

## SOME ECHINODERMS FROM THE EGYPTIAN MEDITERRANEAN WATERS

By

M. EL- BESHBEESHY\*

\* National Institute of Oceanography & Fisheries, Alexandria-Egypt.

Key Words :Taxonomy, Echinoderms, Mediterranean.

### ABSTRACT

*This paper describes 12 species of Echinoderms, they belong to classes: Echinoidea, Asteroidea and Ophiuroidea. The material were collected along the Egyptian Mediterranean waters in Area lies between El Dabaa & Port Said and on two shelf stations of "Meteor" cruise 25 leg 1 at depths: 194-1017 m. All species are illustrated, and information is given on their Morphology and distribution. According to the available literature 4 species seem to be new records for the Egyptian Mediterranean waters: **Psammechinus microtuberculatus** (Blainville, 1825), **Sphaerodiscus placenta** (Muller et Troschel, 1842), **Astropecten aranciacus** (Linne, 1758) and **Echinaster sepositus** (Gray, 1840).*

### INTRODUCTION

The Echinodermata of Egypt have so far received little attention. The history of recording echinoderms in the Egyptian Mediterranean waters goes back to Fourtau (1909), who investigated the Echinoid fossils in the Lybian coastal desert from Sidi Barani till Algeria. This area represents the ancient extension of the Mediterranean Sea, which was covered later by sand. He described so many species, gave illustrations and made numerous new records. Mortensen & Steuer (1937) have investigated the Echinoderms around Alexandria (from El Dechila to Abu Qir Bay). They determined 33 different

species, but in the same time they did not give any illustration for the recorded species. Some Edinoderms genera were mentioned by Ramadan 1979, in his work on benthos in the region between Matrouh and Rosetta. We can say, that there have been new echinoderm records in recent years, but in general, the literature on actual number of Echinoderm species of the Egyptian Mediterranean waters is very limited, and in some respects lacking. The aim of the present work is to study the morphology and distribution of the recorded 12 species, which belong to Echinoidea, Asteroidea and Ophiuroidea, these are: *Stylocidaris affinis* (Philippi, 1845), *Psammechinus microtuberculatus* (Blainville, 1825), *Schizaster canaliferus* (Lamarck, 1816), *Brissopsis lyrifera* (Forbes, 1841), *Echinocardium cordatum* (Pennant, 1777), *Sphaerodiscus placenta* (Muller et Troschel, 1842), *Astropecten aranciacus* (Linne, 1758), *Astropecten bispinosus* (Otto, 1823), *Astropecten spinulosus* (Philippi, 1937), *Echinaster sepositus* (Gray, 1840), *Amphiura filiformis* (Muller, 1776) and *Ophiura texturata* Lamarck, 1816.

## **MATERIAL AND METHODS**

The specimens were selected from deposited collections of Marine Biological Reference Collection centre, National Inst. of Oceanography and Fisheries (NIOF), Alexandria. The collections were previously dredged during the period 1966-1979 from the area of the Mediterranean Sea, which lies between Port Said and El Dabaa beside two shelf stations of "Meteor" cruise 25, leg 1 (Fiege et al. 1994) at depths: 194-1017 m. by the beam trawl in 1.6.1993. The collection were preserved in formaline 10% or were dried. All species were illustrated by photographs. Identifications and descriptions were made with the guide of Tortonese (1965), Demetropoulos & Hadjichristophorou (1976) and Riedl (1983). Specimens of uncertain identity were compared and identified with the aid of specimens at Senckenberg Museum, Frankfurt, am Main, Germany (SMF), during a visit of the Author there (April-June 1994). A Map showing the collection centres was given. Notes on the morphology and distribution of each species were included in the species descriptions. All samples were documented and are now deposited in the Marine Biological Reference Collection centre, Alexandria.

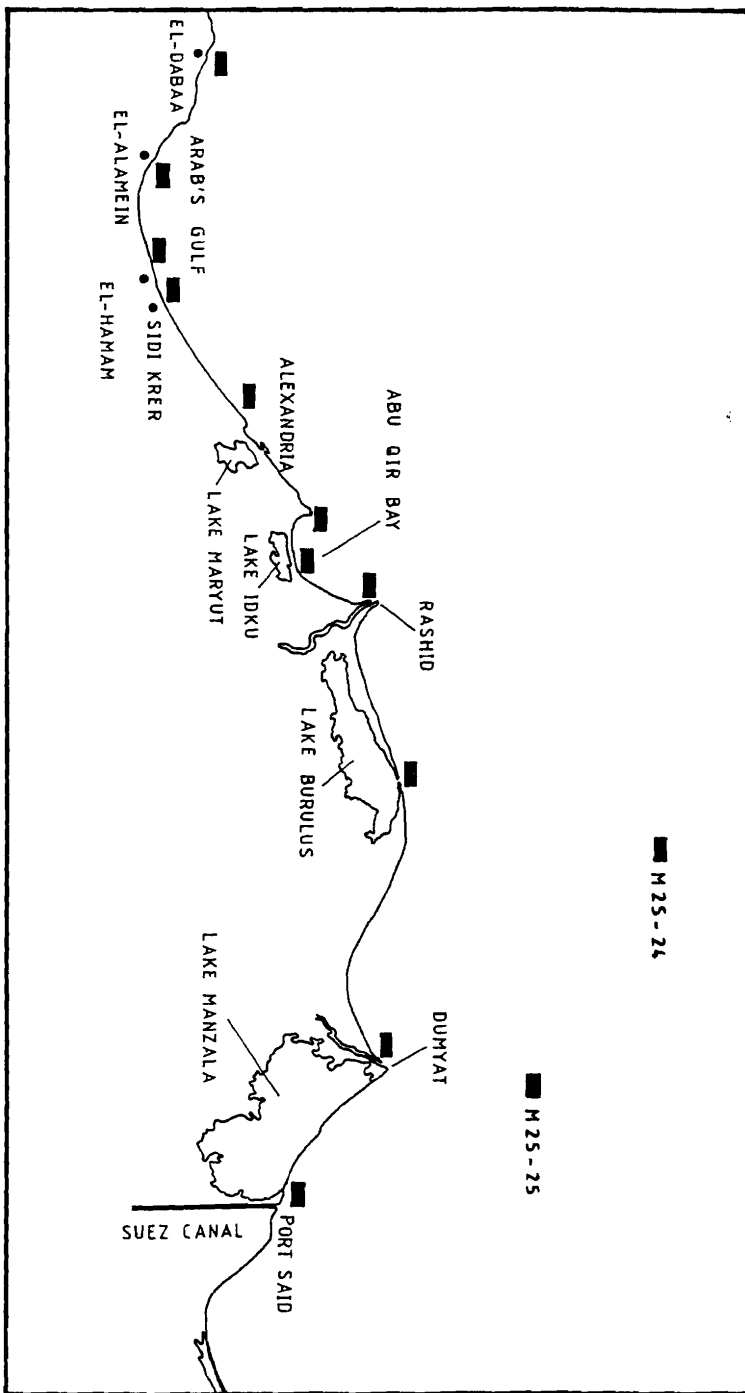


Figure 1: Map of the investigated area (where M 25-24, M 25-25 represent the two shelf stations of "Meteor" cruise 25, leg 1. June 1993).

