

New Records of Polychaetes from the South Part of Suez Canal, Egypt

Faiza A. Abd-Elnaby

National Institute of Oceanography and Fisheries, Alexandria, Egypt

Abstract: Faunistic analysis of benthic samples were obtained during a trip to the south part of Suez Canal, Egypt, during April, 2007, which revealed the presence of 82 polychaete species, 18 of them are considered as new records for the Egyptian waters. In order to achieve this study fouling components and sediments samples were collected by Van Veen grab (0.5 to 8 m depths), from six stations extending from Deversoir to Port Toufiq. Illustrative taxonomical characters is provided for each newly recorded species; as well as geographic distribution are given to draw a picture of the new records, which indicated that most of them are lessepsian migrant and 6 species are of Mediterranean and Adriatic Sea affinity. Also the polychaete recorded formed less dense of population on shallow water, hard substrates and also in sediment.

Key words: Polychaete • New records • Taxonomy • South part of Suez Canal

INTRODUCTION

The Suez Canal appears as consisting of a simple longitudinal narrow channel extending between Lat. 29°56' 14" N, Long, 32°33' 47" E. at Suez in the south on the Gulf of Suez and Lat. 31°15' 45" N., Long, 32°18' 51" E. at Port-Said in the north on the Mediterranean Sea.

The canal connects two major bodies of water, the Red Sea and the Mediterranean, which differ fundamentally both faunistically and hydrographically.

The Suez Canal is regarded either as a bottleneck or a barrier for some species, rather a pathway for migration [1]. This Canal would be unique for evaluating the consequences of creating an irreversible change [2].

The migration of the biota from the Red Sea into the Mediterranean has been termed "Lessepsian migration" [3], while, the minor migration in the opposite direction is known as "Anti-Lessepsian migration". This phenomenon encompasses all major taxa.

The fauna of the Red Sea is of tropical Indo-Pacific origin, while that of the Mediterranean is mainly of temperate Atlantic origin. In the wake of the opening of the Suez Canal, each sea was exposed to invasion of organisms from the other sea. However, the vast majority of migrational movement has been from the Red Sea to the Mediterranean [4,5].

To approach the aspects of strategies and the dynamics of Lessepsian migration, in most of the cases the taxonomic information or even the taxonomic results is still insufficient for a better understanding of Suez Canal immigration, additional taxonomic and biological

investigations are required. Therefore this study may be help in this phenomena.

In this respect [6-8] investigated the polychaetes along the Suez Canal. Later, an extensive work on the fouling assemblage along Suez Canal and Lake Timsah were done by [9-19].

It is worth mentioning that polychaeta inhabiting Suez Canal may be transported from other parts of the world, entering the Canal as plankton or accidentally on objects. Migrant species most likely do settle and reproduce in the Canal [5, 20].

The present research of polychaetes in the south part of Suez Canal focuses on the newly recorded polychaete species. Each taxa provided with illustrative taxonomical characters and geographic distribution discussed to detect the Lessepsian migrats species. This study may be considered as a step for new studies in future.

MATERIALS AND METHODS

Samples were collected by Van Veen grab both on soft and hard substrata from six stations, during 14-18 April 2007, sites of collection are shown in Fig. 1.

Kabrit; Fayed and Devresoir subjected to fishing by the human activity, agricultural effluent and domestic drainage. Bottom of the most station of the south part of Suez Canal are silty mud bottom or muddy sand bottom and the water of Suez Canal is almost turbid due to continuous passage of ships and oil tankers as well as the agricultural wastes and land-based activities [14, 15, 18].

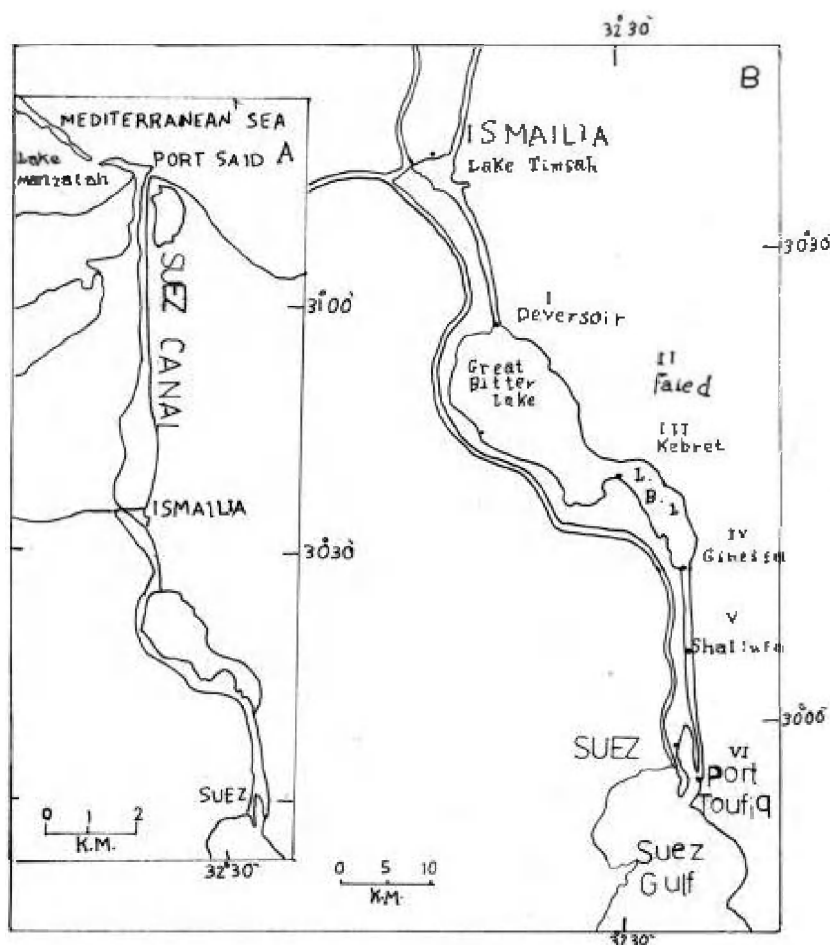


Fig. 1: Maps of: A Suez Canal; B- the part of the Suez Canal investigated in the present work.

The specimens were preserved in 70% ethyl alcohol. Both Zoom Stereo and compound microscopes were used for examination of the specimens. Drawings were made by means of Camera lucida and micrographs were taken by using a digital camera attached to the compound microscope (model... Sony, 9001).

RESULTS

Table 1, lists Eighty two species belonging to 59 genera and 20 families were collected from the six stations resembled the south part of Suez Canal. And their distribution, based on the new data and previous records, presence or absence in Alexandria, Red Sea, Suez Canal and Suez Bay, also the original of each species. 18 species of them are considered as a newly recorded species in the Egyptian waters, 12 species of them are considered as Lessepsian migrants. A synopsis of taxonomical characters and geographic distribution will be reported as follows.

Family Capitellidae Grube, 1862

Leiocapitella glabra Hartman, 1947

Leiocapitella glabra Hartman [21] and Fauchald [22]

Material: One specimen from Portawfiq. Medium sand bottom.

Length of body to 4 cm. with 85 segments, thorax consists of 15 segments, Branchiae absent (plate 1-1). Setae: Capillary setae and long handled hooks (Fig. 2a and b).

Distribution: Coast of Mexico, South America, Galapagos Islands.

Capitellathus dispar (Ehlers, 1907)

Capitellethus dispar Hartman [23]; Fishelson & Rullier [24].

