

SYNTAXONOMIC PROBLEM OF ILLYRIAN (DINARIC) FIR-
BEECH FORESTS
(*ABIETI-FAGETUM DINARICUM (ILLYRICUM)* S. LAT.)

SINTAKSONOMSKI PROBLEM ILIRSKIH (DINARSKIH) JELOVO-
BUKOVIH GOZDOV
(*ABIETI-FAGETUM DINARICUM (ILLYRICUM)* S. LAT.)

Mitja ZUPANČIČ¹

<http://dx.doi.org/10.3986/fbg0077>

ABSTRACT

Syntaxonomic problem of Illyrian (Dinaric) fir-beech forests (Abieti-Fagetum dinaricum (illyricum) s. lat.)

For the analysis of the syntaxonomic problem of Illyrian fir-beech forests (*Abieti-Fagetum dinaricum (illyricum)* s. lat.), we selected the most important authors or researchers of these forests in the Dinaric mountains of the Central Balkan Peninsula and Slovenia. These authors are Blečić, Fukarek, Glavač, I. Horvat, Pelcer, Puncer, Stefanović and Tregubov. The analysis revealed floristic and ecological similarities and differences of Illyrian fir-beech forests. They can be classified into a single association *Rhamno fallaci-Fagetum*.

Key words: *Abieti-Fagetum* s. lat. = *Rhamno fallaci-Fagetum* nom. nov., phytocoenology, Dinaric mountains, Balkan peninsular, Slovenia.

IZVLEČEK

Sintaksonomski problem ilirskih (dinarskih) jelovo-bukovih gozdov

(Abieti-Fagetum dinaricum (illyricum) s. lat.)

Za analizo sintaksonomskega problema ilirskih jelovo-bukovih gozdov (*Abieti-Fagetum dinaricum (illyricum)* s. lat.) smo izbrali najpomembnejše avtorje oz. raziskovalce teh gozdov v dinarskem gorstvu osrednjega Balkanskega polotoka in Slovenije. Ti avtorji so Blečić, Fukarek, Glavač, I. Horvat, Pelcer, Puncer, Stefanović in Tregubov. Analiza je pokazala floristične in ekološke podobnosti in razliknosti ilirskih jelovo-bukovih gozdov. Mogoče jih je uvrstiti v enotno združbo *Rhamno fallaci-Fagetum*.

Ključne besede: *Abieti-Fagetum* s. lat. = *Rhamno fallaci-Fagetum* nom. nov., fitocenologija, Dinaridi, Balkanski polotok, Slovenija.

¹ SAZU, Novi trg 3, 1000 LJUBLJANA

INTRODUCTION

Illyrian fir-beech forests are among the most common beech forests of the Dinaric mountains. In addition to their wide distribution, they are also economically interesting because high quality beech and fir thrive in them. The base is mostly carbonate but additionally includes non-carbonate (silicate) neutral to moderately acidic rocks of various geological ages. The soils are brown carbonate eutric to dystic or even non-carbonate neutral to acidic (pH in H_2O = 5–7.5 pH in KCl = 4–7). We are thus talking about poorly basophilic to acidic beech forest. It has so far been defined as basophilic beech community. Illyrian fir-beech forest in the Dinaric mountains constructs the montane vegetation belt in all compass exposures (“climax”), and it can also extend into the altimontane belt in warm exposures and in rare cold positions, it can extend into the upper layer of the submontane belt.

Illyrian fir-beech forest is interesting in terms of floristic diversity, especially due to the presence of southeast European-Illyrian (Illyrian, Illyroid) species, which are some of the characteristic species of the Illyrian beech forest alliance of *Aremonio-Fagion*. In terms of their prevalence, they are classified into four categories (on the example of BORHIDI, 1963), ranging from narrower (specific) to wide (southeast European) phytogeographic distribution. The following species are in the first category, with narrow distribution: *Aremonia agrimonoides*, *Calamintha grandiflora*, *Cardamine kitaibelii*, *C. trifolia*, *C. waldsteinii*, *Epimedium alpinum*,

Hacquetia epipactis, *Homogyne sylvestris*, *Lamium orvala*, *Omphalodes verna*, *Rhamnus fallax*, *Ruscus hypoglossum*, *Scopolia carniolica*, *Scrophularia scopolii* and *Vicia oroboides*. In the second category, with a slightly wider distribution, are: *Aposeris foetida*, *Cardamine enneaphyllos*, *Euphorbia carniolica*, *Helleborus niger* and *Knautia drymeia* subsp. *drymeia*. The third category, with wide distribution, consists of: *Cyclamen purpurascens*, *Erythronium dens-canis*, *Euonymus verrucosa*, *Fraxinus ornus*, *Ostrya carpinifolia* and *Stellaria montana*. In the fourth category, with very wide distribution, are: *Astrantia major*, *Daphne laureola*, *Doronicum austriacum*, *D. columnae*, *Helleborus odoratus*, *Primula vulgaris*, *Saxifraga rotundifolia* and *Tamus communis*.

According to the synsystematic classification of species in Illyrian fir-beech associations, the most numerous are from the order *Fagetalia* s. lat., in which we have included rarely represented species from the order *Prunetalia* and class *Quercus-Fagetea*. A similar number of species are from the class *Vaccinio-Piceetea*. The specific humidity of the habitat is indicated by species from the class *Betulo-Adenostyletea* s. lat. or *Mulgedio-Aconitetea* s. lat. with suitable participation. Of note is the group of species of the order *Quercetalia pubescens* s. lat., which in some lower syntaxonomic units – subassociations, variants or forms – indicate warmer conditions.

The number of species mentioned above by synsystematic unit varies by author and by region.

ANALYSIS OF THE ASSOCIATION *ABIETI-FAGETUM DINARICUM (ILLYRICUM)* S. LAT. IN THE DINARIC MOUNTAINS

For the analysis of Illyrian fir-beech communities, we selected the works of authors who have focused most on the appearance of Illyrian fir-beech communities in the Central Balkan Peninsula and in Slovenia, in which the tree species *Abies alba* and *Fagus sylvatica* dominate. These are the works of HORVAT (1974), TREGUBOV (1957) and PUNCER (1980), PUNCER, WJTERSKI & ZUPANČIČ (1974), FUKAREK (1958), FUKAREK & STEFANOVIĆ (1958), BLEČIĆ (1958) and the tables and manuscripts of Glavač and Pelcer from the synthesis tables of HORVAT et al. (1974: 423–425).

The analysis is based on the Central European (Zurich-Montpellier, Braun-Blanquet) method. A synthesis table with thirteen or twenty syntaxa (Puncer's section 6 includes eight syntaxa – sub-associations) presents Illyrian fir-beech communities of southwest

Croatia, the Delnice and Plješevica areas in Croatia, the Perućica area and Grmeč planina in Bosnia, the Piva area in Montenegro (the entire Central Balkan Peninsula) and the Snežnik and Kočevsko areas in Slovenia.

The basic characteristics of Illyrian fir-beech communities are summarized according to Tregubov, supplemented by Puncer; these are: *Aremonia agrimonoides*, *Calamintha grandiflora*, *Cardamine trifolia* and *Rhamnus fallax*. The former characteristic species *Abies alba* has been classified as a differential species, in contrast to other beech syntaxa (*Fagetum* s. lat.). The results of comparisons showed that in the southwest part of Croatia, Kočevsko and partly on Snežnik, all characteristic and differential species are represented, in the area of Perućica and Piva there is no characteristic

species *Cardamine trifolia* and in the area of Plješevica and Grmeč planina there is no characteristic species *Calamintha grandiflora*. The differential species *Abies alba* appears in all syntaxa - with the note that it is present only in the shrub layer in the Piva area. It is evident that the most pronounced "Illyrian" characteristic species *Cardamine trifolia* and *Calamintha grandiflora* disappear towards the southeast of the Central Balkan Peninsula, and thus also the optimal development of Illyrian fir-beech communities.

It is similar with the diagnostic species of the Illyrian association of beech forests *Aremonio-Fagion* and other "Illyrian" species, which we have divided into four categories, as already mentioned in the introductory chapter (see p. 240). Their largest representation is in southeast Croatia and in the Delnice area and in Kočevsko in Slovenia (see Table 2). Their low representation on Snežnik is hard to understand. It may be explained by the intensity of work of the inventory taker and the time of the inventory, especially late autumn or early spring. However, the situation may be caused by different ecological conditions in areas that are less favourable for the growth of some species. It should be noted, though, that the disappearance of "Illyrian" species is also accompanied by a modest representation of other species of the *Fageta-lia* order and of the *Vaccinio-Piceetea* class, as well as others, in comparison with the previously mentioned areas (see Table 2). The disappearance of some "Illyrian", as well as other species, is expected in the central area of the Illyrian floral province in view of perhaps slightly different or less similar ecological conditions than in other phytogeographical areas, e.g., in Slovenia or Croatia. It often happens that they are more numerous and more frequent in the extreme areas of their distribution. This occurs with "Illyrian" species on the north-western margins of the Illyrian floral province in Slovenia and Croatia, which is richer in "Illyrian" or southeast European "Illyrian" species. We must again note that these gaps may depend on how the inventory taker works.

