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Contribution to the Knowledge of the Association Fraxino orni-Pinetum nigrae Martin-Bosse 1967

Beitrag zur Kenntnis der Gesellschaft Fraxino orni-Pinetum nigrae Martin-Bosse 1967

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Abstract

The article phytosociologically describes natural stands of black pine (*Pinus nigra* Arnold) in the area of Govci on the northeastern edge of the Trnovski gozd plateau (western Slovenia). The author classified them in the association Fraxino orni-Pinetum nigrae Martin-Bosse 1967, and compared them with other forms of the same association and with the association Genisto januensis-Pinetum Tomažič 1940. He stated that these are, in spite of their floristic similarity, two well differentiated associations. He classified the *Pinus nigra* stands in the area of Govci as a new geographical variant Fraxino orni-Pinetum nigrae var. geogr. *Primula carniolica* var. geogr. nova.

Key words: Fraxino orni-Pinetum nigrae, Genisto januensis-Pinetum, the Trnovski gozd plateau, Slovenia.

Zusammenfassung

Natürliche Bestände der Schwarzföhre (*Pinus nigra* Arnold) im Gebiet Govci oberhalb dem Trebuša-Tal (nordöstlicher Rand des Trnovski gozd, westliches Slowenien) wurden pflanzensoziologisch untersucht und in das Syntaxon Fraxino orni-Pinetum nigrae Martin-Bosse 1967 var. geogr. *Primula carniolica* var. geogr. nova rhododendretosum hirsuti eingereiht.

Mit der multivariaten Statistik (hierarchische Gruppierung, PCoA - Ordination) haben wir die bis jetzt beschriebenen Formen der Assoziationen Fraxino orni-Pinetum nigrae und Genisto januensis-Pinetum Tomažič 1940 verglichen. Es wurde festgestellt, daß diese zwei Gesellschaften, trotz der floristischen und ökologischen Ähnlichkeit zwei verhältnismäßig gut getrennte Assoziationen darstellen. Die Assoziation Fraxino orni-Pinetum nigrae unterscheidet sich vom Genisto januensis-Pinetum hauptsächlich durch alpine und teilweise alpin-nordillyrische Arten wie z. B. *Euphrasia cuspidata, Arctostaphylos uva-ursi, Rhodothamnus chamaecistus* u. a., (in den Karnischen und westlichen Julischen Alpen auch durch die

Taxa *Euphorbia triflora* subsp. *kerneri* und *Bupleurum ranunculoides* subsp. *canalense*). Die Assoziation Genisto januensis-Pinetum ist durch illyrische bzw. südosteuropäische Arten wie *Genista januensis*, *Daphne blagayana* und *Potentilla carniolica* gekennzeichnet.

1. Introduction and Methods

According to data, known as yet, the association Fraxino orni-Pinetum nigrae (= Orno-Pinetum nigrae) Martin-Bosse 1967 is distributed in the area of the Southeastern Alps: the Karawanken (the Karavanke range), the Gailtaler Alps, the Julian Alps, the Carnic Alps and the Venetian (Belluno) Alps (AICHINGER 1933, MARTIN-BOSSE 1967, POLDINI 1967, 1969, T. WRABER 1979, WALLNÖFER 1993).

In the Julian Alps the association Fraxino orni-Pinetum nigrae was thoroughly researched by POLDINI (1969) in the Italian part: in the valleys of the Dogna, the Raccolana and the Resia, and by T. WRABER (1979) in the Slovene part: in the Koritnica valley near Bovec. This association was partly studied also in the Trenta valley, on the peak Treska near the village of Srpenica and above the Tolminka valley (T. WRABER 1964, DAKSKOBLER 1997 mscr.)

The locality of black pine in the area of Govci, above the village Gorenja Trebuša on the northeastern edge of the Trnovski gozd plateau, has been known since a long time: SCHARNAGGL (1873: 5), POSPICHAL (1897: 23-24), H. SCHMIED (1929:

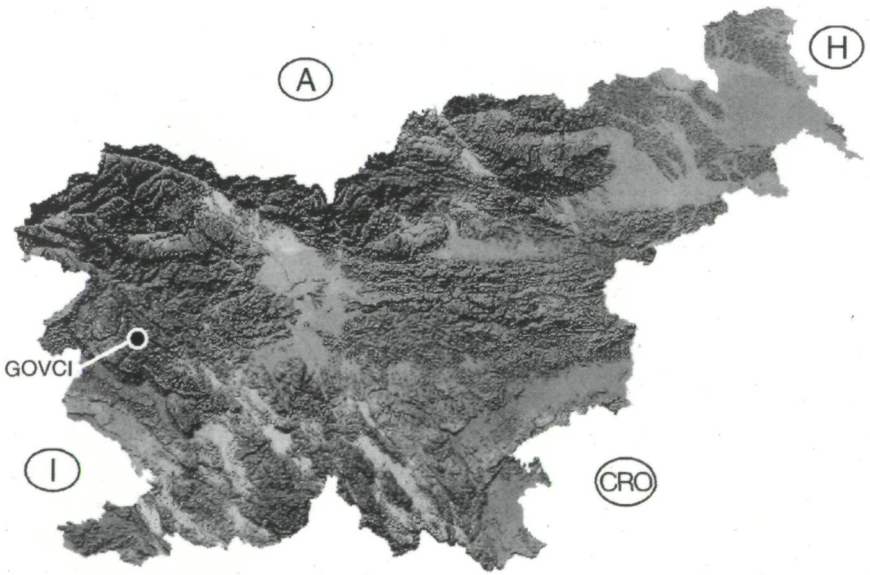

Fig. 1

300), AICHINGER (1933: 242), M. WRABER (1953: 16, 1960: 68), P. FUKAREK (1958: 53), B. JURHAR (1960), POLDINI (1969: 34), MLINŠEK at al. (1980: 63-64), BRUS (1995). The stands in the area of Govci have not been researched phytosociologically yet.

Our research was aimed primarily at supplementing the knowledge of the distribution, the structure and floristic composition of the association Fraxino orni-Pinetum nigrae in the southern and southeastern part of its distribution area, in the contact area with the association Genisto januensis-Pinetum Tomažič 1940. For this purpose we studied natural stands of black pine in the area of Govci, applying the standard Central European phytosociological method (BRAUN-BLANQUET 1964). We compared their floristic composition with other forms of the association Fraxino orni-Pinetum nigrae (MARTIN-BOSSE 1967, POLDINI 1969, T. WRABER 1979, DAKSKOBLER 1997 mscr.), described so far, with various forms of the association Genisto januensis-Pinetum from the pre-Alpine and partly pre-Dinaric phytogeographical region of Slovenia (TOMAŽIČ 1940), and with two transitional communities from the western part of the pre-Alpine region of Slovenia (the Šentviška planota and the Cerkno regions) - DAKSKOBLER (1996 mscr.). We compared the syntaxa enumerated applying the methods of hierarchical classification and Principal Coordinates Analysis (PCoA). We used the program package SYN-TAX (PODANI 1993, 1994). In the synoptic table numbers mean frequencies of species from analytic tables. Some rare species with frequency less than 10% are not included in this table.

In the analysis of chorological groups and biological forms we made use of the Chorological Atlas of Vascular Plants in the region Friuli-Venezia Giulia (POLDINI 1991). We refer to TRPIN & VREŠ (1995) for the majority of vascular plant names, and to DÜLL (1991) for moss names. Annual Report of Meteorological Service for the Year 1957, PUČNIK (1980) and Climatography of Slovenia (1988, 1989) are the sources of climatic data, and BUSER (1986) is a reference for data on geological structure.

2. The Association Fraxino orni-Pinetum nigrae in the Area of Govci on the Northeastern Edge of the Trnovski Gozd Plateau (western Slovenia)

In one of the largest natural localities in Slovenia, on the northeastern edge of the Trnovski gozd plateau above the Trebuša valley, black pine grows on rocky, steep slopes of the peaks Stanov rob, Poldanovec and Zeleni rob, ridged with numerous gorges. The whole area is called Govci (9948/4, 9949/3, UTM VL09 and VL19). *Pinus nigra* thrives there at an altitude of 500 to 1200 m. It grows also in the area of Mali Govci, at the roots of the peak Bukov vrh. Parent material is Triassic dolomite. The soil is shallow and very skeletony (Lithosols, rendzina), exposed to erosion. On the northeastern edge of the Trnovski gozd plateau there is

a relatively cold and very humid climate (average annual temperature from 6 to 8° C, average annual precipitation about 2500 mm). Frequent weather phenomena in this area are glaze (see e. g. ŠIFRER 1977), and occasionally also windbreak. Verbal reports and chronicles often mention forest fires in this area.

Beech stands are the prevailing vegetation in the area of Govci. They are classified in the following associations: Ostryo-Fagetum M. Wraber ex Trinajstić 1972, Arunco-Fagetum Košir 1962 (submontane and montane belt), Rhododendro hirsuti-Fagetum Accetto 1996 var. geogr. *Anemone trifolia* Dakskobler 1998, Homogyno sylvestris-Fagetum Marinček et al. 1993, Ranunculo platanifolii-Fagetum Marinček et al. 1993 (montane and upper montane belt). Among the contact communities we should mention also Primulo carniolicae-Potentilletum caulescentis Dakskobler 1998 nom. prov., Potentillo clusianae-Campanuletum zoysii Aichinger 1933 var. geogr. *Primula carniolica* Dakskobler 1998 and Rhodothamno-Pinetum mugo (Martinčič 1977) Zupančič & Žagar 1980 mscr. var. geogr. *Primula carniolica* Dakskobler 1998 prov. (in the rock faces of Poldanovec and Zeleni rob) – DAKSKOBLER 1998. Beech could not successively replace black pine on the most extreme sites - sheer rocky slopes, prominences, conical peaks, spires and crests. The black pine community of this place was characterized by names as Erico-Pinetum nigrae (M. WRABER 1953), Genisto januensis-Pinetum (M. WRABER 1960) and *Pinetum austroalpinum* (MLINŠEK et al.1980). Our analyses and comparisons, described in the following chapter, confirm that we can classify it in the southeast-Alpine association Fraxino orni-Pinetum nigrae Martin-Bosse 1967. Open *Pinus nigra* stands are mosaicly scattered over the whole rock faces of Govci, on the most extreme sites. Trees are 15 (max. 20) m, at spots only 10 m high, measuring at breast height 30 to 45 cm. Black pine has spread as a pioneer to surrounding beech sites, to open areas, formed in consequence of glaze or windbreak. There black pine grows up to 30 meters high or more, reaching 50 (max. 80) cm diameter at breast height.

