SYNTAXONOMY AND NOMENCLATURE OF THE COMMUNITIES OF THE ALLIANCES *ASTERO ALPINI-SESLERION CALCARIAE* AND *SESLERION TATRAE* IN SLOVAKIA

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Abstract

The article brings the most important results of the syntaxonomical revision of the communities of the alliances *Astero-Seslerion calcariae* and *Seslerion tatrae* from the territory of Slovakia: descriptions of the new suballiances (*Astero-Seslerienion calcariae*, *Pulsatillo slavicae-Caricenion humilis*), associations (*Gentiano clusii-Festucetum versicoloris*, *Diantho nitidi-Seslerietum tatrae*) and subassociations (*Minuartio langii-Festucetum pallentis campanuletosum carpaticae* and *campanuletosum xylocarpae*, *Seslerietum tatrae luzuletosum rubellae* and *biscutelletosum laevigatae*, *Seslerio tatrae-Festucetum versicoloris ranunculetosum pseudomontani* and *inops*). The authors validate the name *Minuartio langii-Festucetum pallentis* (Sillinger 1933) Mucina in Mucina et Maglocký 1985 nom. nud. They propose the new name for the association *Arctostaphyletum fatrense* Sillinger 1933 (*Seslerio albicantis-Arctostaphyletum uvae-ursi*).

Izvleček

V članku so obravnavani najpomembnejši rezultati sintaksonomske revizije zvez *Astero-Seslerion calcariae* in *Seslerion tatrae* na Slovaškem. Opisane so: nove podzveze (*Astero-Seslerienion calcariae*, *Pulsatillo slavicae-Caricenion humilis*), asociacije (*Gentiano clusii-Festucetum versicoloris*, *Diantho nitidi-Seslerietum tatrae*) in subasociacije (*Minuartio langii-Festucetum pallentis campanuletosum carpaticae* in *campanuletosum xylocarpae*, *Seslerietum tatrae luzuletosum rubellae* in *biscutelletosum laevigatae*, *Seslerio tatrae-Festucetum versicoloris ranunculetosum pseudomontani* in *inops*). Avtorji so pravilno opisali asociacijo *Minuartio langii-Festucetum pallentis* (Sillinger 1933) Mucina in Mucina et Maglocký 1985 nom. nud. Predlagajo novo ime za asociacijo *Arctostaphyletum fatrense* Sillinger 1933 (*Seslerio albicantis-Arctostaphyletum uvae-ursi*).

Key words: syntaxonomical revision, new syntaxa, high mountain calcareous grasslands, *Elyno-Seslerietea*, Western Carpathians

Ključne besede: sintaksonomska revizija, novi sintaksoni, visokogorski travniki na apnencu, *Elyno-Seslerietea*, Zahodni Karpati

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INTRODUCTION

The class *Elyno-Seslerietea* Br.-Bl. 1948 associates mainly natural, neutrophilous to basiphilous grass communities on the calcite and dolomite substratum in the montane to the alpine belt of European mountain ranges (Pyrenees, Apennines, the Alps, Carpathians, mountains of the Balkan Peninsula). The communities occupy very shallow to medium deep, skeletal, humus and calcite rich soils. In the Slovak part of the Carpathians the class is represented only by the order *Seslerietalia coerulae* Br.-Bl. in Br.-Bl. et Jenny 1926. It includes three alliances, which differ in exposition to the sun, wind and also by the thickness and duration of the snow cover. The alliance *Astero alpini-Seslerion calcariae* Hadač ex Hadač et al. 1969 comprises open communities on shallow, carbonate skeleton and humus rich soils on the steep sunny calcareous and dolomite slopes, fissured rocks, small rocky terraces and stable screes with short term snow in the montane (to subalpine) belt. Within the alliance *Seslerion tatrae* Pawłowski 1935 corr. Klika 1955 are ordered mainly close communities occupying medium deep soils with a favourable water regime at leeward habitats. In winter they are covered by thick and long term snow. Communities are situated in the alpine (rarely also in subalpine) belt. The alliance *Caricion firmae* Gams 1936 represents dwarf shrub-grass communities on rocky, north oriented habitats exposed to strong winds in the alpine, less in the subalpine belts, in winter with thin and short time snow. The alliances *Astero alpini-Seslerion calcariae* and *Seslerion tatrae* are limited by their distribution to the territory of the Western Carpathians.

This work is based on complex processing of relevé data of the communities of the class *Elyno-Seslerietea* from the carbonate mountains of the Western Carpathians and involves the most important results of their syntaxonomical revision. Contentually it relates to the recent summary paper on the West Carpathian communities of the alliance *Caricion firmae* (Šibík & al. 2004).

MATERIAL AND METHODS

Processed data set contains 844 phytocoenological relevés of the class *Elyno-Seslerietea* from the limestone areas of the Western Carpathians, also partially (the association *Seslerio tatrae-Festucetum versicoloris*) from its Polish part (Fig. 1). All relevés were

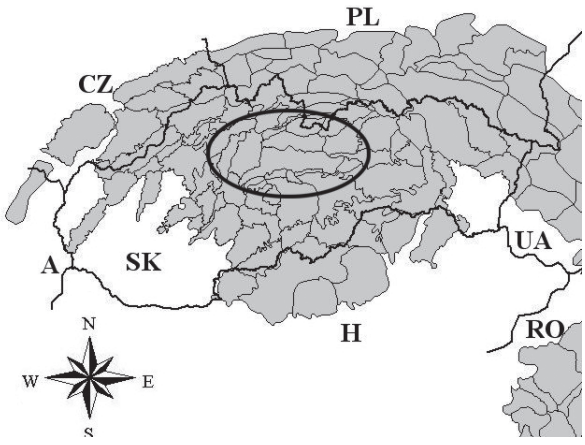

Figure 1: Area of the occurrence of the plant communities of the West Carpathian endemic alliances *Astero-Seslerion calcariae* and *Seslerion tatrae* (marked by ellipse). Grey area stands for orographical units in the Carpathians.
Slika 1: Območje pojavljanja rastlinskih združb, ki jih uvrščamo v endemične zveze zahodnih Karpatov *Astero-Seslerion calcariae* in *Seslerion tatrae* (označeno z elipso). Siva barva označuje orografske enote v Karpatih.

obtained by methods of the Zürich-Montpelliér school (Braun-Blanquet 1964); individual authors used different scales of abundance: the 7-degree Braun-Blanquet scale, its modified 9-degree version (Barkman & al. 1964), the 10-degree Domin or 11-degree Domin-Hadač scale (cf. Klika 1948; Hadač & al. 1969). To obtain comparable data for numerical classification all relevés were transformed into the nine-degree ordinal scale (van den Maarel 1979). Subspecies and some narrowly delimited species were included into the closest higher or broadly defined taxa. Taxa determined only to the rank of genus and the most of mosses (with exception of equal presence in data) were excluded. Numerical classifications were performed by the NCLAS program from the SYN-TAX 2000 (Podani 2001). β - flexible method ($\beta = -0.25$) and Jaccard's, Ružička's and Wishart's similarity coefficients and Euclidean distance were used. The hypotheses obtained were evaluated by comparison and analysis of phytocoenological tables processed by the FYTOPACK program (Jarolímek & Schlosser 1997). The results of numerical classification were used for approximative orientation in large data sets. The arrangement of the tables does not strictly follow these results.

The nomenclature of taxa follows the Checklist of non vascular and vascular plants of Slovakia (Marhold & Hindák 1998); the exceptions com-

prise the author's citation. In the tables subspecies (without the name of species) are marked by asterisks (*). The value of frequency (in %) and mean value of abundance in the relevant column (upper index) for every taxon is calculated. Sources to the columns contain: short citation of source (in unpublished data only the name of author/authors of the relevé), number of relevés and their location on the level of orographic units according to the base map for Database of Fauna of Slovakia in scale 1: 500 000. Full names of syntaxa with author's citation are given only for the first mention of the name in the text.

Diagnostic taxa of the class *Elyno-Seslerietea* and lower syntaxa are used in accordance with the synoptic table prepared for the new fourth volume of the series of the books Plant Communities of Slovakia. Other syntaxa are defined following the newest relevant publications (Kliment & al. 2004, Šibík & al. 2004, Petrík & al. 2005). The names of syntaxa are abbreviated in the tables 1–3 as follows: ac = *Arabidion coerulae*, as = *Astero-Seslerion calcariae*, AT = *Asplenietea trichomanis*, Be = *Brometalia erecti*, ca = *Calamagrostion arundinaceae*, CC = *Caricetea curvulae*, cf = *Caricion firmae*, ch = *Pulsatillo-Caricenion humilis*, CK = *Carici rupestris-Kobresietea*, Cv = *Calamagrostietalia villosae*, cy = *Cystopteridion*, ES = *Elyno-Seslerietea*, FB = *Festuco-Brometea*, fc = *Festucion carpaticae*, fv = *Festucion versicoloris*, Fv = *Festucetalia valesiacae*, LV = *Loiseleurio-Vaccinietea*, MU = *Mulgedio-Aconitetea*, oe = *Oxytropido-Elynion*, Pc = *Potentilletalia caulescentis*, pc = *Potentillion caulescentis*, pt = *Papaverion tatrici*, Sc = *Seslerietalia coerulae*, sf = *Seslerio-Festucion pallentis*, st = *Seslerion tatrae*, tf = *Trisetion fusci*. Diagnostic important taxa of the individual communities are presented in bold type.

In descriptions of communities following abbreviations were used: art. = art of the Code of phytocoenological nomenclature (ICPN; WEBER & al. 2000), ass. = association, bas.: basionym, C = characteristic taxon (in tables), cf. = confer (compare), d = differential taxon (in tables), dom., D = dominant species (D – in tables), incl. = inclusive, ined. = ineditus (unpublished data), nom. corr. = corrected name, nom. ined. = ineffectively published name, nom. nov. = nomen novum, nom. nud. = nomen nudum, OFN = original form of a name, p. p. = pro parte (partly), pseud. = pseudonym, r. = relevé, reg. = regionally characteristic taxon, sp. div. = species diversae (various species), subass. = subassociation, subdom. = subdominant taxon, syn. = synonym, syntax. syn. = syntaxonomical synonym, transgr., t = transgressive taxon (t – in tables).

The communities well known from the literature are characterised only shortly by essential information; less known and newly described syntaxa are characterised in more detail.

RESULTS AND DISCUSSION

***Elyno-Seslerietea* Br.-Bl. 1948**

***Seslerietalia coerulae* Br.-Bl. in Br.-Bl. et Jenny 1926**
Syn.: *Seslerietalia tatrae* Hadač 1962 (art. 8)
Syntax. syn.: *Seslerietalia tatrae* Hadač ex Hadač et al. 1969 p. p. (excl. *Delphinion elati* Hadač ex Hadač et al. 1969)

Hadač & al. (1969) reclassified chionophilous communities of the alliance *Seslerion tatrae* – within the class *Aconito-Cardaminetea* Hadač 1956 – into the order *Seslerietalia tatrae*. He included into this order also the alliance *Delphinion elati*, which was later regarded by Mucina & Maglocký (1985) as a part of the order *Adenostyletalia alliariae* Br.-Bl. 1930 (class *Mulgedio-Aconitetea* Hadač et Klika in Klika 1948). Recent syntaxonomical revision confirms the validity of ordering of the alliance *Seslerion tatrae* into the class *Elyno-Seslerietea*. Mutual comparison of the alliances *Astero-Seslerion calcariae*, *Seslerion tatrae* and *Caricion firmae* shows a strong differences in their floristic composition, reflecting the peculiarities of their habitat conditions. Chionophobia partly delimitates the stands of the alliances *Astero-Seslerion calcariae* and *Caricion firmae* against the alliance *Seslerion tatrae*, even though it is caused by different ecological factors – the alliance *Astero-Seslerion* occupies sunny habitats, the alliance *Caricion firmae* occupies habitats exposed to strong winds. Consequently these alliances have nearly no common diagnostic (differential) taxa (Tab. 1). On the other hand, with regard to optimal occurrence in the alpine belt, the alliances *Seslerion tatrae* and *Caricion firmae* are floristically closer by the presence of high mountain taxa. At the same time they differ just in the thickness and duration of snow. A division of the class *Elyno-Seslerietea* into the two orders (*Seslerietalia coerulae*, *Seslerietalia tatrae*) based on snow conditions without any diagnostic taxa is hardly reasonable. Therefore we prefer the older conception (Holub & al. 1967), based on division of the class *Elyno-Seslerietea* in the Western Carpathians into three alliances (*Astero-Seslerion calcariae*, *Seslerion tatrae*, *Caricion firmae*) within only one order *Seslerietalia coerulae* (Fig. 2).

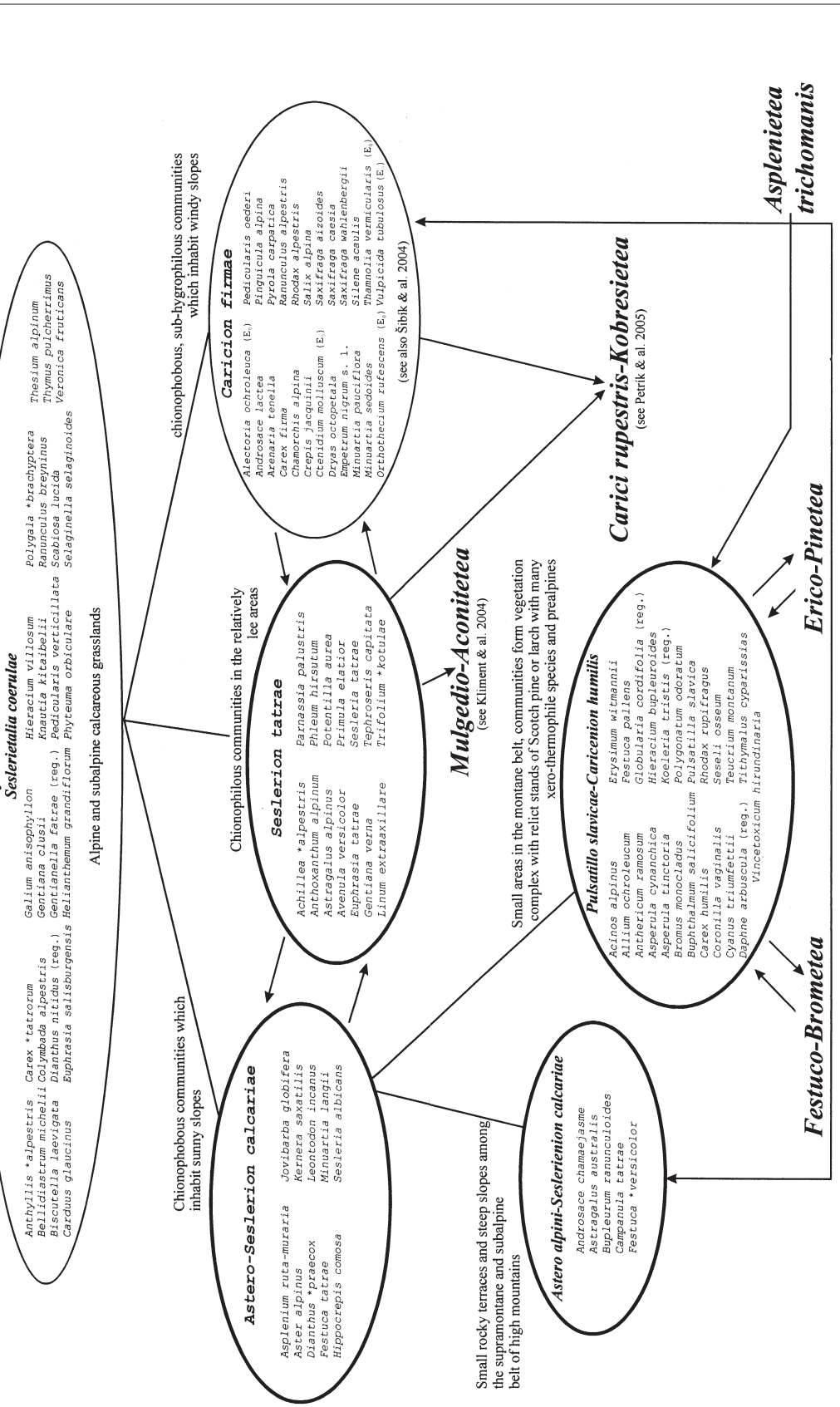

Figure 2: Syntaxonomical and synecological scheme of the plant communities belonging to the class *Elyno-Seslerietea* in the Slovakia. The (sub)species inside ellipses represent diagnostic taxa (characteristic and differential); the studied (sub)alliances are marked by thicker outlines. The arrows indicate dynamics and close syngenetic relationships between individual syntaxa.

Slika 2: Sintaksonomska in sinekološka shema rastlinskih združb, ki jih uvrščamo v razred *Elyno-Seslerietea* na Slovaškem. (Pod)vrste v elipsah predstavljajo diagnostične taksone (značilne in razlikovalne), obravnavane (pod)zveze so označene z debelejšo črto. Puščice označujejo dinamske in singenetske povezave med posameznimi sintaksoni.

***Astero alpini-Seslerion calcariae* Hadač ex Hadač et al. 1969 nom. invers. propos.**
(Tab. 1, columns 1–5)
Syn.: *Seslerieto-Asterion alpini* Hadač 1962 (art. 8); *Astereto-Seslerion calcariae* Hadač et Smola 1962 (art. 8); *Astero serpentimontani-Seslerion* Hadač 1962 corr. Mucina 1981 (art. 43)
Pseud.: *Seslerion coerulae* auct. carpat. occid. p. p., non Br.-Bl. in Br.-Bl. et Jenny 1926
Phantom: *Seslerio tatrae-Asterion alpini* Hadač 1962 (Coldea 1997)
Characteristic taxa: *Sesleria albicans* (dom.), *Aster alpinus* (Fig. 3), *Dianthus praecox* subsp. *praecox*, *Festuca tatrae* (transgr.), *Minuartia langii*
Differential taxa: *Asplenium ruta-muraria, Campanula carpatica, Jovibarba globifera, Kernera saxatilis, Leontodon incanus*
Nomenclatural type: *Astereto-Seslerietum calcariae* Hadač et al. 1969, lectotypus (art. 20)

Hadač (1962) described the alliance *Seslerio-Asterion alpini* based on the list of characteristic species only, hence invalidly; the name was validated in the collective work from the Belianske Tatry Mts (Hadač & al. 1969). He included into the alliance open neutrophile to basiphile communities occupying unstable, skeleton rich soils at small rocky terraces in the montane to subalpine belts. These habitats are protected from the wind and they are without snow in the winter. Later (Mucina & Maglocký 1985), the content of the alliance was broadened by the other West Carpathian mountain grass communities on calcite or dolomite slopes, which originally had been ordered within the alliance *Seslerion coerulae*. In accordance to articles 10b and 20 of ICPN we propose reversion of the sequence of the taxa names.

