

A NEW ENDEMIC PLANT COMMUNITY WITH *SCHOENUS NIGRICANS* IN THE SOUTHEASTERN ALPS AND NORTHERN DINARIC ALPS

NOVA ENDEMIČNA ZDRUŽBA Z VRSTO *SCHOENUS NIGRICANS* V JUGOVZHODNIH ALPAH IN SEVERNEM DELU DINARSKEGA GORSTVA

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ABSTRACT

A new endemic plant community with *Schoenus nigricans* in the Southeastern Alps and northern Dinaric Alps

We studied the phytosociology of plant communities with *Schoenus nigricans*, a character species of the alliance *Caricion davallianae*, in western Slovenia. Most of our relevés are classified into the new association *Astrantio carniolicae-Schoenetum nigricantis*, whose stands grow on moist rocks and in the headwater section of springs and small brooks in dolomite wooded areas, especially in the Cerklno region, in the basin of the Idrijca river. Its character species and (geographical) differential species are *Schoenus nigricans*, *Molinia arundinacea*, *Astrantia carniolica*, *Palustriella commutata*, *Carex flacca*, *Valeriana saxatilis*, *Salix glabra*, *Erica carnea* and *Primula carniolica*. In addition to the typical form (subassociation *-typicum*) we described also the subassociation with predominating *Cladium mariscus* (*-cladidosum marisci*). The studied dolomite headwaters are a Natura 2000 habitat type and the sites of several vulnerable and protected species. Their role as a biotope is therefore significant and requires adequate protection.

Key words: phytosociology, synsystematics, dolomite springs, *Schoenus nigricans*, *Cladium mariscus*, *Primula carniolica*, *Caricion davallianae*, Natura 2000, Slovenia

IZVLEČEK

Nova endemična združba z vrsto *Schoenus nigricans* v Jugovzhodnih Alpah in severnem delu Dinarskega gorstva

Fitocenološko smo preučili rastlinske združbe zahodne Slovenije, v katerih uspeva vrsta *Schoenus nigricans*, značilnica zveze *Caricion davallianae*. Večino naših popisov uvrščamo v novo asociacijo *Astrantio carniolicae-Schoenetum nigricantis*, katere sestoji poraščajo vlažno skalovje in povirja studencev in majhnih potokov v dolomitnih gozdnatih območjih predvsem na Cerkljanskem, v povodju Idrijce. Njene značilnice in (geografske) razlikovalnice so vrste *Schoenus nigricans*, *Molinia arundinacea*, *Astrantia carniolica*, *Palustriella commutata*, *Carex flacca*, *Valeriana saxatilis*, *Salix glabra*, *Erica carnea* in *Primula carniolica*. Poleg tipične oblike (subasociacija *-typicum*) smo opisali tudi subasociacijo s prevladujočo vrsto *Cladium mariscus* (*-cladidosum marisci*). Preučena dolomitna povirja sodijo med varstveno pomembne habitatne tipe v evropskem merilu (Natura 2000). So rastišča z več ranljivimi in zavarovanimi vrstami, zato imajo velik biotopski pomen in potrebujejo ustrezno varovanje.

Ključne besede: fitocenologija, sinsistematika, dolomitno povirje, *Schoenus nigricans*, *Cladium mariscus*, *Primula carniolica*, *Caricion davallianae*, Natura 2000, Slovenija

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1 INTRODUCTION

Schoenus nigricans is a subcosmopolitan species, a character species of small-sedge rich-fen vegetation of calcareous oligotrophic flushes, soligenous mires and dune slacks in lower altitudes from the alliance *Caricion davallianae* (AESCHIMANN et al. 2004: 778, MARTINČIČ 2007: 803, ŠILC & ČARNI 2012: 128). Its distribution and sites in Slovenia have been described in detail in several articles (MARTINČIČ 1991, 1995, KOČJAN et al. 2013). While mapping the flora of the Soča Valley and studying the sites and communities of the endemic *Primula carniolica* we came across, mainly in wooded areas, fascinating, small-area dolomite headwaters that were usually dominated by *Schoenus nigricans* and *Molinia arundinacea*, very rarely also by *Cladium*

mariscus. The stands with the latter species were already described in more detail in previous article (DAKSKOBLER 2011: 5–6, 19–21) and we also published a phytosociological table with four relevés of the provisional syntaxon *Astrantio carniolicae-Schoenetum nigricantis cladietosum marisci* prov. (see also ŠILC & ČARNI 2012: 128). As we have collected more new relevés since then, mainly in the gorges and ravines of the Cerknjo region, we made a phytosociological table that allows us to compare the community with *Schoenus nigricans* from this area with previously described communities elsewhere in Slovenia (MARTINČIČ, *ibid.*, ACCETTO 2001) and provide a more thorough synsystematic classification for this community.