Structure and floristic composition of the community is presented in Phytosociological Table 1. The presence of phytosociological and chorological groups are shown in Tables 1 and 2, proportion of biological forms can be seen in Table 3. *Pinus nigra*, *Ostrya carpinifolia, Sorbus aria* and *Fraxinus ornus* are frequent species in the tree layer. These species (and also *Amelanchier ovalis* and *Rhododendron hirsutum*) are most frequent in the shrub layer, which usually covers 20 to 40% of the surface area. Species of *Erico-Pinetea* (*Erica carnea, Polygala chamaebuxus, Buphthalmum salicifolium*), species of dry and subalpine grasslands (*Carex humilis, Sesleria albicans, Betonica alopecuros*), some species of beech forests (*Cyclamen purpurascens*, *Mercurialis perennis*), species of rock fissures (*Paederota lutea, Potentilla caulescens*), and *Molinia arundinacea* have the greatest presence degree and (or) cover in the herb layer (usually it covers 40 to 70% of the

surface area). *Viscum album*, mostly living as parasite on *Sorbus aria*, is relatively frequent. Most frequent species of the moss layer are *Fissidens cristatus, Neckera crispa, Tortella tortuosa* and *Ctenidium molluscum.*. The reasons for the relatively high proportion of Fagetalia species are, in our opinion, the following: black pine stands thrive in the direct contact with beech forest. Therefore some species of beech forest spread also to black pine stands. These are a relatively permanent (self-regenerating) stage on the most extreme sites, and a transitional community on less extreme ones. The latter will probably be successively replaced by beech stands. This tendency is partly revealed by the arrangement of the relevés in Phytosociological Table 1.

Table 1: Phytosociological groups of the association Fraxino orni-Pinetum nigrae in the area of Govci above the Trebuša valley (relative frequencies).

Tabelle 1: Pflanzensoziologische Gruppen von Fraxino orni-Pinetum nigrae in dem Gebiet Govci oberhalb dem Trebuša-Tal (relative Häufigkeiten).

Erico-Pinetea s. lat.	**20,6**
Quercetalia pubescentis s. lat.	7,2
Quercetalia roboris s. lat.	1,3
Fagetalia sylvaticae s. lat.	**14,2**
Querco-Fagetea s. lat.	2,8
Vaccinio-Piceetea s. lat.	8,5
Adenostyletalia s. lat.	1,5
Trifolio-Geranietea s. lat.	1,5
Festuco-Brometea s. lat.	6,0
Seslerietea albicantis s. lat.	8,8
Asplenietea trichomanis s. lat.	**9,5**
Thlaspietea rotundifolii s. lat.	3,8
Other species	4,2
Mosses and lichens	**10,1**

Table 2: Chorological groups of the association Fraxino orni-Pinetum nigrae in the area of Govci - relative frequencies.

Tabelle 2: Chorologische Gruppen von Fraxino orni-Pinetum nigrae in dem Gebiet Govci - relative Häufigkeiten.

Arctic-Alpine, Alpine and (south)east-Alpine species	10
Southeast-European and Alpine-Illyrian species	11
Illyrian and Illyrian-sub-Mediterranean species	5
Mediterranean-montane species	**24,5**

Mediterranean-Pontic and Pontic species	5
Sub-Atlantic and Mediterranean-Atlantic species	1
Eurimediterranean species	4
European species	12,5
Boreal species	8
Eurasiatic and Eurosiberian species	13
Paleotemperate and other species	6

Table 3: Plant life form spectrum of the association Fraxino orni-Pinetum nigrae in the area of Govci - relative frequencies.

Tabelle 3: Lebensformspektrum des Fraxino orni-Pinetum nigrae in dem Gebiet Govci - relative Häufigkeiten.

Phanerophytes	**P**	**24**
	NP	5
	P caesp	11
	P ep	1
	P lian	0
	P scap	7
Chamaephytes	**Ch**	**21**
	B ch	8
	Ch frut	4
	Ch lich	0
	Ch pulv	0,5
	Ch rep	1,5
	Ch suffr	7
Hemicryptophytes	**H**	**43**
	H caesp	11
	H ros	7
	H scap	23
	H th	2
Geophytes	**G**	**11**
	G bulb	4
	G rhiz	7
Therophytes	**T**	**1**
	T scap	1

Local character species of the association Fraxino orni-Pinetum nigrae (according to POLDINI 1969) in the area of Govci are *Allium ochroleucum, Asperula aristata* and *Euphrasia cuspidata*. The differential species of the association (accor-

ding to WALLNÖFER 1993: 260), *Laserpitium peucedanoides*, is frequent. The association Fraxino orni-Pinetum nigrae on the northeastern edge of the Trnovski gozd plateau is phytogeographically characterized by *Primula carniolica* and *Omphalodes verna*. The endemic *Primula carniolica*, which the new geographical variant was named after, thrives only in the pre-Alpine, Dinaric and partly pre-Dinaric area of Slovenia. *Omphalodes verna* has southeast-Alpine-Illyrian distribution. We classified the black pine stands of Govci (Phytosociological Table 1) in the subassociation Fraxino orni-Pinetum nigrae var. geogr. *Primula carniolica* rhododendretosum hirsuti. Its nomenclatural type (at the same time also the nomenclatural type of the newly described geographical variant) is relevé 6 in the Phytosociological Table 1. The differential species of the subassociation *Rhododendron hirsutum* indicates very steep, mostly shady dolomite slopes with cool local climate, and the vicinity of the Alps. Black pine stands on the coldest, the most rocky, and relatively humid sites are classified in the variant with *Rhodothamnus chamaecistus*. Its differential species are also *Valeriana saxatilis* and *Salix glabra*. In the upper montane belt (1000 to 1150 m a. s. l.) we have found also a subvariant with *Larix decidua* (the southernmost natural locality of this tree species in Slovenia) and subvariant with *Pinus mugo*. The more thermophilous, typical variant which thrives on less extreme sites, indicates succession to beech forest.

3. Comparative Analysis of the Associations Fraxino orni-Pinetum nigrae and Genisto januensis-Pinetum (the Commentary to Phytosociological Table 2)

19 syntaxa from the area of the Southeastern Alps and their headland (the Carnic Alps, the Gailtaler Alps, the Karawanken chain, the Julian Alps, pre-Alpine region of Slovenia), which are classified in the associations Fraxino orni-Pinetum nigrae and Genisto januensis-Pinetum (List 1) were ranged in the Phytosociological Table 2.

We compared them applying the methods of hierarchical clustering: FNC (Farthest Neighbour Clustering= Complete Linkage Clustering) and MISSQ (minimization of the increase of error sum of squares = Increment Sum of Squares). Ordination was performed applying the Principal Coordinates Analysis = Metric Multidimensional Scaling (PCoA). The measure of dissimilarity was the complement of the „similarity ratio" coefficient, and when solely binary data (presence/absence of species) were taken into consideration, the complement of Jaccards's coefficient.

In the Figure 2 there are two dendrograms, obtained with complete linkage clustering. The left one takes into consideration solely binary data (presence/absence of species), and the right one also quantitative values (frequency in percentage). Figure 3 presents two dendrograms, obtained with the method, based on opti-

mal homogeneity of clusters (MISSQ, Ward's method). Similarly, the left one takes into consideration only binary data and the right one also frequency of the species. The syntaxa of the association Genisto januensis-Pinetum (columns 16-19 in Phyt. Table 2) are united in a separate cluster in all dendrograms elaborated. This confirms that the associations Genisto januensis-Pinetum and Fraxino orni-Pinetum nigrae are relatively clearly differentiated and distinguished one from the other, in spite of similarities in their floristic composition and ecology. Three from five character species of the first association: *Genista januensis, Daphne blagayana*, and *Potentilla carniolica*, have not been found in the other association yet. In spite of this, we can make an assertion at least for one of them, *Daphne blagayana*, that its distribution area and the distribution area of the association Fraxino orni-Pinetum nigrae do not exclude. This is confirmed by the localities of *Daphne blagayana* in the Trebuša valley (T. WRABER & MIKULETIČ 1965) and in the Carnic pre-Alps (MARTINI & POLDINI 1990: 303).

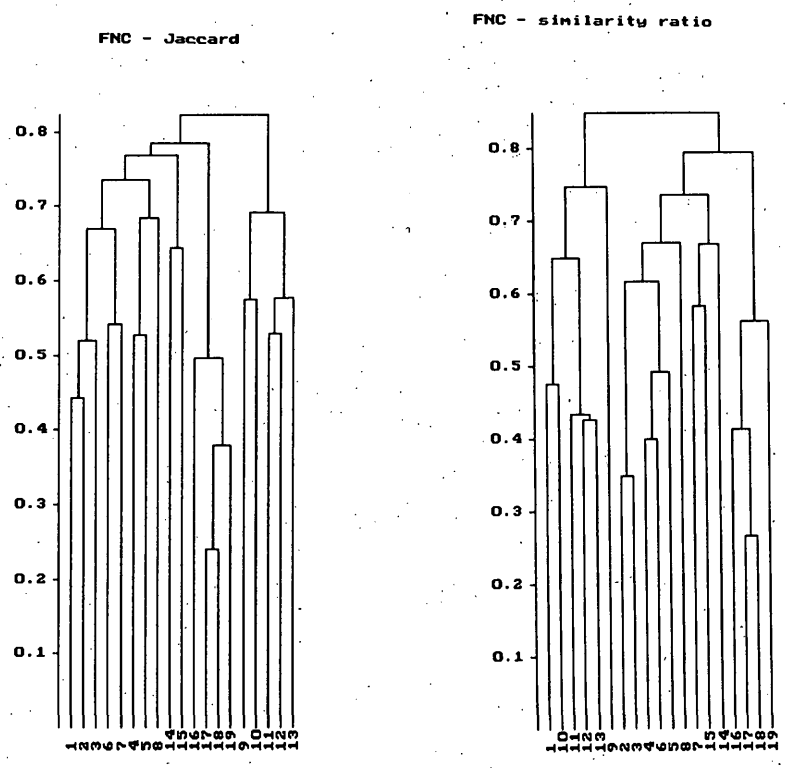

Fig. 2

Fig. 2: Dendrograms of various forms of associations Fraxino orni-Pinetum nigrae and Genisto januensis-Pinetum - Farthest Neighbour Clustering - FNC. The numbers refer to syntaxa in Phytosociological Table 2.

Abb. 2: Die Dendrogramme verschiedener Formen der Assoziationen Fraxino orni-Pinetum nigrae und Genisto januensis-Pinetum - FNC. Die Nummern beziehen sich auf die Syntaxa in der Vegetationstabelle 2.

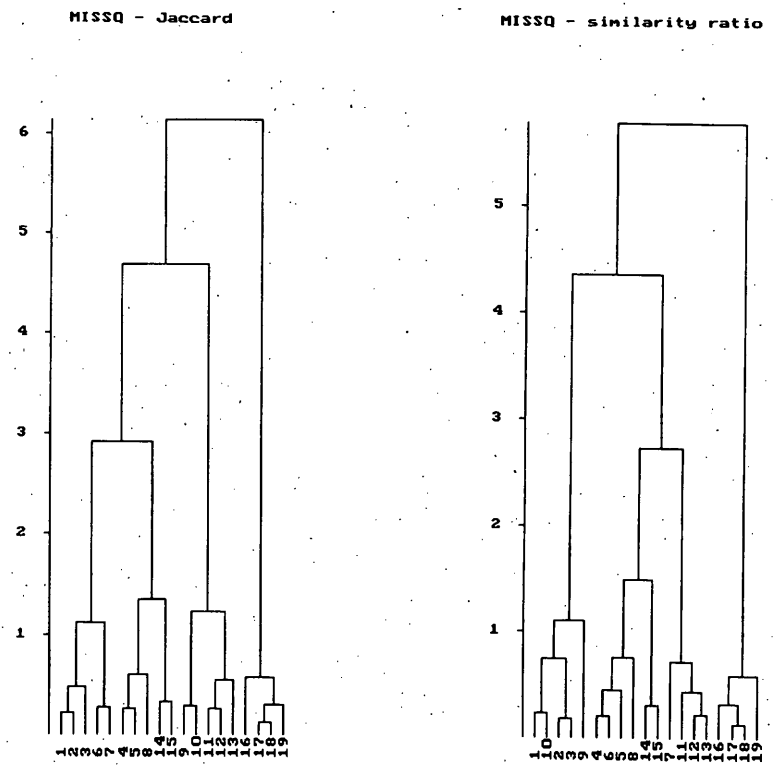

Fig. 3:

Fig. 3: Dendrograms of various forms of the associations Fraxino orni-Pinetum nigrae and Genisto januensis-Pinetum - MISSQ. The numbers refer to syntaxa in Phytosociological Table 2.