Table 1: Check list of polychaete species recorded in the south part of Suez Canal and their distribution in Egyptian waters and Red Sea

Taxa	Origin	Alex	Suez Canal	Suez Bay	Red Sea
Family: Caprellidae (Grube, 1862)					
<i>Leiocapitella glabra</i> (Hartman, 1947)*	Atlantic, South America	-	-	-	+
<i>Capitellus dispar</i> (Ehlers, 1907)*	New Zealand, SW West Pacific	-	-	-	+
<i>Notomastus latericeus</i> (Sars, 1851)*	Norway (NE Atlantic)	-	-	-	+
Family: Chrysopetalidae (Ehlers, 1864)					
<i>Chrysopetalum debile</i> (Grube, 1855)	France, Med. Sea	+	+	-	+
Family: Cirratulidae (Ryckholdt, 1851)					
<i>Cirratuliformia tentaculata</i> (Montagu, 1808)	Great Britain, NE Atlantic	+	-	-	+
<i>Cauterella bioculata</i> (Kieferstein, 1862)	France, NE Atlantic	+	-	-	+
<i>Cauterella zetlandicus</i> (Saint-Joseph 1894)	Irish Sea (NE Atlantic)	+	-	-	+
<i>Tharyx marioni</i> (Saint-Joseph, 1894)	France, NE Atlantic	-	+	-	+
<i>Dodecaceria Capensis</i> (Day, 1961)*	South Africa	-	-	-	+
<i>Dodecaceria pulchra</i> (Day, 1955)*	South Africa	-	-	-	+
<i>Dodecaceria laddi</i> (Hartman, 1954)*	Northern Marshall Islands, W Pacific	-	-	-	+
Family: Dorvilleidae (Chamberlin, 1919)					
<i>Schistomeringas rudolphii</i> (Delle Chiaje, 1822)	Naples, Italy, Med. Sea	+	-	-	-
<i>Dorvillea (Dorvillea) rubrovittata</i> (Grube, 1855)*	Bei Triest (Adriatic Sea)	-	-	-	+
Family: Eunicidae (Berthold, 1827)					
<i>Eunic harassii</i> (Audouin&Milne-Edwards, 1833)	France, NE Atlantic	-	-	+	+
<i>Nematonereis unicornis</i> (Grube, 1840)	Med. Sea	+	+	-	+
Family: Glyceridae (Grube, 1850)					
<i>Glycera alba</i> (O.F. Muller, 1776)	Scandinavia (NE Atlantic)	-	-	+	+
Family: Hesionidae (Grube, 1850)					
<i>Hesione pantherina</i> (Risso, 1826)	France, Med. Sea	-	+	-	+
<i>Podarke obscura</i> (Verrill, 1873)*	Atlantic Ocean	-	-	-	+
<i>Oxydromus pallidus</i> (Claparede, 1864)	Atlantic, Med. Adriatic	+	-	-	-
<i>Gyptis propinqua</i> (Marion, Bobretzky, 1875)*	France, Med. Sea	-	-	-	+
Family: Lumbrineridae (Schmarda, 1861)					
<i>Lumbrineris coccinea</i> (Renier, 1804)	Med. Sea	+	+	-	+
<i>Lumbrineris inflata</i> (Moore, 1911)	Monterey Bay (NE Pacific)	+	-	-	+
<i>Lumbrineris latreilli</i> (Audouin&Milne-Edwards, 1833)	France, NE Atlantic	+	+	-	+
Family: Nereididae Johnston, 1865					
<i>Ceratonereis (composita) costae</i> (Grube, 1840)	Med. Sea	+	+	+	+
<i>Leonnates decipiens</i> (Fauvel, 1929)	Indian Ocean, Suez Canal	-	+	+	+
<i>Neanthes unifasciata</i> (Wiley, 1905)	Sri Lanka, Indian Ocean	-	+	+	+
<i>Neanthes cuadata</i> (Delle Chiaje, 1822)	Gulf of Naples, Italy, Med. Sea	+	+	-	+
<i>Nereis zonata</i> (Malmgren, 1867)	NE Atlantic, Arctic Ocean	+	-	-	+
<i>Perinereis mutia brevicirris</i> (Grube, 1857)	Japan, Indian Ocean	-	+	+	+
<i>Platynereis dumerillii</i> (Audouin&Milne-Edwards, 1833)	France, NE Atlantic	+	+	-	+
<i>Pseudonereis anomala</i> (Gravier, 1899)	Egypt, Red Sea, Gulf of Aden	+	+	+	+
Family: Oeonidae (Kinberg, 1865)					
<i>Oeon fulgida</i> (Savigny in Lamarck, 1818)	Red Sea	-	+	-	+
Family: Opheliidae (Malmgren, 1867)					
<i>Armandia cirrhosa</i> (Filippi, 1861)*	Italy, Adriatic Sea	-	-	-	+
Family: Phyllodoceidae (Orsted, 1843)					
<i>Eumida sanguinea</i> (Orsted, 1843)	North Sea, Baltic Sea	+	+	-	+
<i>Phyllodoce</i> sp.					
<i>Nereiphylla castanea</i> (Marenzeller, 1879)	Japan, NW Pacific	-	+	-	-
<i>Eulalia</i> sp.					
Family: Polynoidae Malmgren, 1867					
<i>Paralepidonotus ampullifer</i> (Grube, 1878)	Philippines, W Pacific	-	+	-	-
<i>Lepidonotus clava</i> (Montagu, 1808)	Great Britain, NE Atlantic	+	+	-	+
<i>Halosydna</i> sp.					
Family: Sabelliidae (Malmgren, 1867)					
<i>Branchiommata lucullana</i> (Delle Chiaje, 1822)	Naples, Italy, Med Sea	+	+	+	+
<i>Jasmineria elegans</i> (Saint-Joseph, 1894)	France, Atlantic Ocean	+	-	-	+
Family: Scalibregmatidae (Malmgren, 1867)					
<i>Hyboscolex longiseta</i> (Schmarda 1861)*	South Africa, SE Atlantic	-	-	-	+
<i>Lipobranchius jeffreysii</i> (Fauvel, 1927)*	Atlantic	-	-	-	+

