Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

Journal of Entomology and Zoology Studies

E-ISSN: 2320-7078
P-ISSN: 2349-6800
JEZS 2017; 5(2): 1041-1047

Received: 17-01-2017
Accepted: 15-02-2017

Dr. Izdihar Ammar
Associate professor, Dept. of Marine biology at HIMR, Tishreen University, Latakia, Syria

Sara Fadel
MS. Student in Marine biology at HIMR, Tishreen University, Latakia, Syria

Correspondence
Dr. Izdihar Ammar
Associate professor, Dept. of Marine biology at HIMR, Tishreen University, Latakia, Syria

Update list of sponges of Latakia (Syria)-New Record exotic species

Dr. Izdihar Ammar and Sara Fadel

Abstract
This study deals with the diversity of sponge and at the Northern Latakia of Syria. The updated detection of sponge biodiversity in the Northern Latakia, Syria including previous data was carried out. Quantitatively, samples were collected via SCUBA diving at depths ranging from 15–30 m in Ibn Hani area near the High Institute of Marine Research in 2014.
Results revealed 11 species. *Chondrosia reniformis, Ircinia Sp, Axinella verrucosa, Hippospongia commuis, Crambe crambe, Maxilla incrustans, Spongia officinalis, Axinella polypoides, Axinella cannabina, Agelas oroides, Agelas linnaei*. Most of these species like S*pongia officinalis* and *Hippospongia communis* were listed as protected by the SAP /BIO protocol of the Barcelona Convention. Furthermore, new record of exotic species was detected for the first time in the Mediterranean and Syrian coast belong to the genus Agelas *linnaei* from Indo- pacific origin exclusively the Thousands Islands of Indonesia.

Keywords: Sponges, Demosponges, Syrian coast, Marine Biodiversity, exotic species, *Agelas linnae, distribution, diversity, eastern Mediterranean, Ibn Hani.*

1. Introduction
Sponges are considered one of the most common marine zoo benthic phylum in the world. 5015species of sponges throughout the world have been identified [1]
Sponges are aquatic organisms, they abundantly dwell at different depths of coastal waters as well as at areas of marine currents enriched with plankton. Also, marine sponges may be found stuck to rocks, shells, coral colonies, sandy bottoms and soft mud. Sponges belong to the phylum of Spongillidea are exclusively found in fresh water [2].
The anatomy of sponges makes them very useful as environmental filters of biological and chemical pollutants [3, 4]. Also sponges are considered a real reservoir of stem cells, which gives ideas of genetic engineering and cellular research and its application like reducing the death of human cells and renovation.
The ability to produce sponge from small pieces is very important aspect of commercial farming where sponges can regenerate at a great rate that is if sponge is cut into small pieces, each part will grow to entire animal if the small pieces contain some cells of the external and internal layers, this property that being relied upon for farming processes of sponge [5]
There are 681 species of sponges in the Mediterranean Sea, 432 species in the western basin, 200 species in the Adriatic Sea [6,7,8] and 85 species in Levantine Sea [8,9,10]
The latest studies on nonindigenous species have referred to the absence of the exotic species of sponges in the Mediterranean Sea (Zenetos *et al* 2005; Zenetos *et al* 2010), Syrian coast is characterized by geological, physical and chemical benthic properties together with slight seasonal changes in temperature and low salinity enhance sponge growth [11, 12].
Studies show that sponges in Syria were prosperous in the early seventies of the last century. Arwad island represents the most important site for the launch of the ships and sponge hunt as described by Gruvel1931as one of the highest quality national species. In the mid-seventies and for several reasons such as exhaustion, disease and pollution....etc. these sponges has become rare in the Syrian marine waters and led to lower yield of sponge hunt which stopped after 1986 [13, 14]
It has been reported that there are many species of sponges in the Syrian marine waters [8, 15] However, as has been indicated by a biological survey of the protected area of Um Tiur [15,16,17] In the latest study, the specimens were collected from four sites of Albassit, Ibn Hani, Banias,

and Tartous at depths ranging between 5-35 m in each. The results showed that 18 species of sponges, mostly belonging to Demospongia, were found and all of them are of Atlantic - Mediterranean Fauna. [8,18,19,20]

This study deals with many objects as follows:

- The diversity and distribution of sponges collected along Latakia coast in relation to depth,
- Recording new and exotic species.
- Establishing an up to date checklist of the recorded sponges species along the Syrian coast.

