

D.T2.2.4

GRASSLAND STATE EVALUATION

Final Version

The results of testing of grassland state
evaluation protocol

09 2021



eurac
research



PRO
NATUR





Content

1.	Introduction	2
2.	The use of the methodology.....	3
3.	Results and evaluation	8
3.1	Non-peat-forming reed beds, sedges and ponds (B1a)	8
3.2	Non-clogging high grassland (B5)	8
3.3	Meadows with Purple Moor Grass (D2)	9
3.4	Wetland meadows (D34).....	10
3.5	Meadows with False oat-grass (E1).....	11
3.6	Open siliceous mudflats (G3).....	12
3.7	Sloping steppes with stony soils (H3a)	13
3.8	Forest-steppe, semi-dry slash and burn, dry grassland (H4)	14
3.9	Slough grassland, grassland with cohesive soils (H5a).....	15
3.10	Shade-tolerant open rock vegetation (I4)	16
4.	Literature	18



1. Introduction

The methodology was based on the idea of the methodology introduced within O.T2.1 „Assuring quality in grassland management with a goal-oriented database” (<https://www.interreg-central.eu/Content.Node/Centralparks/Centralparks-CE1359-O.T2.1-Joint-strategic-document-on-ra-5.pdf>) together with the base of the forest state evaluation protocol (SH4/13 project - <http://karpatierdeink.hu/eng/1-feladatcsomag>). During the preparation, the Natura 2000 monitoring protocol for dry grasslands was used as background documentation as well.

There are numerous, very diverse (even within one habitat) grasslands within the administration area of the Danube-Ipoly National Park Directorate. That means a dozen of more than 100 ha areas of grassland in the total administration area of the national park.

These grasslands are mostly affected by turning into shrubs to a greater or lesser extend or are the areas of previous shrub removal.

The results were evaluated according to the ÁNÉR 2011 habitat types, based on the D.T2.1.3 Grassland state evaluation protocol, developed under the Centralparks Interreg CE1359 project.



2. The use of the methodology

Hereby we would like to introduce the usage of the methodology based on a sample plot:
Lower Hinta meadow.

1. sample area:

Lower Hinta meadow, Börzsöny mountains

11,25 m radius circle

Designation and first survey: 30 June 2021.

Surveyor: András Kun, Róbert Kun

GPS coordinates of centre point: 47.95004990, 18.96820670

Altitude: 780 m

Average slope angle, exposure: 15%, DK

Marking: wooden stake

Photos from the centre:

1_Also_Hinta_ret_1_20210630 (E to E), 1_Also_Hinta_ret_2_20210630 (D to S),

1_Also_Hinta_Hret_3_20210630 (in the NY direction), 1_Also_Hinta_Hret_4_20210630 (in the N direction)

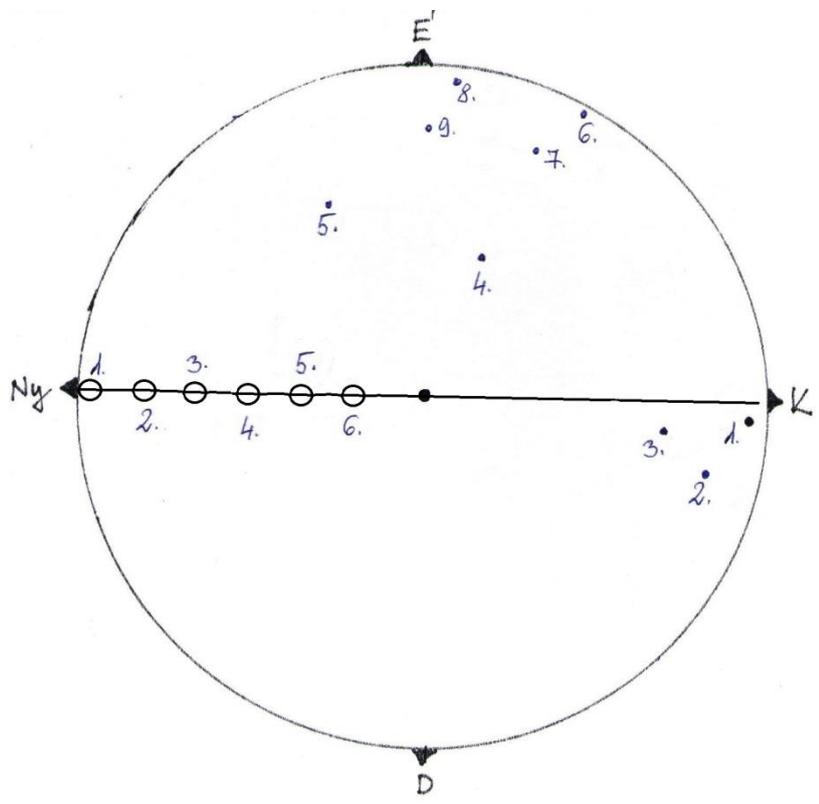
Description: Species-rich mountain meadow with vervaceous fescue. The grassland is tiered, currently used as a mowing field. Scattered with trees and groups of trees (*Quercus cerris*, *Acer pseudoplatanus*). The stand is sparsely woody (10%), with patches of openings due to wild boar burrows. Scattered shrub species are currently found only at C level, with a height of 8-15 cm.

