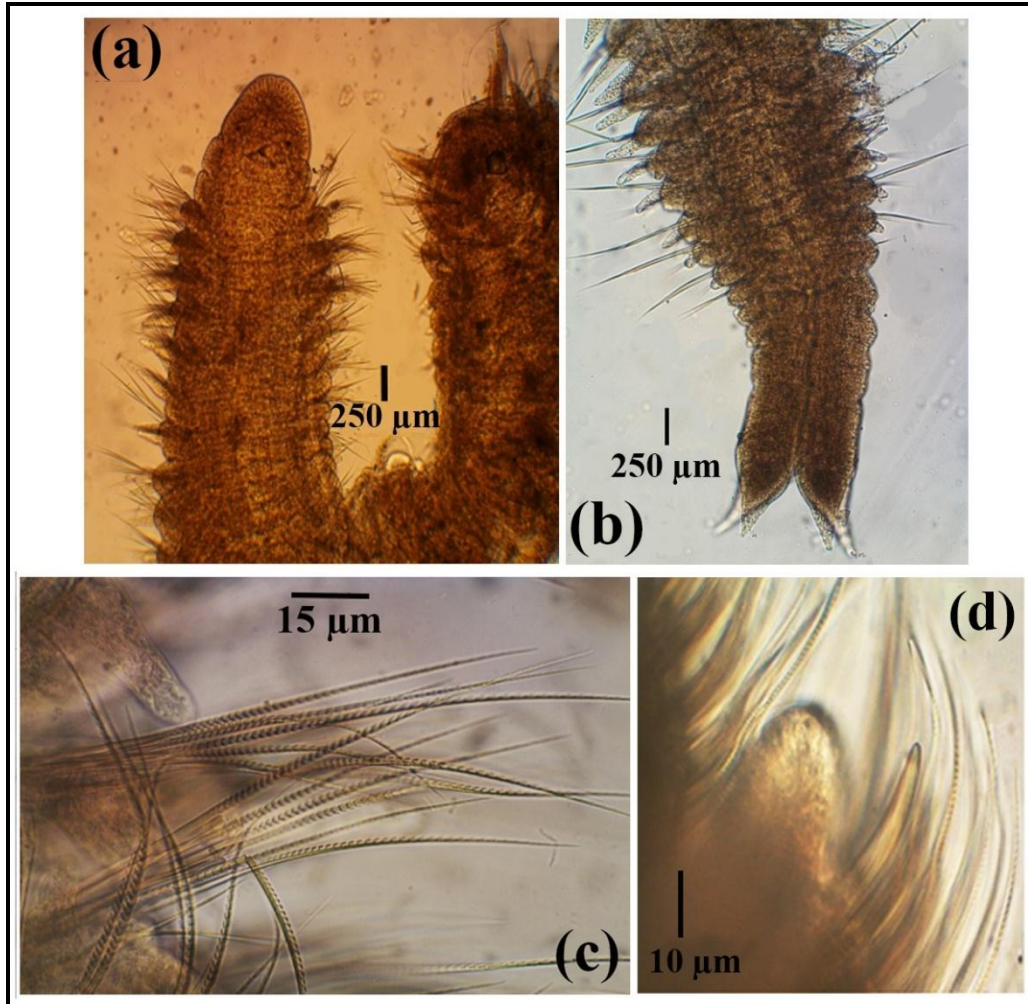
#### Remarks:

The description of the present specimen agrees well with the description reported by Fauvel (1927) except for the long pygidium and its four slightly long papillae, which were smaller cirri with rounded ends in Fauvel's specimen. According to the Mediterranean action Plan for Invasive species (UNEP-MAP-RAC/SPA, 2013), Shipping (ballast water and sediments, anchoring, and fouling) is the second main vector of species introduction into or from the Mediterranean (Katsanevakis *et al.*, 2013). So, the distribution of *P. oerstedii* in the Red Sea (Wehe and Fieg, 2002), may indicate its

anti-Lessepsian behavior. **Çinar and Demirci (2005)** recorded this species assemblages on shallow-water with *Cystoseira barbata* (50cm) along the Sinop Peninsula (Black Sea, Turkey).

**Distribution:**

Atlantic Ocean, Mediterranean Sea, Red Sea (**Wehe and Fieg, 2002**).



**Fig. 2.** *Protoaricia oerstedii* (**Claparède, 1864**): (a) Anterior part of the body, (b) posterior end of the body, (c) Crenellated capillary setae and forked setae, (d) hook-like setae. Scale bars: a–b, 250 µm; c, 15 µm; d, 10 µm.