Table 1: Continued

Family: Serpulidae				
<i>Hydroides elegans</i> (Haswell, 1883)	Australia Sydney, W Pacific	+	+	+
<i>Pomatoleios Krusii</i> (Baird, 1865)	Cape of Good Hope, S Africa SE Atlantic	-	+	+
<i>Serpula jukesii</i> (Barid, 1865)	Australia (S Pacific)	-	+	+
<i>Serpula concharum</i> (Langerhans, 1880)	NE Atlantic	-	+	+
<i>Spirobranchus tetraceros</i> (Schmarda, 1861)	New S Wales, Australia, SW Pacific	+	+	+
<i>Placostegus tridentatus</i> (Fabricius, 1779)	Norway, NE Atlantic	-	+	+
<i>Vermiliopsis glandigera</i> (Gravier, 1906)	Gulf of Aden	-	+	+
Family: Spionidae (Grube, 1850)				
<i>Prinospio</i> (<i>Prionospio</i>) <i>steentrupi</i> (Malmgren, 1867)	Iceland, NE Atlantic	+	-	+
<i>Prinospio</i> (<i>Aquilaspio</i>) <i>aucklandica</i> (Blake&Kudenov, 1978)	Indo-Pacific	+	-	+
<i>Boccardia polybranchia</i> (Haswell, 1885)	S Atlantic, Pacific	+	-	+
<i>Dipolydora giardi</i> (Nesnil, 1896)	France, NE Atlantic	+	-	+
<i>Laonice cirrata</i> (Sars, 1851)*	Norway, NE Atlantic	-	-	+
<i>Pseudopolydora antennata</i> (Claparede, 1869)	Gulf of Naples, Italy, Med. Sea	+	-	+
Family: Syllidae (Grube, 1850)				
<i>Branchiosyllis exilis</i> (Gravier, 1900)	Djibouti (Gulf of Aden)	+	+	+
<i>Exogone dispar</i> (Webster, 1879)*	North pacific	-	-	+
<i>Haplosyllis spongicola</i> (Grube, 1855)	Italy, Adriatic Sea	-	+	+
<i>Odontosyllis fulgurans</i> (Audouin&Milne-Edwards, 1833)*	Med. Sea	-	-	+
<i>Sphaerosyllis hystrix</i> (Claparede, 1863)	France, NE Atlantic	+	-	+
<i>Grubeosyllis tenuicirrata</i> (Claparede, 1864)	France, Med. Sea	+	-	+
<i>Grubeosyllis clavata</i> (Claparede, 1863)	France, NE Atlantic	-	+	+
<i>Grubeosyllis limbata</i> (Claparede, 1868)	Gulf of Naples, Italy, Med. Sea	+	-	-
<i>Opisthosyllis brunnea</i> (Langerhans, 1879)*	Atlantic Ocean	-	-	+
<i>Syllis garciai</i> (Compoy, 1982)*	Med. Sea	-	-	+
<i>Trypanosyllis zebra</i> (Grube, 1860)	Croatia, Adriatic Sea	+	+	+
<i>Typosyllis amica</i> (Quatrefages, 1866)	France, NE Atlantic	+	-	+
<i>Typosyllis krohni</i> (Ehlers, 1864)	Croatia, Adriatic Sea	+	-	+
<i>Typosyllis rosea</i> (Langerhans, 1879)*	Madeira (NE Atlantic)	-	-	+
<i>Typosyllis lutea</i> (Hartman-Schroder, 1960)	Egypt, Red Sea	-	+	+
<i>Typosyllis hyaline</i> (Grube, 1863)	Croatia, Adriatic Sea	+	-	+
<i>Typosyllis muchalis</i> (Hartmann-Schroder, 1960)	Egypt, Red Sea	-	+	+
Family: Terebellidae (Malmgren, 1867)				
<i>Pista cristata</i> (O.F. Muller, 1776)	Scandinavia (NE Atlantic)	-	+	+
<i>Lanice conchilega</i> (Pallas, 1766)	Netherlands (North Sea)	+	-	+
<i>Nicolea vemustula</i> (Montagu, 1818)	Great Britain, NE Atlantic	-	-	+
Family: Saccocirridae (Bobretzky, 1871)				
<i>Saccocirrus papillocercus</i> (Bobretzky, 1871)	Black Sea, Marseilles, France	+	-	-

Alex.=Alexandria shore (Egypt)* = New record species

Material: Two uncomplete specimens, from Portawfiq (sandy substratum, 1.5m depth) and Shallufa (8m depth sed.coll.).

Body without Branchiae, thorax with 11 segments, all thoracic setigers carry capillary setae; abdominal segments with hooded hooks (plate 1-2).

Distribution: Red Sea, Arabian Gulf and SW Westpacific.

Notomastus latericeus Sars, 1851

Notomastus latericeus Fauvel [25]; Monro [26]; Hartman [23] and [21]; Day [27] and Amoureux *et al.* [28].

Material: Five specimens were collected, Portawfiq (sed. coll.1.5m depth) and Shallufa (8m sed. coll

Length up to 45mm with more than 120 segments. (plate 1-3). Eleven thoracic setigers carrying capillaries in both rami. Gills present but rudimentary (Fig. 2-c). Abdominal neuropodia have long rows of hooks (Fig. 2-d and e).

Distribution: Red Sea, Arabian Sea, Gulf of Oman, Arabian Gulf and NE Atlantic.

Family Cirratulidae Ryckholdt, 1851

Dodecaceria laddi Hartman, 1954

Dodecaceria laddi Hartman [29]; Day [30] and [33]; Knox [31]; Amoureux *et al.* [32].

Material: Two specimens from Portawfiq (shor.coll.)

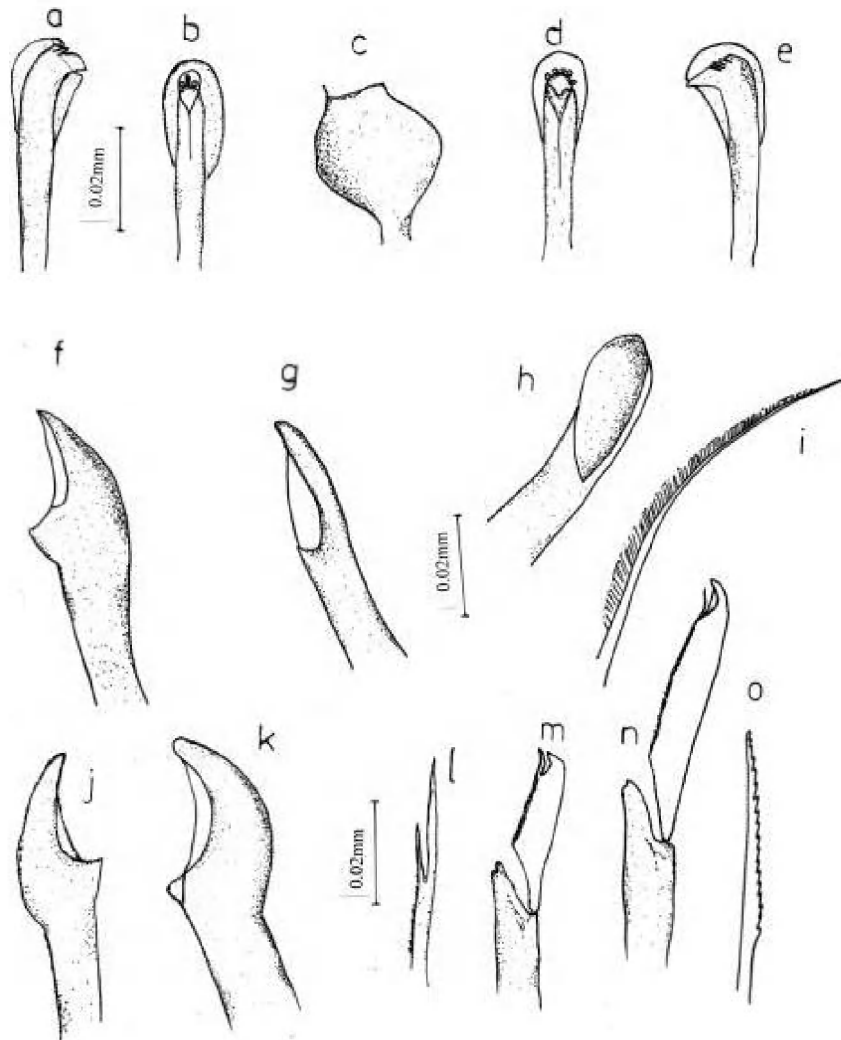


Fig. 2: *Leiocapitella glabra* a: abdominal hooded hook, b: frontal view of hooded hook; *Notomastus latericeus* c: gills, d: frontal view of hooded hook, e: side view of hook *Dodecaceria laddi* f: posterior hook, g: anterior spoon-shaped hook; *Dodecaceria pulchra* h: spoon-shaped hook; i: capillary seta; *Dodecaceria capensis* j&k: hooks setae; *Podark obscura* l: furcated seta, m&n: neurosetae, O: simple seta.