## Systematic account

Class : Echinoidea

Subclass : Regularia

Family : Cidaroida

*Stylocidaris affinis* (Philippi, 1845)

(Plate I : A,B)

*Cidaris affinis* Philippi, 1845 : 351

*Tretocidaris affinis* : Clark, 1907 : 203

*Stylocidaris affinis* : Mortensen & Steuer, 1937: 17, (Chart 16); Tortonese, 1965 : 305-307, figs. 137, 141; Demetropoulos & Hadjichristophorou, 1976 : 8, Plate 20; Riedl, 1983 : 599, Taf. 221.

### Sites of collection :

El Hamam, 12.6.1969, 19m depth; El Alamain, 18.6.1969, 14m depth; Sidi Krer, 2.11.1978, 25m depth; off Egyptian coast st. Met. 25-25-KU (32 00.54 N 31 53.70 E-32 00.55 N 31 52.61 E), (196-199m depth), 1.6.1993, R.V. "METEOR".

### Habitat :

On muddy bottom and on coralline algae.

### Descriptive notes :

27 tested specimens 2.3-5.8 cm in diameter with large spines, many small spines are arranged around the bases of the large spines and on either side of the rows of tube-feet. Tapering spines reach little more than test diameter. Solid when broken; with many small thorns. Colour preserved in formaline dark reddish brown.

**Distribution :**

Eastern Atlantic and Mediterranean. From the Mediterranean it was found from the Western Part (Italian coasts, Malta and Morocco), and from the Eastern part (Marmara Sea). It was previously recorded in the Egyptian Mediterranean waters around Alexandria by Mortensen and Steuer (1937).

**Order : Diadematoida**

**Suborder : Camerodonta**

**Family : Echinidae**

*Psammechinus microtuberculatus* (Blainville, 1825)

**Plates I C; II A**

*Echinus microtuberculatus* Blainville, 1825: 88; Agassiz, 1872 : 124.

*Psammechinus microtuberculatus* : Heller, 1868: 66; Tortonese, 1965; 333  
-335, fig. 159; Demetropoulos & Hadjichristophorou,  
1976 : 9, plate. 29; Riedl, 1983 : 601, Taf. 221.

*Parechinus microtuberculatus* : Mortensen, 1903 : 107, 134, 178, Taf. XV,  
fig. 8-9, XVI, fig. 14.

**Sites of collection :**

West of Alexandria, 2.6.1969, (17 m depth); Sidi Krer, 2.11.1972, (25 m depth); El Alamein, 29.5.1977, (25 m depth); Abu Qir, 18.7.1979, (7 m depth); Abu Qir, 29.8.1979, (10 m depth).

**Habitat :**

Found on rocky sand and oyster-beds, on rocks, often disguised with sea-grass or pieces of algae.

**Discriptive notes :**

19 tested specimens, 1.3-3.5 cm in diameter. Body hemispheric, not deep. Primary spines are fairly slender and equal approximatly to secondary spines. The aboral ambulacral plates with 3 pair-

primary spine. There is thick green plates on the mouth-field. Colour of preserved specimens is greenish and with whitish peaks.

**Distribution :**

Eastern Atlantic and Mediterranean. In the Western part of Mediterranean it was found in Italian coasts, Adriatic, Algerian coasts and around Malta, while in the Eastern Part it was found in Marmara Sea and around Cyprus. According to the available literature, it seems, that this species is newly recorded in the Egyptian Mediterranean waters.

**Subclass : Irregularia**

**Order : Spatangoida**

**Family : Loveniidae**

*Echinocardium cordatum* (Pennant, 1777)

**Plate II B,C**

*Echinus cordatus* Pennant, 1777 : 58, Taf. XXXIV, fig. 75;

*Spatangus arcuarius* Lamarck, 1816 : 32

*Amphidetus cordatus* Agassiz. Desor, 1847 : 11.

*Echinocardium cordatum* : Agassiz, 1872-1874: 109, 349, Taf.

XIX, fig. 10-17, XX, fig. 5-7; Mortensen & Steuer, 1937 : 23, (Chart 22); Tortonese, 1965 : 360-364, figs. 175-178; Demetropoulos & Hadjichristophorou, 1976 :10, Plate 6 & 33; Riedl, 1983 : 603, Taf. 222.

**Site of Collections :**

Port Said, 19.6.1969, (16 m depth); Port Said, St.7, 20.6.1969, (19 m depth); Port Said, 19.9.1969, (17 m depth); El Tabia, 21.9.1969, (18 m depth); Domyat, (13 m depth); off Egyptian coast, St. Met. 25-25-Ku (32 00.54 N 31 53.70 E-32 00.55 N 31 52.61 E), (196-199 m depth); 1.6.1993, R.V. "METEOR".

**Habitat :**

Usually on muddy ground with or without algae.

**Descriptive notes :**

31 tested specimens 1,8-6 cm long. Body heart-shaped oval, concave in front, highly domed on top, almost flat underneath; bearing 5 rows of tube-feet of which the anterior row is the longest and unlike the rest lies in a deep furrow reaching nearly to the mouth. Spines mostly short, densely set and directed backwards. Colour yellow-brown in life (Riedle, 1983); test yellow-white when cleaned.

**Distribution :**

Almost cosmopolitan species. The whole Atlantic, North Sea and Mediterranean. It was also recorded from Pacific Ocean (Australia, New Zealand and from South America. This species was previously recorded from the Egyptian Mediterranean waters around Alexandria by Mortensen & Steuer (1937).

**Family : Schizasteridae**

*Schizaster canaliferus* (Lamarck, 1816)

Plate II D,E

*Spatangus canaliferus* Lamarck, 1816 : 31

*Schizaster canaliferus* : Aradas, 1850: 37; Tortonese, 1965: 369-371, figs.

170, 181; Demetropoulos & Hadjichristophorou, 1976:

10, pl. 35; Riedl, 1983 : 603, Taf. 222.

*Ova canaliferus* Clark, 1925 : 209

*Ova (Schizaster) canalifera* : Mortensen & Steuer, 1937 : 22 (Chart. 21).

**Sites of collection :**

Port Said, 19.6.1969, (16 m depth); Port Said, 20.6.1969, (19 m depth); Domyat, 1.2.1971, (13 m depth); West of El Agamy, 18.12.1978, (37 m depth); off Egyptian coast, St. Met. 25-25-KU (32 00.54 N 31 53.70 E-32 00.55 N 31 52.61 E), (196-199 m depth), 1.6.1993, R.V. "METEOR".

**Habitat:**

On muddy ground with or without algae, sometimes with *Caulerpa*.

**Descriptive notes :**

15 tested specimens 2.1-4.6 cm in length. This species is broad at front and tapering towards posterior; bearing 5 rows of tubefeet of which the front row is decidedly the longest, reaching nearly to the mouth and lying in a furrow with a conspicuous indentation at the front of the test. Spines mostly short and thick-set, longer at the front. Colour in life grey with a pink tinge (Riedl, 1983); cleaned test greyish.

**Distribution :**

This species is endemic to the Mediterranean and it is very common in the whole coasts of Mediterranean (Riedl, 1983). *Schizaster canaliferus* was previously recorded from the Egyptian Mediterranean waters (around Alexandria) by Mortensen & Steuer, (1937).