Communities of the alliance *Astero-Seslerion calcariae* are characteristised by the presence of large number of endemic taxa of vascular plants, especially of endemic [CW] and subendemic [CWs] taxa of the West Carpathian mountains or their sub-regions and Carpathian endemics [C] and subendemics [Cs] (see Tab. 1). However, the presence of these taxa, together with peculiar floro- and syngenesis, differentiates the West Carpathian phytocoenoses from similar ones from the Alps, ordered within the alliance *Seslerion coerulae*, even though they are unified in some recent surveys (cf. Grabherr & al. 1993).

Strong differences in the floristical composition of individual communities conditioned by distribution in different vegetation belts allow for two suballiances to be distinguished: *Astero alpini-Seslerienion calcariae* and *Pulsatillo slavicae-Caricenion humilis*.

Figure 3: *Aster alpinus* – characteristic taxon of the alliance *Astero-Seslerion calcariae*.
Slika 3: *Aster alpinus* – značilnica zveze *Astero-Seslerion calcariae*.

***Astero alpini-Seslerienion calcariae* suball. nov. hoc loco**
(Tab. 1, columns 1–3)
Characteristic taxa: *Bupleurum ranunculoides*
Differential taxa: *Androsace chamaejasme, Astragalus australis, Campanula tatrae, Festuca versicolor* subsp. *versicolor*
Nomenclatural type: identical with the type of the alliance name

The nominate suballiance corresponds in its content to the original diagnosis of the alliance *Astero-Seslerion calcariae* (Hadač & al. 1969). It involves stands occurring in the supramontane to subalpine belts, mainly in the Belianske Tatry Mts. Against the following suballiance it is differed by high mountain taxa, which usually do not decrease to the montane belt. Dominants of stands are grasses *Festuca *versicolor* and *Sesleria albicans*, rarely *Festuca tatrae*.

Associations: *Astero alpini-Seslerietum calcariae* Hadač et al. 1969, *Diantho praecoci-Festucetum versicoloris* Hadač et al. 1969, *Gentiano clusii-Festucetum versicoloris* Bělohlávková ass. nov.

***Astero alpini-Seslerietum calcariae* Hadač et al. 1969**
(Tab. 1, column 1)
Characteristic taxon: *Oxytropis campestris* subsp. *tatrae*
Differential taxa: *Gypsophila repens* (subdom.), *Leontopodium alpinum*; *Fulgensia bracteata, Hymenostylium recurvirostrum, Squamarina gypsacea*

Constant companions: *Sesleria albicans* (dom.), *Aster alpinus*, *Bupleurum ranunculoides*, *Campanula tatrae*, *Dianthus *praecox*, *Euphrasia salisburgensis*, *Festuca tatrae*, *F. *versicolor*, *Galium anisophyllon*, *Helianthemum grandiflorum*, *Jovibarba globifera*, *Libanotis pyrenaica*, *Primula auricula* subsp. *hungarica*, *Ranunculus breyninus*, *Saxifraga paniculata*, *Thymus pulcherrimus* subsp. *sudeticus*, *Trisetum alpestre*, *Tortella tortuosa*
Nomenclatural type: Hadač & al. 1969: 67, r. 106, lectotypus hoc loco

An open, species rich community dominated by *Sesleria albicans* occupies very shallow, skeleton and humus rich, slightly to medium moist soils on small terraces at steep, sunny, south oriented calcareous rocks in the subalpine belt in the Belianske Tatry Mts, ca 1490–1750 m a. s. l. Habitats are protected from wind, exposed to direct sunshine, in winter without snow. The community is close to the communities of the alliance *Potentillion caulescentis* Br.-Bl. in Br.-Bl. et Jenny 1926 em. Sutter 1969, mainly to the association *Leontopodio-Asteretum alpini* Šmarda ex Šmarda et al. 1971 by a low cover of herb layer (30–60 %), similar floristic composition and also by synecology.

***Diantho praecoci-Festucetum versicoloris* Hadač et al. 1969**
(Tab. 1, column 2)
Syn.: *Festucetum tatrae* Šmarda 1956 (art. 31)
Syntax. syn.: *Tortello tortuosae-Festucetum tatrae* Hadač et al. 1969
Non: *Festucetum tatrae* Szafer et al. 1923 corr. 1927
Differential taxa: *Festuca carpatica*, *Gentianella lutescens*, *Hieracium murorum*, *Linum extraaxillare*, *Silene vulgaris* subsp. *prostrata* (Gaudin) Chater et Walters, *Trifolium pratense* subsp. *kotulae*
Constant companions: *Festuca *versicolor* (dom.), *F. tatrae* (subdom.-dom.), *Carex sempervirens* subsp. *Tatrorum* (Zapał.) Pawł., *Dianthus *praecox*, *Galium anisophyllon*, *Helianthemum grandiflorum*, *Libanotis pyrenaica*, *Lotus corniculatus* var. *alpicola* Beck, *Phyteuma orbiculare*, *Polygala amara* subsp. *brachyptera*, *Ranunculus breyninus*, *Scabiosa lucida*, *Trisetum alpestre*, *Tortella tortuosa*
Nomenclatural type: Hadač & al. 1969: 72–73, r. 90, lectotypus hoc loco

Subspecies *Festuca *versicolor* dominates in a species rich, open community. In some places species *F. tatrae* occurs with similar cover. The community occupies sheer, south oriented (SW-SE) talus cones in the subalpine belt in the Belianske Tatry Mts, 1450–1775 m a. s. l. Shallow, rocky, humus rich and dense rooted soils are, during winter, without or with only thin snow cover and they are exposed to the sun radiation.

Hadač & al. (1969), based on four relevés from the Dolina Siedmich prameňov Valley, described the association *Tortello-Festucetum tatrae* with constant subdominant presence of the subspecies *Festuca *versicolor*. It is in synmorphology, synecology and floristic composition very close to the association *Diantho-Festucetum versicoloris*. The authors characterized these stands as more thermophile with regard to the lower elevation of most of the localities. Despite these differences the syntaxonomical revision proves their ordering within the variability of the association *Diantho-Festucetum versicoloris*. Their relevé 221 can be identified with this association without restrictions, while others differ mainly negatively. The lower number of species to a certain extent relates with the small sample area (2 m^2 only) of two of analysed stands (r. 256, 258).

***Gentiano clusii-Festucetum versicoloris* Bělohlávková ass. nov. hoc loco**
(Tab. 2; Tab. 1, column 3)
Differential taxa: *Androsace lactea*, *Bartsia alpina*, *Hedysarum hedysaroides*, *Potentilla crantzii*, *Ranunculus alpestris*, *Rhodiola rosea*, *Saxifraga moschata* subsp. *dominii*, *Sesleria tatrae*, *Vicia oreophila*
Constant companions: *Festuca *versicolor* (dom.), *Euphrasia salisburgensis*, *Galium anisophyllon*, *Gentiana clusii*, *Helianthemum grandiflorum*, *Jovibarba globifera*, *Phyteuma orbiculare*, *Poa alpina*, *Primula *hungarica*, *Saxifraga paniculata*, *Scabiosa lucida*, *Thymus *sudeticus*, *Trisetum alpestre*
Nomenclatural type: Tab. 2, r. 7, holotypus

An open community with prevalence of the subspecies *Festuca *versicolor*, concurrently with an amount of dicotyledonous herbs, which attract attention by their various coloured flowers during flowering period. Taxa *Primula *hungarica* and *Gentiana clusii*, more rarely *Draba aizoides* and *Pulsatilla slavica* subject striking yellow-blue spring aspect (Fig. 4). The more varicoloured summer aspect is conditioned mainly by species *Androsace lactea*, *Bartsia alpina*, *Campanula cochleariifolia*, *Dianthus *praecox*, *Helianthemum grandiflorum*, *Phyteuma orbiculare*, *Potentilla crantzii*, *Ranunculus breyninus*, *Saxifraga paniculata*, *Scabiosa lucida* and *Vicia oreophila*. Beside the dominant fescue the grasses *Sesleria tatrae*, *S. al-*

Figure 4: Early vernal aspect of the community *Gentiano clusii-Festucetum versicoloris.* (Krivánska Malá Fatra Mts – rock formation "Sviňa"; altitude 1 555 m a. s. l.; May 27th 2005).
Slika 4: Zgodnjepomladanski aspekt asociacije *Gentiano clusii-Festucetum versicoloris.* (gorovje Krivánska Malá Fatra – gora »Sviňa«; nadmorska višina 1 555 m; 27. maj 2005).

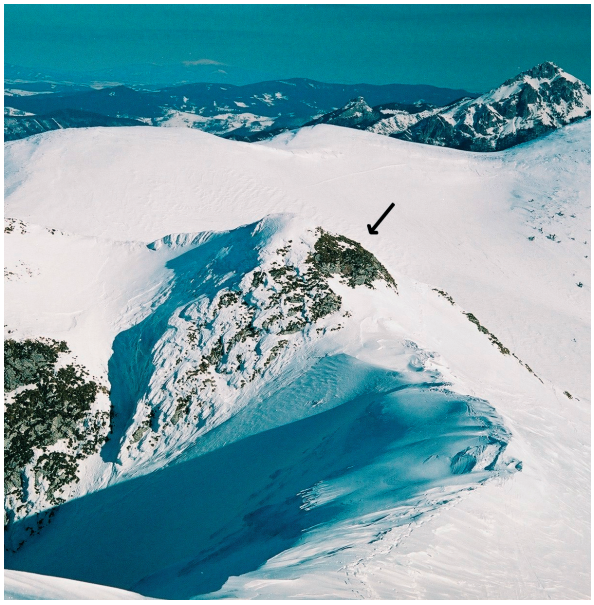

Figure 5: Winter aspect of the community *Gentiano clusii-Festucetum versicoloris* – highlighted by arrow (Krivánska Malá Fatra Mts – rock formation "Sviňa"; altitude 1 555 m a. s. l.; February 10th 2005; all photos were taken by J. Šibík).
Slika 5: Zimski aspekt asociacije *Gentiano clusii-Festucetum versicoloris* – označeno s puščico (gorovje Krivánska Malá Fatra – gora »Sviňa«; nadmorska višina 1 555m; 10. februar 2005; vse fotografije J. Šibík).

bicans, *Poa alpina* and *Trisetum alpestre* also participate in stands. The moss layer is developed scarcely. The average number of species per relevé is 30 (min. 23, max. 37).

The community occupies fissures and small terraces on steep, sunny to slightly shadowed calcareous rock in the subalpine belt. Dense roots of dominant fescue help the development of humus protorendzina in fissures and on terraces. These habitats are without snow or with a thin layer of short lasting snow during winter (Fig. 5); in early spring they are exposed to large variations of temperature.

Based on recent knowledge on floristic composition, ecology and distribution, two variants can be distinguished within the association: a more mesophilous variant with *Rhodiola rosea* (Tab. 2, r. 1–9; Differential taxa: *Rhodiola rosea*, *Allium senescens* subsp. *montanum*, *Anemone narcissiflora*, *Hedysarum hedysaroides*, *Parnassia palustris*, *Potentilla crantzii*, *Viola biflora*, *Tortella tortuosa*) occurs mainly in south oriented choppy rocks in the highest parts of the Krivánska Malá Fatra Mts, 1540–1625 m a. s. l. Stands of the variant with *Minuartia langii* (Tab. 2, r. 10–14) are more xerophilous, with a higher portion of petrophytes and without mosses. This is reflected in the group of differential taxa (*Carex ornithopoda*, *Hieracium villosum*, *Minuartia langii*, *Pulsatilla slavica*, *Rhodax alpestris*, *Veronica fruticans*). The variant was found in the south and south-east oriented rocks of the Choč Mt. at altitude 1470–1500 m a. s. l. (Švandová-Ursínyová 1966).

***Pulsatillo slavicae-Caricenion humilis* Uhlířová suball. nov. hoc loco**
(Tab. 1, columns 4–5)
Characteristic taxa: *Acinos alpinus*, *Allium ochroleucum*, *Bromus monocladus* (reg.), *Buphthalmum salicifolium* (reg.), *Coronilla vaginalis*, *Daphne arbuscula* (reg.), *Erysimum witmannii*, *Globularia cordifolia* (reg.), *Koeleria tristis* (reg.), *Pulsatilla slavica*, *Rhodax rupifragus*
Differential taxa: *Carex humilis*, *Anthericum ramosum*, *Asperula cynanchica*, *A. tinctoria*, *Cyanus triumfettii*

(subsp. *dominii*, subsp. *axillaris*), *Festuca pallens*, *Hieracium bupleuroides*, *Polygonatum odoratum*, *Seseli osseum*, *Teucrium montanum*, *Tithymalus cyparissias*, *Vincetoxicum hirundinaria*
Nomenclatural type: *Caricetum humilis carpaticum* Sillinger 1933

The suballiance represents phytocoenoses occurring in the montane belt. They usually occupy only small areas forming a vegetation complex with relic stands of the Scots Pine or European Larch (*Larix decidua* subsp. *polonica*). Typical components and diagnostic species of the communities of this suballiance are xero- thermophilous and prealpine species (Fig. 2). Many of them survive there as relicts from the drier and warmer postglacial and/or interglacial periods. They often live in the ecological limit of their distribution and some of them reach there the altitudinal limit in the Western Carpathians. The floristic spectrum of these communities is supplemented by calciphilous oreophytes and dealpine species with optimal occurrence on the relatively colder habitats with higher air humidity. *Carex humilis*, *Sesleria albicans*, *Festuca pallens*, *F. tatrae*, *Carex approximata* Bell. ex All. and *C. *tatrorum* represent the most frequent dominants and subdominants.

The suballiance associates phytocoenoses ordered by Sillinger (1933) into the "group of xerophilous and subxerophilous associations on calcareous rocks and fine scree (the alliance *Seslerion coerulae* p. p.)", except for the association *Calamagrostietum variae carpaticum* Sillinger 1933, and also later described communities on sunny calcite and dolomite slopes in the montane to supramontane belt. The association *Diantho nitidi-Caricetum tatrorum* (syn.: *Seslerio-Semperviretum fatrense* Sillinger 1933), distributed over large areas in the supramontane to subalpine belt, has a transition syntaxonomical position between the alliances *Astero-Seslerion calcariae* and *Seslerion tatrae*.

Associations: *Seslerio albicantis-Arctostaphyletum uvae-ursi* (Sillinger 1933) nom. nov., *Minuartio langii-Festucetum pallentis* (Sillinger 1933) Mucina ex Kliment et al. nom. nov., *Seslerio variae-Caricetum approximatae* Bernátová et Kliment 1982, *Globulario cordifoliae-Caricetum humilis* Bernátová et Uhlířová 1994, *Pulsatillo slavicae-Caricetum humilis* (Sillinger 1933) Mucina ex Uhlířová et Bernátová 2004, *Festuco tatrae-Caricetum humilis* Uhlířová et Petrík nom. ined. [a description of this association will be published in another paper], *Seslerio calcariae-Festucetum tatrae* Sillinger 1933, *Diantho nitidi-Caricetum tatrorum* (Sillinger 1933) Kliment et al. 2005.

***Seslerio albicantis-Arctostaphyletum uvae-ursi* (Sillinger 1933) nom. nov. hoc loco**
(Tab. 1, column 4)
Bas.: *Arctostaphyletum fatrense* Sillinger 1933 (art. 34a)
Characteristic taxon: *Arctostaphylos uva-ursi* (dom.)
Constant companions: *Sesleria albicans* (subdom.), *Festuca tatrae*, *Gentiana clusii*, *Phyteuma orbiculare*, *Primula *hungarica*, *Pulsatilla slavica*, *Scabiosa lucida*, *Thesium alpinum*, *Thymus *sudeticus*
Nomenclatural type: Sillinger 1933: 218, r. 3, lectotypus hoc loco

A less known grass- dwarf shrub community with dominant species *Arctostaphylos uva-ursi*, forms in suitable places large, floristically relatively poor stands (on average 24 species per relevé) on ridges, terraces and tops of calcite-dolomite cliffs in montane to subalpine belt. Its physiognomy is complemented beside the constantly occurring grasses (*Sesleria albicans*, *Festuca tatrae*) by several lively flowering herbs, such as *Coronilla vaginalis*, *Gentiana clusii*, *Gentianella fatrae*, *Phyteuma orbiculare*, *Primula *hungarica*, *Pulsatilla slavica* and *Scabiosa lucida*. Ridge climate is manifested in the constant presence of calciphile oreophytes and humicolous species like *Hieracium bifidum, Vaccinium vitis-idaea*, *V. myrtillus, Luzula luzuloides* and *Homogyne alpina*. Lichens, mainly species *Cetraria islandica* and species of the genus *Cladonia*, reach the higher cover. The community was described from the Nízke Tatry Mts (Sillinger 1933), later it was found and analysed also in the Veľká Fatra Mts (Bernátová & Uhlířová ined.).

***Minuartio langii-Festucetum pallentis* (Sillinger 1933) Mucina ex Kliment et al. hoc loco**
(Tab. 1, column 5)
Bas.: *Festucetum pallentis carpaticum* Sillinger 1933 (art. 34a)
Syn.: *Festuca *pallens-Minuartia laricifolia*-ass. Sillinger 1933 pro syn. (art. 3a, 43); *Pulsatillo slavici-Festucetum pallentis* (Sillinger 1933) Mucina et Petrík in Petrík 1977 nom. ined. (art. 1); *Minuartio langii-Festucetum pallentis* (Sillinger 1933) Mucina in Mucina et Maglocký 1985 nom. nud.
Characteristic taxon: *Festuca pallens* (transgr., dom.)
Differential taxon: *Campanula carpatica*
Constant companions: *Asplenium ruta-muraria*, *Jovibarba globifera* subsp. *glabrescens*, *Saxifraga paniculata*, *Seseli osseum*, *Sesleria albicans*, *Tithymalus cyparissias*; *Homalothecium philippeanum*, *Tortella tortuosa*

Nomenclatural type: Sillinger 1933: 181, r. 3, lectotypus
Nomenclatural note: In Mucina & Maglocký (1985: 187) the name *Minuartio langii-Festucetum pallentis* (Sillinger 1933) Mucina nom. nov. was published with specification of bazionym, but relevant work was not cited in the references (art. 2b). Therefore the validisation of this name is necessary and proper.