It is appropriate to mention even more recent phytocenological research on Illyrian-Dinar fir-beech forests, which are mostly based on classical studies of the aforementioned authors (Blečić, Fukarek, Galvač, I. Horvat, Pelcer, Puncer, Tregubov). Basically, they confirm or more or less complement the results of the aforementioned researchers. Recent research includes publications by the Croatian researcher VUKELIĆ (2012), which summarizes the results of previous Croatian phytocenologists (I. HORVAT 1938, I. HORVAT, GLAVAČ & ELLENBERG 1974, GLAVAČ 1974, TRINAJSTIĆ 1992, BERTOVIĆ, CESTAR & PELCER 1966) and adds his

own unpublished research (41 relevés). VUKELIĆ (2012) accepts and supports the naming of fir-beech forests in Croatia according to the Slovene proposal *Omphalodo-Fagetum*. It is evident from his synthesis chart with eight analytical tables that, in our opinion, all four characteristic species are represented in the *Omphalodo-Fagetum* association in Croatia: *Aremonia agrimonoides*, *Rhamnus fallax*, *Cardamine trifolia* and *Calamintha grandiflora*, together with the regional differential species *Omphalodes verna* and the differential species of the association *Abies alba* selected by Tregubov, supplemented by Puncer, and finally we confirmed them for the newly named Illyrian-Dinaric fir-beech association *Rhamno fallaci-Fagetum*. The weakest is the area of Lička Plješevica, which does not have the species *Calamintha grandiflora* and *Omphalodes verna*. In his synoptic table, VUKELIĆ (2012) proposes a slightly different selection of the characteristic species of the association, the alliance *Aremonio-Fagion* and the southeast European-Illyrian (Illyroid) species, which he chose solely on the basis of comparisons in the area of Croatia. The Vukelić synoptic table clearly indicates that all eight analytical tables (VUKELIĆ 2012: 155–158 with columns 9–16) convincingly correspond to the common Illyrian-Dinaric fir-beech association *Rhamno fallaci-Fagetum*.

TRINAJSTIĆ (1970, 1972) persists in the primary research of HORVAT (1938), in which Horvat classified the Illyrian-Dinaric fir-beech forest as a sub-association of the southern Croatian beech forest *Fagetum croaticum australe abietetosum* Horvat 1938. According to the new Codices (1976, 1986, 2000) this syntaxon name is invalid. In both of TRINAJSTIĆ's (1970, 1972) tables, all the characteristic and differential species of the association and local differential species that we envisaged for the newly named association *Rhamno fallaci-Fagetum* are represented. This is also evident from Vukelić's synthesis table (2012: 155–158, column 13), which takes into account Trinajstić's analytical table with relevés from Mala Kapela.

TRINAJSTIĆ (2008) and TRINAJSTIĆ et al. (2009) later followed the Code (2000) and combined the first designation of the Illyrian-Dinar fir-beech forest according to TREGUBOV (1941) *Fago-Abietetum*. He corrected the association with new characteristic and differential species and excluded the sub-association with the species *Omphalodes verna*, thus creating a new nomenclature of the syntaxon, *Fago-Abietetum* Tregubov 1941 corr. Trinajstić 2007. The table contains many species of the Illyrian alliance *Aremonio-Fagion*, or southeast European-Illyrian species, including our characteristic species for the association *Rhamno fallaci-Fagetum*: *Aremonia agrimonoides*, *Calamintha gran-*

diflora and *Rhamnus fallax*, and the association *Abies alba* and the regional differential species *Omphalodes verna*. The characteristic and differential species of the syntaxon *Fago-Abietetum* are generally widespread species in beech forests - not only in the Illyrian floral province but also in others (e.g., Central European province). The question arises as to whether the name of the association is valid. According to the Code (2000), the name *Fago-Abietetum* or *Abieti-Fagetum* is not used. In any case, Trinajstić's syntaxon *Fago-Abietetum* belongs to the syntaxon *Rhamno fallaci-Fagetum*, in a slightly truncated form; the composition is not optimal.

SURINA (2001, 2002) studied fir-beech forests in the Trnovski gozd plateau and found, as had PUNCER (1979) before him, that the characteristic species *Rhamnus fallax* and *Calamintha grandiflora* and the local differential species *Omphalodes verna* are rarer. PUNCER (1979) even indicated the possibility of a new syntaxon *Abieti-Fagetum praealpino-dinaricum* Puncer 1979 mscr. SURINA (2001, 2002, SURINA & DAKSKOBLE 2013) solved the problem of the »intermediate« fir-beech association between the pre-alpine and Dinaric regions with two geographic variants, namely *Omphalodo-Fagetum* (Tregubov 1957 corr. Puncer 1980) Marinček et al. 1993 var. geogr. *Saxifraga cuneifolia*

Surina 2001 and *Omphalodo-Fagetum* (Tregubov 1957 corr. Puncer 1980) Marinček et al. 1993 var. geogr. *Calamintha grandiflora* Surina 2001. He retained all Tregubov's characteristic species or Puncer's supplemented version, which today we state as the newly designated association *Rhamno fallaci-Fagetum* with the difference that we classify the species *Omphalodes verna* as a regional differential species and the species *Abies alba* as the association differential species.

The association *Omphalodo-Fagetum* contains a large number of subassociations, which, in relation to ecological conditions, are more or less various (thermophytes, lithophytes, acidophytes etc.), so Košir (2010) provisionally proposed that some subassociations be given the higher syntaxonomic status of association, with an essential change in the dominant tree species – instead of the species *Fagus sylvatica* the species *Abies alba*. He thus proposes the following associations: *Sorbo ariae-Abietetum* Košir 2010 nom. inv., *Clematido-Abieteum* Košir 2010 nom. inv., *Homogyno sylvestris-Abietetum* Košir 2010 nom. inv. and *Lycopodio-Abietetum* Košir 2010 nom. inv. The scientific description is incomplete, so we think the new designation is invalid. Floristic composition of this Košir's syntax still allow to be included into the association *Omphalodo-Fagetum*.

Table 1: Number of species in syntaxonomic units

Number	1	2	3	4	5	6	7	8	9	10	11	12	13
Author	Ht	Ht	Ht	Tr	Tr	Pu	Gl	Tr	Tr	Bl	F-S	Pe	Tr
Region			JZH	Sn	Sn	Ko	De	Sn	Sn	Pi	Pe	Pl	Gr
Country	HR	HR	HR	SL	SL	SL	HR	SL	SL	ČG	BIH	HR	BIH
Number of relevés	15	32	6	20	15	109	12	10	20	12	17	17	20
Southeast European-Illyrian species													
Category I	12	12	10	7	5	12	8	4	5	3	5	4	3
Category II	2	5	4	1	1	5	4	0	1	2	2	4	0
Category III	3	1	0	1	1	4	3	3	1	1	1	2	0
Category IV	4	6	3	2	0	4	4	1	0	4	3	2	4
TOTAL - Σ	21	24	17	11	7	25	19	8	7	10	11	12	7
AREMONIO-FAGION	11	11	10	6	5	11	8	4	5	3	4	4	3
FAGETALIA	39	60	50	26	20	49	35	12	20	35	42	36	34
BETULO-ADENOSTI.	7	13	12	4	4	11	5	2	5	9	13	7	10
QUERCETALIA PUBES.	0	7	4	0	1	5	2	0	1	2	3	3	1
VACCINIO-PICEETEA	14	21	16	10	21	41	9	9	23	16	16	9	13
QUERCETALIA ROB.-PUBESCENTIS	1	3	2	0	0	3	2	1	0	4	3	2	0
CARPINETALIA	0	0	0	0	0	9	0	0	0	1	0	0	0
No. of species in tables - Σ Σ	82	128	101	51	53	143	72	32	56	77	88	69	65
Place by no. of species:	5 th	2 nd	3 rd	12 th	11 th	1 st	7 th	13 th	10 th	6 th	4 th	8 th	9 th

NOTES:

JZH = Southwest Croatia, Sn = Snežnik, Ko = Kočevsko, De = Delnice, Pi = Piva, Pe = Peručica, Pl = Plješevica, Gr = Grmeč
Ht= HORVAT, Tr = TREGUBOV, Pu = PUNCER, Gl = GLAVAČ, Bl = BLEČIČ, F-S = FUKAREK-STEVANOVICH, Pe = PELCER

HR = Croatia, SL = Slovenia, ČG = Montenegro, BIH = Bosnia & Herzegovina

Tables 1 and 2 show exemplarily that all syntaxa presented can be classified in the broadest sense into Illyrian fir-beech forests, into *Abieti-Fagetum* s. lat. (*Abieti-Fagetum dinaricum* = *Omphalodo-Fagetum* in Slovenia and southwestern Croatia, *Abieti-Fagetum illyricum* in Bosnia and Herzegovina, *Fagetum illyricum* (*croaticum*) *australe abietetosum* in Croatia, and *Fagetum sylvaticae* ("montenegrinum") *abietetosum* in Montenegro) but with specific differences in respect to their phytogeographic position or in terms of the representation of southeast European-Illyrian species. We therefore have several syntaxonomic options: (i) to adhere strictly to the rules of the Code or (ii) to formulate geographical variants beyond the Code, but which will not be scientifically recognized. The syntaxonomic solution has been indicated in Table II.

We see the syntaxonomic solution of Illyrian fir-beech forests primarily in terms of four southeast European-Illyrian species: *Aremonia agrimonoides*, *Rhamnus fallax*, *Calamintha grandiflora* and *Cardamine trifolia*. There are some possibilities of dividing Illyrian fir-beech forests according to their phytogeographic position into geographical variants. They are not officially recognized in the Code but the possibility is allowable because of the clearly defined phytogeographic area of the syntaxa or associations. Several variants are possible:

1. We reintroduce the older nomenclature of *Abieti-Fagetum*. For the characteristic and differential species of the association, we accept the already familiar diagnostic species of Tregubov or Puncer (see page 240), as shown in Table 2. The basic association (macro-association) is then divided into geographical variants with differential species corresponding to their phytogeographic area (position), as follows: *Abieti-Fagetum* (Tregubov 1957) var. geogr. *Omphalodes verna* var. geogr. nova for the area of Slovenia and southwestern Croatia;

- *Abieti-Fagetum* (Tregubov 1957) var. geogr. *Calamintha grandiflora* var. geogr. nova for the area of Slovenia (partially Snežnik), Croatia (Delnice), Bosnia (Perućica) and Montenegro (Piva);
- *Abieti-Fagetum* (Tregubov 1957) var. geogr. *Aremonia agrimonoides* var. geogr. nova for the area of Croatia (Plješevica) and Bosnia (Grmeč).

2. The possibility of dividing Illyrian fir-beech forests into three independent associations, as follows, is less convincing:

- *Omphalodo-Fagetum* (Tregubov 1957) Marinček et al. 1993 (Slovenia, southwest Croatia);
- *Calamintho-Fagetum* (Tregubov 1957) ass. nova. (partially for the areas of Snežnik in Slovenia, Croatia – Delnice, Bosnia – Perućica and Montenegro – Piva);

- *Aremonio-Fagetum* (Tregubov 1957) ass. nova. s str. (Croatia – Plješevica, Bosnia – Grmeč planina).

