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Association of Hacquetio Epipactidis-Quercetum cerris in the Lož Valley in Slovenia

Lojze Marinček & Urban Šilc

Abstract

In this paper the association Hacquetio epipactidis-Quercetum cerris ass. nova in the western part of the Predinaric Region of the Illyrian floral province is described. The association forms a part of the successive reforestation process of abandoned farm lands on the potentially natural site of the association Hacquetio-Fagetum var. geogr. *Geranium nodosum.*

Zusammenfassung

Die Autoren haben aus dem westlichen Teil des Gebietes der illyrischen Florenprovinz die Assoziation Hacquetio epipactidis-Quercetum cerris ass. nova beschrieben. Die Assoziation ist nur ein Teil der Sukzessionsreihe auf den verlassenen landwirtschaftlichen Nutzflächen auf dem potentiell-natürlichen Standort der Gesellschaft Hacquetio-Fagetum var. geogr. *Geranium nodosum.*

Key words: Slovenia, vegetation, dynamics, secondary associations, Fagetalia sylvaticae, Quercetalia pubescentis, Querco-Fagetaea

Introduction and methodology of work

Examining and mapping the forest vegetation in the Lož valley (Marinček, 1965) revealed that there are numerous phytocoenoses which developed on abandoned farm lands in addition to the relatively well preserved forests of the association Hacquetio-Fagetum var. geogr. *Geranium nodosum* in the submontane region. The agricultural activities had already been diminishing prior to World War II. However, most of the associations grew on abandoned meadows, pastures and fields after World War II. In view of the farming activity termination time and the ecological circumstances as well as the starting status (pasture, meadow, field) a number of phytocoenoses were formed. This paper will focus its attention on the oldest phytocoenoses which developed secondarily on the potentially natural sites of the submontane beech forests, on the bitter oak forests.

In the seventies, the knowledge of plant associations in Slovenia was rather one-sided. Merely forest vegetation was studied and mapped. The associations

were formed on the basis of relevés describing the preserved forest vegetation, i.e. on the forests whose composition was as similar as possible to that of the potentially natural forests. Yet the secondarily developed phytocoenoses had also been registered and mapped; there had even been some relevés collected, but they were not adequately treated and published with the exception of stages of acidophilous beech forests of the sort Blechno-Fagetum (MARINČEK, 1973) and some stages on sites of the association Luzulo-Fagetum (PUNCER, ZUPANČIČ, 1981).

The interest for developing stages as an independent association has not been shown until recently, actively involved in this field is A. ČARNI.

The vegetation relevés were made according to the standard central European method. The nomenclature of plants is in accordance with the nomenclature by TRPIN & VREŠ (1995), whereas the nomenclature of vegetation is in accordance with the one by MARINČEK et al. (1993) and MARINČEK & ZUPANČIČ (1995).

The morphology of the ground was described by J. Kalan by applying the method of representative pedologic sections.

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General ecological circumstances

The Lož valley is a part of the karstic system of valleys consisting of Babno Polje, Cerknica valley and marginal slopes. Babno Polje is a spacious karstic field located at the altitude of around 750 m. In the north-western direction it lowers and narrows gradually and it lowers abruptly into the Lož valley at Babna Polica. The Lož valley does not have an expressive longitudinal shape of the fields in the Notranjska region, but it has an irregular circular shape with its centre in Stari Trg, from where a wide plain extends towards the steep Racna Gora. In the south, it gently proceeds into the valley of Cerkniško jezero (Cerknica Lake). The moderately karstic slopes are, in general, of gentle inclinations. Since there are no surface water outlets they are homogenous as far as their relief is concerned (according to MELIK, 1960). The bedrock consists mainly of lias Jurassic dolomites and crystalline lime stones. On the whole, there are brown carbonate soils, medium deep, on these rocks.

Description of a sample section:
Geological bedrock: crystalline lime stones

A_{00} - withered dry herbaceous plants
A_r - 0-7 cm, 4 mm big conglomerates, organomineral with 10% of quartz bedrock
B1 - 7-26 cm, a few traces of organic matters, 1cm big conglomerates
B2 - 26-60 cm, karstic underground (clayey structure).
The decay of organic matters is quick and thorough. In the underground, directly

along the bedrock, there is a characteristic red brown clay horizon. The ground is biologically very active and fertile.
On smaller planes and gentle slopes the soil is a medium deep Haplic Luvisol. Compared to the standard luvisol, this soil depends, above all, on its lithology: on granular dolomites with admixture of rough silicate sand.
The brown soil with skeleton is rarely found under the association described.

