

VEGETATION OF SILICICOLOUS GRASSLANDS OF THE HIGHLANDS OF NORTH-EASTERN SLOVENIA

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Abstract

Vegetation of the silicicolous grasslands of the highlands of North-Eastern Slovenia has been sampled with standard Braun-Blanquet procedure. All the 102 collected relevés have been classified within the order *Nardetalia* Oberd. ex Preising 1949. The association *Homogyno alpinae-Nardetum* Mráz 1956 (all. *Nardo-Agrostion tenuis* Sillinger 1933) has been stated, inside which the typical form and the transitional forms to the heaths with *Ericaceae* have been distinguished. Chorology, life forms and spontaneous reforestation are discussed and nature-conservancy issue is mentioned.

Key words: silicicolous grasslands, NE Slovenia, Twinspan, *Nardo-Agrostion tenuis*, *Homogyno alpinae-Nardetum*, Pohorje, Kozjak, Smrekovec.

Izveček

Vzorčili smo vegetacijo silikatnih travišč na ovršnih predelih pogorij severovzhodne Slovenije po standardni Braun-Blanquetovi fitocenološki metodi. Vseh 102 zbranih fitocenoloških popisov smo uvrstili v red *Nardetalia* Oberd. ex Preising 1949. Ugotovili smo asociacijo *Homogyno alpinae-Nardetum* Mráz 1956 (zveza *Nardo-Agrostion tenuis* Sillinger 1933), znotraj katere ločujemo tipične sestoje asociacije in sestoje, ki predstavljajo prehodne oblike k resavam z vrstami družine *Ericaceae*. Predstavljene so tudi geoelementna sestava in življenjske oblike obravnavane vegetacije, dotaknili pa smo se tudi problematike spontanega zaraščanja in naravovarstvene problematike.

Ključne besede: silikatna travišča, SV Slovenija, Twinspan, *Nardo-Agrostion tenuis*, *Homogyno alpinae-Nardetum*, Pohorje, Kozjak, Smrekovec.

1. INTRODUCTION

Slovenian mountains are predominately consisted of calcareous substrates. Acid substrates, predominately silicates, are rare and do not reach higher altitudes. Grasslands on non-calcareous substrates are dominated by acidophilous grasses, like *Nardus stricta* (Matgrass), *Festuca rubra* and *Deschampsia flexuosa*. Sometimes, on shallow soils and oligotrophic conditions, they could be physiognomically close to heaths, with dominating *Ericaceae* Chamaephytes, like *Vaccinium myrtillus*, *Vaccinium vitis-idaea*

and *Calluna vulgaris*. They are classified first of all according to their origin. Basically it should be distinguished between natural and semi-natural (anthropogenic) grasslands, which could be described also by vegetation belt in which they occur. The *Nardetalia* Oberd. ex Preising 1949 order is present at altitudes up to the montane belt, bellow the timberline. Above the timberline, within the natural treeless vegetation, the silicicolous grasslands of the Alps are classified within the *Caricetalia curvulae* Br.-Bl. in Br.-Bl. et Jenny 1926 order (Ellenberg 1996). There are several schemes used for the clas-

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sification of the European silicicolous grassland vegetation. The survey of Austrian plant communities (collected work »Die Pflanzengesellschaften Österreichs«) (Mucina & al. 1993; Grabherr & Mucina 1993) was followed in this study. In that work all the important surveys of European silicicolous vegetation are considered and critically reviewed (Preisling 1949; Oberdorfer 1957, 1978; Krahulec 1985, 1988). On Slovenia's non-carbonate bedrock, the Matgrass swards were mentioned by Aichinger (1933) for Karavanke alpine range. The vegetation of the dry grassland vegetation on the Pohorje Mts. top areas was recently described by Kaligarič & Škornik (2002). Floristic study of grasslands with some indications about vegetation was performed by T. Wraber (1971) on Pohorje Mts., Vreš (1987) on Košenjak Mts. and by Druškovič (1966) and Martinčič (1996) on Smrekovec mountains.

The objectives of the present study were: 1. to assess the silicicolous grassland vegetation on highlands of North-Eastern Slovenia: the top areas of Pohorje region, the highest tops of Kozjak moun-

tains (Košenjak) and Smrekovec mountains (between Smrekovec, Komen and Travnik); 2. To classify the phytosociological reléves and to produce a syntaxonomic scheme of the sampled vegetation; 3. To discuss phytogeographic, environmental and nature-conservation issues of the vegetation of silicicolous grasslands of the highlands of North-Eastern Slovenia.

2. METHODS

2.1 Study area

Silicicolous montane ranges of North-Eastern Slovenia are Pohorje, Kozjak and Smrekovec mountains (Fig. 1). Pohorje is forming together with Kozjak one single meso-region, the extreme southern part of the Central Alps. The river Drava is dividing both parts.

Pohorje is the most dominant mountain range in the NE Slovenia. It links Central Alps in the north