The characteristic species *Omphalodes verna* would be indisputably dominant for the association *Omphalodo-Fagetum* in an association with relative differential species *Ruscus hypoglossum*, *Epimedium alpinum*, *Knautia drymeia* subsp. *drymeia* and *Stellaria montana*.

Less convincing is the characteristic species *Calamintha grandiflora* for the association *Calamintho-Fagetum*. It also appears in the association *Omphalodo-Fagetum*. An Illyrian fir-beech stand in Montenegro (Piva) is interesting, in which three southeast European-Illyrian species appear as relative differential species: *Scrophularia scopolii*, *Astrantia major* and *Doronicum columnae*. Most convincing is *Scrophularia scopolii* (east European-west Asian species), whose area of distribution is also the south-eastern part of the central Balkan peninsular, here and there also in the Slovene Alps. We classify there the species *Doronicum columnae*, which is also in Illyrian fir-beech stands in the area of Grmeč planina in Bosnia.

Only the characteristic species *Aremonia agrimonoides* appears in Illyrian fir-beech associations in Plješevica (Croatia) and Grmeč planina (Bosnia), although generally widespread in all three syntaxa. On Grmeč planina in Bosnia, the southeast European-Illyrian species *Doronicum columnae* also appears in addition to it. The association *Aremonio-Fagetum* s. lat. is not a special syntaxon only for the mentioned region but has a wider extent.

None of these three associations have their own explicit characteristic or differential species that would unconditionally indicate or confirm their independence. All three associations could be understood as relative associations of phytogeographical origin at a higher synsystematic level than the geographical variant, which is not recognized in the Code.

In the first two cases, we tried to resolve the position of all three phytogeographically conditioned associations with higher synsystematic association ranking, but this is not satisfactory or correct.

For Slovenia, we partially resolved the systematic position of Illyrian fir-beech forest, or its designation, with a sufficiently recognizable regional characteristic species *Omphalodes verna*, although it is not only present in the Illyrian fir-beech association, but also in other Illyrian beech forests of Slovenia. We have adopted four characteristic species of southeast European-Illyrian origin: *Aremonia agrimonoides*, *Calamintha grandiflora*, *Cardamine trifolia* and *Rhamnus fallax*, according to Tregubov (1957), and left out his characteristic species – *Cardamine enneaphyllos* and *Prenan-*

thes purpurea – because of their generally widespread nature in many forest syntaxa.

Analytical Table 2 shows that these characteristic species are present in Illyrian fir-beech associations of the Central Balkan Peninsula and Slovenia. All are represented in some phytocoenoses, in others only a few, but not less than three of the four characteristic species, all with the differential species *Abies alba*. A comparison between Illyrian fir-beech associations of the Central Balkan Peninsula and Slovenia shows that these phytocoenoses combine the aforementioned characteristic and differential species. We believe that these syntaxa can be combined into a single syntaxon, *Rhamno fallaci-Fagetum* nov. nom.

Possible and most suitable is probably:

Possibility 3: to change the syntaxonomic nomenclature and introduce a new common name for Illyrian fir-beech forests according to the relatively widespread southeast Illyrian species in the Illyrian floral province, *Rhamnus fallax*, thus *Rhamno fallaci-Fagetum*. It is evident from Table 2 that the species *Rhamnus fallax* is present in all associations (syntaxa) of Illyrian fir-beech forests.

***Rhamno fallaci-Fagetum* (Tregubov 1957) nom. nov. hoc. loco**

Basionym: *Abieti-Fagetum dinaricum* Tregubov 1957 (Art. 34 a)

Synonyms: *Fagetum croaticum australe abietetosum* Horvat 1938, (ICPN Ar. 34a) (HORVAT 1938)

Fagetum illyricum (= *croaticum*) *australe abietetosum* Horvat (ICPN Art. 34a) (HORVAT, GLAVAČ & ELLENBERG 1974).

Abieti-Fagetum dinaricum Tregubov 1957 (ICPN Art. 34a) (TREGUBOV et al. 1957)

Abieti-Fagetum illyricum Fukarek (ICPN Art. 34a) (FUKAREK 1958).

Fagetum sylvaticae montenegrii abietetosum Blečić 1958 (ICPN Art. 34a) (BLEČIĆ 1958).

Inc.: *Omphalodo-Fagetum* (Tregubov 1957) Marinček et al. 1993.

Characteristic species: *Aremonia agrimonoides*, *Calamintha grandiflora*, *Cardamine trifolia* and *Rhamnus fallax*.

Differential species: *Abies alba*.

Nomenclature type: Tregubov (1957: 32–34, relevé 13) Lectotypus hoc loco (MARINČEK et al. 1993).

Despite the new name of the association, the problem remains of geographical variants, which run from the northwest of Slovenia to the southeast of the central region of the Balkan Peninsula. This is mainly due to differences indicated by the following southeast European-Illyrian species: the most widespread species *Aremonia agrimonoides*, the central widespread species *Calamintha grandiflora*, the northwest widespread species *Omphalodes verna*, and the southeast widespread species *Doronicum columnae* and *Scrophularia scopolii*. There are also differences in the richness of the flora, in particular species of the Illyrian alliance *Aremonio-Fagion* and the order *Fagetalia*, partly also of the class *Vaccinio-Piceetea* (Table 1). We abandoned the breakdown of the *Rhamno fallaci-Fagetum* association into geographical variants and only emphasized floristic development from optimal northwest to more modest southeast syntaxa.

CONCLUSION

We propose the adoption of a new name for the Illyrian fir-beech forest association *Rhamno fallaci-Fagetum*, which covers all phytocoenoses described by Horvat, Tregubov, Fukarek, Blečić and their followers Glavač, Pelcer, Puncer (et Wojterski & Zupančič), Stefanović etc. The new name for the *Rhamno fallaci-Fagetum* association would solve the syntaxonomic problem of Illyrian fir-beech forests, which are more or less floristically harmonized with each other in terms of diagnostic species, such as characteristic species, species of the Illyrian alliance *Aremonio-Fagion* or other southeast European-Illyrian species. The number of plant species declines towards the southeast of the area of Illyrian fir-beech forests, which is probably not only a matter of slightly dif-

ferent ecological conditions but also of the intensity and timing of the inventory by the researcher. Subjective relations must not be neglected. The problem of two different researchers making an inventory is clearly seen in Slovenia (Table 2). If we were to repeat today the research of Illyrian fir-beech forests in the same areas of the plots studied, we would probably get a slightly different floristic image of the phytocoenosis. Newer and more optimal research may reveal the presence of other species. It would be important to discover the presence of new southeast European-Illyrian and Balkan species, which would enable a justifiable division of the association *Rhamno fallaci-Fagetum* into geographical variants or even independent associations.

POVZETEK

Uvod

Ilirski jelovo-bukovi gozdovi so med najbolj razširjenimi bukovimi gozdovi dinarskega gorstva. Poleg velike razširjenosti so tudi gospodarsko zanimivi, saj v njih uspeva kakovosten bukov in jelov les. Večinoma poraščajo karbonatne, poleg teh pa tudi nekarbonatne (silikatne) nevtralne do zmerno kisle kamnine različnih geoloških starosti. Tla so rjava karbonatna evtrična do distrična ali celo nekarbonatna, nevtralna do kisla (pH v H_2O = 5–7,5 pH v KCl = 4–7). Govorimo o slabo bazičnem do kislem bukovem gozdu. Doslej smo ga opredeljevali kot bazičen bukov gozd. Ilirski jelovo-bukov gozd gradi v Dinaridih montanski vegetacijski pas v vseh nebesnih legah („klmaks“), seže lahko tudi v altimontanski pas na toplih legah, v redkih hladnih legah pa v zgornjo plast submontanskega pasu.

Ilirski jelovo-bukov gozd je zanimiv glede na floristično pisanost, zlasti zaradi prisotnosti jugovzhodnoevropsko-ilirskih (ilirskih, ilirskoidnih) vrst, ki so nekatere značilnice ilirske zveze bukovih gozdov *Aremonio-Fagion*. Glede na njihovo razširjenost jih uvrščamo v štiri kategorije (po zgledu BORHIDIJA, 1963), in sicer od ožje (specifične) do široke (jugovzhodnoevropske) fitogeografske razširjenosti. V prvo kategorijo z ozko razširjenostjo uvrščamo naslednje vrste: *Aremonia agrimonoides*, *Calamintha grandiflora*, *Cardamine kitabelii*, *C. trifolia*, *C. waldsteinii*, *Epimedium alpinum*, *Hacquetia epipactis*, *Homogyne sylvestris*, *Lamium orvala*, *Omphalodes verna*, *Rhamnus fallax*, *Ruscus hypoglossum*, *Scopolia carniolica*, *Scrophularia scopolii* in *Vicia oroboides*. V drugi kategoriji z nekoliko širšo razširjenostjo so: *Aposeris foetida*, *Cardamine enneaphylos*, *Euphorbia carniolica*, *Helleborus niger* in *Knautia drymeia* subsp. *drymeia*. Tretjo kategorijo s široko razširjenostjo sestavljajo: *Cyclamen purpurascens*, *Erythronium dens-canis*, *Euonymus verrucosa*, *Fraxinus ornus*, *Ostrya carpinifolia* in *Stellaria montana*. V četrti kategoriji z zelo široko razširjenostjo so: *Astrantia major*, *Daphne laureola*, *Doronicum austriacum*, *D. columnae*, *Helleborus odorus*, *Primula vulgaris*, *Saxifraga rotundifolia* in *Tamus communis*.

Glede na sinsistematsko razvrstitev vrst v ilirskih jelovo-bukovih združbah so najštevilčnejše iz reda *Fagetalia* s. lat., v katerega smo uvrstili redko zastopane vrste iz reda *Prunetalia* in razreda *Quercio-Fagetea*. Podobno število vrst je tudi iz razreda *Vaccinio-Piceetea*. Določeno vlažnost rastišča nakazujejo vrste iz razreda *Betulo-Adenostyletea* s. lat. oz. *Mulgedio-Aconitetea* s. lat. s primerno udeležbo. Omembe vredna je še skupina vrst reda *Quercetalia pubescens* s. lat., ki v nekate-

rih nižjih sintaksonomskih enotah – subasociacijah, variantah ali formah – nakazujejo toplejše razmere.

