

Ahmed Mohamed El-Bossery  
Fyez Abdel Maksoud Shoukr  
Mohamed Mohamed El Komi  
Hanaa Mahrous Rady  
Mohamed Abdel Latif Ezz El-Arab

## Sponges from Elphinstone Reef, Northern Red Sea, Egypt

### ABSTRACT:

A total of fifteen species of sponges were collected distinguished during 2011/2012. This list of genera and species provided in this work represented new records not previously reported for Elphinstone reef. The fifteen-sponge species all were in the class Demospongiae represented by seven orders and thirteen families. The most common family was Theonellidae Lendenfeld, 1903, which was represented by one genus and three species. Most species were collected from the reef wall in relatively depth from 10-25 meters depth. The most widespread sponge collected was the massive *Erylus* sp. a number of species collected in this study may not have been described. For example, *Neopetrosia* sp., *Erylus* sp., *Suberea* sp. and *Theonella* sp. collected during this study differ from the previously described taxon and may be a new species for this genus; however morphometric analysis is needed to confirm this assessment. The fragments labelled under special codes with their data; location, depth and colour and then incorporated in the collections of the Regional Museum of Natural History (RMNH).

### KEY WORDS:

Sponges, Egypt, Red Sea, Taxonomy, Coral reef

### CORRESPONDENCE:

Ahmed Mohamed El-Bossery  
Zoology Department, Faculty of Science, Tanta University, Tanta, Egypt.  
E-mail: bossery@gmail.com

Fyez Abdel Maksoud Shoukr\*  
Mohamed Mohamed El Komi\*\*  
Hanaa Mahrous Rady\*\*\*  
Mohamed Abdel Latif Ezz El-Arab\*\*\*

\* Zoology department, Faculty of Science, Tanta University.

\*\* National Institute of Oceanography and Fisheries.

\*\*\* National Center for researches, Egypt.

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### INTRODUCTION:

The Red Sea is globally renowned for their unique and beautiful environments, the diversity of species inhabiting it, the high degree of endemism. Ecosystems of the Red Sea include subtidal soft bottom, sandy and muddy shores, Rocky shores, mangroves, seagrass and coral reefs. The Red Sea is a home to some of the most spectacular coral reefs in the world. Coral reefs support many habitats, which accounts for the enormous array of animals found on and in coral reefs. Animals associated with coral reefs include soft corals, sponges, anemones, molluscs, crustaceans, echinoderms, and fishes.

Like many marine invertebrate taxa, several sponge species have long been perceived to be widely distributed, ranging from the Red Sea to the central western Pacific islands, reported as 5-15% of regional faunas (Hutchings *et al.*, 2008). The diversity and prevalence of sponges of the Red Sea remain underexplored, with only a handful of monographic reports, most of which are antiquated. Where, during the last two decades, interest in Red Sea sponges has risen considerably due to the high number of natural products found within them and their important role in reef ecology.

Many species of the largest class Demospongiae have been recorded so far from the Red Sea. Most of these records come from large monographs by Keller (1889 & 1891), Row (1909 & 1911), and Lévi (1958 & 1965), with additions by Topsent (1892 & 1906), Burton (1926, 1952, & 1959), Kelly-Borges and Vacelet (1995), and Vacelet *et al.* (2001). Upon diving in the Northern parts of the Red Sea, it may be apparent that a variety of species require be describing and identifying.

A part of the Red Sea sponges collected by Mr. Crossland (1904-1905) were studied by Row (1911), who reported 77 species, belonging to 44 genera of non-Calcareous sponges. The orders of the non-Calcareous were all represented by Myxospongia two

species, Tetraxonida 49 species of which 24 were new including 2 new genera, and Euceratosa 26 species of which seven were new including two new genera. Another part of the class Calcarea from the collection of Mr. Crossland (1904-1905) was studied by Row (1909). Those were consisted of 16 species, of which six were new to science, and they were distributed among five old and two new genera.

The Cambridge Expedition to the Suez Canal was done in 1924, for collecting sponges and reported by Burton (1926). The report showed that 25 species of sponges were found in the Canal, of which 14 have undoubtedly emigrated from the Red Sea, while two only came from the Mediterranean. Burton (1952) described the sponges collected in the "Manihine" expedition to the Gulf of Aqaba (1948-1949). The sponges represented 33 species, made a useful addition to the faunal list of the Red Sea area. In addition, it has been possible to establish the correct identity of some of the forms described by Keller (1889 & 1891), which has long been in doubt. In 1959, Burton listed 22 species related to 19 genera of the Red Sea sponges (excluding the Suez Canal) as a part of the Indian Ocean report.

Sponges from the south of the Red Sea were collected by Lèvi (1965), and the collection was added to the crops of Keller (1889 & 1891) and Row (1911). The majority of these collected species in the Red Sea belonged to the fauna of Tropical Indo-Pacific, but some are also reported in Tropical Atlantic and in the Mediterranean. Species list of the sponges in Lèvi (1965) included species that were collected by Lèvi (1958) from the Arabian Coast (South of Jeddah on the coast of Saudi Arabia).

Despite the importance of the sponges at the marine ecosystem, few studies in the past years have been reported or published specifically on the taxonomy and distribution of the porifera along the coast of the Red Sea and its contiguous regions. At the East of Africa towards the Northern Red Sea, Helmy (2000) investigated the spatial distribution of the sponges in 15 different sites represented the various habitats in the Gulf of Aqaba. The study reported the occurrence of 13 different sponge species belonged to 12 genera. Ten of the most abundant sponge species from the Northern Red Sea were studied by Ilan *et al.* (2004). While during the period of 2005, an intensive survey for sponge fauna was carried out along the coasts of the Gulf of Aqaba (Hasan and Belal, 2005). During this survey, a total of 17 species were recorded, *Cliona vastifica*, *Theonella conica* and *Grantessa hastifera* were distributed in the most of the surveyed sites.

During the present study, sponges were collected between 2011/2012 from

Elphinstone reef to provide a preliminary identification of the sponge fauna.

#### MATERIAL AND METHODS:

During the period between 2011/2012, sponges were collected from Elphinstone reef. Elphinstone is a steep reef runs north-south ( $25^{\circ} 18'.56$  N  $34^{\circ} 51'.57$  E), situates 25 kilometres at the north-east of Marsa Alam, Red Sea, Egypt, accessible by boat (Fig. 1). The north and the south tips of Elphinstone have a wide plateau between 20-40 meters deep, while the eastern and western walls of the reef extend steeply up to 400 meters deep. The reef is great and unspoiled, including varieties of hard corals, alcyonacean soft corals and poriferans extend at all levels of the depths.