The climatic circumstances of the Lož valley are given on the basis of data collected at the following weather stations:

Planina at Rakek	456 m above sea level (observation period 1925-1956)
Babno Polje	756 m above sea level (observation period 1925-1956)
Cerknica	576 m above sea level (observation period 1925-1956)
Podcerkev	600 m above sea level (observation period 1925-1956)

In the studied area there is an interferential climate resulting from intermingling the continental, Mediterranean and Atlantic climate. The influence of the Mediterranean climate is indirectly reflected in high mean annual precipitations (approx. 1500 to 1600 mm per year) and in the autumn precipitation maximum, whereas the continental in the precipitation distribution throughout the year: relative dry winter period and early summer precipitation maximum. The continental influence in the area studied is most significant in the valleys which are open towards the east. It is mostly exerted in the Lož valley where the macroclimatic influence is intensified with higher altitude in the valley Babno Polje. In the eastern direction the continental influence decreases and in the Unška valley the medtiterranian influence prevails finding its way along the valley between the Javorniki and Hrušica.

The mean annual temperature in the submontane region of the Lož valley ranges from 6,5 to 9° C. The temperature depends to a great extent on the relief. At a gentle relief the temperature differences between shady and sunny sides are trivial. At steeper and especially very shady positions, the temperatures are more equalised and lower, and on sunny positions, explicit temperature extremes appear very often. Unfavourable climatic circumstances for the vegetation on sunny positions result from more explicit and long-lasting regressions in comparison with those on shady slopes.

The cold winter season lasts from December to February; in this time the mean monthly temperatures range from 1,5 to -1,5° C. The average summer temperatures from June to August range from 15,5 to 17,5° C.

The vegetation period begins in the submontane stage at the beginning of May (around 10th May at latest, it might start already at the end of April). Taking into consideration that the vegetation period ends on about 20th October and that it shortens with the rising altitude, each 100 m for approximately five days, this

vegetation period would last 160 to 175 days. The possibility of hoarfrost occurrence during the growing season is rather great. Only at the weather station in Cerknica, the days of the last frosts coincide with the commencement of the vegetation period, whereas at all other weather stations in the direction of Babno Polje, the vegetation period starts 14 days or even one month earlier than the mean last frost.

In submontane region, the snow cover in the Lož valley lasts about one month and a half, in extreme cases two months. Most of the snow falls during the months of December and January. Due to low February temperatures it remains until March.

Based on this analysis of the climate circumstances prevailing in the Lož valley, it can be established that the continental influence is very strongly exercised. Because of the basin like characteristics of the valley, temperature inversions occur very often. Late frosts are very perilous due to absent alleviating effect of the fog. Additionally, it can be ascertained that the conditions for the growth of vegetation are, in spite of some climate labilities, very favourable for the growth of forest vegetation owing to relative high mean temperatures during the growth period and to humid climate as well.

Floristic composition and sociological structure
Association stratification

The forests of the association Hacquetio epipactidis-Quercetum cerris are expressive two-layer forests with predominance of bitter oak, *Quercus cerris*, with individual addition of *Fagus sylvatica* and rare *Pinus sylvestris*, *Picea abies* and *Ulmus glabra* in the dominant layer. In some places beech competes with bitter oak (relevé no. 7). The lower layer consists of, above all, *Ostrya carpinifolia* and *Fraxinus ornus*. The remaining tree species: *Prunus avium*, *Pyrus pyraster* and *Tilia platyphyllos* are added only as individual trees. There are some more trees of *Carpinus betulus*.

The forests of the association described are mostly stumpwoods with trees reaching a height of 14 to 16 m and having a trunk diameter of about 20 cm.

