

A SECOND ILLYRIAN GEOGRAPHIC VARIANT OF THE
ASSOCIATION OF SESSILE OAK AND SAW-WORT (*SERRATULO
TINCTORIAE-QUERCETUM PETRAEAE* VAR. GEOGR.
EPIMEDIUM ALPINUM)

DRUGA ILIRSKA GEOGRAFSKA VARIANTA ZDRUŽBE GRADNA
IN BARVILNE MAČINE (*SERRATULO TINCTORIAE-QUERCETUM
PETRAEAE* VAR. GEOGR. *EPIMEDIUM ALPINUM*)

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ABSTRACT

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A second illyrian geographic variant of the association of sessile oak and saw-wort (*Serratulo tinctoriae-Quercetum petraeae* var. geogr. *Epimedium alpinum*)

A second illyrian geographic variant of *Serratulo tinctoriae-Quercetum petraeae* Ht. ex Zupančič & Žagar 2009 var. geogr. *Epimedium alpinum* var. geogr. nova in the western part of the illyrian floral province (Bela krajina, Poljanska gora, Poljanska dolina, Slovenia) is described.

Key words: phytocenology, *Quercus petraea*, *Epimedium alpinum*, Bela krajina, Slovenia.

IZVLEČEK

UDK 582.632.2:581.55(497.4)

Druga ilirska geografska varianta združbe gradna in barvilne mačine (*Serratulo tinctoriae-Quercetum petraeae* var. geogr. *Epimedium alpinum*)

Opisana je še druga ilirska geografska varianta *Serratulo tinctoriae-Quercetum petraeae* Ht. ex Zupančič & Žagar 2009 var. geogr. *Epimedium alpinum* var. geogr. nova v zahodnem delu ilirske florne province (Bela krajina, Poljanska gora, Poljanska dolina, Slovenija).

Ključne besede: fitocenologija, *Quercus petraea*, *Epimedium alpinum*, Bela krajina, Slovenija.

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In the paper on the association *Quercus-Ostryetum* Ht. 1938 (ZUPANČIČ, ŽAGAR & VREŠ 2009), because of comparison and relatedness we also discussed the question of the association *Serratulo tinctoriae-Quercetum petraeae* Ht. ex Zupančič & Žagar 2009 [= *Lathyro nigrae-Quercetum petraeae* Ht. (1938) 1958] (ZUPANČIČ, ŽAGAR & VREŠ 2009: 139–143, 145–146 in 157–160, 162–163 in 167–188). We then distinguished from the basic or macroassociation a geographic variant *Serratulo-Quercetum* var. geogr. *Acer obtusatum* Zupančič & Žagar 2009, in the region of Medvednica and Hrvatske Zagorje in Croatia. In Slovenia, only the basic association *Serratulo-Quercetum* var. geogr. *typica* (CIMPERŠEK 2008, ZUPANČIČ, ŽAGAR & VREŠ 2009) has been recognised in Notranska, Kočevje and Štajerska. A later review of the phytocenological material of Zupančič and Žagar revealed four phytocenological relevés that relate to the association *Serratulo-Quercetum* in Bela krajina in the region of Poljanska gora (Poljanska dolina). The relevés were recorded in the vicinity of Delki and Debeli vrh (865 m).

A local warm influence is observable in this environment, which comes along the River Kolpa from two directions, namely mediterranean (sub-mediterranean) from the southwest and pannonian (sub-pannonian) from the southeast. The region of Bela krajina otherwise has the moderate continental climate of western and southern Slovenia. The average annual temperatures are 8 to 10 °C. Precipitation averages annually from 1200 to 1300 mm. The soils are from dolomite brown rendzina to brown carbonate soils on limestone. The relief is karstic, broken, in places rounded because of the dolomite base, elsewhere rocky with 20 and more percentage surface stoniness. Slopes are mild to medium steep, for the most part on warm southern, south-western or western exposures.

A geographic variant of sessile oak and saw-wort with alpine barrenwort or barrenwort *Serratulo tinctoriae-Quercetum petraeae* var. geogr. *Epimedium alpinum* appears on these habitats. These sessile oak stands are fairly open in the tree layer, with quite a considerable admixture of turkey oak, which for the most part moderately predominates over sessile oak. The openness of the stands influences the greater cover value and variety of the shrub layer and the settlement of non-forest herb species.