Abb. 3: Die Dendrogramme verschiedener Formen der Assoziationen Fraxino orni-Pinetum nigrae und Genisto januensis-Pinetum - MISSQ. Die Nummern beziehen sich auf die Syntaxa in der Vegetationstabelle 2

Syntaxon, treated in previous chapter (column 13 in the Phytosociological Table 2), is linked into class with more extreme forms of the association Fraxino orni-Pinetum nigrae (described on the peak Treska and above the Tolminka valley – DAKSKOBLER 1997). Stands of this forms are floristically and ecologically similar with the stands classified in two variants of the subassociation Rhodothamno-Rhododendretum hirsuti pinetosum nigrae (columns 9 and 10) by MARTIN-BOSSE (1967). In our opinion, those stands of the latter subassociation, where black pine grows in the tree layer with canopy density of at least about 0.5, could be classified in the association Fraxino orni-Pinetum nigrae as extreme forms with *Rhododendron hirsutum* and (or) *Rhodothamnus chamaecistus*. Hierarchical clustering confirms that *Pinus nigra* stands in the area of Govci belong to the association Fraxino orni-Pinetum nigrae. On the basis of a single relevé published (ACCETTO 1996) we could conclude to certain similarity of the association Fraxino orni-Pinetum nigrae on the northeastern edge of the Trnovski gozd plateau with the newly described association Rhododendro hirsuti-Pinetum nigrae Accetto 1996 from the Kolpa Valley (southern Slovenia), but detailed comparison (ACCETTO 1997, verbal information) reveals that these are two different associations.

Similar results were achieved by applying two-dimensional ordination (Figure 4). The forms of the association Genisto januensis-Pinetum (columns 16-19 in Phyt. Table 2) are clearly differentiated from syntaxa of the association Fraxino orni-Pinetum nigrae. Noticable grouping of more extreme forms of the association Fraxino orni-Pinetum nigrae (with *Rhododendron hirsutum* and *Rhodothamnus chamaecistus*) can be seen.

Analysis of phytosociological groups (Table 4) shows, that species of the class Erico-Pinetea s. lat. prevail in both communities compared by proportion (between 20 and 30%, and in some forms of the association Fraxino orni-Pinetum nigrae even more). Also the proportion of Quercetalia pubescentis species (between 10 and 20%, in the association Genisto januensis-Pinetum usually more) and the proportion of Festuco-Brometea species (mostly between 10 and 20%) are rather large. It is possible (see e. g. POLDINI 1967) that many of the species which are today classified in this class originally grew in open pine forests. The proportion of Fagetalia sylvaticae species varies, in some forms it reaches up to 20%, but usually it is lower than 10%. Phytosociological groups of the subalpine belt (Adenostyletalia, Seslerietea albicantis, Thlaspietea rotundifolii) are characterized by having rather high proportion in the association Fraxino orni-Pinetum nigrae, but they have very low proportions in the association Genisto januensis-Pinetum. The proportion of chasmophytes (Asplenietea trichomanis) is the highest in extreme forms of the association Fraxino orni-Pinetum nigrae, on steep rugged rocks (between 5 and 10%).

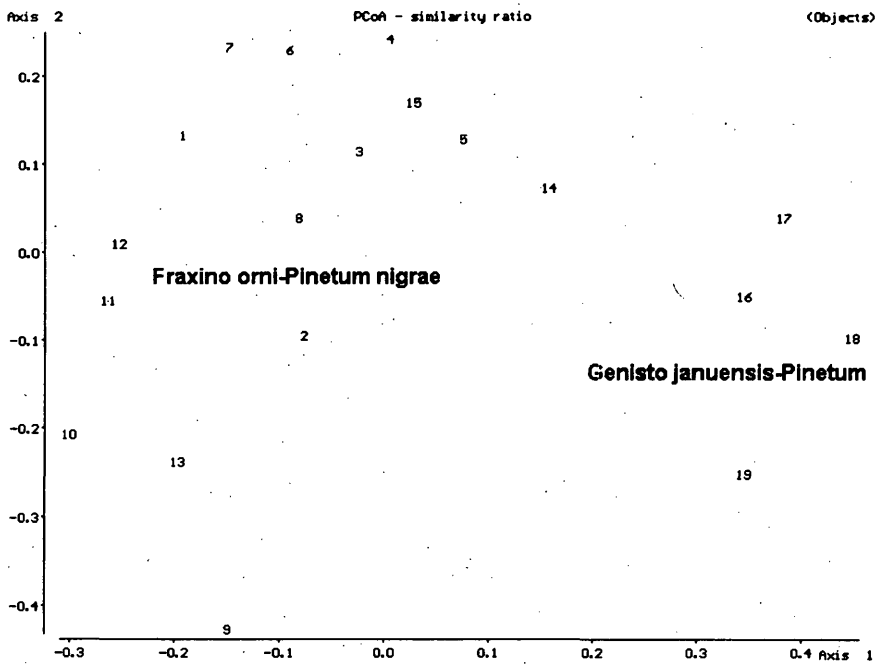

Fig. 4: Two-dimensional scatter diagram of various forms of the associations Fraxino orni-Pinetum nigrae and Genisto januensis-Pinetum. The numbers refer to syntaxa in Phytosociological Table 2.

Abb. 4: Zwei-dimensionales Ordinationsdiagramm verschiedener Formen der Assoziationen Fraxino orni-Pinetum nigrae und Genisto januensis-Pinetum. Die Nummern beziehen sich auf die Syntaxa in der Vegetationstabelle 2.

We can notice some species in the synthetic table which can be, in a wider sense, characterized as the differential species of the association Fraxino orni-Pinetum nigrae, in contrast to the association Genisto januensis-Pinetum. Species, widespread in the Alpine (or Alpine-Illyrian) region, e. g. *Euphrasia cuspidata, Arctostaphylos uva-ursi, Rhodothamnus chamaecistus, Salix glabra, Valeriana saxatilis* and *Campanula cespitosa* mainly prevail among them. We could add also *Laserpitium peucedanoides*, which, however, thrives in the subassociation Genisto januensis-Pinetum pinetosum nigrae (column 16 in Phyt. Table 2), as well. Other differential species are *Allium ochroleucum, Asperula aristata, Asperula purpurea, Cotoneaster tomentosus* and *Hieracium porrifolium*.

Table 4: Phytosociological groups in the associations *Fraxino orni-Pinetum nigrae* and *Genisto januensis-Pinetum* (relative frequencies).																			
The numbers refer to syntaxa of Phytosociological Table 2.																			
Tabelle 4: Pflanzensoziologische Gruppen von *Fraxino orni-Pinetum nigrae* und *Genisto januensis-Pinetum* (relative Häufigkeiten).																			
Die Nummern beziehen sich auf die Syntaxa in der Vegetationstabelle 2.																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Erico-Pinetea s. lat.	38,3	32,4	35,3	27,3	25,9	38	27,6	28	24,6	35	25,4	26	20,6	15,4	22	29,3	28,9	26,3	24,9
Quercetalia pubescentis s. lat.	8,53	14,5	16,2	7,51	20,4	8,78	10,6	7,87	12,3	7,36	6,3	8,4	7,2	8,2	10,1	17,9	15	17,7	18,4
Quercetalia roboris s. lat.	0,56	3,94	4,05	4,78	4,03	2,39	0	2,62	4,34	0,95	0,4	2,1	1,3	2,1	0,9	2,47	0,6	1,79	1,63
Fagetalia sylvaticae s. lat.	3,39	7,94	5,2	5,4	7,19	6,18	3,9	11,4	21,2	6,78	8,8	8,2	14,2	10,7	3,2	8,33	7,62	11,2	20,4
Querco-Fagetea s. lat.	0,78	2,02	3,47	4,4	8,63	1,88	0	1,31	1,05	0,99	0,4	0,8	2,8	6,8	4,7	6,79	4,26	7,78	5,31
Vaccinio-Piceetea s. lat.	1,93	5,16	1,73	2,39	2,27	2,37	3,2	3,5	17,1	6,27	4,6	1,9	8,5	2,1	3,5	2,78	2,14	5,34	7,35
Adenostyletalia s. lat.	0,44	1,14	0,58	2,06	1,04	1,91	1,1	3,5	1,8	1,43	2,9	2,7	1,5	0,4	1,3	0	0,45	0,12	1,22
Trifolio-Geranietea s. lat.	4,58	4,43	3,47	7,65	6,33	6,18	8,8	4,81	1,05	1,94	5	5,8	1,5	7,5	5	3,4	3,21	3,97	3,67
Festuco-Brometea s. lat.	21,6	13,4	19,1	20,8	14,9	16,4	17	10,3	0,7	7,26	10,4	8,1	6	23,9	15,4	16,7	26,5	15	9,8
Seslerietea albicantis s. lat.	5,58	5,06	1,73	4,41	3	5,96	6	6,55	2,5	11,6	17,9	8,6	8,8	2,5	2,5	3,09	2,91	1,65	1,63
Asplenietea trichomanis s. lat.	1,96	1,26	0	1,02	0,17	0,71	3,5	3,5	1,78	5,83	5,4	6,5	9,5	2,5	3,1	0,93	1,82	0,89	0
Thlaspietea rotundifolii s. lat.	7,16	2,76	1,73	5,51	2,47	5,01	12	7,99	5,06	5,86	6,3	6,5	3,8	1,1	10,7	0,62	1,99	1,03	0,41
Other species	2,71	4,67	6,94	4,82	3,66	4,22	1,4	6,56	4,34	1,91	0,8	5,2	4,2	7,2	12,2	2,16	2,14	2,54	2,45
Mosses and lichens	2,46	1,27	0,58	2,01	0	0	4,9	2,19	2,12	6,79	5,4	9,2	10,1	9,6	5,4	5,56	2,42	4,59	2,86

Table 4: Phytosociological groups of the associations Fraxino orni-Pinetum nigrae and Genisto januensis-Pinetum (relative frequencies). The numbers refer to syntaxa of Phytosociological Table 2.

Tabelle 4: Pflanzensoziologische Gruppen von Fraxino orni-Pinetum nigrae und Genisto januensis-Pinetum (relative Häufigkeiten). Die Nummern beziehen sich auf die Syntaxa in der Vegetationstabelle 2.