The shrub layer is very well developed. It mainly consists of three groups. In the first one there are thermophilous shrubs of the orders *Quercetalia pubescentis* and *Prunetalia spinosae: Viburnum lantana, Euvonymus verrucosa, Ligustrum vulgare, Berberis vulgaris, Rhamnus cathartica, Cornus mas* and thermophilous tree species: *Ostrya carpinifolia*, *Fraxinus ornus* and *Sorbus aria*. The most numerous is the second group consisting of subtheromphilous and submesophilous species: *Rosa arvensis, Crataegus monogyna, Prunus spinosa, Crataegus laevigata, Clematis vitalba, Hedera helix, Cornus sanguinea.* The third group is chiefly composed of mesophilous shrubs and trees: *Daphne mezereum, Fagus sylvatica, Acer pseudoplatanus, Tilia platyphyllos, Prunus avium, Lonicera alpigena, Lonicera xylosteum, Corylus avellana, Acer campestre, Picea abies, Evonymus europaea*

and other. Although the latter do not reach a great coverage, they indicate with their presence an already formed forest milieu, a condition for further succession in the direction of beech forest.

The composition of the herb layer is very diversified as a result of different influences being of anthropozoogenic origin. With regard to the rather equal relationship of species of the order Fagetalia sylvaticae: *Melica nutans, Euphorbia dulcis, Asarum europaeum, Salvia glutinosa, Symphytum tuberosum, Viola reichenbachiana, Mercurialis perennis* and others and of species of the order Quercetalia pubescentis: *Asparagus tenuifolius, Mercurialis ovata, Peucedanum austriacum, Vincetoxicum hirundinaria, Melittis melissophyllum, Carex flacca, Buglossoides purpureocaerulea* and others, the herb composition is very similar to the association Ostryo-Fagetum, so that the group of thermophilous species in the association described is numerically bigger and with a greater coverage as the consequence of its origin.

The origin of the formation of the association is shown by species of the classes: Festuco-Brometea: *Brachypodium rupestre, Euphorbia cyparissias, Filipendula vulgaris, Lilium bulbiferum, Pimpinella saxifraga* and Molinio-Arrhenatheretea: *Galium mollugo, Molinia arundinacea, Lathyrus pratensis, Vicia cracca.*

The so-called Illyrian species: *Omphalodes verna, Hacquetia epipactis, Primula vulgaris, Helleborus niger* ssp. *niger, Aremonia agrimonoides, Aposeris foetida, Cyclamen purpurascens, Knautia drymeia* ssp. *drymeia, Geranium nodosum,* characteristic and differential species of the alliance of Illyrian beech forests Aremonio-Fagion, giving the association the Illyrian features, appear permanently and rather abundantly.

The moss layer is more developed only in phytocoenoses with larger surface of bare rocks. *Ctenidium molluscum, Camptothecium lutescens, Scleropodium purum, Hypnum cpressiforme* and *Isothecium myurum* are the ones which appear most frequently.

The differential species of the association

The differential group of the association Hacquetio-Quercetum cerris consists of: *Omphalodes verna, Brachypodium rupestre, Hacquetia epipactis, Quercus cerris, Carpinus betulus* and *Geranium nodosum.*

Omphalodes verna as the Illyrian-dinaric flora element determines chorologically the association studied which appears in the western part of Illyrian-dinaric region. *Hacquetia epipactis, Geranium nodosum* and *Carpinus betulus* show a submontane character of the association and the similarity with the association Hacquetio-Fagetum var. geogr. *Geranium nodosum* which is a potentially natural site of the association described. The species *Brachypodium rupestre* binds the association described with the association Brachypodio rupestre-Ostryetum (Čarni, 1997).

Discussion and conclusions

The similar relationship of the association described with ecologically and floristically resembling associations (Ostryo-Fagetum M. WRABER ex TRINAJSTIČ 1972 var. geogr. typica ostryetosum MARINČEK1997, 29 relevés; Hacquetio-Fagetum var. geogr. *Geranium nodosum* KOŠIR 1979, 12 relevés; Brachypodio-rupestris-Ostryetum carpinifoliae quercetosum cerris ČARNI 1997, 9 relevés; Querco-Ostryetum HORVAT 1937, 11 relevés) was represented on diagrams drawn up by computer program PRINCOOR from the package SYN-TAX 5.0 (PODANI, 1993), where the ordinate diagrams were obtained by the aid of the method of principle co-ordinate analysis and application of similarity coefficient as the sign for similarity. The values of the Braun-Blanquet scale were transformed into the ordinal scale from 0 to 9 according to van der MAAREL (1979).

