

Regulation of Plankton Community Structure in Eutrophic Urban Ponds Dominated by Microzooplankton

Ph.D. Thesis

by

Maurizio Murru

Summary

Small ponds are ubiquitous and highly visible features of urban and suburban landscapes. They are valued as recreational and aesthetic components of parks and are also frequently integrated into municipal storm water runoff systems. The foodwebs of these highly eutrophic ponds are typically dominated by benthic invertebrate predators and/or small, planktivorous fish. The resulting herbivorous zooplankton assemblage consists of small-bodied invertebrate and protistan grazers with diverse, individualized feeding strategies. The phytoplankton is most often composed of species-rich assemblages of eukaryotic algae that vary greatly in particle size, shape and motility. This pond plankton community structure contrasts markedly with that of eutrophic lakes in which summer foodwebs are typically dominated by nuisance Cyanobacteria, large-bodied zooplankton, and sport fish. In such lakes, community structure and dynamics is primarily attributed to a number of strong, size-structured interactions involving a few key species in these trophic compartments. In eutrophic urban ponds, a diffuse trophic network may operate to maintain high biotic diversity and consequently reduce the importance of size-structured trophic interactions operating at the level of plankton. With this research we attempted to identify key factors promoting both high levels of plankton biodiversity and of temporal dynamics in eutrophic urban ponds by examining the complexity of phytoplankton-zooplankton interactions.