It is actually a specific degradation of the sessile oak stands in question, in which species that indicate the degradation predominate in the shrub and herb layers. Of shrub species, these are: *Crataegus monogyna*, *Pyrus pyraster*, *Corylus avellana*, *Rubus caesius* and *R. hirtus*. Of herb species they are: *Brachypodium rupestris*, *Carex flacca*, *Melampyrum pratense* subsp. *vulgatum*, *Pteri-*

dum aquilinum, *Molinia arundinacea* and *Agrostis tenuis*. Turkey oak – *Quercus cerris* – is also considered to be among degradation species, which is also frequent in these sessile oak stands as an indicator of the specific thermophilous nature of the association *Serratulo-Quercetum* s. lat.

In connection with the enumerated species, we considered the possibility of the marginal or secondary association *Brachypodio rupestris-Ostryetum carpinifoliae* Čarni 1997 or perhaps *Melampyro vulgati-Quercetum petraeae* Puncer & Zupančič 1979 var. geogr. *Epimedium alpinum* (Puncer & Zunačič 1979) Zupančič 1994. By comparison, we found that the composition of flora is considerably different, which is also confirmed by Sørensen's (σ_s) and Jaccard's (σ_j) indices of similarity. Comparison between the associations *Serratulo-Quercetum* and *Brachypodio-Ostryetum* is $\sigma_s = 48.8$ or $\sigma_j = 32.3$ and with the geographic variant *Melampyro-Quercetum* var. geogr. *Epimedium alpinum* it is $\sigma_s = 33.2$ or $\sigma_j = 19.9$. In the present stands of the phytocenosis *Serratulo-Quercetum* var. geogr. *Epimedium alpinum*, it is most confirmed by its characteristic species, which are represented with a high level of permanence and large medium cover values. Characteristic species of the order *Quercetalia pubescentis-petraeae* are also relatively well represented, less the alliance *Fraxino orni-Ostryon*, in which the association *Serratulo-Quercetum* s. lat. is classified (see Phytocenological Table).

That it is a degradation form of the geographic variant *Serratulo-Quercetum* var. geogr. *Epimedium alpinum* is indicated by species of the classes *Erico-Pinetea* and partially *Vaccinio-Piceetea*, the order *Prunetalia spinosae* and alliance *Carpinion*, and numerous species of non-forest synsystematic units, above all from the classes *Trifolio-Geranietea*, *Nardo-Callunetea*, *Festuco-Brometea* and *Molinio-Arrhenatheretea*. Occasional species from the classes *Epilobietea angustifolii*, *Sedo-Scleranthetea* and *Artemisietea vulgaris* can also not be neglected. The causes of degradation are for the most part bad silviculture measures by individual owners, the vicinity and easy access to stands, difficult rejuvenation of hardwood deciduous species, above all slow growing sessile oak. Because of the warm influences and satisfactory wetness, in open stands there is a mass appearance of non-forest species, which successfully overgrow habitats of the geographic variant *Serratulo-Quercetum* var. geogr. *Epimedium alpinum* and obstruct or even prevent the growth of seeds of tree species.

Despite the mentioned degradation influences, stands of sessile oak and barrenwort – *Serratulo-Quercetum* var. geogr. *Epimedium alpinum* have retained their autonomous appearance. This is supported by species of the orders *Quercetalia pubescentis-petraeae*, *Fagetalia*

sylvaticae, *Quercetalia roboris-petraeae* and the class *Quercu-Fagetea*. We also provisionally classify to these synsystematic units the order *Prunetalia spinosae*, which, despite its degradation character, is an integral part of the thermophilous association *Serratulo-Quercetum* s. lat. The majority of the recorded species of the order *Prunetalia spinosae* in the phytocenosis *Serratulo-Quercetum* s. lat. are sun-loving and thermophilous.

There is a convincing presence of southeast-european characteristic species of the geographic variant *Epimedium alpinum*. This is a species which has a narrow area of distribution in the illyrian floral province and is classified among de-montane western-illyrian and eastern alpine geo-elements. Of southeast european-illyrian

species are also present *Aremonia agrimonioides*, *Cyclamen purpurascens* and *Omphalodes verna* from the illyrian alliances *Aremonio-Fagion* and *Aposeris foetida* from the class *Vaccinio-Piceetea*. The illyrian geographic variant *Serratulo-Quercetum* Ht. ex Zupančič & Žagar 2009 var. geogr. *Epimedium alpinum* var. geogr. nova is well defined.

The holotype of the geographic variant is relevant number 1 from the accompanying Phytocenological Table.

The article is an addendum to the chapter on the association *Serratulo-Quercetum* s. lat. from the paper on the association *Quercu-Ostryetum* in Slovenia (ZUPANČIČ, ŽAGAR & VREŠ 2009: 139–143 and 157–160).