2. Materials and Methods

2.1 Study site

The study site was focused Sub littoral zone at depth ranged between 15-30 m of marine protected area Ibn Hani at Latakia's blue beach area 10km away from the city center where the habitat is rocky and sandy Fig1.

Fig 1: sampling sites

2.2 Sampling

Specimens of sponges were collected in April, May, June, July and August/2014by scuba divers. For field work, the collected specimens of sponges were placed in plastic bags and in the laboratory, sponge specimens were washed under tap water and preserved with a 5% formaldehyde solution.

The classification used in this work was based on the references [20, 21, 22] The specimens presented here are deposited at Marine Biology Laboratory. High Institute of Marine research, Tishreen University.

3. Results and discussions

Until April 2014, a total of (*1*0) species of sponges belonging to two classes and 8 families were reported in the Syrian coast ; they were *Chondrosia reniformis*, Ircinia sp,*Axinella verrucosa, Hippospongia commuis, Crambe crambe, Myxilla incrustans, Spongia officinalis, Axinella polypoides, Axinella cannabina, Agelas oroides*. [22, 23, 24]. All of the ten species belong to Demospongia but to different families and orders as shown in table 1.

Biological invasions are often seen as an element of global change since they affect biodiversity and often appear to be linked to climate change, encouraging, especially in the eastern Mediterranean, the advance of Lessepsian species. Moreover, recent cases of the introduction of exotic dinophyta with biotoxins or the proliferation of species producing mucilages, have also been correlated to the occurrence of climate anomalies. The Mediterranean Sea has been greatly influenced by the establishment of alien species, especially after the opening of the Suez Canal. Almost 955 alien species have been reported from the Mediterranean Sea so far [25, 26]. The majority of alien species (almost 75%) are known from the eastern part of the Mediterranean. this species could have been transferred to the area by hull fouling or ballast water of ships from the Indo-Pacific/tropical Atlantic regions (as a primary introduction) or from the coasts of Italy (as a secondary introduction) [27,28]. The patchy distribution of this species indicates no adverse effect on the native communities, but if it forms a dense population in the course of time, the potential ecological impact of this alien sponge species includes the competition with native species for suitable substrate and the negative effect on overgrown organisms. *Agelas oroides* is the only Mediterranean species, and is endemic [29,30,31]. A new exotic sponge species of Agelas ***linnaei*** (Demospongia: Agelasida: Agelasidae) is described from Latakia coast of eastern Mediterranean was identified. *Agelas* ***linnaei*** was compared to all other species of Agelas [32,33,34]

i. Family Agelasidae Verrill, 1907 *Agelas linnaei* species (de Voogd *et al*2008)

Material examined: 1 specimen that was collected from Sub littoral area at 15-30 m of Ibn Hani region during April – May/2014. Fig2 Table 1.

Fig 2: *Agelas linnaei*

Description:

Agelas linnaei species was recently described by de Voogd *et al* 2008. The specimen is recognizable with Growth form roundly lobate to thickly flabellate (8 cm in height, 2.5 cm in diameter). Consistency very soft, spongy. Color bright orange at the surface to cream-orange internally. Surface with dense conules (1–3 mm in height) supported by tips of ascending fibers covered by a bright easily distinguishable membrane. Small apertures (< 2 mm) scattered on the surface, bigger pores (2–3 mm) connected to internal axial canals sometime present between some lobes. Choanosome dense with narrow canals (primary canals 200 µm–2.00 mm in diameter; secondary canals 100 µm–1.00 mm in diameter). Ectosomal skeleton not reported. Choanosomal skeletal network irregularly and densely reticulate; primary fibers (35–80 µm

in diameter) aggregated in packs, more or less undulated, heavily cored (1–7 spicules in cross section) and echinate; secondary fibers (25–40 µm in diameter) not cored and less echinate. Megascleres of a single category. Acanthostyles (78.7–(187)–372.3 × 5.2–(12.1)–24 µm) straight, a few slightly curved, ornate by 11–(19.3)–33 whorls with 5–12 spines each; whorls conspicuous in the spicule center but sometimes faint and irregular at the spicule tip and head.

