Coastal and marine ecosystems, biology and ecology

Decline In Biodiversity Of Copepods In Coastal Waters Of Mumbai

ROSAMMA STEPHEN [(1)], JAYALAKSHMY K.V [(1,2)] and VIJAYALAKSHM R. NAIR [(3)]

(1) National Institute of Oceanography(Retired), 682017 Kochi, India
Telephone: 919446404187 Email: rosamma.stephen@gmail.com
(2) Telephone: 919447750602 Email: kvjayaparam@yahoo.co.in
(3) National Institute of Oceanography(retired), 682036 Kochi, India
Telephone: 91-484-2316999 Email: vijayalakshmi40@hotmail.com

Coastal waters of metropolitan cities face severe ecological threat due to sewage discharge and effluents from the industries. Copepods being the most abundant component in zooplankton some species can act as signals of alterations of water quality. Presently analysis of biological communities is adopted as an effective tool for indicating environmental conditions . Studies were conducted on water quality species composition of copepods along the coastal waters of Mumbai harbor and at Thal, a nearby location proposed for installing large fertilizer plant in 1980’s as baseline study which was repeated after a decade and the variations in density and species composition are discussed. The hydrography of the water at Thal was normal in the baseline study. But in the post outfall study the suspended load and the nutrient level especially nitrate and ammonia showed marked increase. During the baseline study from the vicinity of the fertilizer plant a total of 24 species were encountered whereas in the post outfall study 13 species were encountered in the vicinity and only 8 species from the discharge point. Copepods were also studied from Mumbai harbor from 4 stations namely Thane, Bassien ,Versova and Mahim where sewage and other discharges are slowly converting the area into an imperiled ecosystem. Nutrients were high during pre-monsoon; PO4, 42.0µ at/l and NO3, 43. 0µ at/l, being the highest values recorded. The suspended load in the creeks were high namely 87.5mg/l during pre-monsoon and 121mg/l during post-monsoon. The upper reaches of the creeks sustained high nutrients and suspended load and low density of zooplankton and in some stations upstream the percentage of copepod was very low where other zooplankton dominated. Species diversity was high in the coastal stations away from the mouth of the creeks and was composed of estuarine, neritic and oceanic species. From the Bassein creek and surrounding stations 33 species were recorded whereas 35 species were observed in Thane sector. Only 10 species were encountered in Versova and Mahim creek. In a study made a decade earlier 68 species were observed in Versova -Mahim environment and 46 species in Thane creek. This study showed a marked decrease in density and in the total number of species showing 33.3% reduction in diversity from the area studied. The reduction in diversity is more pronounced in the upstream stations where low dissolved oxygen (DO) and heavy concentrations of nitrates, ammonia and phosphates prevail. Bestiolina similis and Acartia spinicuda together accounted for the copepod standing stock. in both localities.

Average density of copepods at Thal is very high(2716/m3) compared to the Mumbai coast;Mahim310/m3,Versova 213/m3 and Thane 185/m3.The hydrographical features point to habitat degradation due to anthropogenic and industrial waste is more pronounced in the Mumbai harbor area. Key words: copepods, coastal indicators,alterations