**Family : Brissidae**

*Brissopsis Lyrifera* (Forbes, 1841)

Plate III A,B

*Brissus lyrifer* Forbes, 1841 : 187

*Schizaster incertus* Aradas, 1850 : 39

*Brissopsis lyrifera* : Ludwig, 1879: 562; Tortonese, 1933: 162; Mortensen & Steuer, 1937: 22 (Chart 20); Tortonese, 1965: 372-374, figs. 170, 182; Demetropoulos & Hadjichristophorou, 1976: 10, plate 36.

**Sites of collection :**

Port Said, 20.6.1969, (19 m. depth); Abu Qir 6.9.1971, (11 m depth) Sidi Krer, 2.11.1972, (25 m depth); Alexandria (Western Harbour), 11.3.1973, (13



m depth), Sidi Krer, 2.11.1978, (27 m depth); west of El Agamy, 18.12.1978, (37 m depth).

**Habitat :**

On muddy bottom (rarely mixed with sand), without algae or with *Caulerpa*.

**Descriptive notes :**

19 tested specimens 2.8-6.4 cm in length. Body oval and slightly concave in front, highly domed on top and almost flat underneath, with 2 distinct lyre-shaped fields. Bears 5 rows of tube-feet, the posterior two being shorter than the anterior rows which lie in a frontal notch. Spines short, fine and dense like fur. Colour brown-red in life (Tortonese, 1965), yellow-grey when cleaned.

**Distribution :**

Atlantic Ocean, North Sea and Mediterranean. From the Western part of Mediterranean it was found in the Algerian and Italian coasts, and from the Eastern part it was found in Israeli coast and around Cyprus. This species was previously recorded from the Egyptian Mediterranean waters around Alexandria by Mortensen & Steuer (1937).

**Class : Asteroidea (Sea-stars)**

**Order : Phanerozonia**

**Family : Goniasteridae**

*Sphaerodiscus placenta* (Muller et Troschel, 1842)

**Plate III C,D**

*Gonidiscus placenta* Muller et Troschel, 1842 : 59

*Gonidiscus placentaeformis* Heller, 1863 : 419, Taf. If. 1-2

*Pentagonaster placenta* Carus, 1885 : 87

*Ceramaster placenta* Koehler, 1921 : 42, fig. 31.

*Sphaerodiscus placenta* : Tortonese-Clark, 1956 : 350, fig. 1B, 2B; Tortonese, 1965 : 157-159, figs. (72-74); Demetropoulos & Hadjichristophorou : 12, Plate 50; Riedl, 1983 : 607, Taf. 223.

**Sites of collection :**

West of Alexandria, 12.6.1969, (16 m depth); Abu Qir, 7.4.1970, (13 m depth); Sidi Krer, 2.11.1978, (27 m depth); off Egyptian coast, St. Me 25-24-Ku (32 19.88 N 31 07.31 E- 32 19.89 N 31 09.62 E), (1033-1034 m depth), beam trawl, 1.6.1993, R.V. "METEOR"; i.d., St. Me 25-25-Ku (32 00.54 N 31 53.70 E-32 00.55 N 31 52.61 E), (196-199 m depth), beam trawl, 1.6.1993, R.V. "METEOR).

**Habitat :**

On muddy sand-ground.

**Descriptive notes :**

9 tested specimens 4.8-9.60 cm in diameter. Body of solid, pentagonal shape, with large disc and short pointed arms, somewhat swollen and rounded. Oral and aboral sides flat. Adambulacral plates with four inner furrow spines and two series of subambulacral spines, the outer series being smaller than the inner one. Colour of life specimens (from the two shelf stations of "METEOR" cruise) is brownish red to yellowish brown, which becomes lighter for the preserved specimens.

**Distribution :**

Eastern Atlantic and Mediterranean, from the western part of Mediterranean it was found in the Italian coasts, Adriatic and Ägais Sea. It was also previously recorded from the eastern part of the Mediterranean (Marmara Sea and around Cyprus). According to the available literature, it seems that *Sphaerodiscus placenta* is newly recorded to the Egyptian Mediterranean waters.

This species was recently recorded in the Egyptian Red Sea waters by Fouda & Hellal (1987) from El Gifton Island & Al-Ghardaqa. The present record fullfill the gap between the localities of this species in Western part and Northern Eastern part of the Mediterranean and its localities in the Northern Red Sea waters. Further records from the Suez Canal are required to establish the full continuity of distribution.

**Family : Astropectinidae**  
***Astropecten aranciacus* (Linne, 1758)**  
**Plate IV A,B**

*Asterias aranciaca* Linne : 662

*Astropecten aurantiacus* Müller et Troschel, 1842 : 67; Tortonese, 1934: 219;  
Demetropoulos & Hadjichristophorou, 1976 : 11, Plate  
41.

*Astropecten aranciacus* : Döderlein, 1917: 49, 89, 171, Taf. 3, Fig. 11, Taf. 8,  
Fig. 7; Tortonese, 1965: 137-140, figs. 60,61;  
Riedl, 1983: 607, Taf. 223.

**Sites of collection :**

Port Said, 18.6.1969, (15 m depth); Domyat, 21.9.1969, (13 m depth);  
Domyat, 25.12.1969, (14 m depth); Abu Qir, 7.4.1970, (13 m depth); West of  
El-Agamy, 18.12.1978, (37 m depth).

**Habitat :**

Found on mud and sand, often near Sea-grass beds (*Posidonia and Zostera*).

**Descriptive notes :**

7 tested specimens 15.7-22.1 cm in diameter. Body with large flattend disc and wide bases of arms. The arms with dorsal marginal plates, which carry the granulae and two rows of large sharp spines. The ventral marginal plates with numerous spines, the outern of them become longer and sharper. The Adambulacral plates with 3 interior and 2 exterior furrows of spines and numerous Subambulacral spines. Madreporos plates are lobed. The colour of the dorsal side in life is orange-red, and the ventral side and legs are yellow (Riedl, 1983). The colour changes during preservation in formaline and becomes more paler.

**Distribution :**

Eastern Atlantic and Mediterranean. It spreads all over the Mediterranean (Riedl, 1983). In spite of the almost dominance of this species in our Egyptian Mediterranean waters, which locally known as "Negm El-Bahr", it is not found in the available Egyptian literature, therefore it is well be considered as a new record.

*Astropecten bispinosus* (Otto, 1823)  
**Plate IV C,D**

*Asterias bispinosa* Otto, 1823: 285, Taf. 3

*Astropecten bispinosus* : Müller et Troschel, 1842 : 69; Tortonese, 1934: 219; Mortensen & Steuer, 1937: 1, (Chart 1); Tortonese, 1965: 140-141, fig. 62; Demetropoulos & Hadjichristophorou, 1976 : 11, Plates 11 & 42; Riedl, 1983 : 609, Taf. 223.

**Sites of collection :**

Port Said 24.4.1969, (17 m depth); west of Alexandria (El Agamy), 19.5.1969, (20 m depth); Port Said 26.8.1969, (12 m depth); El Burollus, 28.8.1971, (16 m depth).

**Habitat :**

On muddy or sandy ground without algae.

**Descriptive notes :**

26 tested specimens 3.4-7.6 cm in diameter. With dorsal marginal plates, which carry the granulae and every plate carry a distinctive sharp spine. The ventral marginal plates to great extent naked, only the margins spined. Adambulacral plates carry 3 interior & 2 or 3 exterior furrows-spines and mostly only 2 subambulacral spines. Colour dark olive on the dorsal side and

become lighter on the ventral side. The colour doesn't change with time during preservation in formaline.