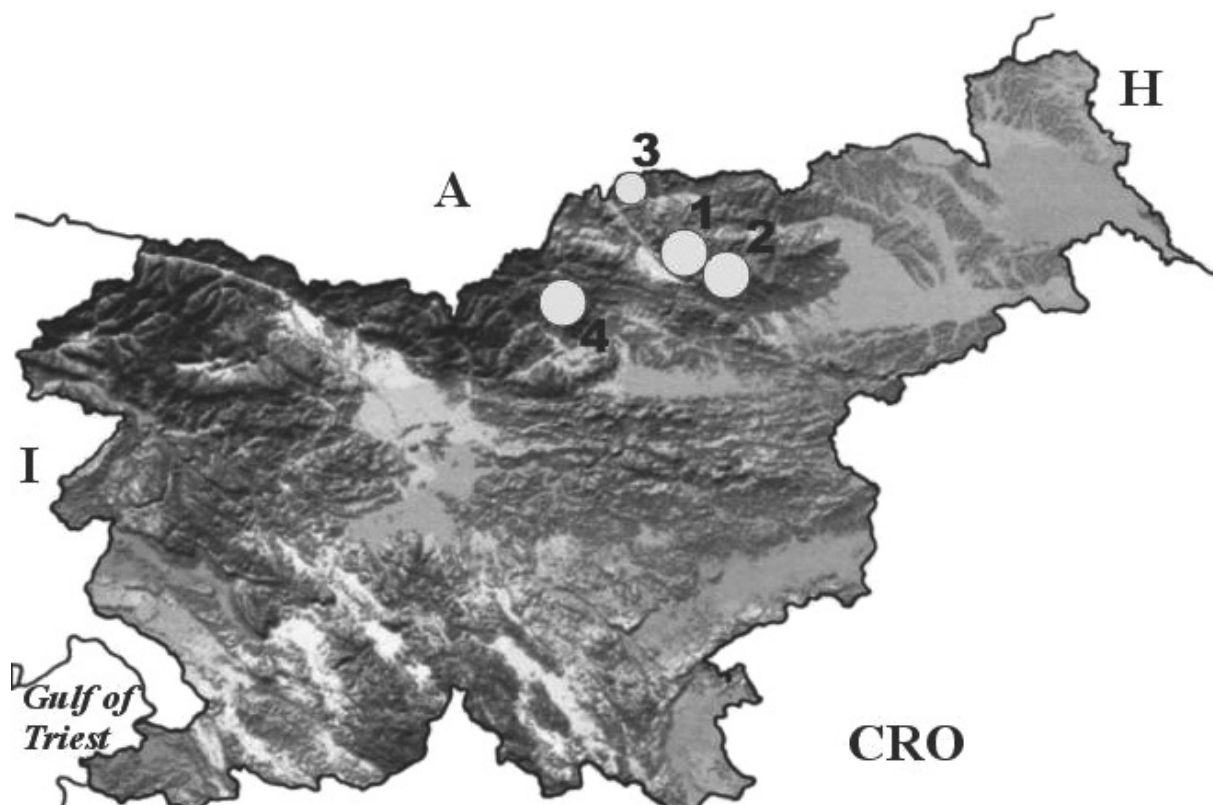


Figure 1: Highlands of North-Eastern Slovenia, where the relevés of silicicolous grasslands were collected. 1, 2 – Pohorje; 3 – Kozjak; 4 – Smrekovec Mts.

Slika 1: Ovršni predeli pogorij severovzhodne Slovenije, kjer so bili zbrani popisi silikatnih travišč. 1, 2 – Pohorje; 3 – Kozjak; 4 – Smrekovško pogorje.

and proceeds to the lowland sub-Pannonian region in the east. The northern and the western boundaries of Pohorje Mts. are determined by Drava valley from Dravograd to Maribor and by Mislinja river, while in the east and south its limit represents the road Maribor – Slovenska Bistrica – Oplotnica – Zreče – Vitanje – Mislinja. Two geomorphological units could be distinguished, namely (1) central plateau, which is surrounded by peaks Klopni vrh, Žigartov vrh, Veliki and Javorski vrh with altitudes about 1300 m and (2) the round ridge of the western Pohorje, which begins with Rogla and continues over Planinka, Jezerski vrh and Črni vrh to Velika Kopa and Mala Kopa in western direction (Jež 1995). Predominating are metamorphic rocks and granodiorite lacolith (Hinterlechner-Ravnik 1995). Gentle-sloping ridges are characteristic of the Pohorje Mountains as the result of the old geological formations on the top areas. Parts with bare surface and exposed rocks are only rarely to be seen.

Kozjak is stretching on the left part of the Drava river from Košenjak (1522 m) above Dravograd (where the montane range continues to Austria, Koralpen/Golica) until Urban above Maribor.

Smrekovec Mountains take part of the eastern Kamniško-Savinjske Alps. The northern boundary is determined by the valley of Bistra river, the southern by the valley of Savinja river and the Golte Plateau, while on the western part Smrekovec Mts. border on the line Mozirje – Lepa njiva – Šmihel – Bele Vode and Ludranski Vrh. The geologic bedrock is vulcanic (Kralj 1996).

The highest sampling sites, excluding Komen (1683 m a.s.l.) don't exceed 1600 m a.s.l. (Črni vrh: 1543 m, Košenjak: 1522 m, Smrekovec: 1577 m).

2.2 Sampling methods and data analysis

In the years 1993 and 2001 phytosociological relevés were taken on the highlands of Pohorje (Kaligarič & Škornik 2002), and in the years 2002 and 2003 on the Kozjak and Smrekovec mountains. They were compiled using standard procedure of the Braun-Blanquet approach (Braun-Blanquet 1964; Westhoff & van der Maarel 1973; Dierschke 1994). All relevés were stored in the computer data base using program JODI 97 (Peterseil & al. unpubl.). In the first stage of the vegetation analysis the classification procedure Two-Way-Indicator-SPecies ANalysis (TWINSPAN; Hill 1979) was run using computer program VEGI (Reiter 1998).

The sequence of the relevés in the analytical table was then corrected empirically due to the presence of some dominant species, which gave significant character to the physiognomy and syndynamics of the collected and studied grassland stands.

Geo-elements were determined according to Poldini (1991). Plant life forms typology follows Ellenberg & Mueller-Dombois (1967) and Poldini (1989, 1991).

2.3 Nomenclature

Taxonomic nomenclature follows Martinčič & al. (1999), syntaxonomic nomenclature follows Mucina & al. (1993) and Grabherr & Mucina (1993).

3. RESULTS AND DISCUSSION

3.1 Vegetation classification and species composition

The top areas of Kozjak and Pohorje mountains do not reach the timberline, while Smrekovec area is just bordering to it. However, anthropogenically treeless highlands are certainly more or less influenced also by the sub-Alpine and Alpine belts and physiognomically they have "subalpine" aspect (habitus). There is a contingent of species, which belong to the class of the alpine acid-soil swards *Caricetalia curvulae* Br.-Bl. in Br.-Bl. et Jenny 1926, which penetrate to the montane belt. But their portion is lower and considering the floristic principle, the collected relevés from altitudes from 1360 to 1660 m a.s.l., should be classified within the class of the secondary Matgrass grasslands and dwarf shrub heaths *Calluno-Ulicetea* Br.-Bl. et R. Tx. Ex Klika et Hadač 1944, namely to the *Nardetalia* Oberd. ex Preising 1949 order, which includes dry Matgrass swards of lowland up to the montane belt.

Correct classification is confirmed also by slow but persistent spontaneous reforestation of studied grasslands. Vegetation of *Nardetalia* order is spread mostly in Atlantic and sub-Atlantic Europe including Alpine region (Preising 1949). While the lime-deficient substrates are characteristic of the larger part of the Europe where great part of the seminatural pastures and meadows belong to that order, in Slovenia due to the prevailing calcareous bedrock, such dry pastures and meadows are not very frequent. Within *Nardetalia* order two more xerophilous alliances can be distinguished. These

grasslands could be therefore classified within (a) the alliance of the lowland and montane Matgrass swards *Violion caninae* Scwickerath 1944 or (b) within the alliance *Nardo-Agrostion tenuis* Sillinger 1933, which is spread mostly in the Carpathian Mountains and riches also the edges of the Alps (Mucina & al. 1993). A central position within the *Violion caninae* has the *Polygalo-Nardetum* (Preising 1953) Oberd. 1957 association. It is mainly found on very acid and nutrients poor soils from the lowland up to the altitudes about 1300 m a.s.l. (Steinbuch 1995). The relevés from highlands consist of some species, not appearing in lower altitudes (within the most widespread association *Polygalo-Nardetum*): *Gentiana pannonica*, *Gentia acaulis*, *Potentilla aurea*, *Solidago virgaurea*, *Hieracium aurantiacum*, *Leontodon helveticus*, *Pseudorchis albida* and *Hypochoeris uniflora*. This species indicate that the dry grasslands from Pohorje can be assigned to the *Nardo-Agrostion tenuis* alliance, which is typical for montane belt.

