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Review

Epiphytic biofilms in freshwater and interactions with macrophytes: Current understanding and future directions

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ABSTRACT

Epiphytic biofilm is an important component in freshwater ecosystems and is one of the main primary producers in shallow freshwater ecosystems. The epiphytic biofilm is comprised of an autotrophic community made up of diatoms, green algae, and cyanobacteria, and a heterotrophic community consisting of bacteria, protozoa, fungi, and other microorganisms. Macrophytes are the host domain for epiphytic biofilm, providing substrate and influencing epiphytic biofilm via structural characteristics. Strong competitive, mutualistic, and commensalistic relationships between epiphytic biofilm and macrophytes have resulted from interactions for resources (e.g., light and nutrients) and trophic and allelopathic dynamics. Even though these interactions have wider implications on ecosystem structure, function, and integrity, the current understanding of epiphytic biofilm-macrophyte interactions is limited. In this review, we highlight the current understanding of epiphytic biofilms in freshwater ecosystems and synthesize their different interactions with macrophytes by providing illustrative examples. Furthermore, we identify key areas where research is currently lacking and provide directions for future research in this field, which will allow for better integrated aquatic ecosystem management and conservation strategies.

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