Število zgoraj omenjenih vrst po sinsistematskih enotah je glede na avtorje in območja različno.

Analiza asociacije *Abieti-Fagetum dinaricum (illyricum)* s. lat. v dinarskem pogorju

Za analizo ilirskih jelovo-bukovih združb smo izbrali dela avtorjev, ki so se najbolj posvetila pojavljanju ilirskih jelovo-bukovih združb na osrednjem Balkanskem polotoku in v Sloveniji, kjer dominirata drevesni vrsti *Abies alba* in *Fagus sylvatica*. To so dela HORVATA (1974), TREGUBOVA (1957) in PUNCERJA (1980), PUNCER, WOJTERSKI & ZUPANČIČ (1974), FUKAREKA (1958), FUKAREK & STEFANOVIČ (1958), BLEČIČA (1958) ter tabele v rokopisu GLAVAČA in PELCERJA iz sintetične tabele HORVATA et al. (1974: 423–425).

Analiza temelji na srednjeevropski (züriško-montpellijski, Braun-Blanquetovi) metodi. Sintezna tabela s trinajstimi oziroma dvajsetimi sintaksoni (v Puncerjevem razdelku 6 je zajetih osem sintaksonov – subasociacij) nam predstavlja ilirsko jelovo-bukove združbe jugozahodne Hrvaške, območje Delnic in Plješevice na Hrvaškem, območje Peručice in Grmeč planine v Bosni, območje Pive v Črni gori (vse osrednji Balkanski polotok) ter območje Snežnika in Kočevske v Sloveniji.

Osnovne značilnice ilirskih jelovo-bukovih združb smo povzeli po Tregubovu z dopolnilom Puncerja; te so: *Aremonia agrimonoides*, *Calamintha grandiflora*, *Cardamine trifolia* in *Rhamnus fallax*. Dosedanje značilnico *Abies alba* pa smo uvrstili kot razlikovalnico nasproti drugim bukovim sintaksonom (*Fagetum* s. lat.). Rezultati primerjav so pokazali, da so na jugozahodnem območju Hrvaške, Kočevskem in delno na Snežniku zastopane vse značilnice in razlikovalnica, v območju Peručice in Pive ni značilnice *Cardamine trifolia* ter v območju Plješevice in Grmeč planine ni značilnice *Calamintha grandiflora*. V vseh sintaksonih je razlikovalnica *Abies alba* – s pripombo, da je na območju Pive prisotna le v grmovni plasti. Razvidno je, da proti jugovzhodu osrednjega Balkanskega polotoka umanjkata najbolj izraziti “ilirski” značilnici *Cardamine trifolia* in *Calamintha grandiflora*, s tem pa optimalni razvoj ilirskih jelovo-bukovih združb.

Podobno je tudi z diagnostičnimi vrstami ilirske zveze bukovih gozdov *Aremonio-Fagion* in drugimi “ilirskimi” vrstami, ki smo jih razdelili v štiri kategorije, kot smo že navedli v uvodnem poglavju (glej str. 245).

Njihova največja zastopanost je v jugovzhodni Hrvaški in na območju Delnic ter na Kočevskem v Sloveniji (glej Tabelo 2). Nerazumljiva je njihova majhna zastopanost na Snežniku. To si lahko razlagamo z intenzivnostjo popisovalčevega dela in časa popisovanja zlasti v pozni jeseni ali zgodnji pomladi. Lahko pa stanju botrujejo različne ekološke razmere na območjih, ki so manj ugodna za rast nekaterih vrst. Vendar moramo opozoriti, da umanjkanju "ilirskih" vrst sledi tudi skromna zastopanost drugih vrst reda *Fagetalia* in razreda *Vaccinio-Piceetea* v primerjavi s prej omenjenimi območji, in tudi drugimi (glej Tabelo 2). Umanjkanje nekaterih "ilirskih" vrst, pa tudi drugih, v osrednjem območju ilirske florne province je pričakovano glede na morda nekoliko drugačne ali manj podobne ekološke razmere kot v drugih fitogeografskih območjih, npr. v Sloveniji ali Hrvaški. Večkrat se dogaja, da so na skrajnem območju svoje razširjenosti številčnejše in pogostejše. To se pri "ilirskih" vrstah dogaja na severozahodnem obrobju ilirske florne province v Sloveniji in na Hrvaškem, ki je bogatejša z "ilirskimi" oz. jugovzhodnoevropsko-ilirskimi vrstami. Ponovno moramo opozoriti, da so te vrzeli lahko odvisne od načina dela popisovalcev.

Ustrezno je, da omenimo še novejšo fitocenološko raziskavo o ilirsko-dinarskih jelovo-bukovih gozdovih, ki pa večinoma temeljijo na klasičnih raziskavah prej omenjenih avtorjev (Blečić, Fukarek, Galvač, I. Horvat, Pelcer, Puncer, Tregubov). V osnovi potrjujejo ali bolj ali manj dopolnjujejo rezultate prej omenjenih raziskovalcev. Med najnovejše raziskave uvrščamo objave hrvaškega raziskovalca VUKELIĆA (2012), ki povzema rezultate predhodnih hrvaških fitocenologov (I. HORVAT 1938, I. HORVAT, GLAVAČ & ELLENBERG 1974, GLAVAČ 1974, TRINAJSTIĆ 1992, BERTOVIĆ, CESTAR & PELCER 1966) in dodaja svoje neobjavljene raziskave (41 popisov). VUKELIĆ (2012) sprejema in podpira poimenovanje jelovo-bukovih gozdov na Hrvaškem po slovenskem predlogu *Omphalodo-Fagetum*. Iz njegove sintezne tabele z osmimi analitičnimi tabelami je razvidno, da so v asociaciji *Omphalodo-Fagetum* na Hrvaškem po našem mnenju zastopane vse štiri značilnice: *Aremonia agrimonoides*, *Rhamnus fallax*, *Cardamine trifolia* in *Calamintha grandiflora* ter regionalna razlikovalnica *Omphalodes verna* in razlikovalnica asociacije *Abies alba*, ki jih je izbral Tregubov, dopolnil Puncer, dokončno pa smo jih potrdili za novo imenovano ilirsko-dinarsko jelovo-bukovo združbo *Rhamno fallaci-Fagetum*. Najšibkejšje je območje Ličke Plješevice, ki nima vrst *Calamintha grandiflora* in *Omphalodes verna*. VUKELIĆ (2012) sicer v svoji sintezni tabeli predlaga nekoliko drugačen izbor značilnic asociacije, zveze *Aremonio-Fagion* in jugovzhodnoevropsko-ilirskih

(ilirskoidnih) vrst, ki pa jih je izbral izključno na podlagi primerjanj na območju Hrvaške. Sinteza tabele VUKELIĆA jasno kaže, da vseh osem analitičnih tabel (VUKELIĆ 2012: 155–158 s stolpci 9–16) preprečljivo ustreza skupni ilirsko-dinarski jelovo-bukovi asociaciji *Rhamno fallaci-Fagetum*.

TRINAJSTIĆ (1970, 1972) vztraja pri primarnih HORVATOVIH (1938) raziskavah, v katerih je Horvat ilirsko-dinarski jelovo-bukov gozd uvrstil kot subasociacijo južnohrvaškega bukovega gozda *Fagetum croaticum australe abietetosum* Horvat 1938. Po novih Kodeksih (1976, 1986, 2000) je to ime sintaksona neveljavno. V obeh TRINAJSTIĆEVIH (1970, 1972) tabelah so zastopane vse značilnice, razlikovalnica asociacije in lokalna raziskovalnica, ki smo jih predvideli za novo imenovano asociacijo *Rhamno fallaci-Fagetum*. To je razvidno tudi iz sintezne tabele VUKELIĆA (2012: 155–158, stolpec 13), ki upošteva analitično tabelo Trinajstića s popisi z Male Kapele.

Pozneje je TRINAJSTIĆ (2008) s sodelavci (2009) sledil Kodeksu (2000) in se pridružil prvemu poimenovanju ilirsko-dinarskega jelovo-bukovega gozda po TREGUBOVU (1941) *Fago-Abietetum*. Asociacijo je korigiral z novimi značilnicami in razlikovalnicami in izločil subasociacijo z vrsto *Omphalodes verna*, tako je nastala nova nomenklatura sintaksona *Fago-Abietetum* Tregubov 1941 corr. Trinajstić 2007. V tabeli so številne vrste ilirske zveze *Aremonio-Fagion* oz. jugovzhodnoevropsko-ilirske vrste, med njimi tudi naše značilnice za asociacijo *Rhamno fallaci-Fagetum*: *Aremonia agrimonoides*, *Calamintha grandiflora* in *Rhamnus fallax* ter razlikovalnica asociacije *Abies alba* in lokalna razlikovalnica *Omphalodes verna*. Značilnice in razlikovalnice sintaksona *Fago-Abietetum* so splošno razširjene vrste v bukovih gozdovih – ne le v ilirski florni provinci, temveč tudi v drugih (npr. srednjeevropski provinci). Pojavlja se vprašanje ali je ime asociacije veljavno (validno). Po Kodeksu (2000) se imena *Fago-Abietetum* ali *Abieti-Fagetum* ne uporabljajo. Vsekakor Trinajstićev sintakson *Fago-Abietetum* pripada sintaksonu *Rhamno fallaci-Fagetum* v nekoliko okrnjeni obliki; sestoj ni optimalen.

SURINA (2001, 2002) je preučeval jelovo-bukov gozd v Trnovskem gozdu in ugotovil, kot pred njim PUNCER (1979), da so tam značilnici *Rhamnus fallax* in *Calamintha grandiflora* ter lokalna razlikovalnica *Omphalodes verna* bolj redke. PUNCER (1979) je celo nakazal možnost novega sintaksona *Abieti-Fagetum praealpino-dinaricum* Puncer 1979 mscr. SURINA (2001, 2002, SURINA & DAKSKOBLER 2013) je rešil problem »vmesne« jelovo-bukove združbe med predalpskim in dinarskim območjem z dvema geografskima variantama, in sicer *Omphalodo-Fagetum* (Tregubov 1957 corr.