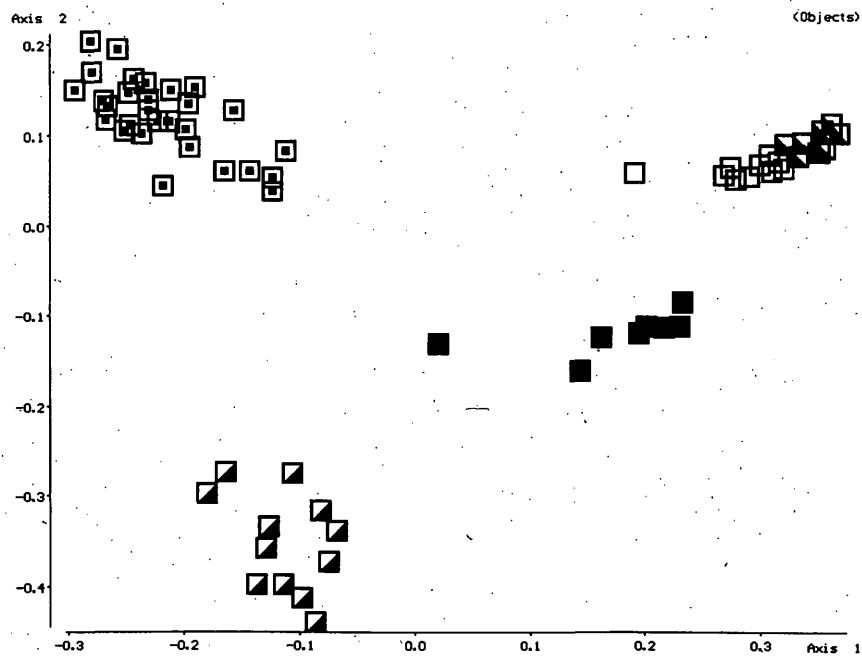

Diagram 1: Ordination of the associations.
Full squares: Hacquetio-Quercetum cerris, lower left corner shaded: Brachypodio rupestris-Ostryetum carpinifoliae quercetosum cerris, lower right corner shaded: Hacquetio-Fagetum var. geogr. *Geranium nodosum*, empty square: Querco-Ostryetum, center of the square shaded: Ostryo-Fagetum var. geogr. *Polygala chamaebuxus* ostryetosum

The diagram 1 shows a moderate mesophilous and moderate thermophilous character of the association described what is fully in accordance with our presumption that the association Hacquetio-Quercetum cerris is a member of the successive reforestation chain, grown on potentially natural sites of the association Hacquetio-Fagetum var. geogr. Geranium nodosum.

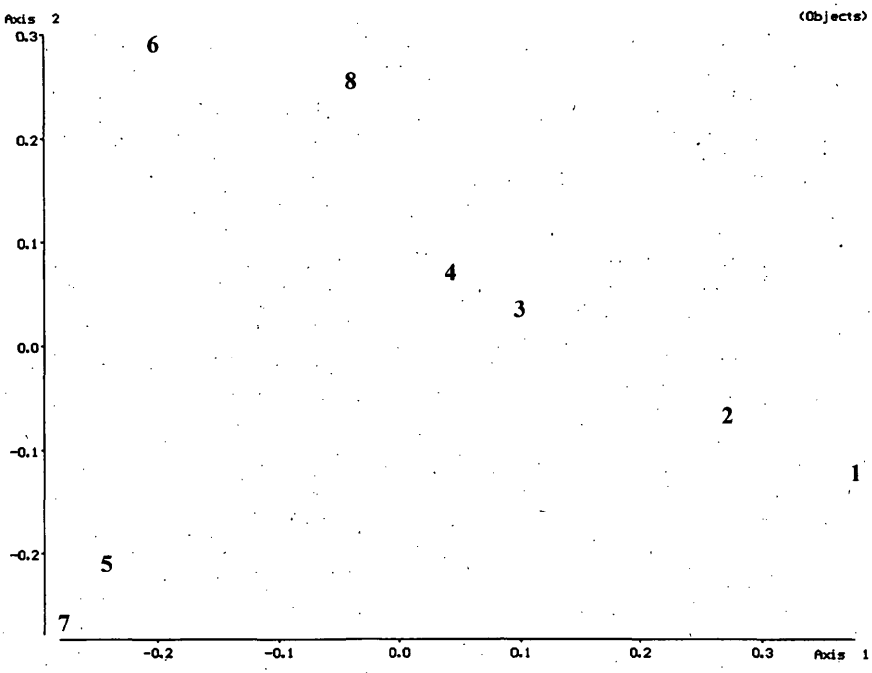

Diagram 2: Ordination of the relevés.

