Spatial and temporal variation in fish community of a marine embayment in Zanzibar, Tanzania. Hydrobiologia

Abstract

Spatial and temporal variation in the fish community structure were studied in a tropical non-estuarine embayment in Chwaka Bay, Zanzibar (Tanzania). Fish samples were collected bi-monthly (at each spring low tide) for 1 year (November 2001–October 2002) from a range of bay habitats ranging from mangroves deep inside the bay to seagrass beds close to the mouth of the bay. Additionally, environmental variables were examined to determine their relationship with the fish community structure. Being a non-estuarine embayment, the environmental variables as well as the fish community structure in each habitat remained relatively constant for most part of the year; however, a marked decline was observed during the rainy period (April–May). Significant variations in fish community variables (density, biomass and species richness) and in water temperature and salinity were observed during the rainy season in all habitats, with larger changes in the mangrove and mud/sand flats habitats than in the seagrass beds. Seasonal variations in water clarity and dissolved oxygen were not significant, though. Many species disappeared from the mangrove and mud/sand flats habitats during the rainy season and those which persisted showed a remarkable decrease in density. Moreover, the results indicate that mangroves were the preferred settling habitats for Gerres filamentosus, Gerres oyena, Lethrinus lentjan and Monodactylus argenteus, especially during the dry period (December–February) before the rainy season. This observation is contrary to what has been reported from some other tropical regions where greater abundance and species richness was observed during the rainy season. A significant relationship was found between density of fish and temperature, salinity and turbidity. Since salinity was the most conspicuously changing environmental variable with seasons, we propose that salinity, alone or in combination with low visibility and temperature, was probably the most important environmental factor structuring the fish assemblage in the mangrove and mud/sand flats habitats, particularly during the rainy season.

Author

B. R. Lugendo, A. de Groene, I. Cornelissen, A. Pronker, I. Nagelkerken , G. van der Velde, Y. D. Mgaya

Keywords

Juvenile fish Spatial-temporal variation Community structure Mangroves Seagrasses Indian Ocean