A detailed description of the community was published by Sillinger (1933), later also by Petrík (1977, 1978). It occupies steep, south to south-east oriented calcite-dolomite slopes or rocky towers, small terraces and jags in the montane belt, approx. 700–1250 m a. s. l. Shallow, generally with discontinuous A-horizon soils are skeleton and humus rich, crumby, with alkaline soil reaction. Open stands of the species *Festuca pallens* form a species medium rich community with regular presence of several calciphile dealpine and prealpine taxa and subthermophile elements.

Based on recognised differences in floristic composition two subassociations were distinguished:

***Minuartio langii-Festucetum pallentis campanuletosum carpaticae* subass. nov. hoc loco**
(Tab. 1, column 5a)
Differential taxa: *Campanula carpatica*, *Acinos alpinus*, *Allium ochroleucum*, *Asplenium trichomanes*, *Bupleurum falcatum*, *Cyanus triumfettii*, *Erysimum witmannii*, *Hieracium bupleuroides*, *Polygonatum odoratum*, *Pulsatilla slavica*, *Thymus *sudeticus*, *Vincetoxicum hirundinaria*; *Anomodon viticulosus, Encalypta streptocarpa*, *E. vulgaris*, *Fissidens dubius*, *Orthotrichum anomalum*, *Rhytidium rugosum*
Nomenclatural type: identical with the type of the association name

A floristically richer (average 36 taxa per relevé), more hydrophilic community with abundant presence of mosses was found in the Nízke Tatry Mts and the Slovenský raj Mts.

***Minuartio langii-Festucetum pallentis campanuletosum xylocarpae* subass. nov. hoc loco**
(Tab. 1, column 5b)
Differential taxa: *Campanula xylocarpa*, *Daphne arbuscula*, *Erysimum odoratum*, *Pulsatilla subslavica*; *Cladonia pyxidata*, *Peltigera rufescens*
Nomenclatural type: Valachovič & Mucina 2004, Tab. 1, r. 7, holotypus

A more xerophile subassociation with an average number of taxa per relevé of only 27 was found in calcareous cliffs of the Muránska planina Mts.

***Seslerion tatrae* Pawłowski 1935 corr. Klika 1955**
(Tab. 1, columns 6–8)
Syn.: *Seslerion bielzii* Pawłowski 1935 (art. 43); *Seslerion tatrae* Pawłowski 1956 (art. 8, 31), Hadač et Smola 1962 (art. 8, 31); *Seslerion tatrae* Pawłowski emend. Hadač 1962 (art. 8, 31)
Syntax. syn.: *Seslerion bielzii* Pawłowski 1935 emend. A. Nyárády 1967 p. p. (excl. *Festucion marmarossicae* Pawłowski et Walas 1949)
Pseud.: *Seslerion coerulae* sensu auct. Carpat. occid. p. p., non Br.-Bl. in Br.-Bl. et Jenny 1926
Non: *Festuco saxatilis-Seslerion bielzii* (Pawłowski et Walas 1949) Coldea 1984
Phantom: *Seslerion tatrae* Hadač 1962 (Mucina & Maglocký 1984, 1985)
Characteristic taxa: *Sesleria tatrae* (dom.), *Astragalus alpinus*, *A. australis* (transgr.), *Euphrasia tatrae*, *Gentiana verna*, *Tephroseris capitata*, *Trifolium *kotulae*
Differential taxa: *Achillea millefolium* subsp. *alpestris*, *Anthoxanthum alpinum*, *Avenula versicolor*, *Ligusticum mutellina*, *Linum extraaxillare*, *Parnassia palustris*, *Phleum hirsutum*, *Potentilla aurea*, *Primula elatior*
Nomenclatural type: *Seslerietum bielzii* Domin 1929, lectotypus (art. 20)

The alliance *Seslerion tatrae* merges basiphilous and mesophilous, species rich, flowery communities of short grasses, which prefer lee slopes and habitats with long-term snow on carbonate bedrock in the subalpine and alpine belt. Their distribution is limited to high mountains of the Western Carpathians (Krivánska Malá Fatra, Veľká Fatra, Nízke, Západné and Belianske Tatry). This fact is stressed by name-giving species – West Carpathian subendemic *Sesleria tatrae*.

Together with this species several more endemic taxa were found in analysed stands. Endemics and subendemics of the Western Carpathians and the Carpathians are highlighted in the table (Tab. 1).

Pawłowski (1935) divided the West Carpathian high mountain communities of the order *Seslerietalia coerulae* to the individual alliance based on the sharp differences in their structure against the relevant communities from the Alps and mountains of Balkan Peninsula. In accordance with knowledge of that time he proposed for this alliance the name *Seslerion bielzii* [taxon *Sesleria tatrae* was originally distinguished in hierarchic level of form as *S. bielzii* f. *tatrae* Degen; till Deyl (1946) reclassified

it up to level of species]. These changes in taxonomic evaluation were for the first time reflected by Klika (1955), who published in a survey of syntaxa of Czechoslovakia the name *Seslerion* (*Bielzii*) *tatrae* Pawł. 1935. Pawłowski (1956) used directly the name *Seslerion tatrae* in characteristics of the vegetation units of the Tatry Mts, but the name of alliance and subordered associations he published without author's citations.

***Diantho nitidi-Seslerietum tatrae* Bělohlávková ass. nov. hoc loco**
(Tab. 3; Tab. 1, column 6)
Syn.: *Polygono vivipari-Seslerietum tatrae* (Šmarda 1956) Bělohlávková 1980 (art. 1)
Non: *Seslerietum tatrae* Šmarda 1956
Differential taxa: *Dianthus nitidus* subsp. *nitidus*, *Knautia arvensis*, *Polygonatum verticillatum*, *Ranunculus nemorosus*, *Viola canina*
Constant companions: *Sesleria tatrae* (dom.), *Carex *tatrorum* (subdom.-dom.), *Bartsia alpina*, *Bellidiastrum michelii*, *Campanula serrata*, *Carlina acaulis*, *Festuca *versicolor*, *Galium anisophyllon*, *Leucanthemum vulgare* agg., *Pedicularis verticillata*, *Phyteuma orbiculare*, *Primula elatior*, *Scabiosa lucida*, *Soldanella carpatica*
Nomenclatural type: Tab. 3, r. 2, holotypus

The community is represented by short grass, nearly completely closed, floristically and physiognomically various stands with more or less equal presence of the (sub-) species *Sesleria tatrae* and *Carex *tatrorum*, locally also *Festuca *versicolor*. Their grassy look is vivified during the vegetation period by varicoloured flowers of many species. Mosses and lichens are presented only sparsely.

Typical habitats of the community are plain to slightly concave slopes with gentle inclination, usually at the foot of steeper slopes or under the top cliffs in the subalpine belt of the Malá Fatra Mts. During winter they are protected by thick snow, which holds over up to the end of May. Sufficiency of soil moisture is ensured both by the melting snow and also by running water from higher situated parts of slopes and channels among rocks.

These relatively sizeable differences in synecology and floristic composition we classify at the level of variants with regard to the limited area and small number of relevés.

Typical variant (Tab. 3, r. 1–22) covers typical hydro- and chionophilous stands of the association with the higher presence of acidophilous and neutrophilous species, which are adapted to the short vegetation period.

Homogeneous large stands of the variant with *Allium *montanum* (Tab. 3, r. 23–29; Differential taxa: *Allium *montanum*, *Carduus glaucinus*, *Gentiana clusii*, *Hieracium villosum*, *Jovibarba globifera*, *Libanotis pyrenaica*, *Polygala *brachyptera*, *Ranunculus breyninus*, *Valeriana tripteris*) occupy regular south to south-east oriented slopes with inclination 30–40° below or among rocky walls at altitude approx. 1520–1630 m.

***Seslerietum tatrae* Domin 1929 nom. corr. hoc loco**
(Tab. 1, column 7)
OFN: *Seslerietum bielzii* Domin 1929 (art. 43) [Domin 1929: 9]
Syn.: *Seslerietum bielzii* Deyl 1936 (art. 31, 43); *Seslerietum tatrae* Šmarda 1956 (art. 31), Bareš et Hadač 1958 (art. 2b, 31), Hadač et Smola 1962 (art. 2b, 31)
Characteristic taxa: *Cardaminopsis halleri* subsp. *tatrica*, *Tephroseris capitata* (transgr.)
Differential taxa: *Anemone narcissiflora*, *Festuca picturata*, *Geranium sylvaticum*, *Homogyne alpina*, *Oreogeum montanum*, *Viola lutea* subsp. *sudetica*
Constant companions: *Sesleria tatrae* (dom.), *Carex *tatrorum* (subdom.), *Achillea *alpestris*, *Alchemilla* sp. div., *Anthoxanthum alpinum*, *Bartsia alpina*, *Bistorta vivipara*, *Campanula tatrae*, *Galium anisophyllon*, *Helianthemum grandiflorum*, *Leontodon hispidus*, *Ligusticum mutellina*, *Myosotis alpestris*, *Parnassia palustris*, *Phleum hirsutum*, *Phyteuma orbiculare*, *Potentilla aurea*, *Primula elatior*, *Ranunculus breyninus*, *Scabiosa lucida*, *Soldanella carpatica*

Closed, two-layered, species rich community of short grasses dominated by species *Sesleria tatrae* and *Carex *tatrorum*. There are many versicolour flowering herbs among the constantly presented species. The favourable water regime is reflected in higher cover of mosses.

The community occupies shallow depressions on steep south oriented and from wind protected slopes in the subalpine to alpine belt approx. (1650) 1750–2050 m a. s. l. Most of the localities are concentrated in altitude between 1900–2000 m a. s. l. In these habitats snow holds over for 7–7.5 months (Hadač & Smola 1962).

The high constancy of the species *Achillea *alpestris*, *Anemone narcissiflora*, *Campanula tatrae*, *Crepis mollis*, *Festuca picturata*, *Geranium sylvaticum*, *Luzula luzuloides* subsp. *rubella* and *Oreogeum montanum* to-

gether with the respectable presence of species *Avenula versicolor* indicates a close relation of the association to the communities of the order *Calamagrostietalia villosae* (class *Mulgedio-Aconitetea* – see Fig. 2). Within the alliance *Seslerion tatrae* it is closest to the associations *Trifolio kotulae-Caricetum tatrorum* and *Seslerio tatrae-Festucetum versicoloris*. Transitions among them are frequent.

Domin (1929) for the first time validly described high mountain chionophilous stands dominated by species *Sesleria tatrae* as individual associations, with regard to the taxonomical knowledge of the time (cf. Domin & Podpěra 1928), with the name *Seslerietum bielzii*. Šmarda (1956) used for the first time the correct name of taxon (*Sesleria tatrae*) in the published relevé of this community. This is perhaps why, in the later period in syntaxonomical literature, the name *Seslerietum tatrae* Šmarda 1956 was used (cf. Hadač & al. 1969; Šomšák & al. 1980; Unar & al. 1984, 1985; Mucina & Maglocký 1985). Some authors mentioned the name *Seslerietum bielzii* Domin 1929 only as a synonym. Based on results of the syntaxonomical revision we can state that Domin's relevé from Havran Mt. in the Belianske Tatry Mts in its floristical composition completely conforms to the actual conception of the association *Seslerietum tatrae*. In accordance to art. 43 ICPN we propose the correction of the original name.

Based on floristic composition, soil ecology and chorology two subassociations were distinguished:

***Seslerietum tatrae luzuletosum rubellae* subass. nov. hoc loco**
(Tab. 1, column 7a)
Differential taxa: *Achillea *alpestris*, *Campanula elliptica*, *Cortusa matthioli*, *Crepis conyzifolia*, *C. mollis*, *Cyanus mollis*, *Hedysarum hedysaroides*, *Linum extraaxillare*, *Luzula *rubella*, *Myosotis alpestris*, *Phyteuma spicatum*, *Ranunculus pseudomontanus*, *R. thora*, *Thymus alpestris*, *Trommsdorfia uniflora*
Nomenclatural type: identical with the type of the association name

More mesophilous subassociation occupies medium deep (to deep), fresh moist to moist, loamy to slightly clayey soils on calcite, dolomite, calcareous clay or marl bedrock. Skeleton is accumulated in the low part of the soil profile. Components of mountain tall-herb communities and alpine grasslands differ this subassociation against the following one. Its centre of distribution lies in the Belianske Tatry Mts, it was also found scarcely in the Nízke Tatry Mts. The stand documented by (Šmarda 1956) on the south slope of Bujačí Mt., 1920 m a. s. l. takes a transition position between both subassociations.

***Seslerietum tatrae biscutelletosum laevigatae* subass. nov. hoc loco**
(Tab. 1, column 7b)
Differential taxa: *Biscutella laevigata*, *Anthyllis *alpestris*, *Hieracium villosum*, *Selaginella selaginoides*, *Thymus pulcherrimus*
Nomenclatural type: Unar & al. 1984, Tab. 19, r. 3, holotypus

Stands of the subassociation occupy medium deep soils on calcite and dolomite bedrock with a higher portion of coarse grained skeleton. They are distributed in the Západné Tatry Mts.

***Seslerio tatrae-Festucetum versicoloris* Pawłowski et Stecki 1927 nom. corr. hoc loco**
(Tab. 1, column 8)
OFN: *Festuca varia-Sesleria bielzii*-Ass. Pawłowski et Stecki 1927 (art. 43)
Syn.: *Festucetum variae calcicolum* Szafer et al. 1923 p. p. (art. 34a, 43); *Festuca varia-Sesleria bielzii*-Ass. Szafer et al. 1927 (art. 2b), Pawłowski 1928 (art. 2b); *Varietum tatricum* Szafer et al. 1927 pro syn. (art. 2b, 3a), Pawłowski et Stecki 1927 pro syn. (art. 3a, 34a), Pawłowski 1928 pro syn. (art. 2b, 3a); *Sesleria bielzii-Festuca versicolor*-Ass. Br.-Bl. 1930 p. p. (art. 43), Vierhapper 1930 (art. 2b, 43), Pawłowski 1935 (art. 3a, 31, 43); *Versicoloretum tatricum* Vierhapper 1930 pro syn. (art. 2b, 3a, 34a), Sillinger 1933 (art. 34a), Pawłowski 1935 (art. 34a), Pawłowski 1956 (art. 2b, 31, 34a); *Festucetum versicoloris tatrense* Deyl 1936 (art. 2b, 34a); *Festucetum versicoloris* Šmarda 1956 (art. 31)
Non: *Festucetum versicoloris* Domin 1929; *Festucetum versicoloris* Domin 1933; *Diantho-Festucetum versicoloris* Hadač et al. 1969
Pseud.: *Seslerietum bielzii* sensu Br.-Bl. 1930 p. p. , non Domin 1929
Differential taxa: *Androsace chamaejasme*, *Campanula alpina*, *Carex atrata*, *C. firma*, *Cerastium eriophorum*, *Erigeron hungaricus*, *Minuartia pauciflora* (Kit. ex Kanitz) Dvořáková (syn.: *M. gerardii* auct. carpat. non Willd.), *M. sedoides*, *Pedicularis oederi*, *Salix alpina*, *S. reticulata*, *Saxifraga *dominii*, *Selaginella selaginoides*, *Silene acaulis* subsp. *longiscapa*; *Cetraria islandica*
Constant companions: *Festuca *versicolor* (dom.),

Sesleria tatrae (subdom.), *Carex*tatrorum* (subdom.), *Bistorta vivipara*, *Campanula tatrae*, *Galium anisophyllon*, *Parnassia palustris*, *Phyteuma orbiculare*, *Poa alpina*, *Saxifraga paniculata*, *Scabiosa lucida*, *Soldanella carpatica*, *Thymus pulcherrimus*; *Tortella tortuosa*
Nomenclatural type: Szafer & al. 1923, Tab. 11, r. 2, lectotypus (Unar & al. 1985: 34)

A short stalk, open, species rich community with important presence of grasses and sedges. A detailed description was published by Pawłowski & Stecki (1927) and Pawłowski (1935). The community occupies prevailingly south oriented rocky slopes, stabilized carbonate screes, small rocky terraces and cornices of steep rocky walls in the subalpine and alpine belt. Soils below the stands are very shallow to shallow, humus and skeleton rich, with neutral to alkaline reaction (in younger development stadiums up to strong alkaline), in the upper horizon slightly acid due to decalcification. Snow is not too thick, it melts early in spring. The soil surface together with vegetation is consequently exposed to severe fluctuations of temperature. The influence of wind is low because of wind protected habitats.

In some syntaxonomical surveys (e. g. Matuszkiewicz 1982, Mucina & Maglocký 1985) this community was mentioned as *Seslerio tatrae-Festucetum versicoloris* (Szafer et al. 1923) 1927. Szafer & al. (1927: 66) otherwise proposed for the association *Festucetum variae calcicolum* nomen novum (*Festuca varia-Sesleria Bielzii*-Assoziation), however without an unambiguous bibliographical citation of the place of the valid publishing of the rejected name: "Früher haben wir diese Assoziation '*Festucetum variae calcicolum*' genannt. Um Missverständnisse zu vermeiden, ziehen wir die nun gewählte, mehr präzise Benennung vor."