**2.2. *Myrianida brachycephala* (Marenzeller, 1874)**

Subclass Errantia Audouin and Milne Edwards, 1832

Order Phyllodocida Dales, 1962

Suborder Nereidiformia Glasby, 1993

Family Syllidae Grube, 1850

Subfamily *Autolytinae* Langerhans, 1879

Genus *Myrianida* Milne Edwards, 1845

*Myrianida brachycephala* (Marenzeller, 1874)

(Figure 3)

**Synonyms:**

*Autolytus benazzii* **Cognetti, 1953**: 89, Fig. 1; **San Martín, 2003**:500, Figs. 277 a-d.

*Autolytus brachycephalus* **Fauvel, 1923**: 316, Figs. G-H.; **Faulwetter, et al., 2017**.

**Materials examined:** One specimen and two juveniles.

**Diagnosis:**

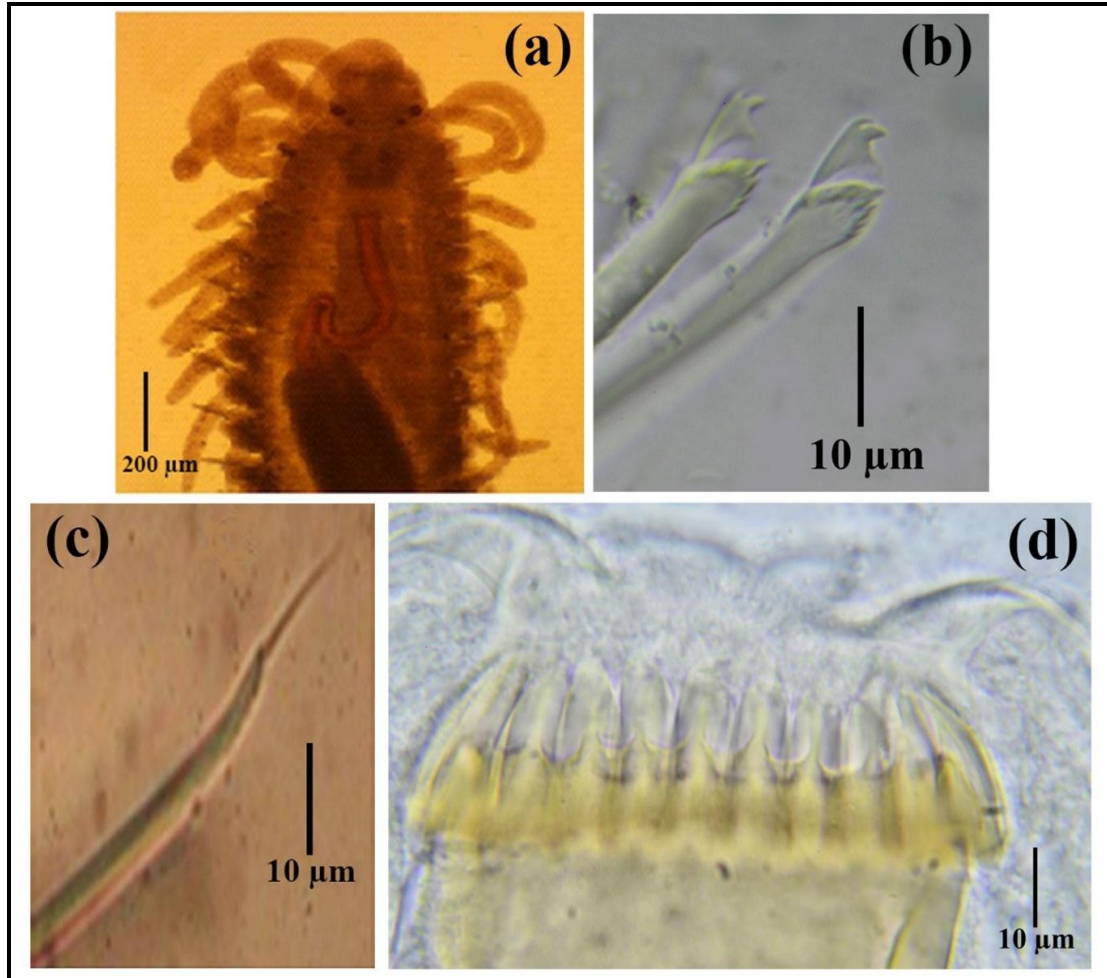
Body: up to 14 mm long with 60 segments, transparent to reddish-yellow, segments with two rows of shining, rounded glands. Prostomium: rounded with four eyes and two ocelli, two nuchal organs reach to second segment. Palps: hardly visible dorsally, with a median groove. Median antenna: smaller in length compared with lateral ones. Dorsal cirri of the anterior segments, longer than the median antenna, all other dorsal cirri are much shorter. Two pointed aciculae present. Anterior compound chaetae with (9-10) chaetae decreased posteriorly to two or three. Blades of compound chaetae bidentate (Figure 3 b), sub-distal tooth larger than the distal one. Shaft with terminal large spines. Bayonet chaetae, serrated from one side, with long terminal straight spin (Figure 3 c). Proventriculus extends through 4 segments with 32 muscle rows. Pharynx: S-shaped. Trepan with 24 teeth, alternate between one large and small (Figure 3 d).

