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Biodiversity of Zooplankton in the Serra Island (Aden)

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ABSTRACT

Marine planktons are the primary producers of the organic matter in the ocean and their important ecological rules are well established. They represent the base of the food chains of most marine organisms such as fishes and other sea animals.Serra Island is undergoing strong economical and tourists activities that cause several negative ecological impacts on the surrounding environment. Furthermore, protection of marine lives and their biodiversity conservation is of vital importance. Therefore, the present work was initiated as a part of future monitoring plan of marine ecosystem in this area to study the biodiversity and abundance of marine planktons in the regional sea water of Serra Island. Using a microscope equipped with digital camera several species of marine planktons were identified and documented from the collected sea water samples. It was found that these planktons were belonged to different main groups which included: Sarcodina, Arthoropoda, Rotifera, Tunicata ,Ciliophora and Nematoda.

Key words: Biodiversity, Zooplanktoon ,Serra Island, Aden.

INTRODUCTION

Most of zooplanktons are categorized under the division Protozoa that includes groups such as foraminifera, Radiolaria, Ciliophora, small Crustacea, Rotifera, Nematoda, and eggs and larvae of different sea organisms. In addition to that large forms of marine planktons such as several types of sea Hydra, jelly fishes, some molluscans and large algae that drift with water tides and currents can be found in the upper sea water layers.

Many zooplankton and some giant marine animals (baleen whales, some type of sharks) feed on the micro phytoplankton which are also the vital source in the oxygen release during the photosynthesis. The abundant production of fishes and other sea animals in fisheries depend on Zooplanktons (1, 2, 3).

The importance of several crustaceans especially copepods have come from the fact that they represent larvae food of many fishes and other sea animals (2). Many Ciliophora participate in water auto-purification process as they essentially feed on bacteria which densely spread in the water. However, some Ciliophora species are fish parasites; Ciliophora generally, have a great importance in lower food chain of water ecosystem. Nevertheless, a low number of marine Rotifera species are existed compared to high number of fresh water Rotifera species. However, marine Rotifera have a great important due to their use as food in the filed of fish aquaculture. In addition, sea worms participate in the richness of the veneries where most marine animals feed on these worms (4).

The present work aims to study the biodiversity and abundance of marine planktons in the regional sea water of Serra Island.

MATERIALS AND METHODS

Study Area

Serra Island is considered one of the best marine inclines for numerous fish species and other marine animals which inhabit the surroundings of this island. This is because of the geographical nature of this island that shows a rocky fissures and meanders and sandy shores. This is help in the formation of a unique ecological system characterized by the quiescence of its waters around the island. It is a rich biodiversity system and natural reservoir of natural lives for the growth and reproduction of eggs and juveniles of marine species. Furthermore, the island represents one of the historical sites and important tourist location which is currently qualified for development. The island is located on the southern abuttals of Aden city and has a 400m length and an average of 100m width. The island face forms a unique marine Khor called Khormaksar with its natural and ecological formations where industrial and urban assemblages are intertwines with natural life's inclines (Fig. 1)..

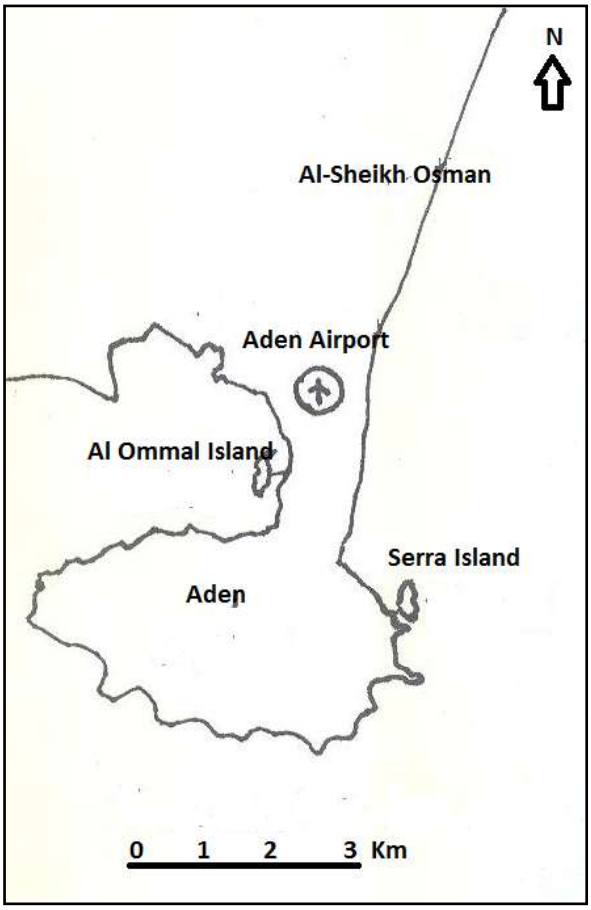

Fig.1: Map of the study area in Serra Island

Samples Collection:

