SS01

FUNCTIONAL CLASSIFICATIONS IN PHYTOPLANKTON ECOLOGY: A COMPARATIVE REVIEW OF APPROACHES AND EXPERIENCES

Salmaso N.[1], Naselli-Flores L.[2], Padisák J.[3]

[1]*IASMA Research and Innovation Centre, Istituto Agrario di S. Michele all'Adige - Fondazione E. Mach Sustainable Agro-ecosystems and Bioresources Department, Via E. Mach, 1, 38010 S. Michele all'Adige, Trento, Italy*
[2]*University of Palermo Department of Biological, Chemical and Pharmaceutical Sciences and Technologies, Via Archirafi 38, 90123 Palermo, Italy*
[3]*University of Pannonia Department of Limnology, Egyetem u. 10, Veszprém, Hungary*

Empirical models of phytoplankton groups and their recurrence in water bodies have traditionally made use of taxonomic classifications, implicitly or explicitly assuming that species classified together could share similar ecological properties. Nevertheless, the use of taxonomy in ecology has many drawbacks. From one side, many broader groups include species with very different ecological properties. From the other side, convergent evolution, the independent evolution of similar characters in different lineages, can explain why distantly phylogenetically related species can be linked together by close analogous ecological affinities. With the aim to obtain a better understanding of the functioning of the freshwater ecosystems, complementary approaches based on ecological criteria have been therefore proposed. The aim of this contribution is to critically review the rationale of the different classifications that have been proposed during the last three decades, highlighting the strengths and weaknesses of the different approaches. Besides the first classifications, which considered broad functional categories based on reproductive (*r-K* selection) and life strategies (*C-S-R*), successive formulations included the functional groups (*FG*), firstly established by C.S. Reynolds, the Morpho-Functional Groups (*MFG*- Salmaso & Padisák, 2007), and the Morphology-Based Functional Groups (*MBFG* - Kruk et al., 2010). In the original formulation of *FG*, species were put together if they showed similar dynamics and ecological requirements, implicitly assuming a similar response to a set of environmental and seasonal changing conditions. With successive refinements, morphological properties have been used to fit hitherto functionally unclassified taxa into existing *FG*. This classification has been widely used in many aquatic ecosystems, with applications in ecological status assessment. At the opposite, *MBFG* (totalling 7 groups) are exclusively based on morphological characters, irrespective of the temporal dynamics of the species. The *MFG* concept use a hybrid approach, integrating morphological, functional and, when ecologically relevant, taxonomic characters in the definition of groups. The comparative evaluation of the above classifications was attempted only very recently, and will be critically examined in this review. Finally, this work will provide an updating of the original *MFG* classification based on the application of the concept to real case phytoplankton studies.