The total extent of openings within the sample area: 3%

Á-NÉR code: E2; Natura2000 code: 6510

Naturalness (tdo): 4,5

Figure 1: Schematic drawing of the sample area:



Protected species in the sample area:

1. Dianthus deltoids 2 clones (8 inflorescence stems), 2. Dianthus deltoids 1 clone (11 inflorescence stems), 3. Dianthus deltoids 3 clones (5 inflorescence stems), 4. Dianthus deltoids 2 clones (7 inflorescence stems), 5. Dianthus deltoids 1 clone (8 inflorescence stems), 6. Dianthus deltoids 2 clones (5 inflorescence stems), 7. Dianthus deltoids 2 clones (8 inflorescence stems), 8. Dianthus deltoids 3 clones (11 inflorescence stems), 9. Dianthus deltoids 1 clone (4 inflorescence stems)

1. sample area: Lower Hinta meadow, Börzsöny mountains	
Habitat code: E2 (6510)	
Date of survey: 2021.06.30. Surveyor: Kun András, Kun Róbert	
Altitude: 780 m	
The angle of repose: 15%, SE	
The total flora of sample area, coverage of the species	
Total flora ar coverage of the sample area	Subsample's data (6 pieces, 80 cm circle)

		<i>Number of the circle</i>								
		1.	2.	3.	4.	5.	6.			
		General grass height (cm)		78	75	68	72	69	73	
<i>Species</i>	<i>Coverage %</i>	<i>Species</i>	<i>Coverage %</i>							
Natural disturbance by game animals	3	Avaros növénytelen felszín	10	10	7	5	12	10		
Achillea millefolium	0,5	Achillea millefolium	0,2	0,2	0	1	0	1		
Agrostis capillaris	10	Agrostis capillaris	5	25	2	10	5	10		
Anthoxanthum odoratum	1	Anthoxanthum odoratum	0,1	0,2	0,5	0,5	2	0		
Arrhenatherum elatius	2,5	Arrhenatherum elatius	2	3	0	0,5	1	1,5		
Avenula pubescens	0,5	Avenula pubescens	1	0	0,1	1	0,8	0		
Briza media	3	Briza media	5	0,3	0,2	1	4	5		
Bromus inermis	0,2	Bromus inermis	1,5	0	0	0	0	0		
Calamagrostis epigeios	2	Calamagrostis epigeios	3	0	0	1	5	0		
Carex caryophylla	0,5	Carex caryophylla	0	0	1	0	0	0		
Carex hirta	0,2	Carex pallescens	0	0	0	0	0,3	0		
Carex pallescens	0,1	Carex praecox	0,1	0	0	0	0	2		
Carex praecox	3	Centaurea jacea	0	10	0	7	1	1		
Centaurea jacea	0,2	Cruciata glabra	0,1	0,2	0	0	0	0		
Colchicum autumnale	0,3	Dactylis glomerata	0	0	0	0,5	1	0		
Crataegus monogyna	C 0,1	Elymus repens	0,5	0	0	0,5	0,5	0,3		
Cruciata glabra	0,3	Euphorbia cyparissias	0	0	3	2	4	2		
Cuscuta sp.	0,01	Festuca pratensis	3	0,2	0	3	3	25		
Dactylis glomerata	0,5	Festuca rubra	27	20	0	25	30	12		
Dianthus deltoides	0,1	Festuca rupicola	4	8	2	15	5	6		
Digitalis grandiflora	0,1	Fragaria viridis	25	3,5	0,2	8	8	10		
Elymus repens	1	Galium boreale	0	0,2	0	0	0,7	0,5		
Euphorbia cyparissias	1,5	Galium verum	5	5	0	3	2	6		
Festuca pratensis	12	Hieracium pilosella	0	0	75	0	0	0		
Festuca rubra	25	Lathyrus pratensis	1	0,2	0	0	0	0		
Festuca rupicola	8	Linaria vulgaris	0,8	1	0,1	0,2	0,1	0		
Fragaria viridis	12	Linum catharticum	0	0	1	0	0	0		
Galium boreale	0,3	Lotus corniculatus	0	0,1	1,5	0,1	0	0		
Galium verum	3	Luzula campestris	0,2	0,3	0	0,3	0,5	0,3		
Hieracium pilosella	1,5	Pimpinella saxifraga	0	2	0,5	6	1	0		
Holchus lanatus	0,2	Plantago media	0	2	0,3	0	0	0		
Hypericum perforatum	0,3	Ranunculus polyanthemus	0	1	0,1	0,4	1,5	0,5		
Knautia arvensis	0,1	Rosa canina C-szint	0	0	0	0	0	3		
Lathyrus pratensis	0,1	Stellaria graminea	0	0	0,1	2	0	1		
Linaria vulgaris	0,3	Thesium linophyllum	3,5	0	1	4	0,3	0		
Linum catharticum	0,01	Thymus glabrescens	0	3	2	3	0	0		
Lotus corniculatus	0,3	Trifolium alpestre	0	0	0,3	0	0	0		
Luzula campestris	0,5	Trifolium pratense	0	2	4	0	0	0		
Pimpinella saxifraga	2	Trifolium repens	0,2	0,5	0,3	0	0	0,3		
Plantago lanceolata	0,01	Veronica chamaedrys	0,3	1	0,2	0,7	1	3		
Plantago media	1	Viola hirta	0	1	0	1	0	1		
Potentilla heptaphylla	0,01	Viola montana	0,5	1	0,5	1	3	3		
Ranunculus polyanthemus	0,5									



