

**AN ECOLOGICAL MONITORING STUDY  
IN RELATION TO PLANKTON AND BENTHOS  
IN YUMURTALIK GULF (MEDITERRANEAN SEA, TURKEY)**

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This study was performed in coastal water of Yumurtalık Bay along Mediterranean coast. In accordance with the goal of the study four stations were determined. Water and phytoplankton samples from 5 and 10 m depths through water bottle and plankton net were collected. Macrophytes, mollusc and porifera species were collected from bottom by means of a grab. Species composition of phytoplankton, macrophyte, mollusc and porifera communities were determined. A total of 31 phytoplankton, three macrophyte, 17 mollusc and one porifera taxa were recorded. The occurrence of toxic diatoms *Nitzschia longissima*, *Pseudo-nitzschia delicatissima*, *Pseudo-nitzschia pseudodelicatissima*, *Pseudo-nitzschia lineola* were noticeable.

**Keywords:** algae, macrophyte, porifera, mollusc, coastal, Mediterranean, Turkey

Coastal waters includes bays and estuaries range from sandy beaches to rock tidepools; from offshore kelps to the productive fishing areas of the continental. They provide home for an amazing array of plants and animals and recreational havens for millions of people. In fact coastal waters are important as they support various wildlife habitats for many groups of marine organisms such as fishes including coastal salmon, algae and invertebrate animals ect. In addition most of the world's populations live near coastlines which often attract human development and also provide essential feeding, cover, migration routes, and breeding areas for a broad array of coastal and marine life.

Mediterranean is an important sea for Turkey and many other mediterranean countries with respect to biological diversity, sea transportation recreational, historical or aesthetic values and also for being nesting and feeding habitat of sea turtles (*Chelonia mydas*, *Caretta caretta*) and some which are almost on the edge of extinction. Mediterranean has a long coastline (1707 km) and there are several important bays along the coast of mediterranean which are all facing with serious pollution problems. Yumurtalık is one the important coastal regions along the coast of Mediterranean situated in İskenderun Gulf (fig. 1). However, an industrial refinery has already been planned to be established on the coastal zone of the bay. This study is aimed to determine conspicuous plant and animal organisms belong to various groups living in water and on sediment of Yumurtalık Bay. There are a few studies [1–5] performed previously in the bay. The present study is aimed to contribute to the biological diversity of the Mediterranean and it also will be a record of the organisms present in coastal water and on sediment of Yumurtalık Bay before the establishment of the refinery.

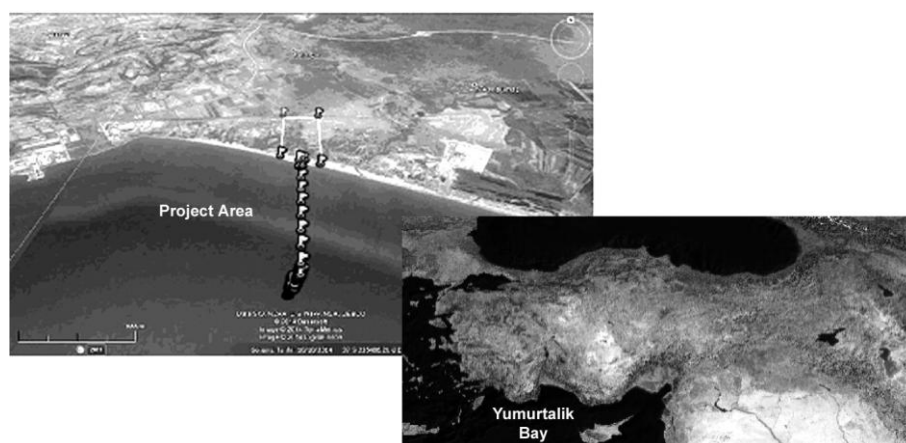


Fig. 1 Map of the study area

**Materials and Methods.** Water and phytoplankton samples were taken from 5 and 10 m depths through Hydro-Bios water sampler and hydro-bios plankton net. Macrophytes are collected by hand through scuba diving. A Hydro-Bios sediment grab was used for mollusc and porifera samples. All samplings were done in april. Microscopic observations for the identification of phytoplankton species were done by a Olympus BX51 DIC research microscope whilst Zeiss Discovery-V8 Stereo microscope was used for identification of macrophytes, porifera and mollusca.