**Distribution :**

The extreme part of Eastern Atlantic, Western part of Mediterranean (Italian coasts, Adriatic and Algerian coasts), Eastern part of Mediterranean (around Cyprus). This species was previously recorded from the Egyptian Mediterranean waters around Alexandria by Mortensen & Steuer (1937).

*Astropecten spinulosus* (Philippi, 1837)

Plate V A,B

*Asterias spinulosa* Philippi, 1837 : 193

*Astropecten spinulosus* Müller et Troschel, 1842: 72; Tortoise, 1935: 235; Mortensen & Steuer, 1937: 3, (Chart 2); Tortoise, 1965: 143-145, figs. 57, 59, 65; Demthropoulos & Hadjichristophorou, 1976: 12, Plates 12, 44; Riedl, 1983: 609, Taf. 12.

**Sites of collection :**

Abu Qir Bey 9.4.1969, (15 m depth); Port Said, 21.7.1969, (14 m depth); Abu Qir, 10.6.1970, (12 m depth); Sidi Krer, 2.11.1978, (27 m depth); off Egyptian coast, St. Me 25-25-Ku (32 00.54 N 31 53.70 E-32 00.55 N 31 52.61 E), 196-199 m depth) beam trawl, 1.6.1993, R.V. "METEOR".

**Habitat :**

Always on sandy ground and between *Caulerpa* and *Posidonia*.

**Descriptive notes :**

18 tested specimens, 2.8-6.3 cm in diameter. With dorsal marginal plates, which frequently carry beside granulae small spines. The lower marginal plates with large spines, every plate have only one. Adambulacral plates with 1

interior, 2 exterior furrows-spines and 2 subambulacral spines. Colour dark brown olive on the dorsal side, which becomes lighter on the ventral side. The preserving in formaline does'nt change the colour by the time.

**Distribution :**

*Astropecten spinulosus* is endemic species for the Mediterranean (Tortonese, 1965; Riedl, 1983). From the Western part it was found in Italian coasts, Adriatic and French Mediterranean coasts. This species was previously recorded from the Egyptian Mediterranean waters around Alexandria by Mortensen & Steuer (1937). It was also recently recorded from the Eastern part of the Mediterranean (around Cyprus) by Demetropoulos & Hadjichristophorou (1976).

**Order : Spinulosa**

**Family : Echinasteridae**

*Echinaster sepositus* (Gray, 1840)

Plate V C,D

*Rhopia seposita* Gray, 1840 : 282

*Echinaster sepositus* : Müller et Troschel, 1842 : 23; Tortonese, 1935: 244; Tortonese, 1965: 181-183, fig. 88; Demetropoulos & Hadjichristophorou, 1976: 13, plate 14, Riedl, 1983: 611, Taf. 224.

**Sites of collection :**

El Tabia, 21.9.1969, (18 m depth); Domyat 23.8.1971, (17 m depth); Sidi Krer, 1.10.1972, (19 m depth); West of El Agamy, 18.12.1978, (37 m depth).

**Habitat :**

Typical for rocky-ground, rare between Sea-grass and very rare on muddy grounds.

**Descriptive notes :**

8 tested specimens 5.6-16.2 cm in diameter. With small disc and 5 not too long round arms, covered with a soft skin which conceals the skeleton and the small spines. Ambulacral grooves narrow and closable; tube-feet suckered; upper surface covered in irregularly arranged "pock-marks". Colour in formaline pale scarlet.

**Distribution :**

Eastern Atlantic and Mediterranean. From the Western part of Mediterranean it was found in the Italian coasts, French coasts and Adriatic, while in the Eastern part it was found around Cyprus and in the Israeli coast. According to the available literature, it seems that *Echinaster sepositus* is newly recorded in the Egyptian Mediterranean waters.

**Class : Ophiuroidea**

**Order : Ophiurae**

**Family : Amphiuridae**

*Amphiura filiformis* (Müller, 1776)

**Plate VI A,B**

*Asterias filiformis* O.F. Müller, 1776 : 59

*Ophiolepis filiformis* Müller et Troschel, 1842 : 94

*Amphiura filiformis* : Lütken, 1858 : 56, Taf. II. fig. 11; Tortonese, 1934: 32; Mortensen & Steuer, 1937: 11, (Chart 10); Tortonese, 1965: 229-230, figs. 99A, 106; Demetropoulos & Hadjichristophorou, 1976: 14; Riedl, 1983: 616, Taf. 226.

**Sites of collection :**

Alexandria (Western Harbour), 11.3.1973, (30 m depth); off Egyptian coast, St. Me 25-25-Ku (32 00.54 N 53.70 E-32 00.55 N 31 52.61 E), (196-199 m depth); beam trawl, 1.6.1993, R.V. "METEOR".

**Habitat :**

On muddy ground.

**Descriptive notes :**

4 tested specimens, diameter of disc, 0.3-0.7 cm, length of arms, 3.9-5.2 cm. A species with rounded and pentagonal disc, concave between arms, scales on top, bare underneath. With 5 very thin, and long arms, finely spined on lateral plates. Colour preserved in formaline, reddish white.

**Distribution :**

Eastern Atlantic and Mediterranean. In the Western part of Mediterranean it was found in the Italian coasts and Adriatic, while in the Eastern part it was found in Marmara Sea, around Cyprus and in Israeli coast. This species was previously recorded from the Egyptian Mediterranean waters (around Alexandria) by Mortensen & Steuer (1937).

**Family : Ophiidermatidae**  
*Ophiura texturata* Lamarck, 1816  
**Plate VI C,D**

*Ophiura texturata* Lamark, 1816 : 542

*Ophiolepis ciliata* Müller et Troschel, 1842 : 91

*Ophioglypha lacertosa* Lyman, 1865 : 40

*Ophiura texturata*: Mortensen & Steuer, 1937 : 15, (Chart. 14); Tortonse, 1965 :268 -272, figs. 123-124; Demtropoules & Hadjichristophorou, 1976 : 14, Plates : 59-60; Riedl, 1983: 618, Taf. 227.

**Site of collections :**

West of Alexandria, 13.6.1969; Abu Qir, 16.4.1970, (14m depth); Sidi Krer, 2.2.1972, (11 m depth); West of El Agmy, 18.12.1978, (37 m depth); Alexandria (El Montazah), 27.12.1978, (40 m depth).



**Habitat :**

On muddy grounds, with *Caulerpa*.

**Descriptive notes :**

12 tested specimens, diameter of Disc "1.7-2.6 cm", length of arms "4.6-7.4 cm"). The disc is round and with coarse scales on top and below, almost smooth and concave over arms. The disc bears 5 tapering arms, with very fine spines directed outwards on lateral plates; plates on underside of arm separated by pores. Colour preserved in formaline reddish-brown above, more paler below.

**Distribution :**

Eastern Atlantic and Mediterranean. In Western part of Mediterranean the species was found in Italian coasts, Algerian coast, Adriatic and around Malta, while in the Eastern Part it was found in Marmara Sea, around Cyprus and in Israeli coast. It was previously recorded from the Egyptian Mediterranean waters (around Alexandria) by Mortensen & Steuer (1957).

