Substrate specificity of epiphytic communities of diatoms (Bacillariophyceae) and desmids (Desmidiales)

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Master´s thesis, Prague, 2015

Abstract

It has been always assumed, and frequently reported, that host plants, as biologically active substrates, should have a direct influence on associated epiphyton. However, some studies favoured the neutral substrate hypothesis. Thus the relationship between host plant and epiphytic community remained unresolved. This Master´s thesis focused on the basal question that numerous previous studies overlooked. Is there any significant influence of host plant on freshwater algal epiphyton in comparison to the influence of other factors, e.g. site and environmental conditions? In addition, substrate specificity of individual algal taxa was investigated. The research concerned several types of natural plant substrates at several water bodies in the Czech Republic, which provided a more accurate and general insight in the ecology of microphytobenthos.

The results have demonstrated that site was the main factor affecting epiphytic community structure, followed by mild, but still noticeable, effect of environmental conditions (pH and conductivity). In contrary, host plant had almost no influence and very few algal species were found to be host specific. Therefore, the neutral substrate hypothesis is considerably supported, suggesting that epiphyton can be used in biomonitoring regardless of substrate type. Moreover, the research concerned diatoms (Bacillariophyceae) and desmids (Desmidiales), two groups of microscopic algae that are monophyletic, unrelated and ecologically very important. All analyses were done in parallel for both algal groups, and finally, the direct comparison of community structures of both algal groups was performed. Apparently, the group strategies were mostly identical, and therefore they could be generalized for the entire microphytobentic community.

Key words: community structure, desmids, diatoms, epiphyton, host plant, substrate specificity