**Results and discussion.** A total of 31 phytoplankton, three macrophytes, 17 molluscs and one porifera taxa were recored in the study (table 1).

Table 1 List of planktonic algae, macrophyte, poriphera and mollusc, recorded in Yumurtalik Bay

Planktonic algae	Macro algae	Poriphera	Mollusc
Oscillatoriaceae <i>Lyngbya</i> sp. 1 <i>Lyngbya martensiana</i> Meneghini ex Gomont 1892 Fragilariaceae <i>Asterionellopsis glacialis</i> (Castracane) Round, 1990 <i>Ceratoneis closterium</i> Ehrenberg 1839 Thalassionemataceae <i>Thalassionema</i> sp. 1 Chaetocerotaceae <i>Bacteriastrum delicatulum</i> Cleve, 1897 <i>Bacteriastrum furcatum</i> Shadbolt, 1854 <i>Bacteriastrum hyalinum</i> Lauder, 1864 <i>Chaetoceros</i> sp. 1 <i>Chaetoceros</i> sp. 2 <i>Chaetoceros</i> sp. 3 <i>Chaetoceros Mitra</i> (Bailey) Cleve 1896 <i>Chaetoceros affinis</i> Lauder 1864 <i>Chaetoceros dadayi</i> Pavillard 1913 <i>Chaetoceros lorenzianus</i> Grunow 1863 <i>Chaetoceros similis</i> Cleve 1896	Scyto-Siphonaceae <i>Colpomenia sinuosa</i> (Mertens ex Roth) Derbès & Solier in Castagne 1851  Zonarieae <i>Padina pavonica</i> (Linnaeus) Thivy in W.R. Taylor 1960	Irciniidae <i>Ircinia</i> sp.	Strombidae <i>Conomurex decorus</i> (Röding, 1798) Conidae <i>Conus mediterraneus</i> (Hwass in Bruguière, 1792) Buccinidae <i>Polia dorbignyi</i> (Payraudeau, 1826) Cerithiidae <i>Cerithium rupestre</i> (Linnaeus, 1758) Trochidae <i>Clanculus jussieui</i> (Payraudeau 1826) <i>Phorcus turbinatus</i> (Born, 1778) Naticidae <i>Neverita josephina</i> (Risso, 1826) Patellidae

Rhizosoleniaceae <i>Guinardia striata</i> (Stolterfoth) Hasle in Hasle & Syvertsen 1996 Skeletonemataceae <i>Skeletonema costatum</i> (Greville) Cleve 1873 Bacillariaceae <i>Nitzschia longissima</i> (Brébisson) Ralfs in Pritchard 1861 <i>Pseudo-nitzschia delicatissima</i> (Cleve) Heiden in Heiden & Kolbe 1928 <i>Pseudo-nitzschia pseudodelicatissima</i> (Hasle) Hasle 1993 <i>Pseudo-nitzschia lineola</i> (Cleve) Hasle 1965 Pleurosigmaaceae <i>Pleurosigma</i> sp.1 Protopteridiniaceae <i>Protopteridinium pentagonum</i> (Gran) Balech 1974 <i>Protopteridinium claudicans</i> (Paulsen) Balech 1974 <i>Protopteridinium divergens</i> (Ehrenberg) Balech 1974 <i>Protopteridinium oceanicum</i> (Vanhöffen) Balech 1974 <i>Protopteridinium pellucidum</i> Bergh 1881 Ceratiaceae <i>Tripos furca</i> (Ehrenberg) F. Gómez 2013 <i>Tripos lineatus</i> (Ehrenberg) F. Gómez 2013 Prorocentraceae <i>Prorocentrum</i> sp.			<i>Patella caerulea</i> (Linnaeus, 1758) Fissurellidae <i>Diodora graeca</i> (Linnaeus, 1758) Cypraeidae <i>Erosaria spurca</i> (Linnaeus, 1758) Arcidae <i>Barbatia barbata</i> (Linnaeus, 1758) Glycymerididae <i>Glycymeris glycymeris</i> (Linnaeus, 1758) Mytilidae <i>Brachidontes</i> <i>pharaonis</i> (P. Fischer, 1870) Chamidae <i>Chama gryphoides</i> (Linnaeus, 1758) Donacidae <i>Donax semistriatus</i> (Poli, 1795) Mactridae <i>Mactra stultorum</i> (Linnaeus, 1758) Solenidae <i>Solen marginatus</i> (T. Pennat, 1777) Spondylidae <i>Spondylus gaederopus</i> (Linnaeus 1758) Carditidae <i>Venericardia antiquata</i> (Linnaeus, 1758)
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*Ircinia* sp. Nardo, 1833 (Irciniidae) was the only sponge species whilst 19 Mollusca species were found to occur in Yumurtalik Bay. *Conomurex decorus*, *Conus mediterraneus*, *Polia dorbignyi*, *Cerithium rupestre*, *Clanculus jussieui*, *Phorcus turbinatus*, *Neverita Josephina*, *Patella caerulea*, *Diodora graeca* and *Erosaria spurca* were members of gastropoda whilst bivalvia were represented by *Barbatia barbata*, *Glycymeris glycymeris*, *Brachidontes pharaonis*, *Chama gryphoides*, *Donax semistriatus*, *Mactra stultorum*, *Solen marginatus*, *Spondylus gaederopus* and *Venericardia antiquata*. Some taxa are given in fig. 2.