Habitat and Distribution: This exotic species was only found on rocks and Coral reef, overgrowing other reef invertebrates. It was previously reported from the northeastern Atlantic and eastern Mediterranean.

Also, *Agelas oroides* species Fig3 Table 2 which belongs to the same family of Agelasidae was reported in previous studies. *Agelas oroides* is the only Mediterranean species, and is endemic.

Fig 3: *Agelas oroides*

In addition to the reported sponges belonging to Agelasidae family, several sponge species belonging to Myxillidae, Spongiidae, Chondorosidae, and Axinellidae families as follows

i. **Family** Myxillidae

Crambe crambe, Myxilla incrustans-species detected: *Crambe crambe* (schmidt1862) was previously reported from the sublittoral area of Albassit, Ibn Hani and Tartous regions Fig4 Table 3.

Fig 4: ***Crambe crambe***

Description: The colonies of *Crambe crambe* form thin orange to orange-red plates, rarely lobed, with a very rough surface perforated by raised oscula found along the exhaling channels. These colonies can cover a surface of 1 m². Crambe crambe shows slow growth and a high investment in skeletal (spongin and spicules) elements and chemical defences. Adult C. crambe specimens and their larvae contain silica spicules surrounded by collagen-like fibrils of sponging.

Habitat and Distribution: Crambe crambe sponge is endemic to the eastern Mediterranean, but it is also present in the North Atlantic Ocean**.** This sponge, of a wide ecological distribution, is abundant in both well-lit rocky substrates and shaded habitats.

Material detected: *Myxilla incrustans* (Johnston, 1842)

Description

M. incrustans is a yellow encrusting sponge occurring in patches up to 20 cm (8 in) across and 5 cm (2 in) high. It is usually some shade of yellow but can range through orange, pink and white. It has a bubbly-looking appearance with internal channels visible through the surface and large, raised oscules Fig5 Table 4. The consistency is fairly soft and elastic but the surface feels crisp because of the vertical spicule bundles supporting it. The skeleton is built out of tornotes, megascleres with spear-shaped ends with tiny spines on them. The microscales are a mixture of curved, shovel-like chelae and "C"-shaped sigmas

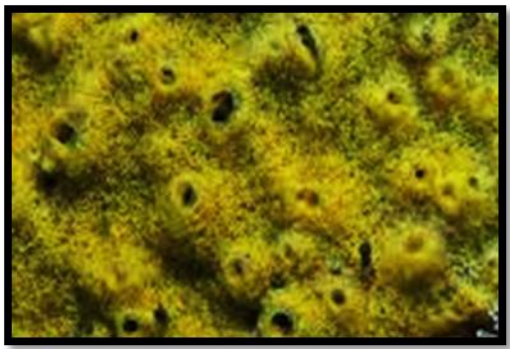

Fig 5: *Myxilla incrustans*

Habitat and Distribution

M. incrustans is found in the Arctic, round Bear Island and the Faroe Islands, on the coasts of Norway and south along the Atlantic coast to the Mediterranean Sea. In these areas it is usually found between low water mark and a depth of four hundred meters on vertical rocks and sites with clean water exposed to strong tidal flows.

ii. Family IRCINIIDAE Gray, 1867 *Ircinia* sp. (Schmidt, 1862)

Material detected: *Ircinia sp* was reported at the sublittoral area of Albassit, Ibn Hani, Banias, and Tartous Fig 6 Table 5.