The association is closely related to the communities of the alliance *Caricion firmae*, in the highest localities to the communities of the alliance *Oxytropido-Elynion* Br.-Bl. 1949 (class *Carici rupestris-Kobresietea bellardii* Ohba 1974 – see Fig. 2). It is distributed on calcite, dolomite and marl limestone bedrock in the Západné and Belianske Tatry Mts. Based on floristic differences two subassociation were distinguished:

***Seslerio tatrae-Festucetum versicoloris ranunculetosum pseudomontani* subass. nov. hoc loco**
(Tab. 1, column 8a)
Differential taxa: *Ranunculus pseudomontanus*, *Anthoxanthum alpinum*, *Bartsia alpina*, *Bistorta major*, *Botrychium lunaria*, *Cerastium arvense* subsp. *glandulosum*, *Festuca supina*, *Gentiana verna*, *Ligusticum mutellina*, *Linum extraaxillare*, *Luzula luzuloides*, *Myosotis alpestris*, *Pedicularis verticillata*, *Phleum hirsutum*, *Primula elatior* subsp. *tatrensis*, *Rhodiola rosea*, *Thymus pulcherrimus*, *Vaccinium vitis idaea*
Nomenclatural type: identical with the type of association name

The subassociation is represented by large, species rich stands (on average 49 taxa per relevé), which occupy gravel to coarse-grained screes on south-west to south-east oriented slopes with inclination 20–35 °. A group of differential taxa is formed by species of alpine meadows and carbonate screes. Stands in the highest elevations in the Západné and Belianske Tatry, approx. 1880–2140 m a. s. l., were divided within individual variant by *Erigeron hungaricus* (Differential taxa: *Erigeron hungaricus*, *Avenula versicolor*, *Ligusticum mutellinoides*, *Lloydia serotina*, *Luzula spicata* subsp. *mutabilis*, *Oreogeum montanum*, *Pulsatilla scherfelii*, *Rhodax alpestris*, *Salix retusa*, *Tephroseris capitata*, *Cetraria cucullata*, *C. nivalis*, *Cladonia rangiferina*, *Thamnolia vermicularis*). In the subalpine belt the community beside the screes occupies also steep, weathering rock walls with various orientation. Consequently, the stands are enriched by species which prefer a rocky background, such as *Crepis jacquinii*, *Dianthus *praecox*, *Euphrasia salisburgensis*, *Gentiana clusii*, *Trisetum alpestre*, *Veronica aphylla* and *V. fruticans*.

***Seslerio tatrae-Festucetum versicoloris inops* subass. nov. hoc loco**
(Tab. 1, column 8b)
Nomenclatural type: Unar & al. 1984, Tab. 16, r. 9, holotypus

Floristically poorer stands with average number of species 37 were found on small terraces of calcite rocks in the subalpine belt in the Červené vrchy Mts. In comparison to the previous subassociation several species with stronger affinity to the rocky substratum are presented with higher frequency: *Asplenium ruta-muraria*, *Pinguicula alpina* and *Saxifraga wahlenbergii*. The more frequent occurrence of some mosses (*Lophozia bantriensis*, *Meesia uliginosa*) can be conditioned by insufficient determination of cryptogam flora in the beginning of phytocoenological studies, so it was not regarded in the differentiation of communities.

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APPENDIX

Sources to Tab. 1:

1 Hadač & al. 1969, p. 67 (*Astereto-Seslerietum calcariae*), 5 r.; Petrík ined., 10 r., the Belianske Tatry Mts.

2 Hadač & al. 1969, p. 72 (*Diantho-Festucetum versicoloris*), 5 r., p. 76 (*Tortello-Festucetum tatrae*), r. 221, 257; Šmarda 1956, p. 24 (*Festucetum tatrae*), 1 r.; Petrík ined., 4 r., the Belianske Tatry Mts.

3 Kliment & al., Tab. 2 (*Gentiano clusii-Festucetum versicolor*), 14 r.

4 Sillinger 1933, p. 218 (*Arctostaphyletum fatrense*), 3 r.; Bernátová & Uhlířová ined., 3 r., Veľká Fatra; Bernátová & Obuch ined., 2 r., the Nízke Tatry Mts.

5a Sillinger 1933, p. 181 (*Festucetum pallentis carpaticum*), 9 r.; Hajdúk 1958, Tab. 14, r. 4 (*Festucetum pallentis carpaticum typicum*); Petrík 1977, Tab. 3 (*Pulsatillo slavici-Festucetum pallentis*), r. 10–16; Petrík 1978, Tab. 3 (*Festucetum pallentis carpaticum*), 23 r.; Petrík & al. 1982, Tab. 1, r. 11 (*Festucetum pallentis carpaticum*).

5b Valachovič & Mucina 2004, Tab. 1, r. 1–3, 5, 7–9 (*Minuartio langii-Festucetum palentis*), r. 11, 12, 15 (*Seslerio-Festucetum tatrae*).

6 Kliment & al., Tab. 3 (*Diantho nitidi-Seslerietum tatrae*), 29 r.

7a Domin 1929, p. 8 (*Seslerietum bielzii*), 1 r.; Šmarda 1956, r. 20 (*Seslerietum tatrae*), 1 r.; Hadač & al. 1969, p. 108 (*Seslerietum tatrae*), r. 23, 25, 124, 152; Petrík ined., 1 r., the Nízke Tatry Mts, 11 r., the Belianske Tatry Mts.

7b Šomšák & al. 1980, Tab. 2 (*Carduo glauci-Caricetum tatrorum*), r. 11, 12, Tab. 3 (*Seslerietum tatrae*), r. 1, 3; Unar & al. 1984, Tab. 18 (*Carduo glauci-Caricetum tatrorum*), r. 3, 6, Tab. 20 (*Seslerietum tatrae*), 5 r.; Petrík ined., 1 r., the Západné Tatry Mts.

8a Szafer & al. 1923, Tab. 11 (*Festucetum variae calcicolum*), r. 2, 4, 5; Pawłowski & Stecki 1927, Tab. 4 (*Festuca varia-Sesleria Bielzii*-Ass.), r. 3–10; Domin 1929, p. 8 (*Festucetum versicoloris*), 1 r.; Braun-Blanquet 1930, p. 106 (*Sesleria bielzii-Festuca versicolor*-Ass.), r. 3; Pawłowski 1935, Tab. 1 (*Versicoloretum tatricum*), r. 1–10; Šmarda & al. 1971, Tab. 8 (*Festucetum versicoloris calcicolum*), r. 57, Tab. 10 (*Carduo glauci-Caricetum tatrorum*), r. 91, 97; Šomšák & al. 1980, Tab. 2 (*Carduo glauci-Caricetum tatrorum*), r. 6; Unar & al. 1984, Tab. 16 (*Festucetum versicoloris calcicolum*), r. 2, 7.

8b Unar & al. 1984, Tab. 16, r. 3, 4, 6, 8–10.

Localities of relevés:

Tab. 2, *Gentiano clusii-Festucetum versicoloris*:
(r. 1–9 = the Krivánska Malá Fatra Mts, r. 10–14 = the Chočské vrchy Mts)

1. the Steny Mt., outcrops of marl limestone below the ridge trace; 1570 m a. s. l., SE, 60 °, 12 m^2, E_1: 90 %, E_0: 5 %, 23. 7. 2003, Bernátová & Uhlířová.
2. the Chleb Mt., west rocky slope of amphitheatre with rocky outcrops; 1625 m a. s. l., W, 85 °, 25 m^2, E_1: 75 %, E_0: 10 %, 18. 8. 1975, Bělohlávková.
3. ridge Koniarky – the Malý Kriváň Mt., cliff in north slope; 1550 m a. s. l., NW, 80 °, 25 m^2, E_1: 75 %, E_0: 15 %, 8. 8. 1977, Bělohlávková.
4. narrow ridge between the Chleb Mt. and the Hromové Mt.; 1620 m a. s. l., S, 80 °, 14 m^2, E_1: 60 %, E_0: 10 %, 22. 8. 2001, Bernátová & Kliment.

5. ridge Koniarky – the Malý Kriváň Mt., cliff in north slope; 1540 m a. s. l., N, 75 °, 25 m^2, E_1: 85 %, E_0: 15 %, 17. 8. 1978, Bělohlávková.
6. ridge Koniarky – the Malý Kriváň Mt., cliff near the ridge trace (the first from the saddle below the Koniarky), 1550 m a. s. l., WSW, 80 °, 25 m^2, E_1: 85 %, E_0: 2 %, 16. 8. 1975, Bělohlávková.
7. ridge Koniarky – the Malý Kriváň Mt., cliff near the ridge trace (second from the saddle below the Koniarky); 1555 m a. s. l., S, 90 °, 25 m^2, E_1: 70 %, E_0: 5 %, 17. 8. 1975, Bělohlávková.
8. ridge Koniarky – the Malý Kriváň Mt., cliff above the saddle below the Koniarky; 1550 m a. s. l., SSE, 70 °, 25 m^2, E_1: 75 %, E_0: 2 %, 26. 7. 1973, Bělohlávková.
9. ridge Koniarky – the Malý Kriváň Mt., cliff on north slope; 1555 m a. s. l., SSW, 50 °, 25 m^2, E_1: 80 %, E_0: 5 %, 17. 8. 1975, Bělohlávková.
10. the Veľký Choč Mt. (1607,7 m); 1470 m a. s. l., SSE, 45 °, 15 m^2, E_1: 75 %, 29. 7. 1965 (Švandová-Ursínyová 1966, r. 62).
11. the Veľký Choč Mt.; 1480 m a. s. l., SSE, 45 °, 8 m^2, E_1: 75 %, E_0: 5 %, 29. 7. 1965 (Švandová-Ursínyová 1966, r. 64).
12. the Veľký Choč Mt.; 1470 m a. s. l., ESE, 65 °, 10 m^2, E_1: 75 %, 29. 7. 1965 (Švandová-Ursínyová 1966, r. 63).
13. the Veľký Choč Mt., rocky wall; 1478 m a. s. l., NE, 80 °, 12 m^2, E_1: 85 %, 29. 7. 1965 (Švandová-Ursínyová 1966, r. 66).
14. the Veľký Choč Mt.; 1500 m a. s. l., S, 45 °, 21 m^2, E_1: 30 %, 29. 7. 1965 (Švandová-Ursínyová 1966, r. 67).

Tab. 3, *Diantho nitidi-Seslerietum tatrae*
(r. 1–29 = the Krivánska Malá Fatra Mts)

1. the Malý Kriváň Mt. (1670,9 m), north slope; 1510 m a. s. l., N, 20 °, 25 m^2, E_1: 95 %, 11. 6. 1986 (Milová & Urbanová 1989: 302 ut *Polygono vivipari-Seslerietum tatrae*).
2. ridge between the Malý Kriváň Mt. – the Koniarky Mt., north slope; 1520 m a. s. l., NW, 30 °, 25 m^2, E_1: 98 %, E_0: 2 %, 22. 7. 1973, Bělohlávková.
3. ridge between the Malý Kriváň Mt. – the Koniarky Mt., north-west slope; 1500 m a. s. l., NW, 25 °, 25 m^2, E_1: 100 %, 28. 6. 1984 (Milová & Urbanová 1989: 303 ut *Polygono vivipari-Seslerietum tatrae*).
4. ridge between the Hromové Mt. – the Severné Steny Mt., west slope; 1600 m a. s. l., W, 30 °, 25 m^2, E_1: 100 %, E_0: 10 %, 14. 8. 1973, Bělohlávková.
5. the Pekelník Mt. (1609,3 m), north slope below the summit; 1575 m a. s. l., N, 25 °, 25 m^2, E_1: 95 %, E_0: 3 %, 10. 8. 1973, Bělohlávková.
6. Chrapáky, plain topic of the ridge in the north slope, enclave in dwarf pine; 1475 m a. s. l., N, 2 °, 25 m^2, E_1: 95 %, 9. 8. 1973, Bělohlávková.
7. Chrapáky, near the spring on north slope; 1400 m a. s. l., NW, 25 °, 25 m^2, E_1: 95 %, E_0: 10 %, 9. 8. 1973, Bělohlávková.
8. the Malý Kriváň Mt., ridge to the saddle Priehyb, south slopes; 1595 m a. s. l., SSW, 35 °, 25 m^2, E_c: 85 %, E_1: 80 %, E_0: 5 %, 18. 7. 2001, Šibík & Krajčiová-Šibíková. 49°10'56,8" n. l., 18°59'25,1" e. l.
9. the Malý Kriváň Mt., east slope; 1624 m a. s. l., E, 30 °, 25 m^2, E_c: 100 %, E_1: 100 %, E_0: 1 %, 31. 7. 2002, Bernátová, Šibík & Uhlířová. 49°11'02,0" n. l., 18°59'52,5" e. l.
10. the Malý Kriváň Mt., ridge part; 1649 m a. s. l., NNW, 30 °, 16 m^2, E_c: 100 %, E_1: 100 %, E_0: 5 %, 31. 7. 2002, Bernátová, Šibík & Uhlířová. 49°10'56,8" n. l., 18°59'58,1" e. l.
11. the Malý Kriváň Mt., below the summit; 1631 m a. s. l., NNW, 30 °, 16 m^2, E_c: 100 %, E_1: 100 %, E_0: 0 %, 31. 7. 2002, Bernátová, Šibík & Uhlířová. 49°11'01,2" n. l., 18°59'50,7" e. l.
12. saddle Vráta (1462 m), north slope, enclave in dwarf pine; 1400 m a. s. l., NW, 25 °, 25 m^2, E_1: 95 %, E_0: 20 %, 17. 7. 1973, Bělohlávková.
13. saddle Vráta, north slope, near the tourist trace; 1375 m a. s. l., NNW, 20 °, 25 m^2, E_1: 98 %, E_0: 5 %, 21. 7. 1973, Bělohlávková.
14. the Veľký Kriváň Mt., shallow depression on south slope; 1625 m a. s. l., S, 30 °, 25 m^2, E_1: 100 %, E_0: 10 %, 11. 8. 1973, Bělohlávková.
15. the Veľký Kriváň Mt., south slope; 1570 m a. s. l., S, 25 °, 25 m^2, E_1: 98 %, E_0: 5 %, 25. 7. 1973, Bělohlávková.
16. the Veľký Kriváň Mt., channel on the west slope; 1500 m a. s. l., SW, 35 °, 25 m^2, E_1: 98 %, 11. 8. 1973, Bělohlávková.
17. the Chleb Mt. (1645,6 m), south-west slope above the trace; 1522 m a. s. l., SSW, 40 °, 20 m^2, E_1: 95 %, 28. 7. 2002, Bernátová & Uhlířová. 49°11,352' n. l., 19°02,520' e. l.
18. the Hromové Mt. (1636,2 m), south slope; 1624 m a. s. l., SSW, 30 °, 25 m^2, E_1: 90 %, 29. 7. 2002, Bernátová & Uhlířová. 49°11,387' n. l., 19°03,302' e. l.

19. the Hromové Mt., west from r. 18; 1620 m a. s. l., SSE, 30 °, 25 m^2, E_1: 100 %, 29. 7. 2002, Bernátová & Uhlířová. 49°11,409' n. l., 19°03,414' e. l.
20. the Veľký Kriváň Mt., shallow channel on south-west slope; 1575 m a. s. l., SW, 35 °, 25 m^2, E_1: 95 %, 11. 8. 1973, Bělohlávková.
21. ridge between the Malý Kriváň Mt. – the Koniarky Mt., south slope; 1550 m a. s. l., SE, 30 °, 25 m^2, E_1: 90 %, 17. 8. 1973, Bělohlávková.
22. the Chleb Mt., depression with boulders on south slope; 1300 m a. s. l., ESE, 35 °, 25 m^2, E_1: 95 %, E_0: 1 %, 17. 8. 1973, Bělohlávková.
23. the Chleb Mt., south slope below the summit; 1632 m a. s. l., S, 40 °, 16 m^2, E_1: 100 %, 28. 7. 2002, Bernátová & Uhlířová. 49°11,259' n. l., 19°03,117' e. l.
24. the Chleb Mt., south slope; 1625 m a. s. l., SSE, 30 °, 25 m^2, E_1: 100 %, 29. 7. 2002, Bernátová & Uhlířová. 49°11,271' n. l., 19°03,114' e. l.
25. the Chleb Mt., south slope; 1610 m a. s. l., SSE, 40 °, 25 m^2, E_1: 95 %, 30. 7. 2002, Bernátová & Uhlířová.
26. the Chleb Mt., south slope; 1596 m a. s. l., S, 40°, 24 m^2, E_1: 100 %, 29. 7. 2002, Bernátová & Uhlířová. 49°11,244' n. l., 19°03,149' e. l.
27. the Chleb Mt., channel on south-east slope; 1524 m a. s. l., SSE, 35°, 24 m^2, E_1: 90 %, 30. 7. 2002, Bernátová & Uhlířová. 49°11,199' n. l., 19°03,193' e. l.
28. the Chleb Mt., SSE slope below rocky walls; 1572 m a. s. l., 30 °, 24 m^2, E_1: 90 %, 30. 7. 2002, Bernátová & Uhlířová. 49°11,220' n. l., 19°03,134' e. l.
29. the Stienky Mt., SE slope below the summit; 1612 m a. s. l., JV, 20 °, 24 m^2, E_1: 85 %, E_0: 15 %, 1. 8. 2002, Bernátová & Uhlířová. 49°11,521' n. l., 19°03,673' e. l.

