

STUDIES ON BOTANY AND ENVIRONMENTAL MANAGEMENT RELATIONS ON A WOODED PASTURE BETWEEN PÉNZESGYŐR AND HÁRSKÚT VILLAGES

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Introduction

Wooded pastures are not only important parts of the Hungarian landscape, but they have preserved historical farming methods. Since the beginning of grazing activities in forests, humans and grazing animals have continuously formed their state. Forests of lower quality were ideal places to provide food and shade for grazing animals.

Authors experienced such a sight during the first visit in the research area. A landscape with picturesque view and various, mosaic-like structure was recognized with huge old seed trees. As the territory is so diverse, authors investigated from different aspects such as landscape history, botany, forestry, nature conservation, landscape ecology and grassland management.

Grazing of the research site was abandoned in the early 1990's, therefore, the effects of natural succession are clearly visible now in this habitat and cultural landscape, being in close-to-natural condition despite the fact that it had been created by human activities. As a result of abandonment, the typical landscape – dominated by ancient seed trees – is on the way of disappearing.

Authors' aim was to explore the history and the present botanical state of the area and to follow the succession progress of the forests. By planning a habitat network and preparing a land use plan for the future, authors tried to ensure the preservation of this wooded pasture by ensuring ideas for nature conservation and sustainability.

Organic matter content plays an important role as nutrient (Ercoli et al. 2006) and shallow soils have extreme water regime (Birkás et al. 2005). Any activity that reduces the soil cover by removing the vegetation is unfavorable, increases the effect of erosion processes, especially considering the effect of future climate change (Mudri et al. 2005).

Observations on vegetation of pastures and its changes have got a high importance, especially in case of grass species (*Poaceae*), since it is mainly these species that ensure the most valuable forage for grazing animals (Süle et al. 2006. Penksza et al. 2005a, 2005b, 2005c).

Material and methods

Investigations took place on a wooded pasture situated between Pénezgyőr and Hárskút villages (High Bakony Mountains, Transdanubia, Hungary), covering 161 hectares. Pedological field research was done in parallel with the vegetation examinations, using a Former (1994, 2002) and current (2006) investigations were used for comparison of

vegetation. During coenological investigations, the method of Braun-Blanquet (1951) was used. Two types of partly vegetated and fully vegetated dolomite grassland areas were examined: 1. where grazing was abandoned; 2. where grazing still takes place. Forage values of significant species occurring in the grassland were determined according to the 10-stage scale of Klapp et al. (1953), which gives value 8 for species with high forage value, 0 for those with the less value or not grazed by animals and -1 for poisonous species.

Grass management value categories follow the system of Tasi (2002): 1. *Poaceae* species important for grassland management, 2. *Fabaceae* species important for grassland management, 3: other *Poaceae*, *Carex* and monocotyledonous species, 4: dicotyledonous species indifferent for grassland management, 5: poisonous species, 6: stinger species.

Results and discussions

An association dominated by *Glyceria declinata*, a new flora element for the Bakony Mountains was found in a wheel-track. Several nature protected species were found in the area, such as *Dianthus deltoides*, *Gentiana cruciata* (great quantities), *Pyrola minor* and *Orchis morio* (found only occasionally).

According to the evaluation of different ecological indexes, there are several species indicating humid circumstances among the plants that grow under the old seed trees. Their coverage ratio is extremely high, which can be traced back to several reasons. These big seed trees have huge leaf area indexes, therefore the intercepted rainfall continuously drops from the leaves, resulting in a wet ground. Widespread root system traps most of the water, this is why it cannot leak away. It is the shade effect that makes the microclimatic circumstances more balanced under the seed trees. The shades, created by the huge tops of these freely growing trees, stop heavy transpiration from the soil.

According to the ratio of plants in weighted relative nitrogen demand, it is clearly visible that most of the species growing under seed trees have very high values. This is why these places are called overmanured habitats. This is a consequence of the former land use, when cattle left vast amount of manure under these trees during culmination and this lead to hypertrophy of nutrients in the soil, helping nitrophilic plants to occupy these habitats.

During the evaluation of forest coverage, authors developed a new method in order to examine the arboreal young plants growing under seed trees. According to coverage values, hornbeam (*Carpinus betulus*) dominates the territory (40%) and beech (*Fagus sylvatica*) is the second most common tree species (23%). Estimated coverage of degradation indicator species (*Rosa canina*, *Crataegus* spp., *Prunus spinosa*) is 6%, while it is 4% in the case of other species (*Populus alba*, *Acer campestre*, *Salix caprea*). Clear surface, called nudum covers a significant part of the territory (27%).

