

TITLE: INTERACTIONS BETWEEN ZEBRA MUSSELS (*DREISSENA POLYMORPHA*) AND MICROBIAL COMMUNITIES

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Source: CANADIAN JOURNAL OF FISHERIES AND AQUATIC SCIENCES: March 2000: Volume: 57 Issue: 3 Pages: 591-599

Abstract: Zebra mussels (*Dreissena polymorpha*) have had an enormous impact on aquatic environments. However, little is known concerning their interactions with microbial communities. In these studies, the ability of zebra mussels to derive nutrition from bacterioplankton and their effect on microbial community diversity were investigated in samples from the Hudson River, New York, and in laboratory studies. Clear physiological responses to starvation were observed, including decreases in respiration rates, lipid content, and total weight, that were reversed after feeding zebra mussels a diet of bacteria. Clearance rates of bacteria were correlated with bacteria size ($r^2 = 0.995$), with the lowest clearance rates associated with small indigenous river bacteria (size = $0.03 \pm 0.04 \mu\text{m}^3$, clearance rate = $0.08 \pm 0.02 \text{ mL.mussel}^{-1}.\text{min}^{-1}$). Comparison of the diversity of microbial communities in zebra mussel tissue extract, detritus, and pseudofecal material associated with zebra mussel colonies, surrounding water, and sediment samples revealed distinct microbial assemblages associated with these environments. The overall ecological effect and importance of bacteria - zebra mussel interactions remains unclear, but these studies indicate that these interactions occur and should be included in our efforts to better understand the impact of zebra mussels on aquatic systems.

Full article can be found at: <http://dx.doi.org/doi:10.1139/cjfas-57-3-591>