Introduction

Similarly to other sciences, the history of ecology consists of different periods. These periods could be characterized by scientific fashions, such as the so-called „ecosystem approach" in the era of International Biological Program, or the evolutionary and behavioural ecology in the turn of '80s and '90s, last century. These preferred topics, however, are not only scientific fashions, but they are brought about by theoretical or practical necessities, too. The alternation of population and community level approaches is very apparent example of the periodical changes in topics as a consequence of theoretical requirements. In the great periods of the community ecology, in the 1910s, 1950s and 1980s, when the composition and structure of many communities were described with more and more sophisticated methods, it turned out that too little was known about the mechanisms behind the community patterns. That is why these periods were followed by mechanistic, usually population level approaches, which, already equipped with deeper knowledge of the mechanisms, catalyzed the further development of community studies, and so on.

Another couple of alternating approaches is that of the equilibrium and non-equilibrium paradigms. In this case, since the scientists prefer to see „rules" in the nature, the equilibrium concepts have been more widespread, and show organic development from the classical Clementsian and Lotka-Volterra approaches to the recent population, community level studies and system models. Although the non-equilibrium theories are not at all new, their history is more disjunct. Recently, they have a renaissance, because it has been clear that a considerable part of dynamic community processes, which are important mechanisms of both degradation and recovery, therefore they are of utmost significance for nature conservation and environmental protection, cannot be understood on the basis of so-called equilibrium concepts. In this case, the practical issues are at least as important as the theoretical ones.

The third cluster of conceptual questions is the appropriate selection of the spatio-temporal scales of the ecological researches. The ecological scenario of the last half century has clearly demonstrated that the mechanistic and the causal backgrounds of the biotic phenomena cannot be explained exclusively on the basis of traditional short-term studies at habitat spatial scales. The studies moved into both directions, toward finer and larger spatio-temporal scales. The microcosm studies and the information theoretical analysis of vegetation-level patterns via micro quadrates provide examples for finer scale approaches, whereas the enlarged scale is well demonstrated by the recent development of the long-term programs, the island ecology, the metapopulation biology, the metacommunity researches and the landscape ecology. The large-scale, landscape or regional level ecological approach (sometimes referred to as macroecology) has a lot of possibilities in conservation applications (e.g. ecological corridors, econets, river corridors and other programs). This has been well recognized by a lot of authorities, and the Eu-region programs

provide suitable basis for regional, cross-border cooperation in ecology and nature conservation.

The ecological researches in river valleys are concerned by all of the above issues, as seen in the chapters of the present volume, based on the presentations of the symposium "Ecological research in river valleys (Eu-region conference)". The majority of papers performs syncentric and/or biotic (faunistic and floristic) approaches, with the exception of the paper by Báldi *et al.* (Ch. 1.1.) on the distribution of four bird species in Szigetköz flood plain affected by the water regime changes. Though we expect a non-equilibrium dynamics in the majority of river aquatic communities (e.g. different plankton assemblages), very few papers are dealing with non-equilibrium dynamics (e.g. Sárkány-Kiss, Ch. 1.6.) although some of them are concerned by human or natural disturbances (e.g. Kisbenedek, Ch 1.9., Bába, Ch 1.10.). An apparent example of the man-made habitat destruction by water management is the hydroelectric power station on River Danube, which caused a reduction of the water supply in the Szigetköz region to 10 p.c. of its original value (Báldi *et al.*, Ch 1.1., Kisbenedek, Ch 1.9., Szabó and Molnár, Ch 1.4.). The high number of the papers on water quality is not surprising, because it is one of the most problematic issues in river ecology. The water qualification from different (biological, chemical et.) aspects is a theoretically problematic issue itself and Gőri *et al.* (Ch 2.1.) give a good example on the complex ecological classification. Other contribution in this topic are mainly dealing with the quality of water in particular areas (Brankovic and Budakov, Ch 3.10., Djukic *et al.*, Ch 3.6., Lakatos *et al.*, Ch 2.2., Matavuly *et al.*, Ch 3.8., Ötvös *et al.* Ch 3.9., T. Nagy *et al.*, Ch 3.1., Teodorovic *et al.*, Ch 3.7.).

The current environmental catastrophe caused by the cyanide pollution of river Tisza highlighted the role of oxbow lakes as potential sources of recolonization of different species populations. This is an additional importance of the oxbow lakes besides their other, well known conservation values. Therefore, the studies on these water bodies are of great significance (Braun *et al.*, Ch 3.5., Lakatos *et al.*, Ch 2.2., Szilágy *et al.*, Ch 3.2.). The establishment of Tisza dam and the reservoir at Kisköre was disputed by a lot of hydrobiologists and ecologists. The reservoir, however, having similar conditions to the state of the river before regulation, was not so vulnerable to cyanide pollution than the other part of the river. This fact does not provide enough basis to support the establishment of newer and newer hydroelectric power stations and reservoirs, but it underlines the necessities of the hydrobiological research of the reservoir, which is given by Kiss *et al.* (Ch 3.3.) and Zsuga *et al.* (Ch 3.4.). We think that the scientific experiences on the ecology of oxbow lakes, channels and the reservoir contribute to the theoretical foundations of the reconstruction of Tisza valley into such state, which improves the resistance of the systems against pollution and high floods, and which is similar to the river before it had been regulated.

River valleys are landscape-level complexes of zonations along the rivers. The habitat strips which are the components of this complex, form interactive systems,

therefore the natural history of river valleys cannot be understood without studies on the terrestrial and wetland habitats of the flood plains (Bába, Ch. 1.10., Báldi *et al.*, Ch 1.1., Gallé *et al.*, Ch 1.3., Horváth and Wagner, Ch 1.7., Kisbenedek, Ch 1.9., Majer, Ch 1.5., Margóczi *et al.*, Ch 1.2., Szabó and Molnár, Ch 1.4.). We also emphasize the significance of landscape-level researches for the same reason (Gallé *et al.*, Ch 1.3., Horváth and Wagner, Ch 1.7., Margóczi *et al.*, Ch 1.2., Szabó and Molnár, Ch 1.4.), which could be developed into regional level projects (e.g. Gallé *et al.*, Ch 1.3. and Margóczi *et al.*, Ch 1.2. are the first publications of such a project).

Although it was thought some decades ago that the biological researches in river valleys have been over their descriptive periods in the region, current results show that there are a lot to do in this field, too. These descriptive studies, which are represented by the papers of Bába (Ch1.10.), Margóczi *et al.* (Ch 1.2.), Pekli and Zsuga (Ch 4.4.), Popovic *et al.* (Ch 4.3.), Szabó (Ch 1.11.), Szitó (Ch 4.2.) and Tóth *et al.* (Ch 1.8.), contribute to the knowledge of the flora, fauna and ecological communities of the river valleys and provide foundations for the further, detailed analysis and for the nature conservation.

We hope that this volume, besides documenting the current results of the regional ecological researches, will stimulate further cooperation of the ecologists interested in the fascinating world of the ecology, natural history, conservation and hydrobiology of river valleys.

Szeged, March 2000

László Gallé and László Körmöczi