

Role of environmental variables in diatom distribution in urban wetlands of Peninsular India

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Abstract

Unplanned anthropogenic activities have contributed to the shrinkage of wetlands as well as degrading their quality. This necessitates watershed-based planning such as inventorying, mapping and regular monitoring with cost-effective and reliable assessment protocols. Diatoms have been used across continents as bioindicators for reflecting the physical, chemical and biological integrity of their habitats. The current study attempts to understand the role of environmental factors in the formation of the diatom community structure in the shallow wetlands of Peninsular India. Diatoms from different habitats and water chemical variables were assessed for 43 wetlands of Bangalore, a profoundly urbanized region of Peninsular India. A total of 181 diatom taxa from 45 genera highlights the rich biodiversity of the region. Wetlands located in the densely populated urban regions are dominated by a prolific growth of eutrophic indicator species such as *Gomphonema parvulum* Kütz., *Nitzschia palea* (Kütz.) W.Sm., *N. umbonata* (Ehrenb.) Lange-Bert., *Diadesmis confervacea* Kütz., *Cyclotella meneghiniana* Kütz. and *C. atomus* Hust. Wetlands located at the outskirts of the city characterize oligo-mesotrophic conditions where *Achnantheidium* sp. dominates. Detrended canonical correspondence analysis showed a strong influence of eutrophication and organic/inorganic pollution on diatom assemblages but a relatively weak influence of conductivity. TWINSpan shows grouping of wetlands based on species composition and suggests that *Achnantheidium* sp. and *Cyclotella meneghiniana* are initial indicator taxa for oligo-mesotrophic and eutrophic conditions respectively. These results indicate that the environmental factors consistently act as limiting variables in structuring diatom assemblages at a regional scale in urban ecosystems. The study provided insights into the ecological importance of endemic diatoms found in different environments. Thus, diatom-based biomonitoring can become a viable surrogate for physical and chemical parameters of water quality. Also, region-specific diatom indices will enable the easy and efficient investigations of wetlands.

Key index words: algae, diatoms, Bangalore, habitat specificity, Peninsular India, water management