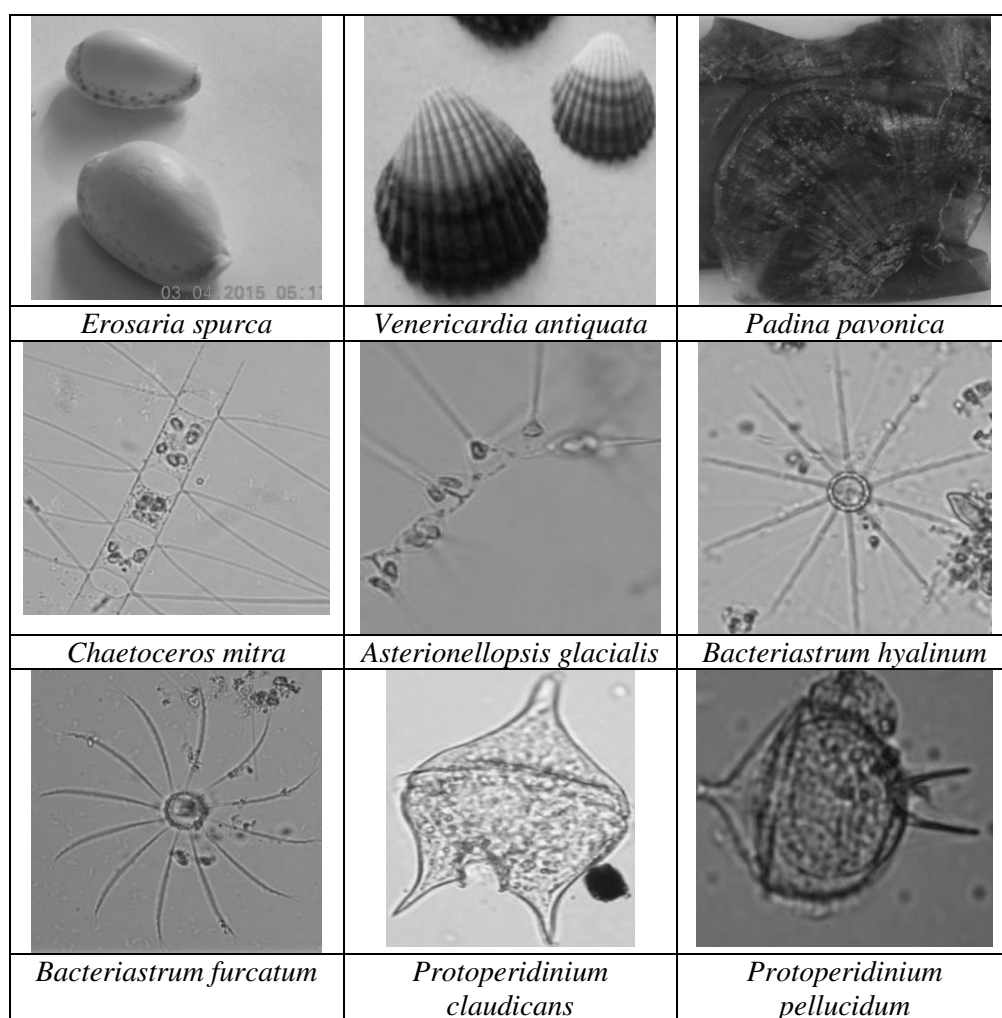


Fig. 2 Some taxa recorded in Yumurtalik Bay

**Conclusion.** Yumurtalik Bay appeared to provide habitat for various kinds of plants and animal communities. Phytoplankton and mollusca communities were richer in number of species compared to those of macrophyte and porifera communities. It is noteworthy to mention that phytoplankton biomass was low (chlorophyll *a* concentration varied 0.005–0.009 mg/l) like that in all mediterranean coastal waters probably due to low concentrations of plant nutrients. However the occurrence of toxic diatoms *Pseudo-nitzschia delicatissima*, *Pseudo-nitzschia pseudodelicatissima*, *Pseudo-nitzschia lineola* were noticeable. The seasonal growth dynamics of these toxic diatoms should be monitored regularly significantly as their occurrence in high cell numbers may cause significant damage to the ecosystem. Another important finding of the study was the occurrence of blue-green alga *Lyngbya martensiana* which is commonly known to be a freshwater form. The study area was found to provide suitable habitat for mollusca community (19 species). However *Neverita josephina* (66) and *Diodora graeca* (43) were the more conspicuous than others with their higher individual numbers.

The findings of the present study related to biological diversity of one of the important gulfs along the Mediterranean yielded that coastal waters should be monitored regularly and protected as they harbour various kinds of organisms. However all coastal waters along the

Mediterranean are under the threats of many environmental factors. In case of Yumurtalık Bay, establishment of a planned industrial refinery will be a threat besides other land-based pollution for the plant and animal communities present in the bay.