Body small about 5mm long, 33-36 segment. Two pairs of gills (plate 1-4). Setae: Capillaries, present in both rami except in the neuropodia of middle segments from segment 9 to 16. Hooks in both rami from setiger 6 on words, the anterior ones with slightly flattened tips, later ones 2-3 spoon-shaped and posterior neuropodial with a boss below the excavation (plate 1-5; Fig 2 f-g).

Distribution: Marshall IS. (W Pacific) Red Sea, New Zealand, Sinai.

Dodecaceria Pulchra Day, 1955

Dodecaceria Pulchra Day [33] and [27].

Material: One specimen collected from, Portawfiq (shore coll.).

Body of the worm with 14mm, 49 segment. Four pairs of gills (plate 1-6). Setae: Saw-edged capillaries present in the notopodia of setigers 1 – 12 then often missing from middle segments only to reappear a continue to the posterior hooks with a boss below the excavation (Fig. 2 h-i).

Distribution: South West Africa.

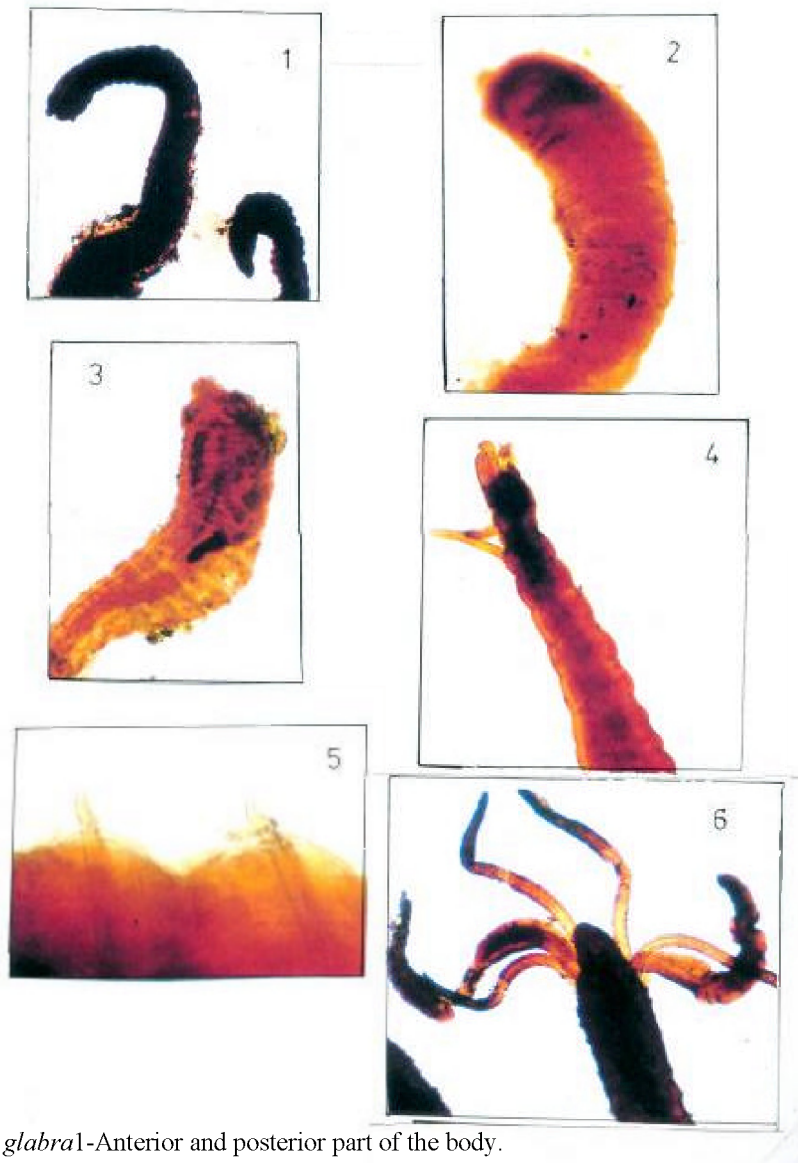


Plate 1: *Leiocapitella glabra* 1- Anterior and posterior part of the body.

Capitellathus dispar 2- Anterior part of the body.

Notomastus latericeus 3- Anterior part of the body.

Dodecaceria laddi 4- Anterior part of the body. 5- Hooks and spoon-shaped seta.

Dodecaceria Pulchra 6- Anterior part of the body.

Dodecaceria capensis Day, 1961

Dodecaceria capensis Day [34, 27).

Material: Four specimens were recorded from Portawfiq (shor. coll.).

Body length 12-18 mm, with 49-53 segments. Four pairs of gills. Setae, are capillaries and acicular hooks. The acicular hooks have the spoon-shaped ends (Fig. 2 j-k).

Distribution: Endemic species in south West Africa (Pacific).

Family Dorvilleidae Chamberlin 1919

Dorvillea (Dorvillea) rubrovittata Grube, 1855

Staurocephalus rubrovittatus Fauvel [35] and Fauchald [22]. *Dorvillea rubrovittata* Amoureux *et al.* [32]. *Dorvillea (Dorvillea) rubrovittata* Imajima [36].

