

# National Grassland Inventory in Slovakia

D. GALVANEK, J. SEFFER, V. STANOVA, R. LASAK and A. VICENIKOVA

## Introduction

The project of national grassland inventory in Slovakia started in October 1998. It is organised by Slovak NGO DAPHNE – Centre for Applied Ecology in cooperation with Royal Dutch Society for Nature Conservation and supported by Dutch government and GEF. Similar projects have also been started in some other Central and East European countries (Hungary, Estonia, Slovenia).

## Backgrounds of the project

There are four main groups of grasslands that can be distinguished in Slovakia: dry thermophilous grasslands; mesophilous grasslands; hygrophilous floodplain grasslands; and alpine meadows. Except for alpine meadows they are semi-natural ecosystems that are the result of permanent management by farmers for over thousands of years. They represent very valuable habitats, contribute significantly to Slovakia's biodiversity and contain a high number of threatened and endemic species (approximately 78 per cent of endemic species of Slovakia occur in grassland ecosystems).

In the intensively managed agricultural landscape of our time grasslands represent a unique landscape that secures both agricultural yield and ecological benefits. Their sustainability should be a top priority, but in Slovakia they are highly threatened due to inappropriate management practices and land degradation, abandonment or reforestation.

During socialism, from 1961 to 1989, the agriculture sector was heavily subsidised and intensive agriculture practices were encouraged. Species-rich meadows were altered by plowing, use of hybrid seed mixtures, overfertilization and overly intensive grazing in many mountain and lowland areas. There is no exact data on the extent of "intensification", but according to data from the Ministry of Agriculture most of the grasslands were altered for intensive purposes.

After the revolution in 1989, the meadows encountered new challenges including reforestation and abandonment. Reforestation became very popular. The agricultural sector was influenced by many changes including the transformation to a market economy, the privatisation of all state-owned enterprises and cooperative farms, and the loss of the subsidies (now only 12 per cent of EU standards). These changes led to a serious decline in the numbers of cattle (55 per cent loss in 1997 compared to 1989) and sheep (67 %) and eventually to the abandonment of unprofitable grassland areas. The abandoned grasslands are now under attack from weeds and invasive plant species, therefore causing serious threats to their biodiversity value. Regarding mountain and alpine grasslands, most of the degradation is due to the intensive grazing practices or, on the contrary, due to abandonment of agricultural practices.

Botanical research on grasslands in Slovakia has quite a long tradition. However, it was mainly oriented towards classification based on the Braun-Blanquet's school. Biotope mapping in 1990s brought some new approaches, but after several years of mapping still only a small part of the area of Slovakia is covered by mapping. (Halada, 1999)

Because of all these facts a grassland inventory project was started in Slovakia to fill the gap in the knowledge about grassland ecosystems.

## Goals of the project:

- to map grassland vegetation in Slovakia with natural species composition on the 1:25,000 scale;
- to develop a classification and evaluation system for grasslands for both managerial and scientific use;
- to determine the most threatened grassland types in Slovakia and to find the most valuable grassland complexes in Slovakia;

- to create geographical information system and database about grasslands in Slovakia accessible for government conservation bodies and scientists as well.

## Methodological approach

Because of very fast degradation of some grassland types in various regions of Slovakia we realised that mapping had to be done as quickly as possible. On the other hand, some information about species composition and structure of grasslands is necessary for evaluation. Therefore, two approaches were applied.

Firstly, it is quick mapping of grasslands in the whole territory of Slovakia. It is planned to finish this mapping in 5 years. There are four basic principles of mapping. Mapper has to find polygon with homogenous vegetation, identify vegetation type, make list of species in the polygon with their coverage in simple Tansley's scale and put a polygon on the map. Some other additional information like management of the site, tree and shrub vegetation, threats of the locality etc. are filled in special form for each polygon. Mosaics of small patches of different vegetation types can be mapped as a complex of vegetation units. Pragmatically, it was decided 0.5 hectare to be the smallest area for polygons to be mapped. Smaller isolated localities can be mapped exceptionally if they are extremely valuable from a conservation point of view in regional or national scale.

