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BOOK REVIEW

Ecology of mammalian communities

Patterns in the structure of mammalian communities. D. W. Morris, Z. Abramsky, B. J. Fox and M. R. Willig, eds. Texas Tech University, The Museum, Special publications no. 28, Texas Tech. Univ. Press, Lubbock, 1989, 266 pp.: ISBN 0-89672-173-6.

The book is a result of a symposium under the same title which took place within the 4th ITC in Edmonton in 1985. It is a collection of original articles concerning, in a broad sense, the ecology of mammalian communities, prepared by 26 authors from 7 countries. It contains both theoretical papers and the results of experimental research. The subject of these researches were various taxonomic groups of mammals and species of various life-history strategies inhabiting all kinds of habitats on almost all continents. The highest number of data, however, concerns rodents. The focus of the authors' interests were both the distribution and abundance of species in terms of geography, and the use of microhabitats, or the strategy of foraging by individual animals. Furthermore, they were interested in ecological photographs of current competitive processes, as well as in the analysis of paleontological evidence of the stability and repetitiveness of community structure over millions of years of mammal evolution.

The first part concerns habitat selection. In it the theoretical models of such selection and their application in the research of community organization were discussed (M. L. Rosenzweig). It was shown that the spatial variation of rodent density in the temperature and boreal zones forests was the effect of the spatial diversity of food abundance in the habitats (D. W. Morris). The habitat selection and the level of desert rodent density depend on the seasonal changes of food abundance resulting from the use of herbicides and the variable precipitations (W. G. Whitford, Y. Steinberger). The habitat tolerance and the niche breadth of the temperate zone rodents can also depend on the density and the population structure, as well as on the density of the competing species (W. I. Montgomery). The distribution of bats on the territory of various plant formations in Venezuela indicates that most of the species are characterized by a considerable habitat tolerance. There is, however, a clear connection between a given type of vegetation and the distribution of insectivorous species inhabiting tropical forests (M. R. Willig, M. A. Mares).

The second part is devoted to the interspecific dependences and interference. The granivorous rodents from semidesert regions of North America belong to the most frequently studied guilds of related and ecologically similar species. They are characterized by both a significant diversity and an impressive variation in the species composition, this latter not only on the historical and geographical but on the local and seasonal scales as well.

This fact contradicts the theory of community coevolution. The species composition results from the reaction of particular species to the habitat heterogeneity, and the interspecific competition is only one of the factors influencing the usefulness of definite habitats for a species (J. I. Brown, M. Kurzius). The model of evolution of competitive community seems interesting: it is based on a maximum matching the food niches and the species richnes growth to the growth of the resources abundance. The model was verified empirically by an analysis of rodent assemblages inhabiting a mosaic of habitats in Eastern Australia. Subsequent species of similar food specializations appeared only after all the available food niches had been occupied (B. J. Fox).

Experimental research which are aimed at proving the existence of an interspecific competition often give incompatible results. Due to a review of published papers on rodent communities of North America, this must be the effect of some methodological deficiency. The data according to which the direct competition exists were collected more often in isolated populations than in those at large, and more often these data showed changes in the spatial distribution of the species than their density reactions (R. D. Deuser, J. H. Porter, J. L. Dooley). Two interesting articles about desert rodents of North America analyse mechanisms enabling the coexistence of species utilizing the same food resources. The division of resources is possible thanks to spatial separation as the foraging strategy of a species results from a predatory risk related to the morphology of a species (B. P. Kotler). The division of resources enables also the foraging efficiency which depends on the size of the animals, and which varies both in time and space (J. S. Brown). Therefore, the morphological diversity of species is crucial for both mechanisms of a community functioning. The ecological consequences of such diversity were analysed in ungulate mammal communities inhabiting savanna forests. The division of resources in this case consisted in utilizing not different plants but rather different parts of them. As a result of this, particular species complement in time and space. Direct competition for food resources is less important than other ecological interactions (N. Owen-Smith).

Morphological diversity is also one of reasons why the niches of insectivorous bats in Australian mangrove forest are separated (as they complement in the three-dimensional areas of living specifically). Environmental fragmentation and degradation adversely effect the species richness, and disturb the spatial organization of a community (N. L. McKenzie, A. N. Start).

The third part of the book describes the distribution and abundance of species as well as the species diversity of mammal communities. An excellent article discusses changes in the Cenozoic mammals of North America. The periodical extinctions of species and whole families caused by significant environmental changes, and periods of intensive radiation resulting from the existence of empty niches as well as a competitive dislodgements of species are described extraordinarily interestingly. Long periods of 10 – 20 million years during which a great many taxons stabilize with almost no modifications prove the stability of communities occupying all the available niches (S. D. Webb). Also the skill of relating biological processes taking place in various time dimensions is helpful in the study of community ecology. The integration of ecological and evolutional theories opens new perspectives for the investigation of coevolutional mechanisms, e.g. the relation between the rate of speciation and the type of population dynamics (N. C. Stenseth). On the semidesert Mediterranean territories the distribution and density of rodent were analysed on both the geographic and local scales. The factors affecting species richness and community biomass are productivity and size of habitats, and, to a lesser extent, competition. The coexistence of species is possible thanks to different microhabitat selection (Z. Abramsky). The diversity of species sizes in rodents guilds inhabiting semideserts in the North America can be the effect of interspecific interference or an reaction to food resource variety. Non-random structure of species sizes points out to the considerable significance of a morphological diversity in the course of community creation (J. S. Findley). Comparing the mammalian fauna inhabiting Australian forests and other areas of that climatic zone, it was found that the character and abundance of available resources determined the trophic structure of communities. Australian forests are comparatively rich in leaf- and insect-eating species, but not in fruit- and seed-eating ones. The fragmentation of tropical rain forest causes the reduction of species richnes and the trophic diversity of communities (S. R. Henry, A. K. Lee, A. P. Smith). Analysing the distribution of predatory marsupials in Australia, it was recorded that they were most abundant on semidesert territories in the center of that continent. All the larger species, however, inhabit the humid and woody seasides. What enables the coexistence of species is food niche separation. This separation is possible due to a heterogeneity of forest habitats, and on drier territories inland, due to low density of small and mobile species. It was proved experimentally that the distribution and density on the local scale depended on both the resources and the presence of other species, and the food niche separation was the effect of a morphological diversity (C. R. Dickman).

According to this review some articles were misplaced in the book. Some of them have imprecise or misleading titles, which can give a headache to a reader. Is it fortunate that the book lacks a summary of any kind? Despite all these faults the book is certainly worth reading. It is a mine-like source of information and ideas for further study.

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