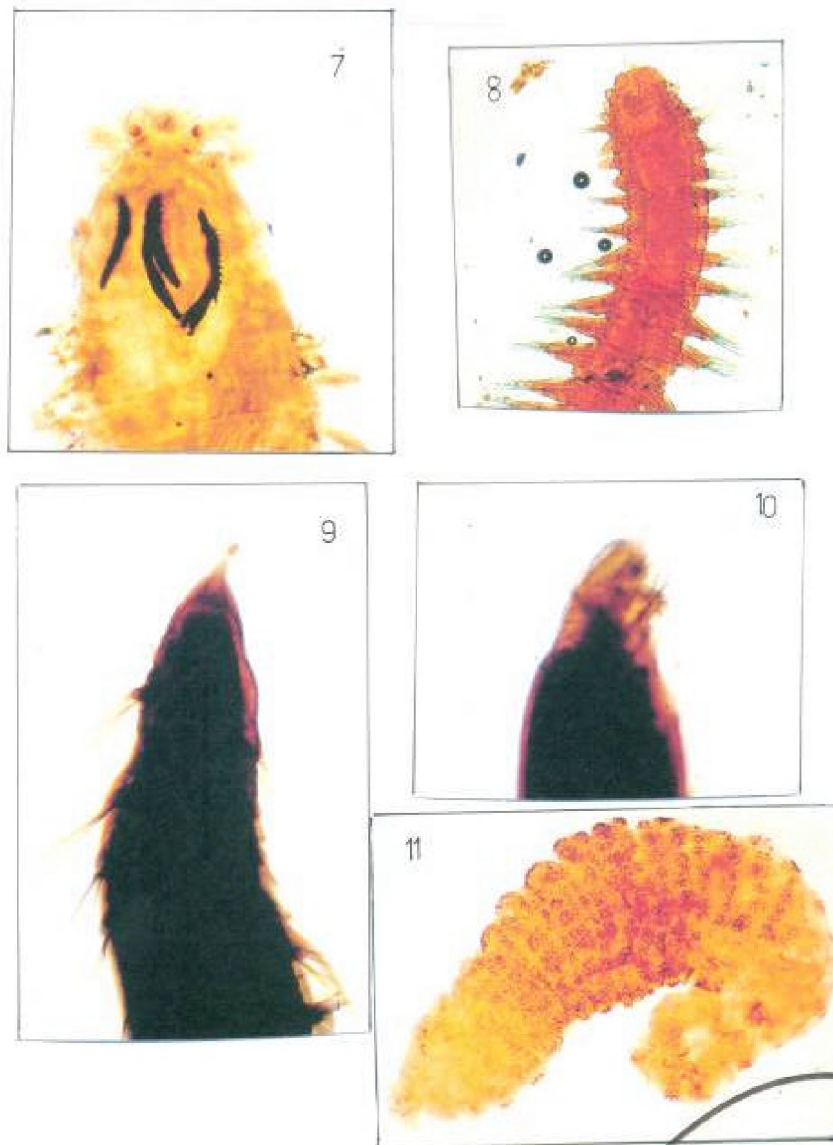


Plate 2: *Dorvillea (Dorvillea) rubrovittata* 7- Anterior part of the body.

Podarke obscura 8- Anterior part of the body.

Armandia cirrhosa 9- and 10- Anterior and posterior part of the body.

Hyboscolex longiseti 11- Anterior part of the body.

Material: Four specimen, one from Portawfiq (1.5m depth, coarse to medium sand and shore collection and two from Deversoir (1/2m sed.)

Body length, 23-28 mm, with up to 45 setigers (plate 2-7). Branchiae absent. Setae: Two types; supra-acicular neurosetae with bidentate tips and compound falcigers.

Distribution: Mediterranean, West Africa, Red Sea and Gulf of Aden.

Family Hesionidae Grube, 1850

Podarke obscura Verrill, 1873

Podarke obscura Pettibone [37]; Uebelacker [38].

Material: One specimen recorded in Deversoir (5m. shore coll.).

Length of body 4mm. with 16 setigers. Antennae clavate, median antenna much smaller than lateral antennae (plate 2-8). Notopodia with one furcated setae

(Fig. 2-l). Neurosetae with about 13 long setae with faint spine (Fig. 2 m-n). Posterior parapodia with simple neuroseta (Fig. 2-o).

Distribution: Atlantic Ocean, Massachusetts to Florida, Bermuda, Caribbean, Gulf of Mexico.

Gyptis propinqua Marion and Bobretzky, 1875

Oxydromus propinquus Fauvel [34]. *Gyptis propinqua* Hartman-Schroder [39]; Fauchald [22]; Amoureux [40] and Pleijel [41].

Material: uncompleted specimen was collected at 2m depth (shore coll.) from Kebret station silty mud bottom.

The fragment was about 3mm long, with 16 segments. Prostomium with. eight pairs of tentacular articulated cirri (Fig. 3-a). Notosetae and composite bidentate falcigerous neurosetae are present (Fig. 3-b).

Distribution: France (Mediterranean Sea), Red Sea and Gulf of Aqaba.

Family Opheliidae Malmgren, 1867

Armandia cirrhosa Filippi, 1861

Armandia cirrhosa Hartman [23] and Amoureux [40].

Material: One specimen was collected from Deversoir (5m shore coll.).

Body elongated, 2cm. with 29 segments. 21 pairs of cirriform branchiae are present from the 2nd segment, the five posterior segments without branchiae. Setae: Two bundles of capillary setae. (plate 2, 9-10).

Distribution: Italy, Adriatic Sea, Atlantic Ocean, Red Sea, Gulf of Aqaba.

Family Scalibregmatidae Malmgren, 1867

Hyboscolex longiseta Schmarda, 1861

Hyboscolex longiseta Day [27]; Fauchald [22]; Kudenov & Blake [42].

Material: Two specimens from Deversoir (5m shore coll.) and Portawfiq (Shore coll.).

Body about 15 mm with up to 50 segments and often dark brown in color (plate 2- 11). Stae: Both notopodial and neuropodial lobes with bundles of capillaries and 2 forked setae (Fig. 3-c). Five small anal cirri.

Distribution: South west Africa, SE Atlantic, Auckland IS. (New Zealand), Red Sea, Australia.

Lipobranchius jeffreysii (Mc Intosh, 1915)

Lipobranchius jeffreysii Day [44]

Material: Five specimens four from Kebret (sed. 2 m depth) and one from Kebret (2m depth shore coll.).

Body small and swollen, 3-5 mm long about 30-39 segments. Setae include slender capillaries and forked setae (Fig. 3-d). No anal cirri.

Distribution: Atlantic, Irlanda.

Family Spionidae Grube, 1850

Laonice cirrata (Sars,1851)

Laonice cirrate Wesenberg-Land [43], Day [27]; Hartman [23]

Material: One specimen was collected from Deversoir 5m shore collection

The specimen with 35 mm in length for 76 segments. Branchiae long and cirriform and present from setiger 2 to 36. Notopodial lamellae large & acircular in the branchial region (Fig. 3-e). Bidentate hooded hooks appear in the neuropodia from setiger 45 (Fig. 3-f).

Distribution: Cosmopolitan

Family Syllidae Grube, 1850

Exogone dispar Webster, 1879

Exogone clavator Day [44], Hartman-Schroder [45]. *Exogone dispar* San Martin [46].

Material: Two specimens from Portawfiq (shore coll.

Body slender and about 8 mm for 62 segments (plate 3-12).

Setigerous lobe truncate and bears five to 7 setae and one aciculum. 2-3 superior compound setae with long sword-shaped blades in the first foot and three normal compound setae (plate 3-13).

Distirbution: South Africa (Endemic).

Odontosyllis fulgurans (Audouin and Milne – Edwards,1833)