Rosa canina	C	0,1
Rumex acetosa		0,1
Stellaria graminea		0,3
Thesium linophyllum		0,5
Thymus glabrescens		1,5
Trifolium alpestre		0,1
Trifolium pratense		0,5
Trifolium repens		0,2
Verbascum phoeniceum		0,1
Veronica chamaedrys		1,5
Viola hirta		0,5
Viola montana		1,5
Viscaria vulgaris		0,2

Table 1: data set of the sample area



Photo 1: Average view of the sample area



Photo 2: showing the coverage on one of the circles at the sample area



3. Results and evaluation

3.1 Non-peat-forming reed beds, sedges and ponds (B1a)

Natura 2000 habitat type: ---

Coenotaxon(s): *Phragmitetum communis* SOÓ 1927 em. SCHMALE 1939, *Typhetum latifoliae* G. LANG 1973

Occurrence: The habitat type occurs very sporadically in the mountains, forming small stands in waterlogged areas. Broad-leaved sedge occurs in the Inner Lake of Bernecebarát, Lake Bajdázói, Lake Büdös, Broad Field, while reed occurs in the Kóspallagi reservoir. Reedbeds are also found wedged between the gullies of the King's Ridge. (Map X)

General characterisation: The associative *Typha latifolia* and *Phragmites australis* form dense, species-poor stands about 2-2.5 m high in shallow, fluctuating water levels in small eutrophic water bodies of natural or artificial origin and their riparian zone. Peat formation does not occur beneath such reed beds and reed beds. The stands embedded in oak woodland or wet valley bottom habitats are often only a few tens or sometimes a few hundred square meters in size. In addition to the constituent species, other typical species are *Alisma plantago-aquatica*, *Calystegia sepium*, *Galium palustre*, *Iris pseudacorus*, *Lycopus europaeus*, *Lysimachia vulgaris*, *Lythrum salicaria*, *Polygonum hydropiper*, *Scutellaria galericulata*, *Solanum dulcamara*.

Natural status: the known small fragmentary stands are species-poor, featureless and of medium natural status (TDO=3).

Vulnerability: The main threat is feral pigs grazing. The zonation complex of Lake Büdös and the associated broad-leaved sedge of Lake Büdös in Kotholya have been trampled by wild boars (the sedge of the Inner Lake has been fenced in the recent past for similar reasons). The habitat type is not currently threatened by the spread of invasive plant species.

3.2 Non-clogging high grassland (B5)

Natura 2000 habitat type: ---

Coenotaxon(s): *Caricetum gracilis* ALMQUIST 1929, *Caricetum acutiformis* EGGLEY 1933, *Caricetum buekii* KOPECZKÝ et HEJNÝ 1964, *Caricetum melanostachyae* BALÁZS 1943, *Galio palustris*-*Caricetum ripariae* BALÁTOVÁ-TULÁČKOVÁ in BALÁTOVÁ-TULÁČKOVÁ et al. 1993

Occurrence: In the valleys of the southern part of the mountain range, especially in the Mill Valley, large valley bottoms are covered by *Caricetum buekii*. *Caricetum gracilis* (*Caricetum gracilis*) occurs in the low-lying, humid, central part of the King's Ridge. Small stands of the bryozoan (*Caricetum melanostachyae*) are found at Pénzásás, in the Great Iron Valley, in the saddle between the Salt Mountain and the Great Eagle Mountain, in waterlogged depressions. Coastal saltmarsh (*Galio palustris*-*Caricetum ripariae*) is a component of the zonation complex of Lake Büdös and a small stand is known at Kapitány-Rét. Small stands of *Caricetum acutiformis* are scattered in the wide valleys of the mountain range (Kemence Valley, Great Valley). (Map X)

General characterisation: Intermittently waterlogged, species-poor grassland communities on well-nourished sites. No peat formation under the vegetation. In general, they are uniform grassland with a grass height of 0,5-1 m. However, the moorland in the southern part of the Bernese Mountains is characterised by the development of heavy (50-80 cm high) heaths due to long periods of no mowing. The most common species are *Carex acuta* (syn.: *C. gracilis*), *C. acutiformis*, *C. melanostachya*, *C. riparia*, *C. buekii*, and other typical species are *Calystegia sepium*, *Humulus lupulus*, *Galium palustre*, *Lycopus europaeus*, *Lythrum salicaria*, *Lysimachia vulgaris*, *Symphytum officinale*, *Urtica dioica*.

Natural condition: The large areas of the Mill Valley with its large areas of shrubby, boggy bogs are of good natural condition (TDO=4). The sharp edge of the King's Ridge is in a good natural condition (TDO=4), as is the dry marsh sedge of the embedded blue-perennial marsh. The shoreline sedge of the Büdös Lake zonation complex is in moderately degraded condition due to damage by feral hogs, while the Captain's Ridge stand is in moderately degraded condition due to drainage/dewatering (TDO=3). The natural condition of the small marsh sedges in the valley bottom, which have developed in the disturbed production areas, is also moderate (TDO=3), similar to that of the small areas of the bog sedges (TDO=3).