Puncer 1980) Marinček et al. 1993 var. geogr. *Saxifraga cuneifolia* Surina 2001 in *Omphalodo-Fagetum* (Tregubov 1957 corr. Puncer 1980) Marinček et al. 1993 var. geogr. *Calamintha grandiflora* Surina 2001. Obdržal je vse značilnice Tregubova oziroma dopolnjene Puncerjeve, ki jih danes navajamo za novo imenovano asociacijo *Rhamno fallaci-Fagetum* z razliko, da vrsto *Omphalodes verna* uvrščamo kot regionalno razlikovalnico, vrsto *Abies alba* pa kot asociacijsko razlikovalnico.

Asociacija *Omphalodo-Fagetum* vsebuje veliko subasocij, ki so glede na ekološke razmere bolj ali manj raznovrstne (toploljubna, skalovita, kisloljubna ipd.), zato je Košir (2010) provizorčno predlagal, da dobijo nekatere subasociacije višji sintaksonomski status asociacije z bistveno spremembo vodilne drevesne vrste – namesto vrste *Fagus sylvatica* vrsto *Abies alba*. Tako predlaga naslednje asociacije: *Sorbo ariae-Abietetum* Košir 2010 nom. inv., *Clematido-Abietum* Košir 2010 nom. inv., *Homogyno sylvestris-Abietetum* Košir 2010 nom. inv. in *Lycopodio-Abietetum* Košir 2010 nom. inv. Znanstveni opis ni dorečen, zato menimo, da je novo poimenovanje neveljavno (invalidno). Floristične razlike ostanejo enake kot pri veljavno (validno) opisanih subasociacijah v sklopu asociacije *Omphalodo-Fagetum*, torej je splošna floristična podoba omenjenih sintaksonov ostala enaka kot v matičnem sintaksonu *Omphalodo-Fagetum*.

Tabeli 1 in 2 nam nazorno prikazujeta, da lahko vse tu predstavljene sintaksone v najširšem smislu uvrščamo v ilirske jelovo-bukove gozdove, v invalidni sintaksom *Abieti-Fagetum* s. lat. (*Abieti-Fagetum dinaricum* = *Omphalodo-Fagetum* v Sloveniji in jugozahodni Hrvaški, *Abieti-Fagetum illyricum* v Bosni in Hercegovini, *Fagetum illyricum (croaticum) australe abietetosum* na Hrvaškem in *Fagetum sylvaticae* ("montenegrinum") *abietetosum* v Črni gori), vendar z določenimi razlikami glede na njihov fitogeografski položaj oz. glede na zastopanost jugovzhodnoevropsko-ilirskih vrst. Zato imamo več sintaksonomskih možnosti: (i) da se natančno držimo pravil Kodeksa, ali (ii) da mimo Kodeksa izoblikujemo geografske variante, ki pa ne bodo znanstveno priznane. V Tabeli 2 smo sintaksonomsko rešitev nakazali.

Sintaksonomsko rešitev ilirskih jelovo-bukovih gozdov vidimo predvsem v štirih jugovzhodnoevropsko-ilirskih vrstah: *Aremonia agrimonoides*, *Rhamnus fallax*, *Calamintha grandiflora* in *Cardamine trifolia*. Nekaj možnosti je, da členimo ilirske jelovo-bukove gozdove glede na njihov fitogeografski položaj z geografskimi variantami, ki sicer v Kodeksu niso uradno priznane, vendar je dopustna možnost zaradi jasne opredelitve fitogeografskega območja sintaksona oz. združbe. Možnih je več variant:

1. Ponovno uvedemo starejšo nomenklaturu *Abieti-Fagetum*. Za značilnice in razlikovalnice združbe sprejmemo že znane diagnostične vrste Tregubova oz. Puncerja (glej stran 245), kot je prikazano v Tabeli 2. Osnovno asociacijo (makroasociacijo) nato delimo na geografske variante z razlikovalnicami, ki ustrezajo njihovem fitogeografskemu območju (položaju), in sicer:

- *Abieti-Fagetum* (Tregubov 1957) var. geogr. *Omphalodes verna* var. geogr. nova za območje Slovenije in jugozahodne Hrvaške;
- *Abieti-Fagetum* (Tregubov 1957) var. geogr. *Calamintha grandiflora* var. geogr. nova za območje Slovenije (delno Snežnik), Hrvaške (Delnice), Bosne (Perućica) in Črne gore (Piva);
- *Abieti-Fagetum* (Tregubov 1957) var. geogr. *Aremonia agrimonoides* var. geogr. nova za območje Hrvaške (Plješevica) in Bosne (Grmeč).

2. Manj prepričljiva je možnost, da ilirske jelovo-bukove gozdove delimo v tri samostojne asociacije, in sicer:

- *Omphalodo-Fagetum* (Tregubov 1957) Marinček et al. 1993 (Slovenija, jugozahodna Hrvaška);
- *Calamintho-Fagetum* (Tregubov 1957) ass. nova. (delno za območje Snežnika v Sloveniji, Hrvaške – Delnice, Bosne – Perućice in Črne gore – Pive);
- *Aremonio-Fagetum* (Tregubov 1957) ass. nova. s str. (Hrvaška – Plješevica, Bosna – Grmeč planina).

Za asociacijo *Omphalodo-Fagetum* bi bila nesporno dominantna značilnica *Omphalodes verna* v družbi z relativnimi razlikovalnicami *Ruscus hypoglossum*, *Epimedium alpinum*, *Knautia drymeia* subsp. *drymeia* in *Stellaria montana*.

Manj prepričljiva je značilnica *Calamintha grandiflora* za združbo *Calamintho-Fagetum*, ki se pojavlja tudi v družbi *Omphalodo-Fagetum*. Zanimiv je ilirski jelovo-bukov sestoj v Črni gori (Piva), kjer se pojavljajo tri jugovzhodnoevropsko-ilirske vrste kot relativne razlikovalnice *Scrophularia scopolii*, *Astrantia major* in *Doronicum columnae*. Najbolj prepričljiva je *Scrophularia scopolii* (vzhodnoevropsko-zahodnoazijska vrsta), katere areal je tudi jugovzhodni del osrednjega Balkanskega polotoka, tu in tam je tudi v Alpah Slovenije. Sem uvrščamo vrsto *Doronicum columnae*, ki pa je tudi v ilirskih jelovo-bukovih sestojih v območju Grmeč planine v Bosni.

V ilirsko jelovo-bukovih združbah na Plješevici (Hrvaška) in Grmeč planini (Bosna) se pojavlja samo značilnica *Aremonia agrimonoides*, sicer splošno razširjena v vseh treh sintaksonih. Na Grmeč planini v Bosni se poleg nje pojavlja še jugovzhodnoevropsko-ilirska vrsta *Doronicum columnae*. Združba *Aremonio-Fagetum* s. lat. ni poseben sintakson le za omenjeno območje, pač pa ima širši obseg.

Vse tri našete asociacije nimajo svojih izrazitih značilnic ali razlikovalnic, ki bi brezpogojno nakazovale ali potrjevale njihovo samostojnost. Vse tri asociacije bi lahko razumeli kot relativne združbe fitogeografskega porekla na višji sinsistematski stopnji, kot je geografska varianta, ki v Kodeksu ni priznana.

V prvih dveh primerih smo skušali rešiti položaj vseh treh fitogeografsko pogojenih združb z višjim sinsistematskim rangom asociacije, kar pa ni zadovoljivo in korektno.

Za Slovenijo smo parcialno reševali sinsistematski položaj ilirskega jelovo-bukovega gozda oziroma njegovega poimenovanja z dovolj prepoznavno območno (regionalno) značilno vrsto *Omphalodes verna*, ki pa ni zastopana samo v ilirski jelovo-bukovi združbi, temveč tudi v drugih ilirskih bukovih gozdovih Slovenije. Sprejeli smo štiri značilnice jugovzhodnoevropsko-ilirskega porekla: *Aremonia agrimonoides*, *Calamintha grandiflora*, *Cardamine trifolia* in *Rhamnus fallax*, po TREGUBOVU (1957), in opustili njegovi značilnici – *Cardamine enneaphyllos* in *Prenanthes purpurea* – zaradi njune splošne razširjenosti v mnogih gozdnih sintaksonih.

Analitična Tabela 2 nam kaže, da so našete značilnice prisotne v ilirskih jelovo-bukovih združbah osrednjega Balkanskega polotoka in Slovenije. V nekaterih fitocenozah so zastopane vse, v drugih le nekatere, vendar ne manj kot tri od štirih značilnic in vse z razlikovalnico *Abies alba*. Primerjava med ilirskimi jelovo-bukovimi združbami osrednjega Balkanskega polotoka in Slovenije kaže, da te fitocenoze združujejo prej omenjene značilnice in razlikovalnica. Menimo, da je mogoče omenjene sintaksone združiti v enoten sintakson *Rhamno fallaci-Fagetum* nov. nom.

Mogoča in najbolj ustrezna je verjetno:

3. možnost, da spremenimo sintaksonomsko nomenklaturu in uvedemo novo skupno ime za ilirske jelovo-bukove gozdove po razmeroma v ilirski florni provinci široko razširjeni jugovzhodnoevropsko-ilirski vrsti *Rhamnus fallax*, torej *Rhamno fallaci-Fagetum*. Iz Tabele 2 je razvidno, da je vrsta *Rhamnus fallax* prisotna v vseh združbah (sintaksonih) ilirskih jelovo-bukovih gozdov.

***Rhamno fallaci-Fagetum* (Tregubov 1957) nom. nov. hoc. loco**

Basionim: *Abieti-Fagetum dinaricum* Tregubov 1957 (Art. 34 a)

Sinonim: *Fagetum croaticum australe abietetosum* Horvat 1938, (ICPN Art. 34a) (HORVAT 1938)

Fagetum illyricum (= *croaticum*) *australe abietetosum* Horvat (ICPN Art.) 34a) (HORVAT, GLAVAČ & ELLENBERG 1974).