Samples were collected early in the morning (5.00 - 7.00 a.m.) during the months of June - September 2013 and fishing boats working in the area were used during these cruises. Stations were chosen during the cruises, started from east to west of the island as shown in the study area map (Fig 1). Picture of the locations were taken using digital camera (Cyber Pix-5-550v) and shown in Figure (2).

Fig.2: Photograph of Serra Island

The measurements of water hydrological parameters that included pH, salinity, dissolved oxygen and temperature were conducted using InoLabpH, CondLevel1, Dissolved Oxygen meter and field thermometer, respectively.

For zooplankton samples of water were collected by filtration of thirty liters of island surface water filtered through 55 µm mesh size plankton net. Parts of the collected samples were fixed with 5% formalin solution. Using glass containers all the samples were then transferred to Faculty of Education-Saber.

Samples were examined using light microscope equipped with special camera (Presentoi CCP Camera) attached to computer. Pictures of the species in the samples were snapped using the magnification powers of X100, X400 and X1000. Results are the average of three samples collected from three different collection sites during the months from Jun to Sebtember2013.

During this study, the identification and classification of zooplankton species from different samples were conducted according to (5,6,7,8,9, 10, 11, 12, 13).

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RESULTS AND DISCUSSION

Physicochemical parameters:

The results of these parameters of Serra Island are shown in Table (1). The average temperature of water surface was 34°C. The pH value of the island water was slightly alkaline (8.00). For dissolved oxygen, the average values were (7 mg/L). The salinity was at 37 ppt. These results are in accordance with (22).

Table.1: Physicochemical parameters In Study Area

Temperature (T)	26°C
hydrogen ion(pH)	8.00
Salinity	37ppt
Dissolved oxygen	7 mg/l

Zooplanktons:

A number of zooplanktons were identified in the collected samples. These included 4 species of Crustaceae, 7 species of Cilliophora, 5 species of Sarcodina, 2 species of Rotifera, one species of Tunicata and one species of Nematoda (Table 2).

Table. 2: Zooplankton Species Around Serra Island

Phylum	species	Common	Rare	Rare
Sarcodina	*Actinosphaerium eichhorni Ehr*		*	
	Aulacantha scolymantha			*
	Globigerina bulloides Dorbigny		*	
	Astrorhiza limicola		*	
	camoeba striata The Schaeffer(Penard)		*	
Arthropoda	*Calanus finmarchicus(Gunner)*	*		
	Nanocalanus minor (Claus)		*	
	Temora discaudata Giesbrecht		*	
	Rhincalanus nasutus Giesbrecht		*	
Rotifera	*Brachs plicatilis Mueller*	*		
	a adriaticaCleve Colurell(Bory)	*		
Tunicata	*Doliolum sp*		*	
Ciliophora	*Cyclidium citrullus Cohn*	*		
	(.Mull)Dileptus anser	*		
	Euplotes eurystomus Wrzes	*		
	Tintinnopsis sp	*		
	Tintinnopsis beroidea Stein	*		*
	Litonotus sp		*	
	Lacrymaria olor (.Mull)	*		
Nematoda	*Nematode sp*	*		
Unknown spp	Zygotes &Larvae ,Spores			

Photomicrographs of some identified zooplanktons found in the collected samples are shown in Figures (3-8). The percentage of different phytoplanktons and zooplanktons groups is shown in Figures (9 & 10).

Ljakin (1990) has pointed that, phosphate and others mineral salts are further enriches in the month of August by cause of action of marine currents which flow to the Bab-el-Mandab Straits from the Gulf Aden, this play an essential role in prosperous of phytoplankton (14).The decrease of temperature, in addition to the ecological suitable condition of availability of salinity and pH water in September play an essential role in prosperous of phytoplankton which in turn plays a crucial role in feeding zooplankton and increase of dissolved oxygen.