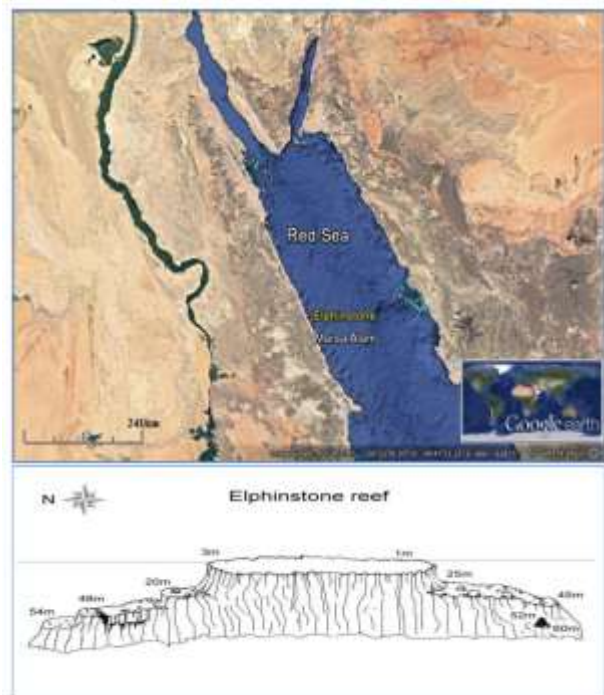


Fig. 1. Elphinstone reef

Sponges were surveyed from 1 - 25 meters depth in Elphinstone reef. The fieldwork was performed using SCUBA diving equipment and sponges were photographed in situ using underwater camera. Specimens were carefully collected and transported to the lab in plastic bags. Freezing was chosen to keep and fix soluble pigments in colourful species. Small pieces of each specimen of the collected sponges were fixed for light microscopy in 4% formalin in seawater for 24 hours, then transferred immediately, and preserved in 70% ethanol. The descriptions presented below are based on external morphology, skeletal architecture and shape and size of the spicules. For study of the skeletal architecture hand-cut tangential sections of the ectosome and perpendicular sections of the choanosome were made. The sections were air-dried, mounted in Canada-balsam on a microscope slide, and studied

under a high-power light microscope. Spicule preparations were made by dissolving a small piece of the specimen in 100% nitric acid (HNO<sub>3</sub>), after which the residue was rinsed four times with water, once with hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) and finally once with 96% ethyl alcohol. The spicules were air-dried on microscopic slides and prepared for study with the light microscope.

## RESULTS:

### Systematic:

**Class Demospongiae**  
**Order Poecilosclerida Topsent, 1892**  
**Sub-Order Microcionina**  
**Family Acarnidae Dendy, 1922**  
**Genus *Acarnus* Gray, 1867**  
***Acarnus wolffgangi* Keller, 1889**

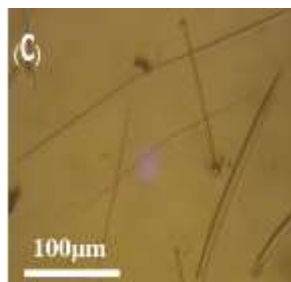
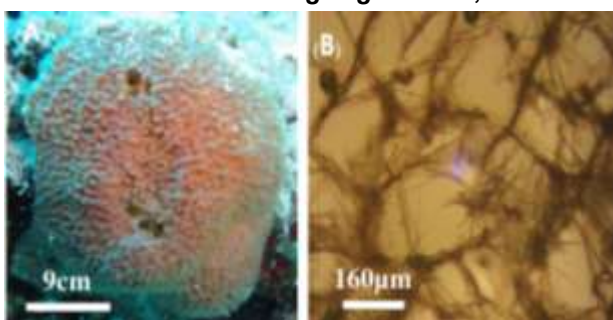


Fig. 2. (A) *Acarnus wolffgangi* Keller, 1889 (B) TS shows reticulation of choanosomal skeleton (C) Megascleres (Styles & cladotylotes) and microscleres (Toxas & isochela)

### Description:

Encrusting cushioned-shaped, massive compact and firm shows resistance to tearing. Surface is tuberculate with a warty appearance caused by semi-papillate projections.

### Colour:

Exterior brown, interior yellow alive. Colourless in preservation

### Skeleton:

Reticulation forms ovoid chambers, consist of plumose multispicular tracts. Fibres lightly invested with spongin, but heavily cored by mega styles and micro palmate isochela, toxas and tylotes. Fibres are echinated by cladotylotes, clads project into the chambers.

### Megascleres:

Long styles are thick and sharply pointed, with rounded bases (length 230 µm). Rare tylotes, thin, straight and slightly swollen ends (length 200 µm). Cladotylotes in one size (length 200 µm) thick, straight, mostly smooth shaft, rounded swollen tylote base and 3 clads on apical end.

### Microscleres:

Toxas (I) are small and thick (length 50 µm). Toxas (II) are always thin and very long in two lengths (length 300-600 µm). Palmate isochela (length 10 µm) are several.

### Ecology and distribution:

Reef wall at different depths (10-25 m)

### Family Microcionidae Carter, 1875

**Genus *Echinoclathria* Carter, 1885**  
***Echinoclathria gibbosa* (Keller, 1889)**

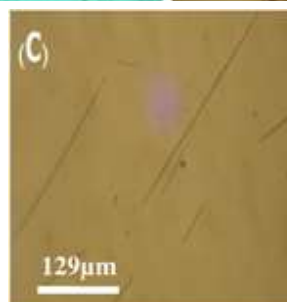
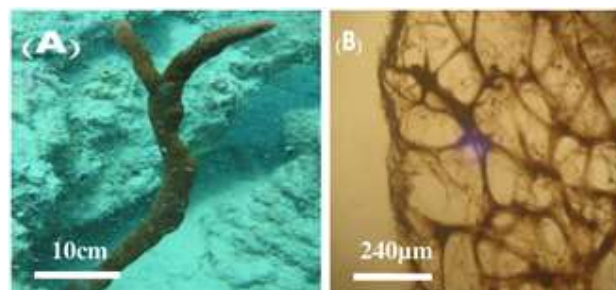


Fig. 3. (A) *Echinoclathria gibbosa* (Keller, 1889) (B) TS shows reticulation of choanosomal skeleton (C) Megascleres (Styles & strongyles) and microscleres (Acanthostyles)

### Description:

Digitate-erect directly without basal mass, markedly compressed hard where tearing requires knife. Surface like wood and spinose due to spicules projecting through the surface. Oscula are small and visible dispersed on surface.