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Table 1: Analysed communities of the class *Elyno-Seslerietea* from the Western Carpathians.
Tabela 1: Obravnavane združbe razreda *Elyno-Seslerietea* iz zahodnih Karpatov.
1 – *Astero alpini-Seslerietum calcariae*; 2 – *Diantho praecoci-Festucetum versicoloris*; 3 – *Gentiano clusii-Festucetum versicoloris*; 4 – *Seslerio albicantis-Arctostaphyletum uvae-ursi*; 5 – *Minuartio langii-Festucetum pallentis*, 5a – subass. *campanuletosum carpaticae*, 5b – subass. *campanuletosum xylocarpae*; 6 – *Diantho nitidi-Seslerietum tatrae*; 7 – *Seslerietum tatrae*, 7a – subass. *luzuletosum rubellae*, 7b – subass. *biscutelletosum laevigatae*; 8 – *Seslerio tatrae-Festucetum versicoloris*, 8a – subass. *ranunculetosum pseudomontani*, 8b – subass. *inops*
1–5 – *Astero-Seslerion calcariae*; 6–8 – *Seslerion tatrae*

Number of column			1	2	3	4	5a	5b	5	6	7a	7b	7	8a	8b	8
Number of relevés			15	12	14	10	41	10	51	29	18	12	30	28	6	34
Average number of taxa			37	39	30	24	36	27	34	38	51	43	48	49	37	47
Diagnostic taxa of the associations																
pc	*Oxytropis* *tatrae [C]	C1	**47** ^{5}	17 ^{3}	.	.	.	.	.	.	.	.	.	4 ^{2}	.	3 ^{2}
pc	*Gypsophila repens*	d1	**93** ^{5}	42 ^{4}	7 ^{2}	10 ^{2}	.	.	.	.	.	.	.	.	.	.
pc	*Leontopodium alpinum*	d1	**80** ^{3}	17 ^{2}	.	.	5 ^{3}	.	4 ^{2}	.	.	.	.	.	.	.
	Fulgensia bracteata (E_0)	d1	**47** ^{2}	.	.	.	.	.	.	.	.	.	.	.	.	.
	Squamarina gypsacea (E_0)	d1	**47** ^{3}	.	.	.	.	.	.	.	.	.	.	.	.	.
	Hymenostylium recurvirostrum (E_0)	d1	**40** ^{3}	.	.	.	.	.	.	.	.	.	.	.	.	.
	Gentianella lutescens	d2	20 ^{2}	**67** ^{2}	.	.	.	.	.	31 ^{2}	11 ^{2}	25 ^{2}	17 ^{2}	36 ^{2}	.	29 ^{2}
	Silene vulgaris	d2	.	**58** ^{2}	.	.	7 ^{2}	.	6 ^{2}	3 ^{2}	11 ^{2}	.	7 ^{2}	.	.	.
fc	*Festuca carpatica* [C]	d2	.	**42** ^{3}	.	.	.	.	.	7 ^{2}	33 ^{5}	25 ^{2}	30 ^{4}	7 ^{2}	.	6 ^{2}
	Hieracium murorum	d2	.	**42** ^{2}	.	.	2 ^{2}	10 ^{2}	4 ^{2}	10 ^{2}	.	17 ^{2}	7 ^{2}	4 ^{1}	.	3 ^{1}
	Bartsia alpina	d3,8a	.	.	**71** ^{3}	30 ^{2}	.	.	.	90 ^{3}	61 ^{3}	75 ^{2}	67 ^{3}	**57** ^{2}	.	47 ^{2}
ca	*Vicia oreophila*	d3	.	.	**64** ^{2}	.	.	.	.	7 ^{2}	.	.	.	.	.	.
fv	*Hedysarum hedysaroides*	d3,7a	.	.	**50** ^{3}	.	.	.	.	.	**39** ^{3}	.	23 ^{3}	36 ^{3}	50 ^{3}	38 ^{3}
fv	*Potentilla crantzii*	d3	.	.	**50** ^{3}	.	.	.	.	55 ^{3}	6 ^{2}	8 ^{3}	7 ^{3}	61 ^{3}	33 ^{4}	56 ^{3}
tf	*Rhodiola rosea*	d3,8a	.	.	**50** ^{3}	.	.	.	.	24 ^{3}	39 ^{2}	42 ^{2}	40 ^{2}	**39** ^{2}	.	32 ^{2}
cf	*Androsace lactea*	d3	.	17 ^{2}	**50** ^{2}	.	.	.	.	3 ^{2}	.	.	.	4 ^{2}	17 ^{3}	6 ^{3}
ac, cf	*Ranunculus alpestris*	d3	.	.	**43** ^{2}	.	.	.	.	.	6 ^{2}	.	3 ^{2}	11 ^{2}	33 ^{3}	15 ^{2}
fv	*Saxifraga* *dominii [CW]	d3,8	.	.	**29** ^{2}	.	.	.	.	.	.	.	.	61 ^{2}	50 ^{2}	**59** ^{2}
	Arctostaphylos uva-ursi	C4	.	.	.	**100** ^{8}	.	.	.	.	.	.	.	.	.	.
	Festuca pallens	t4	.	.	.	10 ^{2}	100 ^{6}	100 ^{6}	**100** ^{6}	.	.	.	.	.	.	.
cy	*Campanula carpatica* [C]	d5,5a	.	.	.	.	**83** ^{2}	.	**67** ^{2}	.	.	.	.	.	.	.
Sc,ES	*Dianthus* *nitidus [CW]	d6	.	.	7 ^{2}	.	.	.	.	**90** ^{3}	.	.	.	.	.	.
	Knautia arvensis	d6	.	.	7 ^{2}	.	20 ^{2}	.	16 ^{2}	**66** ^{3}	.	8 ^{3}	3 ^{3}	.	.	.
	Ranunculus nemorosus	d6	.	.	.	.	.	.	.	**41** ^{2}	.	.	.	.	.	.
	Viola canina	d6	.	.	7 ^{2}	.	.	.	.	**24** ^{2}	.	.	.	.	.	.
	Polygonatum verticillatum	d6	.	.	.	.	.	.	.	**21** ^{2}	.	.	.	.	.	.
	Cardaminopsis *tatrica [C]	C7	.	.	.	.	.	.	.	.	83 ^{3}	50 ^{3}	**70** ^{3}	14 ^{2}	17 ^{3}	15 ^{2}
st	*Tephroseris capitata*	t7	.	17 ^{4}	.	.	.	.	.	.	67 ^{3}	83 ^{2}	**73** ^{2}	29 ^{2}	17 ^{1}	26 ^{2}
	Homogyne alpina	d7	.	.	.	10 ^{2}	.	.	.	34 ^{2}	72 ^{4}	92 ^{2}	**80** ^{3}	43 ^{2}	17 ^{3}	38 ^{2}
MU	*Geranium sylvaticum*	d7	.	8 ^{2}	.	.	.	.	.	34 ^{2}	89 ^{3}	67 ^{3}	**80** ^{3}	11 ^{2}	.	9 ^{2}
Cv	*Festuca picturata*	d7	.	.	.	.	.	.	.	.	89 ^{5}	58 ^{4}	**77** ^{4}	4 ^{2}	.	3 ^{2}
Cv	*Anemone narcissiflora*	d7	.	.	29 ^{2}	.	.	.	.	17 ^{3}	89 ^{3}	50 ^{3}	**73** ^{3}	32 ^{2}	50 ^{2}	35 ^{2}
	Oreogeum montanum	d7	.	.	.	.	.	.	.	.	78 ^{3}	42 ^{3}	**63** ^{3}	25 ^{2}	17 ^{3}	24 ^{2}
	Viola *sudetica	d7	.	8 ^{2}	.	.	.	.	.	.	28 ^{4}	8 ^{6}	**20** ^{5}	.	.	.
	Cetraria islandica (E_0)	d8	.	.	7 ^{2}	10 ^{5}	.	10 ^{2}	2 ^{2}	3 ^{3}	6 ^{2}	42 ^{5}	20 ^{4}	86 ^{3}	83 ^{3}	**85** ^{3}
Sc,ES	*Selaginella selaginoides*	d8,7b	.	.	.	.	.	.	.	24 ^{2}	11 ^{2}	**58** ^{2}	30 ^{2}	71 ^{2}	83 ^{3}	**74** ^{2}
fv	*Pedicularis oederi*	d8	.	.	.	.	.	.	.	.	17 ^{2}	42 ^{3}	27 ^{3}	71 ^{2}	83 ^{3}	**74** ^{2}
ac	*Salix reticulata*	d8	.	.	7 ^{2}	.	.	.	.	.	22 ^{2}	.	13 ^{2}	61 ^{3}	83 ^{3}	**65** ^{3}
fv	*Silene* *longiscapa	d8	.	.	.	.	.	.	.	.	6 ^{2}	8 ^{3}	7 ^{3}	64 ^{3}	67 ^{3}	**65** ^{3}
cf	*Carex firma*	d8	13 ^{3}	.	21 ^{3}	.	.	.	.	7 ^{3}	.	.	.	54 ^{2}	50 ^{3}	**53** ^{2}
oe	*Carex atrata*	d8	.	.	.	.	.	.	.	.	6 ^{3}	8 ^{2}	7 ^{3}	43 ^{2}	67 ^{2}	**47** ^{2}
cf	*Salix alpina*	d8	.	.	21 ^{2}	.	.	.	.	17 ^{4}	11 ^{3}	17 ^{2}	13 ^{3}	39 ^{3}	67 ^{4}	**44** ^{3}
fv	*Cerastium eriophorum*	d8	.	.	.	.	.	.	.	.	6 ^{2}	8 ^{3}	7 ^{3}	50 ^{2}	17 ^{2}	**44** ^{2}
fv	*Minuartia sedoides*	d8	.	.	.	.	.	.	.	.	.	.	.	36 ^{2}	33 ^{3}	**35** ^{2}

Number of column			1	2	3	4	5a	5b	5	6	7a	7b	7	8a	8b	8
Number of relevés			15	12	14	10	41	10	51	29	18	12	30	28	6	34
Average number of taxa			37	39	30	24	36	27	34	38	51	43	48	49	37	47
fv	*Minuartia pauciflora* [C]	d8	.	.	.	.	.	.	.	.	.	.	.	21^{3}	33^{3}	**24^{3}**
CC	*Campanula alpina*	d8	.	.	.	.	.	.	.	.	.	.	.	18^{2}	50^{2}	**24^{2}**
Differential taxa of the subassociations																
ch	*Erysimum witmannii* [C]	d5a	.	.	.	.	**68^{3}**	.	55^{3}	.	.	.	.	.	.	.
ch	*Pulsatilla slavica* [CW]	d5a	.	.	36^{5}	90^{2}	**66^{2}**	.	53^{2}	.	.	.	.	.	.	.
ES	*Thesium alpinum*	d5a	13^{2}	17^{2}	7^{2}	60^{2}	**61^{2}**	10^{2}	51^{2}	28^{2}	28^{2}	17^{3}	23^{2}	.	.	.
Sc,ES	*Thymus pulcherrimus* [C]	d5a,7b,8a	93^{3}	50^{4}	64^{2}	80^{3}	**56^{3}**	20^{4}	49^{3}	21^{3}	6^{2}	**83^{3}**	37^{3}	**75^{3}**	.	62^{3}
ch	*Allium ochroleucum*	d5a	.	.	.	40^{2}	**51^{2}**	.	41^{2}	.	.	.	.	.	.	.
Fv	*Bupleurum falcatum*	d5a	.	.	.	.	**51^{2}**	.	41^{2}	.	.	.	.	.	.	.
AT	*Asplenium trichomanes*	d5a	.	.	.	.	**44^{2}**	10^{2}	37^{2}	.	.	.	.	.	.	.
ch	*Acinos alpinus*	d5a	.	.	.	.	**41^{3}**	20^{2}	37^{2}	.	.	.	.	.	.	.
	Encalypta vulgaris (E_0)	d5a	47^{3}	17^{3}	.	.	**63^{3}**	10^{3}	53^{3}	.	.	.	.	.	.	.
	Encalypta streptocarpa (E_0)	d5a	27^{2}	.	.	.	**54^{2}**	20^{2}	47^{2}	.	.	.	.	4^{5}	17^{3}	6^{4}
	Rhytidium rugosum (E_0)	d5a	20^{2}	58^{3}	29^{3}	10^{2}	**44^{2}**	10^{6}	37^{3}	7^{4}	.	.	.	25^{2}	.	21^{2}
	Fissidens dubius (E_0)	d5a	7^{2}	8^{2}	.	.	**44^{2}**	.	35^{2}	.	.	.	.	.	.	.
	Orthotrichum anomalum (E_0)	d5a	.	.	.	.	**41^{2}**	20^{3}	37^{2}	.	.	.	.	.	.	.
	Anomodon viticulosus (E_0)	d5a	.	.	.	.	**29^{2}**	.	24^{2}	.	.	.	.	.	.	.
pc	*Campanula xylocarpa* [CW]	d5b	.	.	.	.	.	**60^{3}**	12^{3}	.	.	.	.	.	.	.
Fv	*Erysimum odoratum*	d5b	.	.	.	.	.	**60^{2}**	12^{2}	.	.	.	.	.	.	.
Fv	*Pulsatilla subslavica* [CW]	d5b	.	.	.	.	.	**40^{2}**	8^{2}	.	.	.	.	.	.	.
ch	*Daphne arbuscula* [CW]	d5b	.	.	.	.	.	**20^{6}**	4^{6}	.	.	.	.	.	.	.
	Cladonia pyxidata (E_0)	d5b	.	8^{2}	.	.	.	**70^{3}**	14^{3}	.	6^{3}	.	3^{3}	32^{2}	33^{3}	32^{2}
	Peltigera rufescens (E_0)	d5b	.	.	.	.	.	**40^{2}**	8^{2}	.	.	.	.	7^{3}	.	6^{3}
ac,oe	*Myosotis alpestris*	d7a,8a	.	8^{2}	.	.	.	.	.	7^{2}	**83^{3}**	33^{2}	63^{3}	**50^{2}**	.	41^{2}
Cv	*Campanula elliptica*	d7a	.	50^{3}	.	.	.	.	.	45^{2}	**78^{2}**	.	47^{2}	4^{2}	.	3^{2}
Cv	*Luzula *rubella*	d7a,8a	.	17^{3}	7^{2}	20^{3}	.	.	.	24^{3}	**72^{3}**	17^{2}	50^{3}	**29^{2}**	.	24^{2}
	Thymus alpestris	d7a	.	17^{3}	7^{5}	.	.	.	.	52^{2}	**72^{3}**	8^{2}	47^{3}	11^{3}	.	9^{3}
Cv	*Crepis mollis*	d7a	.	8^{2}	.	.	.	.	.	14^{2}	**67^{3}**	17^{2}	47^{3}	4^{2}	.	3^{2}
	Phyteuma spicatum	d7a	.	.	.	.	.	.	.	.	**61^{2}**	.	37^{2}	.	.	.
Cv	*Trommsdorfia uniflora*	d7a	.	.	.	.	.	.	.	3^{1}	**50^{4}**	.	30^{4}	4^{2}	.	3^{2}
Cv	*Crepis conyzifolia*	d7a	.	.	.	.	.	.	.	.	**39^{4}**	.	23^{4}	.	.	.
	Ranunculus thora	d7a	.	.	.	.	.	.	.	.	**33^{3}**	.	20^{3}	11^{3}	.	9^{3}
	Ranunculus pseudomontanus [Cs]	d7a,8a	.	.	.	.	.	.	.	21^{3}	**28^{3}**	.	17^{3}	**50^{2}**	.	41^{2}
Cv	*Cyanus mollis* [Cs]	d7a	.	.	.	.	.	20^{2}	4^{2}	3^{2}	**22^{3}**	.	13^{3}	.	.	.
	Cortusa matthioli	d7a	.	.	.	.	.	.	.	.	**22^{3}**	.	13^{3}	7^{3}	.	6^{3}
Sc,ES	*Biscutella laevigata*	d7b	.	17^{2}	.	.	10^{2}	.	8^{2}	45^{3}	11^{2}	**67^{2}**	33^{2}	36^{2}	33^{4}	35^{2}
Sc,ES	*Hieracium villosum*	d7b	47^{2}	25^{2}	21^{2}	.	2^{3}	.	2^{3}	34^{2}	.	**67^{2}**	27^{2}	11^{2}	17^{2}	12^{2}
Sc,ES	*Anthyllis *alpestris*	d7b	20^{2}	42^{2}	36^{2}	30^{3}	20^{2}	20^{3}	20^{2}	59^{4}	17^{2}	**50^{3}**	30^{2}	14^{3}	.	12^{3}
pt	*Cerastium *glandulosum* [CW]	d8a	.	.	.	.	.	.	.	.	33^{4}	50^{2}	40^{3}	**64^{2}**	.	53^{2}
Sc,ES	*Pedicularis verticillata*	d8a	53^{2}	33^{3}	21^{2}	.	.	.	.	69^{3}	67^{2}	42^{2}	57^{2}	**61^{2}**	17^{3}	53^{2}
LV	*Vaccinium vitis-idaea*	d8a	.	.	29^{2}	40^{4}	.	.	.	45^{3}	28^{2}	42^{2}	33^{2}	**61^{3}**	.	50^{3}
MU	*Bistorta major*	d8a	.	8^{3}	7^{2}	.	.	.	.	10^{4}	44^{3}	58^{2}	50^{2}	**39^{2}**	.	32^{2}
	Botrychium lunaria	d8a	.	33^{2}	.	.	2^{2}	.	2^{2}	14^{2}	61^{2}	25^{2}	47^{2}	**39^{2}**	.	32^{2}
oe	*Erigeron hungaricus* [C]	d8a	7^{2}	.	7^{2}	.	.	.	.	.	.	.	.	**32^{3}**	.	26^{3}
CC	*Festuca supina*	d8a	.	.	.	.	.	.	.	.	17^{2}	.	10^{2}	**25^{2}**	.	21^{2}
Astero alpini-Seslerienion calcariae																
	Bupleurum ranunculoides	C	**73^{2}**	**58^{2}**	**21^{3}**	.	.	.	.	.	.	.	.	11^{2}	.	9^{2}
CK,ES	*Festuca *versicolor* [Cs]	d	**87^{4}**	**100^{7}**	**100^{7}**	20^{4}	.	.	.	72^{4}	33^{3}	50^{3}	40^{3}	100^{7}	100^{8}	100^{7}
st	*Astragalus australis*	d	**47^{3}**	**42^{3}**	**7^{6}**	.	.	.	.	3^{6}	6^{3}	8^{2}	7^{3}	4^{2}	50^{3}	12^{3}
oe	*Androsace chamaejasme*	d,d8	**27^{2}**	**17^{2}**	**7^{2}**	.	.	.	.	.	17^{2}	33^{2}	23^{2}	75^{3}	33^{2}	**68^{3}**
CK,Cv	*Campanula tatrae* [CW]	d	**60^{2}**	**58^{3}**	**.**	.	.	.	.	.	61^{2}	83^{2}	70^{2}	71^{3}	67^{3}	71^{3}
Pulsatillo slavicae-Caricenion humilis																
	Rhodax rupifragus	C	.	.	.	**30^{2}**	**5^{4}**	**.**	**4^{4}**	.	.	.	.	.	.	.
	Coronilla vaginalis	C	.	.	.	**50^{2}**	**.**	**.**	**.**	.	.	.	.	.	.	.
	Globularia cordifolia	C	.	.	.	**40^{4}**	**.**	**.**	**.**	.	.	.	.	.	.	.
	Koeleria tristis	C	.	.	.	**10^{2}**	**.**	**.**	**.**	.	.	.	.	.	.	.