Previous analysis of Pohorje grasslands (Kaligarič & Škornik 2002) and comparisons with similar dry grassland stands from nearby Alpine region in south-eastern Austria (Steinbuch 1995) confirmed that within that alliance we can classify them in the association *Homogyno alpinae-Nardetum* Mráz 1956. The syntaxonomical scheme of the studied vegetation would be the following:

Class ***Calluno-Ulicetea*** Br.-Bl. et. R. Tx. ex Klika et Hadač 1944

Order ***Nardetalia*** Oberd. ex Preising 1949

Alliance ***Nardo-Agrostion tenuis*** Sillinger 1933

Association ***Homogyno alpinae-Nardetum*** Mráz 1956.

The relevés are presented in Table 1. First group (relevés from 1–46) we consider as “typical” for the association *Homogyno alpinae-Nardetum*. The main group of relevés are from Pohorje, the other from Smrekovec. On Smrekovec stands of this association reach 1670 m a.s.l. Characteristic species for this group are *Nardus stricta*, *Arnica montana*, *Homogyne alpina*, *Solidago virgaurea*, *Potentilla erecta*, *Carex pilulifera* and *Veratrum album* subsp. *album*. On Pohorje are present also the following species: *Gentiana pannonica*, *Hieracium aurantiacum* and *Festuca rubra*. According to some historical data (Petkovšek 1952) also *Gentiana acaulis* appears on Pohorje Mts., but it was not confirmed for decades (Kaligarič & Škornik 2002). It was found in Košenjak, Komen, Krnes and Smrekovec, in some parts quite abundantly.

The second group (relevés from 47–102) is represented by drier stands on shallow soil, dominated by *Ericaceae*, predominately *Calluna vulgaris*. They are physiognomically very similar to the heaths of the *Vaccinio-Genistetalia* Schubert 1960 order. However the characteristic species of this order, such as the species of the genus *Genista*, are missing, while the species of the order *Nardetalia*, for example *Arnica montana*, *Nardus stricta* and *Hypericum maculatum*, are regularly present. Therefore those stands could be considered only as the transitional forms to the heaths. These “heaths-like” grasslands occur on the slopes on very shallow soil, poor with minerals and with low pH values, when grazing (or mowing) ceased. They often have parts with bare surface and are more often exposed to erosion (inclination!) than typical variants of the association which predominately occur on flat ground.

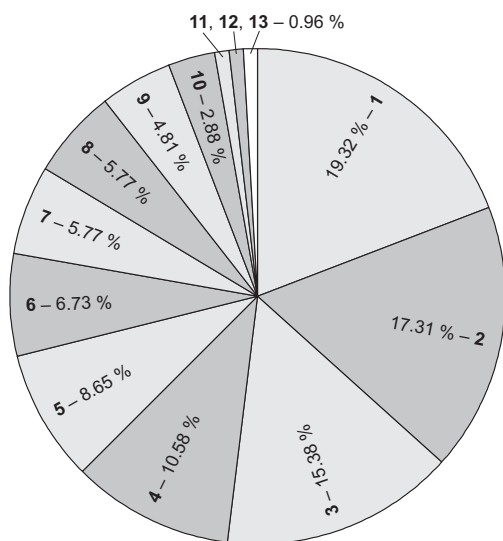
3.2 The chorological spectrum and life forms

The chorological structure of the association (Fig. 2) shows absence of Illyrian species and high portion of European (including Alpine) geoelements. This confirms the position of North-Eastern Slovenian highlands within the southernmost extensions of the Alps. One quarter of the species represent Circumboreal, Arctic-Alpine and Alpine geo-elements. One half of the species represent Eurasian, European and Eurosiberian geo-elements and the rest Mediterranean-Montane, Palearctic and some smaller groups.

According to their life forms (Fig. 3) these grasslands could be considered as typical middle European semi-natural grasslands of the montane belt up to the timberline. Hemicryptophytes represent the far major group with 68.62 %. Chamaephytes are 10.78% and geophytes 12.74 %. The lowest proportion have therophytes (7.84%), which could be easily explained by unsuitable habitat conditions – higher altitude, short vegetation season, etc..

3.3 Nature conservation

Acidophilous grasslands of Pohorje, Kozjak and Smrekovec mountains have a semi-natural origin, i.e. they had been developed and are maintained because of the human activities. This can not be satisfactory explained for tops of Travnik, Komen, Krnes and Smrekovec, all exceeding 1570 m a.s.l.,



- 1 – Eurasian (evrazijske) 19.23 %
 2 – European (evropske) 17.31 %
 3 – Circumboreal (cirkumborealne) 15.38 %
 4 – Eurosiberian (evrosibirske) 10.58 %
 5 – Mediterr.-Montane (mediter.-montanske) 8.65 %
 6 – Cosmopolitans (kozmpopoliti) 6.73 %
 7 – Evmediterranean (evrimediteranske) 5.77 %
 8 – Alpine (alpske) 5.77 %
 9 – Paleotemperate (paleotemperatne) 4.81 %
 10 – Arctic-Alpine (arktično-alpske) 2.88 %
 11 – Alpine-Carpathic (alpinsko-karpatске) 0.96 %
 12 – Mediterr.-Atlantic (mediter.-atlantske) 0.96 %
 13 – Subatlantic (subatlantske) 0.96 %

Figure 2: Chorological groups of the association *Homogyno alpinae-Nardetum* of the highlands of North-Eastern Slovenia.

Slika 2: Geoelementna sestava asociacije *Homogyno alpinae-Nardetum* na območjih ovršnih predelov pogorij severovzhodne Slovenije.

also due to relief and microclimate conditions. Due to the changes in traditional land-use, mostly on Pohorje, such grasslands are no longer used for grazing and mowing and are increasingly being reforested by trees. The forest progression is relatively slow and could be noticed throughout a longer period. The succession is relatively slow due to the short vegetation season in the montane climate and absence of invasive shrub species, not present on non-calcareous substrate, which is generally less species-rich. But the process of spontaneous reforestation is making progress. Edaphic conditions are important, e.g. in small depressions and on the slopes with deeper soil – having higher water-capacity – a forest sedge *Carex brizoides* is

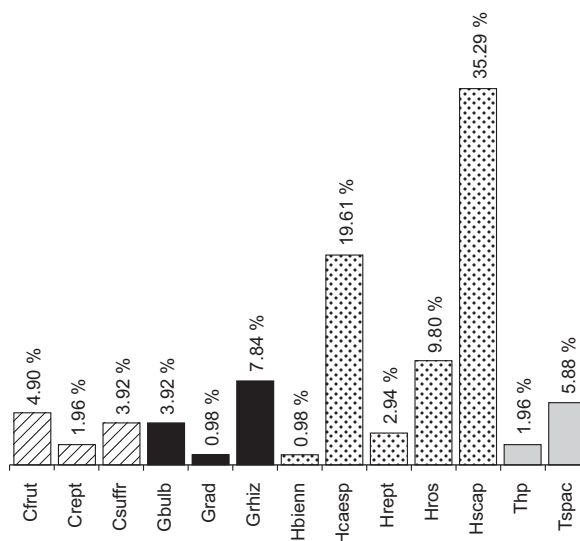


Figure 3: Plant life forms of the association *Homogyno alpinae-Nardetum* of the highlands of North-Eastern Slovenia. Legend: **C** – chamaephyta, **H** – hemikryptophyta, **G** – geophyta, **T** – therophyta, **bienn** – biennial, **bulb** – bulbosa, **caesp** – caespitose, **frut** – frutescentia, **par** – parasites, **rad** – radicigemmata, **rept** – reptantia, **rhiz** – rhizomatosa, **ros** – rosulata, **scap** – scaposa, **succ** – succulenta, **suff** – suffrutescencia, **hp** – half-parasites.