**Remarks:**

*Autolytus benazzii* **Cognetti (1953)** differs from *M. brachycephala*; whereas the trepan features equal teeth in *A. benazzii*, the trepan features unequal teeth in *M. brachycephala*. In the original description of *Proceraea brachycephala*, **Marenzeller (1874)** showed some differences between his specimen and *M. brachycephala* where trepan with 29–42 unequal teeth separated by three, four, or five larger ones. In the present specimens, the trepan features 24 teeth, large one alternate with small one, that agrees with the description of **San Martín (2003)** for the synonymized name *Autolytus brachycephalus* where, trepan with 30 large and small teeth alternating irregularly, and with relatively large eyes and two ocelli. **Fauvel (1923)** reported four relatively large eyes, and also two ocelli. In the present specimens, proventriculus with 32 muscle rows, meanwhile **San Martín (2003)** reported 35-40 muscle rows.

**Distribution:**

North Atlantic, Mediterranean Sea, Adriatic Sea (**Şahin & Çinar, 2012**).



**Fig. 3.** *Myrianida brachycephala* (Marenzeller 1874): (a) Anterior part of the body; (b) bidentate setae; (c) Bayonet chaeta; (d) Trepan. Scale bars: a, 200 µm; b, c, & d 10 µm.

### 2.3. *Syllis jorgei* San Martín and López, 2000

Family Syllidae Grube, 1850  
 Subfamily Syllinae Grube, 1850  
 Genus *Syllis* Lamarck, 1818  
*Syllis jorgei* San Martín and López, 2000  
 (Figure 4)

#### Synonyms:

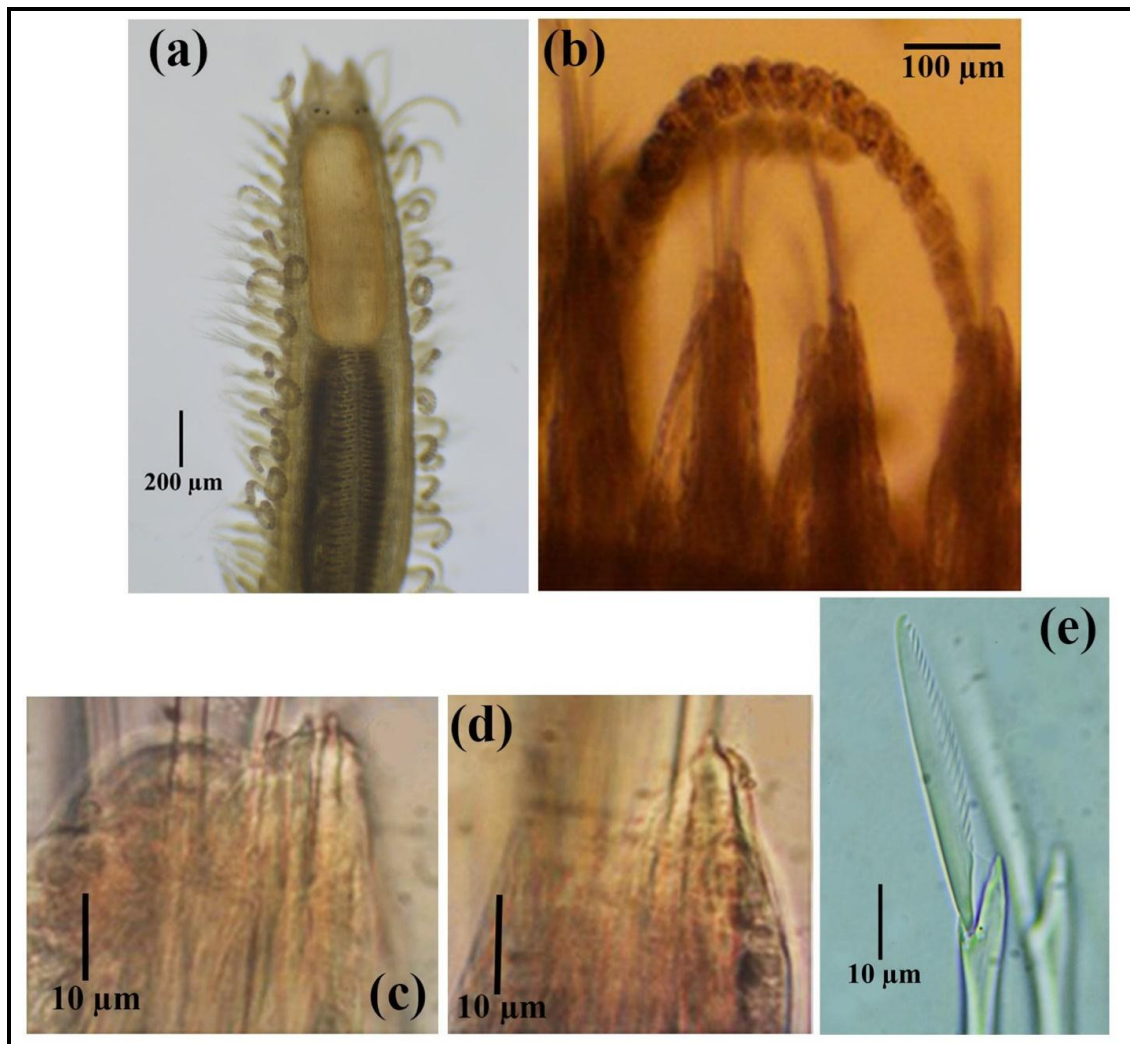
*Syllis lutea* Hartmann-Schröder, 1960: 53, Figs. 38-41 (2-5); San Martín, 1984: 370-372; Núñez *et al.*, 1992:118, Figs. 4d-f.