Threats: Burning during the dormant season can damage the beautifully shrubby stands of the bog swamps. In the Mill Valley, trampling along the hiking trail does not cause significant damage. The wetland tall fescue is threatened by desiccation and by feral pigs. Occasionally, for example in the Pénasca valley or the Great Basin valley, the grassland is also used as a loading area. Invasive species are currently not found in the core habitats.

3.3 Meadows with Purple Moor Grass (D2)

Natura 2000 habitat type: Purple Moor Grass swamps on calcareous, peaty or clayey soils (*Molinion caeruleae*) (6410)

Cenotaxon(s): *Succiso-Molinietum hungaricae* (KOMLÓDI 1958) SOÓ 1969 corr. BORHIDI 2001

Occurrence: A rare, unique habitat type in the mountains. Its largest stands (in more than one case several hectares) occur in the area of the King's Ridge in Kotholya, while a smaller, more species-poor patch is known from the sloping part of the Great Valley of Bernecebarát above the Betyár well (Map X)



General characterisation: A type of turf that has developed secondarily in valley bottoms or undrained depressions, following the formation of loose areas, on soils with a bound, impermeable layer. Stands of tall grass (1-1,5 m), dense, the shrubby structure may have shallow surface water cover in spring, drying out by mid-summer. *Molinia arundinacea* is the dominant (almost monodominant) species of the grassland type, while the other type (partly rare) species are: *Deschampsia caespitosa*, *Filipendula ulmaria*, *Galium boreale*, *Gentiana pneumonanthe*, *Gladiolus imbricatus*, *Gymnadenia conopsea*, *Iris sibirica*, *Juncus atratus*, *Juncus conglomeratus*, *Juncus effusus*, *Lysimachia vulgaris*, *Lythrum salicaria*, *Pseudolysimachion longifolium*, *Sanguisorba officinalis*, *Scutellaria hastifolia*, *Selinum carvifolia*, *Succisa pratensis*, *Thalictrum lucidum*, *Viola canina*.

Natural condition: Most of the stands are of favourable natural condition, free of alien elements (TDO=4), and the south-eastern, deepest part of the King's Ridge is also very species-rich and close to natural condition (TDO=5).

Vulnerability: Although the abandonment of meadow cultivation in recent decades has allowed some expansion of the stands, the maintenance of good natural conditions (prevention of further homogenisation) is strongly influenced by the lack of mowing. In the absence of regular or at least periodic mowing, the expansion of reed (*Phragmites australis*) from lower-lying areas and the encroachment of shrubs and woody vegetation from the edges are problems. In the area of the King's Ridge, the former drainage ditch, although it is now largely blocked, is an obstacle to a better water supply for the area.

3.4 Wetland meadows (D34)

Natura 2000 habitat type: *Cnidion dubii* river valley marshes (6440)

Cenotaxon(s): *Agrostio-Deschampsietum caespitosae* UJVÁROSI 1941, *Carici vulpinae-Alopecuretum pratensis* (MÁTHÉ et KOVÁCS 1967) SOÓ 1971 corr. BORHIDI 1996

Occurrence: A rare habitat type throughout the mountain range, typically occupying areas of less than 0,5-1 ha within a closed forest block. Larger stands of a few hectares are found in the Broad Meadow. It occurs in broad stream valleys (e.g. Kemence Valley, Great Valley) in valley bottom situations, on low-lying sloughs along with intermittent watercourses (Béla Ridge, Bull Ridge), on gentle slopes with seepage, on flat troughs (Széles Meadow), on forest sloughs with spring water confluences (e.g. Faragottkúti Grassland, Tányér Ridge). (Map X)

General characterisation: For most of the growing season, the meadows are lush and moist (often waterlogged in spring, but drying up in summer), with tall grasses. Their soils are not peaty meadows or slope alluvium. In addition to the predominant grassland grasses, there are also a large number of colourful flowering dicots. Protected plant species are rarely found. The species composition of their dryland stands becomes similar to that of the mown grassland (E1). Stand-forming species: *Alopecurus pratensis*, *Deschampsia caespitosa*. Other characteristic species: *Ranunculus acris*, *R. repens*, *Lysimachia vulgaris*,

L. nummularia, *Lychnis flos-cuculi*, *Inula britannica*, *Carex vulpina*, *C. acutiformis*, *C. panicea*, *Cardamine pratensis*, *Allium angulosum*, *Symphytum officinale*, *Stachys palustris*, *Poa trivialis*, *Lythrum salicaria*, *Cirsium canum*.

Natural condition: stands regularly mown each year are typical of favourable natural condition (TDO=4). Wetland meadows that have not been mown for a long time, are tallgrass, grassy, fragmented, with a moderate or strong transition to herbaceous grassland (OB), are characterised by a moderately degraded condition (TDO=3) (e.g. the section of the Kemence Valley above the King's Well, Great Valley).

Threats: The main threat is the lack of regular mowing, which leads to the onset of high mosses, weeds, scrub and character loss in the marshes. The resumption of livestock farming in the Broad Meadows may lead to overgrazing on the grassland. The habitat type is not currently threatened by the spread of invasive species, but there is a potential threat from *Solidago* species. Occasional problems may be caused by the weed control effect of spreaders in the vicinity of the marsh meadows and the resulting wild trampling.

