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PHYTOSOCIOLOGICAL DESCRIPTION OF THE DWARF MOUNTAIN PINE SHRUB COMMUNITY (*AMELANCHIERO OVALIS-PINETUM MUGO*) IN THE VALLEYS OF THE SLOVENIAN ALPS

FITOCENOLOŠKI OPIS GRMIŠČNE ZDRUŽBE DOLINSKEGA RUŠEVJA (*AMELANCHIERO OVALIS-PINETUM MUGO*) V SLOVENSKIH ALPAH

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ABSTRACT

We have expanded our knowledge of the localities, sites and distribution of the *Amelanchiero ovalis-Pinetum mugo* association in the Slovenian Alps. Based on phytocenological analyses, the shrub association belonging to the forest vegetation type Alpine mountain pine scrub was divided into two subassociations: *peucedanetosum oreoselini* and *hylocomiadelphetosum triquetri*. We also described four variants within the latter association.

Key words: phytosociology, synsystematics, *Pinus mugo*, Natura 2000, Triglav National Park, Topla Landscape Park, Slovenia

IZVLEČEK

Dopolnili smo vednost o nahajališčih, rastiščih in razširjenosti sestojev asociacije *Amelanchiero ovalis-Pinetum mugo* v slovenskih Alpah. Grmovnato združbo, ki sodi v gozdni rastiščni tip Alpsko ruševje, smo na podlagi fitocenološke analize členili v dve subasociaciji *peucedanetosum oreoselini* in *hylocomiadelphetosum triquetri* in znotraj druge opisali še štiri variante.

Ključne besede: fitocenologija, sinsistematika, *Pinus mugo*, Natura 2000, Triglavski narodni park, Krajinski park Topla, Slovenija

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1 INTRODUCTION
1 UVOD

The phytocenological problematics of valley dwarf mountain pine scrub in the southern and southeastern Alps were presented in more detail several years ago (Dakskobler, 2014). The *Amelanchiero ovalis-Pinetum mugo* association has been described in northern Italy, in the Trento region, and is also known in Friuli-Venezia Giulia (Minghetti, 1996; Poldini and Vidali, 1999; Poldini et al., 2004) and in the Austrian part of the Karavanke Mountains, near Borovlje / Ferlach (Franz, 2020). Zupančič et al. (2006), in a synthetic review of Alpine dwarf mountain pine scrub in Slovenia, placed it in the rank of the *Rhodothamno-Rhododendretum hirsuti* form *Amelanchier ovalis* (= *Rhodothamno-Pinetum mugo* form *Amelanchier ovalis*). However, in our work (Dakskobler, 2014) we considered that the dwarf mountain pine scrub, which grows in the Julian Alps in warm spots at the ends of alpine valleys or on very steep, crumbly dolomite slopes in the mountain beech forest belt, could be classified in the *Amelanchiero ovalis-Pinetum mugo* association on the basis of its floristic composition. It is a long-lasting pioneer stage on extreme sites where natural factors such as erosion and avalanches prevent its development into beech forest. Although it does not contain all the diagnostic species of this association described in northern Italy, the frequent presence of the species *Amelanchier ovalis*, *Fraxinus ornus*, *Ostrya carpinifolia*, *Hieracium porrifolium* and *Frangula alnus* distinguishes it well from the *Rhodothamno-Pinetum mugo* scrub widespread in the altimontane and subalpine belt of the Julian Alps, including its most thermophilic form, *Rhodothamno-Pinetum mugo typicum* var. *Genista radiata*. On the basis of inventories from the Julian Alps, we described a new geographical variant, var. geogr. *Rhamnus fallax*. We divided the stands into two site variants, var. *Peucedanum oreoselinum* and var. *Carex firma*, and also

mentioned the occurrence of this community in the Karavanke and Kamnik-Savinja Alps. A year later, we presented the valley dwarf mountain pine scrub in the Slovenian Alps in a popular scientific way (Dakskobler et al., 2015). A few years later (Dakskobler, 2019), we published two additional relevés from the Kot Valley, which we classified in a provisional new subassociation *laricetosum deciduae*. In the overview of forest vegetation types of Slovenia (Bončina et al., 2021), we classified the valley dwarf mountain pine scrub into the forest vegetation type Alpine dwarf mountain pine scrub. The syntaxonomic description of this vegetation type also includes the association *Amelanchiero ovalis-Pinetum mugo*, its geographical variant *Rhamnus fallax* and three subassociations *typicum*, *caricetosum* and *laricetosum*, but which are not based on validly described syntaxa (Theurillat et al., 2021). The lower syntaxonomic units of this association were therefore examined in the present paper, which also considered relevés from the Karavanke and Kamnik-Savinja Alps, in addition to previously published relevés from the Julian Alps (Dakskobler, 2014; 2019).

2 METHODS
2 METODE

The valley dwarf mountain pine scrub was inventoried according to the Central European method (Braun-Blanquet, 1964). Phytocenological relevés were entered into the FloVegSi database (Seliškar et al., 2003). The combined estimates of cover and abundance were converted to ordinal values from 1 to 9 (van der Maarel, 1979). The relevés were compared by hierarchical classification and numerical ordination using principal coordinate analysis (PCoA, Wishart's coefficient of similarity) and ordered in Table 1 based on the results of the clustering method using the unweighted pair-group method with arithmetic mean (UPGMA), where the Wishart's coefficient of similarity (similarity ratio) was also chosen. Ecological conditions were determined using Ellenberg-type indicator values (Tichý et al., 2023), where estimates of environmental conditions for relevés were calculated from indicator values of herbaceous layer plant species using a weighted arithmetic mean. The software package SYN-TAX 2000 (Podani, 2001) and the R software environment (R core team, 2022) were used for all analyses. Geoelementary, ecological and phytoecological descriptions of plant species were taken from Flora alpina (Aeschimann et al., 2004a; 2004b). Nomenclatural sources for ferns and higher plants are Martinčič et al. (2007) and the FloVegSi database; for mosses Hodgetts et al. (2020); for lichens Suppan et al. (2000); and for syntaxonomy Zupančič (2007; 2013), Šilc and Čarni (2012), Dakskobler et al. (2015) and Bončina et al. (2021). Those species that are not listed in the nomenclatural source are written with the full name and author.

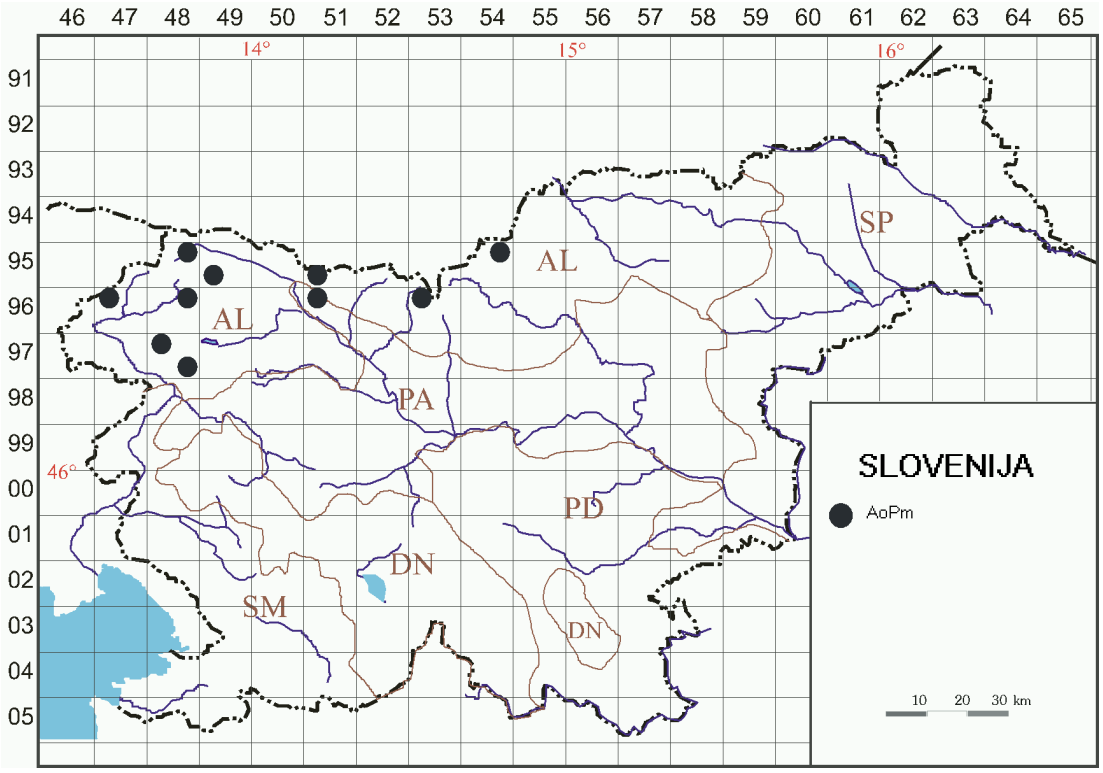


Fig. 1: Localities of recorded stands of the association *Amelanchiero ovalis-Pinetum mugo* on the map of Slovenia

Slika 1: Nahajališča sestojev asociacije *Amelanchiero ovalis-Pinetum mugo* na zemljevidu Slovenije

3 RESULTS AND DISCUSSION
3 REZULTATI IN RAZPRAVA

3.1 Description of the established syntaxa
3.1 Opis ugotovljenih sintaksonov

The relevés of valley dwarf mountain pine scrub from the mountain elevation zone (between 750 m and 1150 m, with only one stand above 1200 m) of the Julian Alps, the Karavanke Mountains and the Kamnik-Savinja Alps (Fig. 1) were divided into three main groups based on hierarchical classification. These relevés were arranged in Table 1 according to the dendrogram (Fig. 2), also taking into account the diagnostic species identified during the classification process.