4. Conclusions

We classified natural stands of *Pinus nigra* in the area of Govci on the northeastern edge of the Trnovski gozd plateau in the association Fraxino orni-Pinetum nigrae Martin-Bosse 1967. We described them as a new geographical variant and subassociation Fraxino orni-Pinetum nigrae var. geogr. *Primula carniolica* var. geogr. nova rhododendretosum hirsuti (with variant *Rhodothamnus chamaecistus* and subvariants with *Larix decidua* and *Pinus mugo*).

We ranged the association Fraxino orni-Pinetum nigrae Martin-Bosse 1967 in alliance Fraxino orni-Ostryion carpinifoliae Tomažič 1940 (=Orno-Ericion Horvat 1959), in order Erico-Pinetalia Horvat 1959 and class Erico-Pinetea Horvat 1959, according to WALLNÖFER (1993: 244) and POLDINI & VIDALI (1995: 169).

Comparing the forms of the associations Fraxino orni-Pinetum nigrae and Genisto januensis-Pinetum, described as yet, we ascertained that these are - in spite of similar floristic composition and ecology - in fact two relatively clearly differentiated communities. The first is differentiated from the other mainly by species distributed in the Alpine (and partly north-Illyrian) region, e. g. *Euphrasia cuspidata, Arctostaphylos uva-ursi, Rhodothamnus chamaecistus, Salix glabra, Valeriana saxatilis* and *Campanula cespitosa* (in the Carnic Alps and western Julian Alps also *Euphorbia triflora* subsp. *kerneri* and *Bupleurum ranunculoides* subsp. *canalense*), while the latter is differentiated from the former by the Illyrian and southeast-European species *Genista januensis, Daphne blagayana* and *Potentilla carniolica.*

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Phytosociological Table 1: The Association Fraxino orni-Pinetum nigrae Martin-Bosse 1967 in the area of Govci above the Trebuša valley (western Slovenia).

Vegetationstabelle 1: Die Assoziation Fraxino orni-Pinetum nigrae Martin-Bosse 1967 in dem Gebiet Govci oberhalb dem Trebuša-Tal (westliches Slowenien).

Phytosociological Table 1: The association *Fraxino orni-Pinetum nigrae* Martin-Bosse 1967 in the area of Govci above the Trebuša valley (western Slovenia)

Vegetationstabelle 1: Die Assoziation *Fraxino orni-Pinetum nigrae* Martin-Bosse 1967 in dem Gebiet Govci oberhalb dem Trebuša-Tal (westliches Slowenien)

Number of relevé (Aufnahmenummer)		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		
Working number (Arbeitsnummer)		x4	26	30	25	24	14	34	32	x5	13	M1	M2	M3	M4	M5	22	18	4	2	1	3	20b	6	10	5	16	17	19	21	8		
Altitude in 10 m (Meereshöhe in 10 m)		103	115	113	104	102	107	104	103	104	92	91	89	85	83	81	77	75	50	48	46	48	70	50	56	51	52	55	58	73	59		
Aspect (Exposition)		NE	NE	NE	NE	NE	NE	NE	SW	NE	NE	N	N	E	N	NE	N	NE	NE	NW	N	NE	NE	E	NE	E	NE	NW	W	SE	NE		
Slope in degrees (Neigung in Grad)		50	40	50	45	45	45	40	35	45	40	40	45	40	40	45	45	40	45	40	45	40	45	40	35	35	40	40	40	45	45		
Parent material (Geologische Unterlage)		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	D	D		
Soil (Böden)		R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R		
Stoniness in % (Steinigkeit in %)		30	20	60	20	10	30	30	30	20	20	30	30	20	30	40	20	20	20	20	50	30	30	20	10	10	40	50	5	20	20		
Cover in % (Deckungsgrad in %):																																	
Upper tree layer (Baumoberschicht)	E3b	40	40	40	50	60	50	50	50	50	50	50	60	60	60	60	70	50	60	50	60	60	70	50	60	60	60	60	60	60	50		
Lower tree layer (Baumunterschicht)	E3a	20				10						10	10	10	10	10	10	20	20	20	10	20	10	20	20	20	20	20	30	20	20		
Shrub layer (Strauchschicht)	E2	30	40	50	30	20	30	20	20	30	40	30	20	20	10	20	50	30	50	40	50	50	40	40	50	40	40	30	30	20	60		
Herb layer (Krautschicht)	E1	70	70	50	70	70	70	70	70	70	60	70	70	80	60	60	50	80	50	70	60	70	60	70	70	70	60	40	50	70	40		
Moss layer (Moosschicht)	E0	10	5	10	5	5	10	10	10	10	10	5	5	5	5	10	10	5	20	10	10	10	10	10	10	5	15	20	10	10	10		
Stand (Bestand):																																	
Max. diameter (Max. Stammdurchmesser) - cm		35	30	30	30	30	30	40	35	25	35	45	35	40	48	45	40	35	35	35	30	30	40	35	45	40	40	40	40	40	40		
Maximum height (Baumhöhe) - m		12	12	8	10	12	7	10	8	10	12	12	12	16	14	12	18	14	17	18	16	18	20	17	14	20	19	19	20	17	20		
Relevé area (Grösse der Aufnahmefl.) -10 m2		10	10	10	10	10	20	20	20	10	20	20	20	20	20	10	10	20	10	10	10	10	10	10	20	20	20	10	20	10	10		
Month of taking relevé (Monat der Aufnah.)		7	7	8	7	7	9	8	8	7	9	9	9	9	9	9	9	7	9	9	9	9	9	9	9	9	9	9	9	9	9		
Number of species (Artenzahl)		68	56	64	55	53	60	57	53	53	42	59	54	47	50	49	45	51	60	61	63	46	45	55	71	74	61	63	53	42	51		
CHAR. AND DIFF. SP. OF THE ASSOCIATION																																Pr.	Fr.
Kenn- und Differ.-Arten der Assoziation																																	
Allium ochroleucum	E1	+	1	1	1	1	1	1	1	1	+	1	1	1	1	+		+	+	+	r	+	r	+		+				+		24	80
Laserpitium peucedanoides		1		1	+	+	1	1	1	1		1	1	1	1	1	+	+	1	+	+			+	+	+		+		+		23	77
Asperula aristata			+	+	1		+	+	1	+	r			r																		9	30
Euphrasia cuspidata							+					+																				2	7
GEOGRAPHICAL DIFFERENTIAL SPECIES																																	
Geographische Differentialarten																																	
Omphalodes verna	E1	+		r											r		+	r	+	+		+		+	1	+	+	+			13	43
Primula carniolica		r	+	r	+		r	+		+						r					+										9	30
DIFFERENTIAL SPECIES OF LOWER UNITS		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		
Differentialarten der niedrigeren Einh.																																	
Rhododendron hirsutum	E2a	1	1	2	+	2	+	1	+	1	+	+	2		+	+	3	1	3	+	1	+	1	+	1	r	+	1	+	+	3	29	97
Valeriana saxatilis	E1	+	+	1	+	+	+	+		+		+	+	+	+	1	+	1	1	+	+	+	+		+	r						22	73
Rhodothamnus chamaecistus		1	+	1	+	1	1	1	+	1	+	1	1	+	+	+	+	+	+	+	+											20	67
Salix glabra	E2a	r	1	+	+	+	+	1	+	+	+		r	r		r	+	r			+											16	53
Larix decidua	E3b	1	r	r																												3	10
Pinus mugo	E2b			2	+	+																										3	10
Pinus mugo	E2a			1																												1	3

ERICO-PINETEA s. lat.		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		
Pinus nigra	E3b	1	2	3	3	4	3	3	3	3	3	3	4	4	4	4	4	3	3	3	3	4	4	3	3	4	4	3	3	4	2	30	100
Pinus nigra	E3a	+			1	+		1	1				1	1	1		+	1	1	1	1	+	1	+		+	+	+	1	1	+	23	
Pinus nigra	E2b	+	1	+	1	1	1	1	1		+	+	+	+	+	+	+	1	+	+		+	+			+	+	+	+	+	+	28	93
Pinus nigra	E2a	1	+	+		+	1	+			+	+	+	+	+	+		+													16	
Erica carnea	E1	2	2	2	3	1	2	3	2	2	1	+	2	1	1	3	2	2	2	1	2	3	2	3	2	2	2	2	3	2	30	100
Polygala chamaebuxus		+	1	1	+	+	+	+	1	1	+	1	1	1	1	+	+	1	+	+	+	1	+	1	+	1	1	1	1	1	+	30	100
Rhododendron hirsutum	E2a	1	1	2	+	2	+	1	+	1	+	+	2		+	+	3	1	3	+	1	+	1	+	1	r	+	1	+	+	3	29	97
Amelanchier ovalis	E2b	+	1		1	1	1	1	1	1	1	+	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	28	97
Amelanchier ovalis	E2a	1	1		+	+		+	1		1	+	+	1	+	+		1	1			1	+		+			+			21	70
Allium ochroleucum	E1	+	1	1	1	1	1	1	1	1	+	1	1	1	1	+		+	+	+	r	+	r	+						+	24	80
Calamagrostis varia		1	1	1	+	1	1	+	1	+	1	2	1	2	1	1	+	+					2		1		1	+	2	2	23	77
Buphthalmum salicifolium			+		r	+		+	+		+	+	+		+		+	r	1	1	+	+	+	+	+	+		+		+	22	73
Rhodothamnus chamaecistus		1	+	1	+	1	1	1	+	1	+	1	1	+	+	+	+	+	+	+	+										20	67
Cirsium erisithales	E1		+	r				+	r								+	+	+	+	+	+	+	r	+	+	+	+			+	18	60
Cotoneaster tomentosus	E2a		+		+	+	+	+	+	+	+	r		+		r															+	13	43
Chamaecytisus hirsutus											+							r	+	r	+	+		+			+		+		11	37
Asperula aristata	E1		+	+	1		+	+	1	+	r			r																	9	30
Carex alba											+		+														+	+	+	+	9	30
Rubus saxatilis			+				+								+	+			+		+						+			+	9	30
Arctostaphylos uva-ursi	E2			+	1		+	+	r																					6	20
Leontodon incanus	E1						1	r			r									+					+	+					6	20
Epipactis atrorubens			r									r										+			r			+		5	17
Peucedanum austriacum																									+		r	+			4	13
Gymnadenia odoratissima	E1			+	r				+																						3	10
Pinus mugo	E2b		2	+	+																										3	10
Pinus mugo	E2a		1																	+											1	3
Carex ornithopoda (?)	E1	+				+																									2	7
Euphrasia cuspidata						+						+																			2	7
Coronilla vaginalis					+				+																						2	7
Genista radiata	E2a									r																					1	3
Pyrola minor	E1																														1	3
QUERCETALIA PUBESCENTIS s. lat.																																	
Ostrya carpinifolia	E3b									r													+							1	3	67
Ostrya carpinifolia	E3a	+					r	+			+					+	+		1	1	1	1	+	1	1	1	1	+	+		1	19	
Ostrya carpinifolia	E2b		+	r				r	r		+		+	1	+	+		+	+	1	1	1	+	+	+		+	1	+	1	23	83
Ostrya carpinifolia	E2a	+	+		r		r			+			+	+	+		+	+	+				+							13		
Sorbus aria	E3b																	+					+								2	63	
Sorbus aria	E3a				+							+	+	1	+	+	+	+	+	+	+	+		+			+	1	+	1	+	18	
Sorbus aria	E2b	1	+	1	+	+		1	1	+	1	+	1	1		1	+	+	1	+		1			1	+	+	+	+	+	1	25	90
Sorbus aria	E2a				+	+		+		+		+	+	+							+				+	+				+	10	
Sorbus aria	E1	+										+	+	1	+	+				+	+						+				12	40	
Fraxinus ornus	E3b								+																					1	1	37	
Fraxinus ornus	E3a										+	r											+		+	+	+	+	+	+	1	11	
Fraxinus ornus	E2b					+				r			+	+	+	+	+	+	1	+	1	1	1	1	1	1	1	1	1	1	1	22	73
Fraxinus ornus	E2a															+	+	+	+	1	1	1	+	1		+	1	1	+	1	1	15	
Fraxinus ornus	E1													+	+	1	+				1	+	1				1	1	1	+	12	40	
Convallaria majalis						r		+				+	+		+	+		+	r			+		+		1	+	+		+	14	47	