Slika 3: Spekter življenjskih oblik rastlin v asociaciji *Homogyno alpinae-Nardetum* na območjih ovršnih predelov pogorij severovzhodne Slovenije. Legenda: **C** – hamefiti, **H** – hemikriptofiti, **G** – geofiti, **T** – terofiti; **bienn** – dvoletnice, **bulb** – vrste s koreninskimi gomolji in čebulicami, **caesp** – v spodnjem delu razvejane in šopaste rastline, **frut** – polgrmi, **par** – parazitske rastline, **rad** – rastline s koreninskimi brsti, **rept** – rastline s poleglimi poganjki, ki se ukoreninjajo, **rhiz** – rastline z živicami (rhizomatosa), **ros** – rastline z listno rozeto, **scap** – rastline s pokončnimi, v zgornjem delu razvejanim stebлом, **succ** – sukulentni, **suff** – lesnate rastline, **hp** – polparaziti.

successful colonizer and can form monodominant stands (e.g. above the top of Komen, on Pohorje). However the sedge is not always the first colonizer of the fallow plains. On drier places spruce (*Picea abies*) or mountain ash (*Sorbus aucuparia*) start to germinate in Pohorje. On Komen there is also *Larix europea* and both junipers – *Juniperus communis* and *J. sibirica*, while *Alnus viridis* was found to reforest the grasslands on Kozjak.

The grasslands of the association *Homogyno-Nardetum* have high nature-conservation value not only because they contain in Slovenia and EU rare and endangered species, but also due to their rareness in Slovenia, where montane belt is more or less calcareous. Regular or at least occasional

grazing or mowing is essential for their preservation. Throughout the proper management, the existence of rare and endangered species would be assured. After joining EU, different sources for subsidize mountain grazing (or mowing) has been offered. Some project are planned to be started, some already run. But the results have to be expected in the following year. In general – for conservational purposes – very light grazing or late mowing is the best way to preserve oligotrophic stands.

The red-listed species (Uradni list RS 2002) from our relevés are: *Campanula barbata*, *Gentiana acaulis*, *Hypochoeris uniflora* and *Pulsatilla alba*.

4. ACKNOWLEDGEMENT

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5. POVZETEK

Vegetacija silikatnih travšč na ovršnih predelih pogorij severovzhodne Slovenije

Glavni namen raziskave je bil fitocenološko ovrednotiti vegetacijo silikatnih travščih na ovršnih predelih Pohorja, Kozjaka in Smrekovškega pogorja. Vegetacijo smo kartirali po standardni srednjeevropski Braun-Blanquetovi metodi (Braun-Blanquet 1964; Westhoff & van der Maarel 1973; Dierschke 1994). Popisi rastlinskih združb na Pohorju so bili izvedeni v letih 1993 in 2001 (Kaligarič & Škornik 2002), na Kozjaku in Smrekovškem pogorju pa leta 2002 in 2003. Ugotovili smo, da se na raziskovanem območju pojavlja asociacija *Homogyno alpinae-Nardetum* Mráz 1956, ki je bila opisana na Karpatih (Mucina & al. 1993). Omenjeno asociacijo uvrščamo v zvezo *Nardo-Agrostion tenuis* Sillinger 1933, red *Nardetalia* Oberd. ex Preising 1949 in razred *Calluno-Ulicetea* Br.-Bl. et. R. Tx. ex Klika et Hadač 1944.

Travišča so zaradi silikatne matične podlage floristično precej skromna. Hkrati k temu pripomore večje izpiranje organskih snovi zaradi relativno visoke količine padavin in kopičenje surovega

humusa. Značilnice in razlikovalnice asociacije so *Solidago virgaurea*, *Veratrum album* subsp. *album*, *Homogyne alpina*, *Hypochoeris uniflora*, *Gentiana pannonica* in *Potentilla aurea*.

Klasifikacijo naših popisov smo izvedli najprej s TWINSPAN – analizo (Hill 1979). Zaporedje popisov v analitični tabeli smo nato korigirali na podlagi empiričnih izkustev, saj se je po izvedeni klasifikacijski analizi izkazalo, da je premalo upoštevana dominanca vrst *Calluna vulgaris*, *Vaccinium myrtillus* in *V. vitis-idaea*, ki dajejo značilen pečat fiziognomiji proučevanih travšč. Na podlagi zbranih popisov smo določili dve skupini travšč. Med seboj se razlikujeta predvsem po različni stopnji sušnosti in trofičnosti. Prvih 46 popisov predstavlja osrednjo obliko asociacije *Homogyno alpinae-Nardetum*, ki je na raziskovanem območju razširjena pretežno na Pohorju (Kaligarič & Škornik 2002), zabeležena pa je bila tudi na območju Smrekovškega pogorja. Vrste, ki označujejo to tipično obliko, so *Nardus stricta*, *Arnica montana*, *Homogyne alpina*, *Solidago virgaurea*, *Potentilla erecta*, *Carex pilulifera* in *Veratrum album* subsp. *album*, na Pohorju pa se poleg nekaterih omenjenih vrst pojavljajo še *Gentiana pannonica*, *Hieracium aurantiacum* in *Festuca rubra* (Kaligarič & Škornik 2002). Za drugo skupino (popisi št. 47 – 102), so značilna suha travšča na plitkih tleh, ki so revna z minerali in močno zakisana. Značilen pečat jim dajejo vrste iz družine *Ericaceae* zlasti vrsta *Calluna vulgaris*. Zato so fiziognomsko ti sestoji zelo podobno resavam iz reda *Vaccinio-Genistetalia* Schubert 1960. Vendar pa – z izjemo rese – večina značilnic tega reda v teh travščih manjka, npr. vrste rodu *Genista*, hkrati pa so dovolj dobro zastopane značilnice reda *Nardetalia*, npr. *Arnica montana*, *Nardus stricta* in *Hypericum maculatum*. Zato pojmujejo te sestojte zgolj kot prehodne oblike k resavam, kar je del sindinamike teh travšč po opustitvi paše (ali košnje).

Glede na spekter življenjskih oblik se v asociaciji *Homogyno alpinae-Nardetum* Mráz 1956 pojavlja sestava, tipična za srednjeevropska travšča. Prevladujejo hemikriptofiti (68.62 %), geofiti predstavljajo 12.74 % vseh vrst in hamefiti 10.78 %. Najmanj je delež terofitov (7.84 %).

Za asociacijo je značilna odsotnost ilirskih in pontskih vrst, največ pa je evrazijskih in evropskih vrst, kar potrjuje položaj travšč na skrajnem jugovzhodnem delu Centralnih Alp. Precejšen delež zavzemajo cirkumborealne in evrosibirske vrste. Zaradi opuščanja kmetijskih dejavnosti predvsem v najvišjih predelih hribovitih pokrajin poteka sukcesija travšč v klimaksno gozdno stanje.