To the diagnostic species of the association *Pinus mugo*, *Amelanchier ovalis*, *Ostrya crapinifolia*, *Fraxinus ornus*, *Hieracium porrifolium* and *Frangula alnus*, we added two more, *Molinia arundinacea* and *Campanula cespitosa*. Both are rare in stands of subalpine dwarf mountain pine scrub (*Rhodothamno-Pinetum mugo*) and more common only in stands of the syntaxon *Rhodothamno-Pinetum mugo typicum* var. *Genista radiata* (Dakskobler, 2014). Although the dendrogram (Fig. 2) and, to some extent, the ordination diagram (Fig. 3) indicate three groups of relevés, we believe that the existing relevés only provide a basis for describing the two subassociations. The subassociation *Amelanchiero ovalis-Pinetum mugo peucedanetosum oreoselini* subass. nov. hoc loco includes relevés nos. 1-7. Its nomenclatural type, *holotypus*, is relevé no. 2 in Table 1. The differential species of the subassociation are *Peucedanum oreoselinum*, *Genista radiata*, *Viola hirta*, *Leucanthemum heterophyllum*, *Teucrium montanum* and *Inula ensifolia*. Thus, the new subassociation includes stands that were considered to belong to the variant with *Peucedanum oreoselinum* a few years ago (Dakskobler, 2014). Most of the relevés were made in the Tolminka Valley (Gnelice) in the southern Julian Alps, but only one relevé was made in the Mala Pišnica Valley (in the northeastern Julian Alps). This is a form of valley dwarf mountain pine scrub from warmer sites, which is also most similar to stands of this association as described in northern and northeastern Italy (see Dakskobler, 2014, Table 3).

The other relevés, nos. 8-27, show somewhat greater similarity to stands of *Rhodothamno-Pinetum mugo*, as some diagnostic species of *Amelanchiero-Pinetum mugo* (*Ostrya carpinifolia*, *Fraxinus ornus*, *Frangula alnus*) are somewhat rarer in these relevés. However, these stands still have the characteristics of valley dwarf mountain pine scrub, and their overall species composition still allows them to be classified into the *Amelanchiero ovalis-Pinetum mugo* association and into the new *hylocomiadelphetosum triquetri* subassociation. The nomenclatural type, *holotypus*, is relevé no. 21 in Table 1. The differential species of the subassociation are *Hylocomiadelphus triquetrus* (*Rhytidiadelphus triquetrus*), *Hylocomium splendens*, *Larix decidua*,

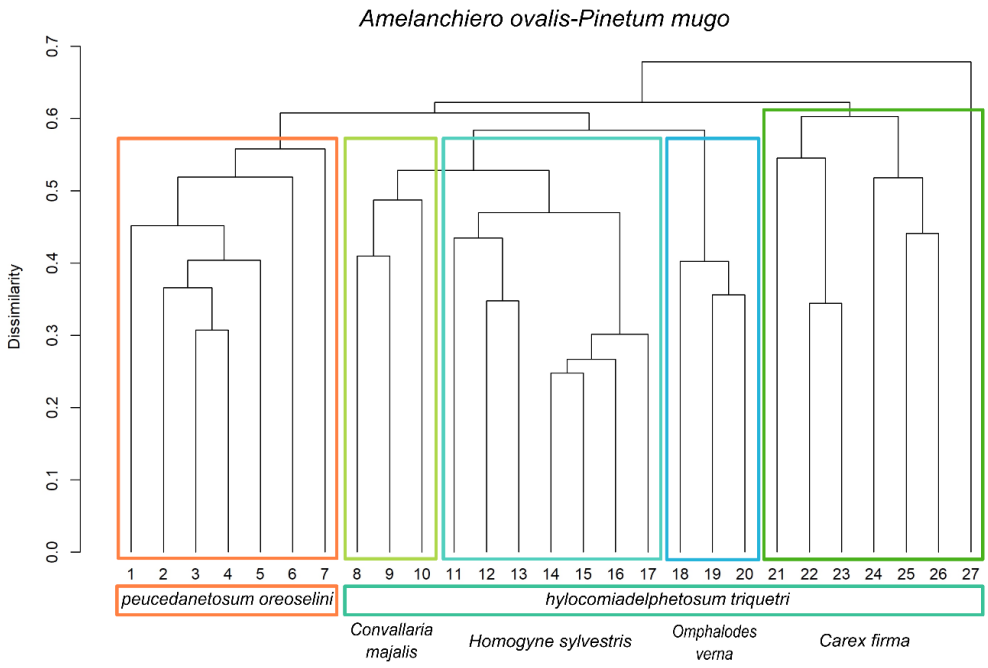


Fig. 2: Dendrogram of relevés of the association *Amelanchiero ovalis-Pinetum mugo*, showing the lower syntaxonomic units (UPGMA, similarity ratio)

Slika 2: Dendrogram popisov sestojev asociacije *Amelanchiero ovalis-Pinetum mugo* s prikazom nižjih sintaksonomskih enot (UPGMA, similarity ratio)

Tofieldia calyculata, *Heliosperma alpestre*, *Gymnocarpium robertianum*, *Salix appendiculata*, *Primula wulfeniana*, *Paederota lutea*, *Pinguicula alpina*, *Senecio abrotanifolius*, *Vaccinium myrtillus* and *V. vitis-idaea*. These species are characteristic of the colder sites of valley dwarf mountain pine scrub in areas where snow remains longer. This subassociation also includes stands of the provisionally described subassociation *laricetosum deciduae* (Dakskobler, 2019).

The phytocenoses of this subassociation are divided into four variants. The relevés of the variant with *Convallaria majalis* (two from the Struje erosion area in the Tolmin Julian Alps, one from the Zadnjica Valley in Trenta, relevés nos. 8-10) are most similar in terms of species composition to the stands of the *peucedanetosum oreoselini* subassociation.

Most of the relevés of the *Homogyne sylvestris* variant (its differential species is also *Galium austriacum*, relevés nos. 11-17) were made in the eastern Karavanke Mountains, in the Peca Mountains, Topla Valley and torrential-erosion area of Šodri; only one relevé was from the Zadnjica Valley in Trenta. A characteristic feature of these stands is the sparse occurrence of some of the characteristic species of the association (*Ostrya carpinifolia* and *Fraxinus ornus* were not found in the stands in the Topla Valley). Therefore, their inclusion in this association is legitimate, while these stands are grouped with the other stands of the *Amelanchiero-Pinetum mugo* association and are not completely separated from the other inventories.

The variant with *Omphalodes verna* (relevés nos. 18-20) includes relevés from the western Karavanke Mountains, from the Draga Valley near Begunje. *Aquilegia nigricans*, *Festuca amethystina* and *Chamaecytisus purpureus* are also its differential species. These are the lowest stands of this association in Slovenia, with

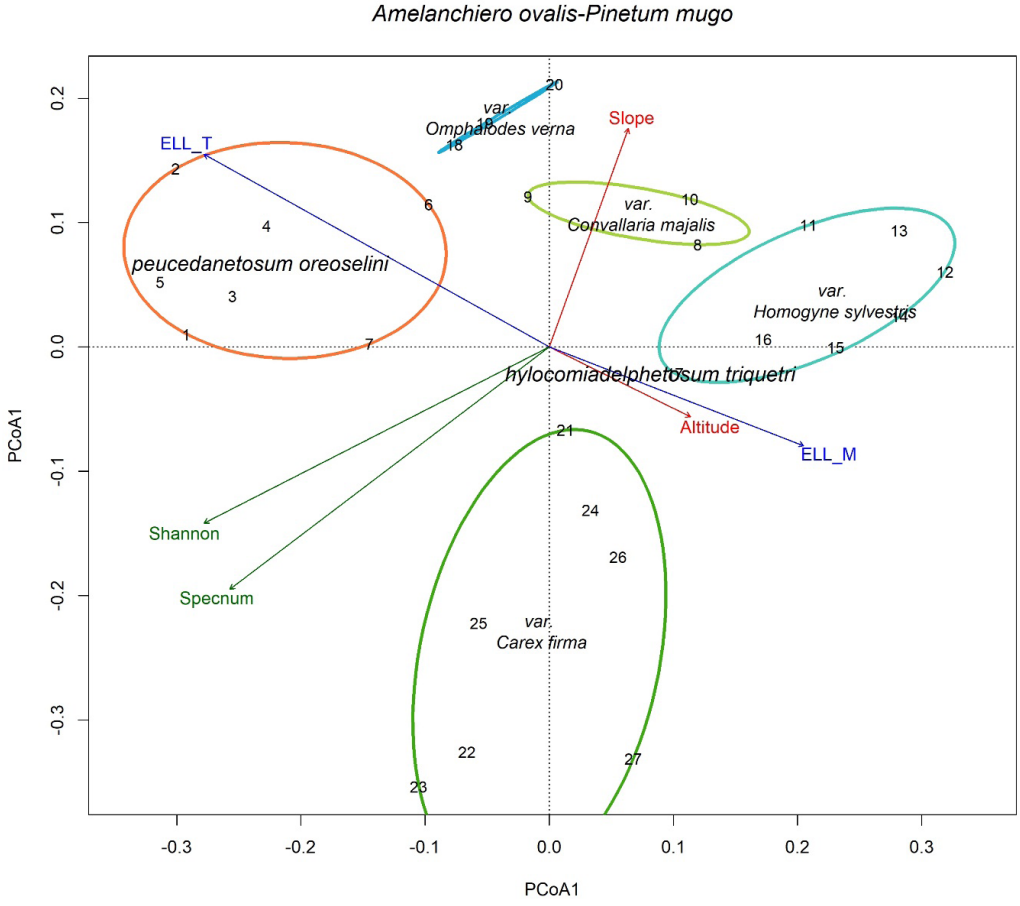


Fig. 3: The ordination plot (PCoA, similarity ratio) of the *Amelanchiero ovalis-Pinetum mugo* relevés with the lower syntaxonomic units circled and the passive variables added (ELL_T: phytoindicator assessing temperature conditions; ELL_M: phytoindicator assessing moisture; Shannon: Shannon index of species diversity; Specnum: number of species on the relevé)