2 METHODS

Communities with *Schoenus nigricans* were studied applying the Braun-Blanquet method (BRAUN-BLANQUET 1964). A total of 75 relevés (of which five had already been published: one in DAKSKOBLER 2005, relevé 8 in Table 1, and four in DAKSKOBLER 2011: 19–21) were entered into the FloVegSi database (Fauna, Flora, Vegetation and Paleovegetation of Slovenia) of the Jovan Hadži Institute of Biology at ZRC SAZU (T. SELIŠKAR, VREŠ et A. SELIŠKAR 2003). They were arranged into a working table based on hierarchical classification. We transformed the combined cover-abundance values with numerical values (1–9) according to van der MAAREL (1979). Numerical comparisons were performed with the SYN-TAX 2000 program package (PODANI 2001). The relevés were compared by means of “(unweighted) average linkage method” – UPGMA, using Wishart’s similarity ratio.

The nomenclature source for the names of vascular plants is the Mala flora Slovenije (MARTINČIČ et al. 2007), except for the names *Molinia arundinacea*

Schrank and *Sesleria caerulea* (L.) Ard. (instead of *S. caerulea* subsp. *calcaria*). Ros et al. (2007) is the nomenclature source for the names of liverworts (*Marchantiophyta*) and Ros et al. (2013) for the names of mosses. ŠILC & ČARNI (2012) are the nomenclature source for the names of the syntaxa, except for the name of the class *Quercio-Fagetea* Braun-Blanquet et Vlieger in Vlieger 1937.

Most of the relevés discussed in this article were made in the Cerknjo and Idrija Hills at the contact of the pre-Alpine and Dinaric phytogeographical regions of Slovenia (Figure 3). The geological bedrock in the study area is mainly dolomite (BUSER 2009). The studied communities occur in the submontane belt (from 200 to 570 m a. s. l.) on initial soils (lithosols, rendzina or very shallow mollic gleysols) – VIDIĆ et al. (2015). The regional climate is moderately warm and humid, with mean annual precipitation of 2,000 to 2,500 mm (ZUPANČIČ 1998) and mean annual air temperature of 6 °C to 8 °C (CEGNAR 1998), but the local climate is colder.

3. RESULTS AND DISCUSSION

3.1 Review of the studied syntaxa, with types of newly described communities

Scheuchzerio palustris-Caricetea nigrae Tx. 1937 nom. mut.

Caricetalia davallianae Br.-Bl. 1949

Caricion davallianae Klika 1934

Caricetum davallianae Dutoit 1924

Schoenetum nigricantis W. Koch 1926

Astrantio carniolicae-Schoenetum nigricantis ass. nov. hoc. loco, the nomenclature type, *holotypus*, is relevé 23 in Table 1.

-typicum, subass. nov., the nomenclature type is the same as the nomenclature type of the association

In terms of species composition the relevés made in the headwaters on glacial material, deluvium or on alluvium in Bohinj, the Završnica valley, the Vipava Valley, near Godovič and in the Bača Valley are clearly different and are provisionally classified into the association *Schoenetum nigricantis*. Also very distinct was one relevé of the dolomite headwaters along Poličnica (at the village of Police) which is temporarily classified into the association *Caricetum davallianae* (published already in DAKSKOBLER 2005). These six relevés were not classified into the analytical table (Table 1) which comprises all other 69 relevés. The most different in terms of floristic composition is the group of relevés on the left side of the dendrogram or in the right part of Table 1. Five of these relevés were made on moist rocks and are temporarily classified into the association *Primuletum carniolicae* s. lat., and two relevés were made on a stony grassland and are classified into the association *Primulo carniolicae-Seslerietum calcariae*. Despite a certain floristic similarity with previously mentioned communities we nevertheless discuss two relevés from this separate group, based on their dominant species, together with the majority of relevés of the new association *Astrantio carniolicae-Schoenetum nigricantis* (as a

provisional variant with *Sesleria caerulea*). In terms of species composition and sites its stands are clearly different from the stands of the association *Schoenetum nigricantis* as it was documented in Slovenia (MARTINČIČ 1991). In addition to *Schoenus nigricans* both communities share only the following more frequent species: *Pinguicula alpina*, *Tofieldia calyculata*, *Parnassia palustris* and *Potentilla erecta*, occasionally also *Campylium stellatum*, *Cladium mariscus*, *Palustricola commutata* and *Bryum pseudotriquetrum*. However, there are a number of species that do not occur in both communities and subsequently SØRENSEN'S similarity coefficient (1948) is only a bit more than 20%, if we take into account also the less frequent (accidental) species. The studied stands usually occur on small plots ranging between 5 m² to not more than 30 m² in size, on gentle to very steep, erosion-exposed slopes, along small springs or in moist rocks. They are in direct contact with chasmophytic communities that are frequently dominated by *Primula carniolica*, as well as with natural grasslands with dominant *Molinia arundinacea* and (or) *Sesleria caerulea*. In part, these erosion slopes and dolomite headwaters are being overgrown, above all with willows (*Salix glabra*, *S. appendiculata*, *S. eleagnos*) and