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APPENDIX:

Appendix to the table 1: Localities, dates of the relevés and species, occurring in one relevé only. Dodatek k tabeli 1: Lokalitete popisanih sestojev, datumi popisov ter vrste, ki se pojavljajo samo v enem popisu.

1: Komen, 2.7.2003; **2:** Komen, 2.7.2003; **3 – 16:** Kaligarič & Škornik 2000: Tab.1/ relevés 14, 15, 16, 26, 12, 18, 13, 17, 22, 23, 11, 24, 25, 20; **17:** Smrekovec, 1.7.2003; **18:** Komen, 1.7.2003, *Phyteuma zahlbruckneri*; **19:** Smrekovec, 1.7.2003; **20:** Krnes – Komen, 1.7.2003; **21:** Smrekovec, 1.7.2003; **22:** Krnes, 20.7.2002; **23:** Komen, 20.7.2002; **24:** Komen – Travnik, 20.7.2002; **25:** Smrekovec, 1.7.2003; **26:** Smrekovec, 1.7.2003; **27:** Krnes, 20.7.2002; **28:** Smrekovec – Krnes, 20.7.2002; **29:** Košenjak, 26.6.2003;

30: Travnik, 20.7.2002, *Polygala chamaebuxus*; **31:** Smrekovec, 1.7.2003; **32:** Smrekovec – Krnes, 1.7.2003; **33:** Smrekovec – Krnes, 1.7.2003; **34:** Smrekovec – Krnes, 1.7.2003; **35:** Smrekovec – Krnes, 1.7.2003; **36:** Kaligarič & Škornik 2000: Tab.1/ relevé No. 29; **37:** Smrekovec, 1.7.2003, *Athyrium filix-femina*; **38:** Smrekovec, 20.7.2002; **39:** Smrekovec, 20.7.2002; **40:** Smrekovec – Krnes, 20.7.2002; **41:** Smrekovec – Krnes, 20.7.2002; **42:** Krnes, 20.7.2002; **43:** Krnes, 1.7.2003; **44:** Krnes, 1.7.2003; **45:** Kaligarič & Škornik 2000: Tab.1/ relevé No. 27; **46:** Smrekovec, 1.7.2003; **47:** Kaligarič & Škornik 2000: Tab.1/ relevé No. 21; **48:** Smrekovec – Krnes, 1.7.2003; **49:** Komen, 2.7.2003, *Doronicum austriacum*; **50:** Komen, 2.7.2003; **51:** Komen – Travnik, 2.7.2003, *Lilium martagon*; **51:** Komen – Travnik, 2.7.2003, *Lilium martagon*; **52:** Travnik, 2.7.2003, *Gnaphalium uliginosum*; **53:** Travnik, 2.7.2003; **54:**

Table 1 (Part 1): Analytical table of the *Homogyno alpinae-Nardetum* Mráz 1956 association. Relevés No. 1–46 – typical form of the association.

Tabela 1 (1. del): Analitična tabela asociacije *Homogyno alpinae-Nardetum* Mráz 1956. Popisi št. 1–46 – tipična oblika asociacije.

Relevé No. (Številka popisa)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Altitude a. s. l. (m) (nadmorska višina)	1430	1670	1430	1420	1640	1520	1525	1550	1520	1520	1590	1530	1550	1530	1560	1530	1480
Inclination (°) (Naklon)	3	3	3	1	10	3	5	0	3	20	10	5	5	0	20	3	4
Exposition (Lega)	SW	E	SW	SW	SE	SW	E	/	E	S	E	E	E	/	W	E	NW
Coverage (%) (Pokrovnost)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	95	100	100
Surface of the relevé (m ²) (Velikost popisne ploskve)	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
No. of species in the relevé (Št. vrst v popisu)	15	17	15	15	18	14	11	17	16	19	18	11	15	13	29	18	12
Characteristic and differential species of the association																	
(Značilnice in razlikovalnice asociacije)																	
<i>Veratrum album</i>	+	+	.	+	1	.	+	+	.	+	+	+	+	.	+	+	.
VP <i>Homogyne alpina</i>	.	+	.	.	.	+	.	+	+	+	+	.	+	+	+	+	.
<i>Solidago virgaurea</i>	+	+	+	+	1	.	.	.	.	.	+	.	.	.	.	.	+
CC <i>Hypochoeris uniflora</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CC <i>Gentiana pannonica</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CC <i>Potentilla aurea</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
A. ONardo-Agrostion tenuis Sillinger 1933,																	
Nardetalia Oberd. ex Preising 1949																	
<i>Nardus stricta</i>	3	4	4	4	3	5	4	4	4	5	4	4	4	4	2	4	4
<i>Arnica montana</i>	+	+	+	+	+	.	.	.	.	.	+	.	.	+	1	2	2
<i>Hypericum maculatum</i>	.	.	.	.	+	+	2	1	+	+	+	+	+	1	+	+	.
<i>Carex leporina</i>	.	.	.	.	.	1	.	+	+	+	+	2	1	2	.	+	.
<i>Carex pallescens</i>	.	.	.	.	.	.	+	+	1	+	+	.	+	+	+	+	.
<i>Hieracium aurantiacum</i>	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.
<i>Gentiana acaulis</i>	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
<i>Hypericum perforatum</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
CU Calluno-Ulicetea Br.-Bl. et R. Tx. ex Klika																	
et Hadač 1944																	
<i>Potentilla erecta</i>	+	+	1	2	1	+	+	+	+	+	+	+	+	+	.	+	+

Košenjok, 29.7.2002; **55:** Krnes – Komen, 20.7.2002; **56:** Košenjak, 29.7.2002, *Fragaria vesca*, *Homogyne sylvestris*; **57:** Košenjak, 26.6.2003; **58:** Košenjak, 26.6.2003; **59:** Komen, 20.7.2002; **60:** Kaligarič & Škornik 2000: Tab.1/ relevé No. 19; **61:** Komen, 2.7.2003; **62:** Kaligarič & Škornik 2000: Tab.1/ relevé No. 30; **63:** Kaligarič & Škornik 2000: Tab.1/ relevé No. 32; **64:** Smrekovec – Krnes, 1.7.2003; **65:** Smrekovec – Krnes, 1.7.2003; **66:** Smrekovec – Krnes, 1.7.2003; **67:** Krnes, 1.7.2003; **68:** Košenjak, 26.6.2003; **69:** Košenjak, 26.6.2003; **70:** Košenjak, 26.6.2003; **71:** Smrekovec – Krnes, 1.7.2003; **72:** Krnes, 1.7.2003; **73:** Kaligarič & Škornik 2000: Tab.1/ relevé No. 7; **74:** Krnes – Komen, 1.7.2003; **75:** Smrekovec, 20.7.2002; **76:** Krnes, 20.7.2002; **77:** Košenjak (Austrian site), 26.6.2003; **78:** Smrekovec – Krnes, 1.7.2003; **79:** Kaligarič & Škornik 2000: Tab.1/ relevé No. 10; **80:** Kaligarič & Škornik

