

ABSTRACT

Epipellic algae can perform a range of ecosystem functions (that include biostabilisation of sediments, regulation of benthic-pelagic nutrient cycling, and primary production). There is a growing need to understand their ecological role in light of current and future alterations in sediment loading resulting from land-use change and land management practices. Although the majority of recent work on epipellic algal ecology has been conducted within estuarine ecosystems, significant advances have also been made in freshwaters. We review these recent studies in combination with more classical freshwater approaches to highlight the importance of freshwater epipellic algal ecology and to aid discussions regarding future research. A summary of benthic algal groups is given with particular emphasis on substratum preference and habitat boundaries. No standard methodology exists for sampling freshwater epipellic and we discuss the advantages and disadvantages of a suite of currently employed methodologies. Spatial variability in epipellic community biodiversity is discussed from the micro-scale (i.e. vertical migration in the sediment surface) to the ecosystem scale (i.e. lake versus river habitats), and finally at the geographic scale (i.e. the “ubiquity” of epipellic species). Factors regulating epipellic community composition and biomass (e.g. reproductive strategies, habitat disturbance, grazing pressures, resource limitation, resilience, symbiosis, and parasitism) are also reviewed. Finally, examples of specific epipellic ecosystem functions (e.g. primary production, biostabilisation, and regulation of biogeochemical cycling) are given and areas of research requiring particular focus in the future are outlined.