

Diversity and distribution of riparian plant communities in relation to stream size

John Bohme Dybkjaer and Annette Baattrup-Pederson
National Environmental Research Institute, Aarhus University, Denmark

Riparian areas are recognised as one of the most species rich environments due to high levels of spatio-temporal heterogeneity. Within the last decade, however, there has been an increasing concern regarding the disappearance of species-rich plant communities in riparian areas, and a huge effort is made at both national and international levels, e.g. EU Habitat Directive and Water Framework Directive, to conserve species rich riparian areas that still remain. Furthermore, rehabilitation of former species rich areas through various restoration efforts as well as establishment of uncultivated buffer zones along stream reaches are also widely implemented.

The present study was conducted to investigate the diversity and distribution of plant communities in riparian areas along a lowland stream-size gradient (1st to 5th order). We hypothesise that 1) there is an overall increase in community diversity with increasing stream size and 2) the distribution of the various community types is closely linked to their tolerance towards eutrophication. To test these hypotheses we use vegetation data from a total of 1,823 plots located in 50 representative Danish riparian areas. Following vegetational analysis each plot was classified into a habitat type using a species-based classification model that builds on habitat types protected by the EU Habitat Directive.

We found a positive correlation between stream size and number of habitat types ($r^2 = 0.75$) which seem to be coupled to the intensity in the interaction between the stream and the riparian area. Furthermore we found that the tolerant habitat types were widely distributed e.g. tall herb fringes and mesophile pastures, whereas more vulnerable types like fens and meadows were more restricted in their distribution. These results demonstrate the need for conservation or reestablishment of natural hydrological processes to conserve or restore diversity in riparian areas and also that special attention regarding excess nutrient loadings should be allocated towards riparian areas and buffer zones with sensitive habitat types to prevent their future decline with respect to both quantity and quality.