2000: Tab.1/ relevé No. 5; **81:** Kaligarič & Škornik 2000: Tab.1/ relevé No. 6; **82:** Kaligarič & Škornik 2000: Tab.1/ relevé No. 28; **83:** Kaligarič & Škornik 2000: Tab.1/ relevé No. 31; **84:** Smrekovec – Krnes, 1.7.2003; **85:** Smrekovec – Krnes, 1.7.2003; **86:** Kaligarič & Škornik 2000: Tab.1/ relevé No. 4; **87:** Košenjak, 26.6.2003; **88:** Komen, 2.7.2003, *Arctostaphylos uva-ursi*; **89:** Komen, 2.7.2003; **90:** Komen, 2.7.2003; **91:** Komen, 2.7.2003; **92:** Kaligarič & Škornik 2000: Tab.1/ relevé No. 8; **93:** Kaligarič & Škornik 2000: Tab.1/ relevé No. 9; **94:** Komen, 20.7.2002, *Ajuga genevensis*; **95:** Kaligarič & Škornik 2000: Tab.1/ relevé No. 1; **96:** Smrekovec, 1.7.2003; **97:** Košenjak, 26.6.2003; **98:** Košenjak, 26.6.2003; **99:** Kaligarič & Škornik 2000: Tab.1/ relevé No. 3; **100:** Kaligarič & Škornik 2000: Tab.1/ relevé No. 2; **101:** Smrekovec, 1.7.2003; **102:** Krnes – Komen, 20.7.2002

18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
1480	1465	1580	1520	1350	1510	1520	1520	1500	1530	1590	1500	1590	1510	1510	1500	1520	1550	1590	1400	1590	1510	1510	1520	1520	1450	1540	1525	1430
3	3	15	5	0	0	3	3	0	0	5	0	5	3	3	0	3	10	10	5	5	5	0	3	3	5	15	10	5
/	NW	SSW	S	/	/	E	E	/	/	E	/	E	S	S	/	E	SE	SE	E	E	E	/	SW	E	SW	W	W	W
100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
50	25	25	25	50	25	25	25	50	25	25	25	25	25	25	25	25	25	25	50	25	25	25	25	25	50	50	50	50
18	13	36	12	28	16	6	9	22	10	14	12	10	26	28	11	11	9	15	17	15	15	7	12	15	16	14	13	14

.	+	+	+	+	+	+	+	.	.	1	.	+	+	+	.	+	.	+	+	+	+	+	1	+	1	+	+	+	+	
.	1	+	1	+	+	.	.	+	.	.	+	2	+	.	.	.	1	2	.	+	.	.	.	.	.	+	+	.	+
+	2	+	.	.	.	.	.	.	+	.	.	.	.	+	+	2	.	+	+	.	.	.	.	.	.	+	+	.	.
+	.	.	.	+	+	+	
+	+	.
.
3	3	4	5	4	5	5	5	2	1	3	+	3	+	+	1	+	4	4	3	4	5	4	5	4	5	5	5	3		
+	1	+	.	1	.	.	.	+	.	.	.	.	+	+	.	.	3	.	+	+	.	.	.	.	1	1	1	1	
.	.	+	1	.	.	.	.	.	3	1	+	.	1	+	+	.	2	.	+	+	+	+	+	+	.	+	.	.	
.	.	.	.	.	.	.	.	.	4	2	2	3	.	.	.	+	.	+	.	2	2	3	1	2	.	.	.	.
.	.	+	.	.	+	+	+	.	.	+		
.	.	.	.	+	.	.	.	+	+	+	+	.	.	.	
.	
.	
+	1	+	+	+	+	+	+	+	+	.	+	.	+	+	.	1	2	+	+	+	+	+	+	+	+	1	1	+	+	

Relevé No. (Številka popisa)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<i>Calluna vulgaris</i>	+	.	.	.	+	+	+	.	+	.	+	.	.
<i>Luzula campestris</i>	1	.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	.
<i>Carex pilulifera</i>	1	+	1	1	+	1	1	2	+	+	1	2	2	1	+	2	.
<i>Anthoxanthum odoratum</i>	.	.	+	+	.	.
<i>Antennaria dioica</i>
<i>Chamaespartium sagittale</i>
<i>Phyteuma spicatum</i>	+
<i>Viola canina</i>
<i>Polygala vulgaris</i>
<i>Hieracium pilosella</i>
<i>Botrychium lunaria</i>
<i>Danthonia decumbens</i>
CC Caricetea curvulae Br.-Bl. 1948																	
<i>Campanula barbata</i>	+	.	+	+	+	.	+
<i>Leontodon helveticus</i>	.	.	+
<i>Pseudorchis albida</i>	.	+	+
MA Molinio-Arrhenatheretea R. Tx. 1937 em.																	
R. Tx. 1970																	
<i>Festuca rubra</i>	+	+	+	+	.	+	+	+	.	.	+	1
<i>Cruciata glabra</i>	+	+	+	.	+	+	+	1	+	.	.
<i>Lychnis flos-cuculi</i>	.	.	+
<i>Agrostis capillaris</i>	.	+
<i>Campanula patula</i>	+	.	.
<i>Deschampsia caespitosa</i>
<i>Knautia drymeia</i>
<i>Achillea millefolium</i>
<i>Rumex acetosa</i>	+	.	.
<i>Leucanthemum vulgare</i>
<i>Ranunculus acris</i>
<i>Molinia caerulea</i>
<i>Centaurea jacea</i>
<i>Lotus corniculatus</i>
<i>Rumex acetosella</i>
<i>Euphrasia stricta</i>
<i>Trifolium pratense</i>
<i>Trifolium repens</i>
<i>Molinia arundinacea</i>
<i>Rhinanthus alectorolophus</i>
VP Vaccinio-Piceetea Br.-Bl. in Br.-Bl. et al 1939																	
<i>Vaccinium vitis-idaea</i>	+	+	.	+	.	.	.	+	+	+	+	+	.
<i>Luzula pilosa</i>	+	+	+	.	+
<i>Luzula luzuloides</i>	+	+	+	+	+	+	+	1
<i>Calamagrostis villosa</i>	+
<i>Melampyrum sylvaticum</i>	+	.	.
O Others (Ostale)																	
<i>Deschampsia flexuosa</i>	3	3	3	2	4	3	3	3	3	4	3	3	3	3	3	2	3
<i>Vaccinium myrtillus</i>	.	+	.	+	+	+	+	+	+	+	+	.	+	.	+	+	.
<i>Melampyrum pratense</i>	.	.	.	+	+	.	.	1	+	+	.	.	+	.	+	+	1
<i>Gentiana asclepiadea</i>	+	.	.
<i>Stellaria graminea</i>	.	.	.	+	.	.	.	+	+	+	.	.	.	+	+	+	.
<i>Hieracium laeviscaule</i>	.	.	+	+	+	+	1
<i>Anemone nemorosa</i>	.	+	+	+	+
<i>Gymnadenia conopsea</i>	.	+
<i>Crocus vernus ssp. vernus</i>	+	+	.	+
<i>Vaccinium gaultherioides</i>