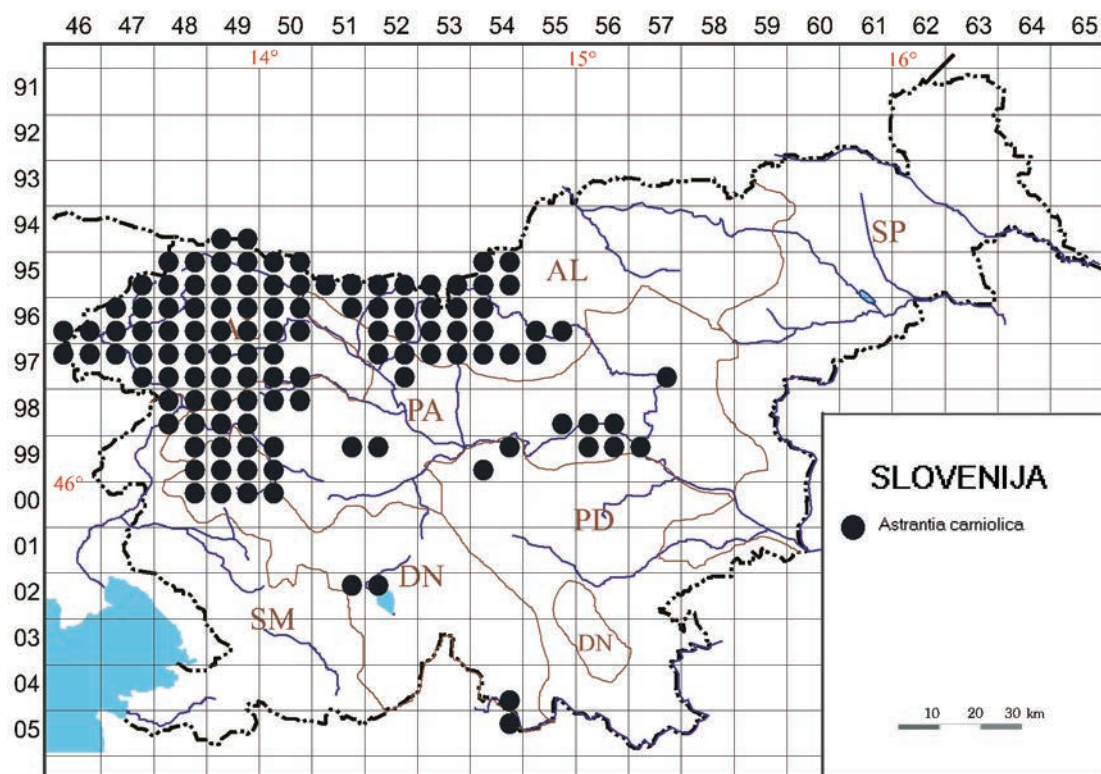


Figure 2: Distribution of *Astrantia carniolica* in Slovenia
Slika 2: Razširjenost vrste *Astrantia carniolica* v Sloveniji

with individual specimens of *Picea abies*, *Frangula alnus* and *Ostrya carpinifolia*. The headwaters occur within wooded areas dominated by communities of Scots pine (*Pinus sylvestris*), hop hornbeam (*Ostrya carpinifolia*) and beech (*Fagus sylvatica*), stands of the associations *Genisto januensis-Pinetum sylvestris*, *Rhododendro hirsuti-Ostryetum*, *Rhododendro hirsuti-Fagetum* and *Ostryo-Fagetum*. The diagnostic species that very clearly differentiate the new association from all of the previously described, similar fen and headwater communities are: *Schoenus nigricans* and *Molinia arundinacea* (dominant species), *Astrantia carniolica* and *Palustriella commutata* (with high constancy; they are characteristic for rocky headwater sites), *Carex flacca*, *Erica carnea* (frequent in surrounding forests and grasslands), *Salix glabra* (indicates both moist sites as well as cold gorges between the Julian Alps and the Trnovski Gozd Plateau) as well as *Valeriana saxatilis* and *Primula carniolica* (character species of chasmophytic communities on moist rocks). The latter is an endemic and as such also a phytogeographical differential species that jointly with *Astrantia carniolica* points to an endemic headwater community of the Southeastern Alps and northern part of the Dinaric Alps.

The new association was named after *Astrantia carniolica*, a southeastern-Alpine Illyrian species that usually occurs on more or less moist and stony limestone and dolomite sites with shallow soils (lithosol, rendzina) in numerous forest and shrub communities, primarily of the montane, altimontane and sub-alpine belts (*Anemone trifoliae-Fagetum*, *Homogyno sylvestris-Fagetum*, *Polysticho lonchitis-Fagetum*, *Saxifraga cuneifolii-Fagetum*, *Rhododendro hirsuti-Fagetum*, *Arunco-Fagetum*, *Adenostylo glabrae-Piceetum*, *Petasiti paradoxi-Piceetum*, *Rhodothamno-Laricetum*, *Rhododendro hirsuti-Ostryetum*, *Hemerocallido-Ostryetum*, *Lamio orvalae-Alnetum incanae*, *Alno incanae-Pinetum sylvestris*, *Lamio orvalae-Salicetum eleagni*, *Rhodothamno-Pinetum mugo*, *Rhododendro hirsuti-Alnetum viridis*, *Rhododendro hirsuti-Salicetum glabrae*), in stony grasslands (*Primulo carniolicae-Seslerietum calcariae*, *Ranunculo hybridi-Caricetum sempervirentis*, *Caricetum ferrugineae*), in scree communities (*Astrantio carniolicae-Adenostyletum glabrae*), and most abundantly in headwater basins and in chasmophytic communities of moist rocks with *Primula carniolica*, *Paederota lutea* and (or) *Pinguicula alpina*. Its distribution in Slovenia (according to the FloVegSi database) is shown in Figure 2. Its site