### Colour:

Dark-red alive and other is dark-grey.

### Skeleton:

Choanosomal skeleton regularly reticulate to isodictyal form, where meshes of equal length with well-developed multispicular fibres form distinctly plumose multispicular tracts and no distinction between primary and secondary tracts. When a junction between two or more fibres occurs, there are nodule branches to give

another fibre with the same size. Choanosomal fibres are extending to the surface to form sub-ectosomal spicules protrude through surface of the sponge.

#### Megascleres:

Principles megascleres are styles straight, bent varied in length (length 100-320  $\mu\text{m}$ ) campaigned with strongyles straight, and some with a warp at one point (length 100-320  $\mu\text{m}$ ).

#### Microscleres:

Acanthostyles are in little numbers (length 70  $\mu\text{m}$ ). Palmate isochelae are uncommon (length 10  $\mu\text{m}$ ). Rare small toxas (length 15  $\mu\text{m}$ ) and rare long toxas (length 200  $\mu\text{m}$ ).

#### Ecology and distribution:

Reef wall at 25 m depth.

**Family Raspailiidae Hentschel, 1923**

**Genus *Echinodictyum* Ridley, 1881**

***Echinodictyum jousseaumi* Topsent, 1892**

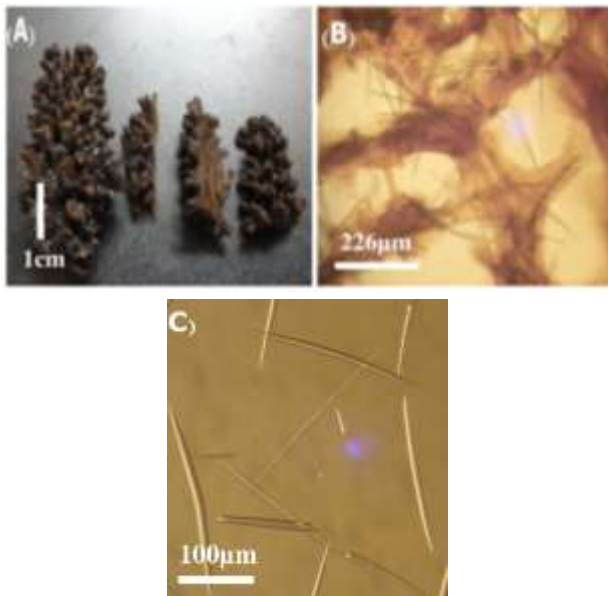


Fig. 4. (A) *Echinodictyum jousseaumi* Topsent, 1892 (B) TS shows reticulation of choanosomal skeleton (C) Megascleres (Stout oxea & acanthostyles)

#### Description:

Sponge erect on short stalk, harsh texture and compressed, difficult to tear, the exterior surface is smooth and conulose prominently fibrous, greatly undulating; senior 3 millimeters. Interior surface more compressed. Oscules are minute and not visible.

#### Colour:

Dark-brown alive

#### Skeleton:

Choanosomal skeleton is irregularly reticulate to isodictyal form, without axial compression. Meshes are ovoid of equal length, cramped with the spicules. Spongin fibres heavy, multispicular and cored by many

stocky oxeas and small echinating acanthostyles.

#### Megascleres:

Short stout oxeas are very regular and curves slightly, have short spikes (length 200-350  $\mu\text{m}$ ). Acanthostyles are straight covered with very fine thorns (length 90  $\mu\text{m}$ ).

#### Microscleres:

Rare palmate isochelae and toxas not accepted for Raspailiidae.

#### Ecology and distribution:

Reef wall at 16, 25 m depth.

#### Sub-order Myxillina

#### Family Crellidae Dendy, 1922

#### Genus *Crella* Gray, 1867

#### Sub-genus *Crella (Grayella)* Carter, 1869

#### *Crella (Grayella) cyathophora* (Carter, 1869)

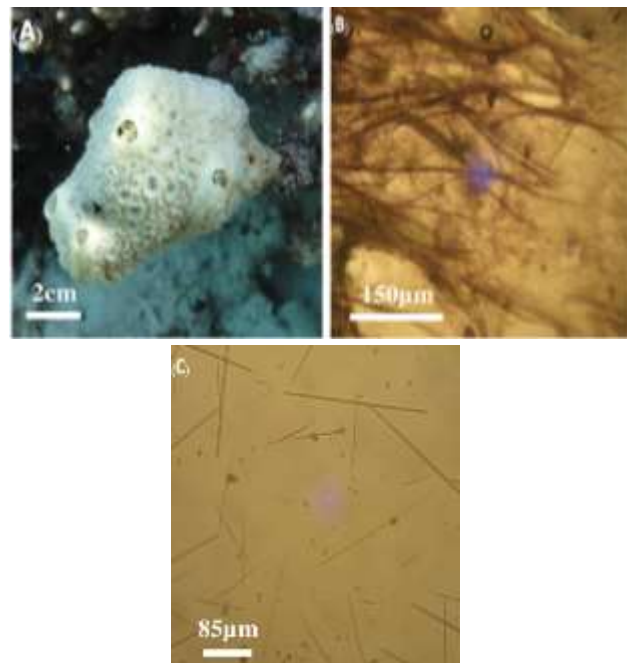


Fig. 5. (A) *Crella (Grayella) cyathophora* (Carter, 1869) (B) TS shows dendritic tracts – (C) Megascleres (Acanthoxeas and strongyles)

#### Description:

Massively encrusting on dead corals. Surface smooth with numerous circular elevated areolae, these areolae are 1.5-2 mm and are slightly raised pore-areas. Oscula are large likewise elevated forming conical papillae. Texture is soft, just compressible but delicate.

#### Colour:

Snow white alive and yellowish grey in preservation.

#### Skeleton:

Choanosomal skeleton consists of dendritic tracts of very stout spicular fibres. Fibres are not very well defined (No conspicuous spongin) and consist of dense wisps of smooth and spined oxea



intermingled. The wisps are running towards the surface and braking up as they approach it. A close sub-isodictyal reticulation of spicules (single or in bundles) is between the fibres.

**Megascleres:**

Acanthoxeas are thin, finely spined, slightly curved may be there straight, sharply pointed at each end (length 110  $\mu\text{m}$ ). Strongyles with slightly ovoid heads, long straight (length 250  $\mu\text{m}$ ).

**Microscleres:**

No microscleres.