Slika 3: Slika ordinacije popisov sestojev asociacije *Amelanchiero ovalis-Pinetum mugo* z označenimi nižjimi sintaksonomskimi enotami (PCoA, similarity ratio) in dodanimi pasivnimi spremenljivkami (Slope: naklon terena; Altitude: nadmorska višina; ELL_T: fitoindikatorska ocena temperaturnih razmer; ELL_M: fitoindikatorska ocena vlažnostnih razmer; Shannon: Shannonov indeks vrstne pestrosti; Specnum: število vrst na popisni ploskvi)

an altitude of only 750 m to 880 m. All characteristic species of the association are represented in them, but among the differentiated species of the subassociation there is no European larch (*Larix decidua*). However, since they are grouped together with the relevés of the two previous variants, they are assigned to the subassociation *hylocomiadelphetosum triquetri*. It is likely that these stands could be placed in their own subassociation due to a greater number of relevés.

Relevés nos. 21-27 are classified in the variant *Carex firma*. Differential species also include *Pyrola rotundifolia*, *Salix eleagnos*, *Astrantia carniolica*, *Trisetum argenteum* and *Aquilegia iulia* Nardi. The localities are the Možnice and Kot Valleys (both in the Julian Alps) and Ravenska Kočna in the Kamnik-Savinja Alps. These are dwarf mountain pine stands on alluvial-glacial deposits, on gravel and rubble, near occasional watercourses, as indicated by the differential species of the variant, including grey willow (*Salix eleagnos*) and the scree species *Trisetum argenteum* and *Aquilegia iulia*. Also some of the association differential species (*Ostrya carpinifolia*, *Fraxinus ornus*) are very rare or absent in these relevés, as in the Kot Valley and Ravenska Kočna, but the subassociation differential species are well represented there.

The differential species of the geographic variant *Rhamnus fallax* is common only in stands of the subassociation *peucedanetosum oreoselini*, but it also occurs sporadically in stands of the subassociation *hylocomiadelphetosum triquetri*. The range of the species *Rhamnus fallax* in Slovenia (see Dakskobler et al., 2013: 103) overlaps with the range of the association *Amelanchiero ovalis-Pinetum mugo* in Slovenia (the only exception could be the Topla Valley, where this species has not yet been recorded in quadrant 9545/2). Therefore, we consider all syntaxa described in this paper within the geographical variant *Amelanchiero ovalis-Pinetum mugo* Minghetti and Pedrotti 1994 var. geogr. *Rhamnus fallax* Dakskobler 2014.

3.2 Ecological characteristics of the detected syntaxa

3.2 Ekološka oznaka ugotovljenih sintaksonov

The inventoried stands of valley dwarf mountain pine scrub are at elevations between 750 m and 1230 m. In general, the stands of the *A-P peucedanetosum oreoselini* subassociation grow at a slightly lower elevation than the stands of the *A-P hylocomiadelphetosum triquetri* subassociation, except for the stands in the Draga Valley, which are assigned to the *Omphalodes verna* variant. The stands of dwarf mountain pine on alluvial-glacial deposits, on gravel and rubble in the Ravenska Kočna, Možnica and Kot Valleys, which we classified as variant *A-P hylocomiadelphetosum* var. *Carex firma*, grow on gentle slopes up to 10°, while the stands of the other variants of this subassociation grow on steeper dolomite slopes of 30°-45°; they are classified as variant *A-P hylocomiadelphetosum* var. *Carex firma*. The slope of the relevés of the stands of the *peucedanetosum oreoselini* subassociation is gentle to steep (Fig. 3 and Fig. 4).

Using Ellenberg-type indicator values (Tichý et al., 2023), we found significant differences between the

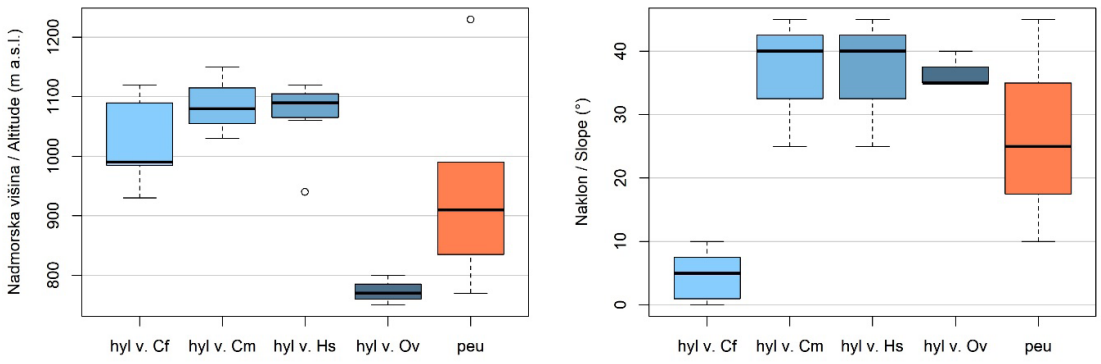
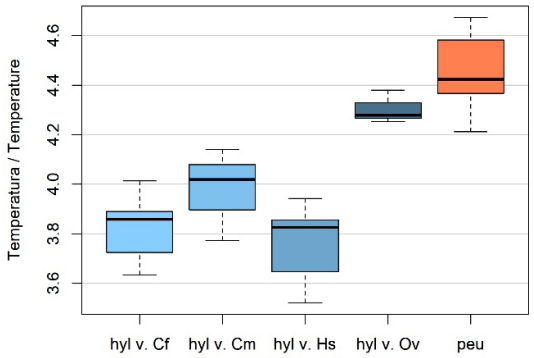


Fig. 4: Altitude and slope of inventoried valley dwarf mountain pine stands (hyl v. Cf: *A-P hylocomiadelphetosum triquetri* var. *Carex firma*; hyl v. Cm: *A-P hylocomiadelphetosum triquetri* var. *Convallaria majalis*; hyl v. Hs: *A-P hylocomiadelphetosum triquetri* var. *Homogyne sylvestris*; hyl v. Ov: *A-P hylocomiadelphetosum triquetri* var. *Omphalodes verna*; peu: *A-P peucedanetosum oreoselini*)

Slika 4: Nadmorska višina in naklon terena popisanih sestojev dolinskega ruševja (hyl v. Cf: *A-P hylocomiadelphetosum triquetri* var. *Carex firma*; hyl v. Cm: *A-P hylocomiadelphetosum triquetri* var. *Convallaria majalis*; hyl v. Hs: *A-P hylocomiadelphetosum triquetri* var. *Homogyne sylvestris*; hyl v. Ov: *A-P hylocomiadelphetosum triquetri* var. *Omphalodes verna*; peu: *A-P peucedanetosum oreoselini*)



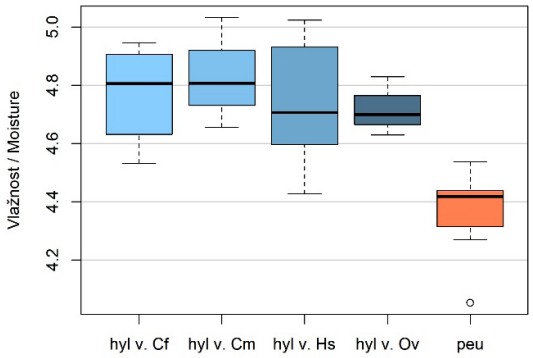


Fig. 5: Estimates of temperature and moisture conditions determined from Ellenberg-type indicator values of inventoried valley dwarf mountain pine stands (syntaxa label legend under Fig. 4)

Slika 5: Ocene temperaturnih in vlažnostnih razmer, ugotovljenih z Ellenbergovimi indikatorskimi vrednostmi popisanih sestojev dolinskega ruševja (legenda oznak sintaksonov pod sliko 4)

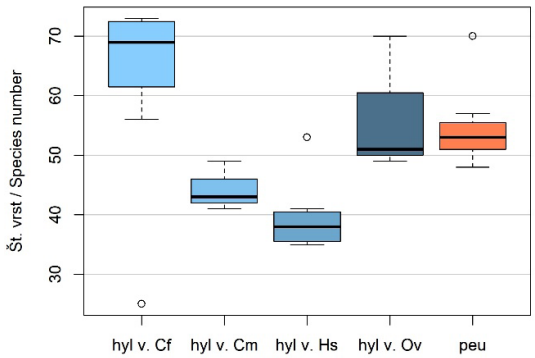
considered syntaxa only in the estimates for temperature and humidity (Fig. 3 and Fig. 5). Stands of subassociation *A-P peucedanetosum oreoselini* grow under the warmest conditions, where we also found significantly lower moisture content at the site (Anova, Tukey post-hoc test, $p < 0.05$).