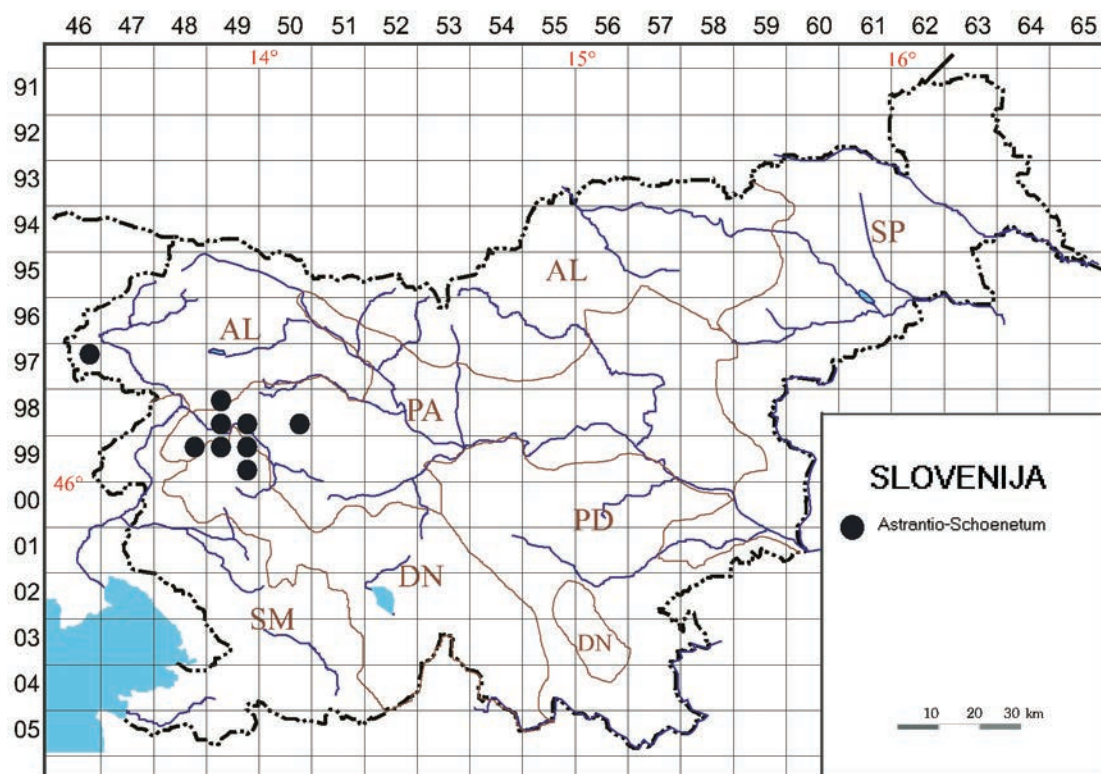


Figure 3: Approximate localities of stands of the association *Astrantio carniolicae-Schoenetum nigricantis* on the map of Slovenia
Slika 3: Približna nahajališča sestojev asociacije *Astrantio carniolicae-Schoenetum nigricantis* na zemljevidu Slovenije

requirements indicate that it is a very good character species of the newly described association, both in terms of ecology and chorology. The existing localities of the stands of the new association are mainly in the Cerknjo and Idrija regions: gorge Kazarska (Bukovska) Grapa with Beli Potok creek, Orehovska Grapa gorge, Poličnica, Dabrška Grapa gorge, the Idrija valley at Stopnik – all of them still in the pre-Alpine phytogeographical region, the Sjavnica (Sevnica) valley with its tributary the Kopačnica, the area of Dolenja Trebuša with Hotenja, the area of Gorenja Trebuša with the Pršjak, the Kanomlja valley with Govška Grapa gorge – already in the Dinaric phytogeographical region. We came across slightly less typical stands of this association in the Breginjski Kot and in the Bača Valley (above the ravine of the Koritnica) – both in the Alpine phytogeographical region, and in the river basin of the Poljanska Sora (above the Kopačnica valley before Hotavlje) – also in the pre-Alpine phytogeographical region. The existing distribution of the described community on the map of Slovenia is presented in Figure 3.