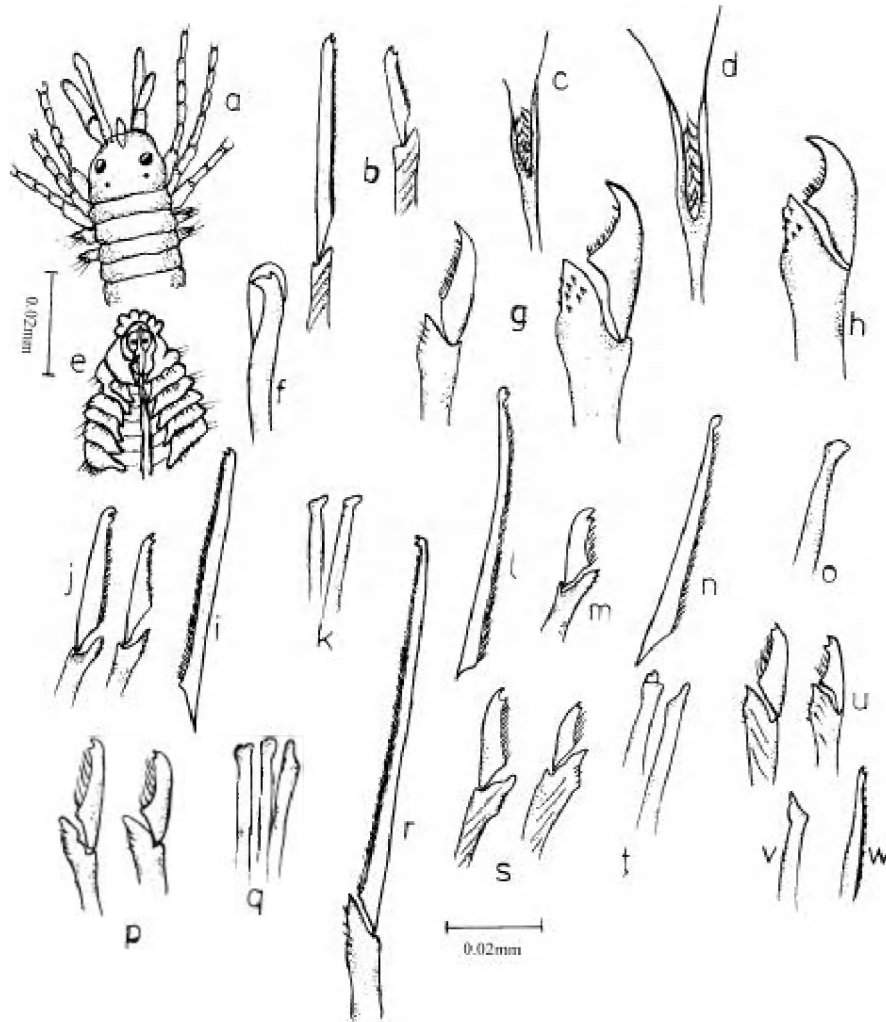


Fig. 3: *Gyptis propinqua* a: anterior end, b: setae; *Hyboscleris longiseta* c: forked seta; *Lipobranchius jeffreysii* d: forked setae; *Laonice cirrata* e: anterior end, f: hooded hooks setae; *Opisthosyllis brunnea* g: anterior compound setae, h: middle seta; *Typosyllis rosea* i&j: anterior acicula, l,m&n: middle setae, o: middle and posterior acicula; *Syllis garciai* p&r: Description: Body 8 mm long for 62 segments (plate 3-12). Pharynx equipped anterior setae, q: anterior acicula; s: middle setae, t: middle acicula, u: posterior setae, v: posterior acicula; w: simple posterior seta.

Odontosyllis fulgurans Fauvel [35], San Martin [46] and Licher [47].

Material: One specimen was collected from Portaufig (shore coll.).

Body small about 5mm (plate 3-14). Setae numerous composite falcigers with short bidentate blades. Superior simple seta slender, present posteriorly, inferior simple seta thicker, bidentate (plate 3-15).

Distirbution: Mediterranean Sea, Red Sea and Gulf of Aden.

Opisthosyllis brunnea Langerhans, 1879

Opisthosyllis brunnea Ben-Eliahu [48] and San Martin [46].

Material: Two specimens were collected from Gineifa (Shore coll.)

Body smooth, broad until proventriculus then become thin, with 63 segments (plate 3-16). Pharynx with papillated margine. Anterior and posterior parapodia with compound unidentate setae with more curved tip (Fig. 3-g). Setae of middle parapodium with a hollow tip and subterminal thin spine (Fig. 3-h).

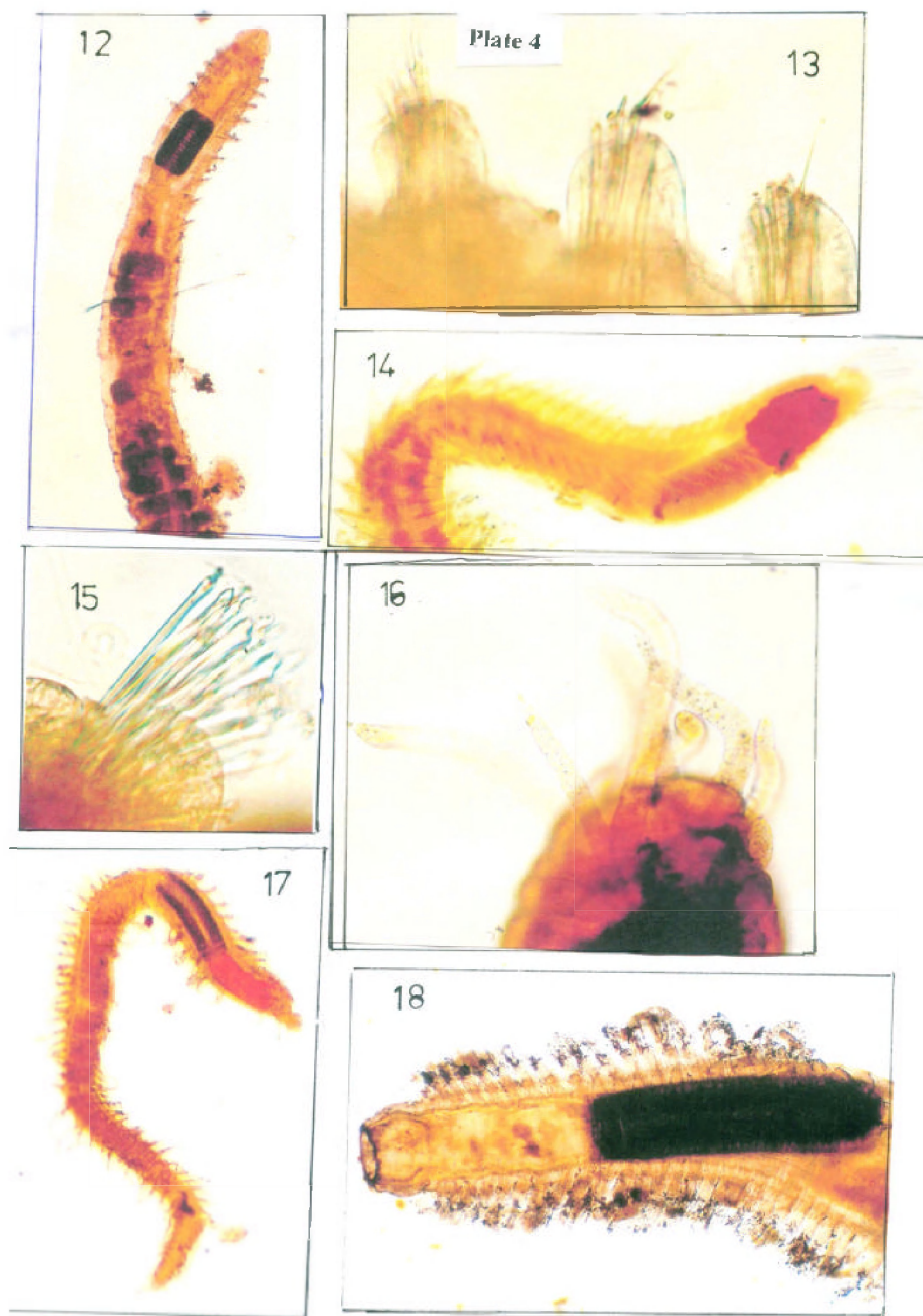


Plate 3: *Exogone dispa* 12- Anterior part of the body. 13- Seta
Odontosyllis fulgurans 14- Anterior part of the body. 15- Seta.
Opisthosyllis brunnea 16- Anterior part of the body.
Typosyllis rosea 17- The whole body of the body
Syllis garciai 18- Anterior part of the body.

Distribution: N.E. Atlantic, Gulf of Mexico, Spain, Red Sea and South Africa.

Typosyllis rosea (Langerhans, 1879)

Ehlersia cornuta Hartman-Schroder [45].

Material: Two specimens were collected from Gineifa (shore collection).