**Ecology and distribution:**

All reef zones at different depths.

**Family Hymedesmiidae Topsent, 1892**

**Genus *Hemimycale* Burton, 1934**

***Hemimycale* aff *Arabica***

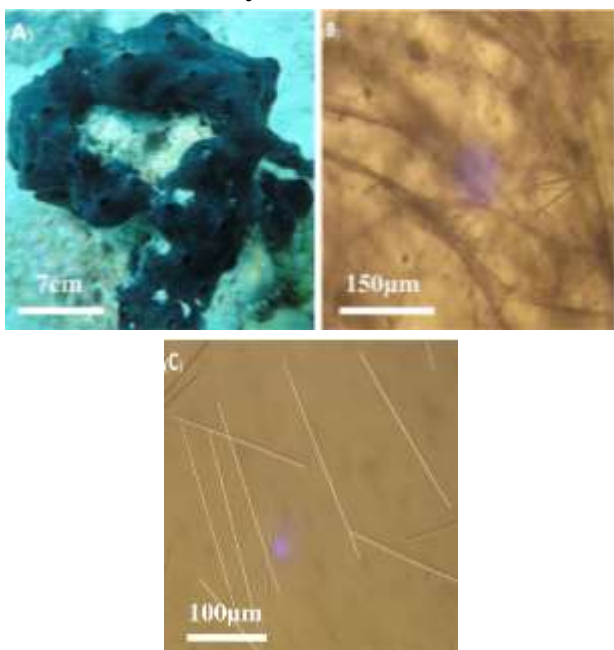


Fig. 6. (A) *Hemimycale* aff. *arabica* Ilan, Gugel & van Soest, 2004 (B) TS shows vague reticulated multispicular tracts (C) Megascleres (Strongyles & styles)

**Description:**

Encrusting and massive irregularly mass, creeping on dead corals. Surface is smooth and the oscula scattered in several number over the whole surface. The texture is soft and can be cut easily.

**Colour:**

Dark-blue alive at exterior but interior is yellow.

**Skeleton:**

Skeleton is loose or vague reticulated multispicular tracts composed of slender subtylostyles and numerous strongyles. There are no meshes clearly to distinguish, where the multispicular tracts are stretched parallel to each other with numerous strongyles scattered vaguely between tracts. There is

also present a dermal congested strongyles densely matted together at the surface. The fibres can't be differentiated into primary and secondary.

**Megascleres:**

Strongyles are numerous, mostly straight, thin with two blunted ends (length 280  $\mu\text{m}$ ). Styles are numerous but less than strongyles, mostly straight, thicker than strongyles (length 250  $\mu\text{m}$ ).

**Microscleres:**

No microscleres.

**Ecology and distribution:**

All reef zones at different depths.

**Order Haplosclerida Topsent, 1892**

**Sub-order Petrosina**

**Family Petrosiidae Soest, 1980**

**Genus *Neopetrosia* de Laubenfels, 1949**

***Neopetrosia* sp.2**

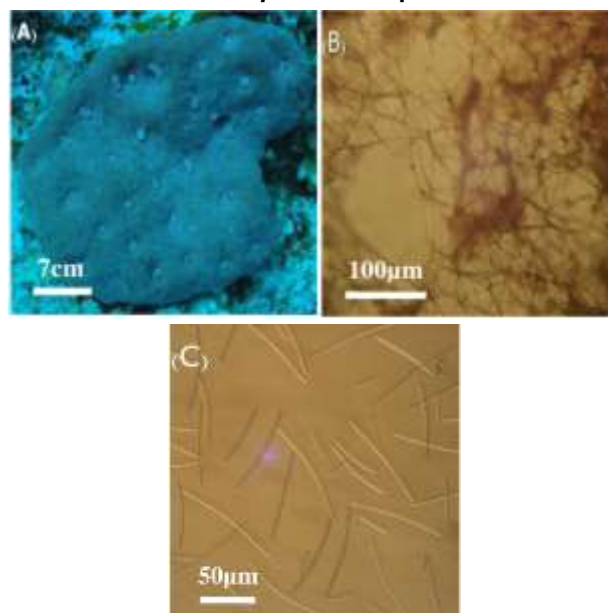


Fig. 7. (A) *Neopetrosia* sp.2 (B) TS showing a dense isodictyal regular reticulation with triangular meshes (C) Megascleres (Oxeas)

**Description:**

Typically cushion-shape, with softly rounded margins about 4 cm thickness. Texture is massive soft, elastic, easily to tear or falls to pieces when cut or rub between fingers. Surface is even smooth, and oscula are scattered in few number, with a scale of 0.5 cm and 3 – 4 cm between each other. Oscula may have small-elevated margins and the opening reticulated.

**Colour:**

Dark green alive and dark olive green in preservation.

**Skeleton:**

Choanosomal skeleton consists of a dense isodictyal regular reticulation of uni-

spicular primary lines, which are at equal and regular distances, spicules are joined by scarce spongin to form triangular meshes. The ectosomal skeleton is consisting of a tangential isodictyal dense surface network composed of one spicule length.

**Megascleres:**

Bent oxeas with a length of 100-140  $\mu\text{m}$ .

**Microscleres:**

No microscleres.

**Ecology and distribution:**

Reef wall at 16, 25 m depth.

**Order Halichondrida Gray, 1867**

**Family Axinellidae Carter, 1875**

**Genus *Dragmacidon* Hallmann, 1917**

***Dragmacidon coccineum* (Keller, 1891)**

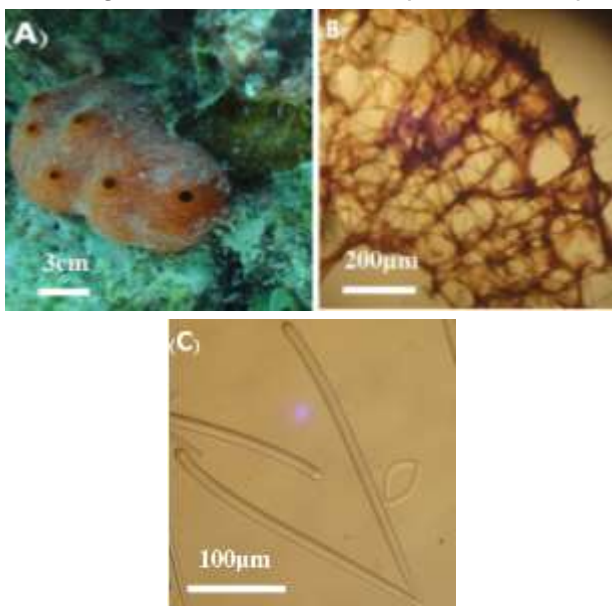


Fig. 8. (A) *Dragmacidon coccineum* (Keller, 1891) (B) TS shows spiculo-fibres that radiate and spread out to the periphery, (C) Megascleres (Rough styles)

**Description:**

Encrusting massive or thick rounded crusts 2-3 cm height. Texture is tough and firmness is flexible, easy to cut. Mucus is apparent when sponge is rubbed between fingers. Surface is velvety and may be micro-hispid due to the projection of choanosomal spicules. Oscula are visible with a scale of 7 mm.

