
Preface

Many conferences have been carried out concerning floodplain ecology, often dealing with hydrology, floodwater protection, aquatic biodiversity and/or nature protection. The express purpose of the present symposium was to focus on the soil system. The symposium aimed at creating a dialogue between hydrologists, soil scientists and soil zoologists in order to bring together for the first time the widely dispersed research in these fields and thus to produce an understanding of the interactions between inundation, soils and soil fauna in floodplain habitats.

The conference was attended by somewhat more than 40 scientists from a dozen different countries, with a strong emphasis on, but not limited to central Europe. The effects of different flooding regimes and land-use types on floodplain ecosystems from around the world were presented. Major themes concerned hydrological interactions between surface and groundwater as well as their influence on soils, vegetation and soil carbon; floodplain soil types as well as pollutants and nutrient cycling. The majority of presentations, however, dealt with soil fauna, whereby most soil-animal groups – both epi- and endogaic – were represented. Faunistic presentations concerned the reactions, dynamics and physiological adaptations of single species, but especially community-level distribution and reaction patterns to inundation. Notably missing, however, were reports on nematodes from floodplain habitats. The current volume represents only a small portion of the themes reported during the conference.

Important themes of discussion concerned, for instance, reasons why floodplains should be studied from a soil perspective: (1) environmental protection of an important ecosystem type, research on and preservation of the high biodiversity in these systems; (2) securing the ecosystem services provided by floodplains (e.g., food resources, buffers for excess nitrogen between agricultural and river systems, etc.); (3) theoretical ecology: the dynamics of floodplains allow mechanisms occurring in community and landscape ecology to be studied at small spatio-temporal scales.

A further result of the conference was the recognition that most soil-ecological research in floodplains is being carried out by single teams looking at specific ecosystem components. Thus, research has until now been largely limited to revealing and describing the dynamic patterns in singular elements (hydrology, soils, particular faunal groups) attributable to the variable inundation of floodplain ecosystems. These are undoubtedly complex and difficult to study, especially when taking place at the landscape and community level. The present conference could show that this research has already progressed very far. However, only some of the presentations dealt with specific interactions (e.g., hydrological and vegetation dynamics; inundation, soil fauna and nutrient dynamics).

The next step in floodplain soil research therefore appears to be the study of the interactions between the diverse ecosystem components in order to reveal the mechanisms behind these dynamic patterns. In other words, since specific components are becoming increasingly well described, research needs lie in the soil-ecological processes in floodplains and their relation to inundation. This will indeed be difficult, since the perturbations caused by the high spatio-temporal dynamics of floodplain habitats add additional complexity to the already multifaceted interactions within the soil system. There is thus the acute need to build integrated research groups for soil-ecological studies in floodplains. It also became obvious

during the conference that, while most previous research concerned descriptive field work of natural patterns, a next step should include an increase in experimental studies, not only in the laboratory, but also in the field, in order to unravel the complex interactions within species (physiological studies), between species and species-groups as well as between hydrology, soil and fauna.

Such integrated research of interactions and processes is needed to identify and comprehend the complex, emergent ecosystem properties – at both local as well as landscape scales – that are exclusive to floodplain ecosystems. This will help increase the understanding of how stable ecosystems are maintained despite the recurrent, yet variable disturbance of inundation. This, in turn, can assist the application of basic research to nature conservation as well as human interests, e.g., floodwater control, securing ecosystem services etc. We hope that future meetings can and will address these themes.

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