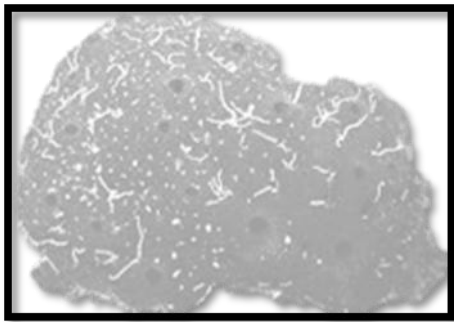

Fig 6*:* ***Ircinia sp.***

Description: A greyish white, massive sponge species with

irregular form. Size of about 20 cm. The body of this species has cylindrical or flattened branches of 1-2 cm in diameter.
The surface of the body has many conules that are almost 1 mm high. No apparent oscula are present. Choanosomal skeletons are formed by spongin fibrils and these primary fibrils are covered with a foreign material (like sand grains). Primary fibrils are 110-190 µm long. In secondary fibrils, sand and similar structures are not seen. They are 20-8µm long. Filaments are formed in a clean and quite thin structure. They are 3-6 µm long.

Habitat and Distribution: The endemic eastern Mediterranean was encountered in reef areas, shallow to depth of 30 m.

i. Family SPONGIIDAE Gray, 1867 -*Spongia officinalis* Linnaeus, 1759

Material reported *Spongia officinalis* was reported at the sublittoral area of Ibn Hani and Tartous Fig7 Table 6.

Fig 7: *Spongia officinalis*

Description: is a dark colored, finely conules, globular sponge which is very compressible, spongy, and elastic... Size frequently over 10 cm in diameter. Internally, it is light-colored. Surface quite regular and covered with fine conules of 0.2-0.5 mm high, spaced 1.5-2 mm apart. It usually has several oscules on the upper side, up to 1 cm in diameter.
The spicules are absent. A system of primary fibers cored by foreign material and uncored secondary fibers. The primary fibers are relatively rare, not differing from the secondary fibers in size, only recognizable by the core of spicule debris and small sand grains. Secondary fibers yellow-brown, 10-35 µm in diameter, and quite irregular in the way they anastomose. In general the reticulation is very dense and meshes are small and irregular.

Habitat and Distribution: *Spongia officinalis* is sublittoral found on rocks in warm seas only, at a depth up to 45m. They are most numerous in the Mediterranean, particularly the eastern half

***Hippospongia commuis* (Lamarck, 1813)**

Material reported: *Hippospongia commuis* was reported at the sublittoral area of Albassit, Ibn Hani and Tartous Fig8 Table 7.

Fig 8: ***Hippospongia commuis***

Description: Massive, compact, and usually roughly spherical. These sponges are on average 15–25cm in diameter. The color is blackish grey. The surface is normally coarsely conules, but sometimes conules may be rare, localized around the oscules, or even absent. Oscules are numerous and of large, but variable diameter, either distributed haphazardly over the sponge, or arranged in groups of five or six. The consistency is firm and elastic. The body of the sponge is also traversed with large circular canals, often attaining more than 2 cm in diameter. Primary fibers are rare, cored with foreign debris, and terminate in surface conules. They range in diameter from 60–100_m. Secondary fibers measure 20–30 m in diameter, and form a very dense network.

Habitat and Distribution: *Hippospongia communis* was found to be dominant along the sublittoral rocks of the Syrian coast.

ii. Family Chondorosidae *Chondrosia reniformis* Nardo, 1833

Material reported: *Chondrosia reniformis* was encountered on sandy areas of Shallow water of Albassit, Ibn Hani, Banias, and Tartous Fig 9 Table 8.

Fig 9: ***Chondrosia reniformis***

Description

Chondrosia reniformis is a massive lobate, smooth sponge colored in variable shades of grey and brown-violet on top, lighter at the sides. Size up to 5 cm high, 10 or more cm. When cut in half a distinct darker rim (cortex) is visible on the peripheral parts and the interior is whitish. Its consistency is described as cartilaginous. There are no spicules or fibers in this sponge. The spicules are absent. The Choanosome is

lighter colored, whitish and contains also collagen with scattered elliptical choanocyte chambers.

