

An ecological role of the shorefront in a brackish lake as a refuge from hypoxia for benthic organisms (a preliminary)

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Introduction

It has been known that benthic communities are seriously damaged by hypoxia in eutrophicated waters. Bottom environment in central basins of brackish lakes are easily deteriorated by hypoxia since oxygen supply is prevented by strong salinity stratification. While central basins of lakes are defaunated by hypoxia in summer, benthic organisms may survive in shallow areas where hypoxic water masses rarely occur. To assess the ecological role of shorefronts in population maintenance of macrozoobenthos, seasonal dynamics of water quality and macroinfauna were studied in the shallow area of a small brackish lake, Hinuma, Ibaraki, Japan.

Materials & Methods

The fixed station was established in the eastern coastal fringe of the lake, ca 1.2m deep (Fig.1). Periodical samplings were conducted in 1-2 month interval from November 2002 onward. Salinity and dissolved oxygen concentration (DO) of surface water were measured with handy devices. Five sediment samples were collected with an Ekman-Birge bottom sampler (0.0225m^2) and washed with a 0.5 mm mesh screen. Materials retained on the screen were fixed with 10 % formaldehyde solution. In the laboratory, organisms were sorted, identified and counted. Water temperature and DO in the bottom layer were recorded from 29 July 2003 onward in 30 min interval with an automatic device (ADOW, Alec Co. Ltd.).

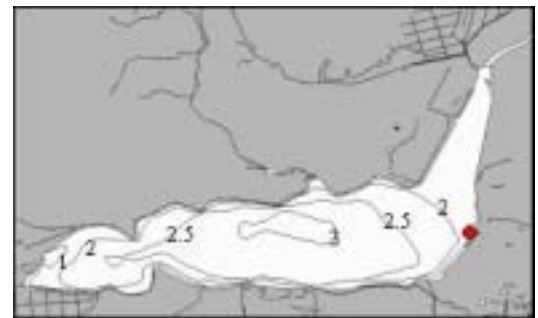


Figure 1 Sampling location in the lake Hinuma.

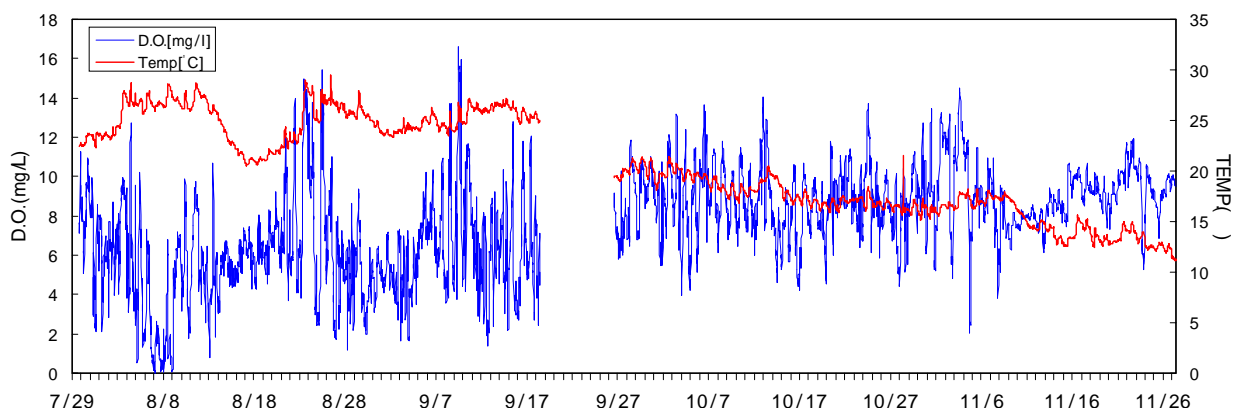


Figure 2 Temporal records of water temperature (red) and DO (blue) in the bottom layer of the shorefront.

Results & Discussion

Bottom water DO widely fluctuated in short periods (Fig.2). Despite of occasional hypoxia, total abundance of benthic organisms did not decreased in summer (Fig.3). Two mollusks (*Corbicula japonica* and *Assiminea lutea japonica*), 3 polychaetes (*Prionospio japonica*, *Potamilla* sp. and *Notomastus* sp.) and tubificid oligochaetes were common. *P. japonica* was abundant in July through September 2003. Brief hypoxia did not cause any faunal deterioration. It is likely that the shorefront of the lake has a significant role in population maintenance of benthic organisms as a refuge from hypoxia, and the conservation policy on the management of shorefronts should be stressed.

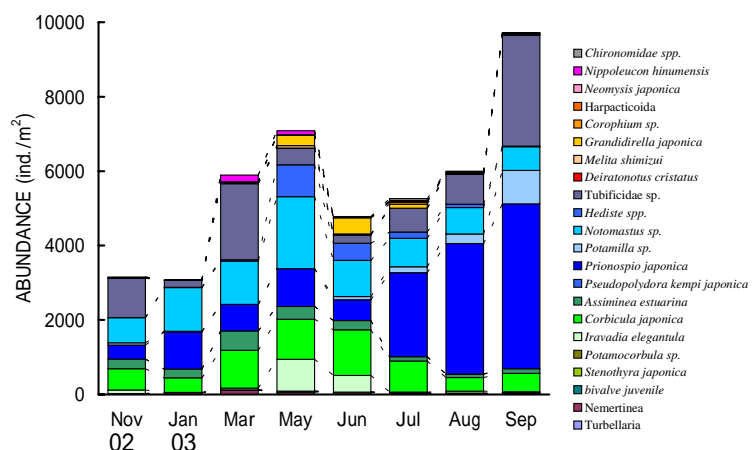


Figure 3 Seasonal change in macrofauna at the shorefront.