Number of column			1	2	3	4	5a	5b	5	6	7a	7b	7	8a	8b	8
Number of relevés			15	12	14	10	41	10	51	29	18	12	30	28	6	34
Average number of taxa			37	39	30	24	36	27	34	38	51	43	48	49	37	47
Fv	*Carex humilis*	d	.	.	.	**40** 3	**34** 3	**20** 2	**31** 3	.	.	.	.	.	.	.
FB	*Tithymalus cyparissias*	d	.	42 3	.	**20** 2	**66** 2	**30** 2	**59** 2	.	.	.	.	.	.	.
Pc	*Hieracium bupleuroides*	d,d5a	.	.	.	**20** 2	**63** 2	**20** 2	**55** 2	.	.	.	.	.	.	.
FB	*Anthericum ramosum*	d	.	.	.	**10** 5	**29** 2	**20** 2	**27** 2	.	.	.	.	.	.	.
Fv	*Teucrium montanum*	d	.	.	.	**10** 2	**27** 3	**20** 2	**25** 3	.	.	.	.	.	.	.
	Polygonatum odoratum	d,d5a	.	.	.	**20** 3	**41** 2	**.**	**33** 2	.	.	.	.	.	.	.
	Asperula tinctoria	d	.	.	.	**20** 2	**12** 2	**.**	**10** 2	.	.	.	.	.	.	.
Fv	*Seseli osseum*	d	.	.	.	**.**	**100** 3	**70** 3	**94** 3	.	.	.	.	.	.	.
FB	*Cyanus triumfettii*	d,d5a	.	.	.	**.**	**63** 2	**20** 2	**55** 2	.	.	.	.	.	.	.
	Vincetoxicum hirundinaria	d,d5a	.	.	.	**.**	**59** 2	**20** 2	**51** 2	.	.	.	.	.	.	.
Fv	*Asperula cynanchica*	d	.	.	.	**.**	**49** 2	**40** 2	**47** 2	.	.	.	.	.	.	.
Astero alpini-Seslerion calcariae																
	Sesleria albicans	C	**100** 5	**58** 3	**50** 3	**100** 4	**83** 4	**90** 6	**84** 4	.	.	.	.	.	.	.
	Festuca tatrae [CWs]	t	**67** 2	**75** 5	**.**	**60** 2	**5** 2	**20** 2	**8** 2	.	6 3	.	3 3	.	.	.
	Aster alpinus	C	**93** 3	**33** 2	**36** 4	**30** 3	**12** 4	**.**	**10** 4	.	.	.	.	4 2	.	3 2
	*Dianthus *praecox* [CW]	C	**67** 3	**83** 4	**57** 3	**.**	**37** 3	**20** 2	**33** 2	.	.	.	.	11 1	.	9 1
	Minuartia langii	C	**7** 2	**17** 3	**36** 3	**30** 2	**61** 3	**30** 2	**55** 3	7 2	.	.	.	.	.	.
	Jovibarba globifera	d	**67** 2	**17** 2	**71** 2	**50** 2	**93** 2	**70** 2	**88** 2	17 2	.	8 2	3 2	.	.	.
Pc	*Asplenium ruta-muraria*	d	**53** 2	**.**	**14** 2	**.**	**98** 2	**90** 2	**96** 2	.	.	.	.	.	50 2	9 2
pc	*Kernera saxatilis*	d	**27** 2	**17** 2	**.**	**10** 2	**24** 2	**.**	**20** 2	.	.	.	.	.	.	.
sf	*Leontodon incanus*	d	**13** 3	**.**	**.**	**30** 2	**29** 2	**20** 2	**27** 2	.	.	.	.	.	.	.
Seslerion tatrae																
	Sesleria tatrae [CWs]	C,d3	.	17 2	**71** 3	.	.	.	.	**100** 6	**100** 8	**100** 7	**100** 7	**100** 5	**83** 4	**97** 5
	*Trifolium *kotulae* [C]	C,d2	7 2	**50** 2	.	.	.	.	.	**7** 2	**39** 2	**33** 2	**37** 2	**7** 2	**.**	**6** 2
	Gentiana verna	C,d8a	.	17 2	7 2	.	.	.	.	**17** 2	**33** 3	**67** 2	**47** 2	**61** 2	**.**	**50** 2
	Astragalus alpinus	C	7 5	17 2	14 3	.	.	.	.	**.**	**28** 4	**.**	**17** 4	**7** 4	**.**	**6** 4
	Euphrasia tatrae [C]	C	.	.	.	.	.	.	.	**.**	**28** 3	**33** 2	**30** 2	**25** 2	**17** 2	**24** 2
	Potentilla aurea	d	.	8 2	.	.	.	.	.	**41** 3	**94** 4	**100** 3	**97** 3	**61** 2	**33** 3	**56** 2
	Parnassia palustris	d	.	17 3	29 2	.	.	.	.	**41** 2	**61** 2	**58** 3	**60** 2	**86** 2	**83** 3	**85** 2
Cv	*Achillea *alpestris*	d,d7a	.	17 2	21 2	.	.	.	.	**59** 3	**94** 3	**25** 2	**67** 3	**25** 2	**.**	**21** 2
Cv	*Linum extraaxillare* [Cs]	d,d2,7a,8a	13 2	**75** 4	.	.	.	.	.	**17** 2	**67** 3	**25** 4	**50** 3	**29** 3	**.**	**24** 3
MU	*Primula elatior*	d,d8a	.	.	7 1	10 2	.	.	.	**62** 3	**100** 3	**67** 3	**87** 3	**50** 2	**.**	**41** 2
	Ligusticum mutellina	d,d8a	.	.	.	.	.	.	.	**48** 3	**78** 5	**67** 5	**73** 5	**50** 3	**.**	**41** 3
	Anthoxanthum alpinum	d,d8a	.	.	7 3	.	.	.	.	**45** 3	**94** 3	**92** 3	**93** 3	**39** 2	**.**	**32** 2
Cv	*Phleum hirsutum*	d,d8a	.	17 2	.	.	.	.	.	**55** 2	**78** 3	**67** 3	**73** 3	**36** 2	**.**	**29** 2
CC	*Avenula versicolor*	d	.	.	.	.	.	.	.	**.**	**28** 2	**50** 4	**37** 3	**29** 3	**17** 3	**26** 3
Seslerietalia coerulae, Elyno-Seslerietea																
	Scabiosa lucida		7 2	92 3	71 3	70 2	29 2	30 3	29 2	97 3	50 3	75 3	60 3	71 2	33 2	65 2
	Ranunculus breyninus		100 3	83 3	50 4	20 2	2 3	10 3	4 3	31 2	50 3	100 2	70 3	54 3	50 2	53 3
	Helianthemum grandiflorum		60 3	75 3	86 3	20 3	29 3	20 2	27 3	45 3	78 4	58 4	70 4	64 3	33 3	59 3
	Phyteuma orbiculare		20 2	67 3	100 2	70 2	32 2	30 2	31 2	90 3	89 3	100 3	93 3	93 2	50 3	85 2
	Galium anisophyllon		80 2	92 3	79 2	50 2	7 2	.	6 2	66 2	67 3	50 2	60 3	93 3	33 3	82 3
	*Polygala *brachyptera*		40 2	67 3	14 2	20 2	37 2	50 2	39 2	31 2	11 2	17 2	13 2	7 2	.	6 2
	Euphrasia salisburgensis		60 2	58 2	71 2	30 2	29 2	20 3	27 2	34 2	6 2	8 2	7 2	29 2	.	24 2
	*Carex *tatrorum* [CW]		53 3	67 5	36 2	40 3	.	.	.	100 7	94 5	100 5	97 5	82 5	67 4	79 5
	Bellidiastrum michelii		20 2	25 2	29 2	20 2	.	.	.	72 3	39 2	67 2	50 2	57 3	33 3	53 3
	Veronica fruticans		33 2	33 2	43 2	.	.	.	.	.	.	8 2	3 2	7 2	.	6 2
cf	*Arenaria tenella* [CW]		20 2	8 2	.	.	.	.	.	.	.	8 1	3 1	11 2	.	9 2
	Colymbada alpestris		27 2	8 3	.	.	7 2	.	6 2	.	.	.	.	.	.	.
	Gentiana clusii		13 2	.	86 2	60 2	.	.	.	17 3	.	.	.	14 2	.	12 2
	Carduus glaucinus		.	58 2	.	30 2	54 2	30 2	49 2	41 4	17 2	42 2	27 2	4 2	.	3 2
	Gentianella fatrae [CW]		.	.	43 2	40 2	.	.	.	17 2	.	.	.	.	.	.
cb	*Knautia kitaibelii* [CWs]		.	.	.	30 2	12 2	.	10 2	45 3	6 3	17 4	10 3	11 2	.	9 2
cf	*Pinguicula alpina*		.	.	.	.	.	.	.	3 2	.	.	.	11 2	67 3	21 2
Asplenietea trichomanis																
Pc	*Saxifraga paniculata*		80 3	42 2	100 4	.	88 3	90 2	88 3	21 2	.	8 2	3 2	57 3	67 3	59 3

Number of column		1	2	3	4	5a	5b	5	6	7a	7b	7	8a	8b	8
Number of relevés		15	12	14	10	41	10	51	29	18	12	30	28	6	34
Average number of taxa		37	39	30	24	36	27	34	38	51	43	48	49	37	47
Pc	*Primula *hungarica* [CWs]*	93 4	17 2	71 4	90 2	41 3	30 3	39 3	.	.	.	.	4 2	17 2	6 2
pc	*Crepis jacquinii*	13 3	17 2	21 2	10 2	7 2	.	6 2	3 2	.	.	.	14 3	17 2	15 3
pc	*Trisetum alpestre*	100 4	75 3	79 3	20 2	20 2	.	16 2	.	.	.	.	18 2	17 2	18 2
pc	*Campanula cochleariifolia*	7 2	8 2	57 2	30 2	5 2	.	4 2	3 2	.	.	.	4 2	.	3 2
pc	*Draba aizoides*	47 2	.	43 2	.	2 2	.	2 2	.	.	.	.	14 2	.	12 2
cy	*Valeriana tripteris*	.	8 2	.	.	2 2	.	2 2	10 2	17 2	.	10 2	.	.	.
cy	*Asplenium viride*	.	.	14 2	.	2 2	.	2 2	.	.	.	.	11 2	.	9 2
cy	*Cystopteris fragilis*	.	.	14 2	.	7 2	30 2	12 2	.	.	.	.	.	.	.
Festuco-Brometea															
	Genista pilosa	.	.	.	10 2	10 3	20 2	12 2	.	.	.	.	.	.	.
	Viola hirta	.	.	.	.	27 2	30 2	27 2	.	.	.	.	.	.	.
sf	*Chamaecytisus hirsutus*	.	.	.	.	10 2	30 2	14 2	.	.	.	.	.	.	.
	Colymbada scabiosa	.	.	.	.	5 2	30 2	10 2	.	.	.	.	.	.	.
Fv	*Campanula *divergentiformis*	.	.	.	.	2 3	20 2	6 2	.	.	.	.	.	.	.
Fv	*Potentilla arenaria*	.	.	.	.	20 4	.	16 4	.	.	.	.	.	.	.
Fv	*Allium flavum*	.	.	.	.	.	20 2	4 2	.	.	.	.	.	.	.
Mulgedio-Aconitetea															
Cv	*Astrantia major*	.	17 2	.	.	.	.	.	10 2	44 2	25 2	37 2	7 2	.	6 2
Cv	*Solidago *minuta*	.	8 2	.	.	.	.	.	10 2	33 2	8 2	23 2	7 2	.	6 2
	Aconitum firmum [C]	.	8 2	.	.	.	.	.	.	6 1	.	3 1	7 3	17 2	9 2
Cv	*Pyrethrum clusii*	.	17 2	.	.	.	.	.	.	11 2	.	7 2	.	.	.
Cv	*Campanula serrata* [C]	.	.	7 2	.	.	.	.	69 3	6 3	8 1	7 2	.	.	.
Cv	*Cirsium erisithales*	.	.	.	.	.	.	.	34 2	28 3	17 2	23 2	.	.	.
	Senecio subalpinus	.	.	.	.	.	.	.	14 2	11 2	17 2	13 2	.	.	.
	Gentiana asclepiadea	.	.	.	.	.	.	.	10 2	11 3	8 2	10 2	.	.	.
	Acetosa arifolia	.	.	.	.	.	.	.	3 2	11 2	8 2	10 2	.	.	.
tf	*Taraxacum alpinum*	.	.	.	.	.	.	.	.	11 2	.	7 2	7 2	.	6 2
tf	*Cerastium fontanum*	.	.	.	.	.	.	.	.	28 2	8 2	20 2	.	.	.
	Poa chaixii	.	.	.	.	.	.	.	.	22 2	8 2	17 2	.	.	.
Caricetea curvulae															
	Agrostis pyrenaica	.	.	.	.	.	.	.	.	17 2	25 3	20 3	14 3	.	12 3
	Pulsatilla scherfelii	.	.	.	.	.	.	.	.	11 2	8 2	10 2	18 2	.	15 2
	Luzula sudetica	.	.	.	.	.	.	.	.	11 2	8 2	10 2	14 2	.	12 2
	Hieracium alpinum	.	.	.	.	.	.	.	.	11 2	.	7 2	14 2	.	12 2
	Oreochloa disticha	.	.	.	.	.	.	.	.	.	17 3	7 3	14 2	17 3	15 2
	Juncus trifidus	.	.	.	.	.	.	.	.	.	.	.	11 2	17 2	12 2
Salicetea herbaceae															
ac	*Leontodon pseudotaraxaci* [C]	.	.	.	.	.	.	.	.	33 2	17 4	27 3	46 2	33 3	44 2
	*Luzula *obscura* [C]*	.	.	.	.	.	.	.	.	17 2	.	10 2	4 3	.	3 3
ac	*Salix retusa*	.	.	.	.	.	.	.	.	6 2	.	3 2	25 2	.	21 2
ac,pt	*Saxifraga wahlenbergii* [CW]	.	.	.	.	.	.	.	.	.	.	.	4 1	50 2	12 2
Carici rupestris-Kobresietea															
	Bistorta vivipara	.	25 2	.	.	.	.	.	45 3	100 3	100 3	100 3	82 2	50 2	76 2
	Dryas octopetala	7 2	.	7 3	.	.	.	.	28 5	.	.	.	46 3	17 3	41 3
oe	*Saussurea alpina*	.	.	.	.	.	.	.	.	17 2	8 2	13 2	18 2	.	15 2
	Ligusticum mutellinoides	.	.	.	.	.	.	.	.	6 2	25 3	13 3	29 3	.	24 3
	Dianthus glacialis	.	.	.	.	.	.	.	.	6 2	.	3 2	7 2	.	6 2
fv	*Agrostis alpina*	.	.	.	.	.	.	.	.	.	17 3	7 3	11 2	.	9 2
oe	*Sedum atratum*	7 2	.	.	.	.	.	.	.	.	.	.	11 2	17 2	12 2
oe	*Carex capillaris*	7 3	.	.	.	.	.	.	.	.	.	.	4 2	17 3	6 3
oe	*Oxytropis carpatica* [C]	13 3	8 5	.	.	.	.	.	.	.	.	.	7 3	.	6 3
CK	*Lloydia serotina*	.	.	.	.	.	.	.	.	.	.	.	18 2	17 1	18 2
fv	*Erigeron uniflorus*	.	.	.	.	.	.	.	.	.	.	.	7 2	33 1	12 2
CK	*Luzula *mutabilis*	.	.	.	.	.	.	.	.	.	.	.	18 2	.	15 2

		1	2	3	4	5a	5b	5	6	7a	7b	7	8a	8b	8
Number of column															
Number of relevés		15	12	14	10	41	10	51	29	18	12	30	28	6	34
Average number of taxa		37	39	30	24	36	27	34	38	51	43	48	49	37	47
Other taxa															
	Carlina acaulis	7 2	50 2	.	30 2	5 2	.	4 2	66 3	39 3	42 3	40 3	4 1	17 1	6 1
	Lotus corniculatus	7 2	83 3	.	10 2	7 2	.	6 2	59 3	28 3	58 3	40 3	4 2	.	3 2
	Gymnadenia conopsea	7 1	33 2	.	20 2	2 2	.	2 2	10 2	33 2	42 2	37 2	7 2	.	6 2
	Linum catharticum	7 1	42 3	.	10 2	10 2	10 2	10 2	10 2	.	8 2	3 2	.	17 2	3 2
	Rhodax alpestris	33 3	.	29 5	10 2	.	.	.	.	6 5	.	3 5	25 2	.	21 2
	Leucanthemum vulgare agg.	.	33 2	50 2	.	12 2	.	10 2	97 3	50 2	33 2	43 2	7 4	.	6 4
	Cardaminopsis arenosa agg.	.	33 2	29 2	.	24 2	40 3	27 2	38 2	.	.	.	14 2	17 1	15 2
	Pimpinella major	.	58 3	.	.	2 2	.	2 2	10 2	22 3	25 3	23 3	.	.	.
	Laserpitium latifolium	.	17 4	.	10 2	34 2	20 4	31 2	.	6 3	.	3 3	.	.	.
	*Allium *montanum*	27 2	25 2	43 2	10 3	10 3	.	8 3	24 3	.	.	.	.	.	.
	Hieracium bifidum	7 2	8 2	7 5	50 2	15 2	20 2	16 2	34 2	.	.	.	.	.	.
	Thalictrum minus	7 2	8 2	.	.	10 2	20 2	12 2	3 2	.	.	.	.	.	.
	Libanotis pyrenaica	67 2	67 3	21 3	.	2 2	.	2 2	17 2	.	.	.	.	.	.
	Digitalis grandiflora	.	33 2	.	.	2 2	20 2	6 2	.	.	.	.	.	.	.
	Fragaria vesca	.	8 2	7 2	.	10 2	30 2	14 2	.	.	.	.	.	.	.
	Campanula rapunculoides	.	8 2	.	.	20 2	10 2	18 2	.	.	.	.	.	.	.
	Carex digitata	.	17 3	.	30 2	37 2	.	29 2	.	.	.	.	.	.	.
	Clematis alpina	.	8 2	.	10 2	2 2	20 2	6 2	.	.	.	.	.	17 2	3 2
	Achillea stricta	.	.	.	10 2	15 2	30 2	18 2	.	.	.	.	.	.	.
	Cotoneaster tomentosus	.	.	.	20 2	12 2	10 2	12 2	.	.	.	.	.	.	.
	Sorbus aria	.	.	.	20 2	10 2	10 1	10 2	.	.	.	.	.	.	.
	Securigera varia	.	.	.	.	44 2	30 3	41 2	.	.	.	.	.	.	.
	Sedum album	.	.	.	.	39 3	20 2	35 3	.	.	.	.	.	.	.
	Dianthus carthusianorum	.	.	.	.	34 2	10 3	29 2	.	.	.	.	.	.	.
	Calamagrostis varia	.	.	.	.	24 2	.	20 2	7 2	6 2	17 3	10 2	.	.	.
	Galium mollugo agg.	.	.	.	.	2 2	10 2	4 2	3 2	6 2	.	3 2	.	.	.
	Hypericum maculatum	.	.	.	.	.	10 1	2 1	21 3	33 2	8 2	23 2	.	.	.
	Heracleum sphondylium	.	8 3	.	.	.	10 2	2 2	38 2	28 2	8 2	20 2	.	.	.
	Poa alpina	.	33 2	64 2	.	.	.	.	52 3	44 2	50 2	47 2	64 2	50 2	62 2
	Leontodon hispidus	.	17 2	.	.	.	.	.	34 4	72 4	50 3	63 3	14 2	17 2	15 2
	Alchemilla sp. div.	.	8 2	.	.	.	.	.	48 3	83 3	50 2	70 2	64 2	.	53 2
	Arabis alpina	.	17 2	.	.	.	.	.	.	6 2	.	3 2	14 2	17 2	15 2
	Trifolium badium	.	8 3	.	.	.	.	.	.	6 2	8 3	7 3	4 2	.	3 2
	Pinus mugo	.	.	14 2	10 2	.	.	.	.	6 2	8 2	7 2	4 2	17 2	6 2
	Viola biflora	.	.	36 2	.	.	.	.	28 3	39 4	17 2	30 3	39 2	17 3	35 2
	Swertia perennis	.	.	7 2	.	.	.	.	10 4	44 3	42 2	43 3	43 2	67 3	47 3
	Vaccinium myrtillus	.	.	.	20 4	.	.	.	38 2	44 3	42 2	43 3	21 3	33 4	24 3
	Soldanella carpatica [CW]	.	.	.	.	.	.	.	62 2	94 3	83 2	90 3	71 2	67 2	71 2
	Luzula sylvatica	.	.	.	.	.	.	.	24 2	11 2	.	7 2	11 2	.	9 2
	*Dianthus *alpestris*	.	.	.	.	.	.	.	.	17 2	33 2	23 2	7 2	.	6 2
oe	*Astragalus frigidus*	.	.	.	.	.	.	.	.	17 3	.	10 3	11 4	.	9 4
oe	*Astragalus norvegicus*	.	.	.	.	.	.	.	.	17 3	.	10 3	4 2	.	3 2
	Trifolium orbelicum	.	.	.	.	.	.	.	.	17 2	.	10 2	4 2	.	3 2
	Veronica aphylla	.	.	7 2	.	.	.	.	.	.	8 2	3 2	29 2	.	24 2
	Traunsteinera globosa	.	.	.	.	.	.	.	28 2	6 3	17 2	10 2	.	.	.
	Coeloglossum viride	.	.	.	.	.	.	.	3 2	28 2	8 2	20 2	.	.	.
	Saxifraga aizoides	.	.	.	.	.	.	.	7 2	.	.	.	29 2	33 3	29 2
	Viola alpina	.	.	7 2	.	.	.	.	.	.	.	.	11 2	17 3	12 2
LV	*Vaccinium gaultherioides*	.	.	.	.	.	.	.	.	.	.	.	.	33 4	6 4
Bryophytes and lichens															
	Tortella tortuosa	93 4	100 3	43 3	50 3	71 3	100 4	76 4	10 3	28 4	33 3	30 3	61 3	83 5	65 3
	Rhytidiadelphus triquetrus	.	8 2	7 2	10 2	2 2	.	2 2	.	17 4	.	10 4	21 2	.	18 2
	Ctenidium molluscum	7 2	8 2	.	.	.	10 2	2 2	.	.	8 3	3 3	7 2	.	6 2
	Thuidium abietinum	7 2	17 2	.	.	17 2	10 2	16 2	.	.	.	.	4 2	.	3 2
	Myurella julacea	40 2	.	.	.	2 2	.	2 2	.	.	.	.	7 3	33 4	12 3