4 CONCLUSIONS

Dolomite headwaters are recognised as vulnerable and threatened habitat types (calcareous fens) also at the European level (Natura 2000) – JOGAN et al. (2004). In the study area they were located in rather remote areas where no major human interventions have been made recently and where their development is mainly subject to the natural dynamics, i.e. succession processes and increasing forest cover. These are also the sites and localities of several red listed vulnerable species of Slovenia (ANON. 2002): *Schoenus nigricans*, *Cladium mariscus*, *Carex hostiana*, *C. davalliana*, *Epipactis palustris*, *Eriophorum latifolium*, protected species *Pinguicula alpina*, *Dactylorhiza fuchsii*, *Gymnadenia conopsea*, *Listera ovata* and *Platanthera bifolia* (ANON. 2004) as well

Most relevés in Table 1 are classified into the typical subassociation (*Astrantio carniolicae-Schoenetum nigricantis typicum*); in addition to the already mentioned two relevés (var. *Sesleria caserulea* prov.) there are five more relevés that stand out with the dominant *Cladium mariscus*. These relevés were made in the gorges of Pršjak (Gorenja Trebuša) and Vidršek (below Ravne at Cerknjo). We discussed these stands in the past already (DAKSKOBLER 2011) and also justified why they could not be classified neither into the association *Mariscetum serrati* (*Cladietum marisci*) nor into the association *Euphorbio villosae-Cladietum marisci* (ACCETTO 2001), the alliance *Magnocaricion elatae* and class *Phragmito-Magnocaricetea*. In this article we typify these stands, which differ from others mainly with considerable coverage of *Cladium mariscus*, as a new subassociation *Astrantio carniolicae-Schoenetum nigricantis cladietosum marisci*. Its only differential species is *Cladium mariscus*, which is dominant in the highest stand layer. According to this criterion these stands could also be classified at the rank of the new association *Schoeno nigricantis-Cladietum marisci*.

as of the endemic and Natura 2000 species *Primula carniolica*. Foresters should pay special attention to envisaged interventions (especially when planning chutes or heavy logging) in these wooded areas. As the studied headwaters are very small they may easily be overlooked. As such, they required accurate mapping and should be indicated in large-scale maps. We advise nature conservation services to encourage research into similar dolomite headwaters with *Schoenus nigricans* also in other parts of Slovenia, with the financial support of the European Union. They have been reported also in the Notranjska region (Polhov Gradec Hills) and in the Dolenjska region (the headwaters of the Besnica and the vicinity of Lipoglav) – KOCJAN et al. (2013: 154).

5 POVZETEK

Po srednjeevropski metodi (BRAUN-BLANQUET 1964) smo fitocenološko preučili malopovršinska dolomitna povirja, v katerih v zahodni Sloveniji raste črnikasti sitovec (*Schoenus nigricans*). Našli smo jih predvsem v Cerkljanskem in Idrijskem hribovju: Kazarska (Bukovska) grapa z Belim potokom, Orehovska grapa, Poličnica, Dabrška grapa, dolina Idrije pri Stopniku, v do-

lini Sjavnice (Sevnice) s pritokom Kopačnico, v Dolenji Trebuši s Hotenjo, v Gorenji Trebuši s Pršjakom, v dolini Kanomlje z Govško grapo, nekaj sestojev tudi v Breginjskem kotu, v Baški dolini (nad grapo Koritnice) in v povodju Poljanske Sore (nad dolino Kopačnice pred Hotavljami); torej v alpskem, predalpskem in dinarskem fitogeografskem območju. Od skupno 78 po-

pisov smo izločili tri, ki smo jih naredili v gozdnih sestojih (dva v rdečeborovju in enega v črnogabrovju z dlakavim slečem). Na podlagi primerjave 75 popisov (slika 1) smo ugotovili, da so se ločeno združevali popisi naslednjih asociacij: *Schoenetum nigricantis*, *Caricetum davallianae*, *Primuletum carniolicae* s. lat., *Primulo carniolicae-Seslerietum calcariae*. Večina popisov pa je bila od njih različnih. Njihova vrstna sestava je v primerjavi s sestoji asociacije *Schoenetum nigricantis* (MARTINČIČ 1991) precej drugačna, podobno velja za rastiščne razmere, zato jih uvrščamo v novo asociacijo *Astrantio carniolicae-Schoenetum nigricantis*. Obema združbama so poleg vrste *Schoenus nigricans* skupne le naslednje pogostejše vrste *Pinguicula alpina*, *Tofieldia calyculata*, *Parnassia palustris* in *Potentilla erecta*, deloma tudi *Campylium stellatum*, *Cladium mariscus*, *Palustriella commutata* in *Bryum pseudotriquetrum*. Precej vrst pa obema združbama ni skupnih in posledično je floristična podobnost po SØRENSEN-u (1948), če upoštevamo tudi manj pogoste (slučajne) vrste, le malo več kot 20 %. Preučeni sestoji uspevajo navadno na majhnih površinah, 5 m² do največ 30 m², na položnih do zelo strmih erozijskih pobočjih, ob majhnih studencih ali v vlažnem skalovju. So v neposrednem stiku z združbami skalnih razpok, v katerih pogosto prevladuje vrsta *Primula carniolica*, pa tudi z naravnimi travišči z dominantima vrstama *Molinia arundinacea* in (ali) *Sesleria caerulea*. Deloma se ta erozijska pobočja in dolomitna povirja zaraščajo, predvsem z vrbami (*Salix glabra*, *S. appendiculata*, *S. eleagnos*), posamično tudi s smreko, navadno krhliko in črnim gabrom. Povirja so v gozdnem prostoru, kjer prevladujejo združbe rdečega bora, črnega gabra in bukve (sestoji asociacij *Genisto januensis-Pinetum sylvestris*, *Rhododendro hirsuti-Ostryetum*, *Rhododendro hirsuti-Fagetum* in *Ostryo-Fagetum*). Diagnostične vrste, ki novo asociacijo zelo jasno razlikujejo od vseh dosedaj opisanih podobnih združb nizkih barij in povirij so: *Schoenus nigricans* in *Molinia arundinacea* (dominantni vrsti), *Astrantia carniolica* in *Palustriella commutata* (z veliko stalnostjo, zelo značilni za povirna skalnata rastišča), *Carex flacca*, *Erica carnea* (pogosti vrsti okoliških gozdov in travišč), *Salix glabra* (označuje ne samo vlažna rastišča, temveč tudi hladne grape med Julijskimi Alpami in Trnovskim gozdom) ter *Valeriana saxatilis* in *Primula carniolica* (značilnici združb vlažnih skalnih