We counted 242 taxa of higher plants and 19 species of mosses in the valley dwarf mountain pine stands. Among them, 11 species were found in the tree layer, 44 species in the shrub layer, and 187 taxa (species and subspecies) in the herb layer of higher plants. The moss layer is incomplete, as only the most common taxa have been identified so far, while others have been collected and are still awaiting determination. On average, 52 taxa (ranging from 25 to 73) were present in an relevé area of 100 m^2 to 400 m^2 (plot size was adjusted to the homogeneity of the plot). The most species-rich stands were those of the variant *A-P hylocomiadelphetosum triquetri* var. *Carex firma*, which grows on alluvial-glacial material at the bottom of alpine valleys, while slightly fewer species were found in the stands of the variants *Homogyne sylvestris* and *Convallaria majalis*, which dominate in erosion areas. The Shannon-Wiener index of species diversity shows a similar pattern to the number of species per relevé plot (Fig. 3 and Fig. 6).

3.3 Overview of established syntaxa and their classification into higher syntaxonomic units

3.3 Pregled in sinsistematska uvrstitev obravnavanih združb v višje enote

The assemblage is classified into the following higher synsystematic units:



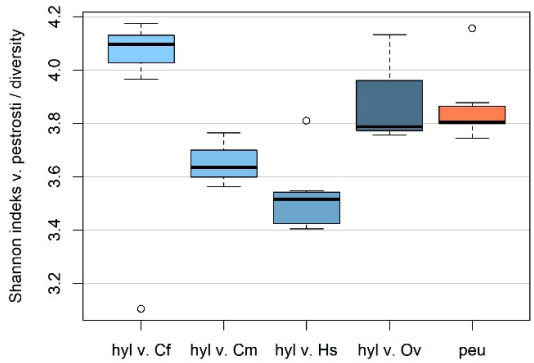


Fig. 6: Species diversity of valley dwarf mountain pine stands (legend of the syntaxa labels under Fig. 4)

Slika 6: Vrstna pestrost sestojev dolinskega ruševja (legenda oznak sintaksonov pod sliko 4)

Class: *Erico-Pinetea* Horvat 1959
Order: *Erico-Pinetalia* Horvat 1959
Alliance: *Fraxino orni-Pinion nigrae-sylvestris* Zupančič 2007 (sin. *Fraxino orni-Ericion* Horvat 1959 = *Erico-Fraxinion orni* Horvat 1959)
Suballiance: *Helleboro nigri-Pinenion* (Horvat 1959) Zupančič 2007
Association: *Amelanchiero ovalis-Pinetum mugo* Minghetti in Pedrotti 1994
Subassociation: *peucedanetosum oreoselini* subass. nov. (incl. var. *Peucedanum oroselinum* Dakskobler 2014)
Subassociation: *hylocomiadelphetosum triquetri* subass. nov. (incl. var. *Carex firma* Dakskobler 2014 and *laricetosum deciduae* Dakskobler 2019 nom. prov.)
Variants: var. *Convallaria majalis*, var. *Homogyne sylvestris*, var. *Omphalodes verna*, var. *Carex firma*

The classification in the monograph on forest vegetation types of Slovenia (Bončina et al., 2021) is also possible:
Class: *Roso pendulinae-Pinetea mugo* Theurillat in Theurillat et al. 1995
Order: *Junipero-Pinetalia mugo* Boşcaiu 1971
Alliance: *Pino mugo-Ericion* Leibundgut 1948
Association: *Amelanchiero ovalis-Pinetum mugo* Minghetti in Pedrotti 1994
Subasociation: *peucedanetosum oreoselini* subass. nov. (incl. var. *Peucedanum oroselinum* Dakskobler 2014)
Subasociation: *hylocomiadelphetosum triquetri* subass. nov. (incl. var. *Carex firma* Dakskobler 2014 and *laricetosum deciduae* Dakskobler 2019 nom. prov.)
Variants: var. *Convallaria majalis*, var. *Homogyne sylvestris*, var. *Omphalodes verna*, var. *Carex firma*

Fig. 7: Valley dwarf mountain pine scrub in the Tolminka Valley, surrounded by Alpine beech forest (Photo: Igor Dakskobler)

Slika 7: Sestoji dolinskega ruševja v zatrepu doline Tolminke, obdani z alpskim bukovim gozdom (foto: Igor Dakskobler)

4 CONCLUSIONS
4 ZAKLJUČKI

Dwarf mountain pine scrub, found in the valleys of the Slovenian Alps at altitudes between 750 m and 1150 m (exceptionally higher, above 1200 m), is known in the Tolminka, Možnica, Zadnjica and Kot Valleys, as well as on the slopes above the Mala Pišnica Valley in the Julian Alps, in the Draga Valley in the western Karavanke, in the Topla Valley in the eastern Karavanke, in Ravenska Kočna in the Kamnik-Savinja Alps, and probably elsewhere in these mountains. It differs somewhat in appearance and structure from the subalpine-alpine dwarf mountain pine scrub of the southeastern Alps. It thrives on special sites, in erosion are-

Fig. 8: Dwarf mountain pine stand of the drier subassociation *Amelanchiero ovalis-Pinetum mugo peucedanetosum oreoselini*, Mala Pišnica Valley (Photo: Igor Dakskobler)

Slika 8: Sestoj bolj sušne subasociacije *Amelanchiero ovalis-Pinetum mugo peucedanetosum oreoselini*, Mala Pišnica (foto: Igor Dakskobler)

Fig. 9: Dwarf mountain pine stand, classified in the syntaxon *Amelanchiero ovalis-Pinetum mugo hylocomiadelphetosum triquetri* var. *Carex firma*, Ravenska Kočna Valley (Photo: Igor Dakskobler)

Slika 9: Sestoj sintaksona *Amelanchiero ovalis-Pinetum mugo hylocomiadelphetosum triquetri* var. *Carex firma*, Ravenska Kočna (foto: Igor Dakskobler)

as, on torrential fans and on alluvial-glacial deposits, especially in the montane beech forest belt. It serves as a long-lasting successional stage where conditions are too extreme for more demanding tree species, such as beech, to thrive. It is characterised by a diverse species composition that includes typical species of pine, spruce, beech and oak-hop hornbeam forests, as well as species of scree, rock crevices, the subalpine zone and dry mountain meadows. Although it usually still contains two characteristic species of subalpine-alpine dwarf pine scrub, *Rhodothamnus chamaecistus* and *Rhododendron hirsutum*, its overall species composition and pioneer character allow it to be classified as an independent association *Amelanchiero ovalis-Pinetum mugo*, as has already been done in some alpine areas of northern Italy. We have described two of its new subassociations, *peucedanetosum oreoselini* (its stands are most similar to those in northern Italy and *hylocomiadelphetosum triquetri.* Some stands of the latter could also be considered on the rank of a particular elevational (valley) form of *Amelanchier ovalis*, as suggested by Zupančič et al. (2006), or as a particular subassociation of *amelanchieretosum ovalis*, within the *Rhodothamno-Pinetum mugo* association.

Valley dwarf mountain pine scrub is not of great importance in the forest area of Slovenia because of its small size, and has therefore been added to the Alpine dwarf mountain pine scrub type in terms of forest vegetation types. The importance of these scrub stands is mainly protective, as they prevent erosion. In some places these stands are located along mountain paths (e.g. in the Ravenska Kočna, Tolminka, Zadnjica and Kot Valleys), where they can be partially cleared by humans, which is strongly discouraged. It may be threatened by forest fires, avalanches, torrents, rockfall, prolonged drought and fungal diseases.

Valley dwarf mountain pine scrub is classified as habitat type 4070 *Bushes with *Pinus mugo* and *Rhododendron hirsutum* (*Mugo-Rhododendretum hirsuti*) in the European Natura 2000 network of special areas of conservation. It is an integral part of Triglav National Park and the Topla Landscape Park. It is an important site for rare and/or protected ferns and higher plants. Three Natura 2000 species, *Aquilegia iulia*, *Campanula zoysii* and *Cypripedium calceolus*, have been recorded in its stands, as have several other protected species (Uredba, 2004): *Arctostaphylos uva-ursi*, *Cephalanthera longifolia*, *Convallaria majalis*, *Cyclamen purpurascens*, *Dactylorhiza fuchsii*, *Epipactis atrorubens*, *E. helleborine*, *Gymnadenia conopsea*, *G. odoratissima*, *Daphne cneorum*, *Goodyera repens*, *Helleborus niger*, *Huperzia selago*, *Listera cordata*, *L. ovata*, *Lycopodium annotinum*, *Pinguicula alpina* and *Platanthera bifolia*, a Red List species (Pravilnik, 2002). *Festuca amethystina*, a rare taxon, is also included in this list, as are *Betula pubescens* subsp. *carpatica* and some southeastern or eastern Alpine endemics: *Aconitum angustifolium*, *Centaurea haynaldii* subsp. *julica*, *Primula wulfeniana* and *Saxifraga burseriana*.

