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of the Black Sea Against Pollution

# 2nd BIENNIAL AND BLACK SEA SCENE EC PROJECT JOINT CONFERENCE



CLIMATE CHANGE IN THE **B**LACK **S**EA –  
**H**YPOTHESIS, **O**BSERVATIONS, **T**RENDS  
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## TEMPORAL CHANGING OF GELATINOUS MACROZOOPLANKTON OFF SINOP REGION, THE SOUTHERN BLACK SEA

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**Key words:** Gelatinous macrozooplankton, Seasonality, Distribution, Black Sea, Sinop Region.

In the Black Sea, increase in gelatinous macrozooplankton played an important role in its ecosystem functioning, and specifically for fishery resources. The main aim of the present study is to determine changes in gelatinous distribution during recent years. Impacts of climatic changes on distribution and seasonality of gelatinous macrozooplankton were investigated in the southern Black Sea. For that purpose seasonal distribution, biomass and abundance values of gelatinous macrozooplankton (*Aurelia aurita*, *Pleurobrachia pileus*, *Mnemiopsis leidyi* and *Beroe ovata*) in the central southern Black Sea were studied between January 2003 and December 2004. Plankton samples were collected monthly at two stations.

Inter-annual and seasonal changes of macrozooplankton were compared with the literature data from other regions of the Black Sea.

## EFFECTS OF COASTAL STRUCTURES ON ECOSYSTEM AND FISHERIES IN TURKISH COASTS

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**Key words:** Coastal structures, artificial reefs, field gaining, ecosystem, fisheries, Black Sea

Coastal regions are major important areas of seas in terms of biodiversity and fisheries. These areas are affected considerably by land based pollution and man made structures as harbors, quays and fishing ports, and sea fillings for the purpose of field gaining and denudation prevention.

Man made coastal structures are spread over wide fields in the Black Sea coasts. There are many positive and negative effects of these structures on ecosystem and fisheries.

This study deals with coastal man made structures and its effects on ecosystem and fisheries. Future suggestions were aimed to be provided by comparing the results of the observations and studies.



## CHANGES IN TEMPORAL DISTRIBUTION OF ZOOPLANKTON OFF SINOP REGION, THE SOUTHERN BLACK SEA

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**Key words:** Zooplankton, climatic impact, seasonality, Black Sea, Sinop region

In this study, the possible impact of climatic variations on zooplankton off Sinop in the southern Black Sea was investigated. With this purposes, available data from this region collected during the last two decades were used. Inter-annual and seasonal changes of zooplankton were analyzed in detail, and compared with the literature data from other regions of the Black Sea.

## CHANGES IN COMPOSITION AND DISTRIBUTION OF PHYTOPLANKTON IN THE SOUTHERN BLACK SEA DURING THE LAST DECADE

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**Key words:** Phytoplankton, composition, distribution, southern Black Sea

172 taxa – 103 Bacillariophyta, 52 Dinophyta, 12 Chlorophyta, 3 Cyanophyta and 2 Chrysophyta have been determinate by researchers in Southern Black Sea until 1995. 155 taxa - 1 taxa of Cyanophyceae, 65 taxa of Dinophyceae, 4 taxa of Dictyochophyceae, 33 taxa of Bacillariophyceae, 10 taxa of Prymnesiophyceae, 1 species of Euglenophyceae and 1 species of Acantharea have been added as a new record to the existing species by means of studies conducted between 1995 -2000. Only 6 taxa of Bacillariophyceae have been given as a new record for Turkish coast after 2000. As a result, 294 Phytoplankton species consisting 80.1 % of diatoms (48.3%) and dinoflagellates (39.8) determined on Turkish Southern Black Sea coast by conducted studies up to now.

The most important change observed within 10 years is the fast development of dinoflagellates and other micro-nanoplankton species rather than diatoms. The increase in the ratio of dinoflagellates could be related to the change in nutrient balance in addition to the temperature regime of the seawater. In the present study, impacts of climatic changes on phytoplankton dynamics were investigated in the southern Black Sea.

## THE VISIBLE DECLINE OF LIMPET, *PATELLA CAERULEA* LINNAEUS, 1758, A BIOMONITOR SPECIES, AT THE SINOP PENINSULA AND VICINITY (THE SOUTHERN BLACK SEA, TURKEY)

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Due to their economic and ecological importance, as well as sedentary life, molluscs have assumed a major role in monitoring contaminants worldwide. They are abundant, sedentary and easy to collect, makes them ideal for biomonitoring. Limpets are important structuring agents of intertidal assemblages, controlling distribution of algae, bulldozing small sessile animals, or consuming sessile and mobile prey. They are frequently limited in their distribution by specific microhabitats, many of which may be absent from constructed habitats. Studies on this species at Sinop peninsula have been evaluated and a decline of limpets was determined. Also, probable reasons for the decline of limpets were studied in this research.

