

# MONITORING, MODELLING AND MANAGEMENT OF SEMI-NATURAL MEADOW ECOSYSTEMS IN THE PIENINY NATIONAL PARK (WEST CARPATHIANS)

by

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in collaboration with

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The Pieniny Mts, a small calcareous range of the Western Carpathians, situated on the border of Poland and Czechoslovakia, are well known as a region of exceptional beauty and biological richness. Twenty years ago flora, fauna and ecosystems in the Pieniny were studied intensively [1]. In the recent years rapid changes of the vegetation and fauna have been observed: dying out of pine and fir trees, as well as many butterflies, disintegration of meadow communities as a result of irregular management or mineral fertilisation.

Semi-natural meadows (*Anthylli-Trifolietum montani*) and calcareous mountain bogs (*Valeriano-Carietum* with *Carex davalliana*) in the Pieniny Mts are very valuable from a biological point of view.

The aim of the present research is to elaborate a project and to give practical suggestions on how to manage the meadows in the Pieniny National Park and preserve their diversity. Integrated studies of different groups of plants and animals (vascular plants, esp. *Orchidaceae*, mosses, lichens, macromycetes, bees, butterflies, ichneumonidae, birds) allow the development of a model of main meadow communities from the point of view of nature conservation. A proposition for general management and practical detailed instructions for concrete areas are given.

## Practical conclusions:

1. To maintain a typical type of meadow in the region (*Anthylli-Trifolietum*), it is necessary to mow the meadows (430-700 m a. s.) every year, between July 20 and August 20; the hay should be taken away (in some cases it may be burnt or left on the edge of the meadow). If an unfavorable change occurs it is necessary for preventing soil degradation, from time to time, to leave the area unmown, for one year. Throughout the greater meadows area we left long, unmown belts (about 10 m wide), to facilitate the dissemination of seeds and movement of animals between the glades.

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2. The meadows in the higher parts of the Pieniny Mts (above 800 m) with many herbs (*Laserpitium latifolium*, *Veratrum lobelianum* and others) may be mown only every 2-3 years, leaving the biomass in the meadow.

3. Some glades should be left as permanent refuge for wildlife. If necessary, shrubs and young trees, reaching 5-6 m high should be cut out.

4. A study on secondary forest succession on permanent plots (abandoned meadows in central part of National Park) is in progress.

#### References

1. Zarzycki, K. 1989. Flora-, Fauna- und Ökosystemforschung im Pieniny – Nationalpark (Polnische Westkarpaten). 19-th International Phytogeographic Excursion 1989. pp. 24. Kraków.