5 SUMMARY

5 POVZETEK

Ruševje, ki ga najdemo v dolinskih legah slovenskih Alp na nadmorski višini od 750 m do 1150 m (izjemoma tudi višje, nad 1200 m) in ga poznamo v zatrepih dolin Tolminke, Možnice, Zadnjice in Kota ter na pobočjih nad Malo Pišnico v Julijskih Alpah, v dolini Drage v zahodnih Karavankah, v dolini Tople v vzhodnih Karavankah, v Ravenski Kočni v Kamniških Alpah in najbrž še kje v teh gorovjih, se po videzu in zgradbi nekoliko razlikuje od podvisokogorsko-visokogorskega ruševja Jugovzhodnih Alp. Uspeva na posebnih rastiščih, v erozijskih območjih, na hudourniških vršajih, na rečno-ledeniških nanosih večinoma v pasu gorskih bukovih gozdov in je (dolgo)trajen sukcesijski stadij, kjer so razmere za uspevanje zahtevnejših drevesnih vrst, kot je bukev, preveč skrajne. Njihova značilnost je pisana vrstna sestava, v kateri so tako značilnice borovih, smrekovih, bukovih in hrastovo-črnogabrovih gozdov kot vrste melišč, skalnih razpok, subalpinskih in suhih gorskih travišč. Čeprav v njih navadno še vedno uspevata dve značilni vrsti podvisokogorsko-visokogorskega ruševja, *Rhodothamnus chamaecistus* in *Rhododendron hirsutum,* njihova celotna vrstna sestava v povezavi z njihovim pionirskim izvorom dopušča uvrstitev v samostojno asociacijo *Amelanchiero ovalis-Pinetum mugo*, kot so to storili v nekaterih alpskih območjih severne Italije. Opisali smo dve njeni novi subasociaciji *peucedanetosum oreoselini* (njeni sestoji so najbolj podobni sestojem iz severne Italije, nomenklaturni tip, *holotypus*, je popis št. 2 v preglednici 1) in *hylocomiadelphetosum triquetri* (njen nomenklaturni tip, *holotypus*, je popis št. 21 v preglednici 1). Slednjo členimo na štiri variante: var. *Convallaria majalis,* var. *Homogyne sylvestris*, var. *Omphalodes verna* in var. *Carex firma*. V splošnem imajo sestoji subasociacije *Amelanchiero-Pinetum mugo peucedanetosum oreoselini* nekoliko manjšo nadmorsko višino kot sestoji subasociacije *Amelanchiero-Pinetum mugo hylocomiadelphetosum triquetri*, izjema so sestoji v dolini Drage, ki jih uvrščamo v varianto z vrsto *Omphalodes verna*. Sestoji rušja na rečno-ledeniških nanosih, na produ in grušču v dolinah Možnice, Kota in Ravenske Kočne (var. *Carex firma*) rastejo na položnih terenih z naklonom do 10 °,

sestoji drugih variant subasociacije *hylocomiadelphetosum triquetri* pa na strmejših dolomitnih pobočjih z nakloni med 30-45 °.

S pomočjo fitoindikacijskih vrednosti Ellenbergovega tipa (Tichý in sod., 2023) smo pomembnejše razlike med obravnavanimi sintaksoni našli le pri ocenah za temperaturo in vlažnost (sliki 3 in 5). Sestoji subasociacije *Amelanchiero-Pinetum mugo peucedanetosum oreoselini* rastejo v najtoplejših razmerah, tam smo ugotovili tudi značilno manjšo vlažnost na rastišču (Anova, Tukey post hoc test, $p < 0.05$).

V sestojih dolinskega ruševja smo našteli 242 taksonov višjih rastlin in 19 mahovnih vrst. V spodnji drevesni plasti je bilo popisanih 11 vrst, v grmovni plasti 44 vrst in v zeliščni plasti 187 taksonov (vrste in podvrste) višjih rastlin. Na popisni ploskvi velikosti 100-400 m^2 (velikost ploskve je bila prilagojena homogenosti popisne površine) je bilo zabeleženih v povprečju 52 taksonov (med 25 in 73). Vrstno najbogatejši so sestoji variante *Amelanchiero-Pinetum mugo hylocomiadelphetosum triquetri* var. *Carex firma*, ki rastejo na rečno-ledeniškem gradivu na dnu alpskih dolin, nekaj manj vrst smo našli v sestojih variant z vrstama *Homogyne sylvestris* in *Convallaria majalis*, ki prevladujejo na erozijskih območjih. Podoben vzorec kot število vrst na popisno ploskev kaže tudi Shannonov indeks vrstne pestrosti (sliki 3 in 6).

Dolinsko ruševje zaradi majhnih površin v gozdnatem prostoru Slovenije nima večjega pomena, zato smo ga v smislu gozdnih rastiščnih tipov pridružili tipu Alpsko ruševje. Pomen teh grmovnatih sestojev je predvsem varovalni, saj preprečujejo erozijo. Ponekod so ti sestoji ob planinskih poteh (na primer v dolinah Tolminke, Zadnjice, Kota in Ravenske kočne), kjer nanje lahko z delnimi krčitvami posega tudi človek, kar pa zelo odsvetujemo. Ogrožajo ga lahko gozdni požari, snežni plazovi, narasli hudourniki, skalni podori, dolgotrajna suša, glivične bolezni.

Dolinsko ruševje uvrščamo v habitatni tip 4070 *Ruševje z dlakavim slečem (*Mugo-Rhododendretum hirsuti*) v okviru evropskega omrežja posebnih varstvenih območij Natura 2000. Je sestavni del Triglavskega narodnega parka in Krajinskega parka Topla. Pomembna je njegova biotopska vloga, saj je rastišče redkih in (ali) zavarovanih praprotnic in semenk. V njegovih sestojih smo popisali tri Natura 2000-vrste *Aquilegia iulia, Campanula zoysii* in *Cypripedium calceolus* in še nekatere druge zavarovane vrste (Uredba, 2004): *Arctostaphylos uva-ursi, Cephalanthera longifolia, Convallaria majalis, Cyclamen purpurascens, Dactylorhiza fuchsii, Epipactis atrorubens, E. helleborine, Gymnadenia conopsea, G. odoratissima, Daphne cneorum, Goodyera repens, Helleborus niger, Huperzia selago, Listera cordata, L. ovata, Lycopodium annotinum, Pinguicula alpina* in *Platanthera bifolia,* vrsto iz rdečega seznama (Pravilnik, 2002): *Festuca amethystina*, redek takson, ki v ta seznam prav tako sodi: *Betula pubescens* subsp. *carpatica,* in nekatere jugovzhodno- ali vzhodnoalpske endemite: *Aconitum angustifolium, Centaurea haynaldii* subsp. *julica, Primula wulfeniana* in *Saxifraga burseriana.*

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Table 1: Association *Amelanchiero ovalis-Pinetum mugo* in Slovenia

Preglednica 1: Asociacija *Amelanchiero ovalis-Pinetum mugo* v Sloveniji

Successive number of relevé (Zaporedna številka popisa)		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**
Database number of relevé (Delovna številka popisa)		203380	203382	203405	203406	203407	203381	242273	203375	203376	273161	258930	262984	262986	262981	262982	262983	262985	254837	254838	254839	234425	273194	273196	238498	253529	253530	293361
Author of the relevé (Avtor popisa)		ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	IDMCŽR	IDMCŽR	IDMCŽR	IDMCŽR	IDMCŽR	IDMCŽR	IDAR	IDAR	IDAR	ID	ID	ID	IDAS	IDAR	IDAR	IDBVSB
Elevation in m (Nadmorska višina v m)		990	800	910	870	770	1230	990	1150	1080	1030	940	1060	1090	1120	1110	1100	1070	800	750	770	930	990	990	1120	1080	1100	980
Aspect (Lega)		E	SE	SEE	SE	SE	E	S	N	E	NW	NNE	N	NW	NW	N	NW	S	W	W	NE	NE	NE	NE	NW	W	NW	0
Slope in degrees (Nagib v stopinjah)		25	15	20	25	10	45	45	40	45	25	25	45	40	45	30	40	35	35	35	40	10	1	1	5	10	5	0
Parent material (Matična podlaga)		Mo	Mo	Mo	Mo	Mo	D	D	D	D	De	De	D	D	D	D	D	D	D	D	D	De	AL	AL	De	De	De	Mo
Soil (Tla)		Re	Re	Re	Re	Re	Re	Re	Re	Re	Re	Re	Re	Re	Re	Re	Re	Re	Re	Re	Re	Li	Re	Li	Re	Re	Li	Re
Stoniness in % (Kamnitost v %)		.	.	20	40	20	20	5	.	20	20	10	5	5	5	10	5	10	10	5	5	20	5	20	20	10	5	20
Cover of treee layer in % (Zastiranje drevesne plasti v %):	E3	.	20	.	.	.	.	20	10	30	20	5	.	.	.	.	.	.	10	.	.	.	5	.	10	5	1	10
Cover of shrub layer in % (Zastiranje grmovne plasti v %):	E2	80	70	80	80	70	70	70	80	70	90	80	80	90	80	95	90	80	80	70	80	80	80	70	80	90	90	70
Cover of herb layer in % (Zastiranje zeliščne plasti v %):	E1	60	60	70	70	70	60	60	50	70	60	80	80	90	95	90	95	95	90	80	90	70	90	70	30	90	90	80
Cover of moss layer in % (Zastiranje mahovne plasti v %):	E0	10	10	5	5	5	5	10	10	10	30	10	70	30	10	20	10	10	20	10	20	10	10	5	2	5	5	10
Maximum tree diameter (Maksimalni premer dreves)	cm	10	20	.	.	.	.	.	20	25	10	10	.	.	.	.	.	.	20	.	.	10	20	.	10	20	20	15
Maximum tree height (Maksimalna višina dreves)	m	4	5	.	.	.	.	7	5	10	5	10	.	.	.	.	.	.	10	.	.	.	15	.	8	10	10	10
Number of species (Število vrst)		70	57	48	51	53	54	51	49	43	41	41	53	36	40	35	38	35	70	51	49	67	69	73	56	72	73	25
Relevé area (Velikost popisne ploskve)	m^2	100	100	100	100	100	100	100	100	100	200	200	100	100	100	100	100	100	200	200	200	200	200	200	200	400	400	200
Date of taking relevé (Datum popisa)		13.09.1999	18.09.1997	16.07.2003	16.07.2003	16.07.2003	18.09.1997	25.07.2011	27.08.1998	27.08.1998	21.09.2018	3.07.2015	25.08.2016	25.08.2016	25.08.2016	25.08.2016	25.08.2016	25.08.2016	23.05.2014	2.06.2014	2.06.2014	6.09.2004	19.09.2018	19.09.2018	7.07.2010	4.07.2014	4.07.2014	15.06.2022
Locality (Nahajališče)		Tolminka-Gnelice	Tolminka-Gnelice	Tolminka-Gnelice	Tolminka-Gnelice	Tolminka-Gnelice	Tolminka Kot-Prehodci	Mala Pišnica	Struje-Zarobarska grapa	Struje-Zarobarska grapa	Zadnjica-Utro	Zadnjica-Utro	Topla-Šodri	Topla-Šodri-Žlihi	Topla-Šodri	Topla-Šodri	Topla-Šodri-Žlihi	Topla-Šodri	Begunje-Draga	Begunje-Draga	Begunje-Draga	Možnica	Kot-Klin	Kot-Klin	Ravenska kočna	Ravenska kočna	Ravenska kočna	Kot-Klin
Quadrant (Kvadrant)		9748/1	9748/1	9748/1	9748/1	9748/1	9748/1	9548/2	9748/4	9748/4	9648/2	9648/2	9554/2	9554/2	9554/2	9554/2	9554/2	9554/2	9651/1	9651/1	9551/3	9647/1	9549/3	9549/3	9653/1	9653/1	9653/1	9549/3