Abieti-Fagetum dinaricum Tregubov 1957 (ICPN Art. 34a) (TREGUBOV et al. 1957)

Abieti-Fagetum illyricum Fukarek (ICPN Art. 34a) (FUKAREK 1958).

Fagetum sylvaticae montenegrii abietetosum Blečić 1958 (ICPN Art. 34a) (BLEČIĆ 1958).

Inc.: *Omphalodo-Fagetum* (Tregubov 1957) MARINČEK et al. 1993.

Značilnice so: *Aremonia agrimonoides*, *Calamintha grandiflora*, *Cardamine trifolia* in *Rhamnus fallax*.

Razlikovalnica je: *Abies alba*.

Nomenklaturni tip: Tregubov (1957: 32–34, popis 13) Lectotypus hoc loco (MARINČEK et al. 1993).

Kljub novemu poimenovanju asociacije ostaja problem geografskih variant, ki se nizajo od severozahoda Slovenije do jugovzhoda osrednjega območja Balkanskega polotoka. Tu gre predvsem za razlike, ki jih kažejo naslednje jugovzhodnoevropsko-ilirske vrste: najširše razširjena vrsta *Aremonia agrimonoides*, osrednje razširjena vrsta *Calamintha grandiflora*, severozahodno razširjena vrsta *Omphalodes verna* ter jugovzhodno razširjeni vrsti *Doronicum columnae* in *Scrophularia scopolii*. Razlike so še v bogastvu flore, zlasti vrst ilirske zveze *Aremonio-Fagion* in reda *Fagetalia*, deloma tudi razreda *Vaccinio-Piceetea* (Tabela 1). Opustili smo razčlenjevanje asociacije *Rhamno fallaci-Fagetum* na geografske variante in le poudarili floristično razvitost od optimalnega severozahodnega do skromnejšega jugovzhodnega sintaksona.

Sklep

Predlagamo, da se sprejme novo poimenovanje združbe ilirskih jelovo-bukovih gozdov *Rhamno fallaci-Fagetum*, ki zajame vse dosedanje opisane tovrstne fitocenoze Horvata, Tregubova, Fukareka, Blečića in njihove sledilce Glavača, Pelcerja, Puncerja (et Wojterskega & Zupančiča), Stefanovića idr. Z novim poimenovanjem asociacije *Rhamno fallaci-Fagetum* bi bil rešen sintaksonomski problem ilirskih jelovo-bukovih gozdov, ki se med seboj floristično bolj ali manj usklajujejo glede diagnostičnih vrst, kot so značilnice, vrste ilirske zveze *Aremonio-Fagion* ali druge jugovzhodnoevropsko-ilirske vrste. Število rastlinskih vrst upada proti jugovzhodu območja ilirskih jelovo-bukovih gozdov, kar verjetno ni le vprašanje nekoliko drugačnih ekoloških razmer, temveč tudi intenzivnost in izbire časa popisovanja raziskovalca. Subjektivnih razmer ne smemo zemariti. Problem popisovanja dveh raziskovalcev se razločno vidi na območju Slovenije (Tabela 2). Če bi danes ponovili raziskave ilirskih jelovo-bukovih goz-

dov na istih območjih oz. raziskovanih ploskvah, bi verjetno dobili nekoliko drugačno floristično podobo fitocenoz. Novejše in optimalnejše raziskave bi morda odkrile prisotnost še drugih vrst. Pomembno bi bilo

odkritje prisotnosti novih jugovzhodno-evropskoilirskih in balkanskih vrst, kar bi omogočalo upravičeno razlikovanje asociacije *Rhamno fallici-Fagetum* na geografske variante ali celo na samostojne asociacije.

ACKNOWLEDGEMENT

We are grateful to anonymous reviewer for reviewing the manuscript, supplementing it and for welcome suggestions; Dr. Branko Vreš for producing the phyto-

coenological tables and Ana Batič for technical processing of the manuscript.

LITERATURE

- BARKMAN, J.J., J. MORAVEC & S. RAUSCHERT, 1976, 1986: *Code of phytosociological nomenclature*. Vegetation (The Hague) 32 (3): 131-185; 67 (3): 145-197.
- BLEČIĆ, V., 1958: *Vegetation des forêts et celle des rochers et des éboulis dans la vallée de la rivière (Monte-Negro)*. Glas. Prirod. muz. 11. Beograd.
- BORHIDI, A., 1963: *Die Zönologie des Verbandes Fagion illyricum*. Acta Botanica Academiae scientiarum Hungaricae (Budapest) 9: 259-297.
- FUKAREK, P., 1958: *Der Urwalgebiet „Peručica“ in Bosnien und seine Vegetationsverhältnisse*. (Sarajevo) 2: 88-146.
- FUKAREK, P., & V. STEFANOVIĆ, (1958): *Prašuma Peručica*. Radovi poljoprivredno šumarskog fakulteta univerziteta u Sarajevu (B. Šumarstvo), 3 (3), 93-145. Sarajevo.
- HORVAT, I., 1938: *Biljnosociološka istraživanja šuma u Hrvatskoj*. Glasnik za šumske pokuse (Zagreb) 6: 127-279.
- HORVAT, I., V. GLAVAČ & H. ELLENBERG, 1974: *Vegetation Südosteuropas*. Geobotanica selecta, Jena.
- KOŠIR, Ž. 2010: *Lastnosti gozdnih združb kot osnova za gospodarjenje po meri narave*. Zveza gozdarskih društev Slovenije. Gozdarska založba, Ljubljana, 288 pp.
- MARINČEK, L., L. MUCINA, M. ZUPANČIČ, L. POLDINI, I. DAKSKOBLER & M. ACCETTO, 1992 (1993): *Nomenklatorische revision der Illirischen Buchenwälder (Verband Aremonio-Fagion)*. Studia botanica (Trieste) 12: 121-13.
- PUNCER, I., T. WOJTERSKI & M. ZUPANČIČ, 1974: *Der Urwald Kočevski Rog in Slowenien (Jugoslawien)*. Fragm. Flor. Geobot. (Krakow) 20: 41-87.
- PUNCER, I., 1979: *Ekološke in floristične značilnosti združbe Abieti-Fagetum na Trnovskem gozdu*. V: RAUŠ, Dj. (ur.): Drugi kongres ekologa Jugoslavije II. Savez društva ekologa Jugoslavije. (Zagreb): 125-138.
- PUNCER, I., 1980: *Dinarski jelovo-bukovi gozdovi na Kočevskem*. Razprave IV. razr. SAZU (Ljubljana) 27 (6): 401-561 + tabele.
- SURINA, B., 2001: *Fitocenološke raziskave jelovo-bukovega gozda (Omphalodo-Fagetum s. lat.) v zahodnem delu ilirске florne province. Magistrska naloga*. Univerza v Ljubljani, Biotehniška fakulteta, Oddelek za biologijo, 98 str. + priloge.
- SURINA, B., 2002: *Phytogeographical differentiation in the Dinaric fir-beech forest (Omphalodo-Fagetum s. lat.) of the western part of the Illyrian floral province*. Acta Botanica Croatica 61 (2): 145-178.
- SURINA, B., I. DAKSOBLER, 2013. *Phytosociology and ecology of the Dinaric fir-beech forests (Omphalodo-Fagetum) at the north-western part of the illyrian floral province (NW Dinaric Alps)*. Hacquetia 12 (1): 11-85.
- TREGUBOV, V., 1941: *Les forêts vierges montagnardes des Alpes Dinariques. Masiv de Klekovatcha-Guermetch*. Etude Botanique et Forestière, These doctorat. Montpellier, Causse, Graille et Castelana 118 + 305.
- TREGUBOV, V. (ur.) & M. ČOKL (ur.) 1954: *Prebiralni gozdovi na Snežniku*. Inšt. gozd. les. Slov. Strokovna in znanstvena dela 4, Ljubljana.
- TRINAJSTIĆ, I., 1970: *Prilog poznavanja šumske vegetacije prašumskeg rezervata „Čorkova uvala“ u Hrvatskoj ANU BiH (Sarajevo)*. Posebna izdaja 15, Odjeli prirodi i matem. nauka 4. 125-130 + tabela.
- TRINAJSTIĆ, I., 1972: *O rezultatima komparativnih istraživanja florističnog sastava prašumskih i gospodarskih sestojima zajednice Fagetum croaticum abietetosum Ht. u Hrvatskoj*. Šumski list (Zagreb) 9-10: 334-347.

- TRINAJSTIĆ, I., 2008. *Biljne zajednice Republike Hrvatske. Plant communities of Croatia*. Akademija šumarskih znanosti, Zagreb.
- TRINAJSTIĆ, I., FRANJIČ, J. & ŠKVORC, Ž., 2009: *The nomenclatural and syntaxonomic analysis of the Dinaric beech and fir forest (Fago-Abietetum Tregubov 1941 corr. Trinajstić 2007)*. In: Matić, S., Anič. I. (eds.): Zbornik radova znanstvenog skupa Prašumski ekosustavi dinarskoga krša i prirodno gospodarjenje šumama u Hrvatskoj. Zagreb, pp. 101–113.
- VUKELIĆ, J. 2012: *Šumska vegetacija Hrvatske*. Sveučilište u Zagrebu, Šumarski fakultet, Državni zavod za zaštitu prirode. Zagreb, 403 str.
- WEBER, H.E., J. MORAVEC & J.P. THEURILLAT, 2000: *International Code of Phytosociological Nomenclature. 3rd edition*. Journal of Vegetation Science (Uppsala) 11 (5): 739–768.