3.5 Meadows with False oat-grass (E1)

Natura 2000 habitat type: lowland and hilly reaper meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) (6510)

Cenotaxon(s): *Alopecuro-Arrhenatheretum* (MÁTHÉ and KOVÁCS 1960) SOÓ 1971, *Pastinaco-Arrhenatheretum* (KNAPP 1957) PASSARGE 1964

Occurrence: A scattered habitat type throughout the mountain range, typically occurring in small stands (less than 0,5-1 ha) within closed forest blocks (e.g. Bajdázói, Taxi, Szállásoki). Larger patches of several hectares are very rare in the interior of the mountain range (e.g. Kemence valley above the junction with Csarna valley, Nyíri-ret), but more common on the mountain rim (e.g. around Törökmező, Malom valley, Széles meadow). (Map X)

General characterization: Secondary, mainly oak belt, often on unflooded surfaces of stream valleys, developed on slash-and-burn, fresh, nutrient-rich soils, a tall grass (1-1.2 m), species-rich meadows, predominantly grassland (sometimes with 8-10 species of grass), with scattered tall, bushy-stemmed bivalves and a large number of bivalves as understory grasses. The most abundant species are *Arrhenatherum elatius* and *Dactylis glomerata*, but there are also patches dominated by *Alopecurus pratensis*, *Briza media*, *Festuca pratensis* and *Trisetum flavescens*. Other typical species are *Anthoxanthum odoratum*, *Campanula patula*, *Centaurea pannonica*, *Colchicum autumnale*, *Cruciata laevipes*, *Dianthus deltoides*, *Galium mollugo* agg., *Galium verum*, *Helictotrichon pubescens*, *Holcus lanatus*, *Leucanthemum vulgare*, *Lychnis flos-cuculi*, *Orchis morio*, *Pastinaca sativa*, *Poa pratensis*, *Potentilla reptans*, *Ranunculus acris*, *Rumex acetosa*, *Rumex thyrsoiflorus*, *Stellaria graminea*, *Trifolium pratense*, *Trifolium repens*, *Veronica chamaedrys*.

Natural condition: the unmowed, regularly mown stands are typical of favourable natural condition (TDO=4), and the low-lying, alder-dominated, golden oat-dominated mowing layer of the Broad field is of outstanding natural condition (TDO=5). In contrast, the mowed areas of long-unmanaged, siskan-dominated, weedy grasslands, which show a more moderate or stronger transition to lush grassland (OB), are in many cases in a moderately degraded state (TDO=3).

Threats: The main threat to the maintenance and natural state of the stands is the lack of regular mowing, which leads to weed infestation, invasion by siskana (*Calamagrostis epigeios*), high mould and blackberry blight. Long periods of no treatment lead to intensive scrub encroachment and afforestation, while the use of grassland as a loading area or approximate trail leads to weed encroachment and the appearance of adventive species (e.g. *Ambrosia artemisiifolia*, *Erigeron annuus*). The over-seeding of grassland leading to glaciation was previously carried out for wild fodder in the Kemence Valley. Another problem is the weed control effect of the scattering of grass on the slash-and-burn pastures, and the resulting trampling and trampling by wild boars.

3.6 Open siliceous mudflats (G3)

Natura 2000 habitat type: Pannonian rocky grassland (*Stipo-Festucetalia pallentis*) (6190)

Coenotaxon(s): *Asplenio septentrionali-Melicetum ciliatae* (SOÓ 1940) MÁTHÉ et M. KOVÁCS 1964, *Minuartio-Festucetum pseudodalmaticae* (MIKYSA 1933) KLIKA 1938, *Poëtum scabrae* ZÓLYOMI 1936

Occurrence: Throughout the entire mountain range, but especially in South-Börzsöny on the slopes of Szent-Mihály-Hill above the Danube, in Southwest-Börzsöny (Bánya-Hill, Gömbölyű-Kő) and on the rocky copas of Central-Börzsöny (Jancsi-Hill, Wild-Top, Drínó, Nagy-Mána, Rustok-Hill, Zálog-Bérc) and on the rocky walls above the Kemence Valley in the North-Börzsöny (Barát-kő, Cicőke, Kő-szirt), on Kámor and Kőember, which occur on steep slopes, rocky peaks and ridges. (Map X)

General characterisation: It occurs at altitudes of 150-700 m above sea level on siliceous bedrock, on extremely dry, rocky-rocky subsoil, predominantly south, south-west and less frequently east-facing, with a slope angle of 20-40-(80)°. Grassland cover ranges from 10-20-(40)%. Occurs in small stands, often only a few hundred square metres, rarely several hectares. The majority of stands are of natural origin. There are also extensive siliceous grasslands as a secondary result of grazing. The habitat is not threatened by invasive species. Conservation species: *Festuca pseudodalmatica*, *Poa pannonica*, *Melica ciliata*. Other characteristic species: *Asplenium septentrionale*, *Erysimum crepidifolium*, *Gagea bohemica*, *Inula oculus-christi*, *Jovibarba hirta*, *Linaria genistifolia*, *Sedum acre*, *Sedum sexangulare*, *Sedum album* (South Woodland), *Sempervivum matricum*, *Seseli osseum*, *Teucrium chamaedrys*, *Thymus glabrescens*. Three "subtypes" occur in the area. *Minuartio-Festucetum pseudodalmaticae* - *Festuca pseudodalmatica* is the dominant perennial, clump-rooted grass of the Hungarian open siliceous silt-loam grassland community. It is most abundant and has a characteristic species assemblage on the Jancsi Hill and Wild