POVZETEK

Druga ilirska geografska varianta združbe gradna in barvilne mačine (*Serratulo tinctoriae-Quercetum petraeae* var. geogr. *Epimedium alpinum*)

V razpravi o asociaciji *Quercu-Ostryetum* Ht. 1938 (ZUPANČIČ, ŽAGAR & VREŠ 2009) smo zaradi primerjave in sorodnosti obravnavali tudi problematiko asociacije *Serratulo tinctoriae-Quercetum petraeae* Ht. ex Zupančič & Žagar 2009 [= *Lathyro nigrae-Quercetum petraeae* Ht. (1938) 1958] (ZUPANČIČ, ŽAGAR & VREŠ 2009: 139–143, 145–146 in 157–160, 162–163 in 167–188). Tedaj smo od osnovne ali makroasociacije ločili geografsko varianto *Serratulo-Quercetum* var. geogr. *Acer obtusatum* Zupančič & Žagar 2009 na območju Medvednice in Hrvaškega Zagorja na Hrvaškem. V Sloveniji je bila na Notranjskem, Kočevskem in Štajerskem do zdaj poznana le osnovna asociacija *Serratulo-Quercetum* var. geogr. *typica* (CIMPERŠEK 2008, ZUPANČIČ, ŽAGAR & VREŠ 2009). Poznejši pregled fitocenološkega gradiva Zupančiča in Žagarja je odkril štiri fitocenološke popise, ki se nanašajo na asociacijo *Serratulo-Quercetum* v Beli krajini na območju Poljanske gore (Poljanska dolina). Popisi so bili posneti v okolici Delkov in Debelega vrha (865 m).

V tem okolju je opazen lokalni toplotni vpliv, ki prihaja po reki Kolpi iz dveh smeri, in sicer mediteranski (submediteranski) z jugozahoda ter panonski (subpanonski) z jugovzhoda. Sicer pa je na območju Bele krajine zmerno kontinentalno podnebje zahodne in južne Slovenije. Povprečne letne temperature so od 8 do 10 °C. Padavin je na leto povprečno od 1200 do 1300 mm. Tla so od dolomitnih rjavih rendzin do rjavih karbonatnih tal na apnencu. Relief je kraški, razgiban, ponekod zaobljen zaradi dolomitne podlage, drugod

skalovit z 20 in več odstotno površinsko kamnitostjo. Pobočja so blago do srednje strma, večinoma izpostavljena toplim južnim, jugozahodnim ali zahodnim legam.

Na teh rastiščih se pojavlja geografska varianta gradna in barvilne mačine z alpskim vimčkom ali lipico *Serratulo tinctoriae-Quercetum petraeae* var. geogr. *Epimedium alpinum*. Ti gradnovi sestoji so v drevesni plasti precej odprti, s precejšnjo primesjo cera, ki večinoma zmerno prevladuje nad gradnom. Odprtost sestojev vpliva na večjo pokrovnost in raznovrstnost grmiščne plasti in naselitev negozdnih zeliščnih vrst.

Pravzaprav gre za določeno degradacijo obravnavanih gradnovih sestojev, kjer v grmovni in zeliščni plasti prevladujejo vrste, ki nakazujejo degradacijo. Od grmovnih vrst so to: *Crataegus monogyna*, *Pyrus pyraeaster*, *Corylus avellana*, *Rubus caesius* in *R. hirtus*. Od zeliščnih vrst pa so: *Brachypodium rupestris*, *Carex flacca*, *Melampyrum pratense* subsp. *vulgatum*, *Pteridium aquilinum*, *Molinia arundinacea* in *Agrostis tenuis*. Tudi cer – *Quercus cerris* prištevamo k degradacijskim vrstam, ki je tudi sicer pogost v teh gradnovih gozdovih kot znanilec določene termofilnosti asociacije *Serratulo-Quercetum* s. lat.

