

ID: W2078880223

TITLE: Ecohydrographic constraints on biodiversity and distribution of phytoplankton and zooplankton in coral reefs of the Red Sea, Saudi Arabia

AUTHOR: ['Benjamin Kürten', 'H. Khomayis', 'Reny P. Devassy', 'Saskia Audritz', 'Ulrich Sommer', 'Ulrich Struck', 'Mohsen M. El?Sherbiny', 'Ali M. Al?Aidaros']

ABSTRACT:

Abstract An integral concept of ecological research is the constraint of biodiversity along latitudinal and environmental gradients. The Red Sea features a natural example of a latitudinal gradient of salinity, temperature and nutrient richness. Coral reefs along the Red Sea coasts are supported with allochthonous resources such as oceanic and neritic phytoplankton and zooplankton; however, relatively little is known about how the ecohydrography correlates with plankton biodiversity and abundance. In this article we present the biodiversity of phytoplankton and zooplankton in Red Sea coral reefs. Oceanographic data (temperature, salinity), water samples for nutrient analysis, particulate organic matter, phytoplankton and zooplankton, the latter with special reference to Copepoda (Crustacea), were collected at nine coral reefs over ~1500 km distance along the Red Sea coast of Saudi Arabia. The trophic state of ambient waters [as indicated by chlorophyll a (Chl a)] changed from strong oligotrophy in the north to mesotrophy in the south and was associated with increasing biomasses of Bacillariophyceae, picoeukaryotes and Synechococcus as indicated by pigment fingerprinting (CHEMTAX) and flow cytometry. Net?phytoplankton microscopy revealed a Trichodesmium erythraeum (Cyanobacteria) bloom north of the Farasan Islands. Several potentially harmful algae, including Dinophysis miles and Gonyaulax spinifera (Dinophyceae), were encountered in larger numbers in the vicinity of the aquaculture facilities at Al Lith. Changes in zooplankton abundance were mainly correlated to the phytoplankton biomass following the latitudinal gradient. The largest zooplankton abundance was observed at the Farasan Archipelago, despite high abundances of copepodites, veligers (Gastropoda larvae) and Chaetognatha at Al Lith. Although the community composition changed over latitude, biodiversity indices of phytoplankton and zooplankton did not exhibit a systematic pattern. As this study constitutes the first current account of the plankton biodiversity in Red Sea coral reefs at a large spatial scale, the results will be informative for ecosystem?based management along the coastline of Saudi Arabia.

SOURCE: Marine ecology

PDF URL: None

CITED BY COUNT: 38

PUBLICATION YEAR: 2014

TYPE: article

CONCEPTS: ['Phytoplankton', 'Zooplankton', 'Oceanography', 'Plankton', 'Ecology', 'Coral reef', 'Biology', 'Environmental science', 'Nutrient', 'Geology']