Roof in Perőcsény. *Poëtum scabrae* - Hungarian periwinkle and open siliceous silt-grassland, partly formed as a degradation stage, partly as a pioneer community (e.g. Rustok Hill, Nagy-Mána, Köember, Kopasz Hill). *Asplenio septentrionali-Melicetum ciliatae* - This is a mountain-wide community of siliceous rocky outcrop grassland, typical of sunny, steep rock faces and rocky slopes, usually complexed with open siliceous rocky outcrops. It occurs on the rocks of the Barát rock, Cicőke, Drínó, Kámor, St. Michael's Hill, Wild-top. Typical species are *Melica ciliata*, rock-forming ferns, possums, crow's-foot and cirrus roses. The latter form pioneer communities on rock outcrops with mossy-uzmose synusia. The subtypes often form complexes with each other and with the stony-soil slope steppe (H3a).

Natural status: The majority of stands are in favourable natural status, free of alien species (TDO=4). There are many moderately degraded, wild-roaming stands (TDO=3) with degradation-tolerant grasses (*Botriochloa ischaemum*, *Cleistogenes serotina*) and annual weeds (*Scleranthus annuus*, *Polygonum aviculare*, *Tragus racemosus*).

Vulnerability: overgrazing, grazing, ploughing and fertilisation by overstocked big game (mainly mouflon and wild boar), leading to degradation, weed encroachment, changes in dominance (*Festuca pseudodalmatica* may be conspicuous by its decline) and the formation of completely barren patches. In beautiful viewpoints (Ant Hill, Raven Rock), degradation is caused by trampling by tourists.

3.7 Sloping steppes with stony soils (H3a)

Natura 2000 habitat type: Subpannonian steppe (6240*)

Cenotaxon(s): *Potentillo-Festucetum pseudodalmaticae* MÁJOVSKY 1955, *Inulo oculi christi-Festucetum pseudodalmaticae* MÁJOVSKÝ et JURKO 1956, *Stipetum tirsae* MEUSEL

Occurrence: A habitat type occurring throughout the whole mountain range, but especially in the south-western part of the Börzsöny, on the slopes of the Szent-Mihály-Hill and Ördög-Hill above the Danube in the southern part of the Börzsöny, and on the rocky copas of the Central Börzsöny, which occurs within the closed forest block, on steep slopes with shallow, stony soils, near rocky peaks and ridges, which are already unfavourable for forestry. (Map X)

General characterisation: It occurs at altitudes of 150-850 m above sea level on siliceous bedrock, on erubic soils, predominantly with a south-south-west exposure, with a slope angle of 10-30-(40)°. They are closed, medium to low, species-rich, dry grassland communities dominated by mesophytic grasses. Grassland cover between 60 % and 95 %. Typically small in area (less than 0.5-1 ha), often forming patches of only a few hundred square metres. Most of the stands can be considered natural, but there are also secondary or extensive stands of uncharacteristic stands. Range-forming species: *Festuca pseudodalmatica* (widespread), *Festuca pallens* (Salt Hill, Great Koppány), *Stipa dasyphylla* (Salt Hill, Bánya Hill, Dríno, Rustok Hill), *Stipa pulcherrima* (mainly in the south, Devil's Hill, *Stipa tirsae* (in the south and south-west of the mountain range, Nagy-Galla, Kis-Koppány, Hegyes-Hegy - these are not secondary stands on the site of

abandoned vineyards!), *Bothriochloa ischaemum* (widespread), *Cleistogenes serotina* (widespread). In smaller patches *Bromus pannonicus* var. *reptans*, *Chrysopogon gryllus*, *Elymus hispidus*, *Festuca valesiaca* (more on the mountain slopes), *Poa pannonica*, *Stipa pennata* may also become dominant. Other typical species are *Achillea crithmifolia*, *Allium sphaerocephalon*, *Asperula cynanchica*, *Dianthus pontederiae*, *Eryngium campestre*, *Galium glaucum*, *Hypericum perforatum*, *Potentilla arenaria*, *Stachys recta*, *Teucrium chamaedrys*, *Thymus glabrescens*.

Natural condition: stands dominated by the clump-rooted hemicryptophytic grasses (*Stipa pulcherrima*, *S. dasyphylla*, *S. tirsae*, *Festuca pseudodalmatica*, *F. pallens*) are typically of favourable natural condition (TDO=4). Parts of the species-rich, diverse sloping grassland of the Great Salt Hill (dominated by *Stipa dasyphylla* and *Festuca pallens*) and the Great Coppice (dominated by *Festuca pallens* and *Festuca pseudodalmatica*) can be considered as even better (TDO=5). In stands trampled by wildlife or tourists, the dominance pattern changes, with the dominance of disturbance-tolerant, trampling grasses such as *Cleistogenes serotina*, *Elymus hispidus* and *Bothriochloa ischaemum*, and the proliferation of species tolerant of trampling and grazing (*Euphorbia cyparissias*, *Eryngium campestre*, *Caucalis platycarpus*). Such stands can be considered as moderately degraded (TDO=3), even if only the small areas of sloping grassland dominated by *Poa pannonica* are of the most pioneer character.