**Colour:**

Colour is red alive and dark red in preservation.

**Skeleton:**

Choanosomal skeleton consists of spiculo-fibres that radiate and spread out to the periphery, connected irregularly by loose spicules and short tracts, and ending in skeletal projections at the surface. No specialized ectosomal skeleton.

**Megascleres:**

Principally, spicules are rough styles with a length of 300-350  $\mu\text{m}$ . the rounded end is sometimes swollen weak, the lower end is sharply pointed. The top half is always straight while the rounded half is bending.

**Microscleres:**

No original microscleres but may be there rare foreign microscleres like clavidisc, acanthostyles, Euasters, and isochelae.

**Ecology and distribution:**

Reef wall at different depths.

**Family Dictyonellidae Soest, Diaz and Pomponi, 1990**

**Genus *Stylissa* Hallmann, 1914**

***Stylissa carteri* (Dendy, 1889 as *Acanthella*)**

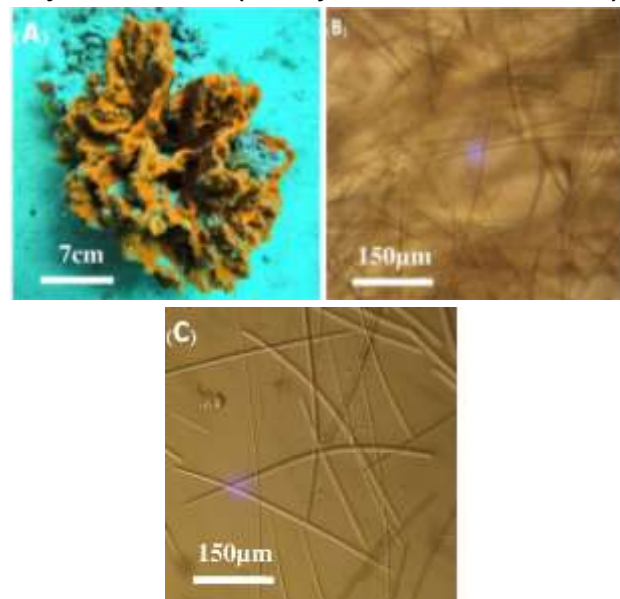


Fig. 9. (A) *Stylissa carteri* (Dendy, 1889). (B) Transverse section shows irregular network of stylotes (C) Megascleres (Stout styles)

**Description:**

Sponge is erected lamellar. Lamellae thin irregular branching, with sinuous margins. Both surfaces of the lamellae are covered with short, stout conules; conules form extensive ridges on the surface and run in a diverging manner towards the margin of the lamellae. Fusion of the lamellae is quite common. Oscula are visible surrounded with a delicate transparent envelope. Texture is stiff and leathery.

**Colour:**

Orange or may be orange-red alive.

**Skeleton:**

Choanosomal skeleton consists of very irregular network of stylotes, extremely dense in certain parts but absent in others. There are no definite fibres, and these are probably represented by certain denser spicular tracts.

**Megascleres:**

Stout styles slightly curved with evenly rounded bases. Tips sharply pointed or rarely blunt, with a length of 300-500  $\mu\text{m}$ . Small number of very long and very slender slightly curved styles evenly rounded off at the base and very gradually sharp pointed at the apex, with a length of 120-600  $\mu\text{m}$ .

**Microscleres:**

No microscleres.

**Ecology and distribution:**

All reef zones at different depths.

**Order Chondrosida Boury-Esnault and  
Lopès, 1985**

**Family Chondrillidae Gray, 1872**

**Genus *Chondrilla* Schmidt, 1862**

***Chondrilla nucula* Schmidt, 1862**

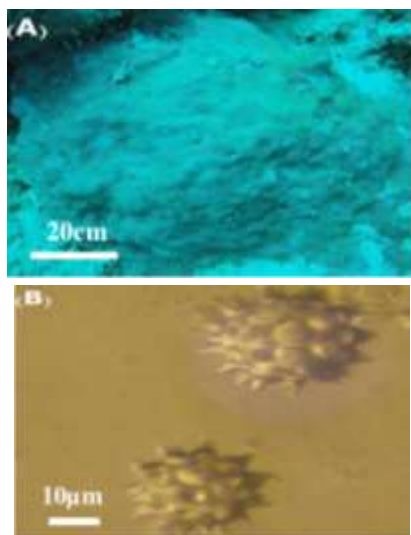


Fig. 10. (A) *Chondrilla nucula* Schmidt, 1862 (B) Microscleres (Spherasters)

**Description:**

Sponge is irregular thin to thick encrusting reaches to 4cm. Surface is smooth, with the oscula regularly distributed 2 cm wide in between and 2 mm size; there is a paler region around each osculum. Texture is cartilaginous, firm and tough.

**Colour:**

Sponge is grey or brownish grey alive.

**Skeleton:**

Principally, a dense sheet in the choanosome made of scattered spherulous cells and spherasters.

**Megascleres:**

Never megascleres are present

**Microscleres:**

Spherasters are abundant in the cortex, with average about 30  $\mu\text{m}$ .

**Ecology and distribution:**

All reef zones at different depths.