It was also necessary to built some criteria what to map and what not to map.

It was decided that no mapping will be done on:

- ① grasslands overgrown by ruderal species for more than 40 per cent;
- ② intensified grassland where hybrid species cover more than 40 per cent or the number is artificially reduced to several species;

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**Authors:** D. GALVANEK, J. SEFFER, V. STANOVA, R. LASAK and A. VICENIKOVA, DAPHNE - Centre for Applied Ecology, Hanulova 5/D, SK-84440 BRATISLAVA

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- ③ fields transformed to grassland recently;
- ④ reeds;
- ⑤ polygons overgrown by trees and shrubs for more than 40 per cent in tree layer and 60 per cent in shrub layer;
- ⑥ polygons with rocks covering more than 40 per cent of the area.

In nature there are no sharp boundaries so it is sometimes a bit subjective and arbitrary and mappers have to decide whether to map or not to map the polygon.

Secondly, the methodological approach reflects the needs for exact data about diversity and structure of different grassland types. Vegetation relevés are recorded in all identified grassland types in different regions of Slovakia. Classical 5 to 5 meter relevé is combined with the records from 8 smaller squares (0.5 m x 0.5 m) randomly distributed in the area of relevé. Such a data can be used for more accurate analysis of structure and species diversity of different types (for example the analysis of species diversity in various scales). Some of this relevés will be fixed and used as permanent monitoring plots.

### Mapping units

Thirty mapping units were identified in Slovakia. They are based on the level of alliance in Braun-Blanquet's phytosociological system that is recommended for national scale (Veen et al. 1999). The list of mapping units is only a first draft used for mapping. It is a result of the work of the team of best grassland experts in Slovakia. It should be updated in the future according the results of field mapping. The characteristics of all mapping units were compiled in a manual for mapping (Šeffler et al. 1999).

### Organisation of mapping

Such a large project requires the participation of very large team of local experts able to recognise grassland species and

to do field mapping. Now the team of mappers counts 82 persons with various backgrounds, experience and education from different organisations (Slovak Environmental Agency, national park administrations, universities, research institutes...). The oldest mapper is 64 years, the youngest 21 years old. Everybody is responsible for mapping of one or more mapping sheets.

The military maps in the scale 1:25,000 are used in mapping. There are 673 sheets covering the territory of Slovakia. The first 198 sheets started to be mapped in 1999. The protected areas should be given priority in mapping.

### Remote sensing analysis

The analysis of satellite images was processed to extract thematic layer of grasslands in Slovakia. CORINE – Landcover (Feranec, Otahel, 1996, SEA, 1996) was used as a base for classification. 8,440 square kilometers of grasslands were identified in Slovakia. The grassland layer is printed on the working maps as a pink striped area. Then, it is used by mappers in the field to help them to identify the grasslands in the landscape.

However, the experience with the potential grasslands put on the map is a bit controversial. They fit quite well the situation in mountain regions, but the situation is much different in lowland areas, where often vineyards or riverbank forests were identified as grasslands.

### Data processing and evaluation

All the data from mapping are processed by geographical information system. Programmes ArcView and MsAccess are used. The polygons are digitalised on the base of military maps and species records and information about polygons are put into the database. Presently, the status of the database is in preparation. The database should be offered to government conservation bodies and should be accessible for non-commercial use by the public.

Data can be used for different purposes. First, the most threatened and rare grassland types and the most valuable grassland areas in Slovakia should be identified. Their conservation and management should be subsidised by state budget or public funds because they will be key areas for protection of grassland biodiversity in Slovakia. Data can also be used for preparation of management plans for different areas.

The classification system about grasslands for managerial and scientific purposes should be proposed according the results of the project.

### Conclusions

The grasslands in Slovakia contribute significantly to the biodiversity of the country and their loss would cause their decrease in all of Central Europe. The inventory project is trying to collect necessary basic information to help in their conservation and management. The knowledge is a first step and concrete projects have to follow. Therefore, some concrete projects for important mountain grassland areas are in preparation. (Slovak Paradise NP, Low Fatra NP) as pilot management projects following inventory.

### References

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