

# Semi-natural Grasslands of the Slovak Carpathians – Present State, Endangering, and Possibilities of their Protection

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## Abstract

Meadows occupy 10.5 per cent and pastures 22.7 per cent of agricultural land in Slovakia at present. Of course, there are differences in their distribution across the country. In lowland areas grassland is rare, on the other hand, some mountain villages are farming almost only on grasslands.

The present state, extent, way of utilisation and the consequent species composition of the majority of semi-natural grasslands are influenced by the gradual liquidation of private farming after 1950, the rise of co-operative farms, and the extinction of traditional types of landscape utilisation. Grasslands were recultivated, drained, shrubs and trees have been removed, the adjusted areas planted with non-original species of grasses and clovers reacting very well to mineral fertilisation, all with strong financial support by the state. Meadows that could not be intensified in this way, like on steep slopes, badly accessible sites, and far mountain ridges, were changed into pastures, reforested or lay fallow.

The intensive mode of grassland management is connected with the high concentration of farm animals. The permanent as well as transitional keeping of large stocks grazing on substrata sensitive to erosion causes serious ecological problems on many sites. Semi-natural grasslands managed in the traditional way can be found only in the villages where collectivisation has not been carried out, around secluded houses, isolated "kopanitse" settlements, in old long-boled orchards, around gamekeepers cottages, shooting lodges etc. There is only a small number of sites with such grasslands in Slovakia and they are not recorded. In spite of the fact that the species-rich grasslands belong to the most endangered plant communities of Slova-

kia, only a small part of them is protected by special management regime in nature reserves. There is only a small chance for the conservation of a wide range of species-rich types of extensive grasslands. There are no separate funds in Ministry of Agriculture nor in Ministry of Environment for regular, organised management of selected types of grassland.

Slovakia, situated in the western part of the Carpathians, has very varied geological, geomorphological, soil, and climatic conditions. The diversity of vegetation corresponds with these not only in natural formations, but also in grasslands which are the products of human activity.

The present situation is a result of very bad soil-relief and climatic conditions in the mountainous areas and the impossibility to use heavy agricultural machines. In the past when private farmers operated in this area more arable land existed in these villages. Each family produced bread and milk for their own needs. The tradition of larger private dairy farms was unknown in Slovakia. Only a few individuals made a living from sheep grazing, the sheep owned by several farmers.

The intensification of agricultural production was not only carried out by ploughing of balks and the creation of large homogenous fields on arable land, but also by ploughing of grasslands. These sown grasslands are regularly renewed or they are kept as permanent ones. Partly the original species return back to these "permanent" stands after a certain period, but they do not regain their original species diversity. The grazing of large stocks of young cattle appears as a strong devastative factor on the formerly picturesque grasslands with haylofts. Only the destroyed haylofts and old to-

pographical maps are the witnesses of their existence in past. Large attention was paid to these meadows in the traditional way of management because they secured the winter breeding of farming animals. They were mown once or twice (according to the distance from the settlement), occasionally extensively grazed and fertilised. The destiny of these meadows was determined also by the fact that during the period of collectivisation the farmers could not keep cattle for their own need so they lost the interest to mow grasslands, especially in sites with extreme conditions. These grasslands have been mown up to now only in the villages where some stocks remained with the farmers. The local communities of certain mountain villages which disapproved of collectivisation significantly influenced their conservation and individual farmers are operating there up to now. But they were not able to make a living from agriculture under the new conditions. Some of the inhabitants are commuting to work and grasslands are farmed mainly in the surroundings of the villages. One phenomenon can be observed in several Slovak villages, i.e., self-grassing of former, mainly terraced fields. Stabilised grassland communities arose gradually on these sites which are a little less rich in diversity than original grasslands. They became a substitute for the former mountain pastures which were abandoned, especially as a result of the decline of sheep breeding. The old type of pastoral life in remote shepherd huts typical for Slovakia in past is now rather folklore than real life.

Large stables, silage towers, large metallic haylofts, water tanks are deterrent dominants in the beautiful Slovak mountainous landscape and they will be some of the hardly solvable problems of landscape revitalisation. Lost traditional gras-

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slands represent a loss of information on the possibilities of sustainable fertility for other cultural plants of unfavourable sites. For example, the boundary of economically viable utilisation of grasslands in mountains came down by 500 or more meters of altitude especially as a result of the measures aiming at nature protection. It causes changes of plant communities. Mowing is carried out up to the altitude of 1,000 m to a maximum of 1,200 m, grazing up to 1,500 m altitude. The following types of the mountain grasslands are endangered in Slovakia:

• **Wet submountain and mountain grasslands (*Calthion*)**

Different communities of wet grasslands are relatively widespread in mountainous areas often in a mosaic with marsh and peat-bog meadows. They are unfertilised and regularly mown only in the areas with a lack of meadows of better quality (Orava, Kysuce). Most extended are the meadows with *Cirsium rivulare* (*Cirsietum rivularis*) which have the highest species diversity on extreme, during season dried sites. Many valuable and endangered species are growing there: *Gentiana pneumonanthe*, *Trollius altissimus*, *Scorzonera humilis*, *Carex hostiana*, *Carex umbrosa*, *Gladiolus imbricatus*, *Polemonium caeruleum*, *Salix repens* subsp. *rosmarinifolia*, and *Primula farinosa*. They are distributed in mountain basins (e.g., below the High Tatra Mountains). Transitions to matgrass stand with junipers and birches occurred frequently on extreme dry soils there. The larger part of these species-rich communities which form an attractive landscape has been changed into intensive grasslands.