***General Remarks***

A characteristic feature of the Echinoderm species recorded in the area investigated was the comparatively little number of species (12). Most of the recorded species were represented by adequate number of individuals, and a few species were represented by few individuals. Only one species (*Amphiura filiformis*) was represented by only 4 individuals. That indicates that this species is nearly rare among all the recorded species. The offshore region (two shelf stations of "METEOR" cruise 25 leg 1 at depths: (194-1017m) was even much poorer than the inshore region. The total number of Echinoderm species so far recorded from the Egyptian Mediterranean waters is now 37 species. Further, the Egyptian Mediterranean waters have not received adequate study and more investigations would undoubtedly add several other species to the list.

The study of the zoogeographic affinities of the recorded species showed that all of them are found in the Western part of the Mediterranean, about 75% (9 species) of them are related to the Mediterranean Atlantic fauna, while about 16% (2 species) are related to the Mediterranean fauna, and about 8% (1 species) are cosmopolitan. Only one species (*Sphaerodiscus placenta*) was recently recorded in the Egyptian Red Sea waters.

This indicates, that the Echinoderm fauna of the Egyptian Mediterranean waters is an extension of those of the Western part of the Mediterranean and has no special peculiarity. In the same time it exhibits very little affinity with those of the Red Sea.

**EXPLANATION OF PLATES**

**Plate I**

Aboral (dorsal) side of :

- A. *Stylocidaris affinis* (Philippi, 1845)
- C. *Psammechinus microtuberculatus* (Blainville, 1825)

Oral (Ventral) side of :

- B. *Stylocidaris affinis* (Philippi, 1845)

**Plate II**

Oral (Ventral) side of :

- A. *Psammechinus microtuberculatus* (Blainville, 1825)
- C. *Echinocardium cordatum* (Pennant, 1777)
- D. *Schizaster canaliferus* (Lamarck, 1816)

Aboral (dorsal) side of :

- B. *Echinocardium cordatum* (Pennant, 1777)
- E. *Schizaster canaliferus* (Lamarck, 1816)

**Plate III**

Aboral (dorsal) side of :

- A. *Brissopsis lyrifera* (Forbes, 1841)
- C. *Sphaerodiscus placenta* (Müller et Troschel, 1842)

Oral (ventral) side of :

- B. *Brissopsis lyrifera* (Forbes, 1841)
- D. *Sphaerodiscus placenta* (Müller et Troschel, 1842)

**Plate IV**

Aboral (dorsal) side of :

A. *Astropecten aranciacus* (Linne, 1758)

C. *Astropecten bispinosus* (Otto, 1823)

Oral (ventral) side of :

B. *Astropecten aranciacus* (Linne, 1758)

D. *Astropecten bispinosus* (Otto, 1823)

**Plate V**

Aboral (Dorsal) side of :

A. *Astropecten spinulosus* (Phillipi, 1837)

C. *Echinaster sepositus* (Gray, 1840)

Oral (Ventral) side of :

B. *Astropecten spinulosus* (Phillipi, 1837)

D. *Echinaster sepositus* (Gray, 1840)

**Plate VI**

Aboral (dorsal) side of :

A. *Amphiura filiformis* (Müller, 1776)

C. *Ophiura texturata* Lamarck, 1816

Oral (Ventral) side of :

B. *Amphiura filiformis* (Müller, 1776)

D. *Ophiura texturata* Lamarck, 1816

REFERENCES

- Agassiz, A., 1872-1874. Revision of the Echini. "III. Cat. Mus. Comp. Zool. Harvard coll", 7.
- Agassiz, L. & Desor, E., 1847. Catalogue raisonne des familles, de genres et des especes de la classe des Echinoderms. "Ann. Sci. Nat.", (3), VII.
- Aradas, A., 1850. Monografia degli Echinidi viventi e fossili di Sicilia. "Atti Accad. Gioenia, Catania", (2), 6,7.
- Blainville, H.M.DE, 1825. Oursins Dict. Hist. Nat., Paris.
- Clark, H.L., 1907. The Apodus Holothurians. "Smiths. Contrib. Washington", XXV.
- , 1925. Catalogue of the Recent Sea-Urchins in the collections of the British Museum. London.
- Carus, J.V., 1885. Prodrromus faunae mediterraneae. I. Stuttgart.
- Demetropoulos, A. & Hadjichristophorou, H., 1976. Echinodermata of Cyprus. Crinoidea, Echinoidea, Asteroidea, Ophiuroidea. Some additions to the knowledge of the Malacofauna of Cyprus, 7-16, pls. 1-62. Public inform. office for the Department of Fisheries. "Zarallis Press Ltd".
- Döderlein, L., 1917. Die Gattung Astropecten und ihre Stammesgeschichte. Siboga Mon. XLVI a : 1-190, 20 Figs., pls. 1-17.
- Fiege, D.; Ben. Eliahu, N.M.; Allspach, A.; EL Beshbeeshy, M.; Galil, B.; Pastore, M.; Rosenboom, W.; Steudel, C. & Turkay, M., 1994. Macro and Megabenthos. - In: Hieke, W., Halsbach, P., Türkay, M. & Weikert, H. (Eds.): Mittelmeer 1993, Cruise No. 25, 12 May-20 August 1993. "Meteor" Brichte, 94-3: 56-60.

- Fouda, M. & Hellal, A., 1987. The Echinoderms of Northern Red Sea "Asteroidea". Fauna & Flora of Egypt. Vol. II. Nat. Hist. Mus. Egypt. Academy of Scientific Research & technology, 1-64, pls. I-XV.
- Fourtau, R., 1909. Description des Echinides Fossiles. Resueillis Par M.M.W.F. Hume et John A. Ball dans les Desert Libyque et le Nord du Desert Arabique. Catalogue de LEgypte par M. Paul Pallary. Memoires presentes A L'institut Egyptien et Pubiles sous les Auspices, Tome VI- Fascicule II-1909.
- Forbes, E., 1841. A History of the British starfishes and other animals of the Class Echinodermata. London.
- , 1844. On the Echinidae of the Eastern Mediterranean. "Proc. Linn. Soc. London", I. 20.
- Gray, J.E., 1840. A Synopsis of the genera and species of the Class Hypostoma (Asterias L.). "Ann. Mag. Nat. Hist", VI. (1): 175-184; 275-290.
- Heller, C., 1863. Untersuchungen über die littoral fauna des adriatischen Meeres. "Sitz. Akad. Wiss. Wien.: XLVI.
- , 1868. Die Zoophyten und die Echinodermen des adriatischen Meeres. Wien.
- Koehler, E., 1909. Echinoderms provenants des Campagnes du Yacht "Princesse Alice.: Res. Sci. Monaco., XXXIV.
- , 1921. Les Echinodermes de France. Paris. 210 pp., 153 Figs.
- Lamarck, A., 1816. Histoire Naturelle des Animaux sans vertebres. III. Paris.
- Leseke, N.G., 1778. Additamenta ad J.T. Klein naturalem dispositionem Echinodermatum, e c c. Lipsia.
- Linne, C., 1758. Systema Naturae. Regnum Animale. Ed. 10, reformata. 2 Volumes, 824 pp. Holmaie.