1. Yılmaz A., Baştürk Ö., Saydam C., Ediger D., Yılmaz K., Hatipoğlu E. Eutrophication in İskenderun Bay, northeastern Mediterranean // *Science of Total Environment*. 1992. Suppl. P. 705–717.
2. Polat S., Sarihan E., Koray T. Seasonal changes in the phytoplankton of the northeastern Mediterranean (Bay of İskenderun) // *Turkish Journal of Botany*. 2000. Vol. 24. P. 1–12.
3. Polat S., Işık O. Phytoplankton distribution, diversity and nutrients at the NE Mediterranean coast of Turkey (Karataş-Adana) // *Turkish Journal of Botany*. 2002. Vol. 26. P. 77–86.
4. Polat S. Nutrients, chlorophyll a and phytoplankton in the İskenderun Bay (Northeastern Mediterranean). P.S.Z.N. // *Marine Ecology*. 2002. Vol. 23. P. 115–126.
5. Polat S., Olgunoğlu M. P., Akiz A., Koray T. Kuzeydoğu Akdeniz Kıyısı sularında (İskenderun Körfezi) dağılım gösteren potansiyel zararlı fitoplankton türleri // *E.Ü Su Ürünleri Dergisi*. 2006. Vol. 23. P. 169–172.

### **ЭКОЛОГИЧЕСКИЙ МОНИТОРИНГ ПЛАНКТОНА И БЕНТОСА В ЗАЛИВЕ ЮМУРТАЛЫК (СРЕДИЗЕМНОЕ МОРЕ, ТУРЦИЯ)**

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Исследования выполнены в прибрежных водах залива Юмурталык на побережье Средиземного моря. На четырех станциях, определенных в соответствии с целью исследований, отобраны пробы воды и фитопланктона на глубине 5 и 10 м с помощью сосудов и планктонной сети. Макрофиты, моллюски и губки отобраны с помощью бентосного дночерпателя. Определен видовой состав сообществ фитопланктона (31 вид), макрофитов (3), моллюсков (17) и губок (1). Отмечено присутствие токсических диатомовых водорослей *Nitzschia longissima*, *Pseudo-nitzschia delicatissima*, *Pseudo-nitzschia pseudodelicatissima*, *Pseudo-nitzschia lineola*.

**Ключевые слова:** водоросли, макрофиты, губки, моллюски, побережье, Средиземное море, Турция