razpok). Druga je kot endemit tudi fitogeografska razlikovalnica in kaže skupaj s kranjskim zalim kobulčkom (*Astrantia carniolica*) na endemično povirno združbo Jugovzhodnih Alp in severnega dela Dinarskega gorstva. Večino popisov v preglednici 1 uvrščamo v tipično subasociacijo *Astrantio carniolicae-Schoenetum nigricantis typicum*. Izstopata dva popisa, ki kažeta na podobnost s sestoji asociacije *Primulo carniolicae-Seslerietum calcariae* (začasno ju vrednotimo kot var. *Sesleria caerulea* prov.) in pet popisov, v katerih je dominantna navadna rezika (*Cladium mariscus*). O njih smo že pisali (DAKSKOBLER 2011) in jih zdaj tipiziramo kot novo subasociacijo *Astrantio carniolicae-Schoenetum nigricantis cladietosum marisci*. Njena edina razlikovalnica je vrsta *Cladium mariscus*. Po merilih dominantne vrste v najvišji sestojni plasti bi bila mogoča tudi uvrstitev teh sestojev v samostojno asociacijo *Schoeno nigricantis-Cladietum marisci*.

Dolomitna povirja sodijo med ranljive in ogrožene habitatne tipe (karbonatna nizka barja) tudi v evropskem okviru (Natura 2000) – JOGAN et al. (2004). V preučnem območju smo jih večinoma našli v precej odmaknjenih območjih, kjer v zadnjem času ni večjih človekovih posegov in na njihov razvoj najbolj vpliva naravna dinamika, torej sukcesijski procesi in večanje gozdnatosti. V sestojih opisane združbe uspeva tudi več v Sloveniji ranljivih vrst iz rdečega seznama (ANON. 2002): *Schoenus nigricans*, *Cladium mariscus*, *Carex hostiana*, *C. davalliana*, *Epipactis palustris*, *Eriophorum latifolium*, nekaj zavarovanih vrst: *Pinguicula alpina*, *Dactylorhiza fuchsii*, *Gymnadenia conopsea*, *Listera ovata* in *Platanthera bifolia* (ANON. 2004) in endemit in Natura 2000 vrsta kranjski jeglič (*Primula carniolica*). Gozdarji morajo biti pozorni pri morebitnih načrtovanih posegih (predvsem gradnji vlak in močnejših sečnjah) v ta gozdnata območja. Ker se preučena povirja pojavljajo na zelo majhnih površinah, jih nepoučeni prav lahka spregledajo, zato bi bilo potrebno njihovo natančno kartiranje in vnos v zemljevide podrobneje merila. Službam za varstvo narave priporočamo, da z denarno podporo Evropske skupnosti to spodbudijo, prav tako raziskave podobnih dolomitnih povirij s črnikastim sitovcem v drugih delih Slovenije. Poznamo jih tudi na Notranjskem (Polhograjsko hribovje) in na Dolenjskem (v povirju Besnice in v okolici Lipoglavu) – KOČJAN et al. (2013: 154).

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Figures (Slike) 4-14: Photo (Foto): I. Dakskobler



Figure 4: Typical dolomite area with small springs and stands with *Schoenus nigricans* (Beli potok, Kazarska grapa, Bukovo)
Slika 4: Značilno dolomitno območje, kjer so povirja s črnikastim sitovcem (*Schoenus nigricans*) – Beli potok (Kazarska grapa, Bukovo)



Figure 5: Stands of the association *Genisto januensis-Pinetum sylvestris* are typical for dolomite areas with stands of *Schoenus nigricans* (Pršjak, Gorenja Trebuša)
Slika 5: Sestoji asociacije *Genisto januensis-Pinetum sylvestris* so značilni za območja z dolomitnimi povirji s črnikastim sitovcem (*Schoenus nigricans*), Pršjak, Gorenja Trebuša



Figure 6: Stands of the association *Rhododendro hirsuti*-*Ostryetum* are also characteristic for dolomite areas with stands of *Schoenus nigricans*, Poličnica (Police)