	Successive number of relevé (Zaporedna številka popisa)		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		
	Coordinate GK Y (D-48)	m	400738	401350	401002	401119	401485	400923	406323	406352	406408	408208	407277	483311	483320	483423	483385	483406	483321	441178	440602	440385	388848	415090	415051	465017	464802	464995	415068		
	Coordinate GK X (D-48)	m	5125382	5125261	5125362	5125358	5125195	5126127	5148545	5118445	5118484	5137195	5137490	5148996	5148987	5149016	5149004	5149037	5149006	5139768	5139792	5139877	5138347	5141082	5140996	5137186	5137183	5137223	5141048		
	Mountain range (Pogorje)		JA	JA	JA	JA	JA	JA	JA	JA	JA	JA	JA	EK	EK	EK	EK	EK	EK	WK	WK	WK	JA	JA	JA	KA	KA	KA	JA		
	Diagnostic species of the association (Diagnostične vrste asociacije)																													Pr.	Fr.
EP	*Pinus mugo*	E3a	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	r	.	2	7
EP	*Pinus mugo*	E2b	4	4	4	4	4	4	4	5	3	5	5	5	5	5	5	5	5	4	4	3	4	4	4	4	5	5	3	27	100
EP	*Pinus mugo*	E2a	1	.	.	.	+	.	.	.	+	1	.	.	.	.	.	.	.	.	.	1	.	1	1	.	.	1	.	8	30
EP	*Pinus mugo*	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	2	7
EP	*Amelanchier ovalis*	E2b	+	1	1	+	1	.	1	+	1	+	1	1	1	1	.	1	+	1	2	2	1	.	+	1	.	1	.	22	81
EP	*Amelanchier ovalis*	E2a	.	+	.	+	1	+	.	+	+	+	1	+	.	.	.	.	+	.	.	.	+	r	+	.	+	+	.	15	56
EP	*Amelanchier ovalis*	E1	.	.	.	.	1	.	.	.	.	.	.	+	+	+	.	.	.	+	+	+	.	.	.	.	+	.	.	8	30
PcSp	*Campanula cespitosa*	E1	+	+	.	+	+	1	+	+	1	.	.	+	+	+	+	+	+	+	.	.	1	+	1	+	.	.	.	19	70
PcSp	*Hieracium porrifolium*	E1	1	+	+	+	r	+	+	.	r	.	.	.	.	.	.	.	+	.	.	.	1	+	1	+	+	.	.	14	52
EP	*Molinia arundinacea*	E1	+	3	2	2	1	.	+	.	+	+	.	.	.	.	.	.	.	+	2	2	+	4	2	.	.	.	.	14	52
QP	*Ostrya carpinifolia*	E3a	.	+	.	.	.	.	r	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	11
QP	*Ostrya carpinifolia*	E2b	+	.	.	+	+	+	.	r	1	+	r	.	.	.	.	.	.	+	+	2	r	.	.	.	.	.	.	12	44
QP	*Ostrya carpinifolia*	E2a	+	+	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	7	26
QP	*Ostrya carpinifolia*	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	2	7
QP	*Fraxinus ornus*	E3a	.	+	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	3	11
QP	*Fraxinus ornus*	E2b	1	1	2	2	1	.	.	.	.	.	.	.	.	.	.	.	.	1	1	+	+	.	.	.	.	.	.	9	33
QP	*Fraxinus ornus*	E2a	1	1	1	1	1	.	+	.	.	.	r	.	.	.	.	.	.	.	1	+	.	.	.	.	.	.	.	9	33
QP	*Fraxinus ornus*	E1	.	.	.	+	1	.	+	.	.	.	.	.	.	.	.	.	.	1	+	.	.	.	.	.	.	.	.	5	19
AI	*Frangula alnus*	E2	.	r	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	+	.	+	+	.	.	.	.	.	.	6	22
	Differential species of lower units (Razlikovalnice nižjih enot)																														
FB	*Peucedanum oreoselinum*	E1	1	1	1	1	1	.	1	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	7	26
EP	*Genista radiata*	E2a	1	1	2	2	2	1	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	7	26
TG	*Viola hirta*	E1	+	+	.	+	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	6	22
ES	*Leucanthemum heterophyllum*	E1	+	+	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5	19
FB	*Teucrium montanum*	E1	.	+	+	.	+	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	15
FB	*Inula ensifolia*	E1	.	+	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	11

	Successive number of relevé (Zaporedna številka popisa)		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		
VP	*Hylocomiadelphus triquetrus (Rhytidiadelphus triquetrus)*	E0	.	.	.	.	.	.	.	+	.	2	+	3	1	+	+	.	.	.	.	2	+	+	.	.	.	+	1	12	44
AP	*Tofieldia calyculata*	E1	.	.	.	.	.	.	.	+	.	.	.	+	.	.	+	.	.	+	+	.	+	+	+	+	+	+	.	11	41
VP	*Hylocomium splendens*	E0	.	.	.	.	.	.	.	+	+	1	.	2	+	+	.	.	.	+	.	.	+	+	.	.	.	+	.	10	37
VP	*Larix decidua*	E3a	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	1	.	.	r	.	4	15
VP	*Larix decidua*	E2	.	.	.	.	.	.	.	.	.	+	.	r	r	+	.	r	.	.	.	.	r	+	+	+	.	.	1	10	37
VP	*Larix decidua*	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	1	4
TR	*Heliosperma alpestre*	E1	.	.	.	.	.	.	.	.	.	.	+	+	+	+	+	+	.	+	.	.	.	+	+	.	+	.	.	10	37
TR	*Gymnocarpium robertianum*	E1	.	.	.	.	.	.	.	.	.	1	.	+	+	1	+	+	.	1	+	1	.	.	.	.	.	.	.	9	33
BA	*Salix appendiculata*	E2	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	+	.	.	+	+	+	.	1	+	.	8	30
AP	*Paederota lutea*	E1	.	.	.	.	.	.	.	+	.	.	.	+	.	+	+	.	.	+	.	.	.	.	.	+	+	+	.	8	30
AP	*Pinguicula alpina*	E1	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	.	+	+	+	.	.	.	.	+	.	+	.	8	30
ES	*Primula wulfeniana*	E1	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	+	.	r	.	.	.	+	+	+	.	6	22
ES	*Senecio abrotanifolius*	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	.	.	.	.	.	+	+	+	.	.	.	.	6	22
VP	*Vaccinium myrtillus*	E1	.	.	.	.	.	.	.	.	.	.	+	3	3	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	5	19
VP	*Vaccinium vitis-idaea*	E1	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	5	19
QP	*Convallaria majalis*	E1	+	+	.	+	+	+	+	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	9	33
VP	*Homogyne sylvestris*	E1	.	.	.	.	.	.	.	.	.	+	1	2	+	+	+	+	.	.	.	+	.	.	.	.	.	.	r	.	9	33
EP	*Galium austriacum*	E1	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	+	+	.	.	.	.	.	.	.	.	.	.	.	4	15
EP	*Aquilegia nigricans*	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	1	.	.	+	.	.	.	.	4	15
EP	*Chamaecytisus purpureus*	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	1	+	.	.	.	.	.	.	.	3	11
AF	*Omphalodes verna*	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	1	.	.	.	.	.	.	.	3	11
FB	*Festuca amethystina*	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	1	.	.	.	.	.	.	.	3	11
ES	*Carex firma*	E1	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	2	1	+	+	+	+	.	8	30
VP	*Pyrola rotundifolia*	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	1	+	1	6	22
SP	*Salix eleagnos*	E3a	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	.	.	.	+	3	11
SP	*Salix eleagnos*	E2	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	+	+	1	7	26
SP	*Salix eleagnos*	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	4
AP	*Astrantia carniolica*	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	3	11
TR	*Trisetum argenteum*	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	3	11
TR	*Aquilegia iulia*	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	3	11
EP	***Erico-Pinetea***																														
	Erica carnea	E1	2	3	4	3	4	4	4	2	2	3	3	4	4	4	4	4	4	4	4	4	3	4	4	1	4	4	4	27	100
	Calamagrostis varia	E1	1	+	2	2	1	1	1	1	2	+	1	2	1	2	1	1	1	+	.	.	+	+	1	1	4	3	1	25	93
	Polygala chamaebuxus	E1	1	1	1	2	1	+	1	1	1	+	1	1	+	+	+	.	1	2	1	1	1	1	1	+	1	1	.	25	93