It is evident from the diagram 2 that the first relevés show the thermophilous association more initially, with many thermophilous species of the order Quecetalia pubescentis: *Mecurialis ovata, Peucedanum austriacum, Anthericum ramosum, Aster amellus* and species of the class Festuco-Brometea: *Bromus erectus, Sanguisorba minor, Salvia pratensis.*

In the second part of the table of the association Hacquetio-Quercetum cerris , there is, however, a greater number of species of the order Fagetalia sylvaticae: *Salvia glutinosa, Symphytum tuberosum, Viola reichenbachiana, Prunus avium, Campanula trachelium, Lonicera alpigena* and others. This analysis shows the possibility of dividing the association described into two subassociations, yet, this issue will not be described in this paper.

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Hacquetio-Quercetum cerris asoc. nova

Releve no.		1	2	3	4	5	6	7	8	FREQUENCY		CLASSES
Altitude (in m)		720	600	670	620	600	600	670	650			
Aspect		SW	SE	-	S	S	SE	SE	S			
Slope (in °)		17	5-10	0	25	15	15	15	25			
Rock coverage (%)		2	10	5	30	30	30	10	25			
Surface (in m²)		400	400	400	400	400	400	400	400			
Coverage (%)												
Tree layer		90	90	90	100	100	100	100	100			
Shrub layer		30	40	30	30	30	40	30	30			
Herb layer		90	80	90	60	60	70	70	70			
Moos layer		1	5	1	20	20	15	10	10			
DIFFERENTIAL SPECIES OF ASSOCIATION												
Omphalodes verna	C	1	1	1	1	1	+	1	1	8	100	5
Brachypodium rupestre		3	2	3	1	1	1		2	7	88	5
Hacquetia epipactis		1	1	1	+	+	2		1	7	88	5
Quercuscerris	A1		1	2	2	3	3	2	3	7	88	
Quercus cerris	A2			+	+					2	25	5
Quercus cerris	B	+	+		+		+		+	5	63	
Quercus cerris	C						+		+	2	25	
Carpinus betulus	A2		+	+	+	+		+		5	63	4
Carpinus betulus	C					+				1	13	
OSTRYO-FAGENION												
Ostrya carpinifolia	A2	4	3	4	4	2	4	3	3	8	100	5
Ostrya carpinifolia	B	+	+	+	+		1		+	6	75	
Fraxinus ornus	A2	1	1	1	2	+	1	+	2	8	100	
Fraxinus ornus	B1						+			1	13	5
Fraxinus ornus	B	+	+	1	1	+		+	+	7	88	
Fraxinus ornus	C					+				1	13	
Asparagus tenuifolius					+	+	+	+	+	5	63	4
Mercurialis ovata		1	1		+					3	38	2
Peucedanum austriacum		+	+		+					3	38	2
AREMONIO-FAGION												
Primula vulgaris	C	1	+	+	+	+	+	1	+	8	100	5
Helleborus niger ssp niger		1	+	+	+	+	+	1	+	8	100	5
Aremonia agrimonioides		+	+	+	+	+	+	+	+	8	100	5
Aposeris foetida		+	+	1	+	+	+	1	+	8	100	5
Cyclamen purpurascens		+	1	+	+	+				5	63	4
Knautia drymeia		+				+		+		3	38	2
Geranium nodosum				+						1	13	1