Slika 6: Sestoji asociacije *Rhododendro hirsuti*-*Ostryetum* so prav tako značilni za dolomitna območja s sestoji črnkastega sitovca (*Schoenus nigricans*), Poličnica (Police)



Figure 7: Also in the stands of the association *Primulo carniolicae*-*Seslerietum calcariae* in spots thrive *Schoenus nigricans*

Slika 7: Tudi v sestojih asociacije *Primulo carniolicae*-*Seslerietum calcariae* ponekod uspeva črnkasti sitovec (*Schoenus nigricans*)



Figure 8: Stand of the association *Primuletum carniolicae* s. lat. with *Schoenus nigricans*, Beli potok (Bukovo)
Slika 8: Sestoj asociacije *Primuletum carniolicae* s. lat. s črnkastim sitovcem (*Schoenus nigricans*), Beli potok (Bukovo)



Figure 9: Stand of the association *Astrantio carniolicae-Schoenetum nigricantis*, detail
Slika 9: Sestoj asociacije *Astrantio carniolicae-Schoenetum nigricantis*, detajl



Figure 10: Early spring aspect of the association *Astrantio carniolicae-Schoenetum nigricantis*, Beli potok (Bukovo)
Slika 10: Zgodnje spomladanski videz asociacije *Astrantio carniolicae-Schoenetum nigricantis*, Beli potok (Bukovo)



Figure 11: Late spring aspect of the association *Astrantio carniolicae-Schoenetum nigricantis*, Kopačnica (Šebrelje)
Slika 12: Pozno pomladanski videz asociacije *Astrantio carniolicae-Schoenetum nigricantis*, Kopačnica (Šebrelje)



Figure 12: *Astrantia carniolica*, typical plant of stony and moist sites on dolomite bedrock

Slika 12: Kranjski zali koblček (*Astrantia carniolica*), značilna vrsta kamnitih in vlažnih rastišč na dolomitu



Figure 13: *Primula carniolica*, Slovenian endemic and one of the diagnostic species of the association *Astrantio carniolicae-Schoenetum nigricantis*

Slika 13: Kranjski jeglič (*Primula carniolica*), slovenski endemit in ena izmed diagnostičnih vrst asociacije *Astrantio carniolicae-Schoenetum nigricantis*



Figure 14: Stand of the subassociation *Astrantio carniolicae-Schoenetum nigricantis cladietosum marisci*, Pršjak (Gorenja Trebuša)

Slika 14: Sestoj subasociacije *Astrantio carniolicae-Schoenetum nigricantis cladietosum marisci*, Pršjak (Gorenja Trebuša)

Table 1: Communities with *Schoenus nigricans* in western Slovenia
Preglednica 1: Združbe z vrsto *Schoenus nigricans* v zahodni Sloveniji