**Order Astrophorida Sollas, 1888**

**Family Geodiidae Gray, 1867**

**Genus *Erylus* Gray, 1867**

***Erylus* sp.**

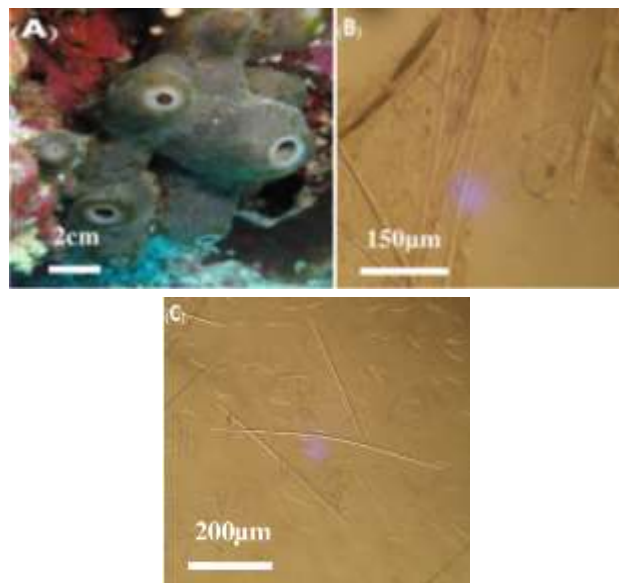


Fig. 11. (A) *Erylus* sp. (B) TS shows radial-arranged oxeas and orthotriaenes at the periphery, confused towards the interior (C) Megascleres (Oxeas & orthotriaenes) and microscleres (Aspidasters, microxeas, microorthotriaenes, oxyasters)

**Description:**

Sponge is massive, ovoid or thickly encrusting with rounded lobes, a unique osculum 2 mm in diameter at the top of each lobe; there is a paler region around each osculum. Surface is smooth even and the texture is compact, elastic and tough.

**Colour:**

Dark state grey and light state grey alive.

**Skeleton:**

Skeleton is composed of radial-arranged oxeas and orthotriaenes at the periphery, confused towards the interior. The orthotriaenes have their cladome lying just beneath cortical layer of flattened sterrasters (aspidasters). The cortical layer of flattened sterrasters (aspidasters) covered by a sub-ectosomal crust of microxea, microorthotriaenes, and oxyasters dispersed throughout the choanosome.

**Megascleres:**

Oxeas are mostly curved may be straight, with a length of 600  $\mu\text{m}$ . Orthotriaenes are with a shaft 250  $\mu\text{m}$  and cladome of 200  $\mu\text{m}$  in length.

**Microscleres:**

Flattened sterrasters (aspidasters) with irregular margins (length 70  $\mu\text{m}$ ). Microxeas are curved (length 50  $\mu\text{m}$ ). Microorthotriaenes about 50  $\mu\text{m}$ . Oxyasters about 20  $\mu\text{m}$ . Few of microrhabds (length 20  $\mu\text{m}$ ).

**Ecology and distribution:**

Reef wall at 10-25 m depth.



**Order Verongida Bergquist, 1978**  
**Family Pseudoceratinidae Carter, 1885**  
**Genus *Pseudoceratina* Carter, 1885**  
***Pseudoceratina arabica* (Keller, 1889)**

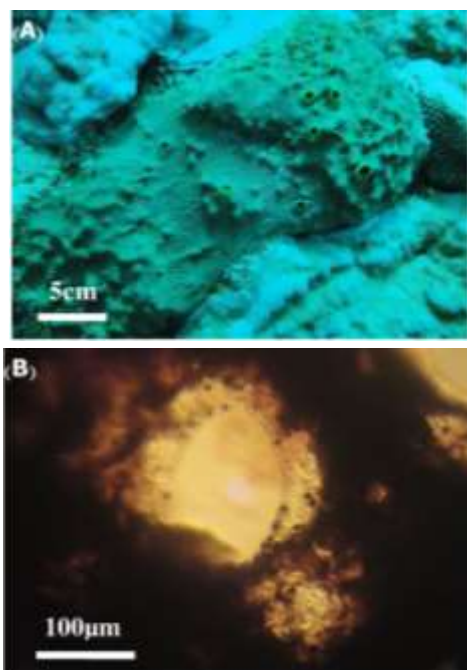


Fig. 12. (A) *Pseudoceratina arabica* (Keller, 1889) (B) TS shows dendritic fibre skeleton

**Description:**

Sponge is irregularly encrusting or ramose in growth form, not massive. Surface is markedly conulose; these conules are connected with one another by a series of ridges radiating from each one; where fibre brushes intersect the surface, so that the surface presents a minutely reticulate appearance. Oscula 2mm are irregularly scattered in few numbers on the surface, and have small-elevated margins. Texture of sponge is compressible and rather rubbery alive and rock hard when dry.

**Colour:**

Sea green to dark green alive, purple black in preservation.

**Skeleton:**

Skeleton is dendritic and is extremely irregular, made up of fibres without investing bark (laminated layer), simple pith elements (central diffuse region within a spongin fibre) are usually clear, and occasionally can incorporate isolated fragments of debris and foreign spicules.

**Megascleres and microscleres:**

No original spicules but there are several foreign inclusions.

**Ecology and distribution:**

Reef wall at 15, 25 m depth.

**Family Aplysinellidae Bergquist, 1980**  
**Genus *Suberea* Bergquist, 1995**  
***Suberea* sp.**

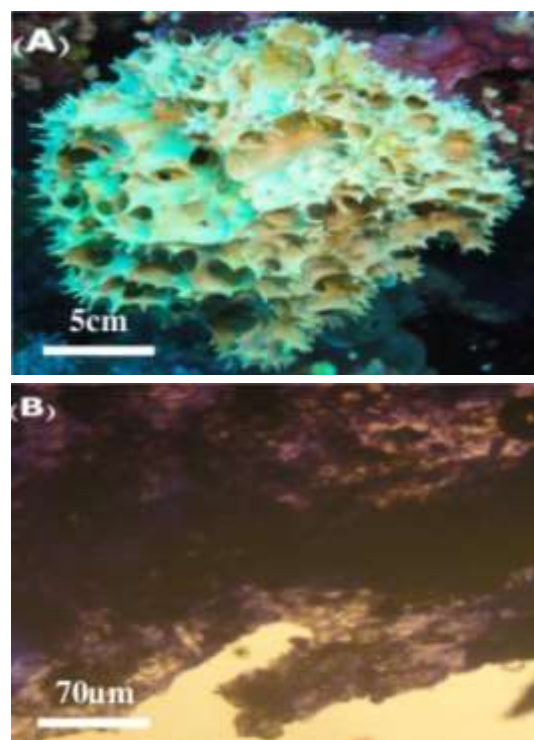


Fig. 13. (A) *Suberea* sp. (B) TS shows dendritic fibre skeleton.

**Description:**

Thin lamellae are fused together to form globular sub-spherical shape. Margins of the lamellae are irregular, forming spiny or pointed ends, in addition to spiny or pointed conules at both sides of the lamellae. Sponge finally appears as a thorny form. Texture is compressible, tough and rubbery. There are many grooves and holes, and the oscula are not restricted.