• **Submountain and mountain oatgrass and yellow trisetum grasslands (*Arrhenatherion*)**

They are distributed in all mountains and basins of Slovakia in altitudes between 400 m and 1,000 m on eutrophic and mesotrophic soils. A great part of primary (unreclaimed) grasslands belongs to this group as well as those that are fifteen and more years after reclamation, provided too intensive fertilisation did not hinder the natural changes of communities. They are mainly twice-

mown grasslands with the dominance of grasses.

The most species-rich mountain oatgrasslands can be found on limestone on very steep slopes, on warm, protected sites with deeper soils. They are traditionally utilised unless they were afforested or lay fallow. Several rare species can be found there: *Lilium bulbiferum*, *Aquilegia vulgaris*, *Primula veris*, *P. elatior*, *Tanacetum clusii*, *Gladiolus imbricatus*, *Crocus heuffelianus*, *Gymnadenia conopsea*, *Listera ovata*, *Laserpitium latifolium*, on colder sites *Trollius altissimus*, *Platanthera bifolia*, *Traunsteinera globosa*. The number of thermophilous species is increasing on the warmest slopes, as *Brachypodium pinnatum*, *Bromus erectus*, *Polygala major*, *Orchis ustulata*, *Orchis mascula* subsp. *signifera*. These grasslands have sometimes the character of semi-dry grasslands with close connections to the communities of alliances *Mesobromion* or *Carduo-Brachypodium* (Mucina et Maglocký, 1985). Species-rich mountain grasslands are also found on disintegrated matters of volcanic mountains. For example, *Iris graminea* subsp. *pseudocyperus*, *Trifolium pannonicum*, *Laserpitium latifolium*, *Polygonatum verticillatum*, and *Orchis mascula* subsp. *signifera* are growing there.

• **Rich mountain grasslands (*Polygono-Trisetion, Calamagrostion arundinacea*)**

Fertilised, once or twice mown grasslands are very rare in the mountains of Slovakia. Their sites are reafforested, grazed or abandoned, and they have changed to high-herbaceous stands (Hadaè, 1969). They occur in typical forms only in limestone areas of the High Tatra (Belanské Tatry Mountains) at altitudes above 900 m. A high dominance of species of the genus *Alchemilla* is typical for these meadows, then *Geranium phaeum*, *Geranium sylvaticum*, *Senecio subalpina*, *Crepis mollis*, *Trollius altissimus*, *Polygonum bistorta*. Grasslands with *Anemone narcissiflora* are protected sites in the Veľká Fatra Mountains. They represented the grasslands of Slovakia which are richest in species (Grebensèikov, 1956) and which have not been managed for a very long time.

• **Poor mountain grasslands (*Polygalo-Cynosurelion*)**

Lower-stalked, flowering, unfertilised, once-mown meadows typical for sites poorer on nutrient in the entire Western Carpathians (Jurko, 1974) belong to the association *Anthoxantho-Agrostietum*. The presence of more species which indicate extensive management (species of warm and on nutrients poor sites, which have no chance to be successful in competition) is typical for the composition of these communities. Their indicative species are *Trifolium montanum*, *Dianthus carthusianorum*, *Carlina acaulis*, *Anthyllis vulneraria*, *Polygala vulgaris*, *Viola canina*, *Primula elatior*, *Thymus pulegioides*, and *Ranunculus polyanthemus*. The most species-rich meadows of this type can be found in the mountain range of the Biele Karpaty Mts. They are rich in orchids. To this group belonged a main part of meadows with lower productivity (for example the extraordinary attractive Vačeké lúky meadows under the High Tatra Mts., today grazed). Meadows of this group in nutrient-poor sites are changing into matgrass communities as a result of permanent extensive grazing.

• **Mountain matgrass meadows and pastures (*Nardo-Agrostidion tenuis*)**

They are secondary (rarely primary matgrass and hair grass) grasslands of mountain to subalpine locations. Besides the species of mesophilous meadows there are also subalpine species. Indicative species are *Nardus stricta*, *Deschampsia flexuosa*, *Calluna vulgaris*, *Crepis conyzifolia*, *Tromsdorfia uniflora*, *Vaccinium myrtillus*, *Vaccinium vitis-idea* etc. They are endangered by afforestation, intensification, grazing by large stocks of cattle, and abandonment. The regional types (e.g. East-Carpathians poloniny) and species-rich communities occurring on small areas are protected.

• **Subxerophilous meadows and pastures (*Carduo-Brachypodium pinnati, Mesobromion*)**

They are extensive pastures on dry, shallow as well as deeper soils, on steep, south-oriented slopes on calcareous substrata, particularly rich in species. We can

mention some endangered species of these communities: *Cirsium pannonicum*, *Linum flavum*, *Bupthalmum salicifolium*, *Carduus glaucinus*, *Polygala major*, *Gentiana cruciata*, *Orchis ustulata*, *Pru-*

*nella grandiflora* and *Thesium alpinum*. Currently they aren't grazed and are very endangered by afforestation, overgrowing by shrubs and natural seeding. Groups of juniper often occur on these

stands and therefore they are attractive a landscape point of view. The preparation of proposals for their management is necessary for maintaining the optimal species composition.

