



Alien Polychaete species and the first record of *Branchiomma bairdi* (McIntosh, 1885) from the Suez Canal and the Mediterranean coast of Egypt

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ABSTRACT

Eleven Polychaetes species, having a place with nine families, are accounted for in the current investigation. Six received: species out of eleven were alien species, and four were accounted for as Lessepsian migrant species. In the current examination, *Branchiomma bairdi* (McIntosh, 1885) was recorded just because of the Suez Canal and Port Said. Thus, this species is considered Lessepsian migrant species. Four species were recently detailed as Lessepsian species: *Sigambra parva* (Day, 1963); *Ceratonereis mirabilis* Kinberg, 1865; *Armandia intermedia* Fauvel, 1902; and *Exogone simplex* Hartmann-Schröder, 1960. Distribution of the Egyptian polychaetes is scant, subsequently, this investigation is viewed as an endeavor to find more types of alien polychaetes, which may have been available in the Egyptian waters for quite a while and have not yet been recognized. Likewise, this examination demonstrates that the polychaetes in the Egyptian waters have been inadequately explored and along these lines, the polychaete diversity in Egypt is still underestimated.

INTRODUCTION

Recently, a large number of biologists are interested to monitor alien species, e.g. Galil (2007); Zenetos *et al.* (2010, 2012); Çinar (2009, 2013). Non-indigenous marine species are introduced mainly as a result of human activities such as shipping, fishery processes and aquaculture. Also, the range of alien species may increase coming through the Suez Canal and the Gibraltar Strait. Ballast water and fouling are responsible for the introduction of alien species and habitat for and dispersal vector of numerous planktonic larvae and benthic organisms (Willan *et al.*, 2000; Radziejewska, 2006). Another factors, which are the main vectors for the introduction of marine pests, which harm the local ecosystem by introducing diseases, and threatening commercial fisheries. According to Çinar (2013) and Zenetos *et al.* (2012), the Suez Canal is the main introduction route of polychaete alien species which migrated across the Mediterranean Basin and known as Lessepsian migration species. Çinar (2013) reported that the number of alien polychaete

species is 292 worldwide, almost 3.4% of the total number of species. 134 polychaete of the listed species represented (39.1%) were recorded from the Mediterranean Sea. While all marine fauna introduced to the Mediterranean Sea reach 902 species especially in the Levantine basin (Zenetos *et.al.*, 2017; Cinar, 2009). It must be noted that there are large components of marine organisms that have not been yet identified (Bishop & Hutchings, 2011). So, the number of introduced species will be increased, 49 alien polychaete species were reported in Egypt (Dorgham *et al.*, 2013 & Hamdy and Ibrahim, 2019). Reach now to 64 alien species (Table.1). Some of them were reported by Ben Eliahu (1972); Amoureux (1976), also by Egyptian authors: Selim (1997); Abd Elnaby (2005, 2009a, b, 2019); Abd Elnaby and Gab-Alla (2007). Abd Elnaby & San Martin (2010, 2011); Dorgham *et al.*, (2013); Hamdy and Ibrahim (2019). The present work aims to add new recorded alien polychaete species to the catalogue of polychaetes recorded in Egypt, notes of description for some species and information on their distribution are also provided.

MATERIAL AND METHODS

Benthic samples were collected from different locations (Figure 1) over the period 2014-2019: from Port Said in 2014-2016 (31° 15' 23.54" N Long. 32° 17' 2.80" E), fouling collection, surface depth, with algae. From the Suez Canal, in 2016 and 2018 (30° 27' 17.99" N Long. 32° 20' 59.99" E), sandy collection from different stations, with depth ranging from 20-50m. From El Dabaa in 2017 (31° 5' 4" N 28° 24' 28" E), sandy collection, 5m depth and Marine (west coast of Alexandria, 30.81 N 29.05E, sandy collection), within the framework of the strategy of National Institute of Oceanography and Fisheries (NIOF, Alexandria) and Lake Burullus in 2018 (31° 21' N Long. 30° 30' E), sandy and sandy mud collection, 10-50m. Sandy samples were collected from the area in the front of Alexandria in 2018 (31° 12' 56.30" N Long. 29° 57' 18.97" E), depth reach to 5m. Lastly, in 2018-2019 samples were collected from the Suez Gulf (28° 49' 48.00" N 33° 34' 54.00" E, sandy collection). Samples were collected by using Van Veen grab (25x25cm). In the laboratory, samples were washed through 0.1 mm mesh sieve for small polychaetes and 0.5 mm for the rest of fauna, and then fixed with a 70% ethyl alcohol solution. Materials were sorted under a stereomicroscope, and then species were identified to species level. The photographs of some species were taken by a digital camera attached to stereo and compound microscopes.



Figure (1). A map of studied stations.

RESULTS

Eleven Polychaetes species, are reported, two of them were published before.

Family: Cirratulidae Ryckholt, 1851.

Genus: *Timarete* Kinberg, 1866.

Timarete punctata (Grube, 1859).

(Fig. 2. A-E)

Audouinia punctata Day 1949, 448.

Cirriiformia punctata Hartmann-Schröder 1992: 71.

Timarete punctata Çinar 2007: 757, Fig. 2 A-E.

Material examined: Specimens were collected from hard substrata in shallow water in Port Said in 2014 and from sediment of coastal shore of Alexandria in 2018.

Description

Body long 28 mm with 122 short crowded segments, prostomum triangular, bluntly, pointed, wider, eyes absent, tapered posteriorly with shallow ventral groove, all surface of body have dark brownish color and black spots (Fig.2 A&D), tentacular filaments firstly appeared on chaetiger 3 (cluster of 5 filaments) (Fig.2 C). In the middle and posterior body a few black lateral stripes present (Fig.2. B). Branchia from first segment. Capillary setae and sigmoid acicular spines first present on segment number 6, (Fig.2 E). Three anteriorly, two posteriorly accompanied with capillaries.

Remarks: The morphological characters of *Timarete punctata* agree with the Mediterranean Sea specimens. Although it is considered the first occurrence for the Egyptian waters, it was reported as an alien species in the Mediterranean known from Lebanon since 1965, Laubier (1966) as *Cirriiformia semicineta* (Ehlers, 1905), Turkey

since 2005-2007 by Çinar, Greece since 2006 (Zenetos *et al.*, 2018), which means it might have been present in Egypt for a long time.