Habitat and Distribution
Chondrosia reniformis was encountered on sandy areas of Shallow water of exposed habitats of the eastern Mediterranean

Family Axinellidae Axinella *verrucosa* (Esper, 1794)
Material reported: ***Axinella verrucosa*** was encountered on rocks of Shallow water of Albassit, Ibn Hani, Banias, and Tartu's Fig10 Table 9.

Fig 10: ***Axinella verrucosa***

Description: Branching-erect with branches compressed and 'webbed' together. Variable in appearance. Up to 10 cm in height, with short stalk. The fusion of the branches tends to result in irregular growth forms in taller specimens. In lower growing, squatter specimens the lamellae become fused and convoluted, producing growth forms. The terminal branches are about 3mm in diameter. The color is bright to deep yellow, verging sometimes towards deep orange at the margins. Firm with strong axial skeleton. Lamellae are flexible. Characteristic 'mealy' appearance to the surface, as though dusted with small yellow particles. Surface velvety, with projecting spicules of uneven length, approximately twice that of *Axinella dissimilis.* Wide canals run up the sponge to arrive radially at 'vents' on the distal edges of the lamellae. Small oscules are borne on the apices of the lamellate branches. When alive, the open oscules are partially surrounded by a small triangular 'flap' of tissue, arising from the oscular rim. On collection this flap cannot be differentiated and the oscules themselves become inconspicuous. The Spicules are **strong** oxea, bent to a greater or lesser degree in the middle, occasionally with tylote swellings, typically 400-(450)-520µm. Strong styles to subtylostyles, occasionally tylostyles, 420-(630)-1030µm long, slightly bent.

Habitat and Distribution: it's a common species in the eastern Mediterranean on sloping rock surfaces.

***Axinella polypoides* (Bowerbank, 1866)**
Material reported *Axinella polypoides* was encountered on rocks of Shallow water of Albassit, Ibn Hani Fig11 Table 10.

Fig 11: ***Axinella polypoides***

Description: the body of *Axinella polypoides* is formed by a set of cells each having a definite functionality. The body is hollow, consists of pores or holes and has a cylindrical main shaft, usually erect. Sponges can form branches or fans which are oval at the end. In the case of *Axinella polypoides* the branches are rounded. Its surface is smooth and has a yellow or orange color. The body length usually varies between 20 cm and 25 cm.

Habitat and Distribution: it's an offshore species found on rock patches surrounded by shell gravel or coarse sand in the eastern Mediterranean.

Axinella cannabina (Esper, 1794) Material reported *Axinella cannabina* was encountered on sublittoral rocky substrate of Albassit, Ibn Hani, Banias and TartousFig12 Table 11.

Fig 12: ***Axinella cannabina***

Description
It is a sponge rather inconspicuous to the size and also for the orange color showing when illuminated by the torches of the divers. *Axinella cannabina* looks very special, often with one or, at most, two trunks that branch out early from which few branches randomly come out. For its particular form it's is called barrel sponge. In general, both along the main axis, there are many side segments bearing oscula. The appearance of each specimen is very uneven, with dilated areas and rich strips and other cylindrical and rich lateral segments. Species of. *Axinella cannabina* may show numerous lamellar structures that characterize this species. On the seabed these sponges are often isolated or otherwise well-spaced thinned to form small groups. The main branches of some specimens may exceptionally reach meter of length and, when they reach these size, can be folded at random. More often these porifera species have ramifications or erect axes, with heights ranging

from a few centimeters 5-10 up to 30 centimeters. Their growth is slow.

Habitat and Distribution:
It an indo Mediterranean species and found in the sublittoral caves. A thin layer of sediment was constantly observed.

4. Conclusions
In conclusion, the updated detection of sponge biodiversity in the Northern Latakia, Syria including previous data revealed the presence of new record exotic species for the first time in the Mediterranean and Syrian coast belong to the genus Agelas. Quantitatively, collected samples at depths ranging from 15–30 m in Ibn Hani area near the High Institute of Marine Research were 11 sponge species i.e. *Chondrosia reniformis, Ircinia Sp,Axinella verrucosa, Hippospongia commuis, Crambe crambe, Maxilla incrustans, Spongia officinalis, Axinella polypoides, Axinella cannabina, Agelas oroides, Agelas linnaei*. Furthermore, the new species were of Indo- pacific origin exclusively from the Thousands Islands of Indonesia.