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	28	29	30	31	32	
Database number of relevé (Delovna številka popisa)	210285	248795	248799	248801	212224	269320	244945	268307	268773	237853	269134	263164	269137	269202	269421	269199	263752	269248	269254	269403	266140	263170	269200	266709	266715	266717	244947	263166	266707	268504	237854	258586	
Elevation in m (Nadmorska višina v m)	480	340	350	400	360	300	225	240	357	480	350	440	400	470	400	440	390	515	560	400	253	475	475	530	565	440	202	440	530	480	500	440	
Aspect (Lega)	SW	NEE	NE	NE	SE	NE	S	SE	SE	SW	W	S	E	NNE	N	S	E	NE	S	N	SW	SW	SW	S	S	NE	S	NE	SE	NE	S	SW	
Slope in degrees (Nagib v stopinjah)	10	20	15	45	50	30	45	20	35	15	30	60	40	35	30	35	10	50	45	70	40	50	50	70	70	45	30	30	80	25	10	10	
Parent material (Matična podlaga)	D	D	D	D	DC	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Soil (Tla)	Li	Hy	Hy	Hy	Li	Hy	Hy	Hy	Hy	Hy	Hy	Hy	Hy	Hy	Hy	Hy	Li	Hy	Hy	Hy	Li	Hy	Hy	Li	Li	Li	Hy	Hy	Li	Re	Hy	Hy	
Cover of shrub layer in % (Zastiranje grmovne plasti v %)	E2	.	.	10	10	5	20	5	5	20
Cover of herb layer in % (Zastiranje zeliščne plasti v %)	E1	100	70	80	70	70	80	80	95	70	80	80	60	70	80	80	80	70	70	60	90	80	80	80	80	80	80	90	70	80	70	80	
Cover of moss layer in % (Zastiranje mahovne plasti v %)	E0	20	20	30	20	10	20	10	20	10	20	40	30	30	10	30	10	30	30	20	30	20	20	5	20	10	20	30	30	20	20	20	
Number of species (Število vrst)	19	22	24	24	15	16	13	14	15	17	18	16	15	20	12	23	14	18	18	15	13	14	16	14	17	25	17	13	19	22	17	21	
Relevé area (Velikost popisne ploskve)	m ²	5	10	15	15	10	20	20	20	10	10	10	10	10	10	10	10	10	10	20	20	10	10	20	20	20	10	10	10	5	10	10	
Date of taking relevé (Datum popisa)	5/30/2005	6/23/2013	6/23/2013	6/23/2013	6/5/2006	5/18/2017	5/29/2012	8/13/2017	10/8/2017	6/8/2010	5/30/2017	9/12/2016	5/30/2017	4/7/2017	3/31/2017	4/7/2017	6/24/2016	5/25/2017	5/25/2017	5/26/2107	4/9/2017	9/12/2016	4/7/2017	4/13/2017	4/13/2017	4/13/2017	5/29/2012	9/12/2016	4/13/2017	9/22/2017	6/8/2010	9/29/2015	
Locality (Nahajališče)	Police-Mlini	Reka-Sv. Ivan	Reka-Sv. Ivan	Reka-Sv. Ivan	Koritnica	Stopnik-Dabrček	Stopnik-V Mlinu	Gorenja Trebuša-Bele vode	Hotenja	Ravne-Vidršek	Sjavnica-Kopačnica	Orehovska grapa	Sjavnica-Kopačnica	Orehovska grapa	Kazarska grapa-Selska voda	Orehovska grapa	Kazarska grapa	Police-Poličnica	Police-Poličnica	Kazarska grapa-Selska voda	Gačnik	Orehovska grapa	Orehovska grapa	Kazarska grapa-Beli potok	Kazarska grapa-Beli potok	Kazarska grapa-Beli potok	Stopnik-Krepaka	Orehovska grapa	Kazarska grapa-Beli potok	Orehovska grapa-Orehhek	Ravne-Vidršek	Kanomlja-Govskarica	
Quadrant (Kvadrant)	9849/3	9849/4	9849/4	9849/4	9849/1	9849/3	9949/1	9949/1	9949/1	9849/4	9849/2	9849/4	9949/2	9849/4	9849/3	9849/4	9849/3	9849/3	9849/3	9849/3	9949/1	9849/4	9849/4	9849/3	9849/3	9849/3	9849/3	9849/4	9849/3	9849/4	9849/4	9949/4	
Coordinate GK Y (D-48)	m	415820	416919	416889	416842	413688	415028	414033	409788	413337	418741	417202	418139	417088	418135	415892	418153	416076	415630	415307	415885	410419	418004	418148	415506	415365	415725	413283	418122	415465	418235	418733	422229
Coordinate GK X (D-48)	m	5109991	5107729	5107617	5107584	5115977	5108813	5106344	5103402	5103897	5108232	5106364	5110899	5106253	5110917	5111324	5110897	5111047	5110158	5110528	5111339	5104091	5111052	5110966	5110732	5110744	5110632	5106883	5110878	5110716	5111155	5108284	5099666

Diagnostic species of the associations (Diagnostične vrste asociacije)

CD <i>Schoenus nigricans</i>	E1	3	4	3	4	4	2	3	4	3	4	3	4	3	3	4	3	4	4	4	4	3	3	4	4	4	4	3	3	4	3	4	3	
EP <i>Molinia arundinacea</i>	E1	3	4	4	3	2	4	4	4	3	3	4	3	3	4	4	3	2	3	3	2	4	4	4	2	3	3	3	4	3	2	4		
TR <i>Astrantia carniolica</i>	E1	1	1	2	1	2	3	1	2	2	1	2	1	1	1	4	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	.	
MC <i>Palustriella commutata</i>	E0	.	2	2	1	1	2	1	1	1	2	2	1	2	2	2	2	2	2	1	2	1	2	1	1	1	1	1	2	3	2	2		
EP <i>Erica carnea</i>	E1	+	+	+	+	+	+	+	+	+	+	+	+	1	+	1	+	+	+	+	+	+	+	+	+	+	+	+	+	1	1	2		
QP <i>Carex flacca</i>	E1	.	+	+	+	+	1	.	.	.	.	+	+	.	+	.	.	.	+	+	+	+	+	1	2	2	+	+	.	.	.	1
AT <i>Valeriana saxatilis</i>	E1	1	1	+	+	.	.	.	.	.	.	.	+	+	.	+	+	1	1	1	1	+	+	+	+	.	1	.	.	+	.	.
BA <i>Salix glabra</i>	E2a	+	.	+	+	.	.	.	.	.	.	.	r	.	.	+	+	+	1	+	+	.	.	+	+	+	+	.	+	+	.	1
AT <i>Primula carniolica</i>	E1	+	.	1	2	.	.	.	.	.	.	.	+	.	1	.	.	.	+	.	.	1	1	2	+	+	+	2	2	.	.	.
Differential species of lower units (Razlikovalna vrsta subasociacije)																																		
PM <i>Cladium mariscus</i>	E1

69 *Pinguicula alpina* community prov.

Pr. Presence (number of relevés in which the species is presented) - število popisov, v katerih se pojavlja vrsta

Fr. Frequency in % - frekvenca v %

A Limestone - apnenec

D Dolomite - dolomit

C Chert - roženec

Tu Tufa - lehnjak

Gr Gravel - grušč

Hy Molic Gleysols - organsko-mineralna tla

Li Lithosol - kamnišče

Re Rendzina - rendzina