Type locality: its type locality is West India, it is Indo-Pacific species introduced to Mediterranean Sea through Suez Canal (Zenetos *et al.*, 2010).

World distribution: W, E Atlantic Ocean, W Indian O., Pacific O., Red Sea, Mediterranean Sea. Hartmann-Schroder (1999) mentioned that *T. punctata* is a circum-tropical and subtropical species.

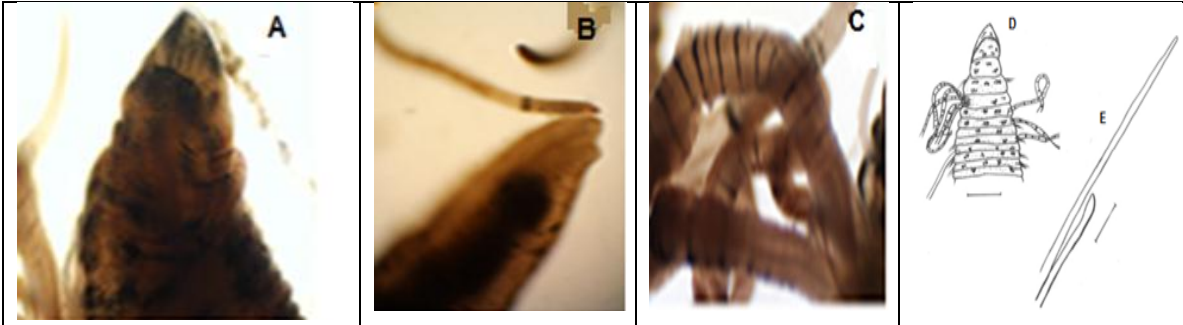


Figure (2). A Anterior part of *Timarete punctata*. B. Posterior part of the body. C. Tentacular cirri, D. (Anterior part & E Setae). Scale of setae 0.01mm, A. part 0.1mm.

3.2 Family: Hesionidae Grube, 1850

Subfamily: Microphthalminae Hartmann-Schröder, 1971

Genus: *Hesionides* Friedrich, 1937

Hesionides arenaria Friedrich, 1937

(Fig. 3. A-F)

Hesionides arenaria Vieitez *et al.*, 2004: 254 fig 96 a-c.

Material examined Specimens were collected from Alexandria with coarse sand in 2018, from the Suez Gulf in 2018.

Description

Body small and thin, reddish-brown color. Prostomium semicircular without eyes. Prostomium with 3 antennae and 2 simple palps. Lateral antennae and palps of the same size, with irregular edges and small hairs. Median antenna longer than lateral ones. 3 pairs of simple tentacular cirri on second segments (Figure 3.A). Dorsal tentacular cirri of first segment long as the median antenna (Figure 3.A). Tentacular cirri of second segment longer than the rest ones (Fig.3 A). Parapodia subbiramous. Dorsal and ventral cirri thread shape and simple. Dorsal cirri short. Ventral cirri half in size of the dorsal cirri (Figure 3.A). Notopodia with 1 acicula and 2 simple chaetae. Neuropodia with 2 aciculae and 4-5 compound chaetae (Fig.3.D,E, F). Pygidium with 2 thread-like cirri and 2 separate pygidial plates (Fig.2 B).

Type locality: Germany, North Sea.

World distribution: Canary Islands, Red Sea, North Sea, Indian Coast.

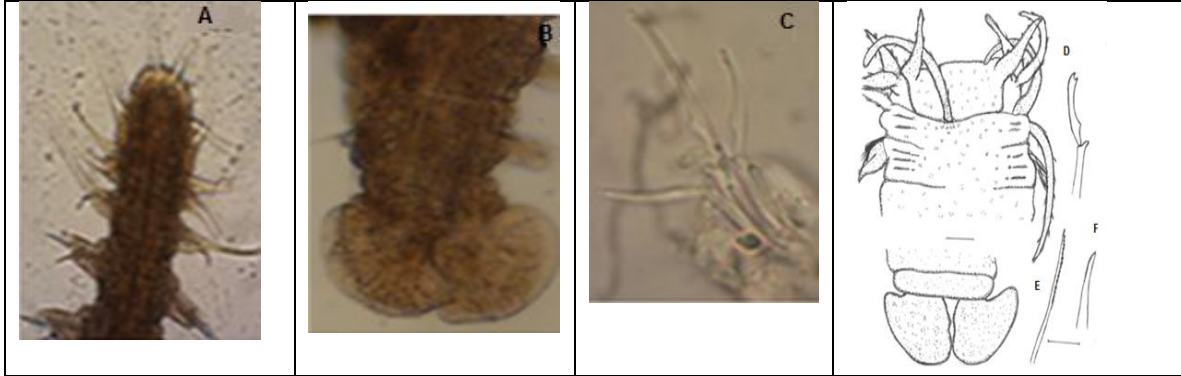


Figure 3. . *Hesionides arenaria* A. Anterior part. B. Posterior part. C. Setae, D. seta, E. simple seta, F. Acicula. Scale of setae 0.01mm, A. part 0.1mm.

Family: Hesionidae Grube, 1850

Subfamily: Psamathinae Pleijel, 1998

Genus: *Syllidia* Quatrefages, 1865

Syllidia armata Quatrefages, 1866

(Fig. 4. A-C)

Synonyms

Syllidia armata Ben-Eliahu 1972: 202, Vieitez *et al.* 2004: 235, fig 84 a-e.

Magalia perarmata Fauvel 1923: 246–247, fig. 92.

Syllidia capensis Day 1967: 226–227, Fig. 11.1m.

Material examined Specimens of this species were collected from the Suez Canal in 2016, and from the Suez Gulf and Alexandria in 2018.

Description

Long body, specimen 8 mm long for 35 segments; anteriorly truncate, tapered posteriorly. Prostomium quadrangular, with 4 eyes, anterior pair larger and curved. Two antennae long but thinner and two annulated palps, Median antenna absent. Six pairs of annulated tentacular cirri. Tentacular and dorsal cirri annulated with cirrophores (Fig.4. A). Notopodia lobes with dorsal cirri and one acicula, Neuropodial lobes and neurochaetae absent on segments 1–3. Neuropodia with two aciculae and compound chaetae, with long bidentate blades. Ventral cirri, short, tapered. Proboscis reaching segment 8, with 10 terminal papillae, Jaws large, dark, visible through body wall (Figure 4. B), with two basal pointed shafts and serrated edges with about seven teeth. Blades with unidentate tips (Figure 4. C). Pygidium with pair of cirri. Pygidial plate absent.

