

**MOSSES AND LICHENS IN DYNAMICS OF ACIDIC SANDY GRASSLANDS:  
SPECIFIC RESPONSE TO GRAZING EXCLOSURE**

Mohok és zuzmók legelelés kizárásra adott válasza savanyú homoki gyepekben

Rebeka BALOGH<sup>1</sup>, Edit FARKAS<sup>2</sup>, László LŐKÖS<sup>3</sup>, Beáta PAPP<sup>3</sup>, Júlia BUDAI<sup>4</sup>,  
Károly ANTAL<sup>4</sup>, Tibor NOVÁK<sup>5</sup>, Gábor MATUS<sup>1</sup>

<sup>1</sup>Dept. of Botany, Univ. of Debrecen; <sup>2</sup>Institute of Ecology and Botany, MTA Centre for Ecological Research, Hungarian Academy of Sciences; <sup>3</sup>Dept. of Botany, Hungarian Natural History Museum, Budapest; <sup>4</sup>Research Institute of Karcag, Univ. of Debrecen, Karcag; <sup>5</sup>Dept. for Landscape Protection and Environmental Geography, Univ. of Debrecen;  
e-mail: beca002@gmail.com

Cryptogams, a neglected segment in vegetation dynamics, can form a large part of biomass in sandy grasslands. Since the pioneer work of Verseghe (early 1970s) their biomass and productivity has not been analyzed in Hungary. We intended to contribute to the knowledge of dynamics of cryptogams in dry acidic grasslands. Study objects were permanent plots in endangered open sandy grasslands 'Pannonic inland dunes' (EU Habitat Directive, 2340). Vegetation of *CORYNEPHORETUM CANESCENTIS* (CC) and *FESTUCETUM VAGINATAE* (FV), characteristic vegetation types of the Nyírség region (NE Hungary) has been monitored in grazed and experimentally fenced stands. Fencing was used to model the overall trend of falling stocking densities. Biomass of cryptogams has been sampled in 2013, five years after grazing exclosure then hand-sorted into species. Morphological studies, spot tests and HPTLC have also been applied to identify critical lichen taxa.

Fencing has led to an increased biomass of cryptogams. Biomass of mosses exceeded those of lichens irrespective of the community or management. Cryptogamic biomass tended to be lower in CC than in FV and lower in grazed stands compared to fenced ones. Most frequent cryptogams (*Brachythecium albicans*, *Cladonia rangiformis*, *C. rei*, *Polytrichum piliferum*) have been supported by exclosure. Lichens benefitted relatively more from exclosure than did the mosses. The only lichen favoured by moderate grazing has been *Cladonia magyarica*.

Soil traits (pH, organic material, P<sub>2</sub>O<sub>5</sub>) had contrasting effects on biomass fractions under different management (Spearman's rank correlation). More significant correlations have been revealed in fenced stands than in the grazed ones. FV had more correlations than the CC. The few strict correlations included preference of *Syntrichia ruralis* for higher while that of *Polytrichum piliferum* for lower pH values. Low phosphorous content has been positively correlated with *Cladonia rangiformis*, *Polytrichum piliferum*, total moss and total of cryptogams while higher values only supported *Brachythecium albicans*. This suggests more organized assemblages in ungrazed stands and in the FV, respectively. Compared to soil traits microtopography had a minor effect on cryptogam distribution. Initial establishment pattern or random patch formation seem to be as important as all above-mentioned factors together. Long-term grazing exclosure is likely to promote further spread of the dominants, *Cladonia rangiformis* and *Polytrichum piliferum*. Short spells of grazing are likely to promote cryptogam biodiversity.

Chemical analyses have been supported by OTKA K81232 and NKFIH K\_17/124341.