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What factors cause the changes in dry grassland vegetation in Slovakia?

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The dry grassland vegetation of the class *Festuco-Brometea* occurs in the warm parts of Slovakia, mostly in the prae-Carpathian area. This vegetation occurs on rocky sites (alliance *Bromo pannonici-Festucion pallentis*) and partly extends to the higher altitudes in its semi-mesophilous form (alliance *Cirsio-Brachypodium pinnati*). The most xerophilous type of dry grasslands (alliance *Festucion valesiacae*) includes xerophilous steppe grasslands on calcareous substrates and loess. It is originally distributed in localities with shallow soil where no forest growth is possible. Suitable sites were also created secondary by deforestation and making pastures for sheep and goat. The character of the sites and the species composition has been maintained for centuries by extensive grazing. The pressure of the plant-animal interaction caused creation of specific plant communities, which represent valuable refuges for many endangered thermophilous plant and animal species.

Dry grasslands are valuable contributions to the diversity of habitats in Slovakia. Using the example of three protected areas of different level (national park, protected landscape area and national nature reserve) I present main factors, which cause the successional changes in dry grassland vegetation, harm or even destroy it. Due to the consisting reduction of area of the grasslands, it is necessary to keep up with management. Pointing out the problems, this study contributes to support public awareness of the necessity for management activities in dry grasslands in Slovakia.

National Park Slovak Karst is the most valuable karst area in Slovakia. It became a national park in 2002 for its vast geological and floristic beauty. In spite of this, the numerous dry grasslands on rocky fields are vanishing. Nowadays, the local people do not practice the traditional agriculture anymore. The sites are abandoned. There are no sheep herds left in the region, which could manage the grasslands. The shrub ant tree self-seeding is evident. In the early spring the fire management used to be carried out by the farmers to provide fresh grass for the herds. This type of management is problematic and not allowed by the Slovak legislation anymore. Annually, the national park staff accomplishes some shrub removal activities, but they help only to manage the sites of the endangered species (*Ferula sadleriana*, *Erythronium dens-canis*, *Onosma tornensis* etc.). Due to the lack of finance sources and indifference of local people, the majority of dry grassland will turn into forest in future years. Other threat for dry grasslands is the surface mining. There are few limestone quarries set in direct vicinity of grasslands on rocky fields. These valuable sites are included in the mining zones and will be destroyed soon.

Protected Landscape Area Považský Inovec Mountains is located along the river Váh in the prae-Carpathian limestone zone. The central part of the mountains, the Tematínske kopce Hills, is built up by dolomites. In this area, the numerous dry grasslands are located. Nowadays, the dry grasslands in the Považský Inovec Mts have to face many threats. First of all, the abandonment of the pastures causes successional changes in the species composition as well as shrub progression. Mostly deer and mouflons (*Ovis ammon* subsp. *musimon*) graze the vegetation dominated by sedge (*Carex humilis*), which can be found at the higher altitudes, away from the settlements. However, the non-native mouflons, introduced into this area in the past, can cause the erosion and increase amount of nitrogen in the soil. In the past decades, an intensive planting of non-native black pines (*Pinus nigra*) and ashes (*Fraxinus ornus*) was accomplished in large areas. This destroyed or eventually reduced the size of many sites. In some areas, the dry grasslands were completely destroyed by ploughing in terms of intensifying the agricultural production in the communistic times.

National Nature Reserve Devínska Kobyla is a low scale reserve located near Bratislava, capital of Slovakia. The south slope of the hill is covered by valuable dry grasslands, which represent a refuge for some highly endangered plants (e. g. *Peucedanum arenarium*). In the past, the locality served as pasture. Nowadays, it is a frequented hiking and picnic destination for the locals. The intense trampling changes the dry grassland vegetation towards the ruderal plant communities. What is more, the bicycles and motorcycles cause enormous erosion of the sandy soil. The presented aerial photographs of the area show the shrub progression in the time period from 1949 to 2003. Until now, no management attempts were successful. The most treating point is abandonment of pastures. No sheep have been grazed in the area since the 1960th. The most complicated problems, which rule the grazing out, are the property owners' relationships.