Type locality: France, NE Atlantic, the area of introduction was Argentina (Orensanz *et al.*, 2002). Çinar (2013), reported this species as alien species.

World distribution: Suez Canal, Atlantic coast of France, Mediterranean Sea, Indian Ocean.

South Africa, Italy, Spain, Denmark in the north, Suez Canal and Florida.

Family: Nereididae Blainville, 1818.

Subfamily: Nereidinae Blainville, 1818.

Genus: *Ceratonereis* Kinberg, 1865.

Ceratonereis mirabilis Kinberg, 1865.

(Fig. 5. A-C)

Synonyms

Ceratonereis mirabilis Day 1967: 324, fig. 14.14 a-g, Çinar 2009: 2292.

Material examined Specimens were collected from El Dabaa (W coast of Egypt), 5m depth, in 2017, with coarse sand.

Remarks: This species was reported from Aqaba Gulf by Amoureux *et al.* (1978); the author reported the same species for Mediterranean coast of Egypt (1976). It is Indo-Pacific species, its origin Brazil, introduced to Mediterranean Sea through Suez Canal (Zenetos *et al.*, 2010), therefore, it is considered lessepsian migrant species. It reported before by the author 2020.

World distribution: Red Sea, W Atlantic, Indian Ocean, Pacific O., Mediterranean Sea , Aqaba Gulf, Cyprus, Turkish coast, Israel.

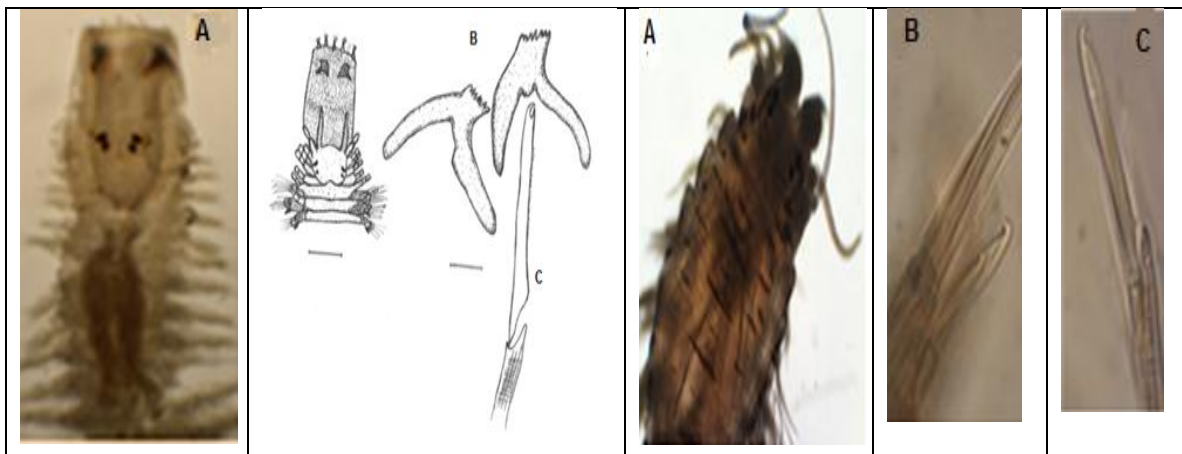


Figure 4. A. *Syllidia armata*, B. jaw, C. seta. Scale of setae 0.01mm, A. part 0.1mm.

Figure 5. A. *Ceratoneries mirabilis*. B. Homogomph C. heterogomph falcigers.

3.5 Family: Onuphidae Kinberg, 1865

Subfamily: Onuphinae

Genus: *Onuphis*

Onuphis eremita oculata Hartman, 1951.

(Fig. 6. A-E)

Synonyms

Onuphis eremita oculata Çinar, 2009: 2279 fig. 4 a-e.

Material examined Specimens were collected in 2018 from Alexandria coast, and from Lake Burullus. Also samples were collected from the Suez Canal in 2015.

Description

Body long, slender, Prostomium with two small eyes, Antennae, palps, prostomium characterized by the presence of dark brownish pigmentation spots, also transvers dark brown pigmentation on anterior part of body. Rings of ceratophore ranging between 17-20, one branchia at chaetiger 1, increased 2 then 3 after segment number 24 (Fig.6. A). Ventral cirri cirriform through anterior segment then converted to pad like shape. Setae at segment 1-4 with tridentate pseudo- compound (Fig.6. D), then bidentate subacicular hooks present from segment 8 (Fig.6 C). Beside limbate chaetae (Fig.6. B) and pectinate setae with 10 teeth (Fig.6. E), as in Çinar (2009), also eyes present, but differ from original description by Hartman 1951, where the last author reported 9 teeth.

Remarks: Çinar (2013) and Zenetos *et al.* (2010) reported this species as alien species for the Mediterranean Sea, it is considered new record for the Egyptian waters. Çinar mentioned that it is found near harbours in Iskenderun and Mersin Bays, so it may be introduced by Ballast water. The species was found within the collected samples in 2018 along the Egyptian Mediterranean coast. Also, it was collected from Suez Gulf, 2019, through the project of Petro Gulf Misr (Gabel el Zeit). This may indicate that this species may be a lessepsian migrant species, which comes through the Suez Canal.

Type locality: Gulf of Mexico (W Atlantic).

World distribution: Gulf of Mexico (W Atlantic), E Mediterranean (Coast of Turkey).