## LIKELY EFFECTS OF GLOBAL CLIMATE CHANGE ON THE BLACK SEA BENTHIC ECOSYSTEM

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**Key words:** Climate change, Mediterraneanization, Benthos, the Black Sea.

Occurrence and distribution of the species in the Black Sea are primarily determined by seawater temperature and salinity. The most recent predictions suggest that, by 2100, average air temperatures may be between 2 and 4 °C higher than at present and seawater temperatures may be as much as 2 °C higher than in 2000. The rise of the coastal zone seawater temperature may be higher than the open sea water average (Hiscock et al., 2001).

It is expected that a warming of air and seawater temperatures will result in increased diversity of benthic marine life in the Black Sea with adverse effects limited mainly to declines in abundance or loss of a small number of native species. Changes to a minority of biotopes might occur in the long term.

Depending on the temperature increase Mediterraneanization of the Black Sea fauna is in progress and occurs owing to immigration of new species.

Aim of this article is discussing of global warming and the range of likely effects on marine benthic species. These effects may be related to changing water temperatures, changing water circulation or changing habitat. At present, to predict or detect the effects of climate change on marine benthic communities are quite difficult. But we can only provide educated guesses about potential changes and the consequences of those changes for the Black Sea.



resistance to an antibiotic, that substance may become useless in the treatment of infectious diseases caused by that pathogen. Antibiotic resistant bacteria may enter marine environments via ballast water, effluents and land runoff. Traditionally, total coliforms and thermotolerant coliforms have been most widely used as indicators of bacterial contamination in marine environments. The bacteria belonging to Enterobacteriaceae family may enter the marine environment via anthropological factors such as domestic and industrial wastes and marine transportation. With an aim to detect and compare indirect influences of bacterial pollution and negative environmental conditions related to antibiotic resistant strains, the frequency of some beta-lactam antibiotics resistance of members of the Enterobacteriaceae family and the levels of indicator bacteria were investigated in sea water samples taken from the western part of the Black Sea, Turkey. Water samples were taken into sterile 250 mL flasks to determine the level of coliform and faecal coliform bacteria using the membrane filtration (Millipore) techniques. M-Endo and m-FC agar were used for viable counts. The bacteria belonging to Enterobacteriaceae members were identified using biochemical tests (API 20E, BioMerieux). *E. coli* (the major species within the thermotolerant group of coliforms), *Klebsiella* spp., *Citrobacter freundii*, *Proteus vulgaris* and *Enterobacter cloacae* were used for the beta-lactam antibiotic resistance test. The percentage of chosen bacteria in the samples which exhibited antibiotic resistance was measured on Nutrient Agar plates supplemented with Imipenem (10 µg/mL), Ampicillin (10 µg/mL), Cefotaxim (30 µg/mL), Ceftriaxon (30 µg/mL) and Cefazidim (10 µg/mL) media. When we compare our indicator bacteria findings in 2006 and 2007 with our previous study, which had been done for the first time in 1998 and 1999, the levels of indicator bacteria were found to be higher. The frequencies of resistance of the isolates were found to be highly resistant to Ampicillin and Imipenem. The results also indicate that the resistant strains which were isolated from sea water samples of the western region of the Black Sea, Turkey have been increasing with time. The increase in resistant strains and the coliform bacteria counts were associated with negative environmental conditions.

### THE CHANGES ON SPAWNING SEASON OF FISH IN SINOP CAPE OF THE SOUTHERN BLACK SEA, TURKEY

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In this study, we have investigated the changes of qualitative and quantitative composition of fish eggs and larvae in the southern Black Sea since 1999. These data has been evaluated with respect to changing climatic conditions.

### MODERN CONDITION OF FAUNA FREE-LIVING NEMATODES OF THE MARINE PART OF THE UKRAINIAN DANUBE

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**Key words:** nematofauna, taxocene structure, environment, multifactor statistical analysis  
The present state of the fauna of free-living nematodes of the marine part of the Ukrainian Danube Delta has been described. Nematofauna of the estuarine part of the Danube is represented by 46