- Ludwig, H., 1879. Die Echinodermen des Mittelmeeres. "Mitth. Zool. St. Neapel", I.
- Lütken, Ch., 1858-1859, 1869. Additamenta ad historiam Ophiuridarum. Kjobenhaven, 1-3.
- Lyman, TH., 1865. Ophiuridae and Astrophytidae. "III. Cat. Mus. Comp. Zool. Harvard Coll.:, I.
- Mortensen, Th., 1903. Echinoidea. Danish "Ingolf" Exped. Copenhagen, I.
- , 1913. Die Echinoiden des Mittelmeeres. "Mitt. Zool. St. Neapel", XXI, I.
- Mortensen Th. & Steuer, A., 1937. The Fishery Grounds near Alexandria. XIII. Echinoderms. "Hydrobiol. Fish. Dir. Cairo, Not. Mem.", 21: 1-37, Figs. 1-27.
- Müller, O.F., 1776. Zoologiae danicae prodromus. Havniae.
- Müller, J. & Troschel, F.H., 1842. System der Asteriden. Braunschweig. 134 pp., 12 pls.
- , 1844. Beschreibung neuerer Asteriden. "Arch. Naturg". X, I.
- Otto, A.W., 1823. Beschreibung einiger neuer Mollusken und Zoophyten. "Nova Acta Leop. Nat. Curios. Bonn.:, XI.
- Pennant, T., 1777. British Zoology. IV. London.
- Philippi, R.A., 1837. Über die mit *Asterias aurantica* verwandeten und verwechsten Asteriden der Sicilianischen Küste. "Arch. Naturg".
- , 1845. Beschreibung einiger neuen Echinodermen. "Arch. Naturg". I.

- Ramadan, Sherif, 1979. A report on the Benthos of the Area between Matrouh and Rosetta during January 1977. November 1977. Tech. Report (2/2). Fisheries invest. of the Sardine & other Pelagic fish along the Egyptian Mediterranean Coast from Rashid to El-Sallum. Academy of Scientific Research & technology. Inst. of Ocean. & Fisheries Alexandria.
- Riedl, R., 1983. Fauna und Flora des Mittelmeeres. Verlag Paul Parey, Hamburg und Berlin : 585-618, Taf. 217-227.
- Tortonese, E., 1933. Gli Echinodermi del Museo di Torino. I. Echinoidi. "Boll. Mus. Zool. Anat. Comp. Torino", XLIII, 34.
- , 1934. Echinodermi del mar Ligure. "Atti Soc. It. Sci. Nat.", LXXIII.
- , 1935. Contributo alla conoscenza degli Echinodermi mediterranei. "Ann. Mus. St. Nat. Genova", LVII.
- Tortonese, E., 1952. Gli Echinodermi del mar Ligure e delle zone vicini. "Atti Accad. Lig. Sci. Lett.", VIII : 1-80.
- , 1965. Echinodermata. Fauna Ditalia Sotto gli auspici dell Accademia Nazionale Italian di Entomologi e del Unione Zoologica Itallian. Edizioni Calderini, Bologna. Band 6. 412 pp., Figs. 1-186.
- Tortonese, E., & Clark, A.M., 1956. On the generic position of the Asteroid *Goniodiscus placenta* Müller-Troschel. "Ann. Mag. Nat. Hist", (12), IX: 347.