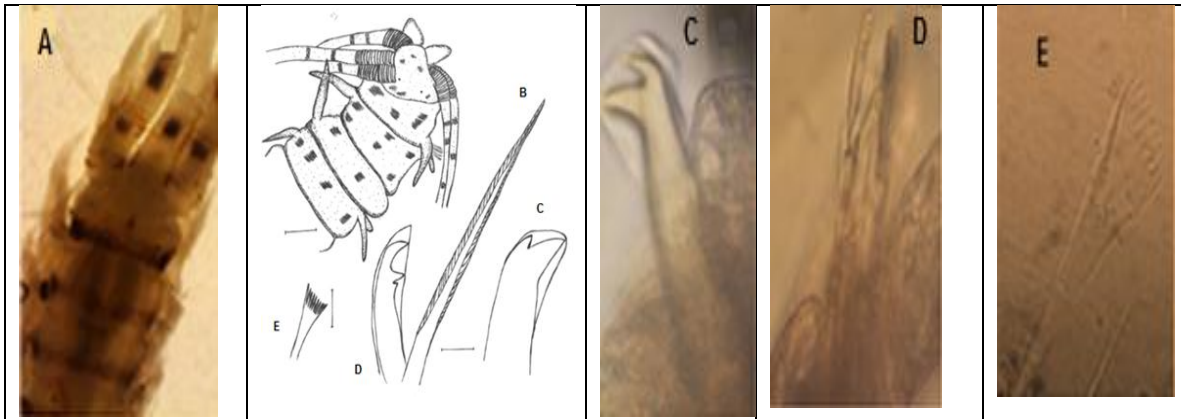


Figure 6. A. *Onuphis eremits oculata*, B. limbate seta, C. Bidentat seta. D. Compounded seta. E. Pectinate setae. Scale of setae 0.01mm, A. part 0.1mm.

Family: Opheliidae Malmgren, 1867.

Genus: *Armandia* Filippi, 1861.

Armandia intermedia Fauvel, 1902.

(Fig. 7 A-B)

Synonyms

Armandia intermedia Day 1967: 577 fig 25.2. d-g.

Material examined: This species was collected in 2018 from Alexandria coast and from Suez Gulf.

Description

Body long, about 27 segments with gills begin from number 2, from segment number seven, lateral eye spots begin, setae long, except those at last few segment, less in length (Fig.7. A), anal funnel short obliquely truncate, a long internal ventral cirrus present and 7 dorsal digit form papillae, the ventral pair are shorter than the rest (Fig.7.B).

Remarks: The description of the Egyptian species agrees with Day (1967). It differs in the number of papillae at the anal funnel, the last author reported the number from 10-20.

Type locality: It was recorded from Casamance (Senegal, NE Atlantic)

World distribution: Indo-Pacific, Atlantic Ocean, Red Sea, Senegal, Australia, Japan, Angola.

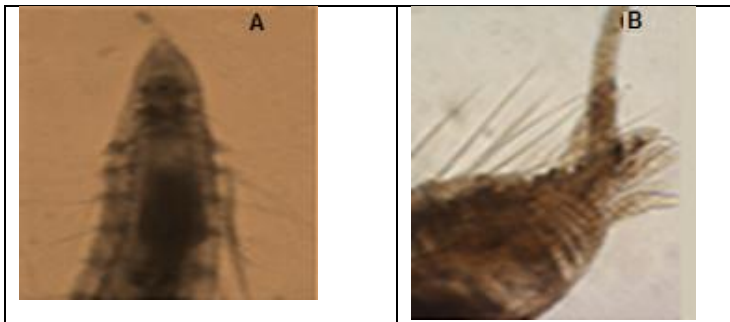


Figure 7.A. *Armandia intermedia* anterior part. B. Posterior part of body.

Family: Pilargidae Saint-Joseph, 1899

Subfamily: Pilarginae Saint-Joseph, 1899

Genus: *Sigambra* Müller, 1858

Sigambra tentaculata (Treadwell, 1941)

(Fig. 8. A-C)

Synonyms

Ancistrostylis tentaculata Treadwell (1941): 1-4, Figs 1-3.

Sigambra tentaculata Moreira and Parapar 2002:100- 104 fig. 1-3 a-f.

Material examined. Two Specimens were collected from Alexandria coast in 2018.

Description

Body length 7, 8 mm, up to 70 segments. Palps very small, biarticulate, three antennae, tapered distally, median antenna longer than the lateral ones. Peristomium with two pairs of tentacular cirri. Near the posterior margin of prostomium (Fig.8.B). Peristomial papillae present (Fig.8A). Proboscis with 14 distal papillae. Some other different size papillae are present between the main papillae (Fig.8A). Parapodia sesquiramous, with tapered dorsal and ventral cirri. Notopodia with acicula and an emergent hook from chaetigers 4 until the last ones, with single capillary chaeta in posterior parapodia

(Fig.8.A). Neuropodia well developed with straight acicula, and two short pectinate supraacicular chaetae with long spinulation, also numerous simple, serrated pointed neurochaetae of variable length, are present (Fig.8C).

Remarks: The present specimen with peristomial papillae. This kind of papillae have been previously reported in *Sigambra bassi* (Hartman, 1947) by Licher & Westheide (1997). Proboscis with 14 distal papillae, subdistal row with about 18 oval papillae and many kinds of small papillae, which agrees with Moreira and Parapar (2002).

Type locality: Long Island Sound (bay).

World distribution: Eastern Pacific, Northern Gulf of Mexico, NE South America, Pacific coast of Costa Rica and Mediterranean coasts of Spain.

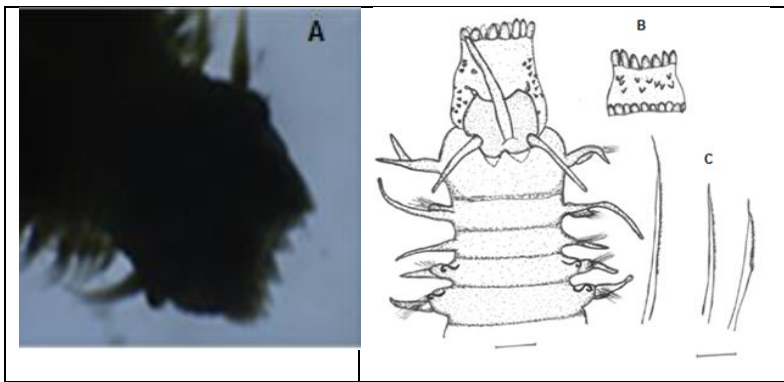


Figure 8 . A. Anterior part of *Sigambra tentaculata*. B. Ventral side of proboscis, C. Setae. Scale of setae 0.01mm.

***Sigambra parva* (Day, 1963)**

(Fig. 9. A-C)

Synonyms

Sigambra parva Moreira and Parapar 2002: 104-109 figs. 4-7.

Ancistrostylis parva Day (1963): 395-396, Figs 3g-k.

Material examined Specimens were collected from Alexandria coast in 2018. Also, specimens were reported from the Suez Gulf through in 2018 and 2019.