Table 12: list of sponge species from the Syrian coast**.**

Class	Order	Family	Species	Depth	Substrate	Location
Demosponges	*Hadromerida*	*Chondorosidae*	*Chondrosia reniformis*	Sub littoral	Sandy	Albassit Ibn Hani Banias Tartous
	Dictyoceratida	Spongiidae	*Ircinia sp.*	Sublittoral	hard bottoms	Albassit Ibn Hani Banias Tartous
			Hippospongia commuis	Sublittoral	rocky	Albassit Ibn Hani Banias Tartous
			Spongia officinalis	Sublittoral	Rocky	Ibn Hani Tartous
	Axinellida	Axinellidae	*Axinella verrucosa*	Sublittoral	rocky	Albassit Ibn Hani Banias Tartous
			Axinella polypoides	Sublittoral	Rocky	Albassit Ibn Hani
			Axinella cannabina	Sublittoral	rocky Substrate	Albassit, Ibn Hani Banias Tartous
	Poicelosclerida	Myxillidae	*Crambe crambe*	Sublittoral	Rocky	Albassit Ibn Hani Banias Tartous
			Myxilla incrustans	shallow Sublittoral	Hard bottoms	Albassit Ibn Hani
		Agelasidae	*Agelas oroides*	Sublittoral	rocky Prefers semi-dark	Albassit Ibn Hani Tartous
			Agelas linnaei	Sublittoral	places & caves	Ibn Hani

5. Acknowledgments
The authors acknowledge the help of Tishreen University and HIMR for the financial and technical support.

6. References
1. Green G. Ecology of Toxicity in Marine Sponges. Mar. Biol. 1977; 40: 207-215.
2. Bitar G, Dupuy R, Foulquié M. Second Mission Relating To the Development of Marine Protected Areas on Syrian Coasts, Mission Report P. 2003; 42.
3. Bakus GI, Schulte B, Green G. Antibiosis and Fouling In Marine Sponges: Laboratory versus Field Studies. Smithsonian Institution Press Washington, 1990; 102-108.
4. Bianchi CN, Morri C. Marine Biodiversity of the Mediterranean Sea: Situation, Problems, and Prospects for Feature Research. Marine Pollution Bulletin 2000; 5: 367-376.
5. Burkholder PR, Ruetzler K. Antimicrobial Activity of Some Marine Sponges. Nature 1996; 222: 983-984.
6. Coll M, Piroddi C, Steenbeek J, Kaschner K, Ben Raislasram F, Aguzzi J, *et al*. The Biodiversity of the Mediterranean Sea: Estimates, Patterns, and Threats. Plos One 2010; 5: 1-36.
7. Fao Ecc. Mediterranee Et Mer Noir Zone De Peche37 Vegetaux Et Nvertebres", 1987; 1.
8. Gab Alla A, Kilada R, Shalaby M, Helmy T. Seasional Distribution of Demospongia in the Gulf of Aqaba. J. Egypt. Ger. Soc. Zool. 2001; 36: 91-102.
9. Gab Alla A, Kilada R, Shalaby M, Helmy T. Antimicrobial Activity of Some Sponges from the Gulf of Aqaba. Egyptian Journal of Biology 2000; 2: 28-33.
10. Green G. Ecology of Toxicity in Marine Sponges. Mar. Biol. 1977; 40: 207-215.
11. Gruvel A. Les États De Syrie. Richesses Marines Et Fluviales. Exploitation Actuelle Avenir. Soc. Edit. Geogr.