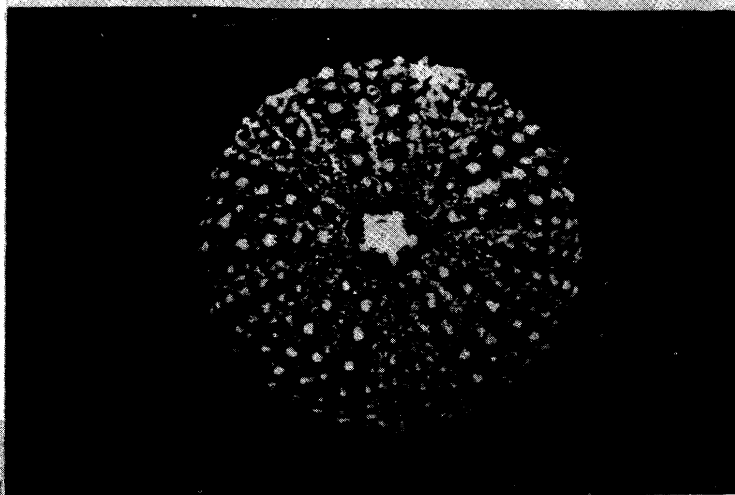
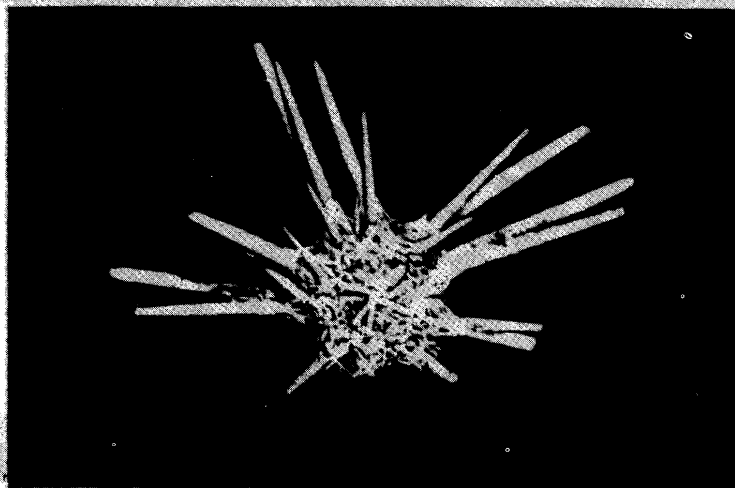
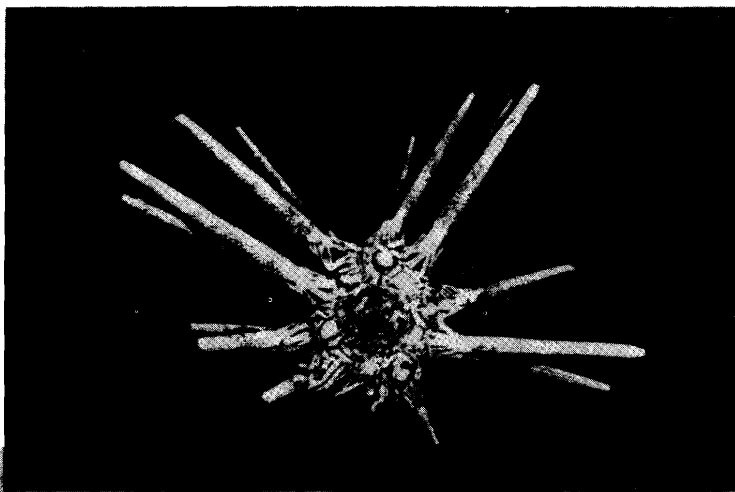
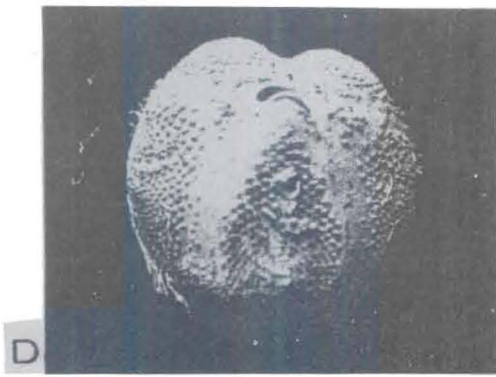
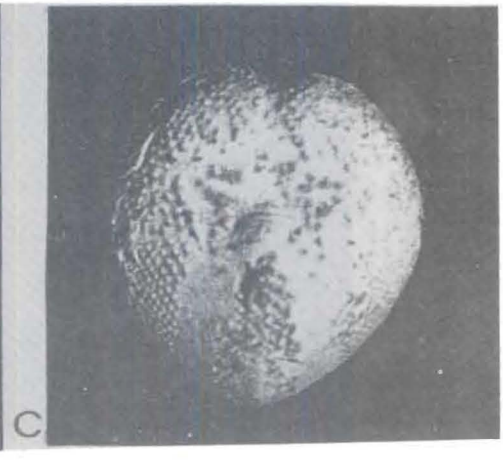
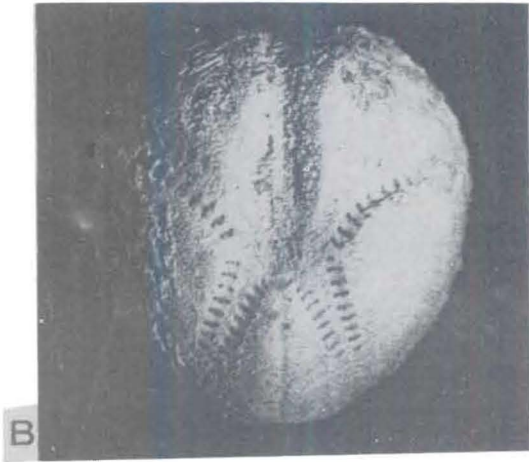
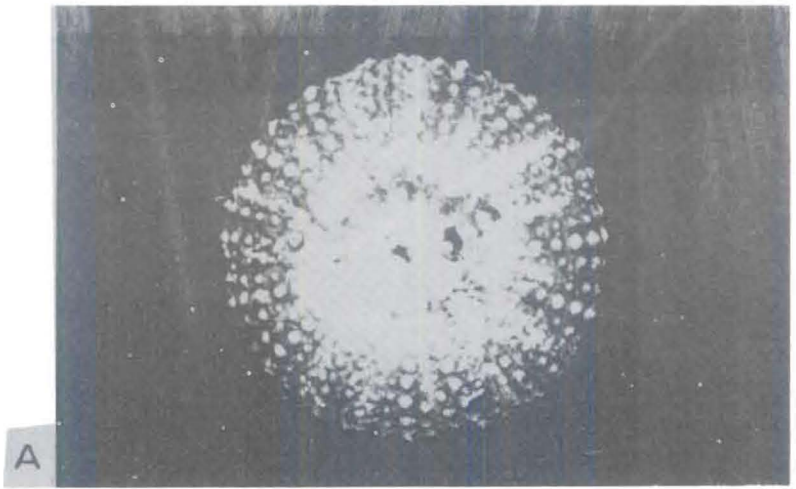
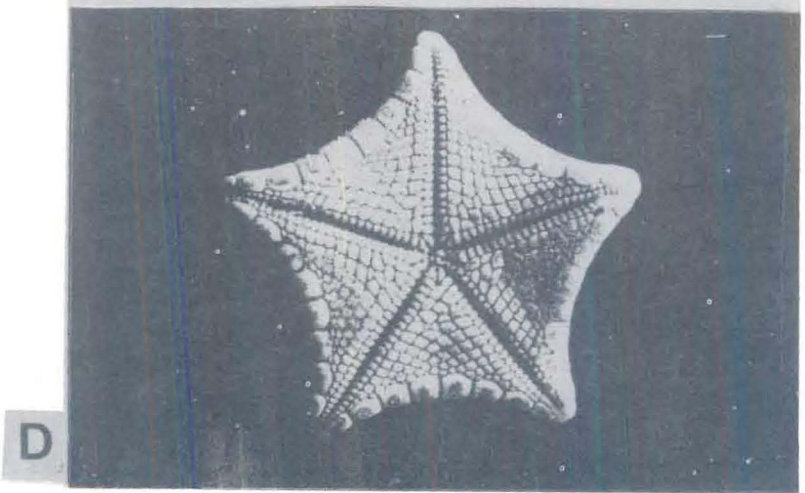
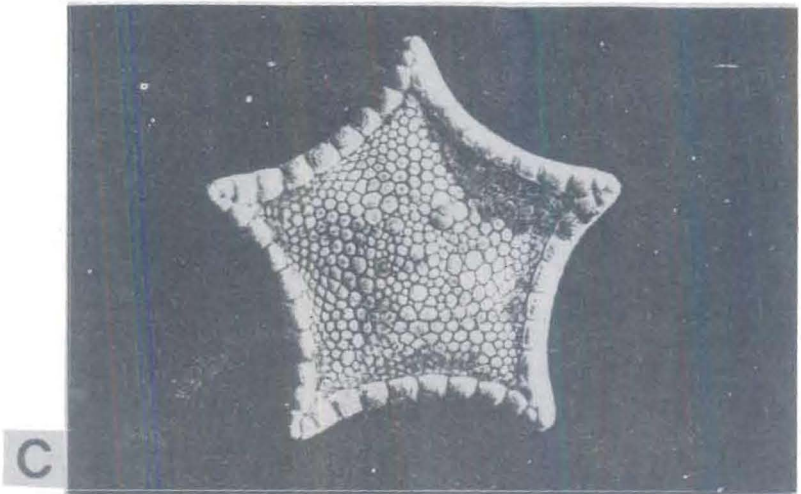
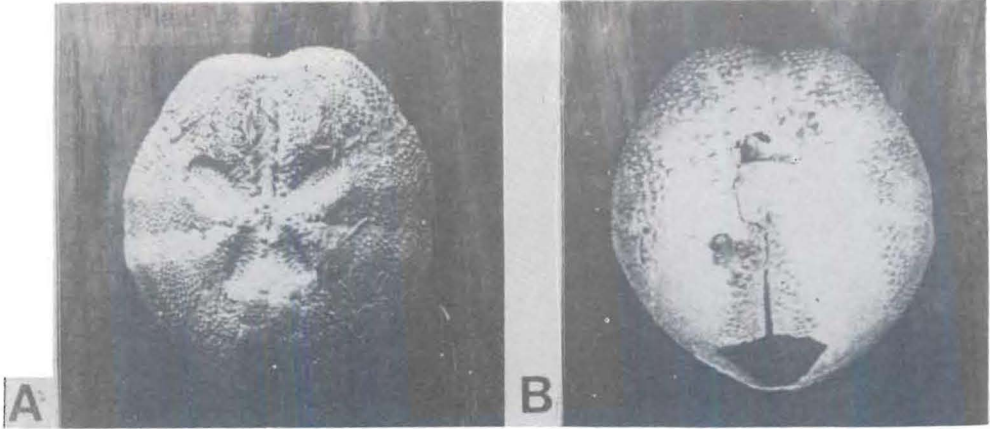
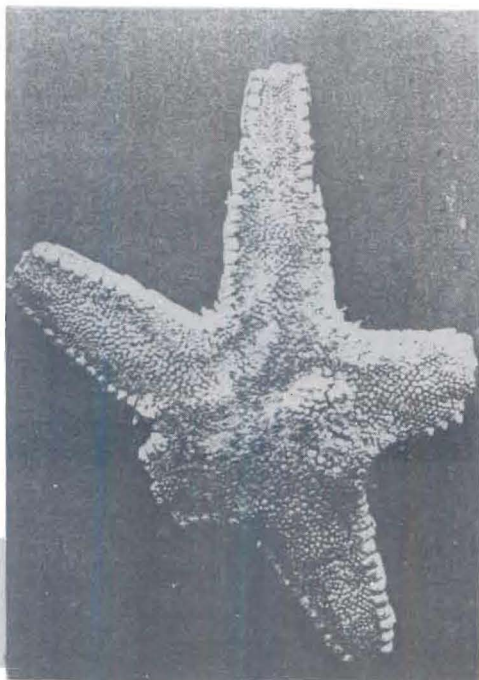