Remarks: Examination revealed *Sigambra parva* (Fig. 9. A-B) is closely related to *S. tentaculata* but is different in the arrangement of the proboscideal papillae and tooth-like papillae (Fig. 9.C). This species was reported from the Indian Ocean then introduced to the Mediterranean Sea by ballast water, so it is considered lessepsian migrant species (Cinar, 2013).

Type locality: Its type locality is South Africa (Day, 1963).

World distribution: This species was reported from Atlantic and Mediterranean coasts of Spain, South Africa.

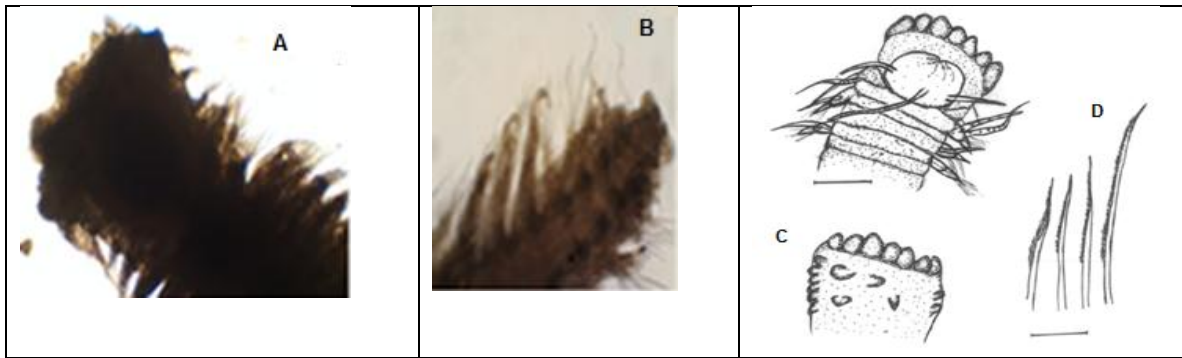


Figure 9. A. Anterior part of *Sigambra parva*. B. Posterior part, C. Ventral side of proboscis, D. Setae. Scale of setae 0.01mm, A. part 0.1mm.

3.9 Family: Poecilochaetidae Hannerz, 1956.

Genus: *Poecilochaetus* Claparède in Ehlers, 1875.

Poecilochaetus serpens Allen, 1904.

(Fig. 10 A-I)

Synonyms

Poecilochaetus serpens Mohammad 1980:36.

Material examined: The family and species were reported in the present study for the first time. Specimens were collected from the Suez Gulf in 2018 and other specimen was collected from the front of Alexandria in 2018.

Description

Burrowing species. Fragile bodies, two fragments with 42, 50 segments. Body slender, slightly flattened posteriorly, body surface covered by heavy papillae. It is translucent bright red anteriorly and dark brown or green posteriorly due to intestine pigmentation (Fig.10 A). Prostomium, round, with two dorsal and two ventral eyes, surrounded by long tentacles and anterior spines (10. H), with tri-lobed nuchal organs extend posteriorly with heavily ciliated grooved and many sensory hairs. The lateral ones reaching segment 4, the median one reaching segment 7. Paired grooved palps present (Fig.10 B). Parapodia biramous, flask-shaped or tapering, (Fig.10 C), also with different types of setae (Fig. 10.D, F), such as spinous, plumose, pectinate and acicular with terminal fibrils capillaries (Fig.10.D, F). Feathery chaetae starting at segment 20 (Fig. 10.E, G.). Gills start at segment number 22, also simple setae are present (Fig.10. I).

Type locality: NE Atlantic.

World distribution: Red Sea, Arabian Sea, Gulf of Oman, Arabian Gulf, Mediterranean Sea.

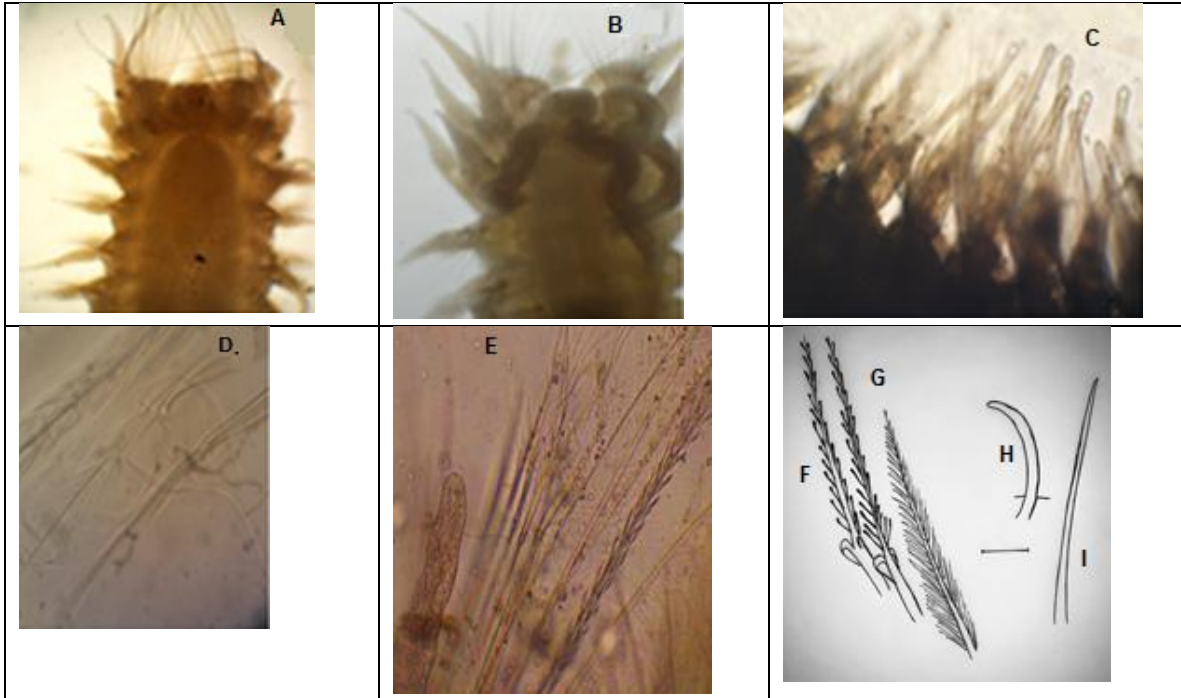


Figure 10. *Poecilochaetus serpens* dorsal view, B. *P. serpens* with tentacles. C. Parapodium. D& F. Large stiff, hairy bristle from no.30. E&G. Membranous spine bristle from no. 20, H. Anterior spines, I. Simple seta. Scale of setae 0.01mm.