Results of the present study showed that zooplanktons were more in number of species at the end of September. This is due to the abundance in availability of their nutrients that consist of the prosperous phytoplankton during the last months of summer. The zooplanktons in turn are crucial for breeding, larvae hatching season and appearance of young fishes (15).

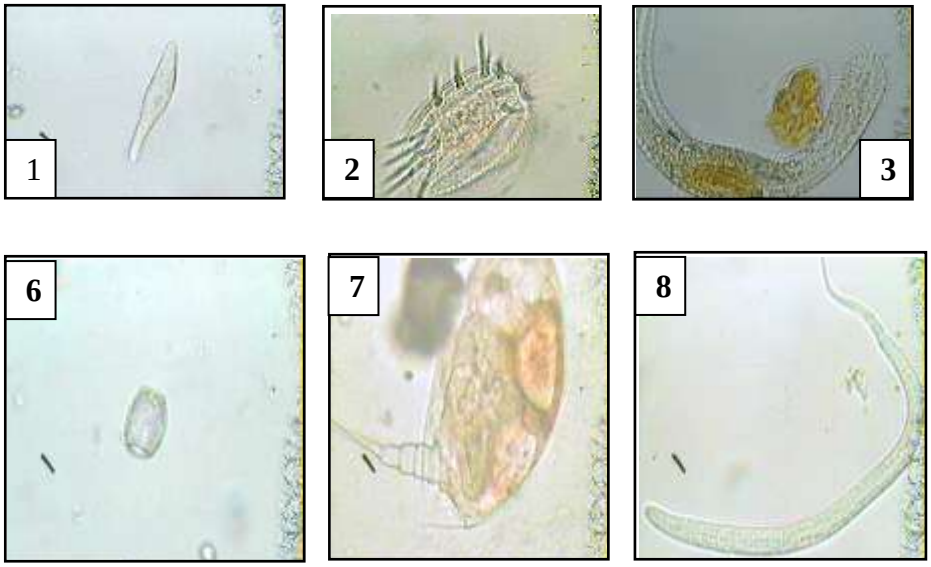

Fig. 3–8 : Photomicrographs of some Zooplankton samples
Fig. 3. *Lacrmaria olor* X400
Fig. 4. *Euplotes sp* X400
Fig. 5. *Litonotus sp* X400
Fig. 6. *Dolillium sp* X400
Fig. 7. *Colurella adriatica* X400
Fig. 8. *Nematode sp* X400

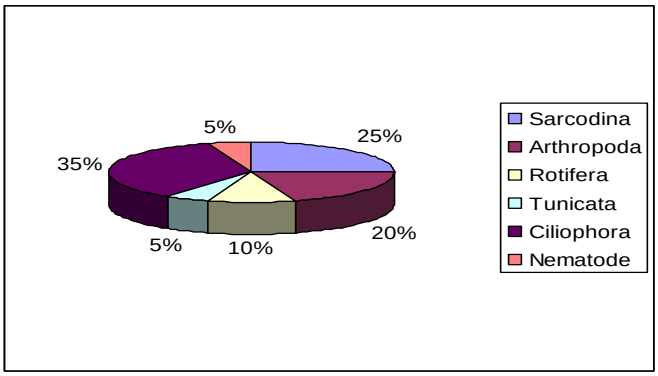

Fig. 9 : Percentage of Zooplankton population

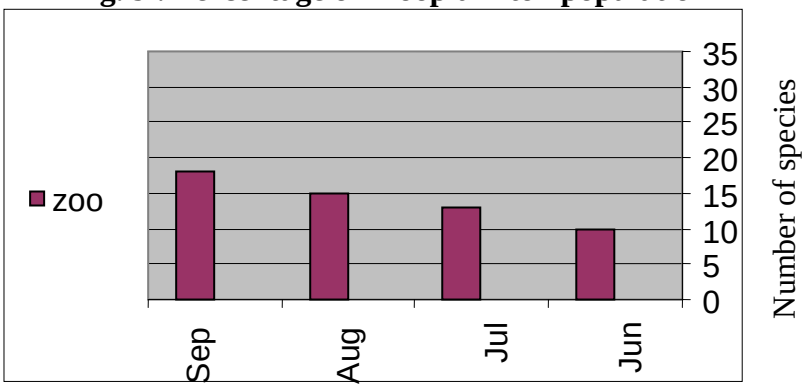

Fig. 10: Monthly variation Species number of Zooplankton

Conclusions

The results of the present study confirmed the richness of Serra Island in its biodiversity especially with regards to zooplankton.