	Successive number of relevé (Zaporedna številka popisa)		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		
	Rhododendron hirsutum	E2a	1	r	2	2	.	1	.	1	2	4	3	3	3	2	2	1	1	2	2	3	2	+	1	2	1	2	+	25	93
	Rhodothamnus chamaecistus	E1	.	+	.	1	.	.	+	+	+	+	2	2	2	3	3	2	2	+	1	1	1	1	+	+	+	1	.	22	81
	Rubus saxatilis	E1	1	1	1	1	1	.	+	+	+	1	.	.	.	.	.	.	.	1	1	1	.	.	.	+	+	+	.	15	56
	Asperula aristata	E1	+	+	+	1	1	+	+	+	+	.	.	.	.	.	.	.	.	.	.	.	+	+	+	+	+	.	.	14	52
	Carex mucronata	E1	.	.	.	.	+	.	+	+	+	.	.	.	.	+	.	+	+	.	+	.	+	+	1	.	.	+	.	12	44
	Scleropodium purum	E0	.	+	.	+	.	.	1	.	.	.	1	1	1	.	.	.	.	3	2	1	+	.	.	.	+	+	.	12	44
	Carex alba	E1	+	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	.	+	+	+	+	+	1	11	41
	Leontodon incanus	E1	+	+	.	.	+	+	1	.	.	.	.	.	+	.	+	+	+	.	+	.	.	.	.	+	.	.	.	11	41
	Allium ericetorum	E1	+	r	.	.	.	r	.	+	.	.	.	.	.	.	.	+	+	.	.	.	+	.	+	.	.	.	.	8	30
	Arctostaphylos uva-ursi	E1	.	.	.	.	.	+	1	+	.	.	.	.	+	+	.	1	.	1	.	.	.	.	.	+	.	.	.	8	30
	Cotoneaster tomentosus	E2a	.	.	+	.	.	.	r	.	.	+	.	.	.	.	.	+	.	.	.	.	+	.	.	+	+	+	.	8	30
	Epipactis atrorubens	E1	.	+	+	.	+	+	+	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	8	30
	Pinus sylvestris	E3a	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	r	.	2	7
	Pinus sylvestris	E2	.	.	.	.	+	.	.	.	.	.	.	+	.	+	+	.	.	+	+	.	r	.	.	.	.	.	.	7	26
	Euphrasia cuspidata	E1	+	.	.	.	.	.	.	r	r	.	.	.	.	.	.	.	.	.	.	.	1	1	1	.	.	.	.	6	22
	Gymnadenia odoratissima	E1	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	r	.	.	+	.	.	4	15
	Carex ornithopoda	E1	.	.	.	.	.	r	.	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	+	.	.	.	.	4	15
	Aster amellus	E1	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	7
	Crepis slovenica	E1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	2	7
	Chamaecytisus hirsutus	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	2	7
	Daphne cneorum	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	1	4
	Pinus nigra	E2b	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	1	4
VP	***Vaccinio-Piceetea***																														
	Solidago virgaurea	E1	1	+	1	1	1	+	.	.	.	+	1	.	.	.	.	.	.	.	1	+	+	.	.	.	+	+	+	.	14	52
	Picea abies	E3a	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	+	4	15
	Picea abies	E2b	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	.	+	.	.	+	.	1	6	22
	Picea abies	E2a	r	.	.	.	+	.	.	r	.	.	.	.	.	.	+	.	.	+	+	1	+	+	.	.	+	.	.	10	37
	Picea abies	E1	.	.	.	.	.	r	.	.	.	.	.	r	.	.	.	.	.	.	+	.	.	.	.	+	.	+	.	5	19
	Dicranum scoparium	E0	.	.	.	.	.	.	.	+	.	+	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	5	18
	Clematis alpina	E1	.	.	.	.	.	r	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4	15
	Lonicera nigra	E2a	+	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	11
	Hieracium murorum	E1	.	.	.	+	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	11
	Abies alba	E2b	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	2	7

	Successive number of relevé (Zaporedna številka popisa)		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		
	Abies alba	E2a	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	2	7
	Abies alba	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	+	.	3	11
	Gentiana asclepiadea	E1	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	3	11
	Rosa pendulina	E2a	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	7
	Huperzia selago	E1	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Lycopodium annotinum	E1	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Pleurozium schreberi	E0	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Goodyera repens	E1	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Listera cordata	E1	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Luzula sylvatica	E1	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Oxalis acetosella	E1	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Dryopteris dilatata	E1	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Gymnocarpium dryopteris	E1	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Rhytidiadelphus loreus	E0	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Maianthemum bifolium	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	1	4
QP	***Quercetalia pubescenti-petraeae***																														
	Sorbus aria (Aria edulis)	E3a	.	1	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	4	15
	Sorbus aria (Aria edulis)	E2b	1	1	1	1	+	1	+	+	1	+	.	r	+	.	.	+	+	+	+	+	+	.	.	.	+	+	.	20	74
	Sorbus aria (Aria edulis)	E2a	.	+	.	1	.	+	.	.	.	.	.	r	.	.	.	.	.	+	.	+	+	+	+	.	1	.	.	10	37
	Sorbus aria (Aria edulis)	E1	.	.	.	+	1	.	.	+	.	.	.	.	+	+	+	+	+	.	+	.	.	+	+	.	+	+	.	13	48
	Mercurialis ovata	E1	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	3	11
	Sorbus austriaca	E2b	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Melittis melissophyllum	E1	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
QP	***Quercetalia roboris***																														
	Potentilla erecta	E1	+	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	1	.	.	.	.	.	6	22
	Melampyrum pratense	E1	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	+	.	3	11
	Betula pendula	E2a	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	1	4
AF	***Aremonio-Fagion***																														
	Cyclamen purpurascens	E1	1	+	+	+	.	+	1	+	1	1	1	+	+	1	+	1	+	1	1	1	+	+	+	+	+	+	.	25	93
	Helleborus niger	E1	+	+	+	.	.	.	1	.	.	.	.	.	.	.	.	+	.	+	.	.	.	1	1	+	+	1	+	12	44
	Anemone trifolia	E1	+	1	.	.	.	.	.	.	+	1	1	.	.	.	.	.	.	1	.	1	+	+	+	.	.	.	+	11	41
	Rhamnus fallax	E2b	1	+	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	6	22
	Rhamnus fallax	E2a	+	+	+	.	1	+	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	r	.	7	26

	Successive number of relevé (Zaporedna številka popisa)		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		
	Rhamnus fallax	E1	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Knautia drymeia	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	1	4
	Cardamine enneaphyllos	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	1	4
FS	***Fagetalia sylvaticae***																														
	Melica nutans	E1	.	+	.	+	.	.	.	.	+	1	1	.	.	.	.	.	.	+	+	+	+	+	.	.	+	.	.	11	41
	Laburnum alpinum	E3a	.	.	.	.	.	.	1	.	.	2	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	3	11
	Laburnum alpinum	E2	.	.	.	.	.	.	+	.	+	+	1	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	+	8	30
	Mercurialis perennis	E1	+	r	+	.	.	r	.	.	+	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	7	26
	Acer pseudoplatanus	E2a	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	+	+	.	.	+	.	.	.	.	4	15
	Acer pseudoplatanus	E1	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	+	.	+	+	+	.	.	+	+	8	30
	Lonicera alpigena	E2a	+	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	5	19
	Cypripedium calceolus	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	1	+	1	4	15
	Daphne mezereum	E2a	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	.	.	4	15
	Fagus sylvatica	E3a	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	3	11
	Fagus sylvatica	E2b	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	4	15
	Fagus sylvatica	E2a	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	3	11
	Fagus sylvatica	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	.	+	.	.	3	11
	Epipactis helleborine	E1	+	.	.	.	.	+	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	11
	Prenanthes purpurea	E1	.	.	.	.	.	.	.	.	.	.	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	3	11
	Galium laevigatum	E1	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	7
	Euphorbia amygdaloides	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	2	7
	Viola reichenbachiana	E1	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Paris quadrifolia	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	1	4
QF	***Querco-Fagetea***																														
	Platanthera bifolia	E1	.	.	.	+	+	.	.	.	.	.	.	.	+	.	.	+	.	+	.	+	+	.	.	.	.	+	.	8	30
	Hepatica nobilis	E1	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	4	15
	Carex digitata	E1	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	3	11
	Dactylorhiza fuchsii	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	2	7
	Cephalanthera longifolia	E1	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Viola riviniana	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	1	4
	Listera ovata	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	4
SSc	***Sambuco-Salicion capreae***																														
	Sorbus aucuparia	E3a	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	r	.	4	15