Marit. Colon. Paris, 1931; 433.
12. Hayword P, Smith T, Shields C. Sea Shore of Britain and Europe Hrper Collins Publishers, 1996; 352
13. Ilan M, Loya Y. Reproduction and Settlement of the Coral Reef Sponge Niphates Sp. From The Red Sea). Mar. Biol. 1988; 105: 25-31.
14. Ilan M, Loya Y. Reproduction and Settlement of the Coral Reef Sponge Chalinula Sp. (Red Sea). Proc. Sixth. Int. Coral Reef Symp. 1988; 2: 745-749.
15. Kefalas EG, Tsirtsis G, Castritsi-Catharios J. Distribution and Ecology of Demospongia from the Circa Littoral of the Islands of the Aegean Sea (Eastern Mediterranean). Hydrobiologia, 2003; 499(1-3): 125-134.
16. Kitagawa K. Biological Active Substances in Marine Sponges and Soft Corals. In: Marine Natural Products Chemistry Iii. Japan, 1987; 133-144.
17. Mccaffrey FJ, Endean R. Antimicrobial Activity of Tropical and Subtropical Sponges. Mar. Biol. 1985; 89: 1-8.
18. Muricy G, Hajdu E, Araujo FV, Hagler AN. Antimicrobial Activity of Southern Atlantic Shallow Water Sponges (Porifera). Sci. Mar. 1993; 57(4): 427-462.
19. Othman I, Yassinem T, Bat IJ. The Measurement of Some Radionuclides in Marine Coastal Environment of Syria. The Science of the Total Environment, 1994.
20. Ozturk B. Marine Life of Turkey in the Aegean and Mediterranean Seas. Turkish Marine Research Foundation Publication, 2004; 27-36.
21. Perez T, Vacelet J, G Bitar, G Zibrowius H. Two New Lithistids (Porifera: Demospongia) From A Shallow Eastern Mediterranean Cave (Lebanon). Journal of the Marine Biological Association of the Uk, 2004; 84: 15-24.
22. Riedl R. Fauna and Flora Des Mittel Meeres. Verlag Paul Pareg Hamburg Berlin, 1983, 832.
23. Voultsiadou E, Vafidis D. Rare Sponge (Porifera Demospongia) Species 64 from the Mediterranean Sea. Journal of the Marine Biological Association of the Uk. 2004; 84: 593-598.
24. Voultsiadou E. Demospongia Distribution in the Eastern Mediterranean: An Nw-Se Gradient. Helgoland Marine Research, 59(3): 237-251.
25. Wilkinson CR. Productivity and Abundance of Large Sponge Population on Flinder Reef Flats. Coral Sea. Coral Reefs 1987; 5: 183-188.
26. Yalç NF. Biological Activities of the Marine Sponge Axinella. Hacettepe University Journal of the Faculty of Pharmacy. 2007; 27(1): 47-60.
27. Zenetos A, Gofas S, Russo G, Templado J. Ciesm Atlas Of Exotic Species In The Mediterranean Mollusks 2003; 3: 376.
28. Alper Evcen. Sponge (Porifera) Species from the Mediterranean Coast of Turkey (Levantine Sea, Eastern Mediterranean), With A Checklist of Sponges from the Coasts of Turkey. Ege University, 2011.
29. Gravilia C, Belmontea G, Cecereb E, Denittoa F, Giangrandea A, Guidettia P, *et al*. Nonindigenous Species Along The Apulian Coast, Italy. 2010.
30. Zenetos A, Çinar ME, Pancucci-Papadopoulou MA, Harmelin JG, Furnari G, Aloro F, *et al*. Annotated List of Marine Alien Species In The Mediterranean With Records of the Worst Invasive Species. Medit. Mar. Sci. 2005; 6: 63-118.
31. Ammar I, Saker F. "Quantitave Study of Zoo Benthos in Latakia Sub Littoral Zone (Syria)" Tishreen University Scientific Journal. 1994; 2: 146-183.
32. Ammar I, Mohammad I, Saker F. "Multivariate &Univariate Analysis of Changes in the Composition of the Zoo Benthic Communities at Banias Sub Littoral Zone (Syria)" Tishreen Univ. Sci. J. 2002; 2(24): 12.
33. Ammar I, Ibrahim I, Abbas G. Primary Study On The Distribution Of Sponges And Associated Biota Of The Syrian Coast, Tishreen Univ. Journal For Research And Scientific Studies-Biological Science Series. 2008; 30(1): 45-64.