3.10 Family: Sabellidae Latreille, 1825.

Subfamily: Sabellinae Chamberlin, 1919.

Genus: *Branchiomma* Kölliker, 1858

Branchiomma bairdi (McIntosh, 1885)

(Fig. 11 A-)

Synonyms:

Branchiomma bairdi Çinar 2009: 2320, fig. 13 a- C, Cepeda and rodri'guez-flores 2017:1, figs. 1A–D & 2.

Material examined: Species was collected from the Suez Canal in 2015 and 2016, and also from Port Said in 2014, with variant lengths.

Description

Body 20-45 mm long with up to 40 segments (Fig.11. A). Body pale brownish with small dark brown spots over whole surface. Crown with brown bands alternating pale brownish bands around radioles (Fig.11. A). Radiolar crown bearing about 24 pairs of radioles with apinnate tips and stylodes. Macrostylodes strap-like. Eyes small, dorsal lips about half the length of radioles (Fig.11. B). Dorsal collar with free, separated margins. Thorax with eight segments, with dark brown spots. Collar bears weak geniculate chaetae (Fig.11. A). Oblique rows of superior and inferior thoracic simple capillary notochaetae are present (Fig.11. E). Thoracic uncini with two rows of teeth (Fig.11. C). Abdominal uncini similar to those in thorax (Fig.11. D).

Remarks: The presence of this species within the fouling collection from the Suez Canal in 2015 and 2016 and also from Port Said in 2014; this means that it is may be a lessepsian migrant species.

Type locality: Bermuda (north-western Atlantic).

World Distribution: Caribbean Sea, Gulf of California, Mediterranean Sea (Spain, Italy, Greece and Turkey), Canary Islands, Madeira Island and Tunisia and Australia.

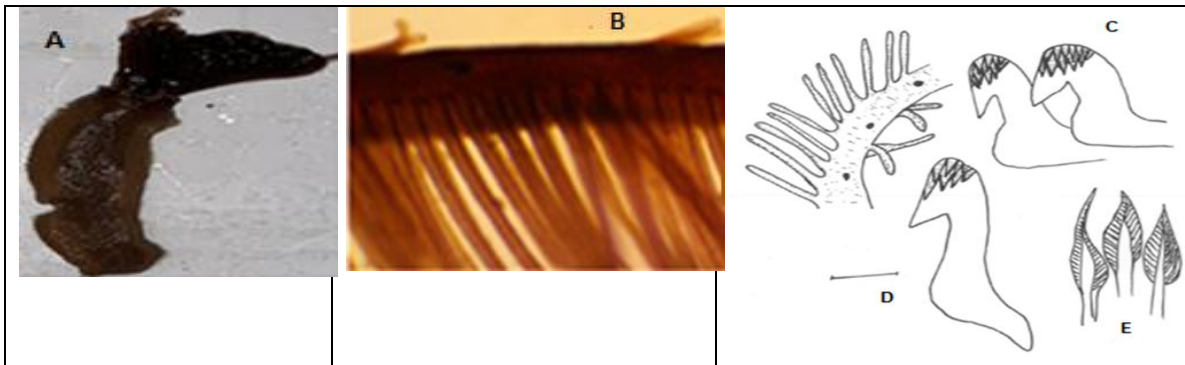


Figure 11. A. *Branchiomma bairdi* body, B. radioles with black eyes spots, C. Uncini of thorax, D. Uncini of abdomen, E. Simple capillary setae. Scale of setae 0.01mm.

3.11 Family: Syllidae Grube, 1850

Subfamily Exogoninae Langerhans, 1879

Genus *Exogone* Ørsted, 18

Exogone simplex Hartmann-Schröder, 1960

(Fig. 12. A-C)

Synonyms

Exogone simplex Hartmann-Schröder, 1960: 107–108, pl. 15, figs 134–136.

Exogone (Sylline) simplex San Martín 2005: 146, fig. 92.

Material examined Specimens were collected from the Suez Gulf in 2018. Another specimen was collected from Marina (Alexandria) in the framework of NIOF strategy in 2018, and also with sand from the Gulf of Suez in 2019.

Remarks: Specimens from West Alexandria (Marina) and from Gulf of Suez, differ from the Australian ones described by San Martín (2005), in that the last author's specimens have only three chaetae per parapodium whereas herein with 3-5 chaetae and agree with Paresque *et. al.* (2014) from Paraíba (Brazilian coast), but the later mentioned that proventricle extends only through one chaetiger, while present specimens detected that the proventricle extending for two chaetigers as San Martín's specimens (2005). It reported before by the author 2019.

Type locality: Ghardaqa (Egypt, Red Sea).

World distribution: Atlantic Ocean: Angola, Brazil (Paraíba and São Paulo). Pacific Ocean: Australia (New South Wales). Indian Ocean: Australia (Western Australia); Red Sea: Egypt.

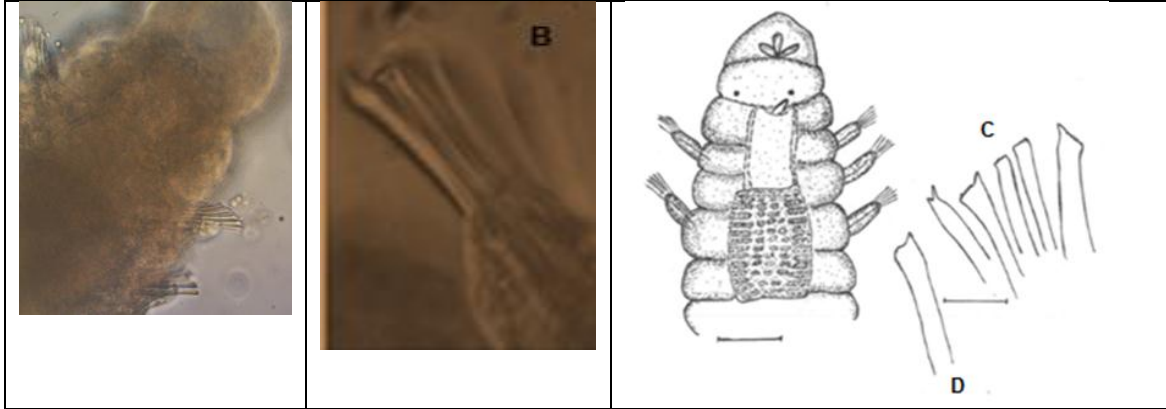


Figure 12. A. Anterior part of *Exogone simplex*. B& C. setae, D. acicula. Scale of setae 0.01mm.