Table 2: Synoptic table of fir - beech forests of the central Balkan peninsula and Slovenia

Tabela 2: Sintezna tabela jelovo-bukovih gozdov osrednjega Balkanskega polotoka in Slovenije

Succesive Number - Zaporedna številka		1	2	3	4	5	6	7	8	9	10	11	12	13
Author of Table - Avtor tabele		Ht	Ht	Ht	Tr	Tr	Pu	Gl	Tr	Tr	Bl	FS	Pe	Tr
Place of relevés - Kraj popisov				JZ HR	Snežnik	Snežnik	Kočevsko	Delnice	Snežnik	Snežnik	Piva	Peručica	Plješevica	Grmeč
Number of relevés - Število popisov		15	32	6	20	15	109	12	10	20	12	17	17	20
Country - Država		HR	HR	HR	SI	SI	SI	HR	SI	SI	ČG	BH	HR	BH
AREMONIO-FAGETUM nom. nov.		1	2	3	4	5	6	7	8	9	10	11	12	13
F1 <i>Aremonia agrimonoides</i> (L.) DC.	III	5	5	5	5	3	4-5	5	5	3	5	5	4	5
F1 <i>Rhamnus fallax</i> Boiss.	II	2	5	3	4	1	1-5	5	4	4	3	2	3	4
F1 <i>Cardamine trifolia</i> L.	III	2	5	4	5	5	4-5	5	3	5			2	2
F1 <i>Calamintha grandiflora</i> (L.) Moench	III	3	5	4	4	5	3-5	5	3	2	4	1		
DIFFERENTIAL SPECIES IN CONTRAST TO FAGETUM s.lat. - RAZLIKOVALNICA NASPROTI FAGETUM s.lat.														
VP <i>Abies alba</i> Mill.	I	5	5	5	5	5	5	5	5	5	-	5	5	5
VP <i>Abies alba</i> Mill.	II	5	5	4	3	4	4-5	5	2	3	4	4	5	5
VP <i>Abies alba</i> Mill.	III	4	5	5	5	5	4-5	5	5	5	-	5	5	3
LOCAL DIFFERENTIAL SPECIES - LOKALNE RAZLIKOVALNICE														
		1	2	3	4	5	6	7	8	9	10	11	12	13
F1 <i>Omphalodes verna</i> Moench	III	2	4	5	3	4	4-5							
A <i>Doronicum columnae</i> Ten.	III										1			1
F1 <i>Scrophularia scopolii</i> Hoppe	III										2			
SOUTHEAST-EUROPEAN ILLYRIAN SPECIES 1 st CATEGORY														
JUGOVZHODNOEVROPSKO-ILIRSKE VRSTE 1. KATEGORIJE		1	2	3	4	5	6	7	8	9	10	11	12	13
F1 <i>Aremonia agrimonoides</i> (L.) DC.	III	5	5	5	5	3	4-5	5	5	3	5	5	4	5
F1 <i>Rhamnus fallax</i> Boiss.	II	2	5	3	4	1	1-5	5	4	4	3	2	3	4
F1 <i>Cardamine trifolia</i> L.	III	2	5	4	5	5	4-5	5	3	5			2	2
F1 <i>Calamintha grandiflora</i> (L.) Moench	III	3	5	4	4	5	3-5	5	3	2	4	1		
F1 <i>Omphalodes verna</i> Moench	III	2	4	5	3	4	4-5							
VP <i>Homogyne sylvestris</i> (Scop.) Cass.	III	2	1		2		2-4	1		5				
F1 <i>Lamium orvala</i> L.	III		4	2	1		1-5					1		
F1 <i>Hacquetia epipactis</i> (Scop.) DC.	III	1	3				2-3						1	
F1 <i>Vicia oroboides</i> Wulf.	III	1	1	1			1					1		
F1 <i>Cardamine kitaibelii</i> Becherer	III	4	1	2			1-2							
F1 <i>Cardamine waldsteinii</i> Dyer	III	3		2			2	2						
F1 <i>Scopolia carniolica</i> Jacq.	III		2				1-5	3						
F1 <i>Ruscus hypoglossum</i> L.	III	2	1	1										
F1 <i>Scrophularia scopolii</i> Hoppe	III										2			
F1 <i>Epimedium alpinum</i> L.	III	1												
2 nd CATEGORY - 2. KATEGORIJE														
		1	2	3	4	5	6	7	8	9	10	11	12	13
F1 <i>Cardamine enneaphyllos</i> (L.) Crantz	III	5	4	3	2	1	2-5	5		4	4	3	1	
VP <i>Aposeris foetida</i> (L.) Less.	III	1	1	1			1-4	3				1	1	
F1 <i>Euphorbia carniolica</i> Jacq.	III		1	2			1-3	3						
F2 <i>Helleborus niger</i> L.	III		1	1			1-2	1						
F2 <i>Knautia drymeia</i> Heuff. subsp. <i>drymeia</i>	III		1				1							
3 rd CATEGORY - 3. KATEGORIJE														
		1	2	3	4	5	6	7	8	9	10	11	12	13
F2 <i>Cyclamen purpurascens</i> Mill.	III	2	4	2	5	3	2-5	2	5	5			1	
Q <i>Euonymus verrucosa</i> Scop.	II	1	1				2-4	1	3				1	

Successive Number - Zaporedna številka			1	2	3	4	5	6	7	8	9	10	11	12	13
Q	<i>Fraxinus ornus</i> L.	I	1	1				2-4	1	3					
F2	<i>Stellaria montana</i> Pierrat	III						1-5							
VP	<i>Erythronium dens-canis</i> L.	III										2			
Q	<i>Ostrya carpinifolia</i> Scop.	I											1		
4 th CATEGORY - 4. KATEGORIJE			1	2	3	4	5	6	7	8	9	10	11	12	13
F2	<i>Daphne laureola</i> L.	III	1	3		4		1-5	4	4			2	1	1
VP	<i>Saxifraga rotundifolia</i> L.	III	1	1	1				1			2	3	1	2
A	<i>Doronicum austriacum</i> Jacq.	III	1	1	1	1		2-4					1		2
F2	<i>Tamus communis</i> L.	III	1	1				1	1						
C	<i>Primula vulgaris</i> Huds.	III		2				1-4		1					
F2	<i>Helleborus odoratus</i> W. & K. ex Willd.	III		1	3							1			
A	<i>Doronicum columnae</i> Ten.	III										1			1
A	<i>Astrantia major</i> L.	III										1			
F2	FAGETALIA s.lat.		1	2	3	4	5	6	7	8	9	10	11	12	13
	<i>Fagus sylvatica</i> L.	I	5	5	5	5	5	5	5	5	5	5	5	5	5
	<i>Fagus sylvatica</i> L.	II	5	4	5	2	1	5	5	1	1	-	2	5	5
	<i>Fagus sylvatica</i> L.	III	4	4	5	3	1	1-4	5	2	2	-	4	3	4
	<i>Euphorbia amygdaloides</i> L.	III	5	5	4	5	4	2-5	4	4	2	5	5	5	5
	<i>Lonicera alpigena</i> L.	II	3	5	3	2	2	2-3	1	4	3	4	2	4	5
	<i>Mycelis muralis</i> (L.) Dum.	III	5	5	5	5	5	4-5	3	5	4	3	5	5	5
	<i>Paris quadrifolia</i> L.	III	5	5	4	3	2	3-4	4	1	4	2	3	4	5
	<i>Prenanthes purpurea</i> L.	III	3	5	3	4	3	3-5	5	4	5	5	3	5	5
	<i>Sanicula europaea</i> L.	III	5	5	4	5	2	2-5	4	3	2	5	5	5	5
	<i>Ulmus glabra</i> Huds.	I	-	1	-	3	1	1-4	2	2	1	-	1	2	1
	<i>Ulmus glabra</i> Huds.	II	-	2	-	3	1	2-4	2	2	2	1	-	1	2
	<i>Ulmus glabra</i> Huds.	III	1	1	1	3	2	1-3	5	1	2	-	2	1	-
	<i>Anemone nemorosa</i> L.	III	5	5	5	2	2	2-5	5		3	5	2	1	4
	<i>Epilobium montanum</i> L.	III	1	3	4	1	1	2-4	1		2	3	4	4	1
	<i>Lamiastrum galeobdolon</i> (L.) Ehrend. & Polatschek ^{*1}	III	2	5	4	4	4	4-5	5	4	3	5	2	3	4
	<i>Viola reichenbachiana</i> Jordan ex Boreau	III	5	4	5	4	3	2-5	1		2	5	3	4	4
	<i>Carex sylvatica</i> Huds.	III	3	5	5	5	3	4-5	5		1		1	4	4
	<i>Polystichum aculeatum</i> (L.) Roth	III	4	5	4		1	4-5	5			3	2	3	1
	<i>Acer pseudoplatanus</i> L.	I	1	4	4	2	3	2-5	4	4	3	4	3	4	1
	<i>Acer pseudoplatanus</i> L.	II	3	5	4	5	2	2-5	3	-	1	-	2	4	4
	<i>Acer pseudoplatanus</i> L.	III	-	4	3	5	3	2-5	5	3	3	-	-	1	-
	<i>Actaea spicata</i> L.	III	2	4	2	3	2	2-4	4		2		4		2
	<i>Galium odoratum</i> (L.) Scop.	III	5	5	3	4		3-5	5			5	4	5	5
	<i>Daphne mezereum</i> L.	II	2	5	3			5	5			2	2	2	2
	<i>Festuca altissima</i> All.	III	2	3	3	4		2-5	4	4	5		5		1
	<i>Hordelymus europaeus</i> (L.) C.O. Harz	III	2	1	1	4	1	1-4				2	2	4	2
	<i>Polygonatum multiflorum</i> (L.) All.	III	1	4	1	4		1-4	3		1		1	2	2
	<i>Brachypodium sylvaticum</i> (Huds.) P. Beauv.	III	1	3	1	2	2	2-5	3				3	1	
	<i>Geranium robertianum</i> L.	III	3	3	3			2-5	2		2	3	5		4
	<i>Salvia glutinosa</i> L.	III		4	2	1		2-5	4			1	1	2	2
	<i>Symphytum tuberosum</i> L.	III	2	1	4			2-3				4	3	2	4
	<i>Cardamine bulbifera</i> (L.) Crantz	III	4	3	4			2-5				4	4	2	3
	<i>Carex digitata</i> L.	III		3	1	2	2	2-5	2	3	2				
	<i>Corylus avellana</i> L.	II	1	4		2	3	1-5	3				3	1	
	<i>Mercurialis perennis</i> L.	II	2	5		2		1-5	3					1	1
	<i>Pulmonaria officinalis</i> L.	III	2	1	1			1-4				4	1	1	2
	<i>Lathyrus vernus</i> (L.) Bernh.	III	1	1	1	1						2		3	2
	<i>Lilium martagon</i> L.	III	2	3	3				1			2	3		1
	<i>Lonicera xylosteum</i> L.	II		2	1			2-5	2			3	2		1
	<i>Neottia nidus-avis</i> (L.) L.C. Rich.	III	2	2	1	2					2	1			
	<i>Phyteuma spicatum</i> L.	III		2	1			1-2	3		2		2		1
	<i>Prunus avium</i> L.	II		4	4				4			3	3	2	2
	<i>Arum maculatum</i> L.	III	1	2	1			1				1	1		