Melittis melissophyllum	E1																		+	r	+		+	+	+	+		1		+	9	30
Viburnum lantana	E2b																			r									r	+	3	23
Viburnum lantana	E2a																		r		+		+		r						4	
Euonymus verrucosus	E2b																													+	1	13
Euonymus verrucosus	E2a																							+	+	r					3	
Mercurialis ovata	E1																		+	+											2	7
Rhamnus catharticus	E2b																			r											1	3
QUERCETALIA ROBORIS s. lat.		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		
Pteridium aquilinum	E1																+		+	+	+		+	+	1	2	+	+	+	r	+	13	43
Frangula alnus	E2b										+						+	r	r		+				r						+	7	23
Frangula alnus	E1																			r					+							2	7
Potentilla erecta	E1										+																					1	3
FAGETALIA SYLVATICAE s. lat.																																	
Cyclamen purpurascens	E1	1	1	1	1	1	1	1	1	1	+	+	1	+	1	+	1	1	1	1	1	+	1	+	1	+	+	+	+	1	1	30	100
Acer pseudoplatanus	E3a																								1	+						2	7
Acer pseudoplatanus	E2b																+		r		+			r		r			+		+	7	27
Acer pseudoplatanus	E2a																				+	r										2	
Acer pseudoplatanus	E1			r					r		+	r	r	+		+	+	r	+			+	+	+	+	1	+	+	1	1	+	20	67
Mercurialis perennis		+	+	+	+	+											+			+	+	+	+	+	1	+	+	+	+	+	+	18	60
Daphne mezereum	E2		+			+						+			+	+		r	r	r	+			+	+	r	+		+	+		15	50
Fagus sylvatica	E3b			r						r													r		r						r	5	43
Fagus sylvatica	E3a	+				r					+			r				+							+			r	+	r		9	
Fagus sylvatica	E2	+		r	r	r						r	r		+			+				r	r									10	33
Fagus sylvatica	E1				r	r						r			r	+	+		r		r			r	r	+			+	+	r	14	47
Epipactis helleborine s. lat.		+		+													+	r	+	+	+			+	+	+		+	+		+	13	43
Laburnum alpinum	E3a	+														+								r							+	4	13
Laburnum alpinum	E2b	+	+			+	+			r			+		+				+		+		r		r							11	43
Laburnum alpinum	E2a																	r									+					2	
Laburnum alpinum	E1	+	+	r				r	+	+		r			+					r			+	r			+	+	+			14	47
Knautia drymeia s. lat.	E1	+	+			+	+			r									1	+				+	+	+	+	+	+			13	43
Omphalodes verna		+		r											r		+	r	+	+		+		+	1	+	+	+				13	43
Prenanthes purpurea		r				+		r	+								+	+	r		r			+		1	+					11	37
Anemone trifolia																			1	1	+		+	+	1	r	+	1			+	10	33
Rhamnus fallax	E2b																						r				+				+	3	33
Rhamnus fallax	E2a				r	r							+		+	r						r				+						7	
Galium laevigatum	E1														r				+	+					+		+		+		+	7	23
Melica nutans		+	+																+	+	+							+				6	20
Salvia glutinosa																				+	+					+			+		+	5	17
Lonicera alpigena	E2a	+																							+	r	+	+			+	5	17
Primula vulgaris	E1																							+		+			+		+	4	13
Helleborus niger						r																					+		+			3	10
Lilium martagon		r																								+						2	7
Galeobdolon flavidum																					+					r						2	7
Neottia nidus-avis																								+								1	3
Viola reichenbachiana										+																						1	3
Senecio ovatus (S. fuchsii)																			r													1	3

QUERCO-FAGETEA s. lat.		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		
Carex digitata	E1	+											+	+	+	+	1			+		+	+	+	+	+	+	+	+	+			17.	57
Hepatica nobilis		1	+																	+	+		+	+			+	1				11	37
Platanthera bifolia		+					+													+	+		+	+			1	r		r		10	33
Spiraea chamaedryfolia	E2a					r				+										+		+						+				5	17
Corylus avellana	E2b																			r												1	10
Corylus avellana	E2a																							r								2	
VACCINIO-PICEETEA s. lat.																																	
Hieracium sylvaticum	E1	+		+	+	+	+	+	1	+	+	+	+	+	+	+	+	+	+	+	+	+	1	+	+	1	+		+	+		27	90
Solidago virgaurea		+	+			r		+	+	+		+	+	+	+	+		+	r	1	1	1		1	1	1	+	+	+			22	73
Valeriana tripteris		+	+			+		+	+	+			+		+	+		+	+	+	+			+	+	+	+	+			19	63
Vaccinium myrtillus		+						+	+	+	+	1		+	+	+		+	+						+		+	+				16	53
Vaccinium vitis-idaea		+	+			+		+	r	+	+	+	+	+	+	+																13	43
Rosa pendulina	E2a	+	+	r								+	+		+	+				+					+			+				11	37
Picea abies	E3	1		r		+						r	r										+		r	+						8	27
Picea abies	E2b	+	+								r		r		r																	5	23
Picea abies	E2a	+	+				r										r															4	
Picea abies	E1							r	r																		r					4	13
Homogyne sylvestris				r										+												+		r				6	20
Clematis alpina	E2	+	+			r	+	r		+																						6	20
Larix decidua	E3b	1	r	r																												3	10
Huperzia selago	E1												+					r														2	7
Abies alba	E2a	+																														1	3
Veronica urticifolia	E1											r																				1	3
Oxalis acetoselle																					+											1	3
Gentiana asclepiadea																									r							1	3
ADENOSTYLETALIA s. lat.																																	
Salix glabra	E2a	r	1	+	+	+	+	1	+	+	+		r	r		r	+	r			+											16	53
Salix appendiculata	E2b			r										r																		2	23
Salix appendiculata	E2a	+	+																													5	
Viola biflora	E1			+																											+		
Centaurea montana																				+												1	3
TRIFOLIO-GERANIETEA s. lat.																																1	3
Viola hirta	E1												+	r	+		+			+				+		+		+	+	+	11	37
Anthericum ramosum															1	+		1		1		r			+	+				+	8	27
Vincetoxicum hirundinaria																				+	+										2	7
Polygonatum odoratum														r																	1	3
Digitalis grandiflora																											+				1	3
Clinopodium vulgare																												+			1	3
Origanum vulgare																														+	1	3
FESTUCO-BROMETEA s. lat.																																	
Carex humilis	E1	1		2		1	+	1	1	1	1	1	2	1		1	1	2	1	1	+	2	1	1	2	2	2	2	2	2	2	26	87
Galium lucidum		+	+		+		+	+	+	1	+	+	+	+	+	+		+		+		+	+	+	+	+		+				22	73
Centaurea jacea agg. (C. bracteata ?)															+				+						+	+	+	+	+	r	+	11	37
Lotus corniculatus		+		+	+	+	+		+	+								r								+						9	30
Globularia cordifolia					+		1		+				+	+		+	+	r					r									9	30
Peucedanum oreoselinum											+												+	+		+	+			+		7	23
Linum catharticum					+			+	+		+	r						r														7	23

Brachypodium rupestre	E1																					+				+	+	+			4	13
Teucrium montanum						+																									1	3
SESLERIETEA ALBICANTIS s. lat.		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		
Sesleria albicans	E1	2	2	3	2	2	3	2	2	3	3	3	3	3	4	4	2	3	1	3	3	2	3	3	1	2	3	2	+	1	2	30	100
Laserpitium peucedanoides		1		1	+	+	1	1	1	1		1	1	1	1	1	+	+	1	+	+			+	+	+		+		+		23	77
Betonica alopecuros			+		+		1	+				1	1	1	1	+	+	+	1	1	+	+	+		+	+		+	+	+	+	22	73
Carex mucronata		+		+	+	+	+	+	+			+	+	+	+	+	+														13	43
Senecio abrotanifolius		1			+	r	+	+	+	+	1		r			+		+								r	+				13	43
Thymus alpigenus		+	+		+	+	1	+	+	+	+							+							r						11	37
Carex firma		+	+	1	+	r	+	+																							7	23
Achillea clavenae			+	+	r		r	r		r																					6	20
Hieracium villosum			r	+	+				r				+		+																6	20
Aster bellidiastrum				1	+																						+			+	4	13
Gentiana clusii							r	r				r	r																		4	13
Dryas octopetala			+	+	+																										3	10
Leontopodium alpinum			+		r																										2	7
Carex ferruginea				+															+												2	7
Campanula scheuchzeri		+																													1	3
ASPLENIETEA TRICHOMANIS																																
Paederota lutea	E1	+	+	1	+		+	+		+		+	1	+	+	+	+	+	+	+	+	+	r		+	+	+	+	+	+	+	26	87
Potentilla caulescens			r	+	+	+	+	+	+	+	+	+	1	+	+	+	+	r	r	r	r	+	+	+	r		+	+			+	26	87
Asplenium ruta-muraria		+			+	+	+	+	+	+	+	+	+	r	+	+			+		+		+		+	+	+	+	+	+		22	73
Valeriana saxatilis		+	+	1	+	+	+	+		+		+	+	+	+	1	+	1	1	+	+	+	+		+	r						22	73
Phyteuma scheuchzeri subsp. columnae					r							+	+	+	+	+	+						+		+	+	1	+		+	+	14	47
Primula carniolica		r	+	r	+		r	+		+						r					+											9	30
Athamanta turbith							r		+											+		+	r	+	+	r				r		9	30
Asplenium trichomanes															r								+			r	+	+		+		6	20
Primula auricula					r		1		1				r	+																		5	17
Saxifraga crustata			r	r			+			+																						4	13
Asplenium viride		+																			+								+			3	10
Rhamnus pumilus	E2a		+		+			+																								3	10
Saxifraga squarrosa	E1		r	+				+																								3	10
Potentilla clusiana				r	r																											2	7
Moehringia muscosa				+																												1	3
Bupleurum petraeum							+																									1	3
THLASPIETEA ROTUNDIFOLII s. lat.																																	
Campanula cespitosa	E1	+	+	1	+	+	+	1	+		+	+	+	+	+	+		+	+	+												17	57
Hieracium porrifolium			+		+			+	+	+		+	r		r									r			r		r		11	37
Carduus crassifolius		+			r		+		r									+		r				r		r				+	9	30
Adenostyles glabra			r	r						+		+								r	+				r	r					8	27
Aquilegia bertolonii		+		+		r	+	+		r																					6	20
Gymnocarpium robertianum		+		+															+	+	+									+	5	17
Astrantia carniolica			+	+																											2	7
Hladnikia pastinacifolia				r					r																						2	7
Campanula cochlearifolia		+																													1	3
Saxifraga caesia										+																					1	3