V zvezi z naštetimi vrstami smo pomislili na možnost obrobne ali drugotne združbe *Brachypodio rupestris-Ostryetum carpinifoliae* Čarni 1997 ali morda na *Melampyro vulgati-Quercetum petraeae* Puncer & Zupančič 1979 var. geogr. *Epimedium alpinum* (Puncer & Zunačič 1979) Zupančič 1994. S primerjanji smo ugotovili, da je sestava flore precej drugačna, kar potrjujejo tudi indeksi podobnosti Sørensenove (σ_s) in Jaccarda (σ_j). Primerjava med asociacijama *Serratulo-Quercetum* in *Brachypodio-Ostryetum* je $\sigma_s = 48,8$ oz. $\sigma_j = 32,3$ in z geografsko varianto *Melampyro-Quercetum* var. geogr. *Epimedium alpinum*

je $\sigma_s = 33,2$ oz. $\sigma_j = 19,9$. V pričujočih sestojih fitocenoz *Serratulo-Quercetum* var. geogr. *Epimedium alpinum* pa jo najbolj potrjujejo njene značilnice, ki so zastopane z veliko stopnjo stalnosti in veliko srednjo pokrovno vrednostjo. Razmeroma dobro so tudi zastopane značilnice reda *Quercetalia pubescentis-petraeae*, manj zveze *Fraxino orni-Ostryon*, kamor uvrščamo asociacijo *Serratulo-Quercetum* s. lat. (glej Fitocenološko tabelo).

Da gre za degradacijsko obliko geografske variante *Serratulo-Quercetum* var. geogr. *Epimedium alpinum*, kažejo vrste razredov *Erico-Pinetea* in deloma *Vaccinio-Piceetea*, reda *Prunetalia spinosae* in zveze *Carpinion*, ter številne vrste negozdnih sinsistematskih enot, predvsem iz razredov *Trifolio-Geranietea*, *Nardo-Callunetea*, *Festuco-Brometea* in *Molinio-Arrhenatheretea*.

Zanemariti ne smemo niti redkih vrst iz razredov *Epilobieteae angustifolii*, *Sedo-Scleranthetea* in *Artemisieteae vulgaris*. Vzroki za degradacijo so večinoma slabi gozdnogojitveni ukrepi posameznih lastnikov, bližina in lahka dostopnost do sestojev, otežena pomladitev vrst trdih listavcev, predvsem počasi rastočega gradna. Zaradi toplotnih vplivov in zadovoljive namočenosti se v odprtih sestojih množično pojavljajo negozdne vrste, ki uspešno preraščajo rastišče geografske variante *Serratulo-Quercetum* var. geogr. *Epimedium alpinum* in zavirajo ali celo onemogočajo rast klicam drevesnih vrst.

Kljub omenjenim degradacijskim vplivom so sestoji gradna in barvilne mačine – *Serratulo-Quercetum* var.

geogr. *Epimedium alpinum* obdržali svoj avtohtoni videz. Temu botrujejo vrste redov *Quercetalia pubescentis-petraeae*, *Fagetalia sylvaticae*, *Quercetalia roboris-petraeae* in razreda *Quercu-Fagetea*. K tem sinsistematskim enotam pogojno uvrščamo tudi red *Prunetalia spinosae*, ki je, ne glede na njegov degradacijski značaj, sestavni del toploljubne asociacije *Serratulo-Quercetum* s. lat. Večina zabeleženih vrst reda *Prunetalia spinosae* v fitocenozah *Serratulo-Quercetum* s. lat. je sončnoljubnih in toploljubnih.

Prepričljiva je prisotnost jugovzhodnoevropsko-ilirske značilnice geografske variante *Epimedium alpinum*. To je vrsta, ki ima v ilirski florni provinci ozek areal in jo uvrščamo med demontanske zahodnoilirske in vzhodnoalpske geoelemente. Od jugovzhodnoevropsko-ilirskih vrst so še prisotne *Aremonia agrimonioides*, *Cyclamen purpurascens* in *Omphalodes verna* iz ilirske zveze *Aremonio-Fagion* ter *Aposeris foetida* iz razreda *Vaccinio-Piceetea*. S temi vrstami je ilirska geografska varianta *Serratulo-Quercetum* Ht. ex Zupančič & Žagar 2009 var. geogr. *Epimedium alpinum* var. geogr. nova dobro definirana.

Holotip geografske variante je popis številka 1 iz pričujoče Fitocenološke tabele.

Članek je dopolnilo k poglavju o asociaciji *Serratulo-Quercetum* s. lat. iz razprave o asociaciji *Quercu-Ostryetum* v Sloveniji (ZUPANČIČ, ŽAGAR & VREŠ 2009: 139–143 in 157–160).