Body small about 4mm. Three antenna (plate 3-17). Proboscis red brown with dorsal tooth inside margin. Setae: Spiniger arising posterior to proventriculus (15th setiger), bread knife shaped, bidentate 4 times in length of inferior falciger (Fig. 3, i-j), mid body spiniger with distal knob, 7 times in length of inferior falciger (Fig. 3, l-m), ventral capillary bidentate (Fig. 3-k); mid body with one blunt recurved tip acicula (Fig. 3-o).

Distribution: Madeira, NE Atlantic, Red Sea.

Syllis garciai Campoy, 1982

Syllis garciai San Martin [46].

Material: Three specimens, one from Faïd shore collection. One from Deversoir from the sediment collection and the last one from Portwfiq shore collection.

Body large (plate 3-18). Setae of anterior parapodium are spiniger and falciger which are unidentate with curved tip (Fig. 3, p-r). The bidentate spiniger setae of mid body more large than that found in the anterior parapodium and bidentate falcigers (Fig. 3-s). Posteriorly a small bidentate spiniger setae beside small bidentate falcigers are present (Fig. 3-u). Acicula 3 anteriorly (fig. 3-q), 2 in the middle part of the body (Fig. 3-s) and one posteriorly (fig. 3-v). Pharynx occupied by 12 papillae.

Distribution: Mediterranean

DISCUSSION

The fauna of the Red Sea is of tropical Indo-Pacific origin while that of the Mediterranean is mainly of temperate Atlantic origin. Through the opening of the Suez Canal, each sea was exposed to invasion of organisms from the other sea. However, the vast majority of emigrational movement has been from the Red Sea to the Mediterranean that agrees with the present results.

The total number of the recorded species are 82 species. A great number of species recorded are widely distributed throughout the Red Sea (68 species), Indian Ocean, Atlantic Ocean and Pacific Ocean. They are restricted to lessepsian migrants and less number from Mediterranean.

It is interesting to draw a picture about the polychaete were collected from the south part of Suez Canal from during April 2007. They distributed as follows, 28 NE Atlantic in origin, 9 Pacific Ocean, 5 Indian Ocean,

15 species from Mediterranean sea, 5 species recorded in Egypt (Red sea), 2 species are endemic in South Africa. They are *Dodecaceria capensis* and *Dodecaceria pulchra* (table 1). All number of nereidid species recorded previously reported from Red Sea, 7 species of family Cirratulidae were recorded from Red Sea too and 16 species of family Syllidae are abundant in Red Sea, 9 of them reported as Mediterranean –Red Sea affinity. In addition, 7 Spionid species were recorded in the Suez Canal are also abundant in Red Sea and three of them are Mediterranean in their origin. Therefore, 30 species from the total 82 are reported as Mediterranean in their origin and the rest are considered as Red Sea – Indo-Pacific and Atlantic affinity. That means the canal is overwhelmingly inhabited by Red Sea polychaete species. This result agrees with Ben-Eliahu [2] and Pierre [5]. This confirmation also revealed that Suez Canal colonization facilitates migration.

In this study, 18 species are newly recorded in the present study, 8 of them are NE Atlantic in origin, 4 species Pacific Ocean, 4 species are Mediterranean Sea in their origin and 2 species are recorded from Adriatic Sea.

The total number of polychaete species in every sites were less than the other associated organisms at all depths from 0.5 m down to 8 m below the surface of water. This also agrees with Ghobashy *et al.* [10] and Ghobashy & Ghobashy [18] they mentioned that from Shaloufa to Suez fouling polychaetes was poor due to the Swift current and silt accumulation on panles and the standing crop of the fouling reached 0.029 g/cm², which was the lowest in the whole Suez Canal.

Moreover, *Pomatoleios kraussi* as a Red Sea form was only found at the southern region of the Lake Timsah. The calcareous forms of the tube worms, were prevailing in the southern part of the Great Bitter Lakes particularly at Kabret station of the Suez canal and declined quantitatively until the Suez Harbour [14], these may be attributed to the high concentration of calcium carbonate owing to raise of salinity [17].

The number of polychaete species recorded from the Suez Canal will be expected strongly raised, because, up till now according to the available literature, we have less studied on the polychaetes of Suez Canal.

In conclusion, the most recorded species (68) are considered Lessepsian migrants and 12 species from 18 newly recorded species are restricted to Lessepsian migrant species and 6 of them are Anti-lessepsian migrants.

REFERENCES

- Steinitz, H., 1968. Remarks on the Suez Canal as pathway and as habitat. Rapp. Comm. Int. Explor. Mer. Medit., 19(2): 139-141.
- Ben-Eliahu, M.N., 1991a. Nereididae of Suze Canal – potential Leseptian migrants. Third International Polychaete Conference held at California State University, Long Beach, California August 6-11, 1989. Bulletin of Marine Science, 48(2): 318-329, Fig. 1
- Ben-Eliahu, M.N., 1991b. Red Sea serpulids (Polychaeta) in the eastern Mediterranean. pages 515-528 in M.E. Petersen and J.B. Kirkegaard, eds. Systematics, biology and morphology of world polychaeta. Proc. 2nd Inter. Polychaete Con., Copenhagen. 1986. Ophelia Suppl. 5.
- Por, E.D., 1978. Lessepsian migration. The influx of Red Sea biota into the Mediterranean by way of the Suez Canal. 228pp. Heidelberg, New -York, Springer-Verlag.
- Pierre, M., 2001. Essay about the phenomenon of Lessepsian Migration. Marine Biology 1 Colloquial Meeting of Marine Biology 1. file: //D: /Lesseps. Htm. pp: 1-12.
- Fauvel, P., 1927a. Rapport sur les anne'lids Polychetes errantes. Zoological results of the Cambridge Expedition to the Suez Canal, 1924. The Transactions of the Zoological Society of London, 22/4(1): 411-437, 3 Fig.
- Ben-Eliahu, M.N., 1972a. A description of *Hydroides steinzi* n. sp. (Polychaeta: Serpulidae) from the Suez Canal with remarks on the serpulid fauna of the canal. Israel Journal of Zoology, 21: 77-81, 2 Fig.
- Ben-Eliahu, M.N., 1972b: Polychaeta Errantia of the Suze Canal. Israel Journal of Zoology, 21: 189-237, 22 Fig.
- Ghobashy, A.F.A. and M.M. El-Komy 1980b. Fouling in the southern region of Suez Canal. Hydrobiol. Bull., 14: 179-185.
- Shalla, S.H., 1985. Studies on the Serpuloides (Polychaeta) in Lake Tisah. M.Sc. Thesis, Suez Canal University, pp: 179.
- Ghobashy, A.F.A., M.M. El-Komy and S.H. Ramadan, 1980. Fouling in the Suez Canal. Proceeding 5th International Congres of Marine Crrosion and Fouling, pp: 75-92.
- Selim, S.A., 1997. Description and Remarks on Suez Canal serpulids (Polychaeta). J. Egypt. Ger. Soc. Zool., vol. 22 d, Invertebrate Zoology and Parasitology, 87- 110, issn 1110-5356.
- Barbary, M.Sh., 1992. Surveillance and Ecological studies on the polychaetes in Lake Timsah (Suez Canal, Egypt). Ph.D. Thesis. Zagazig University, pp: 249.
- Osman, I.H., 2007. Errantiate Polychaetes of commercial interest in Suez Canal: an Ecological and Biological study. M.Sc. Thesis, Suez Canal University, pp: 188.
- El-Komi, M.M., 1980. Ecological studies on the marine fouling in the southern region of the Suez Canal. M.Sc. Thesis. Mansoura University, Egypt, pp: 151.
- Ramadan, S., 1986. Ecological and systematic studies on the Marine fouling of Northern part of the Suez Canal. Ph. D. Thesis. Mansoura University, pp: 358.
- Shalla, S. and T.J. Holt, 1999. The Lessepsian Migrant *Pomatolios kraussi* (Annelids, Polychaeta) recent formation of dense aggregation in Lake Timsah and Bitter Lakes (Suez Canal; Egypt). Egypt Journal of Biology, 1: 133-137.
- Emara, A.M. and A.H. Belal, 2004. Marine fouling in Suez Canal, Egypt Journal of Aquatic Research, 30(a): 189-206.
- Ghobashy, A.F.A. and M.A.F. Ghobashy, 2005. Marine fouling studies in Egypt A- Serpulids. Egyptian Journal of Aquatic Research, 31(2): 89-102.
- Ben-Eliahu, M.N., 1970. Studies on the migration of the polychaeta through the Suez Canal, In: The Hebrew Univ.- Smithsonian Institution Joint program Biota of the Red Sea and the Eastern Mediterranean, Prog. Rep. Appendix Res. Proposal 1970/1971. Dept. Zool., Hebrew Univ. Jerusalem, pp: 14.
- Hartman, O., 1974. Polychaetous annelids of the Indian Ocean including an account of species collected by members of the International Indian Ocean Expeditions, 1963-64 and a catalogue and bibliography of the species from India. Journal of the Marine Biological Association of India, 16(1): 191-252, 13 Fig.
- Fauchald, K., 1977. The polychaete worms. Definitions and keys to the orders, families and genera. Natural History Museum of Los Angeles Country Science Series 28:1-188,42 Fig.
- Hartman, O., 1959. Catalogue of the polychaetou annelids of the world. Parts I and II. Alan Hancock Foundation Occasional Paper 23: 1-628.
- Fishelson, L. and F. Rullier, 1969. Quelques annelides polychetes de la Mer Rouge. Israel Journal of Zoology, 18: 49-117, 3 Fig.