Number of column		1	2	3	4	5a	5b	5	6	7a	7b	7	8a	8b	8
Number of relevés		15	12	14	10	41	10	51	29	18	12	30	28	6	34
Average number of taxa		37	39	30	24	36	27	34	38	51	43	48	49	37	47
Schistidium apocarpum s. l.		47 4	.	7 3	10 2	39 2	10 2	33 2	3 2	.	.	.	4 2	.	3 2
Ditrichum flexicaule		40 2	.	7 3	40 2	54 3	50 3	53 3	.	.	8 2	3 2	.	.	.
Homalothecium philippeanum		47 2	25 2	.	20 2	68 3	40 3	63 3	.	.	.	.	.	.	.
Cladonia sp.		40 3	8 2	14 3	10 3	.	10 2	2 2	.	.	.	.	.	.	.
Bryum argenteum		27 2	33 1	.	.	44 2	40 2	43 2	.	.	.	.	.	.	.
Tortula ruralis		7 3	.	14 3	.	27 2	10 2	24 2	.	.	.	.	.	.	.
Grimmia sp.		53 3	.	.	.	2 2	10 2	4 2	.	.	.	.	.	.	.
Distichium capillaceum		47 2	.	.	.	15 2	.	12 2	.	.	.	.	.	.	.
Hypnum cupressiforme		.	8 2	14 3	.	20 2	10 3	18 2	.	.	.	.	.	.	.
Pleurozium schreberi		.	17 4	.	.	.	.	.	7 5	.	8 2	3 2	11 2	.	9 2
Campylium protensum		.	8 2	.	.	.	.	.	.	6 5	8 2	7 4	4 2	17 2	6 2
Sanionia uncinata		.	8 2	7 2	.	.	.	.	10 3	6 2	33 3	17 2	18 2	17 2	18 2
Hylocomium splendens		.	.	7 3	.	.	.	.	14 4	.	.	.	25 4	33 4	26 4
Cladonia rangiferina		.	.	.	.	.	10 6	2 6	.	.	17 3	7 3	18 2	.	15 2
Mnium marginatum		.	.	.	.	.	.	.	.	6 5	.	3 5	4 2	33 3	9 2
Cladonia furcata		.	.	.	.	.	.	.	.	.	8 2	3 2	7 3	33 3	12 3
Lophozia bantriensis		.	.	.	.	.	.	.	.	.	8 2	3 2	.	50 2	9 2
Plagiochila asplenioides		.	.	.	.	.	.	.	.	.	25 2	10 2	.	33 2	6 2
Cetraria cucullata		.	.	.	.	.	.	.	.	.	.	.	21 2	17 3	21 2
Cetraria nivalis		.	.	.	.	.	.	.	.	.	.	.	18 2	.	15 2
Thamnolia vermicularis		7 2	.	.	.	.	.	.	.	.	.	.	18 2	.	15 2
Meesia uliginosa		.	.	.	.	.	.	.	.	.	.	.	.	67 2	12 2
Number of accesoric taxa	E_1	3	25	2	13	41	21	58	37	24	6	28	31	6	34
	E_0	33	15	2	6	20	13	31	7	23	5	26	29	14	40

Explanations: [C] = Carpathian endemit, [Cs] = Carpathian subendemit, [CW] = endemit of the Western Carpathians and their subregions, [CWs] = West Carpathian subendemit

Taxa with rare occurrence in the described subassociations:

5a – *Minuartio langii-Festucetum pallentis campanuletosum carpaticae*:

E_1: *Acer pseudoplatanus* 2², FB *Arabis hirsuta* 10², FB *Arenaria serpyllifolia* 2², *Carex ornithopoda* 20², Be *Carlina biebersteinii* 2², *Clinopodium vulgare* 2², *Convolvulus arvensis* 2², *Cotoneaster integerrimus* 2², *Epipactis atrorubens* 10², *Galium austriacum* 2², Fv *Galium glaucum* 5², *Geranium robertianum* 2², FB *Geranium sanguineum* 5², *Gymnadenia odoratissima* 2², Fv *Hippocrepis comosa* 5², AT *Hylotelephium maximum* 17², *Hypericum perforatum* 5², Fv *Inula ensifolia* 5², *Larix decidua* 5², *Lembotropis nigricans* 7², *Melampyrum sylvaticum* 5², Fv *Melica ciliata* 2², *M. nutans* 5², *Origanum vulgare* 7², *Picea abies* 2², *Pilosella officinarum* 2², FB *Pimpinella saxifraga* 2², *Pinus sylvestris* 17², *Poa molineri* 10³, Fv *Potentilla heptaphylla* 2², *P. thuringiaca* 2², *Rhinanthus serotinus* 17², *Rosa pendulina* 2², *Rubus saxatilis* 2², *Sedum sexangulare* 2², *Silene nemoralis* 5², *S. pseudotites* 15², *Spiraea media* 7², FB *Stachys recta* 15³, *Taraxacum* sp. 2², *Vicia cracca* 2².

E_0: *Barbilophozia barbata* 2², *Bartramia ithyphylla* 2², *Bryum capillare* 20², *Campylium chrysophyllum* 2², *Dicranum scoparium* 5², *Distichium inclinatum* 2², *Ditrichum heteromallum* 2², *Encalypta rhaptocarpa* 5², *Grimmia pulvinata* 22², *Homalothecium sericeum* 10³, *Hypnum* sp. 2², *Leskea polycarpa* 29², *Porella platyphylla* 5², *Pseudoscleropodium purum* 2², *Solorina saccata* 22², *Tortella inclinata* 24³, *Tortula intermedia* 10², *Tortula* sp. 12², *Trichostomum crispulum* 5², *Weissia condensata* 7².

5b – *Minuartio langii-Festucetum campanuletosum xylocarpae*:

E_1: *Acer pseudoplatanus* 10¹, *Aconitum variegatum* 10¹, *Briza media* 10², *Calamagrostis arundinacea* 10², *Campanula persicifolia* 10², *C. trachelium* 10¹, *Chamaecytisus ratisbonensis* 10², *Galium schultesii* 20³, *Geranium robertianum* 10², *Mycelis muralis* 10¹, *Origanum vulgare* 10², FB *Pimpinella saxifraga* 10², *Poa nemoralis* 10², AT *Polypodium vulgare* 10², *Rhinanthus minor* 10², *Rubus idaeus* 10³, *Sempervivum matricum* 10², *Silene sillingerii* [CW] 10², *Silene* sp. 10¹, FB *Teucrium chamaedrys* 10², *Tithymalus epithymoides* 10².

E_0: *Brachythecium* sp. 10², *Bryoerythrophyllum recurvirostrum* 10³, *Cladonia fimbriata* 20², *C. squamosa* 10², *Collema polycarpon* 10², *Ditrichum* sp. 10⁴, *Endocarpon* sp. 10², *Leptogium lichenoides* 10³, *Neckera crispa* 10², *Plagiopus oederi* 10², *Pseudoscleropodium purum* 10², *Toninia caerulea* 10², *Tortula intermedia* 10².

7a – *Seslerietum tatrae luzuletosum rubellae*:

E_1: *Agrostis capillaris* 6², *Allium schoenoprasum* subsp. *alpinum* 6², *Angelica sylvestris* 11², *Avenella flexuosa* 6³, Cv *Bupleurum*

longifolium 11², *Callianthemum coriandrifolium* 6², Cv *Gentiana punctata* 11², ca *Hieracium prenanthoides* 11², *Hieracium* sp. 11², *Hylotelephium argutum* [C] 6², *Leucanthemum rotundifolium* [Cs] 6², *Lilium martagon* 6², *Orchis mascula* subsp. *signifera* 11², *Plantago atrata* subsp. *carpatica* [C] 11², *Pyrola minor* 11², *P. rotundifolia* 6², *Rhinanthus pulcher* 11⁴, *Senecio abrotanifolius* subsp. *carpaticus* 6², *Taraxacum* sp. 28³, *Tephroseris crispa* 6³, *Tofieldia calyculata* 6², *Trisetum flavescens* subsp. *tatricum* [C] 6³, *Trollius altissimus* 11², MU *Veratrum album* subsp. *lobelianum* 17².

E_0: *Brachythecium glareosum* 11², *B. velutinum* 22⁴, *Bryum algovicum* 6⁵, *B. capillare* 6², *Campylium calcareum* 6⁵, *Desmatodon latifolius* 6², *Eurhynchium praelongum* 6⁵, *E. schleicheri* 6⁵, *Fissidens taxifolius* 6¹, *Homalothecium lutescens* 6⁵, *Lophocolea bidentata* 6², *Mnium spinosum* 11⁴, *M. thomsonii* 6³, *Peltigera aphthosa* 6², *Plagiomnium cuspidatum* 11⁴, *Pohlia wahlenbergii* 6¹, *Porella platyphylla* 6², *Pseudoleskea incurvata* 6², *Ptychodium plicatum* 6², *Rhizomnium punctatum* 11⁴, *Rhodobryum roseum* 6², *Rhytidiadelphus squarrosus* 6¹, *Tortula intermedia* 6⁵.

7b – *Seslerietum tatrae biscutelletosum laevigatae*:

E_1: Cv *Bupleurum longifolium* 8², *Hieracium* sp. 8², *Listera ovata* 8², *Taraxacum fontanum* 25², *T. nigricans* [CW] 17², *Veronica alpina* 8².

E_0: *Desmatodon latifolius* 17³, *Dicranum scoparium* 8², *Heterocladium dimorphum* 17³, *Homalothecium sericeum* 8³, *Rhizomnium punctatum* 172.

8a – *Seslerio tatrae-Festucetum versicoloris ranunculetosum pseudomontani*:

E_1: *Adoxa moschatellina* 4², oe,fv *Antennaria carpatica* subsp. *carpatica* [C] 11², *Avenella flexuosa* 4², *Calluna vulgaris* 7¹, oe, fv *Carex fuliginosa* 14³, cf *Chamorchis alpina* 7², *Coeloglossum viride* 14², *Cystopteris regia* 4², pt *Delphinium oxysepalum* [CW] 4², *Doronicum stiriacum* 4², *Erigeron alpinus* 4², CK *Gentiana nivalis* 4², *Gentianopsis ciliata* 4¹, *Geum rivale* 4², *Gymnadenia odoratissima* 11², *Hieracium caesium* 7², *H. pilosum* 4³, *Luzula campestris* 4², *L. multiflora* 4², oe *Oxytropis halleri* 7⁴, *Phleum rhaeticum* 4², *Picea abies* 4², CC *Primula minima* 7³, *Pritzelago alpina* 4², *Pyrola carpatica* [C] 11², *Ranunculus acris* 4², *Saxifraga adscendens* 4², ac *S. androsacea* 4², *S. hieraciifolia* 4², fv *S. oppositifolia* 4², *Trollius altissimus* 4².

E_0: *Alectoria ochroleuca* 11², *Biatorella fossarum* 4², *Brachythecium glareosum* 7², *Bryum* sp. 4³, *Campylium chrysophyllum* 4², *Campylopus subulatus* 4³, CC *Cladonia arbuscula* 11², *C. bellidifolia* 4³, *C. deformis* 4³, *C. gracilis* 14², *C. symphycarpa* 7³, *Heterocladium dimorphum* 4², *Hypnum revolutum* 4², *Hypogymnia vittata* 4², *Lecanora epibryon* 4², *Mnium spinosum* 4³, *Ochrolechia upsaliensis* 7², *Physconia muscigena* 4², *Plagiobryum demissum* 4³, *Pogonatum urnigerum* 4², *Pohlia cruda* 4², *Polytrichum alpinum* 4², *Pseudoleskeella catenulata* 4², *Racomitrium canescens* 7², *Rhytidiadelphus squarrosus* 7², *Solorina bispora* 4², *Thuidium erectum* 4², *Th. tamariscinum* 4², *Vulpicida tubulosus* 7³.

8b – *Seslerio tatrae-Festucetum versicoloris inops*:

E_1: *Hieracium fritzei* 17², *Huperzia selago* 17³, *Pilosella officinarum* 17¹, ac *Saxifraga androsacea* 17¹, *S. hieraciifolia* 17¹, fv *S. oppositifolia* 17².

E_0: *Anthelia juratzkana* 17², *Blepharostoma trichophyllum* 17², *Brachythecium reflexum* 17², *Bryum* sp. 33², *Cladonia symphycarpa* 17², *Lophozia longiflora* 17¹, *Mannia pilosa* 17², *Mnium stellare* 17², *Orthothecium chryseon* 17², *Peltigera* sp. 17³, *Pohlia cruda* 33², *Psoroma hypnorum* 17², *Solorina saccata* 17², *Timmia norvegica* 17².

Table 2: *Gentiano clusii-Festucetum versicoloris* Bělohlávková ass. nov.; variant with *Rhodiola rosea* (r. 1–9); variant with *Minuartia langii* (r. 10–14).
Tabela 2: *Gentiano clusii-Festucetum versicoloris* Bělohlávková ass. nov.; varianta z vrsto *Rhodiola rosea* (popisi 1–9), varianta z vrsto *Minuartia langii* (popisi 10–14).