FAGETALIA SYLVATICAE

Melica nutans	C	1	1	1	+	1	1	1	+	8	100	5
Daphne mezereum	B	+		+	+	+	+	+	+	7	88	5
Euphorbia dulcis	C	+	+	1	+		+	+	+	7	88	5
Asarum europeum		+	1				+	1	+	5	63	4
Salvia glutinosa			+			+	+	+	+	5	63	4
Symphytum tuberosum					+	+	+	+	+	5	63	4
Fagus sylvatica	A1			+			+	2		3	38	
Fagus sylvatica	A2							+		1	13	4
Fagus sylvatica	B			+		+	+	+		4	50	
Acer pseudoplatanus	B			+			+	+	+	4	50	3
Viola reichenbachiana	C				+		+	+	+	4	50	3
Tilia platyphyllos	B			+	+					2	25	2
Tilia platyphyllos	C					+				1	13	
Ulmus glabra	A1							+		1	13	
Ulmus glabra	A2			+	+					2	25	2
Ulmus glabra	B				+					1	13	
Ulmus glabra	C							+		1	13	
Prunus avium	B						+		+	2	25	2
Campanula trachelium	C					+		+		2	25	2
Neottia nidus-avis		+	+							2	25	2
Lonicera alpigena	B					+	+			2	25	2
Mercurialis perennis	C				+		+			2	25	2
Polygonatum multiflorum						+		+		2	25	2
Cephalanthera damasonium		+	+							2	25	2
Carex pilosa						3				1	13	1
Brachypodium sylvaticum								+		1	13	1
Euphorbia amygdaloides								+		1	13	1
Lathyrus vernus								+		1	13	1
Phyteuma ovatum								+		1	13	1
Phyteuma spicatum				+						1	13	1
Sanicula europea			+							1	13	1

PRUNETALIA SPINOSAE

Rosa arvensis	B	1	1	+	1	1	+	1	+	8	100	5
Ligustrum vulgare		1	1	1	1	+	1	+	+	8	100	5
Crataegus monogyna		+	+	1	+	+	1	1	1	8	100	5
Berberis vulgaris		+	+	1	+	+	+	+	1	8	100	5
Prunus spinosa		+	1	1		+	+	+	+	7	88	5
Crataegus laevigata		+	+		+	+	+	+	+	7	88	5
Rhamnus cathartica		+	+	+		+	+		+	6	75	4
Cornus mas		1	1	+	1	+		+		6	75	4
Clematis vitalba		+	+	+			+	1	+	6	75	4
Euonymus europaea					+	+	+			3	38	2
Coteneaster tomentosus		+								1	13	1

QUERCETALIA PUBESCENTIS s.lat

Vincetoxicum hirundinaria	C	+	+	+	+	+	+	+	+	8	100	5
Melittis melissophyllum		+	+	+	+	+	+	+	+	8	100	5

Carex flacca		1	+	+	+	1	1	1	1	8	100	5
Buglossoides purpurocaerulea		1	+	+	+	1	1	1	1	8	100	5
Betonica officinalis		1	+	+	+	1	1	1	1	8	100	5
Viburnum lantana	B	+	+	+	+		+	+	+	7	88	5
Potentilla alba	C	1		+	+	+	+	+	+	7	88	5
Euonymus verrucosa	B		+	+	+	1	1	1	1	7	88	5
Convallaria majalis	C	+	+		+	+	+	+	+	7	88	5
Sorbus aria	B		+	+	+	+	+	+	+	7	88	5
Polygala chamaebuxus	C	+	+	+	+		+		+	6	75	4
Teucrium chamaedrys		+	+	+	+		+			5	63	4
Carex alba		1	+		+			+	+	5	63	4
Polygonatum odoratum	C	+	+	+			+			4	50	3
Anthericum ramosum		+	+		+					3	38	2
Peucedanum oreoselinum				+		+				2	25	2
Aster amellus		1	+							2	25	2
Dianthus monspessulanus					+					1	13	1
Cirsium erisithales				+						1	13	1
Peucedanum cervaria								+		1	13	1
Lathyrus niger				+						1	13	1
Inula hirta									+	1	13	1
Epipactis atrorubens							+			1	13	1
Carex humilis							+			1	13	1
QUERCETALIA ROBORI-PETRAEAE												
Carex montana	C	1	1	+	1	1	1	+	+	8	100	5
Pteridium aquilinum		1	+	+		+		+		5	63	4
Potentilla erecta		+	+	+		+			+	5	63	4
Frangula alnus	B	+				+	+		+	4	50	3
Serratula tinctoria	C			+	+		+	+		4	50	3
Lathyrus montanus				+						1	13	1
QUERCO-FAGETEA s.lat												
Lonicera xylosteum	B	+	+	+	+	+	+	+	+	8	100	5
Carex digitata	C	+	+	+	+	+	+	+		7	88	5
Corylus avellana	B2		+	+			+		+	4	50	5
Corylus avellana	B1	1			+	1				3	38	
Pyrus pyraster	A2						+			1	13	4
Pyrus pyraster	B		+	+		+	+	+	+	6	75	
Ajuga reptans	C				+	+	3	+	+	5	63	4
Fragaria moschata		+	+		+	+		1		5	63	4
Cruciata glabra		+	+	+	+	1				5	63	4
Cornus sanguinea	A2			+						1	13	2
Cornus sanguinea	B	+			+					2	25	
Acer campestre	B		+	+				+		3	38	2
Acer campestre	C					+	+	+		3	38	2
Hedera helix	A2							+		1	13	1
Hedera helix	B				+					1	13	1
Veratrum nigrum	C					+				1	13	1
Hepatica nobilis							1			1	13	1
Platanthera bifolia								+		1	13	1

