

## Comparative phytosociological study of long-term on Tihany Peninsula of the Balaton Uplands National Park, Hungary

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Phytosociological samples were collected in two territories of the Balaton Uplands National Park (Hungary) dominated by grassland habitats. Samples in the Tihany Peninsula had been taken in a pasture of Hungarian Grey Cattle. We evaluated the changes of species composition and ground cover, the measure of possible regeneration or degradation, and the changes of these factors from the viewpoint of feeding value.

Separate animal breeds were bred to be best adapt to the climatic conditions of the Pannon region. The domestic Hungarian Grey Cattle had originally been grazing on wet grasslands (Török et al., 2014), but it has almost been extinct. Hungarian Grey Cattle has come into the focus as a result of incentives for the sustainable use of grasslands, and has become the main preserver of grasslands under nature protection (Török et al., 2016; Valkó et al., 2018; Tóth et al., 2016). Though this breed is kept extensively, livestock management methods are the same as in case of other cattle breeds. Contrary to the traditional grazing methods, Hungarian Grey Cattle can be kept on the pasture for a longer period (from April till November, through 200 to 240 days). The labour demand is low and the rotational grazing system proved to be the most effective. Besides the usefulness of this breed in nature conservation works, it has got a beef yield similar to other cattle breeds (Kovácsné Koncz et al., 2015, 2017). The beef productivity per area unit depends not only on the performance of the animal, but on the head of cattle per area unit and the effectiveness of the use of pasture as well. There is negative correlation between the effectiveness of pasture use and the production per animal, but positive between the amount of ingestion and grass supply, if animals have the chance to select (Penning et al., 1986; Tasi, 2006, 2007). Food availability depends on the quality, popularity, savouriness, nutritional value, energy concentration and digestibility of the grass, in one word the forage value of the pasture (Bajnok et al., 2009, 2010; Tasi et al., 2013, 2014; Török et al., 2013). Management takes place on the Hungarian natural grasslands as well. This usually means extensive activities such as mowing or grazing (Halász, 2017; Halász és Nagy, 2011; Halász et al., 2016; Tälle et al., 2016). The total cover of grasslands exceeds 1 million hectares, that is 11% of the total area of Hungary, about 0.4 million hectares of this being under nature protection (Tasi et al., 2014).

The current contribution presents a common view on extensively cultivated Transdanubian grasslands and detailed results in the Tihany Peninsula and the Tapolcai Basin, where changes in vegetation, management type and nature conservation values are all important.

Coenological studies were prepared on grazed and non-grazed steppe grasslands near the Inner Lake (Tihany Peninsula) in 1994, 2002, 2006, 2008, 2015 and 2020. Studied area in the Tihany Peninsula is a pasture of Hungarian Grey Cattle (ancient traditional breed) near the Inner Lake, where 5 phytosociological samples were taken both in the upper and in the lower third of the slope (Braun-Blanquet, 1964). A 10 hectares grassland lying along the southern coast of the Inner Lake had been a mown meadow before, and it has been converted into pasture for Hungarian Grey Cattle in 2002 (Penksza et al., 2003). This grassland is grazed by 5 cattles, 1 bull and their calves.

Covering rates of the grassland associations have doubled and species composition has improved in the Tihany Peninsula, however, forage value has not increased, due to the change in land use in favour of the natural area that is converting into grazing field. Both species number and total coverage showed a significant growth in the grassland near the Inner Lake. Rate of medicinal herbs has grown constantly as well, resulting in 24 (in 2006), 25 (in 2008) and 26 (in 2015, 2020) species with medicinal effects in the association. Number of poisonous species has grown as well, but, these species had small covering rate. Amount of stinger plants, however, was high. Decrease in rate of grass species useful for grazing and growth in rate of narrow leaved *Festuca* species are natural, but not disadvantageous processes in case of management by Hungarian Grey Cattle, since this breed was evolved in grasslands with similar species.

From a nature conservation point of view, a positive change has happened on the once mowed area converted into pasture of Hungarian Grey Cattle breed near the Inner Lake on the Tihany Peninsula. During the 20 years of studies, Tihany Peninsula has showed a constant improvement from a nature conservation point of view, however, forage value of the grassland has not increased.

