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THE PURPOSE AND SCOPE OF ZOOCOENOLOGICAL STUDIES OF MOIST MEADOWS ON THE MAZOVIAN LOWLAND

ABSTRACT

The main purpose of zoocoenological studies carried out at the Institute of Zoology, PAS in Warsaw was to recognize the changes in the fauna in response to different types of management. The study was conducted on linden-oak-hornbeam sites, including the fauna of moist meadows. The papers in this volume characterize the structure and species composition of the fauna inhabiting moist meadows of Mazovia.

The present results concerning the invertebrate fauna occurring in moist meadows of the Mazovian Lowland are a part of complex studies carried out for many years at the Institute of Zoology, PAS in Warsaw, and dealing with basic problems of the species composition and structure of typical habitats in Poland. Different types of site management are followed by clear changes in the fauna. The identification of these processes is one of the main aims of the study. First, the fauna living on the sites of moist forests of Mazovia was analysed. The studies concentrated on both the fauna of natural linden-oak-hornbeam and oak forests, as well as that of seminatural grasslands on fertile mineral soils.

Grasslands in Poland occupy about 13.7% of its area, and they account for about 20% of the agricultural land (Prończuk 1971). They consist of extremely diverse meadows and pastures, differing in their economic value and management.

Moist meadows are characterized by a high productivity and from the economic point of view they are most valuable for animal husbandry. They may be utilized as mown meadows, mown-pastured meadows, and pastures. When appropriately cultivated, fertilized and drained, they produce highest yields of green biomass per hectare, as compared with other grassland types.

In consequence of an intensified production, grassland plant communities are subject to deep changes, leading to the formation of new phytocenotic systems

(Matuszkiewicz 1981). It should be expected that similar changes may occur in animal communities inhabiting these grasslands. The present paper is an attempt to characterize these processes by analysing the structure of the fauna on meadows in different stages of production intensification.

The study plots were clearly diversified. For example, the meadow at Białołęka was characterized by a rich floral composition and extensive cultivation. The other meadows were much poorer (Kotowska and Okołowicz, 1989), and differed from each other in the intensity of fertilization and exploitation. These factors, along with many others like water relations, insolation, surrounding habitats, accounted for a high variability of the fauna living there. Also weather conditions (prolonged spells of rainfall and low temperatures) largely affected abundance of animal communities in the meadow sward. The observation of these changes and their interpretation are often difficult.

In the grassland zoocoenoses under study, three main faunal complexes have been distinguished: soil fauna, epigean fauna, and herb-layer fauna.

Soil fauna is a good indicator of soil quality and of the processes of organic matter decomposition which take place in it. It also provides information on the productivity and pollution degree of the soil. The animal species that can be used as bioindicators were subject to detailed research. These include earthworms (*Lumbricidae*), enchytraeids (*Enchytraeidae*), springtails (*Collembola*), and larval click beetles (*Elateridae*).

In this set of papers, the epigean fauna is represented by most abundant groups, playing the most important part in this biocoenotic layer. They consist of spiders (*Aranei*) and carabid beetles (*Carabidae*).

As regards the animals associated with herbaceous plant, particular attention was paid to phytophages because of their negative role, from the economic point of view, as plant pests reducing production of green biomass. The most abundant groups investigated in detail comprise orthopterans (*Orthoptera*), leafhoppers (*Homoptera-Auchenorrhyncha*), leaf beetles (*Chrysomelidae, Coleoptera*), weevils (*Curculionidae, Coleoptera*), *Symphyta*, and mining flies of the families *Agromyzidae, Chloropidae, Tephritidae, Opomyzidae, Anthomyzidae, Drosophilidae* and *Micropezidae, Lauxaniidae*, and *Ephydridae*.

Also some groups of predators and parasites were analysed, which act as bioregulators of phytophages. The most important groups include parasitic hymenopterans of the families *Chalcididae, Proctotrupidae* and *Ichneumonidae*, and also dipterans parasitizing leafhoppers of the family *Pipunculidae*. Among predatory insects, special attention was paid to flies of the families *Empididae, Dolichopodidae, Sciomyzidae*, also to aphidophagous *Syrphidae* and *Chamaemyiidae*, predatory ladybirds (*Coccinellidae*), and spiders (*Aranei*).

Among saprophagous insects, most detailed information was collected on flies of the families *Sphaeroceridae, Sepsidae, Drosophilidae, Ephydridae, Lauxaniidae*, and *Syrphidae*. Mosquitos (*Nematocera*) were analysed to families.

Individual papers of this set characterize the species composition of particular groups on moist meadows, bionomics and ecology of single species, and also their geographical ranges.

One of the objectives of this work was to describe the structure of the animal communities under study. For this purpose abundance indices, and for some species also their densities were estimated, depending on the quantitative trapping method used. The dominance structure of these communities was analysed, and in some cases also seasonal dynamics and phenology of the animals living in moist meadows. The results of this analysis make it possible to follow the changes in the fauna caused by different types of management and utilization of pastures and meadows.

Then an attempt was made to characterize the total fauna of moist meadows of Mazovia. Abundance indices and seasonal dynamics of particular groups are discussed, and their place in the trophic system of these habitats. Particular attention was paid to phytophages considerably reducing the productivity of meadows, and also to predators and parasites limiting the numbers of the former.

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CEL I ZAKRES BADAŃ ZOOCENOLOGICZNYCH ŁĄK ŚWIEŻYCH NIZINY MAZOWIECKIEJ

STRESZCZENIE

Opracowanie fauny łąk świeżych Mazowsza stanowi część kompleksowych badań, prowadzonych od szeregu lat przez Instytut Zoologii PAN w Warszawie, obejmujących podstawowe zagadnienia rozpoznania składu gatunkowego i struktury fauny typowych siedlisk Polski. Pod wpływem

różnych sposobów zagospodarowania siedlisk następują wyraźne zmiany układów faunistycznych. Rozpoznanie tych procesów jest jednym z głównych założeń prowadzonych badań. W pierwszym etapie przystąpiono do opracowania fauny siedlisk lasów świeżych, w tym też seminaturalnych użytków zielonych.

W obrębie badanych zoocenoz łąkowych wyróżniono trzy główne kompleksy faunistyczne: faunę glebową, epigeiczną i faunę runi. W oparciu o materiały ilościowe przeprowadzono analizę struktury zgrupowań badanych zwierząt, określono ich skład gatunkowy, dynamikę liczebności w sezonie oraz podano charakterystykę ekologiczną. Otrzymane wyniki analizy strukturalnej poszczególnych zgrupowań zwierząt umożliwiają określenie zmian, jakim podlega fauna badanych łąk świeżych pod wpływem różnych sposobów uprawy i intensyfikacji produkcji.

ЦЕЛЬ И ОБЬЕМ ЗООЦЕНОЛОГИЧЕСКИХ ИССЛЕДОВАНИЙ СВЕЖИХ ЛУГОВ МАЗОВЕЦКОЙ НИЗМЕННОСТИ

РЕЗЮМЕ

Главным заданием зооценологических исследований, проводимых сотрудниками Института зоологии ПАН в Варшаве, является распознание преобразований, которым подвержены фаунистические системы вследствие влияния разного рода хозяйственного использования биотопов. В настоящее время Институт ведет комплексные исследования по фауне биотопов груда в Польше, в том числе также и фауны свежих лугов. Настоящая разработка включает структуру и видовой состав фауны свежих лугов Мазовии.