25. Fauvel, P., 1932. Annelida Polychaeta of the Indian Museum, Calcutta. Memoirs of the Indian Museum, 12(1): 1- 262, 9 pls.
26. Monro, C.C.A., 1937. The John Murray Expedition 1933-34. Polychaeta. Scientific Reports, Zoology, 4(8): 243-321, 28 Fig.
27. Day, J.H., 1967b. A monograph on the polychaeta of Southern Africa Part II. Sedentaria. Trustees of the British Museum (Natural History) London vii-xvii, 459-878, Fig. o.4.-38.7.
28. Amoureux, L., G. Josef and B. O'conner, 1980. Anne'lides Polychete's de l' e'ponge *Fasciospongia cavernosa* Schmidt. Cahiers de Biologie Marine, 21: 387-392.
29. Hartman, O., 1954. Marine annelids from the northern Marshall Islands. Geological Survey Professional Paper 260-q: 619-644, Fig. 169-178.
30. Day, J.H., 1957. The polychaete fauna of south africa. Part IV. New species and records from Natal and Mocambique. Annals of the Natal Museum, 14(1): 59-121, 8 Fig.
31. Knox, G.A., 1971. *Dodecaceria berkeleyi* n. sp., a polychaete (Family Cirratulidae) from New Zealand. Journal of the Fisheries Research Board of Canada, 28(10): 1437-1443, 10 Fig.
32. Amoureux, L., F. Ruller and I. Fishelson, 1978. Systeme'matique et e'cologie d' anne'lides polychete's de la Presqu'ile du Sinai. Israel Journal of Zoology, 27: 57-163, 16 Fig.
33. Day, J.H., 1955. The polychaete fauna of South Africa. Part III. Sedentary species from Cape shores and estuaries. Linnean Society's Journal- Zoology, 13(287): 407-452. 8 Fig.
34. Day, J.H., 1961. The polychaete fauna of South Africa. Part VI. Sedentary species dredged off Cape Coasts with a few records from the shore. Journal of the Linnean Society of London, 44(299): 463-560, 18 Fig.
35. Fauvel, P., 1923. Polychaetes errantes. Faune de France 5. 488pp. Paris, Paul Lechevalier.
36. Imajima, M., 1992a. Dorvilleidae (Annelida, Polychaeta) from Japan. I. the genus *Dorvillea* (*Dorvillea*). Bulletin of National Cience Museum (A: Zoology) 18(4): 131-147, 10 Fig.
37. Pettibone, M.H., 1963. Marine polychaete worms of the New England region, 1. Aphroditoidae through Trochochaetidae. Smithsonian Institution United National Museum Bulletin, 227(1): 3-356, 83 Fig.
38. Uebelacker, J.M. and P.G. Johnson, (eds), 1984. Taxonomic guide to the polychaetes of the Northern Gulf of Mexico. Final report to the Minerals Management Service, contract 14-12-001-029091. Barry A. Vittor and Associates, Inc., Mobile, Alabama. 7 volume.
39. Hartmann-Schroder, G., 1971. Die Gattung *Opisthodonta* Langrehans (Syllidae, Polychaeta): Wiederbeschreibung von O. Morena Langerhans aus dem westlichen Mittelmeer und aus dem Roten Meer und von *O. pterochaeta* Southern, Neufund in der Nordsee vor der Niederlandischen Kiiste. Zoologische Mededelingen, 45(8): 99-106, 6 Fig.
40. Amoureux, L., 1983c. Note taxinomique et e'cologique sur une collection d'anne'lides polychete's du Golfe D'aqaba (Mer Rouge). Cahiers de Biologie Marine, 24: 363-369.
41. Pleijel, F., 1998. Phylogeny and classification of the Hesionidae (Polychaeta). Zoologica Scripta, 27(2): 89-163, 38 Fig.
42. Kudenov, J.D. and J.A. Blake, 1978. A review of the genera and species of the scalibregmidae (Polychaeta) with descriptions of one new genus and three new species from Australia. Journal of Natural History, 12: 427-444, 32 Fig.
43. Wesenberg- Land, E., 1949. Polychaetes of the Iranian gulf. In: Danish scientific investigations In Iran. Jessen, K. and Sparck, R (eds): 4: 247-40. 47 Fig.
44. Day, J.H., 1967a. Amonograph on the polychaeta of Southern Africa part I Errantia. Trustees of the British Museum (Natural History) London vi-xxix: 1-458, Fig. 0.1-17.21.
45. Hartmann-Schroder, G., 1960. Polychaeten aus dem Roten Meer. Kieler Meeresforschungen, 16(1): 69- 125, 185 Fig.
46. San Martin, G., 1984. Estudio biogeografico, faunistico y sistematico de los poliquetos de la familia silidos (Syllidae: Polychaeta) en Baleares. pp: 529. Madrid, Thesis Doctoral 187/84, Universidad Complutense de Madrid.
47. Licher, F., 2000 (1999). Revision der Gattung *Typosyllis* Langerhans, 1879 (Polychaeta: Syllidae). Morphologie, Taxonomie und phylogenie. Abhandlungen der Senckenbergischen Naturforschenden Gesellschaft 551: 1-336, 121 Fig.
48. Ben-Eliahu, M.N. and U.N. Safriel, 1982. A comparison between species diversities of polychaete from tropical and temperate structurally similar rocky intertidal habitats. J. Biogeography, 9: 371-390, 5 Fig.