**Keywords:** Grassland management, *Festuca*, nature conservation management

## REFERENCES

- Bajnok M.-Szentés S.-Tasi J. (2009): A gyephasználat intenzitásának hatása a gyep takarmányértékére. *Animal Welfare Ethology and Housing Systems* 5: 313-319.
- Bajnok, M.-Szemán, L.-Tasi, J. (2010): The effect of preutilisation and the harvest time of the quantity and quality of fodder by extensive pasture usage. *Acta Agronomica Hungarica* 58: 185-193.
- Braun-Blanquet, J. (1964): *Pflanzensoziologie* 3. Aufl. Wien, A: Springer-Verlag
- Halász A. (2017): Szürkemarha viselkedése a legelőn: Négy lábbal a földön. *Magyar Állattenyésztők Lapja* 22 (2): 42-43.
- Halász A.-Nagy G. (2011): A magyar szürke marha legelői viselkedésmintája előzetes megfigyelések és eredmények alapján. *Animal Welfare, Etológia és Tartástechnológia különszám, Gödöllő*, 7 (4): 345-349.
- Halász, A.-Nagy, G.-Tasi, J.-Bajnok, M.-Mikone, J. E. (2016): Weather regulated cattle behaviour on rangeland. *Applied Ecology and Environmental Research* 14: 149-158.
- Kovácsné Koncz N.-Béri B.-Deák B.-Kelemen A.-Radócz Sz.-Valkó O. (2015): Mély fekvésű gyepék élőhely kezelése különböző szarvasmarhafajták legeltetésével. 27. Georgikon Napok, Cikkadatbázis. 225-234.
- Kovácsné Koncz N.-Penksza V.-Posta J.-Béri B. (2017): Különböző szarvasmarhafajták legelői viselkedésének összehasonlító vizsgálata hortobágyi szikeseken. *Gyepgazdálkodási Közlemények* 2017(2): 29-36.
- Penksza K.-Galli Zs. Illyés Z.-Rudnóczy Sz.-Bauer L.-Bucherna N.-Kiss E.-Bratek Z.-Heszky L. (2003): Adatok a *Festuca ovina* csoportba tartozó fajok taxonómiai revíziójához. VI. Magyar Ökológus Kongresszus Előadások és Poszterek összefoglalói. p. 216.
- Penning, P. D.-Hooper, G. E.-Treacher, T. T. (1986): The effect of herbage allowances on intake and performance of ewes suckling twin lambs. *Grass and Forage Science*, 41, 199-208.
- Tälle, M.-Deák, B.-Poschlod, P.-Valkó, O.-Westerberg, L.-Milberg, P. (2016): Grazing vs. mowing: a meta-analysis of biodiversity benefits for grassland management. *Agriculture, Ecosystems & Environment* 15: 200-212.
- Tasi J. (2006): Gyepnövények fenofázisainak hatása a minőségre és legelési sorrendre. Doktori disszertáció, Szent István Egyetem, Gödöllő
- Tasi, J. (2007): Diverse impacts of nature conservation grassland management. *Cereal Research Communications* 35: 1205-1209.
- Tasi J.-Bajnok M.-Szentés S.-Török G. (2013): A hasznosítási gyakoriság és az időjárás hatása száraz és üde fekvésű gyepék takarmány-minőségére. *Gyepgazdálkodási Közlemények* 2010/2011: 43-47.
- Tasi J.-Bajnok M.-Halász A.-Szabó F.-Harkányiné Székely Z.-Láng V. (2014): Magyarországi komplex gyepgazdálkodási adatbázis létrehozásának első lépései és eredményei. *Gyepgazdálkodási Közlemények* 2014 (1-2): 57-64.
- Tóth, E.-Deák, B.-Valkó, O.-Kelemen, A.-Migléc, T.-Tóthmérész, B.-Török, P. (2016): Livestock type is more crucial than grazing intensity: Traditional cattle and sheep grazing in short-grass steppes. *Land Degradation & Development* doi: 10.1002/ldr.2514.
- Török G.-Bajnok M.-Béres A.-Harkányiné Székely Z.-Tasi J. (2013): Az időjárási tényezők és a hasznosítási rendszerek hatása a terméshozamra és a minőségre néhány pázsitfűfaj esetében. *Gyepgazdálkodási Közlemények*. 43-56.
- Török, P.-Valkó, O.-Deák, B.-Kelemen, A.-Tóthmérész, B. (2014): Traditional cattle grazing in a mosaic alkali landscape: Effects on grassland biodiversity along a moisture gradient. *PLoS ONE* 9 (5): e97095.
- Török, P.-Valkó, O.-Deák, B.-Kelemen, A.-Tóth, E.-Tóthmérész, B. (2016): Managing for composition or species diversity? Pastoral and year-round grazing systems in alkali grasslands. *Agriculture, Ecosystems & Environment* 234: 23-30.
- Valkó, O.-Venn, S.-Zmihoski, M.-Biurrun, I.-Labadessa, R.-Loos, J. (2018): The challenge of abandonment for the sustainable management of Palaearctic natural and semi-natural grasslands. *Hacquetia* 17(1): 5-16.