OTHER SPECIES (Übrige Arten)		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		
Molinia arundinacea	E1	+			+	+	+	2	+	+	+	+		1			1	2	2	.1	1	1	+	1	2	1	+	+	+	+	1	25	83
Sorbus aucuparia	E3a																								r						+	2	7
Sorbus aucuparia	E2b	+		r		+	+		r	r	r						+							+	r							10	43
Sorbus aucuparia	E2a	+	+	r					+									+				+										6	
Sorbus aucuparia	E1				+				r	+		+	+	+			+					+	+		+		+	+				12	40
Viscum album	E2																		+		+	+		+	+		+	+	+	+	+	10	33
Festuca rubra agg.	E1	+				+		+		+																						4	13
Achillea millefolium agg.									r																+	+						3	10
Listera ovata																								r		+		r				3	10
Tofieldia calyculata				+				+																								2	7
Hemerocallis lilio-asphodelus																					+				1							2	7
Juniperus communis	E2											+				+																2	7
Parnassia palustris	E1	r																														1	3
Populus tremula	E2		+																													1	3
Euphorbia sp.	E1											r																				1	3
Betula pendula	E3														r																	1	3
Salvia sp.	E1																							+								1	3
MOSSES and LICHENS (Moose und Flechten)		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		
Fissidens cristatus	E0	+	+	+		+	+	+		+	+	+	+	+	+	+	+	+	1	+	+		+	1	1	1	+	+	1	+	+	27	90
Neckera crispa		+	+	+	+	+	+	+	+	+	1		+	+	+	+	+	+	1	1	1	1	1		1	1		2	+	+	1	27	90
Tortella tortuosa		+		1	+	+	+	+	+		1	+	1	+	+	+	+	+	1	+	1	+	+		1	+	1	1			+	25	83
Ctenidium molluscum		+	+	+				+				+	+		+	+	+		1	+	1	1		+	+		+	1	1	+	+	20	67
Leucobryum glaucum		+				+					+	+	+				+	+					+		+	+	+			+		12	40
Scleropodium purum																	+		+	+		+			+	+	+	+	1			9	30
Hypnum cupressiforme																+								+	+	+	+	+	+			7	23
Grimmia pulvinata						+			+			+		+		+											1					6	20
Dicranum scoparium											+	+						+							+				+			5	17
Polytrichum formosum		+								+			+			+																3	10
Rhytidium rugosum																				+						+		+				3	10
Homalothecium sp.																							+		+						+	3	10
Dicranum sp.		+		+						+																						3	10
Eurchynchium sp.																								+					+			2	7
Plagiochila asplenioides																										+	+					2	7
Peltigera leucophlebia																									+			+				2	7
Orthothecium rufescens				+																												1	3
Hylocomium splendens				+																												1	3
Neckera complanata									+																							1	3
Collema sp.											+																					1	3
Cladonia sp.																						+										1	3
Thuidium tamariscinum																									+							1	3
Rhytidiadelphus triquetrus																									+							1	3
Rhytidiadelphus loreus																									r							1	3
Rhytidiadelphus squarrosus ?																										+						1	3
Abietinella abietina																													+			1	3
Localities of relevés (Lokalitäten der Aufnahmen): Gorenja Trebuša - Govčenk (9949/3, UTM VL09): 18-21, 24, Poldanovška grapa (9949/3, UTM VL09): 22,23, 25-30;																																	
Poldanovec (9949/3, UTM VL09): 2, 4-8, 10, 16, 17; Mali Govci (9949/3, UTM VL19): 11-15; Orlejci (Poldanovec-Zeleni rob, 9949/3, UTM VL19): 3; Poldanovec-Stanov rob (9948/4, UTM VL09): 1, 9.																																	

List 1: List of the syntaxa in the Synoptic Table of the associations Fraxino orni-Pinetum nigrae Martin-Bosse 1967 and Genisto januensis-Pinetum TOMAŽIČ 1940 (Phytosoc. Table 2)

Liste 1: Liste der Syntaxa in der synthetischen Tabelle der Assoziationen Fraxino orni-Pinetum nigrae Martin-Bosse 1967 und Genisto januensis-Pinetum TOMAŽIČ 1940.

1 Fraxino orni-Pinetum nigrae caricetosum humilis - southern Carinthia (A) - MARTIN-BOSSE (1967, Phyt. Tab. 1);
2 Fraxino orni-Pinetum nigrae calamagrostidetosum variae - southern Carinthia (A) - MARTIN-BOSSE (1967, Phyt. Tab. 3);
3 Fraxino orni-Pinetum nigrae molinietosum arundinaceae - southern Carinthia (A) - MARTIN-BOSSE (1967, Phyt. Tab. 6);
4 Fraxino orni-Pinetum nigrae - the Carnic and the Julian Alps (I) - POLDINI (1969, Phyt. Tab. 1);
5 Fraxino orni-Pinetum nigrae ostryetosum - the Carnic Alps (I) - POLDINI (1982, Phyt. Tab. 1);
6 Pinetum austroalpinum pinetosum nigrae *(=Fraxino orni-Pinetum nigrae)* - the Julian Alps - the Koritnica valley (SLO) - T. WRABER (1979, Phyt. Tab. 1, relevés 1-12);
7 Fraxino orni-Pinetum nigrae - the Julian Alps - the Trenta valley (SLO) - DAKSKOBLER 1997 (mscr.);
8 Rhodothamno-Rhododendretum hirsuti pinetosum nigrae - the Carnic and the Julian Alps (I) - POLDINI (1969, Phyt. Tab. 2);
9 Rhodothamno-Rhododendretum hirsuti pinetosum nigrae var. Rhododendron hirsutum - southern Carinthia (A) - MARTIN-BOSSE (1967, Phyt. Tab. 9);
10 Rhodothamno-Rhododendretum hirsuti pinetosum nigrae var. Rhodothamnus chamaecistus - southern Carinthia (A) - MARTIN-BOSSE (1967, Phyt. Tab. 8, relevés 5 - 11);
11 Fraxino orni-Pinetum nigrae - the Julian Alps, the Tolminka valley (SLO)- DAKSKOBLER 1997 (mscr.);
12 Fraxino orni-Pinetum nigrae - the Julian Alps, the peak Treska near the village of Srpenica (SLO) - DAKSKOBLER 1997 (mscr.);
13 Fraxino orni-Pinetum nigrae var. geogr. *Primula carniolica* - the area of Govci on the north-eastern edge of the Trnovski gozd plateau (SLO) – Phyt. Tab. 1;
14 Fraxino orni-Pinetum nigrae - western Slovenia, the Šentviška planota (Lopata, Špik) - SLO - DAKSKOBLER 1996 (mscr.);
15 Fraxino orni-Pinetum nigrae pinetosum sylvestris (?) - western Slovenia, the peak Drnova near the town of Cerkno (SLO) - DAKSKOBLER 1996 (mscr.);
16 Genisto januensis-Pinetum pinetosum nigrae - the gorge Iški Vintgar, the Polhov Gradec Hills (SLO) - TOMAŽIČ (1940, Phyt. Tab. 2);
17 Genisto januensis-Pinetum, initial form from the Polhov Gradec Hills (SLO) -TOMAŽIČ (1940, Phyt. Tab. 1, column III);
18 Genisto januensis-Pinetum typicum - the Polhov Gradec Hills, Šmarna gora, Dolenjska (Turjak, Želimlje) - SLO - TOMAŽIČ (1940, Phyt. Tab. 1, column IV);
19 Genisto januensis-Pinetum daphnetosum blagayanae - the Polhov Gradec Hills (SLO) - TOMAŽIČ (1940, Phyt. Tab. 1, column V).

Phytosociological Table 2: Synoptic table of the associations Fraxino orni-Pinetum nigrae Martin-Bosse 1967 and Genisto januensis-Pinetum TOMAŽIČ 1940.

Vegetationstabelle 2: Synthetische Tabelle der Assoziationen Fraxino orni-Pinetum nigrae Martin-Bosse 1967 und Genisto januensis-Pinetum TOMAŽIČ 1940.

Phytosociological Table 2: Synoptic table of the associations *Fraxino orni-Pinetum nigrae* Martin-Bosse 1967 and *Genisto januensis-Pinetum* Tomažič 1940

Vegetationstabelle 2: Synthetische Tabelle der Assoziationen *Fraxino orni-Pinetum nigrae* Martin-Bosse 1967 und *Genisto januensis-Pinetum* Tomažič 1940