**Colour:**

Dark golden rod alive, but purple black in preservation.

**Skeleton:**

Skeleton is dendritic and is extremely irregular, made up of fibres with investing bark (laminated layer) and pith elements (central diffuse region within a spongin fibre). Skeleton is occasionally incorporated with isolated fragments of debris and foreign spicules.

**Megascleres and microscleres:**

No original spicules but there are several foreign inclusions.

**Ecology and distribution:**

Reef wall at different depths.



**Order Lithistida Schmidt, 1870**  
**Family Theonellidae Lendenfeld, 1903**  
**Genus *Theonella* Gray, 1868**  
*Theonella aff swinhoei*

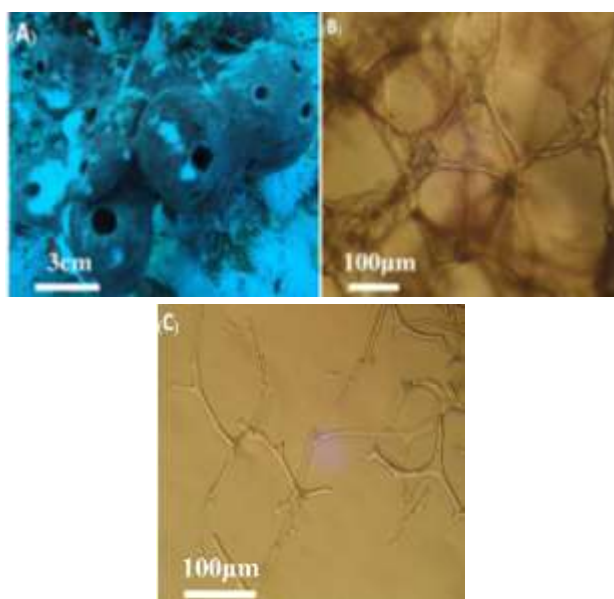


Fig. 14. (A) *Theonella aff. swinhoei* Gray, 1868 (B) TS shows Zygomatic form (C) Megascleres (Tetraclone sinuous desmas & sinuous Phyllostriaenes) and microscleres (Microstrongyles)

**Description:**

Sponge is massive thick-walled tubes or volcanic-shape with a single circular osculum situated in the centre of the rounded summit with a scale of 0.5-1 cm. Thick-walled tubes may be restricted or fusing expanded on the substrate. Surface is smooth even, and the texture is compressible but fragile.

**Colour:**

Mostly olive or dim grey mixed with white.

**Skeleton:**

It is articulated ectosomal and choanosomal densely skeleton of interlocking spicules (Zygomatic form), strongly phyllostriaenes at the ectosome and tetraclone desmas at the choanosome. There are numerous microscleres and slender slightly curved strongyles scattered in between the articulated skeleton.

**Megascleres:**

Tetraclone desmas more advanced; thicker and more rays (length 300-350 µm) characterized by four triangular depressions symmetrically disposed around the centre. Sinuous Phyllostriaenes (length 500 µm) have very short rhabds. Strongyles (length 600 µm) are cylindrical, slightly curved, with rounded ends, may be more in numbers or vestigial.

**Microscleres:**

Microstrongyles or acanthorhabds (length 15 µm) are cylindrical, with roughened surface and rounded ends, usually bent in the

middle. In addition to young forms of desmas are present.

**Ecology and distribution:**

Reef wall at 16 and 25 m depths.

**Order Lithistida Schmidt, 1870**  
**Family Theonellidae Lendenfeld, 1903**  
**Genus *heonella* Gray, 1868**  
*Theonella mirabilis* (de Laubenfels, 1954)

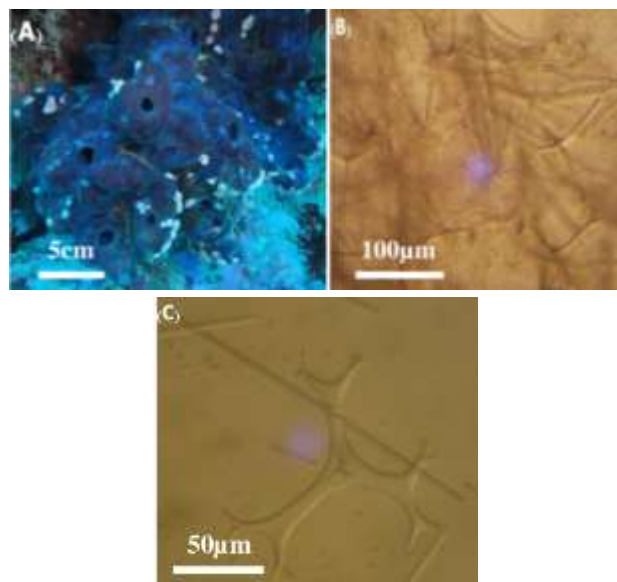


Fig. 15. (A) *Theonella mirabilis* (de Laubenfels, 1954) (B) TS shows loose skeleton (C) Megascleres (Phyllostriaenes & strongyles) and microscleres (Microstrongyles)

**Description:**

Sponge is massive thick-walled tubes or volcanic-shape with a single circular osculum situated in the centre of the rounded summit with a scale of 0.5-1 cm. Thick-walled tubes are fusing over each other in largest mass or may be expanded. Surface is smooth even, and the texture is compressible but fragile.

**Colour:**

Midnight blue alive.

**Skeleton:**

The ectosomal and the choanosomal skeleton are loose, not dense or the spicules are not interlock in sygosis like *Theonella swinhoei*. The phyllostriaenes are the main spicules are scattered in the choanosome without interlocking, in addition to the irregularly scattered bundles of the strongyles spread out to the ectosome.

**Megascleres:**

Phyllostriaenes are not sinuous but regular straight in shafts and periphery long pointed rhabds (length 300 µm). Rare regular desmas with pointed rhabds (length 300 µm). Strongyles (length 350-600 µm) cylindrical slightly curved, with rounded ends.

**Microscleres:**

Microstrongyles or acanthorhabds (length 10-15  $\mu\text{m}$ ) cylindrical, with roughened surface and rounded ends, mostly straighten. Rare discotriaene may be there (length 30  $\mu\text{m}$ ).

**Ecology and distribution:**

Reef wall at 10 and 25 m depths.