FESTUCO-BROMETEA s.lat.												
Euphorbia cyparissias	C	+	1	1	+	+	+	+	+	8	100	5
Filipendula vulgaris		+	+	+		+	+		+	6	75	4
Lilium bulbiferum				+	+		+		+	4	50	3
Pimpinella saxifraga		+	+	+	+					4	50	3
Trifolium montanum		+		+					+	3	38	2
Bromus erectus		+	+							2	25	2
Allium carinatum						+				1	13	1
Sanguisorba minor		+								1	13	1
Salvia pratensis		+								1	13	1
MOLINIO-ARRHENATHERETEA												
Galium mollugo	C	1	+	+	+	+		+	+	7	88	5
Molinia arundinacea			+	1	+	+	+		+	6	75	4
Lathyrus pratensis		+	+	+	+					4	50	3
Vicia cracca				+	+		+	+		4	50	3
Platanthera chlorantha		+	+						+	3	38	2
Knautia arvensis		+				+				2	25	2
Centaurea jacea		+								1	13	1
OTHER SPECIES												
Fragaria vesca	C	1	1	1	+	+	1	+	1	8	100	5
Clinopodium vulgare		1	1	+	+	+	+	+	+	8	100	5
Geranium sanguineum		+	+	+	+		+		+	6	75	4
Dactylis glomerata		+	+	+	+					4	50	3
Silene nutans		+	+		+				+	4	50	3
Cytisus supinus		+	+	+	+					4	50	3
Thalictrum minus			+	+		+		+		4	50	3
Euphorbia verrucosa		+	+	+				+		4	50	3
Thesium bavarum			+		+		+		+	4	50	3
Solidago virgaurea				+	+	+				3	38	2
Picea abies	B			+		1	+			3	38	2
Aquilegia vulgaris	C			+					+	2	25	2
Lotus corniculatus		+	+							2	25	2
Listera ovata		+								1	13	1
Juniperus communis	B						+			1	13	1
Taraxacum officinale	C	+								1	13	1
Ranunculus nemorosus						+				1	13	1
Galium laevigatum		+								1	13	1
Rubus sp.	B					+				1	13	1
Ornithogalum pyrenaicum	C					+				1	13	1
MOSSES AND LICHENS												
Ctenidium molluscum	D	+	1	1	2	2	2	1	1	8	100	5
Tortella tortuosa		+	+	1	2	1	1		1	7	88	5
Camptothecium lutescens		+	+	+	+	1			1	6	75	4
Cladonia pyxidata		+	+	+	+		1		1	6	75	4
Grimmia pulvinata				+	+	+	+		+	5	63	4

Scleropodium purum				+	+	+	+	+	5	63	4
Hypnum cupressiforme	+	+	+					+	4	50	3
Neckera crispa		+		+	1			+	4	50	3
Isothecium myurum		+	+		1		1		4	50	3
Homalothecium sp.		+	+					+	3	38	2
Madotheca platyphylla		+				+			2	25	2
Cladonia rangiferina					+				1	13	1
Bryum capillare			+						1	13	1
Mnium cuspidatum					+				1	13	1

Adress of the authors:

Lojze MARINČEK
Urban ŠILC

Biološki inštitut ZRC SAZU
Novi trg 5
SLO - 1 000 Ljubljana