Relevé No. (Številka popisa)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<i>Carex brizoides</i>	2	.	.	.	.	.	.	.	.	.	.	.
<i>Polygonatum verticillatum</i>	+	+
<i>Lycopodium clavatum</i>	+	+	.
<i>Maianthemum bifolium</i>	+	.	.	+
<i>Carex caryophyllea</i>
<i>Erica carnea</i>	+	+	.
<i>Carex digitata</i>	+	.
<i>Phleum rhaeticum</i>
<i>Leontodon</i> sp.	+
<i>Pulsatilla alba</i>
<i>Carlina acaulis</i>
<i>Pimpinella saxifraga</i>
<i>Veronica officinalis</i>
<i>Carex canescens</i>
<i>Leucocjum vernum</i>
<i>Cerastium glomeratum</i>	+
<i>Juncus effusus</i>	+
<i>Ranunculus platanifolius</i>	+
<i>Epilobium montanum</i>
<i>Euphrasia rostkoviana</i>
<i>Thymus pulegioides</i>
<i>Arabidopsis thaliana</i>
<i>Juncus monanthos</i>
<i>Juncus conglomeratus</i>
<i>Heracleum sphondylium</i>
<i>Hieracium racemosum</i>
<i>Luzula sylvatica</i>
<i>Teucrium chamaedrys</i>
<i>Veronica chamaedrys</i>
<i>Rhinanthus pulcher</i>
Lichens and mosses (lišaji in mahovi)																	
<i>Cladonia</i> sp.	+	.
<i>Cetraria islandica</i>
<i>Sphagnum</i> sp.

Legend (Legenda):

A – *Nardo-Agrostion tenuis*

O – *Nardetalia*

CC – *Caricetea curvulae*

CU – *Calluno-Ulicetea*

MA – *Molinio-Arrhenatheretea*

VP – *Vaccinio-Piceetea*

O – Others (Ostale)

Table 1 (Part 2): Analytical table of the *Homogyno alpinae-Nardetum* Mráz 1956 association. Relevés No. 47–102 – transitional forms to the heaths.

Tabela 1 (2. del): Analitična tabela asociacije *Homogyno alpinae-Nardetum* Mráz 1956. Popisi št. 47–102 – prehodne oblike k resavam.

Relevé No. (Številka popisa)	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	
Altitude a. s. l. (m) (nadmorska višina)	1360	1640	1350	1640	1480	1640	1610	1650	1630	1500	1500	1640	1540	1610	1590	1485	1570	1400	1550	1400	1530	1515	1500	
Inclination (°) (Naklon)	20	3	5	10	3	5	3	0	5	3	3	3	20	3	10	3	30	20	30	3	20	3	0	
Exposition (Lega)	SW	SW	SW	S	SW	S	SE	/	S	E	E	SW	SW	E	SE	S	SSW	/	SE	S	S	NW	/	
Coverage (%) (Pokrovnost)	100	100	100	100	80	100	100	100	100	100	100	100	90	100	100	100	100	100	100	100	100	100	100	
Surface of the relevé (m2) (Vel. popis. ploskve)	25	25	50	25	50	25	25	25	25	25	25	25	50	25	25	25	25	25	25	25	25	25	25	
No. of species in the relevé (Št. vrst v popisu)	20	17	16	13	14	18	21	17	19	31	23	20	13	21	17	15	24	27	19	13	18	32	18	
Characteristic and differential species of the association																								
(Značilnice in razlikovalnice asociacije)																								
<i>Veratrum album</i>																								
	+	+	+	.	+	+	+	.	+	+	+	+	+	+	.	+	+	+	
VP	<i>Homogyno alpina</i>																							
	.	2	+	+	2	2	2	+	+	2	+	+	.	.	+	.	+	.	1	1	+	1	1	
	<i>Solidago virgaurea</i>																							
	+	+	.	.	.	.	+	+	+	+	.	+	.	+	+	+	+	.	1	.	.	+	.
CC	<i>Hypochoeris uniflora</i>																							
	.	.	+	.	.	.	+	+	+	.	.	.	+	.	.	.	+	.	
CC	<i>Gentiana pannonica</i>																							
	+	.	.	+	
CC	<i>Potentilla aurea</i>																							
	.	+	+	
A.O Nardo-Agrostion tenuis Sillinger 1933, Nardetalia Oberd. ex Preising 1949																								
	<i>Nardus stricta</i>																							
	2	4	1	2	1	2	3	4	2	+	+	3	1	3	3	3	5	3	4	4	4	+	+	
	<i>Arnica montana</i>																							
	2	.	+	.	+	+	1	.	+	+	+	+	1	+	.	1	3	2	+	1	.	+	+	
	<i>Hypericum maculatum</i>																							
	+	.	.	+	1	+	+	+	+
	<i>Carex leporina</i>																							

	<i>Carex pallescens</i>																							
	+	+	.	
	<i>Hieracium aurantiacum</i>																							
	.	.	+	+	+	
	<i>Gentiana acaulis</i>																							
	+	.	+	+	.	.	.	+	.	.	
	<i>Hypericum perforatum</i>																							
	+	
CU Calluno-Ulicetea Br.-Bl. et R. Tx. ex Klika et Hadač 1944																								
	<i>Potentilla erecta</i>																							
	1	3	+	+	+	1	1	+	+	2	+	+	+	+	+	1	+	1	1	1	+	1	+	
	<i>Calluna vulgaris</i>																							
	2	2	4	4	4	4	4	3	4	4	4	4	4	4	4	2	2	2	3	3	3	3	4	
	<i>Luzula campestris</i>																							
	.	+	.	.	.	+	.	+	+	+	+	.	+	+	.	+	.	1	.	+	+	+	+	
	<i>Carex pilulifera</i>																							
	1	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.
	<i>Anthoxanthum odoratum</i>																							
	.	.	.	.	.	.	+	.	+	+	.	.	.	.	.	.	.	1	.	.	.	+	+
	<i>Antennaria dioica</i>																							
	+	+	.	+	.	.	+	+	.	
	<i>Chamaespartium sagittale</i>																							
	.	.	.	.	.	.	.	.	.	+	1	.	.	.	.	.	.	.	.	.	.	1	.
	<i>Phyteuma spicatum</i>																							
	+	+	+	
	<i>Viola canina</i>																							
	+	+	+	
	<i>Polygala vulgaris</i>																							
	+	.	.	.	+	
	<i>Hieracium pilosella</i>																							
	
	<i>Botrychium lunaria</i>																							
	+	
	<i>Danthonia decumbens</i>																							
	
CC Caricetea curvulae Br.-Bl. 1948																								
	<i>Campanula barbata</i>																							
	+	.	+	+	+	+	+	.	+	+	+	+	+	+	.	.	+	+	.	
	<i>Leontodon helveticus</i>																							
	+	.	+	.	+	+	.	.	.	
	<i>Pseudorchis albida</i>																							
	+	+	.	+	.	.	.	
MA Molinio-Arrhenatheretea R. Tx. 1937 em. R. Tx. 1970																								
	<i>Festuca rubra</i>																							
	+	+	+	+	+	.	.	.	+	
	<i>Cruciata glabra</i>																							
	+	+	+	+	
	<i>Lychnis flos-cuculi</i>																							
	+	