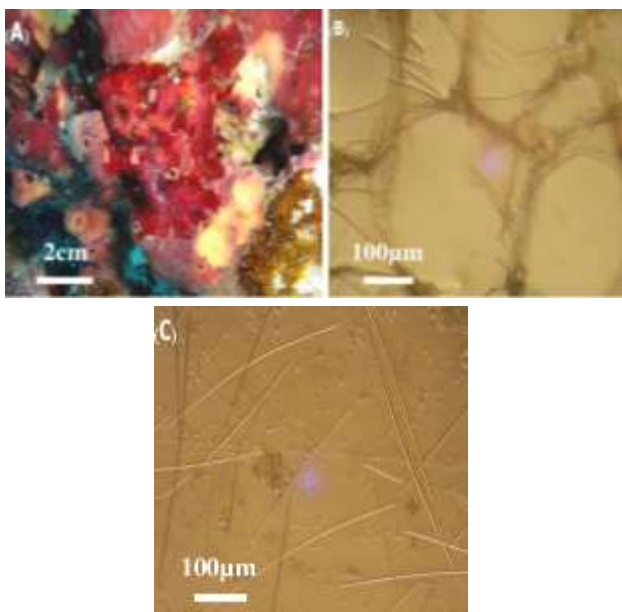
**Order Lithistida Schmidt, 1870****Family Theonellidae Lendenfeld, 1903****Genus *Theonella* Gray, 1868*****Theonella* sp.2**

Fig. 16. (A) *Theonella* sp.2 (B) TS shows reticulation with rounded meshes (C) Megascleres (Strongyloxea) and microscleres (Microstrongyle)

**Description:**

Sponge is massive irregularly mass with the oscula (0.5-1 cm) scattered regularly on little elevated rounded summits. The surface is smooth but more irregularly sinuous, and the texture is compressible and not fragile.

**Colour:**

Exterior Indian red, while orange is interior alive

**Skeleton:**

The ectosomal and the choanosomal skeleton are not dense like other *Theonella*. The skeleton is mostly composed of strongyloxeas that forming bundles of the spicules reticulate with each other to form rounded meshes, in addition to layers of the spongin fibres containing vaguely dispersed spicules. The phyllotriaenes are not restricted in the skeleton like other species of *Theonella*.

**Megascleres:**

Strongyloxeas in large number thick and thin are slightly curved and rarely straight with a scale range of (500-600  $\mu\text{m}$ ). Phyllotriaenes

are occasionally in few numbers, and are regular straight in shafts and periphery long pointed rhabds (length 300-400  $\mu\text{m}$ ). Rare dichotriaene (length 200  $\mu\text{m}$ ).

**Microscleres:**

Microstrongyles in large number (length 10-15  $\mu\text{m}$ ) cylindrical, roughened surface and rounded ends, mostly straighten.

**Ecology and distribution:**

Reef wall at different depths.

**DISCUSSION:**

Taxonomic biodiversity of sponges reported from Elphinstone reef, Northern Red Sea, Egypt. The described sponge species are firstly recorded from the studied site, in addition to several species may not have been described before. For example, *Neopetrosia* sp., *Erylus* sp., *Suberea* sp. and *Theonella* sp. collected during this study differ from the previously described taxon and may be a new species for this genus; however morphometric analysis is needed to confirm this assessment.

The present study described 15 demosponge species of the Egyptian Red Sea. These species were compared with the original descriptions (Hooper and van Soest, 2002). The existence of frequent character losses, modification and apparently convergent features appeared within the present description, therefore, there are commentaries undertaken. For example, species of *Acarus wolffgangi* described here with one size category of the megascleres cladotylotes. On the other hand, Keller (1889) described the same species *Acarus wolffgangi* with two size categories of the megascleres cladotylotes. One size category of cladotylotes originally is remarkable to other species of *Acarus ternatus*, which is so far not known from the Red Sea (van Soest *et al.*, 1991). Consequently, The Naturalis Biodiversity Center, Neatherland confirmed the name of *Acarus wolffgangi* to the present Red Sea species. It is possible that the other category of the megascleres cladotylotes overlooked during the present description of *Acarus wolffgangi* or the latter species may possible prove to be a synonym of *Acarus ternatus*.

The most previous recent surveys in the Egyptian Red Sea included Helmy (2000), Hasan and Belal (2005). Helmy (2000) surveyed fifteen sites along the Gulf of Aqaba. The survey reported the occurrence of 13 different sponge species. About three species were accordant to that of the present collection. Hasan and Belal (2005) carried out an intensive survey along the coasts of the Gulf of Aqaba. During this survey, a total of 17 species were recorded and also about three species were accordant to that of the present collection. An inference indicted that some of the present sponge species is widespeared and extend to the Gulf of Aqaba.

The present study contributed to the knowledge of the Egyptian sponge fauna. The

four-sponge species that not described before and require be describing and identifying may be added to the systematic list of the world sponge species. Moreover, the firstly recorded described 15 sponge species in the present study sites enlarged the biogeographical distribution.

The Red Sea region is very important with its sponge species varieties, which need more description and may affect the original description of the world sponge species.

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#### دراسات تصنيفية لطائفة لإسفنجيات من شعاب إلفن ستون شمال البحر الأحمر، مصر

أحمد محمد البوصيري\*، فايز عبد المقصود شكر\*، محمد محمد الكومي\*\*، هناء محروس راضي\*\*\*، محمد عبد اللطيف عز العرب\*\*\*

\* قسم علم الحيوان، كلية العلوم، جامعة طنطا، مصر  
\*\* المعهد القومي لعلوم البحار والمصايد، مصر  
\*\*\* المركز القومي للبحوث، مصر

أعماق 10-25 متر عمق، وكان نوع *Erylus* sp هو الأكثر تواجداً وانتشاراً في الموقع. أنواع *Neopetrosia* sp., *Erylus* sp., *Suberea* sp. and *Theonella* sp. مثلتها في العائلات والأجناس ويمكن أن تكون أنواع جديدة. تم عمل بطاقة تعريف تشتمل على بيانات الموقع والعمق واللون لكل عينة من الأنواع، والتي تم حفظها في مجموعة متحف التاريخ الطبيعي في هولندا.

تم تجميع 15 نوعاً من أنواع الإسفنجيات أثناء الفترة ما بين 2011\2012 من موقع شعاب إلفن ستون. قائمة الأنواع والأجناس مثلت تسجيلات جديدة لم تسجل من قبل في موقع الدراسة. جميع الأنواع كانت تنتمي لطائفة الإسفنجيات الشائعة والتي مثلت بسبع رتب و13 عائلة، وكانت عائلة *Theonellidae* هي الأكثر تواجداً والتي مثلت بجنس واحد وثلاثة أنواع. تم تجميع معظم الأنواع ما بين