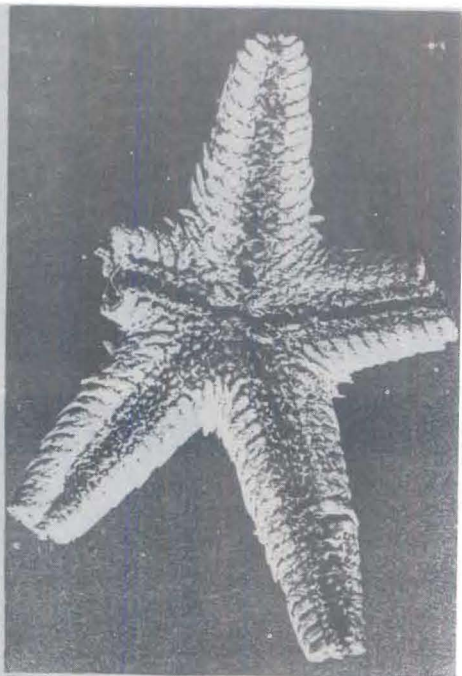
Plate II



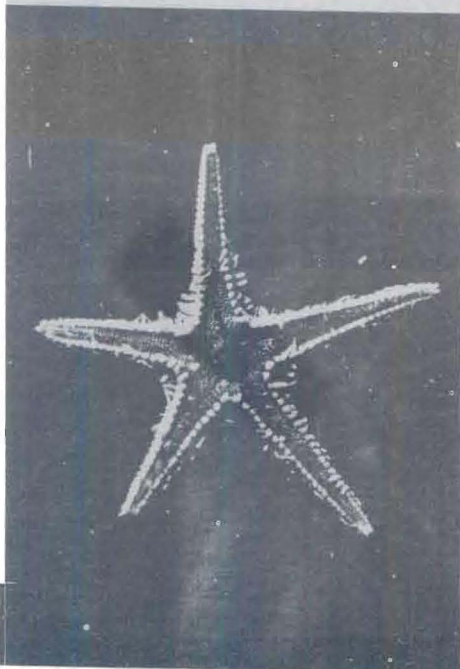




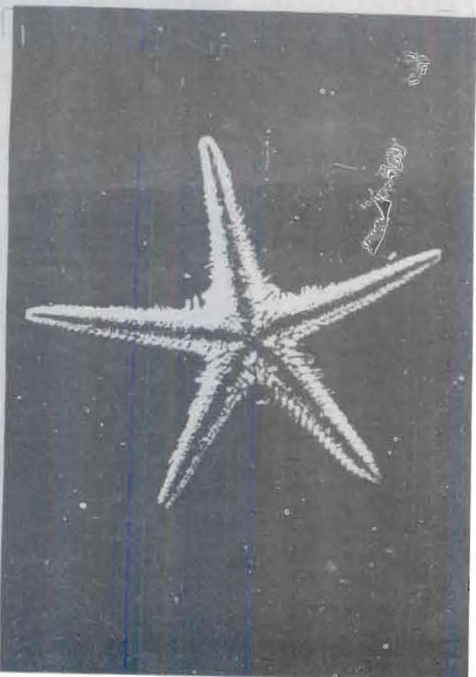
A



B



C



D

Plate V

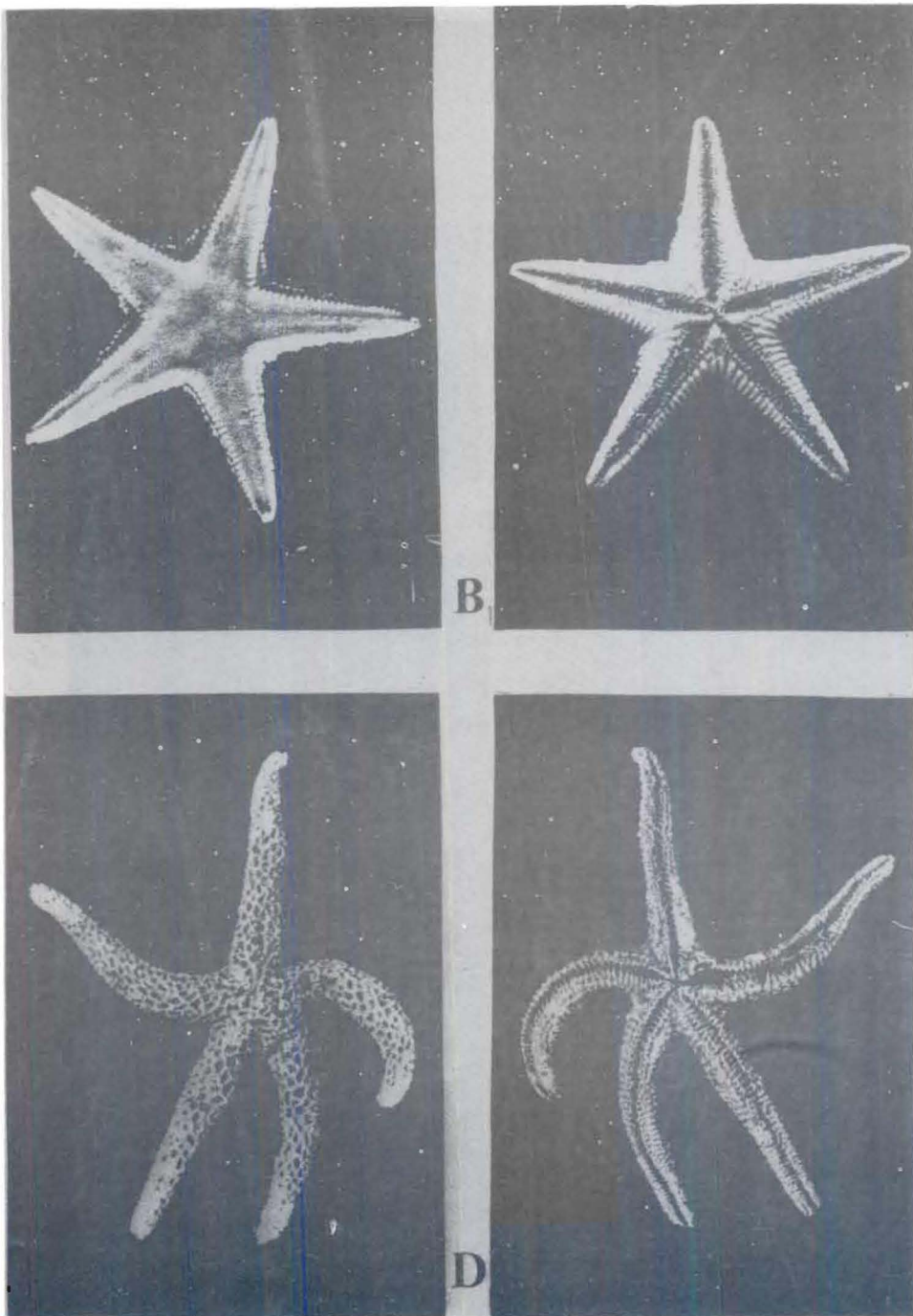


Plate VI