Relevé No. (Številka popisa)	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69
<i>Agrostis capillaris</i>	+	+
<i>Campanula patula</i>	+
<i>Deschampsia caespitosa</i>
<i>Knautia drymeia</i>	+	+	+
<i>Achillea millefolium</i>	+	+
<i>Rumex acetosa</i>	+
<i>Leucanthemum vulgare</i>	+
<i>Ranunculus acris</i>	+
<i>Molinia caerulea</i>	+
<i>Centaurea jacea</i>	+	+
<i>Lotus corniculatus</i>	+	+
<i>Rumex acetosella</i>	+
<i>Euphrasia stricta</i>	+
<i>Trifolium pratense</i>	+
<i>Trifolium repens</i>
<i>Molinia arundinacea</i>
<i>Rhinanthus alectorolophus</i>
VP Vaccinio-Piceetea Br.-Bl. in Br.-Bl. et al 1939																							
<i>Vaccinium vitis-idaea</i>	1	1	2	2	1	2	1	2	1	1	1	2	2	2	1	1	+	+	+	1	+	.	+
<i>Luzula pilosa</i>	+	2	+	.	+	.	.	+	+	.	.	.	+	+	.	+	.	2	.	+	.	.	.
<i>Luzula luzuloides</i>	1	.	.	+	.	+	.	+	.	+	.	.	.	.	+	+	+
<i>Calamagrostis villosa</i>	+
<i>Melampyrum sylvaticum</i>	+
O Others (Ostale)																							
<i>Deschampsia flexuosa</i>	2	4	.	1	1	1	.	+	1	1	1	.	.	+	3	2	1	2	3	2	2	+	1
<i>Vaccinium myrtillus</i>	2	1	2	2	2	3	2	1	1	1	1	1	.	+	+	+	1	1	3	2	2	1	3
<i>Melampyrum pratense</i>	1	+	+	+	+	+	.	+	+	1	.	+	+	+	+	2	+	.	2	+	+	.	+
<i>Gentiana asclepiadea</i>	.	.	+	+	.	.	+	+	.	+	+	.	+	+	+	.	+	.	1	+	.	+	+
<i>Stellaria graminea</i>	+	+	.	.	+	.	.
<i>Hieracium laevicaule</i>	.	.	+	.	.	.	+	+	.	.	.	+	+
<i>Anemone nemorosa</i>	.	.	.	+	.	+	+	.	+	.	+	+	+	.	.	+	.	+	+
<i>Gymnadenia conopsea</i>	+	.	+	.	+	.	+	+	+	.	+	+	+
<i>Crocus vernus ssp. vernus</i>	.	+	+	.	.	.	+	+
<i>Vaccinium gaultherioides</i>	.	.	.	1	.	+	.	2	3	.	.	.	.	.	.	+	.	.	.	.	.	.	.
<i>Carex brizoides</i>	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.
<i>Polygonatum verticillatum</i>	+	+	.	.	.	+	.
<i>Lycopodium clavatum</i>	+	+
<i>Maianthemum bifolium</i>	.	2	.	.	.	+	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.
<i>Carex caryophyllea</i>	+
<i>Erica carnea</i>
<i>Carex digitata</i>	+	+
<i>Phleum rhaeticum</i>	+	+
<i>Leontodon sp.</i>
<i>Pulsatilla alba</i>	+
<i>Carlina acaulis</i>	+	.	.	.	+
<i>Pimpinella saxifraga</i>	+
<i>Veronica officinalis</i>
<i>Carex canescens</i>
<i>Leucojum vernum</i>	.	+
<i>Cerastium glomeratum</i>
<i>Juncus effusus</i>
<i>Ranunculus platanifolius</i>	+
<i>Epilobium montanum</i>
<i>Euphrasia rostkoviana</i>	+
<i>Thymus pulegioides</i>
<i>Arabidopsis thaliana</i>
<i>Juncus monanthos</i>

70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	Fr%	p					
.	+	.	.	.	.	.	+	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	11	I		
.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	7	I	
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	2	5	I	
.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	I	
.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	I	
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	I	
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	3	I
.	+	3	I
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	I
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	I
.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	I
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	I
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	I
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	I
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	I
.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	I
+	+	+	.	+	+	+	+	.	+	2	3	2	1	2	2	.	.	.	.	+	+	+	+	+	+	+	+	+	1	2	.	+	.	.	61	IV		
+	.	2	1	+	1	+	.	2	+	.	.	+	1	+	+	.	.	.	.	+	.	.	1	+	.	.	+	+	1	.	.	.	.	.	.	39	II	
.	+	2	.	+	.	.	.	.	.	.	.	1	.	+	+	.	.	.	.	+	+	+	.	+	.	.	.	.	.	.	.	1	+	.	.	35	II	
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	I
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	I
.	+	3	+	+	.	.	1	3	2	1	2	2	.	+	+	+	3	3	3	1	2	2	2	.	1	3	+	4	3	1	3	.	.	82	V				
1	1	2	1	+	+	+	+	.	+	2	+	+	.	.	4	2	2	2	4	3	2	1	5	4	1	2	2	5	3	+	+	.	.	76	V				
.	+	+	2	+	.	+	+	+	.	.	+	2	+	1	.	+	+	+	1	+	1	1	1	1	+	+	1	1	1	.	+	1	.	.	70	IV			
+	+	.	.	+	.	+	+	+	+	31	II		
.	+	.	.	+	+	.	+	+	+	31	II		
.	+	.	.	+	1	+	.	+	+	+	+	+	27	II			
.	.	+	+	+	.	+	26	II		
.	+	.	.	+	+	+	+	+	.	.	+	25	II		
.	17	I	
.	.	+	1	+	.	4	+	2	11	I		
+	2	+	.	.	.	+	11	I		
.	+	9	I	
.	8	I	
.	8	I	
.	8	I	
.	7	I	
.	6	I	
.	5	I	
.	5	I	
.	4	I	
.	3	I	
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.	2	I	
.	2	I	
.	2	I	

Relevé No. (Številka popisa)	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69
<i>Juncus conglomeratus</i>
<i>Heracleum sphondylium</i>
<i>Hieracium racemosum</i>	+
<i>Luzula sylvatica</i>
<i>Teucrium chamaedrys</i>
<i>Veronica chamaedrys</i>	+
<i>Rhinanthus pulcher</i>
Lichens and mosses (lišaji in mahovi)																							
<i>Cladonia</i> sp.	+	+	+	.	.	.
<i>Cetraria islandica</i>	+
<i>Sphagnum</i> sp.	+

Legend (Legenda):

A – *Nardo-Agrostion tenuis*

O – *Nardetalia*

CC – *Caricetea curvulae*

CU – *Calluno-Ulicetea*

MA – *Molinio-Arrhenatheretea*

VP – *Vaccinio-Piceetea*

O – Others (Ostale)

70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	Fr%	p			
.	2	l	
.	+	2	l	
+	2	l	
.	+	2	l	
.	+	2	l
.	2	l
.	1	l
.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	7	l	
.	+	2	l	
.	1	l