	Successive number of relevé (Zaporedna številka popisa)		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		
	Sorbus aucuparia	E2b	.	.	.	+	.	.	.	+	+	1	1	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	6	22
	Sorbus aucuparia	E2a	+	+	+	.	.	+	.	.	.	.	1	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	7	26
	Sorbus aucuparia	E1	.	.	.	+	.	.	.	+	.	+	1	+	+	+	.	.	.	.	.	.	+	+	.	.	+	+	.	11	41
	Rubus idaeus	E2a	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Fragaria vesca	E1																									+			1	4
RP	***Rhamno-Prunetea***																														
	Juniperus communis	E2a	.	+	.	.	.	.	1	+	+	.	+	.	+	+	.	+	.	.	.	.	.	.	.	.	.	.	.	8	30
	Rhamnus saxatilis	E2a	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Rhamnus saxatilis	E1	.	.	.	.	.	+	+	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	11
BA	***Betulo-Alnetea***																														
	Salix glabra	E2	1	+	1	+	+	2	r	+	1	2	+	+	+	+	1	+	+	2	1	2	1	.	+	+	1	+	.	25	93
	Sorbus chamaemespilus	E2	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	.	2	.	5	19
	Juniperus sibirica	E2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	1	4
	Betula pubescens subsp. *carpatica*	E2a	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	4
MuA	***Mulgedio-Aconitetea***																														
	Aconitum angustifolium	E1	+	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	7
	Heracleum pollinianum	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	1	4
ES	***Elyno-Seslerietea***																														
	Laserpitium peucedanoides	E1	+	+	+	+	+	1	+	1	+	+	1	1	+	1	2	1	1	1	1	1	+	1	+	1	1	2	+	27	100
	Betonica alopecuros	E1	1	+	+	+	.	1	1	+	+	1	+	.	.	+	+	1	+	+	1	+	+	1	+	.	1	.	.	21	78
	Globularia cordifolia	E1	+	+	+	1	+	+	1	.	.	.	.	.	.	.	+	+	+	+	+	.	+	+	1	+	+	1	+	19	70
	Sesleria caerulea	E1	.	+	1	+	.	+	.	1	2	+	.	.	+	+	+	+	2	1	3	3	1	+	.	+	.	1	.	19	70
	Phyteuma orbiculare	E1	.	.	.	.	+	+	.	+	.	.	+	+	+	+	+	+	.	+	+	+	+	.	.	+	.	r	.	15	56
	Dryas octopetala	E1	+	.	+	+	+	.	.	.	r	.	.	.	.	.	+	.	+	.	.	.	1	2	3	+	+	+	2	14	52
	Aster bellidiastrum	E1	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	+	.	.	.	+	.	2	1	.	.	.	+	8	30
	Carduus crassifolius	E1	+	.	+	.	+	r	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	r	.	.	.	7	26
	Thesium alpinum	E1	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	+	+	.	.	+	r	.	7	26
	Thymus praecox subsp. *polytrichus*	E1	+	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	+	.	.	.	.	5	19
	Selaginella selaginoides	E1	.	.	.	.	.	.	.	r	.	.	r	.	.	.	.	.	.	.	.	.	+	.	.	+	.	r	.	5	19
	Scabiosa lucida subsp. *stricta* (incl. *S. lucida* s. lat.)	E1	.	.	.	.	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1	+	.	.	.	.	4	15
	Euphrasia salisburgensis	E1	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	4	15
	Gentiana clusii	E1	.	.	.	.	.	.	.	r	.	.	.	.	.	.	+	.	+	.	.	.	.	+	.	.	.	.	.	4	15
	Globularia nudicaulis	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	1	.	3	11

	Successive number of relevé (Zaporedna številka popisa)		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		
	Juncus monanthos	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	+	+	.	.	3	11
	Rhinanthus glacialis	E1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	2	7
	Centaurea haynaldii subsp. *julica*	E1	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	7
	Daphne striata	E1	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	2	7
	Bartsia alpina	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	2	7
	Carex sempervirens	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	2	7
	Pimpinella alpina	E1	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Helianthemum nummularium subsp. *grandiflorum*	E1	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Acinos alpinus	E1	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Carex ferruginea	E1	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Linum julicum	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1	4
	Ranunculus hybridus	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1	4
	Arctostaphylos alpinus	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	1	4
	Campanula thyrsoides	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	1	4
CU	***Calluno-Ulicetea***																														
	Antennaria dioica	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	2	7
TG	***Trifolio-Geranietea***																														
	Laserpitium siler	E1	.	+	.	+	+	r	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	6	22
	Vincetoxicum hirundinaria	E1	.	+	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	5	19
	Polygonatum odoratum	E1	.	.	.	.	.	1	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	3	11
	Anthericum ramosum	E1	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	3	11
	Thalictrum minus	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1	4
	Thesium bavarum	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1	4
FB	***Festuco-Brometea***																														
	Buphthalmum salicifolium	E1	.	1	1	1	1	1	+	.	+	+	.	.	.	.	+	+	1	+	+	+	+	1	+	+	1	1	.	20	74
	Carlina acaulis	E1	+	+	.	+	+	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	+	+	.	11	41
	Cirsium erisithales	E1	+	.	.	.	.	+	.	.	+	.	.	.	.	.	.	+	.	+	+	1	.	.	.	+	.	+	.	.	9	33
	Carex humilis	E1	.	+	.	.	.	+	2	r	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	6	22
	Gymnadenia conopsea	E1	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	+	1	.	6	22
	Hippocrepis comosa	E1	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1	+	.	.	+	5	19
	Linum catharticum	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	1	.	.	+	+	+	.	5	19
	Galium lucidum	E1	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	+	.	.	.	.	4	15
	Prunella grandiflora	E1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	+	.	.	.	.	3	11

	Successive number of relevé (Zaporedna številka popisa)		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		
	Gentianella ciliata	E1	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	.	.	.	.	3	11
	Brachypodium rupestre	E1	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	.	.	3	11
	Teucrium chamaedrys	E1	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	3	11
	Centaurea bracteata	E1	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	7
	Linum viscosum	E1	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	7
	Orobanche gracilis	E1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Euphorbia cyparissias	E1	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Thesium linophyllon	E1	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Coronilla vaginalis	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	1	4
	Stachys recta	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	1	4
MA	***Molinio-Arrhenatheretea***																														
	Lotus corniculatus s. lat.	E1	+	.	1	+	1	.	+	.	.	.	+	.	+	.	.	+	+	.	.	.	.	1	+	+	+	+	+	15	56
	Angelica sylvestris	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	+	.	.	.	.	2	7
TR	***Thlaspietea rotundifolii***																														
	Hieracium bifidum	E1	+	.	+	.	.	.	r	.	.	.	.	.	.	+	+	+	+	+	+	.	+	+	+	+	1	+	1	16	59
	Biscutella laevigata	E1	+	+	+	+	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	+	+	.	+	+	+	+	.	12	44
	Petasites paradoxus	E1	+	.	2	+	+	r	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	+	+	1	3	2	.	12	44
	Aquilegia einseleana	E1	+	+	+	.	+	+	.	+	.	.	.	.	.	.	.	.	.	+	.	.	1	.	.	.	.	.	.	8	30
	Dianthus sternbergii	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	r	.	.	+	+	+	+	+	.	7	26
	Adenostyles glabra	E1	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	+	+	.	5	19
	Valeriana montana	E1	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	4	15
	Rumex scutatus	E1	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	3	11
	Achnatherum calamagrostis	E1	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	+	.	.	.	.	3	11
	Athamanta cretensis	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	2	7
	Saxifraga caesia	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Gypsophila repens	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	4
	Hieracium piloselloides	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	1	4
	Linaria alpina	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	1	4
	Silene vulgaris subsp. *glareosa*	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	4
AP	***Astrantio-Paederotion***																														
	Valeriana saxatilis	E1	+	+	+	+	+	+	.	+	+	.	1	1	+	1	1	1	+	1	1	1	1	.	.	+	+	1	+	23	85
	Valeriana tripteris	E1	.	+	+	+	.	.	.	+	.	+	.	.	.	.	+	.	.	+	.	1	.	.	.	.	+	.	.	9	33
	Orthothecium rufescens	E0	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	2	7

	Successive number of relevé (Zaporedna številka popisa)		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27		
	Asplenium viride	E1	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	2	7
	Carex brachystachys	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	1	4
PcSp	***Physoplexido comosae-Saxifragion petraeae, Potentilletalia caulescentis***																														
	Potentilla caulescens	E1	.	.	.	.	.	.	+	r	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	7
	Saxifraga burseriana	E1	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	2	7
	Hieracium glaucum	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	2	7
	Rhamnus pumilus	E1	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Saxifraga squarrosa	E1	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	4
	Saxifraga crustata	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	1	4
	Campanula zoysii	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	1	4
	Campanula cochleariifolia	E1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	1	4
ML	**Mosses and lichens (Mahovi in lišaji)**																														
	Ctenidium molluscum	E0	+	+	+	+	+	+		+		+	+	+	+	+	+	+	+	+						+			17	63
	Tortella tortuosa	E0	+		+	+		r	+	+			+	+		+	+	+	1		+			1	+	+	1			17	63
	Exertotheca crispa (Neckera crispa)	E0				+				+	+									+	+	+								6	22
	Schistidium apocarpum	E0	+										+										+							3	11
	Fissidens dubius	E0									+			1																2	7
	Hypnum cupressiforme	E0											+																	1	4
	Sphagnum sp.	E0											+																	1	4
	Eurhynchium angustirete	E0												+																1	4
	Mnium thompsonii	E0												+																1	4
	Plagiochila porelloides	E0												+																1	4
	Cladonia rangiferina	E0																						+						1	4
	Cladonia pyxidata	E0																									+			1	4

Legend - Legenda

ID Igor Dakskobler
AR Andrej Rozman
AS Andrej Seliškar
MC Mateja Cojzer
ŽR Žiga Repotočnik
BV Branko Vreš
SB Sanja Behrič
D Dolomite - Dolomit
Mo Moraine (Till) - Morena (Til)
De Debris - Grušč
Al Alluvium - Prod
Re Rendzina - Rendzina
Li Lithosol - Kamnišče
JA Julian Alps - Julijske Alpe
EK Eastern Karavanke - Vzhodne Karavanke
WK Western Karavanke - Zahodne Karavanke
KA Kamnik-Savinja Alps - Kamniško-Savinjske Alpe
Pr. Presence - Number of relevés in which the species is presented - Število popisov, v katerih se pojavlja vrsta
Fr. Frequency in % - Frekvenca v %
Relevé 5 - nomenclatural type (*holotypus*) - Popis 5 - nomenklaturni tip (Holotip)
Relevé 21 - nomenclatural type (*holotypus*) - Popis 21 - nomenklaturni tip (Holotip)