Table (1) Alien polychaete species reported from Egyptian waters.

<i>Lepidonotus tenuisetosus</i> (Gravier, 1902)	Ben-Eliahu, 1972
<i>Eurythoe complanata</i> (Pallas, 1766)	Hamdy & Ibrahim, 2019
<i>Linopherus canariensis</i> Langerhans, 1881	Hamdy & Ibrahim, 2019
<i>Pisione guanche</i> San Martín, López & Núñez, 1999	Abd Elnaby, 2017
<i>Eumida sanguinea</i> (Örsted, 1843)	Abd Elnaby, 2009 & 2005 & Ben-Eliahu, 1972
<i>Phyllodoce longifrons</i> Ben-Eliahu, 1972	Ben-Eliahu, 1972 & Dorgham <i>et. al.</i> , 2013
<i>Hesionides arenaria</i> Friedrich, 1937	Present study
<i>Sigambra parva</i> (Day, 1963)	Present study
<i>Sigambra tentaculata</i> (Treadwell, 1941)	Present study
<i>Syllidia armata</i> Quatrefages, 1866	Present study & Ben-Eliahu, 1972
<i>Branchiosyllis exilis</i> (Gravier, 1900)	Abd Elnaby, 2009 & 2005; Hamdy & Ibrahim, 2019
<i>Eusyllis kupfferi</i> Langerhans, 1879	Abd Elnaby 2014
<i>Exogone (Exogone) lourei</i> Berkeley & Berkeley, 1938	Abd Elnaby 2014
<i>Exogone simplex</i> Hartmann-Schröder, 1960	Present study & Amoureux <i>et. al.</i> , 1978
<i>Exogone africana</i> Hartmann-Schröder, 1974	Abd Elnaby & San Martin, 2010

<i>Paraehlersia weissmannioides</i> (Augener, 1913)	Abd Elnaby & San Martin, 2010
<i>Syllis gracilis</i> Grube, 1840	Abd Elnaby 2005, Hamdy & Ibrahim, 2019
<i>Syllis schulzi</i> (Hartmann-Schröder, 1960)	Dorgham <i>et al.</i> , 2013
<i>Alitta succinea</i> (Leuckart, 1847)	Abd Elnaby 2005.
<i>Ceratonereis mirabilis</i> Kinberg, 1865	Ben-Eliahu, 1972 & Abd Elnaby, 2020
<i>Leonnates decipiens</i> Fauvel, 1929	Ben-Eliahu, 1972 & Abd Elnaby, 2020
<i>Leonnates persicus</i> Wesenberg-Lund, 1949	Ben-Eliahu, 1972 & Abd Elnaby, 2020
<i>Neanthes willeyi</i> (Day, 1934)	Ben-Eliahu, 1972 & Abd Elnaby, 2020
<i>Neanthes acuminata</i> (Ehlers, 1868)	Ben-Eliahu, 1972
<i>Perinereis nuntia</i> (Lamarck, 1818)	Abd Elnaby 2005
<i>Platynereis dumerilii</i> (Audouin & Milne Edwards, 1833)	Abd Elnaby 2005, Hamdy 2008
<i>Pseudonereis anomala</i> Gravier, 1899	Abd Elnaby 2005, Hamdy & Ibrahim, 2019
<i>Protodorvillea biarticulata</i> Day, 1963	Abd-Elnaby F. A. & Gab-Alla A. A.F. 2007
<i>Leodice antennata</i> Savigny in Lamarck, 1818	Abd Elnaby 2005, Hamdy, Ibrahim, 2019 & Amoureux <i>et al.</i> , 1978
<i>Eunice indica</i> Kinberg, 1865	Ben-Eliahu, 1972 & Amoureux <i>et al.</i> , 1978
<i>Lysidice ninetta</i> Audouin & H Milne Edwards, 1833	Abd Elnaby 2005 & Amoureux <i>et al.</i> , 1978
<i>Lysidice collaris</i> Grube, 1870	Amoureux <i>et al.</i> , 1978
<i>Marphysa sanguinea</i> (Montagu, 1813)	Abd Elnaby 2005
<i>Lumbrineris coccinea</i> (Renier, 1804)	Abd Elnaby, 2009 & 2005 & Ben-Eliahu, 1972
<i>Schistomeringos rudolphi</i> (Delle Chiaje, 1828)	Abd Elnaby 2005, Hamdy & Ibrahim, 2019
<i>Oenone fulgida</i> (Lamarck, 1818)	Abd Elnaby, 2009 & 2005 & Amoureux <i>et al.</i> , 1978
<i>Onuphis eremita oculata</i> Hartman, 1951	Present study
<i>Boccardia polybranchia</i> (Haswell, 1885)	Abd Elnaby, 2019 & 2005
<i>Polydora cornuta</i> Bosc, 1802	Abd Elnaby, 2019
<i>Dipolydora armata</i> (Langerhans, 1880)	Abd Elnaby, 2019 & Hamdy & Ibrahim, 2019 & Amoureux <i>et al.</i> , 1978
<i>Dipolydora giardi</i> (Mesnil, 1893)	Abd Elnaby, 2019, 2005, 2009
<i>Dipolydora socialis</i> (Schmarda, 1861)	Abd Elnaby, 2019
<i>Polydora ciliata</i> (Johnston, 1838)	Abd Elnaby, 2019, 2005
<i>Polydora websteri</i> Hartman in Loosanoff & Engle, 1943	Abd Elnaby, 2019