Authors also prepared coenological researches in the adjacent forests in order to define the volume of their influence on the succession processes of the wooded pasture. It was recognized that the adjacent forests (linear sources) spread towards the middle of the pasture, while arboreal plants that grow under seed trees (point sources) spread towards the edge of the pastures, therefore grasslands are going to disappear soon.

Consequently, if not treated, the formerly utilized wooded pastures between Pénzesgyőr and Hárskút villages will enter a kind of state in 30 years that will need great efforts to be

restored again. There is only 1 or 2 decades left until forestry takes over the territory in the hope of profitable utilization. It is easy to predict the different phases of succession until the final equilibrium stage.

Habitat conservation by nature protection grassland management plans

Since the appearance of intensive farming methods, animal husbandry based on grazing in grasslands, forests and wooded pastures has decreased and finally this kind of utilization ceased in the territory (except for grasslands). Succession in wooded pastures also means the disappearance of numerous animal species that can only live in these ecotones, between closed forests and open grasslands (*Upupa epops*, *Coracias garrulus*, bat species living on trees etc.). Some grassy areas are still open. Authors' aim was to conserve these grasslands and exterminate the bushes in order to turn these parts of the territory into grasslands again.

Firstly bushes and unwanted arboreal plants have to be removed from the territory to form a proper landscape for the wooded pasture. By exterminating the shrubs, the grazing surface could be got back continuously. It must not be forgotten that wooded pastures are not only places for farming activities, but they also are close-to-natural habitats. Therefore, people who utilize these territories have to provide proper living space for wild animals. Habitat networks have an essential role in this activity and their formation is indispensable during the planning progress.

Based on the coenological surveys, the quantity of grass produced by the area was estimated, which has to be corrected with the rate of plant species that cattle do not graze. Based on the result (usable grass production) the number of animals that can be sustained by the territory could be calculated. It will be seen after everyday practice during several years whether this plan with its seemingly low calculation result, 0.23 animal unit/hectare is correct or not. The number of animals to be sustained by the territory always changes, because of the specific weather conditions of the different years. This means that the number of grazing cattle will change year-by-year. Therefore, calculations based on grass yields of the pasture will have an important role in practice.

As the area is quite vulnerable and carries high ecological importance, proper grazing methods have to be defined according to these features. The synchronization of nature conservation objectives, farming elements (animal husbandry) and aspects of sustainability is quite difficult in most cases. This plan tries to fulfill all these requirements, therefore authors planned special activities in the different phases. One of the basic criteria is that mowing time have to be synchronized with the biorhythm of bird species that nest on the ground. That is why it is forbidden to mow until June. This means, however, that the first two grass accessions cannot be utilized, making it necessary to buy hay to compensate the demand of animals in the searing and the winter periods. Additionally, the uncut grass would trammel grazing during the new grass accessions.

The problems mentioned above can be solved by the following methods. Each year one third of the grazing area should be used as a seed bank. This means that this area should be mowed only once a year (in autumn), therefore insects, small mammals and birds can find proper habitats and also the most important protected plants species can ripe their seeds and spread in the grassland. The seed bank will be placed in different parts of the

grasslands each year, therefore the area can totally renew during a 3-year period. In the other two-thirds of the territory, excess grass amount of the first two accessions should be mowed and conserved as hay, in order to be used for feeding animals during the searing and winter periods. So the seed bank will be cut down by a shredder in autumn, when cleaning mowing is also done. If culm remains in too much quantities on the surface, it has to be cleaned from there, because it may alter evaporation from the ground, hence new hydrophil species may appear (*Carex* spp., *Juncus* spp.).

By creating a seed bank, animals can be fed with hay produced in the grazing territory, in addition, hay expenses can be reduced. This way, aspects of nature conservation, sustainability and farming can be harmonized.

Authors plan to graze beef cattle in the territory. As the animals spend most of their time in the pastures, they also help to maintain the original landscape. This plan is based on nature protection grassland management, that is why the pastures should be utilized by indigenous breeds of livestock. Authors chose the Hungarian speckled cattle because of various reasons:

- Hungarian speckled cattle tolerates mountain conditions quite well
- historical researches revealed that one of the Hungarian speckled cattle's ancestors, the Bonyhádi cattle, used to graze in the territory
- it would be easy to get Hungarian speckled cattle from the surrounding villages.

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