	Number of relevé		000000000	11111	
			123456789	01234	
	Number of taxa		232222222	22322	C
			874473446	57193	%
Diagnostic taxa of association					
ES	*Festuca *versicolor*	D	**433334333**	**3333a**	100
st	*Sesleria tatrae*	d	**a++...111**	**.aa11**	71
	Bartsia alpina	d	**+11+a1+.1**	**.1.1.**	71
Cv	*Vicia oreophila*	d	**++...1++.**	**.++++**	64
cf	*Androsace lactea*	d	**++..1+++.**	**...+.**	50
cf	*Ranunculus alpestris*	d	**.+..1....**	**+.+++**	43
Differential taxa of variants					
tf	*Rhodiola rosea*		**a1.++.+++**	.....	50
	Potentilla crantzii		**.+11.aa++**	.....	50
	Hedysarum hedysaroides		**.+1.1111+**	.....	50
	*Allium *montanum*		**1..++a1.a**	.....	43
	Tortella tortuosa (E_0)		**1111..11.**	.....	43
	Viola biflora		**+++.1+...**	.....	36
	Parnassia palustris		**+.+....++**	.....	29
	Saxifraga moschata		**..+.+.+.+**	.....	29
Cv	*Anemone narcissiflora*		**....+++.1**	.....	29
as	*Minuartia langii*		....	**1+1+1**	36
as	*Pulsatilla slavica*		....	**aa3a+**	36
ES	*Veronica fruticans*		...+.....	**+++++**	43
	Carex ornithopoda		....	**11++1**	36
	Rhodax alpestris		....	**33+1.**	29
ES	*Hieracium villosum*		....	**+++..**	21
Astero-Seslerion calcariae					
	Jovibarba globifera	d	++.1.+.+.	+++++	71
	*Dianthus *hungaricus*	t	....+111+	1+..a	57
	Sesleria albicans	C	..+++1111	.....	50
	*Aster *glabratus*	C	..+..aaa1	.....	36
	Bupleurum ranunculoides	C	.....1+.1	.....	21
Seslerietalia coerulae, Elyno-Seslerietea					
	Phyteuma orbiculare		++1r++1+1	++1+1	100
	Gentiana clusii		.++++++1.	11+1+	86
	Helianthemum grandiflorum		+1.+.+a+1	1++1a	86
	Galium anisophyllon		++1+++.+.	+++.+	79
	Euphrasia salisburgensis		.+...++++	1+111	71
	Scabiosa lucida		+a1..1+.1	.+++1	71
	*Thymus *sudeticus*		.++.+..+.	++1++	64
	Ranunculus breyninus		1..1.....	11aa1	50
	Gentianella fatrae		.+.....	+++++	43
	*Carex *tatrorum*		..+...+..	+.++.	36
	*Anthyllis *alpestris*		.+...+.1.	++...	36

	Number of relevé	000000000	11111	
		123456789	01234	
	Bellidiastrum michelii	.+.....+1	...+.	29
	Pedicularis verticillata	.+.+.....	...1.	21
cf	*Salix alpina*	.+1+.....	.....	21
st	*Astragalus alpinus*	.1.1.....	.....	14
	Hieracium villosum	....	+++..	21
cf	*Carex firma*	....	.++a.	21
	*Polygala *brachyptera*	....	+...+	14
Asplenietea trichomanis				
Pc	*Saxifraga paniculata*	1aa1a1+a1	++11a	100
Pc	*Trisetum alpestre*	++++.++..	1a1+1	79
Pc	*Primula *hungarica*	....1aaa+	aa+aa	71
Pc	*Campanula cochleariifolia*	++.+..++.	..1+1	57
pc	*Draba aizoides*	....++.+.	.+11.	43
Pc	*Crepis jacquinii*	.+1.....	..+..	21
	Asplenium ruta-muraria	....	+.+..	14
cy	*Asplenium viride*	....	..r+.	14
Other taxa				
	Poa alpina	+1+1++1+.	....+	64
	Leucanthemum vulgare agg.	++.....1	++.++	50
	Cardaminopsis arenosa agg.	+..++....	..+..	29
	Rhytidium rugosum (E_0)	+1a.....1	.....	29
	Libanotis pyrenaica	a+....1..	.....	21
Cv	*Achillea *alpestris*	....	.+1.+	21

Rarely occurring taxa:

E_1: *Androsace chamaejasme* + (5); *Anthoxanthum alpinum* 1 (9); *Astragalus australis* 2b (1); *Bistorta major* + (1); *Campanula serrata* + (9); *Cystopteris fragilis* r (4), + (11); *Delphinium oxysepalum* + (5); *Dianthus nitidus* + (14); *Dryas octopetala* 1 (2); *Erigeron hungaricus* + (1); *Fragaria vesca* + (10); *Gentiana verna* + (5); *Gypsophila repens* + (5); *Hieracium bifidum* 2a (12); *Knautia arvensis* + (1); *Luzula luzuloides* + (1); *Pinus mugo* r (10), + (13); *Primula elatior* r (1); *Salix retusa* + (2); *Sedum alpestre* + (4); *Swertia perennis* + (5); *Thesium alpinum* + (12); *Thymus alpestris* 2a (4); *Veronica aphylla* + (2); *Viola alpina* + (12); *V. canina* + (8).

E_0: *Dicranum scoparium* + (3), 1 (5); *Hylocomium splendens* 1 (5); *Hypnum cupressiforme* + (1), 1 (2); *Marchantia polymorpha* + (11); *Rhytidiadelphus triquetrus* + (1); *Sanionia uncinata* + (3); *Schistidium apocarpum* 1 (5); *Tortula ruralis* 1 (6, 9). – *Cetraria islandica* + (13); *Cladonia* sp. + (1), 1 (4).

Table 3: *Diantho nitidi-Seslerietum tatrae* Bělohlávková ass. nov.; variant typical (r. 1-22); variant with *Allium *montanum* (r. 23-29)

Tabela 3: *Diantho nitidi-Seslerietum tatrae* Bělohlávková ass. nov.; tipična varianta (popisi 1-22); varianta z vrsto *Allium *montanum* (popisi 23-29)

	Number of relevé		0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	
			1	2	3	4	5	0	6	7	8	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	
	Number of taxa		3	2	3	3	3	2	3	3	4	4	3	4	4	3	4	3	4	4	4	2	3	3	3	4	3	4	4	3	5	C
			3	7	0	9	5	4	8	3	1	9	9	2	0	8	1	1	4	6	7	4	8	4	8	3	4	0	9	8	2	%
Diagnostic taxa of association																																
st	*Sesleria tatrae*	D	a	b	a	3	3	b	b	4	b	3	3	3	b	b	3	3	3	3	b	3	3	3	a	a	b	b	b	b	b	100
ES	*Dianthus nitidus*	d	1	1	1	.	1	1	+	1	1	1	+	1	a	1	1	.	+	+	+	+	1	.	+	1	1	1	+	1	1	90
	Knautia arvensis	d	+	+	+	a	.	.	.	.	.	.	+	1	.	+	+	1	+	1	+	a	1	a	.	1	.	+	a	.	+	66
	Ranunculus nemorosus	d	+	+	+	+	.	1	.	.	.	.	.	1	1	.	.	.	.	+	1	.	.	.	.	+	.	.	+	.	+	41
	Polygonatum verticillatum	d	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	1	.	.	.	.	.	.	+	+	.	+	.	.	.	21
Differential taxa of variants																																
MU	*Primula elatior*		+	+	r	+	+	.	.	1	.	+	.	a	1	1	+	1	1	+	1	.	+	1	.	.	.	.	.	.	+	62
	Potentilla crantzii		a	a	.	.	.	.	.	1	+	+	+	1	+	1	1	1	1	a	1	+	.	.	.	.	.	+	.	.	.	55
	Poa alpina		a	a	+	+	1	.	+	.	+	+	.	+	+	.	a	.	+	.	.	+	1	.	.	.	.	.	.	.	1	52
	Ligusticum mutellina		+	.	+	+	1	+	+	1	1	+	1	.	.	1	+	.	.	b	1	.	.	.	.	.	.	.	.	.	.	48
	Alchemilla sp. div.		+	+	+	1	.	.	+	1	.	+	.	a	a	.	.	.	a	1	a	.	1	+	.	.	.	.	.	.	.	48
	Anthoxanthum alpinum		.	.	.	+	1	a	a	a	.	.	+	1	1	.	.	.	1	+	1	+	a	.	.	.	.	.	.	.	.	45
	Bistorta vivipara		a	.	+	.	1	.	.	+	1	+	1	+	+	+	1	.	+	.	.	.	+	.	.	.	.	.	.	.	.	45
	Vaccinium vitis-idaea		+	+	+	1	1	+	+	.	+	+	+	.	.	.	.	.	.	+	.	.	+	.	.	+	.	.	.	.	.	45
	Potentilla aurea		.	.	+	1	+	.	1	a	+	+	1	.	.	+	.	.	1	+	+	.	.	.	.	.	.	.	.	.	.	41
	Parnassia palustris		.	.	+	1	+	.	+	.	+	+	+	+	+	+	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	41
	Vaccinium myrtillus		.	.	.	.	a	.	a	r	+	+	+	.	.	+	+	+	.	+	+	.	.	.	.	.	.	.	.	.	.	38
	Homogyne alpina		+	.	.	.	+	.	.	1	1	1	1	.	.	+	+	.	.	+	+	.	.	.	.	.	.	.	.	.	.	34
	Viola canina		.	.	.	+	.	.	+	.	.	.	.	+	+	+	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	24
Cv	*Luzula luzuloides*		.	.	.	1	+	.	a	.	.	.	.	+	+	1	.	.	.	.	.	.	.	a	.	.	.	.	.	.	.	24
	Luzula sylvatica		.	.	.	.	+	.	.	.	.	r	+	+	+	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	24
ES	*Selaginella selaginoides*		.	.	+	.	.	1	+	.	+	+	1	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	24
	Ranunculus pseudomontanus		.	.	.	.	1	.	.	+	+	.	.	.	.	.	.	.	.	1	.	.	+	1	.	.	.	.	.	.	.	21
	Hypericum maculatum		.	.	.	.	.	.	+	a	.	.	.	.	+	.	.	.	1	.	1	.	+	.	.	.	.	.	.	.	.	21
Cv	*Anemone narcissiflora*		.	.	.	.	.	.	+	.	.	.	.	.	.	1	1	1	.	.	.	+	.	.	.	.	.	.	.	.	.	17
	*Allium *montanum*		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	a	+	+	+	+	24
ES	*Carduus glaucinus*		.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	+	.	.	a	.	+	+	a	a	m	a	a	a	41
ES	*Ranunculus breyninus*		.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	+	1	1	+	+	+	1	31
ES	*Thesium alpinum*		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	+	+	+	+	+	+	28
ES	*Hieracium villosum*		.	.	.	.	.	.	.	.	.	.	.	+	+	.	+	.	+	.	.	.	+	.	.	+	+	+	.	+	1	34
ES	*Polygala *brachyptera*		.	.	.	.	.	.	.	.	+	.	.	+	+	.	+	.	.	.	.	.	.	.	.	+	.	+	1	+	+	31
	Libanotis pyrenaica		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	+	+	1	17
	Jovibarba globifera		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	+	+	17
ES	*Gentiana clusii*		.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	1	a	.	1	.	.	17
AT	*Valeriana tripteris*		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	.	.	.	10
Seslerion tatrae																																
Cv	*Achillea *alpestris*	d	1	1	1	1	1	+	+	a	.	+	+	1	.	+	1	.	1	.	.	.	.	.	.	.	.	.	+	+	+	59
Cv	*Phleum hirsutum*	d	+	+	+	+	+	.	.	.	.	+	.	+	+	.	1	+	.	+	+	.	.	+	.	+	.	.	.	+	+	55
	Gentiana verna	t	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	+	+	.	17
Cv	*Linum extraaxillare*	d	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	1	.	.	.	.	.	.	.	1	+	.	.	.	.	17

	Number of relevé		0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 2 2 2	2 2 2 2 2 2 2	C
			1 2 3 4 5 0 6 7 8 0 1 2 3 4 5 6 7 8 9 0 1 2	3 4 5 6 7 8 9	%
	*Trifolium *kotulae*	C	. . . . . + + . . .	. . . . .	7
	Astragalus australis	t	. . . . .	. . . . . b	3
Seslerietalia coerulae*, *Elyno-Seslerietea					
	*Carex *tatrorum*		3 3 3 3 1 3 a b 5 4 4 3 3 b 3 3 4 4 4 3 3 3	4 5 4 5 4 5 4	100
	Scabiosa lucida		1 1 + a 1 a a 1 1 1 a 1 a 1 1 + + 1 1 + a +	a 1 . + + 1 1	97
	Phyteuma orbiculare		1 1 + 1 . + + + 1 + 1 1 1 1 1 + 1 + + . 1 .	+ 1 + + + 1 1	90
	Bellidiastrum michelii		+ + + + + 1 . a 1 1 a 1 + ... + 1 .	1 1 1 + 1 + +	72
	*Festuca *versicolor*		1 1 1 a a 1 a . + + b 1 1 a a . . . . . +	3 b a 1 + . +	72
	Pedicularis verticillata		a a a 1 1 + + . 1 . 1 + . . + 1 . + . + . .	+ 1 1 + + . 1	69
	Galium anisophyllum		+ + ... a + + + + + + + . 1 + + . 1 .	. + + . + + +	66
	*Anthyllis *alpestris*		. . . + . . . + + 1 b 1 1 . + ... 1 + +	1 b b a a a .	59
	Helianthemum grandiflorum		. . . . . 1 . 1 + . . + 1 1 a	a 1 1 . + + +	45
	Knautia kitaibelii		. . . . . + 1 a . . . . . + 1 + . . .	a 1 1 1 + 1 +	45
	Biscutella laevigata		r . . . . 1 1 . . . 1 . . 1 + + ... + .	+ 1 1 1 . 1 .	45
	Euphrasia salisburgensis		r . + . . . + . . . + + + ...	. . + + + . +	34
	*Thymus *sudeticus*		. . . . . 1 1 + 1 1 . . . . . 1 .	. . . . .	21
	Gentianella fatrae		r . . . . . + ... + + +	. . . . .	17
cf	*Salix alpina*		. . . . . a 1	. a a + . . .	17
cf	*Carex firma*		. . . . . 1	+	7
Mulgedio-Aconitetea					
Cv	*Campanula serrata*		. . . + + + + + + + + . + + + + b b b . + .	+ + . + + . .	69
Cv	*Campanula elliptica*		+ + . + ... + . . + 1 + 1 . . 1	+ . . . + + +	45
	Geranium sylvaticum		. . . + . . . + . r . + . 1 . . + a + . . .	. . . . + . r	34
Cv	*Cirsium erisithales*		. . . . . + + r + 1 . +	. . . + + + +	34
tf	*Rhodiola rosea*		. . . 1 . . . . . + . . 1 a + . . .	. . . + . . +	24
	Senecio subalpinus		. . . . . + + + . . +	. . . . .	14
Cv	*Crepis mollis*		. . . . . + . + . + + ...	. . . . .	14
	Astrantia major		. . . . . + . . + + ...	. . . . .	10
	Gentiana asclepiadea		. . . . . + . + . . . +	. . . . .	10
	Bistorta major		. . . . a . . . . . a . . . r	. . . . .	10
	*Solidago *minuta*		. . . . . 1 . . . . . + . + . . .	. . . . .	10
Other taxa					
	Leucanthemum margaritae		+ + + 1 1 1 1 + + 1 1 + 1 . + 1 a a 1 1 a +	+ 1 + + a + 1	100
	Bartsia alpina		a a 1 1 1 1 + 1 1 1 1 1 . 1 1 a . + + 1 1 +	1 + + + + . +	90
	Carlina acaulis		+ + ... 1 + + ... + + a b a 1 +	+ 1 1 a 1 + b	66
	Soldanella carpatica		+ + . + + . + + 1 1 1 1 1 + 1 + . . + . . .	+ + ... +	62
	Lotus corniculatus		+ . + 1 + . . 1 + ... + . b a a . 1 1	+ . . + 1 + 1	59
	Thymus alpestris		. . . . . + + ... + . + . b 1 + . . +	+ 1 + 1 + + +	52
	Heracleum sphondylium		. . . . . + ... r . . + + + + . +	. . . + + + 1	38
	Cardaminopsis arenosa agg.		. . . . . + r + . + + + + . + ...	+ + . . . + .	38
	Leontodon hispidus		. . . . . 1 . . . . . b b b . 1 +	. + . + + . a	34
	Hieracium bifidum		. . . . . r + r + ... + . . .	. + + 1 . 1 1	34
	Gentianella lutescens		. . . . . + + ...	1 + + + + + +	31
	Tragopogon orientalis		. . . . . + + . + + . . +	. + . . + + .	28
	Viola biflora		. . . . 1 . . . . + . . . a + 1 r + ...	. . . . + . .	28
	Dryas octopetala		. . + ... b 1 b . . . . a .	b b m	28
	Hieracium sp.		+ . . . . + ... + . + . 1 . . . 1 + +	. . . . .	28
	Traunsteinera globosa		r . r + ... + + + 1	 1	28

Number of relevé	0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 2 2 2	2 2 2 2 2 2 2 2	C
	1 2 3 4 5 0 6 7 8 0 1 2 3 4 5 6 7 8 9 0 1 2	3 4 5 6 7 8 9	%
Pc *Saxifraga paniculata*	. . . . + ... 1 + . . +	+ 1	21
Hieracium lachenalii	. + ... + ... + . 1 + ... + .	. . . .	21
Vicia cracca	1 1 + ... + 1	. . . .	17
Trifolium pratense	. . . + + + 1 . . . . 1	. . . .	17
Agrostis capillaris	. . . . + + + + + .	. . . .	17
*Orchis *signifera*	. . . . + + . . .	. + . . . + +	17
Tofieldia calyculata	. . r . . . . . . a a . . + ...	. . . . a . .	17
Hieracium caesium	. . . . + ...	. . + . 1 + .	14
Antennaria dioica	. . . . . + + ... + .	. . . . + . .	14
Botrychium lunaria	. . . . + . . + ... + . . .	. . . . . . +	14
Hylocomium splendens (E_0)	. . . . 1 . 1 . . . . . a 1	. . . .	14

Rarely occurring taxa:

E_1: *Acetosa arifolia* + (17); *Allium victorialis* + (7, 9); *Androsace lactea* + (29); *Avenella flexuosa* + (18, 19); *Briza media* + (21); *Calamagrostis arundinacea* 1 (22); *C. varia* + (25, 28); *Campanula cochleariifolia* + (25); *Carex flacca* + (27); *Cerastium holosteoides* + (17); *Coeloglossum viride* + (10); *Crepis jacquinii* + (29); *Cruciata glabra* + (18, 20, 24); *Cyanus mollis* + (16); *Deschampsia cespitosa* + (18), r (19); *Euphrasia picta* + (7); *Festuca carpatica* + (10, 23); *Galium album* + (25); *Geum rivale* + (17); *Gymnadenia conopsea* + (16, 23, 27); *Hieracium murorum* + (18, 20, 27); *Hippocrepis comosa* + (27); *Huperzia selago* + (10); *Lilium martagon* + (20); *Linum catharticum* + (13, 27, 28); *Luzula multiflora* + (7); *Minuartia langii* + (20, 26); *Myosotis alpestris* + (2, 6); *Phleum rhaeticum* + (5, 14, 16); *Picea abies* + (9), r (11); *Pilosella lactucella* + (7); *Pinguicula alpina* + (27); *Plantago media* + (5); *Ranunculus acris* + (13); *Rhinanthus pulcher* 2a (29); *Rh. serotinus* + (4); *Salix silesiaca* + (23); *Saxifraga aizoides* + (10, 27); *Silene *prostrata* + (21); *Swertia *alpestris* + (3), 2a (10, 11); *Taraxacum officinale* agg. + (27); *Thalictrum aquilegiifolium* r (26)+ *Th. minus* + (9); *Trifolium repens* + (5); *Trommsdorfia uniflora* r (8); *Veronica chamaedrys* + (12, 13); *Vicia oreophila* + (24, 28); *V. sylvatica* + (21).

E_0: *Amblystegium varium* + (29); *Dicranum scoparium* 1 (2, 7); *Plagiochila porelloides* + (10); *Pleurozium schreberi* 2a (4, 12); *Pohlia cruda* + (4); *Rhytidium rugosum* 2a (12), 1 (15); *Sanionia uncinata* 1 (7, 13), + (10); *Schistidium apocarpum* + (22); *Tortella tortuosa* 1 (10, 29), + (22). – *Cetraria islandica* 1 (4).