Threats: The main threat is overstocking of big game, mainly wild boar and mouflon. Their trampling, grazing, grazing and fertilisation lead to degradation, fragmentation, weeding and changes in dominance of the sloping grassland. It can be characterised by blackberry blight and the formation of 0,5-1 m high bush patches. Due to trampling by tourists, *Festuca pseudovina* may proliferate in viewpoints (Ant Hill). Invasive species are not yet a threat to the habitat type.

3.8 Forest-steppe, semi-dry slash and burn, dry grassland (H4)

Natura 2000 habitat type: Important orchid habitats (6210*) of calcareous semi-natural dry grassland and its shrubby variants (*Festuco-Brometalia*)

Coenotaxon(s): *Polygalo majoris-Brachypodietum pinnati* H. WAGNER 1941, *Campanulo-Stipetum tirsae* MEUSEL em. SOÓ 1971

Occurrence: Scattered, predominantly in the southern part of the mountains, mainly in mountain peripheral situations, with small stands (less than 1 ha). Stands of several hectares are rare (e.g. Turkish Field). It occurs, for example, on the Gomb Hill in Kemence and on the Fehér Hill in Nagymaros (the species-rich *Campanulo-Stipetum tirsae* forest stands on the southern slopes of the Danube, on the site of abandoned vineyards (Eszperanto Hill in Nagymaros, Kapu Hill, Ruzsás Hill in Szczecin) are located outside the boundaries of protected areas) (Table X).

General characterisation: A type of grassland, mainly in the mid-mountain landscape, mainly in a tannic-oak belt. Typically occurs in forested environments, with southern to western exposure, on gentle to steep slopes. Semi-dry grasslands, slash meadows,

dominated mainly by broad-leaved grasses, rich in species, including bivalves, and containing forest species. In addition to broad-leaved grasses, large-leaved dicots are common. In the Börzsöny area, it is mainly found on limestone bedrock, brown Rendzina soils and brown forest soils eroded on siliceous bedrock, and the sites of abandoned vineyards. Species: *Brachypodium pinnatum*, *Bromus erectus* agg., *Danthonia alpina*, *Stipa tirsia*. Other characteristic species: *Adonis vernalis*, *Aster amellus*, *Aster lynosiris*, *Avenula pubescens*, *Centaurea sadleriana*, *Cirsium pannonicum*, *Dianthus pontederiae*, *Dorycnium herbaceum*, *Festuca valesiaca*, *Geranium sanguineum*, *Inula ensifolia*, *Inula hirta*, *Inula salicina*, *Jurinea mollis*, *Linum flavum*, *Linum tenuifolium*, *Peucedanum cervaria*, *Polygala major*, *Pulsatilla grandis*, *Rosa gallica*, *Teucrium chamaedrys*, *Thymus pannonicus*.

Natural condition: most of the stands are in a favourable natural condition, stabilised and free of alien species (TDO=4), but there are occasional stands of poorer natural condition (TDO=3).

Threats: The main threats to the maintenance of good natural conditions are scrub encroachment by bearded buckthorn, celandine, frost and monocotyledonous hawthorn. Vegetation encroachment, such as the proliferation of *Geranium sanguineum*, is also a negative factor, as it leads to species depletion. Some stands are threatened by the expansion of acacia. Sometimes wild boar grazing also occurs in such grasslands.

3.9 Slough grassland, grassland with cohesive soils (H5a)

Natura 2000 habitat type: Subpannonian steppe (6240)

Coenotaxon(s): *Salvia nemorosae-Festucetum rupicolae* ZÓLYOMI ex. SOÓ 1964, *Cynodonti-Poëtum angustifoliae* RAPAICS ex. SOÓ 1957

Occurrence: Scattered in the south-western part of the Bősöny area, mainly on the mountain rim of the Ipoly valley and on the north-western edge of the Márianosztrai basin. The stands range from less than 1 ha to several hectares (e.g. Panholc, Bizmet Rét, Galla Tisza, under the Nostrai edges). It is also found in the South-Börzsöny, e.g. in the Mill Valley around the Ant Ditch.

General description: Closed dry grasslands of humus-rich soils formed on loess, loess-sand, clay-marsh and calcareous-sandy slate of the Upland. In the past, most of them were used for grazing, which led to the proliferation of pine grass. Such grasslands are generally not very species-rich, with disturbance-tolerant dry grassland elements rather than the rarer, more valuable specialist species. Conservation species: *Festuca rupicola*, *Festuca valesiaca*, *Bothriochloa ischaemum*, *Brachypodium pinnatum*, *Elymus hispidus*, *Poa angustifolia*, *Arrhenatherum elatius*. Other typical species: *Adonis vernalis*, *Agrimonia eupatoria*, *Aster lynosiris*, *Centaurea sadleriana*, *Chamaecytisus austriacus*, *Dianthus collinus*, *Filipendula vulgaris*, *Fragaria viridis*, *Gentiana cruciata*, *Inula germanica*, *Inula oculus-christi*, *Iris variegata*, *Knautia arvensis*, *Lathyrus pannonicus*, *Linum hirsutum*, *Linum tenuifolium*, *Nepeta nuda*, *Phlomis tuberosa*, *Rosa gallica*, *Salvia nemorosa*, *Salvia pratensis*, *Stipa tirsia*, *Teucrium chamaedrys*.