<i>Polydora cornuta</i> Bosc, 1802	Abd Elnaby, 2019
<i>Pseudopolydora kempfi</i> (Southern, 1921)	Abd Elnaby, 2019
<i>Prionospio sexoculata</i> Augener, 1918	Amoureux <i>et. al.</i> , 1978
<i>Poecilochaetus serpens</i> Allen, 1904	Present study
<i>Armandia intermedia</i> Fauvel, 1902	Present study
<i>Aphelochaeta marioni</i> (Saint-Joseph, 1894)	Amoureux <i>et. al.</i> , 1978
<i>Heteromastus filiformis</i> (Claparède, 1864)	Abd Elnaby, 2009
<i>Notomastus profundus</i> (Eisig, 1887)	Abd Elnaby, 2009 & Hamdy & Ibrahim, 2019
<i>Timarete punctata</i> (Grube, 1859)	Present study
<i>Euclymene lombricoides</i> (Quatrefages, 1866)	Abd Elnaby, 2008
<i>Loimia medusa</i> (Savigny, 1822)	Dorgham <i>et al.</i> , 2013 & Hamdy & Ibrahim, 2019 & Amoureux <i>et. al.</i> , 1978
<i>Terebella lapidaria</i> Linnaeus, 1767	Abd Elnaby, 2005 & Amoureux <i>et. al.</i> , 1978
<i>Branchiomma bairdi</i> (McIntosh, 1885)	Present study
<i>Fabricia stellaris</i> (Müller, 1774)	Abd Elnaby, 2005.
<i>Hydroides dianthus</i> (Verrill, 1873)	Abd Elnaby 2005, Hamdy & Ibrahim, 2019
<i>Hydroides dirampha</i> Mörch, 1863	Abd Elnaby 2005
<i>Hydroides elegans</i> (Haswell, 1883)	Abd Elnaby 2005, Hamdy & Ibrahim, 2019
<i>Spirobranchus tetraceros</i> (Schmarda, 1861)	Abd Elnaby 2005
<i>Spirobranchus triqueter</i> (Linnaeus, 1758)	Dorgham <i>et al.</i> , 2013 & Hamdy & Ibrahim, 2019
<i>Hydroides norvegica</i> Gunnerus, 1768	Selim, 1987 & Amoureux <i>et. al.</i> , 1978

DISCUSSION

Eleven Polychaete species, nine of them reported for the first time for Egyptian waters as alien species. They attributed to one of two factors first one, they may have been transferred by any of the vectors from other Mediterranean areas, the second, and they had existed in deeper areas of Egyptian waters and recently migrated to the intertidal zone (Dorgham *et al.*, 2013). They named: *Cirratulus punctate* Augener, 1918, *Hesionides arenaria* Friedrich, 1937, *Syllidia armata* Quatrefages, 1866, *Ceratonereis mirabilis* Kinberg, 1865, *Onuphis eremita oculata* Hartman, 1951, *Armandia intermedia* Fauvel, 1902., *Sigambra tentaculata* (Treadwell, 1941), *Sigambra parva* (Day, 1963), *Poecilochaetus serpens* Allen, 1904, *Branchiomma bairdi* (McIntosh, 1885) and *Exogone*

simplex Hartmann-Schröder, 1960 are reported in the present study. Distribution revealed that *Ceratonereis mirabilis* was previously reported from the Red Sea, and it was firstly reported by Amouroux (1976) in Haifa and Zenetos *et al.*, (2010) reported this species as Indo-Pacific introduced to the Mediterranean Sea through the Suez Canal. *Onuphis eremita oculata* was firstly reported by Hartman (1951) from the Gulf of Mexico (Western Atlantic), and it is also found near harbours. Arias and Paxton (2014) described *O. eremita* and reported that the presence of eyespots, as well as that they are present in the *Onuphis eremita oculata* (Çinar, 2009), means that actually *O. eremita oculata* is a Mediterranean native species." In the present study, it is found with sand at the Suez Gulf, so it may be introduced by Ballast water to the Mediterranean Sea, and this disagree with the two authors.

The invasive *Branchiomma bairdi* (McIntosh,1885) was originally described from Bermuda (Western Atlantic Ocean), although it has spread across the Eastern Atlantic and it is fairly common in the Indo-West Pacific region. This species is considered as invasive species due to its ability of colonization make high population density (Cepeda and Rodri'guez-flores, 2017). In the present study this species reported for the first time in the Suez Canal 2015 and 2016, and from Port Said in 2014. So it may be considered lessepsian migrant species coming through the Suez Canal to Mediterranean as mentioned by Zenetos *et al.* (2010), that this species is Atlantic/ Pacific species, introduced to the Mediterranean by ships. There is confusion between the invasive *B. boholense* and *B. bairdi* morphologically, but Tovar-Jernades *et al.* (2009), solve this problem, that *B. bairdi* has strap-like macostylodes and two rows of teeth on thoracic uncini, other species *B. boholense* which reported from Mediterranean with tongue like macrostylodes, one large tooth on thoracic uncini.

Sigambra parva was firstly reported from South Africa by Day (1963). In the present study, this species was collected from Alexandria coast in 2018. Also, another specimen was reported in the same year from the Suez Gulf. Therefore, it is considered as alien species introduced to the Mediterranean through the Suez Canal. *Exogone simplex* Hartmann-Schröder, 1960, is typically located in Ghardaqa along the Egyptian Red Sea Coast; however, it is reported in the present study from Marina, western Alexandria, along the Egyptian Mediterranean coast. It is also reported from the Suez Gulf in 2018. This is sure alien species comes through Canal by ship or by Ballast water; being considered new for Mediterranean Sea. *Armandia intermedia* was reported before from North Africa and Red Sea (Wehe and Fiege 2002), introduced to Mediterranean through Suez Canal (Çinar, 2013). The present data showed that it was collected from Alexandria and from the Gulf of Suez, which means it is a doubtless lessepsian migrant species. Also, *Hesionides arenaria* was formerly reported from the Atlantic Ocean then introduced to the Black Sea by ships (Çinar, 2013), and considered alien species. Though, herein it was collected from the Suez Gulf and Alexandria shores, it is surely alien species may be

comes by ship. The type locality of *Syllidia armata* is France and NE Atlantic species, but it was previously recorded from the Suez Canal (Wehe and Fiege, 2002). According to Çinar (2013), it reported as alien species. The rest of species recorded in the present study are considered alien species reported from the Atlantic Ocean, and may invade the Mediterranean with Ballast water or through the Gibraltar Strait. Zenetos *et al.*, (2010) and Çinar (2013) mentioned that alien species must be regularly updated to monitor their distribution and detected their impact to local ecosystem. He also mentioned that, Boring polychaetes belonging to families, Spionidae, Cirratulidae, and Sabelidae introduced and competes with native suspension feeders and interferes and commonly infest shells of mollusks species making great loss of economy. Also detecting new aliens must be depending on accurate taxonomic identifications and the origin of species to complete the knowledge of local biodiversity (Çinar *et. al.* 2005). So, the present paper will help to improve and add new records of alien species for Egypt.

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