POPULATION AND COMMUNITY DYNAMICS DURING SUCCESSION IN ABANDONED MEADOWS

by

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The rate and character of changes in meadow vegetation after abandonment of mowing were studied for 15 years (1974-88) in the Białowieża Forest. The processes of succession were analysed at different levels of vegetation organization by the hierarchical plot system of different sizes. The dynamics of vegetation was observed over 15 ha, that of phytocenoses – 4 x 1 ha, and that of population – 24 x 200 m^2. The development of individual plants was observed on 6 plots of 25 m^2 each.

The rates and modes in which the forest entered the abandoned meadows varied as follows:

a) Meadow phytocenoses gradually passed into macroforb and then into shrub communities, over a period of ca. 15 years.

b) The mosaic of monospecific aggregations of some 124 meadow components was formed. The aggregations may last from 5 to 15 years. They initiate the development of macroforbs and shrubs later on, and lead to the mosaic pattern.

c) Biogroups of trees developed directly in the meadow and formed the outposts of the forest.

The diverse courses of succession in meadows result from the heterogeneity of their habitats (microrelief, water table) and the richness of colonization strategies of species present before succession. The significance of different species in succession varies. Three different types can be distinguished:

1) promotors, which stimulate the transformation of meadow phytocenoses and initiate the formation of later communities;

2) inhibitors, which restrict species turnover due to persistent aggregations;

3) neutrals, which are present in the course of succession but do not affect the vegetation transformations.

The species present in the course of succession showed either directional changes in numbers depending on the stage of succession, or fluctuations not directly related to it. The promotors were characterized by long life span, high fertility, strong and persistent root systems, and the ability to support or even replace sexual reproduction with the vegetative one. These features allow them to rapidly colonize the new places. However, the changes in the architecture of promotors in the course of their growth and the gradual decaying of their root systems give place to other species, e. g. to forest plants with different microhabitat requirements.

References

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Part I: Species diversity and biological mechanisms turnover in succession
Part II: Demography of the promotors of succession
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