Natural condition: the majority of the stands are in a favourable natural condition, dominated by *Festuca* species and free of alien species (TDO=4). This is the case, for example, for the majority of the Galla's Mistletoe. The stands are moderately degraded (TDO=3), with weedy, species-poor stands, saturated with species that are tolerant to disturbance and heavily shrubby stands.

Vulnerability: Many stands, which are no longer used, are threatened by scrub encroachment, resulting in the conversion of the habitat into thickets of *Rosa canina*, *Prunus spinosa*, *Crataegus monogyna*, *Cornus sanguinea*, etc. Such grasslands are also frequently threatened by white acacia invasions from nearby upland acacia woodlands. Wild boar encroachment often results in an overgrowth of *Calamagrostis epigeios*, which inhibits the natural regeneration of the grassland. The species-rich, valuable grassland of the Galla plateau is under threat from increased wild trampling due to the scattering of the grass almost in the middle.

3.10 Shade-tolerant open rock vegetation (I4)

Natura 2000 habitat type: ---

Coenotaxon(s): *Hypno-Polypodietum JURKO et PECIAR 1963*, *Ribeso alpini-Rosetum pendulinae SÁDLO 1991* (only with *Ribes uva-crispa!*)

Occurrence: Throughout the whole mountain range, but predominantly in the north-facing rock outcrops, rock faces and rocky valleys of the Central Beech (Barsi beech, Drínó valley, Haramia-lik, Hegyes-hegy-slope, Raven-rock, High-Tax, Great-Hideg-hegy, Great-Mana-berl, Great-Varsa-berl, Dobó-berl, Pleska-rock, Rosy-valley, Eagle's Nest-berl, Castle-berl, etc.), always a habitat type with small stands.

General characterisation: It occurs in an altitudinal zone of 300-900 m above sea level, on siliceous bedrock, on rocky-rocky subsoil, predominantly exposed to the north, on shaded, hollow rock outcrops with a slope angle of 60-80° (90°), on rock faces, rubble slopes and gorge valleys. Typically occurs in small patches of a few tens to a few hundred square metres. The habitat is usually embedded in surrounding beech or rocky-soil forests. The moss-grass layer is well developed. The species-poor grassland cover is variable, being more developed in patches and sparse elsewhere. It may also have a shrub layer. They are predominantly natural in origin, but also occur secondarily in abandoned quarries and on unforested rocky outcrops after previous cutting. The dominant species may be *Polypodium vulgare*, *P. interjectum* (the frequency of the latter needs to be clarified), *Rosa pendulina* (Great Varsa Pit), *Hypnum cupressiforme*, *Dicranum scoparium*. Other typical species are *Asplenium septentrionale*, *A. trichomanes*, *Cystopteris fragilis*, *Dryopteris filix-mas*, *Sedum maximum*, *Scrophularia vernalis*, *Valeriana officinalis* ssp. *sambucifolia*, *Cotoneaster niger*, *Euonymus verrucosus*, *Hedera helix*, *Ribes uva-crispa*, *Rubus idaeus*.

Conservation status: Most of the stands (although essentially a species-poor habitat type) have a favourable conservation status (TDO=4). Patches more heavily disturbed by the game animals are classified as moderately degraded (TDO=3).



Vulnerability: Generally a habitat type with low vulnerability due to the difficult accessibility of rocky outcrops. Overstocking by a large game (mouflon, deer) (grazing and trampling) mainly disturbs stands including *Rosa pendulina*. It is occasionally (rarely) threatened by the end-use of encroaching forests, although these are mostly classified as protected forests. Invasive species are not yet a threat.

Other open (grassland) habitat types:

- Stagnant and slow-moving aquatic seaweed vegetation (Ac)
- Ditch and marsh tall fescue, shade-shrub marginal vegetation (D6)
- Riparian and marsh tall fescue (D5)
- Uncharacteristic unlogged wetlands (OA)
- Undistinguished grassland (OB)
- Undistinguished dry to semi-arid grasslands (OC)
- Herbaceous drift species stands (OD)
- Tall ruderal weeds (OF)
- Trampled weeds and ruderal mudflats (OG)
- Nonnative shrub or Japanese knotweed dominated stands (P2c)



4. Literature

„Assuring quality in grassland management with a goal-oriented database”
<https://www.interreg-central.eu/Content.Node/Centralparks/Centralparks-CE1359-O.T2.1-Joint-strategic-document-on-ra-5.pdf>

Forest state evaluation (SH4/13 project - <http://karpatierdeink.hu/eng/1-feladatcsomag>
 ÉNÁR 2011: <https://www.novenyzetiterkep.hu/eiu2011>

Editors:	Borbála Szabó-Major (Danube-Ipoly National Park Directorate)
Contributors:	András Kun Zsolt Baranyai (Danube-Ipoly National Park Directorate) Róbert Kun
Reviewer:	Isidoro De Bortoli (EURAC)
Security Sensitivity check:	