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**PHYTOCOENOLOGICAL TABLE (Fitocenološka tabela) 1: SERRATULO TINCTORIAE-QUERCETUM PETRAEAE (Ht.)
ex Zupančič & Žagar 2009 var. geogr. EPIMEDIUM ALPINUM (Lathyro nigrae-Quercetum petraeae Ht. /1938/ 1958)**

Number of relevé/Author of analytical table (Zaporedna številka popisa/Avtor analitične tab)	1	2	3	4	Zupančič & Žagar	Horvat	Zupančič & Žagar	Cimperšek
Altitude in m (Nadmorska višina v m)	680	500	540	550	500-680	245-660	540-750	270-655
Aspect (Nebesna lega)	SSW	SSW	SSW	W	SSW, W	SE-S-SW	SE-S-SW	SE-S-SW
Slope in degrees (Nagib v stopinjah)	10	25	15	15	10-25	10-35	15-30	25-40
Bedrock (Geološka podlaga)	dol	apn	dol	dol	dol/apn	dol	dol, apn	apn, dol/apn
Stoniness in % (Kamnitost v %)	0	20	0	0	0-20	0	0-60	0-40
Cover (Pokrovnost) %: Tree layer (Drevesna pl.)	I	50	70	60	70			
Shrub layer (Grmovna plast)	II	20	40	30	30			
Herb layer (Zeliščna plast)	III	90	90	100	80			
Moss layer (Mahovna plast)	IV	0	10	0	0			
Relevé (Velikost popisne ploskve) m ²	400	400	400	400				
Location (Kraj popisov)	Bela Krajina – Poljanska dolina Pod Delki in Debelim vrhom				BK PD	MED HZG	NOT KOČ	ŠTAJ
Country (Država)	Slovenija	Slovenija	Slovenija	Slovenija	Slovenija	Hrvaška	Slovenija	Slovenija
Number of relevé (Število popisov)					4	5	4	14

Sinsistematska
(Sinsistematska pripadnost)

SERRATULO TINCTORIAE-QUERCETUM PETRAEAE (Ht.) ex Zupančič & Žagar 2009

		1	2	3	4	Z & Ž	HT	Z & Ž	CI
F ₃ Quercus petraea	I	1.3	1.1	1.3	2.3	4	5250 V	3 ²⁻³	3357 V
	II	+	1.2	1.2	1.2	4	952 IV	3 ⁺¹	36 II
	III	.	.	+	.	1	6 III	3 ⁺¹	.
Q ₂ Tamus communis		+	+	+	+	4	552 V	1 ⁺	4 IV
MA Serratula tinctoria		2.2	+2	+	.	3	3002 V	3 ⁺¹	75 V
Q ₂ Lathyrus niger		+	+	+	.	3	1152 V	2 ⁺	134 V

Distinguishing species of geographic variant (Razlikovalnica za geografsko varianto)

		1	2	3	4	Z & Ž	HT	Z & Ž	CI
• F ₁ Epimedium alpinum	III	2.3	1.2	2.2	2.3	4	.	.	.
Q ₂ QUERCETALIA PUBESCENTIS Br.-Bl. (1931) 1932 s. lat.						Z & Ž	HT	Z & Ž	CI
OO Quercus cerris	I	2.3	2.3	2.3	2.3	4	1106 I	2 ⁺¹	751 IV
	II	.	1.2	1.2	1.2	3	.	3 ⁺	.
	III	.	.	1.1	.	1	4 II	.	.
OO Fraxinus ornus	II	+	+	2.3	1.2	4	1000 V	4 ²	363 V
	I	.	.	.	.	.	754 III	4 ²	112 IV
Tamus communis	III	+	+	+	+	4	552 V	1 ⁺	4 IV
Lathyrus niger		+	+	+	.	3	1152 V	2 ⁺	134 V
Melittis melissophyllum		+	.	+	+	3	206 V	4 ⁺	6 V
Sorbus torminalis	II	+	.	+	+	3	108 V	1 ⁺	5 IV
Hypericum montanum	I	.	.	.	.	.	4 II	1 ⁺	3 III
Hypericum montanum	III	.	+	+	.	2	4 II	2 ⁺	- II
Camptothecium lutescens	IV	.	2.3	.	.	1	.	4 ⁺³	.
OO Ostrya carpinifolia	I	.	2.2	.	.	1	204 IV	2 ¹⁻⁴	76 IV
	II	.	+	.	.	1	4 II	3 ⁺²	.
Sorbus aria	II	.	.	.	+	.	.	.	.
	I	.	.	.	.	.	102 II	2 ⁺¹	4 IV