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REFERENCES

1- Abdel-Karim, M.S.; Ali, M.H.H. and Sayed, M.F. (2006). Spatial and temporal distribution of micro benthic algae in hyper saline Mediterranean Lagoon (Bardawil Lagoon, Egypt), multivariate analysis approach. Egyp. J. Aqua. Res., 32(2):271-291.

2- Almagdob, M.; Gomah, A. and Rezkallah, R. (1994). Biodiversity. The Arabian Organization of Education, Culture and Science. Tunisia: 135pp.

3- Boni, A. D. (1998). The Phytoplankton. Arabic Translation: Alhomidan, A. and Aref. E. King Soaud University Publications, Alryad:224pp.

4- Hardy, S.A,(1970).The Open Sea: The World of Plankton, Part1, Collins Clear-Type Press: London 335p.

5- Bernt Zeitzschel (1973). The Biology of the Indian Ocean, Heidelberg, New York ,549pp

6- Boltovskoy, D. (1859). South Atlantic Zooplankton, Backhuys Publishers: 230pp.

7- Bradford, J.M.(1972) Systematic and Ecology of New Zealand Central East Coast Plankton Sampled at Kaikoura,Wellington: 89pp.

8- Cokolov, B.E.(1987).Life of animals: Protozoa ,Vol1.Prosfeshenie, Moscow.448pp. (in Russian).

9- Fedrov A.A(1977). Life of Plant: Algae and Lichine ,Vol .3 Rosfeshenie, Moscow, 486p.(in Russian).

10- Josafeen, A. T. (1967). Basics of Phycology: Algae and their life bonds. Arabic Translation: Abdulmohsen, A. and others.2nd ed. Anglo-Egyptian Library, Cairo, Egypt: 750pp.

11- Junior, J. R. (1988). Marine biology science. Arabic Translation: Khafagee, A.M.A King Abdulazeez University, Gedah:432pp.

12- Raymont, J. E.G. (1976). Plankton and Productivity in the Ocean, Pergamon Press, Oxford: 660p.

13- Sukhanova, I.N. (1962). On the tropicalof the phytoplankton on the Indian Ocean. Dokl. Acad. Nauk SSSR, 142:1162-1164.

14- Ljakin, Y.I. (1990). Hydrochemistry of the World Ocean tropical region, Leningrad Gedreometeozdat 213pp.(in Russian).

15- El-Shabrawy, G. M. and Taha O.E. (1999). Effect of grazing pressure of zooplankton on phytoplankton assemblage in Lake Qarun, Elfayoum, Egypt. Egypt. J. Aquat. Biol & Fish., 3(3):81-92.

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التنوع الحيوي للهائمات الحيوانية حول جزيرة صيره حول جزيرة صيره

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المستخلص

إن الهائمات البحرية هي المنتج الرئيس للمادة العضوية في المحيطات،وأهمية دورها البيئي معروف فهي تمثل أساس السلسلة الغذائية لمعظم الكائنات البحرية مثل الأسماك والأحياء البحرية الأخرى . وتعاني المنطقة البحرية لجزيرة صيره من نشاطات اقتصادية وسياحية وهذه بدوره تسبب العديد من التأثيرات البيئية السلبية على البيئة المحيطة ، كما أن حماية الأحياء البحرية والحفاظ على تنوعها الحيوي له أهميته الحيوية ، لذلك فان الدراسة الحالية تم البدء بها كجزء من خطة مراقبة مستقبلية للنظام البيئي البحري في هذه المنطقة.

وتهدف هذه الدراسة الى حصر التنوع الحيوي ووفرة الهائمات البحرية في المياه حول جزيرة صيره. باستخدام مجهر مزود بكاميرا رقمية تم تصنيف وتوثيق أنواع من الهائمات البحرية من عينات المياه التي جمعت. وقد وجد أن هذه الهائمات تنتمي إلى: المفصليات،القربيات،الديدان الخيطية،الأميبات ،العجليات ، الرخويات والقشريات.

الكلمات الدالة : التنوع الحيوي ، الهائمات ،جزيرة صيره،عدن.