Successive number (Nummer der Assoziation)		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Number of relevés (Zahl der Aufnahmen)		28	16	4	22	14	12	5	4	8	7	4	22	30	4	6	5	14	12	4
ERICO-PINETEA s. lat.																				
Pinus nigra	E3	100	100	75	82	21	100	100	100	100	100	100	100	100	75	17	100	7		
Pinus nigra	E2	93	56	75	32	21	92	100	25		57	100	100	93	50		100	7		
Pinus nigra	E1	36	25	50	36			20			14	25	41				100			
Erica carnea		100	100	100	100	86	100	100	100	100	100	100	100	100	100	100	100	86	100	100
Polygala chamaebuxus		82	87	100	82	57	92	80	75	75	71	100	100	100	100	100	100	93	92	100
Calamagrostis varia		71	100	100	95	79	100	100	100	87	71	100	82	77	100	100	60	50	100	100
Buphthalmum salicifolium		68	75	50	82	50	83	60	100	12	29	100	59	73	75	100	100	100	100	75
Amelanchier ovalis	E2b	50	87	100	23	93	100	40	50	37	86	100	95	97	25	100	100	14	42	50
Amelanchier ovalis	E2a	68	87	75	68			100		37	57	75	86	70						
Pinus sylvestris	E3	32	62	75	50	14	58		50	25	14		14		100	100	60	100	100	75
Pinus sylvestris	E2	14	12	25	18	21	50		25				9		50	100	40	21	75	50
Pinus sylvestris	E1		19	25	14												60	21	67	25
Asperula aristata		86	50	50	27	36	58	100	25		57	100	77	30		83				
Epipactis atrorubens		32	56	50	91	71	42	100	100	25	14		18	17	75	100	60	36	83	50
Asperula purpurea		43	6	50	18	64	42	100			14		14			50				
Leontodon incanus		32	62	75	36	7	25	80			14	50		20	75	100	60	93	67	25
Chamaecytisus purpureus		21	31	75	95	71	100	100	100				95				100	93	83	75
Daphne cneorum		43	75	25	14				50	25	14							36		
Crepis incarnata (C. froelichiana, C. slovenica)		32	19	50	45		17		25						75		60	71	67	25
Cotoneaster tomentosus	E2	11	19	50	36	43	58	80	75	37	29	50	23	43						
Cotoneaster tomentosus	E1	18	44																	
Rhamnus saxatilis	E2	14	12	25	45	64	25	40	25							33	80	79	75	25
Rhamnus saxatilis	E1		44																	
Rubus saxatilis		7	56	25	41	14	17			75	14	25	54	30						
Euphrasia cuspidata		39	6	25	23		8	80			14	75	32	7						
Arctostaphylos uva-ursi	E2	18	12		4		8				29			20						
Gymnadenia odoratissima	E1	14	31	75	18		17		25				4	10				7	8	
Viola collina		14	44														20	29	58	75
Allium ochroleucum		7			45	14	8				14	50	73	80		33				
Carex alba		4	62	25	14	71				25			4	30			80	29	58	100
Coronilla vaginalis		50	37	25	4				25			75		7				7		
Bupleurum ranunculoides subsp. canalense		11			54	21			50											
Rhodothamnus chamaecistus		4	6		4			20	100	12	100	100	95	67						
Pinus mugo	E2	4	12				50	40	25		43	100	4	10						
Euphorbia triflora subsp. kerneri	E1	7			91	36			75											
Goodyera repens		4			32		25		50											
Cirsium erisithales			37	25		7			25	50	14	75	36	60						
Rhododendron hirsutum	E2		37		18		17		100	100	57	100	86	97						25
Chamaecytisus hirsutus			6	25	4	29								37	100	17	80	71	100	75
Pyrola rotundifolia	E1		12		14														8	
Peucedanum austriacum (incl. P. rablense)					18				25	12		25		13					17	50
Aster amellus					41	14						25	9		75	50	60	71	58	50
Genista radiata	E2				18	14	17	20	25			75		3		83	60			
Dorycnium germanicum (incl. D. herbaceum)	E1				14	7									75		60	93	100	
Knautia ressmannii						21														
Pyrola minor							17							3	25				25	
Pyrola chlorantha							8													
Carex ornithopoda									50					7			40	14	67	75
Orthilia secunda										12									8	25
Genista januensis																	80	93	92	50
Daphne blagayana	E2																20		8	100
Monotropa hypopitys	E1																80	14	42	25
Potentilla carniolica																	40	14	17	100
QUERCETALIA PUBESCENTIS s. lat.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Ostrya carpinifolia	E3	18	25			93	17	20		75	29	25	54	67	100	33	40	7	67	100
Ostrya carpinifolia	E2	18	25		45	50	100	100	100	50	29	100	100	93	100	100	100	79	100	75
Ostrya carpinifolia	E1	7	50					40		25	14		41			17		7	25	75
Fraxinus ornus	E3	29	50	50	4	64		20		25	14	25	27	37	25	50	40	14	58	100
Fraxinus ornus	E2	46	81	75	77	86	83	100	75	37	29	75	100	73	100	100	100	86	100	75
Fraxinus ornus	E1	29	62	75				80		37			77	40	100	17				
Sorbus aria	E3	32	69	25		36				50	29	25	36	63	25		100	21	75	75
Sorbus aria	E2	21	69	50	27	43	92	80	50	25	29	100	82	90	75	67	100	64	75	100
Sorbus aria	E1	32	81	100	36					50	29	25	18	40	25			14	17	75
Berberis vulgaris	E2	14	25	25	36	64	8						18		50	33	100	71	100	50

Berberis vulgaris	E1	7	19	50															
Coronilla emerus s. lat.	E2	14			27	43			75						100				
Lembotropis nigricans		7	25	50	54	29	8		75									17	
Convallaria majalis	E1		50	25					25	50	14	75	54	47	50			25	50
Viburnum lantana	E2		31	25	27	57								23		67	100	57	75	50
Viburnum lantana	E1		25	50															
Carex flacca			19	75	14	7											60	64	67	50
Clematis recta			6	25	18	50														
Mercurialis ovata					18	21								7		50	100	21	58	75
Quercus pubescens	E3					64											40	14	25	
Quercus pubescens	E2				14	43									25		40	64	42	
Quercus pubescens	E1															17				
Hypericum montanum					9	7									50		40	21	42	25
Rhamnus catharticus	E2				4	21							7	3				50	67	25
Frangula rupestris	E2				4															
Melittis melissophyllum	E1					14			50			25	18	30	25		100	21	58	50
Cornus mas	E2					21									25				8	25
Euonymus verrucosus	E2													13					25	25
Dianthus monspessulanus	E1														50		20			
Cotinus coggygria	E2																40	7		
Viola alba	E1																20		8	
Sorbus torminalis	E2																20	14		
Calamintha sylvatica	E1																			25
QUERCETALIA ROBORIS s. lat.																				
Potentilla erecta	E1	4	31	50	82	21	67		75				18	3			40	14	50	50
Melampyrum pratense		14	44	25	14	57			25	75							20			
Pteridium aquilinum			62	50	27					62	14		18	43			40	14	67	50
Frangula alnus	E2b		19	25	4	36	17		50			25	32	23						
Frangula alnus	E2a		25	25	41					12	14		59	7		33				
Genista tinctoria	E1		12		23	21		20							75					
Serratula tinctoria					45	21											60			
Carex montana					18															
Laserpitium prutenicum					14															
Castanea sativa	E1					7									75	17				
FAGETALIA SYLVATICAE s. lat.																				
Cyclamen purpurascens	E1	61	62	50	77	93	92	60	100	100	71	100	82	100	100	33	100	86	92	75
Helleborus niger		14	62	25	18		17	60	50	62	29		23	10	100		80	64	100	100
Melica nutans		4	31	25	32	14			100	12	14	25	9	20			100	21	50	75
Euphorbia amygdaloides		7	37	75	4					50	14									
Mercurialis perennis		4	12		4				50	37		50	4	60						
Laburnum alpinum	E3													13						
Laburnum alpinum	E2				4									43		17				
Laburnum alpinum	E1	7	6									25	4	47		17				
Rhamnus fallax	E2									37		25	4	33						
Rhamnus fallax	E1	4								12		25								
Viola reichenbachiana		4				14				25				3						
Primula vulgaris		4			9									13			60	29	33	100
Anemone trifolia			50	25	45	50	33		50	75	29	50	54	33	25			7	42	50
Fagus sylvatica	E3		6		4	21	8			62	14	50	14	43				14	58	100
Fagus sylvatica	E2		31		4	7	17		25	37		25	18	33	50	17	100	43	100	75
Fagus sylvatica	E1		31		14			20		37	14	25	32	47					25	75
Knautia drymeia s. lat.	E1		37	25						12	14			43	25		60	43	50	75
Acer pseudoplatanus	E3													7				7	25	
Acer pseudoplatanus	E2				4									27			40	7	50	75
Acer pseudoplatanus	E1		6									25	32	67	50	50		7	25	75
Neottia nidus-avis			6							12				3	50					
Mycelis muralis			6							25					50					
Dentaria enneaphyllos			6		4					12										
Prenanthes purpurea					4					37				40						
Galium laevigatum					18	43			50	12		25	9	23					25	25
Epipactis helleborine s. lat.					27		50		25			25	100	43	50	17				
Euphorbia carniolica					9				50									7	17	75
Salvia glutinosa	E1					7			25	25				17	50	17		7	25	75
Euonymus latifolius	E2					14														
Daphne mezereum	E2								25	12		25		50		17		7		75
Lonicera alpigena									25	25		25		17						
Epimedium alpinum	E1								50											
Lathyrus vernus									25											
Aruncus dioicus										12										75
Senecio ovatus												25		3	25					
Lilium martagon												25		7						
Tilia cordata	E3														25					

Tilia cordata	E2													25						
Tilia cordata	E1											4		75						
Omphalodes verna													43							
Tilia platyphyllos	E2													50						
Carpinus betulus	E2													25						
Cephalanthera damasonium	E1													25						
Hacquetia epipactis										°								7	17	50
QUERCO-FAGETEA s. lat.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Carex digitata	E1	14	37	25	9	14				12	29	25	9	57	25	17				
Platanthera bifolia		11	62	50	64		25		25				4	33			40	14	58	25
Cruciata glabra				25	23	50	8								25				42	25
Quercus petraea	E3														25		40	7	50	50
Quercus petraea	E2				9	14											60	21	50	
Quercus petraea	E1			25									4		100	83				
Crataegus monogyna	E2			25	14	29									25		40	43	25	
Hepatica nobilis	E1				23	43				12				37			80	29	75	100
Cephalanthera rubra					18					12										
Corylus avellana	E2				27	64	25		50				18	10	75	17				
Corylus avellana	E1				18								4							
Ligustrum vulgare	E2				14	7									75	17	40	43	33	
Clematis vitalba					9	36									50	50		7	42	
Cornus sanguinea					9	36										33				
Ranunculus nemorosus	E1				9	7													33	75
Hedera helix						14									75	17				
Cephalanthera longifolia	E1					7	8								25					
Lonicera xylosteum	E2					7										17	40			
Vinca minor	E1					21														
Spirea chamaedryfolia	E2													17						
Pyrus pyraster	E3																40	14	33	25
Pyrus pyraster	E2																60	21	67	25
VACCINIO-PICEETEA s. lat.																				
Picea abies	E3	4	6		45	36	17		25	37			9	27	25	17	80	29	75	100
Picea abies	E2	11	37		14	21	58	100	50	50	14		41	23	100	83	60	50	92	50
Picea abies	E1	7	12					40		25	14			13	25	50		7	33	75
Hieracium sylvaticum		36	87	25	23	7			25	75	71	75	4	90	50	67			75	
Vaccinium vitis-idaea		4	19	25						50	14			43						
Solidago virgaurea			56	25	14	7		20		75	14	25	14	73		17	40	14	58	75
Rosa pendulina	E2		12			7				37		50	18	37					8	25
Vaccinium myrtillus	E1		12		9					12		25		53					8	
Larix decidua	E3		6							50		25		10						
Larix decidua	E2								25							17				
Valeriana tripteris	E1		6		9	14	8		25	75		25		63						75
Veronica urticifolia					9				25					3						
Gentiana asclepiadea					4								4	3						25
Homogyne sylvestris									25	75	57			20						
Abies alba	E2									25				3						
Clematis alpina	E2											25		20						
Gymnocarpium dryopteris	E1											25								25
ADENOSTYLETALIA s. lat.																				
Salix glabra	E2	7	6	25	45	21	67	60	100	25	14	100	100	53						
Salix glabra	E1	7	31								14		27							
Salix appendiculata	E2b					21				25			9	7		17				
Salix appendiculata	E2a		19							12	14	25	14	17	25	50				
Knautya longifolia	E1				54				75											
Thalictrum aquilegiifolium					18				25											
Aconitum angustifolium												50								
Grafia golaka																		21	8	75
TRIFOLIO-GERANIETEA s. lat.																				
Vincetoxicum hirundinaria	E1	50	31	25	86	50	75	100	75			75	50	7	50	50		29	42	50
Anthericum ramosum		43	37	25	68	36	50	100		12		75	91	27	75	33	80	79	92	50
Polygonatum odoratum		32	44	50	23		17	40	25	12	43	25	9	3	100			7	42	50
Thesium bavarum		14	25	25	45	21		80	100		14	25				50				
Laserpitium siler		4	12		23	7	8	100	25			100	91		25	33				
Thalictrum minus s. lat.		4	6		9	21				12					50					
Geranium sanguineum			31	25	9	7									50	17	80	21	58	50
Origanum vulgare			6		18	21								3		33				
Vicia galloprovincialis (V. incana)			19																	
Viola hirta					68	43	67	60	25				27	37	75	50				
Verbascum chaixii					27	29									50					
Clinopodium vulgare					23	7								3			20			
Peucedanum cervaria					14	7											40			
Lilium bulbiferum					4	7			25										8	