P PRUNETALIA SPINOSAE R. Tx. 1952

		1	2	3	4	Z & Ž	HT	Z & Ž	CI
Crataegus monogyna	II	2.2	2.2	1.1	2.2	4	206 V	3 ⁺	43 V
Cornus mas		+	+	+	.	3	552 IV	2 ¹	77 V
Ligustrum vulgare		.	.	2.3	1.2	2	302 IV	2 ²	6 IV
Berberis vulgaris		.	1.1	+	.	2	6 III	2 ⁺	1 II
Rhamnus catharticus		.	.	.	1.1	1	4 II	3 ⁺	3 III
Viburnum lantana		.	+3	.	.	1	204 IV	4 ⁺¹	198 II
Juniperus communis		.	+	.	.	1	4 II	1 ⁺	1 II

C CARPINION Issler 1931 em. Oberdorfer 1957									
		1	2	3	4	Z & Ž	HT	Z & Ž	CI
Pyrus pyraeaster	II	+	1.2	+	2.3	4	2 I	.	.
Carex montana	III	+2	+2	1.2	1.2	4	.	.	13 IV
Rosa arvensis	II	.	1.2	+	1.2	3	.	4 ⁺	4 IV
Carpinus betulus		.	+	.	+2	2	202 III	3 ⁺¹	1 I
Acer campestre		+	.	.	.	1	452 III	1 ⁺	6 V
Prunus avium		.	.	.	+	1	8 IV	1 ⁺	- II
• F ₁ AREMONIO-FAGION (Ht. 1938) Török, Podani & Borhidi 1989									
		1	2	3	4	Z & Ž	HT	Z & Ž	CI
Epimedium alpinum	III	2.3	1.2	2.3	2.3	4	.	.	.
Aremonia agrimonoides		.	+	+	+	3	.	4 ⁺	1 I
Cyclamen purpurascens		+	.	+	.	2	2 I	4 ⁺¹	5 V
Omphalodes verna		+	.	+	.	2	.	3 ⁺¹	.
F ₂ FAGETALIA SYLVATICAE Pawl. 1928									
		1	2	3	4	Z & Ž	HT	Z & Ž	CI
Salvia glutinosa	III	1.2	+2	+2	.	3	.	3 ⁺	1 III
Euphorbia dulcis		+	.	+2	+2	3	6 III	.	1 I
Fagus sylvatica	I	1.2	+	.	.	2	.	2 ⁺¹	37 II
Euphorbia amygdaloides	III	+	.	.	.	1	4 II	1 ⁺	1 II
Carex sylvatica		.	+2	+	.	2	.	2 ⁺¹	3 III
Cephalanthera damasonium		.	.	.	+2	1	.	.	.
Daphne mezereum	II	+	.	.	.	1	4 II	.	.
Epipactis helleborine	II	+	.	.	.	1	.	1 ⁺	.
Epipactis helleborine	III	+	.	.	.	1	.	2 ⁺	- II
Galium odoratum		+	.	.	.	1	.	.	- II
Helleborus odoratus		+	.	.	.	1	.	.	.
Polygonatum multiflorum		.	.	+	.	1	.	.	.
Prenanthes purpurea		+	.	.	.	1	.	.	.
Viola reichenbachiana		.	.	+	.	1	.	.	.
RP ₂ QUERCETALIA ROBORIS-PETRAEAE R.-Tx. (1931) 1937									
		1	2	3	4	Z & Ž	HT	Z & Ž	CI
Melampyrum pratense subsp. vulgatum	III	1.1	+	+	+	4	.	.	13 IV
Pteridium aquilinum		3.4	+3	.	1.3	3	.	1 ⁺	1 I
Festuca heterophylla		.	+2	.	+2	2	550 III	1 ⁺	112 V
Veronica officinalis		+	.	.	+	2	.	.	.
Betula verrucosa	I	+	.	.	.	1	.	.	.
Hieracium racemosum	III	.	+	.	.	1	.	.	.
Populus tremula	I	+	.	.	.	1	.	.	.
Teucrium scorodonia	III	.	.	.	+	1	.	.	.
F ₃ QUERCO-FAGETEA Br.-Bl. & Vlieger in Vlieger 1937 s. lat.									
		1	2	3	4	Z & Ž	HT	Z & Ž	CI
Quercus petraea	I	1.3	1.1	1.3	2.3	4	5250 V	3 ²⁻³	3357 V
	II	+	1.2	1.2	1.2	4	952 IV	3 ⁺¹	36 II
	III	.	.	+	.	1	6 III	3 ⁺¹	.
Corylus avellana	II	1.1	1.2	1.1	1.2	4	2 I	2 ⁺¹	.
Hedera helix		+	.	+2	+	3	104 III	.	5 V
Clematis vitalba		+	+	+2	.	3	6 III	3 ⁺	1 IV
Ctenidium molluscum	IV	.	+3	+3	.	2	.	3 ¹⁻²	.
Carex digitata	III	+2	.	.	.	1	.	4 ⁺¹	1 II
Anemone nemorosa		+	.	.	.	1	.	.	1 I
Convallaria majalis		+	.	.	.	1	204 IV	3 ⁺¹	1 III
Prunus padus	II	.	.	+	.	1	.	.	.