*Syllis jorgei* San Martín and López, 2000:430, Figs 5, 6; San Martín, 2003:382, Figs 208-210. Çinar & Ergen, 2003:785.

**Materials examined:** Three specimens.

**Diagnosis:**

Body: slender, long, up to 15 mm, up to 50 chaetigers. Prostomium sub-rectangular with four small eyes and two eye spots. Antennae, palps, and median antenna with 20–25 articles; the lateral antennae with 14–18 articles. Dorsal tentacular cirri with 15–22 articles meanwhile, ventral tentacular cirri short with 10–15 articles (Figure 4 a). Dorsal cirri are of different lengths; the longer one with 20–30 articles, the shorter one with 15–22 articles, including internally, spirally filaments and dark vacuoles (Figure 4 b). Anterior parapodia with three aciculae with curved tips, decrease to one posteriorly with short acute tip (Figure 4 c, d). Compound chaetae: ten anteriorly, decreased to 5–6 posteriorly. Blades are bidentate serrated with upwardly directed long sub-distal spines (Figure 4 e). Pharynx: extends through 11 segments with large papillae (Figure 4 a), the proventriculus extends through 12 segments with 32 muscle rows.



**Fig. 4.** *Syllis jorgei* San Martín and López 2000: (a) Anterior part of the body; (b) Parapodia with dorsal cirri; (c) Acicula anterior; (d) Acicula posterior (e) compound chaetae with long sub-distal spines. Scale bars: a & b, 200 & 100 µm; C, D & E 10 µm.



**Remarks:**

The description of the present specimen shows some differences compared with that given by **San Martín and López (2000)**. Specifically, these authors mentioned that the pharynx of their specimen extends through 10–15 segments and that its proventriculus extends through 8–10 segments with 30 muscle cell rows. It characterized by long sub-distal spines, differs from *S. lutea* examined by **Hartmann-Schröder (1960)** from the Red Sea, where the last one possesses coarser spines on their blades of compound chaetae. So, **San Martín and López (2000)** reported that they are very close to each other, but they are different species. It was reported by **Çinar and Ergen (2003)** among *Posidonia oceanica* rhizomes.

**Distribution:**

Mediterranean Sea; Atlantic Ocean; Canary Islands (**San Martín and López, 2000**).

**CONCLUSION**

- The current study is the first to explore the biodiversity of marine Polychaeta in Marina El-Alamein Resort, looking for new records.
- Fifteen taxa of marine Polychaeta were recorded in the area of study.
- Three Polychaeta species were first recorded in the Egyptian Mediterranean Sea. These include one sedentary species (*Protoaricia oerstedii*) and two errant species (*Myrianida brachycephala* and *Syllis jorgei*).
- These records represent an addition to the biodiversity of the Egyptian Mediterranean fauna.

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