Laserpitium latifolium	E1				14															
Verbascum nigrum															25					
Hypericum perforatum															25					
Trifolium medium																		7	17	
Inula conyza																				25
FESTUCO-BROMETEA s. lat.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Carex humilis	E1	100	19	50	50	36	58	80			14	100	64	87	100	100	100	100	92	75
Globularia cordifolia		86	31	50	59	7	33	100			43	100	64	30	25	67	80			
Peucedanum oreoselinum		61	81	75	91	64	92	100	75	12	14		100	23	100		60	86	67	25
Euphorbia cyparissias		64	69	25	23	14	17	40			14				100	67	40	64	58	25
Teucrium montanum		71	37	50	54	21	33	100				75	9	3	25	100	60			
Lotus corniculatus s. lat.		54	69	50	41	7	17	20	75		43	75		30	50	67	60	93	83	
Teucrium chamaedrys		11	56	100	82	71	50	60							100	50	100	100	100	50
Brachypodium pinnatum agg.		7	44	75	68	57	25	20	25					13	100	17	40	57	75	25
Stachys recta agg.		25	6			50	25	20				25			25	50		50	33	
Carlina acaulis		43	19	50			42	40			14	100	9			33				
Prunella grandiflora		18	37	25	82	14	50	80	50			25			75		60	71	58	25
Thymus longicaulis		54	12		50	21			25		29									
Linum catharticum		18		25	14							25	32	23						
Hippocrepis comosa		29	37	25	14				25			25				33	40			
Galium verum		14	6	50	68	14	42		100				9		100			29	33	
Genista germanica		14	12	75	64	21			75						25		40	14	33	50
Centaurea fritschii		11	50		27	14					14							43	42	
Lathyrus pratensis		7	37	50	27	7				12	14									
Gentianella ciliata		4	6	25	9											83				
Thesium linophyllon		4		25				40				75								
Anthyllis vulneraria			6		14				25		14									
Euphorbia angulata			6														20	7	33	50
Silene nutans			6			36														
Hieracium pilloseloides			6												25					
Centaurea jaccea agg. (inc. C. bracteata)					45	29								37	50		40			
Galium lucidum					23	29								73			100	86	92	100
Helianthemum ovatum					14	7	8	40							25	17	60	71	42	
Pimpinella saxifraga					27	21	8		25						50		40			
Asperula cynanchica					36										25					
Polygala vulgaris					59				25											
Scabiosa gramínifolia					50				25											
Gymnadenia conopsea					18	7			25											
Centaurea dichroantha					9		25	80												
Bromus erectus s. lat.					4	14									25	17				
Campanula spicata					14															
Inula ensifolia					14															
Trifolium montanum					14															
Inula hirta					4										25		60			
Carlina vulgaris					4											17				
Campanula glomerata						21									25					
Allium pulchellum						7									100			64	50	25
Scabiosa triandra						7									25					
Polygala nicaeensis subsp. forojulensis							42						86							
Thymus sp.							8	100										78	50	50
Pseudolysimachion barrelieri									4						75					
Satureja montana									9						50					
Thymus pulegioides															75					
Salvia pratensis															75					
Hypochoeris maculata															75					
Potentilla pusilla															50					
Scabiosa columbaria															25					
Plantago lanceolata															25					
Arabis hirsuta															25					
Cirsium pannonicum																33				
Ophrys insectifera																33				
Koeleria pyramidata																17				
Danthonia alpina																17				
Iris graminea																	40	14	25	25
Libanotis montana agg. (Seseli libanotis)																	40			
Centaurea triumfettii																		57		50
Knautia fleischmannii																		57	8	25
Scabiosa hladnikiana																		50	8	
Poa concinna																		21		
Melica ciliata																		14		
Aster linosyris																		14		

SESLERIETEA ALBICANTIS s. lat.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Sesleria albicans	E1	86	56	50	91	93	100	100	100	12	71	100	100	100	100	100	100	57	42	
Betonica alopecuros		14	6		77	14	92	80	75		14	100	18	73	75	17	60	43	58	100
Laserpitium peucedanoides		25	75	25	14		17	40	75	50	57	100		77			40			
Carex mucronata		29						100			14	100	86	43						
Dryas octopetala		25	6								14	100		10						
Aster bellidiastrum			37								14	50	41	13						
Phyteuma orbiculare ⁄			12		14	7						50	82							
Acinos alpinus			25		14	7														
Rhinanthus aristatus (R. glacialis)			31									25	23							
Gentiana clusii					9							50	27	13						
Leucanthemum adustum					18				25			100								
Horminium pyrenaicum					14															
Euphrasia salisburgensis								20								17				
Carex firma									25		29	25		23						
Pinguicula alpina									25		14		9							
Selaginella selaginoides									25				5							
Carex ferruginea									25					7						
Primula wulfeniana										12	86									
Silene alpestris (*Heliosperma alpestre*)										12	14									
Thesium alpinum											14									
Thymus alpigenus												50		37						
Carex sempervirens												50								
Campanula scheuchzeri												25		3						
Hieracium dentatum ?												25								
Senecio abrotanifolius												25		43						
Centaurea haynaldii												100								
Achillea clavenae														20						
Hieracium villosum														20						
Helianthemum alpestre																		36	8	
ASPLENIETEA TRICHOMANIS																				
Valeriana saxatilis	E1	7	50		14		25	20	100	37	100	75	64	73						
Potentilla caulescens		18			4			20			14	75	54	87						
Primula auricula		11									14	75	59	17						
Rhamnus pumilus	E2a	11						60			14	50	36	10						
Asplenium ruta-muraria	E1	4						60				25	45	73	75	50				
Paederota lutea		4								12	29			87						
Silene hayekiana		4	6					20								83				
Kernera saxatilis		4													25					
Dianthus sylvestris			6		4			20									60	57	50	
Spiraea decumbens s. lat.					18				100											
Hieracium glaucum					9										25					
Phyteuma scheuchzeri subsp. columnae					9									47		17				
Asplenium trichomanes						7								20						
Asplenium viride										12				10						
Paederota bonarota												25	27							
Saxifraga burseriana													14							
Athamanta turbith														30						
Primula carniolica														30						
Saxifraga crustata														13						
Saxifraga squarrosa														10						
Polypodium vulgare															50					
Erysimum sylvestre																17		28	8	
THLASPIETEA ROTUNDIFOLII s. lat.																				
Campanula cespitosa	E1	75	6		64	29	42	100	50		86	75	86	57	25	100				
Hieracium porrifolium		71	12		18			100			43	50	54	37	25	100				
Biscutella laevigata		21	56	25	50	14	17	20	50			25	9		25	83	40	79	67	25
Carduus defloratus agg. (incl. C. crassifolius)		11	6		50	14	75	100	25			100		30						
Aquilegia einseleana agg. (incl. A. bertolonii)		4			45		42	100	25			50	95	20						
Petasites paradoxus		4	31		14				75	50			4			50				
Achnatherum calamagrostis		7		50	45	36		40	25							83				
Valeriana montana		4	12							12	14									
Gypsophila repens		11						100					23							
Seseli austriacum (incl. S. elatum and S. gouanii)		11						60	7											
Rumex scutatus		4						20					4							
Gymnocarpium robertianum			12		9	7			100	87	29		14	17						
Trisetum argenteum					9				25											
Hieracium bifidum ?								20				25								
Astrantia carniolica								20				25		7						
Adenostyles glabra									25	25		25	4	27						
Chamaenerion palustre (Epilobium dodonei)									25							17				
Saxifraga caesia									25					3						

Hieracium bupleuroides	E1											4			67				
Sedum album															33				
Hieracium caesium															17				
Scrophularia canina															17				
Fumana procumbens																	14		
OTHER SPECIES (Übrige Arten)		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Juniperus communis	E2	18	19	25	50	21	58	20	75				23	7	100	100	100	79	100	75
Juniperus communis	E1	11	6																	
Sorbus aucuparia	E3	4								25			4	7						
Sorbus aucuparia	E2				9	14			50				4	43						
Sorbus aucuparia	E1		25		18					62			27	40						
Galium mollugo agg. (incl. G. erectum)		25	75	25	14					25	14									
Aquilegia vulgaris agg.		7	37	25	9					12							40	7	33	75
Leontodon hispidus s. lat.		18			18															
Carex caryophyllea		4				7					14									
Molinia arundinacea			6	100	59	50	42	60	25			50	91	83	50	67				
Tofieldia calyculata			6	25	14		8		100		14		41	7						
Fragaria vesca			6		27	21				25										
Galium boreale			25	25																
Succisa pratensis			12		4															
Populus tremula	E3												4		25	17				
Populus tremula	E2		6		9				25				9	3	25	33				
Populus tremula	E1				9						14									
Salix eleagnos	E2			25	4				25							50				
Parnassia palustris	E1			25	14								14	3						
Tussilago farfara				25																
Salix caprea	E2				4				50							50				
Valeriana officinalis agg.	E1				4				25											
Rosa canina	E2					21									75	33				
Rubus corylifolius						14														
Listera ovata	E1						33						9	10	100	100				
Achillea millefolium agg.							7						9	10						
Juglans regia	E2a												4			67				
Viscum album	E2													33						
Festuca rubra agg.	E1													13	50					
Salvia sp.														3	50					
Betula pendula	E3													3		17				
Achillea distans															25					
Betula pendula	E2															33		7	33	
Salix purpurea	E2															33				
Hieracium sp.	E1															33				
Hieracium cymosum																17				
MOSSES and LICHENS (Moose und Flechten)																				
Tortella inclinata	E0	39	25								57									
Ctenidium molluscum		18			14			40	50	12	29	50	41	67	75					
Scleropodium purum		4	31		18			60		37	43	25	82	30	50	83				
Pleurozium schreberi		14		25	9				25	12					25		60	21	83	50
Rhytidium rugosum		4	6					20						10						
Hylocomium splendens					14						12		4	3			60	21	92	75
Scleropodium touretii					18															
Pedinophyllum interruptum					18															
Plagiomnium undulatum					14															
Tortella sp. (incl. T. tortuosa)								100				100	64	83	50	100	60	64	58	
Neckera sp. (incl. N. crispa)								20			29	75	64	90	25		80			
Fissidens cristatus								20				25	82	90	50	50				
Thuidium sp.								20					14	3	25	17				
Pseudostereodon procerrimus (Ctenidium procerrimum)									50											
Dicranum scoparium										12				17						
Bazzania trilobata											29									
Grimmia pulvinata												25	23	20	50					
Encalypta sp.												25	4			17				
Orthothecium rufescens													14	3						
Rhytidiadelphus triquetrus													18	3			60	7	67	50
Eurhynchium sp.														7		17				
Leucobryum glaucum														40						
Hypnum cupressiforme														23	75					
Homalothecium sp.														10	100					
Rhytidiadelphus squarrosus ?														3	25					
Cladonia sp.														3			40			
Polytrichum formosum														10						
Neckera complanata														3	25					
Isothecium alopecuroides															75					
Madotheca platyphylla (Porella platyphylla)															25					

5. References

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