EP₃ ERICO-PINETEA Ht. 1959 s. lat.

		1	2	3	4	Z & Ž	HT	Z & Ž	CI
Buphthalmum salicifolium	III	+	+	+	+	4	100 I	4 ⁺	2 II
Molinia caerulea subsp. arundinacea		2.3	.	+2	+2	3	.	.	.
Cirsium erisithales		+	+	+	.	3	.	.	.
Dorycnium germanicum		.	+	+	.	2	.	.	.
Scleropodium purum	IV	.	+3	.	.	1	.	.	.
Pinus sylvestris	I	.	+	.	.	1	.	1 ⁺	.

VP₃ VACCINIO-PICEETEA Br.-Bl. in Br.-Bl. et al. 1939 em. Zupančič (1976) 2000

		1	2	3	4	Z & Ž	HT	Z & Ž	CI
Solidago virgaurea	III	+	+	+2	+	4	100 I	4 ⁺¹	- II
Rubus hirtus	II	.	1.2	+	+2	3	.	.	.
Calluna vulgaris	III	+0	.	+0	.	3	.	.	.
Polytrichum formosum	IV	+3	.	.	+3	2	.	.	.
Abies alba	II	.	.	+	+	2	II	2 ⁺	.
Dicranella heteromalla	IV	+3	.	.	.	1	.	.	.
Grimmia pulvinata		.	+3	.	.	1	.	2 ⁺	.
Hypnum cupressiforme		.	+3	.	.	1	.	2 ⁺	.
Aposeris foetida	III	+	.	.	.	1	1 I	.	1 I
Hieracium murorum		+	.	.	.	1	.	.	1 I

E EPILOBIETEA ANGUSTIFOLII R. Tx. & Prsg. in R. Tx. 1950 s. lat.

		1	2	3	4	Z & Ž	HT	Z & Ž	CI
Fragaria vesca	III	+	.	1.1	+	3	.	3 ⁺¹	- I
Verbascum nigrum		.	.	.	+	1	.	.	.

TG TRIFOLIO-GERANIETEA SANGUINEI T. Müller 1961 s. lat.

		1	2	3	4	Z & Ž	HT	Z & Ž	CI
Geranium sanguineum	III	+	+	+	+	4	102 II	2 ⁺	1 I
Clinopodium vulgare		.	+	+	+	3	.	.	.
Cruciata glabra		+	.	+	+	3	4 II	2 ⁺	2 II
Trifolium medium		+	+	+	.	3	.	.	1 I
Origanum vulgare		.	+	+	.	2	.	.	.
Laserpitium latifolium		+	.	.	.	1	350 I	1 ⁺	.
Vincetoxicum hirundinaria		.	.	+	.	1	2 I	2 ⁺	4 IV

NC NARDO-CALLUNETEA Prsg. 1949 s. lat.

		1	2	3	4	Z & Ž	HT	Z & Ž	CI
Potentilla erecta	III	+	+	+	+	4	.	.	.
Genista germanica		+	+2	.	+	3	.	1 ⁺	- II
Chamaecytisus hirsutus		+	1.1	.	+	3	.	1 ¹	.

SS SEDO-SCLERANTHETEA Br.-Bl. 1955 em. Th. Müller 1961 s. lat.

		1	2	3	4	Z & Ž	HT	Z & Ž	CI
Thymus pulegioides	III	.	+2	.	.	1	.	.	.
Allium pulchellum		.	.	.	+	1	.	.	.

FB FESTUCO-BROMETEA Br.-Bl. & R. Tx. 1943 s. lat.

		1	2	3	4	Z & Ž	HT	Z & Ž	CI
Brachypodium rupestre	III	+2	4.4	4.4	3.3	4	.	3 ⁺⁴	.
Galium verum		.	+2	+	.	2	.	.	.
Filipendula hexapetala		.	.	+	+	2	.	.	.
Sanguisorba minor		.	+	.	+	2	.	.	.
Silene italica agg.		.	+	.	+	2	2 I	.	.
Teucrium chamaedrys		.	+	+	.	2	2 I	4 ⁺	.
Carex humilis		1.2	.	.	.	1	.	4 ⁺²	.
Chamaespartium sagittale (Genista sagittalis)		.	.	.	+2	1	.	.	- I
Dianthus hyssopifolius (D. monspessulanus)		.	+	.	.	1	.	2 ⁺	.
Pimpinella saxifraga		.	.	+	.	1	.	2 ⁺	.
Prunella grandiflora		+	.	.	.	1	.	.	.

MA MOLINIO-ARRHENATHERETEA R. Tx. 1937 s. lat.

		1	2	3	4	Z & Ž	HT	Z & Ž	CI
Carex flacca	III	1.2	1.2	2.2	1.2	4	402 V	3 ⁺¹	76 IV
Serratula tinctoria		2.2	+2	+	.	3	3002 V	3 ⁺¹	75 V
Agrostis tenuis		.	+2	1.2	1.2	3	.	.	.
Dactylis glomerata		+2	.	1.2	1.2	3	1102 II	1 ⁺	.
Centaurea jacea c. f.		.	1.1	+	+	3	.	2 ⁺¹	1 I
Betonica officinalis		+	.	+	+	3	4 II	4 ⁺	1 I
Achillea millefolium		.	+	+	.	2	.	.	.
Galium mollugo		.	.	+	+	2	.	.	1 I
Centaurea fritschii		.	1.2	.	.	1	.	.	.
Inula salicina		+	.	.	.	1	.	.	.

ART ARTEMISIETEA Lohmeyer, Preising & R. Tx. in R. Tx.1950 s. lat.

		1	2	3	4	Z & Ž	HT	Z & Ž	CI
Rubus caesius	II	.	2.2	+2	+2	3	.	.	.
Eupatorium cannabinum	III	.	+	.	.	1	.	.	.

M MOSSES (Mahovi)

		1	2	3	4	Z & Ž	HT	Z & Ž	CI
Fissidens taxifolius	IV	+3	.	.	.	1	.	.	.
Tortella tortuosa		.	+3	.	.	1	.	3 ⁺	.
Anomodon viticulosus		.	+2	.	.	1	.	.	.

DEGRADATION INDICATED SPECIES (Vrste, ki nakazujejo degradacijo)

		1	2	3	4	Z & Ž	HT	Z & Ž	CI
FB Brachypodium rupestre	III	+2	4.4	4.4	3.3	4	.	3 ⁺⁴	.
	I	2.3	2.3	2.3	2.3	4	1106 V	2 ⁺¹	751 IV
OO Quercus cerris	II	.	1.2	1.2	1.2	3	.	3 ⁺	.
	III	.	.	1.1	.	1	4 II	.	.
P Crataegus monogyna	II	2.2	2.2	1.1	2.2	4	286 V	3 ⁺	43 V
MA Carex flacca	III	1.2	1.2	2.2	1.2	4	402 V	3 ⁺¹	76 IV
C Pyrus pyraeaster	II	+	1.2	+	2.3	4	2 I	.	.
F ₃ Corylus avellana		1.1	1.2	1.1	1.2	4	2 I	2 ⁺¹	.
RP ₂ Melampyrum pratense subsp. vulgatum	III	1.1	+	+	+	4	.	.	13 IV
RP ₂ Pteridium aquilinum		3.4	1.3	.	1.3	3	.	1 ⁺	1 I
EP ₃ Molinia caerulea subsp. arundinacea		2.3	.	+2	+2	3	.	.	.
ART Rubus caesius	II	.	2.2	+2	+2	3	.	.	.
MA Agrostis tenuis	III	.	+2	1.2	1.2	3	.	.	.
VP ₃ Rubus hirtus	II	.	1.2	+	+2	3	.	.	.

LEGEND (Legenda)

Autor of analytical table (Avtor analitične tabele)

CI	Cimperšek
HT	Horvat
Z & Ž	Zupančič & Žagar

Location (Kraj popisov)

BK	Bela Krajina
HZG	Hrvaško Zagorje
KOČ	Kočevsko
MED	Medvednica
NOT	Notranjska
PD	Poljanska dolina
ŠTAJ	Štajerska

Bedrock (Geološka podlaga)

apn	limestone (apnenec)
dol	dolomite (dolomit)
dol/apn	dolomitized limestone (dolomitiziran apnenec)

Sinsistemata characteristic (Sinsistematska pripadnost)

OO	Fraxino orni-Ostryion carpinifoliae Tomažič 1940
.	Southeast European-Illyrian species (Jugovzhodno evropsko-ilirske vrste)