Succesive Number - Zaporedna številka		1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Asarum europaeum</i> L.* ²	III		4	1			2-5				3	3		3
<i>Euphorbia dulcis</i> L.	III	1	1	2	2							2	1	
<i>Melica nutans</i> L.	III	1	1	1		1	1					1		
<i>Platanthera bifolia</i> (L.) Rich.	III		2	1			2-3				1	2	1	
<i>Allium ursinum</i> L.	III		1	2								1		1
<i>Epipactis helleborine</i> (L.) Crantz	III		1	1			2					2	1	
<i>Euonymus latifolia</i> (L.) Mill.	II	2	1	1			1					2		
<i>Ranunculus lanuginosus</i> L.	III	1	1	2							3		1	
<i>Rosa arvensis</i> Huds.	II		4	2			1	v						1
<i>Scrophularia nodosa</i> L.	III		2	2			1-5					1	1	
<i>Acer obtusatum</i> W. & K. ex Willd.	I	-	-				1						1	
<i>Acer obtusatum</i> W. & K. ex Willd.	II	-	-				3						1	
<i>Acer obtusatum</i> W. & K. ex Willd.	III	1	1				-						1	
<i>Galium sylvaticum</i> L. (incl. <i>G. laevigatum</i> L.)	III		1					2			3	2		
<i>Hepatica nobilis</i> Schreber	III		1				2	1			4			
<i>Anemone ranunculoides</i> L.	III	1	3	1										
<i>Campanula trachelium</i> L.	III		1				2							
<i>Clematis vitalba</i> L.	II		2				2-4	1						
<i>Fraxinus excelsior</i> L.	I		-	1							-			
<i>Fraxinus excelsior</i> L.	II		2	1							1			
<i>Glechoma hirsuta</i> Waldst. & Kit.	III		1									3	1	
<i>Moehringia trinervia</i> (L.) Clairv.	III		1	2							1			
<i>Phyllitis scolopendrium</i> (L.) Newm.	III			2			1-3						2	
<i>Carex pilosa</i> Scop.	III	1	1											
<i>Crataegus monogyna</i> Jacq.	II		1				2							
<i>Ilex aquifolium</i> L.	II		1				1							
<i>Scilla bifolia</i> L.	III			1							1			
<i>Viburnum lantana</i> L.	II		1				1							
<i>Pyrus pyraeaster</i> (L.) Burgsd.	II		1											
Q QUERCETALIA PUBESCENTIS s.lat.														
		1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Euonymus verrucosa</i> Scop.	II	1	1				2-4	1	3				1	
<i>Acer platanoides</i> L.	I		1	1				-				3	2	2
<i>Acer platanoides</i> L.	II		1	-				-				-	-	-
<i>Acer platanoides</i> L.	III		1	1				1				3	-	-
<i>Sorbus aria</i> (L.) Crantz	II		1			1	2	1		1			1	
<i>Cephalanthera rubra</i> (L.) Rich.	III		1	1								1	1	
<i>Cephalanthera longifolia</i> (L.) Fritsch	III						2				2			
<i>Fraxinus ornus</i> L.	I	1	1				2-4	1	3					
<i>Potentilla micrantha</i> Ramond ex DC.	III		1	1										
<i>Sorbus torminalis</i> (L.) Crantz	II		1	1										
<i>Acer campestre</i> L.	I	1	1				2							
<i>Camptothecium lutescens</i> (Hedw.) Schimp.	IV						1-3							
<i>Laserpitium latifolium</i> L.	III						1							
<i>Melittis melissophyllum</i> L.	III										2			
<i>Ostrya carpinifolia</i> Scop.	I											1		
C CARPINETALIA s.lat.														
		1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Primula vulgaris</i> Huds.	III		2				1-4	1						
<i>Carpinus betulus</i> L.	I		1											
<i>Galanthus nivalis</i> L.	III			1										
<i>Betonica officinalis</i> L.	III						1							
<i>Cornus sanguinea</i> L.	II						2							
<i>Oryzopsis virescens</i> (Trin.) G.Beck	III						1-2							
<i>Cruciata glabra</i> (L.) Ehrend. (= <i>Galium vernum</i> Scop.)	III						2							
<i>Ilex aquifolium</i> L.	II						1							
<i>Ligustrum vulgare</i> L.	II						2							
<i>Stellaria holostea</i> L.	III						2				2			
<i>Quercus petraea</i> (Mattuschka) Liebl.	I							1						
<i>Rosa arvensis</i> Huds.	II						2							

Succesive Number - Zaporedna številka	1	2	3	4	5	6	7	8	9	10	11	12	13
A BETULO-ADENOSTYLETEA s.lat. / MULGEDIO-ACONITETEA s.lat.	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Dryopteris filix-mas</i> (L.) Schott	III	4	5	4	5	4		5	4	4	5	4	5
<i>Rubus idaeus</i> L.	II		4	3	4	4		4	4	2	2	3	4
<i>Cirsium erisithales</i> (Jacq.) Scop.	III		4	1	2		2-3	2	2	3		1	1
<i>Myosotis sylvatica</i> Ehrh. ex Hoffm.	III	2	1	1		1		1		1	1		3
<i>Milium effusum</i> L.	III	1	1	1			1			1	1	2	
<i>Doronicum austriacum</i> Jacq.	III	1	1	1	1		2-4				1		2
<i>Senecio nemorensis</i> L.	III	3	5	2				5			2	4	4
<i>Aconitum vulparia</i> Rchb.* ³	III		1	1			1				1	1	2
<i>Adenostyles alliariae</i> (Gouan) A. Kerner	III	1	1	2							3	1	2
<i>Veratrum album</i> L.	III	2	1	2						1	2		
<i>Circaea lutetiana</i> L.	III		5	1			1-5				1		
<i>Corydalis solida</i> (L.) Sw. (= <i>Corydalis bulbosa</i> (L. emend. Mill.) DC.)	III	1	1	1							2		
<i>Aruncus dioicus</i> (Walter) Fernald	III		1							1	1		
<i>Athyrium filix-femina</i> (L.) Roth	III					4	4		3				
<i>Adoxa moschatellina</i> L.	III									2	1		
<i>Cicerbita alpina</i> (L.) Wallr.	III										2		3
<i>Doronicum columnae</i> Ten.	III									1			1
<i>Polygonatum verticillatum</i> (L.) All.	III						1-5		1				
<i>Ranunculus platanifolius</i> L.	III		1										1
<i>Cardamine impatiens</i> L.	III						1						
<i>Chrysosplenium alternifolium</i> L.	III						4						
<i>Geum urbanum</i> L.	III						1-2						
<i>Glechoma hirsuta</i> Waldst. & Kit.	III						1						
<i>Impatiens noli-tangere</i> L.	III						4						
<i>Astrantia major</i> L.	III									1			
<i>Senecio rupestris</i> Waldst. & Kit.	III			2									
RP QUERCETALIA ROBORIS-PETRAEAE s.lat.	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Polypodium vulgare</i> L.	III	1	2				1-4	1		1	2	1	
<i>Veronica officinalis</i> L.	III		1	2			2		2	3	2		
<i>Pteridium aquilinum</i> (L.) Kuhn	III		1				2-4	1					
<i>Veronica chamaedrys</i> L.	III			1						1	2		
<i>Betula pendula</i> Roth	I									1			
<i>Populus tremula</i> L.	I											1	
VP VACCINIO-PICEETEA s.lat.	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Abies alba</i> Mill.	I	5	5	5	5	5	5	5	5	-	5	5	5
<i>Abies alba</i> Mill.	II	5	5	4	3	4	5	5	2	3	4	5	5
<i>Abies alba</i> Mill.	III	4	5	5	5	5	4-5	5	5	-	5	5	3
<i>Oxalis acetosella</i> L.	III	5	5	5	5	5	5	3	5	1	5	4	5
<i>Picea abies</i> (L.) Karsten	I	2	2	1	4	4	1-3		2	4	-	5	4
<i>Picea abies</i> (L.) Karsten	II	-	2	2	2	5	3-5		3	4	1	4	2
<i>Picea abies</i> (L.) Karsten	III	-	1	1	1	2	1-4		-	2	-	3	2
<i>Gentiana asclepiadea</i> L.	III	1	4	2	2	2	2-5	2		2	1	2	2
<i>Hieracium murorum</i> L.	III	1	1		2	4	2	1	2	2	1		4
<i>Lonicera nigra</i> L.	II	1	3	2	4	5	1-4			4	4	2	5
<i>Vaccinium myrtillus</i> L.	III	1	2	2		5	2-4			3	3	2	4
<i>Veronica urticifolia</i> Jacq.	III	4	1	2				1		2	3	1	3
<i>Galium rotundifolium</i> L.	III	3	3	1			2-4	1			3	2	4
<i>Rosa pendulina</i> L.	II	2			3	4	1-5			4	4	2	3
<i>Orthilia secunda</i> (L.) House	III		1			1	2		3	2	2	3	
<i>Saxifraga rotundifolia</i> L.	III	1	1	1				1		2	3	1	2
<i>Polystichum lonchitis</i> (L.) Roth	III	1	1	1			1-5			1	3	1	
<i>Aposeris foetida</i> (L.) Less.	III	1	1	1			1-4	3				1	1
<i>Solidago virgaurea</i> L.	III		3			2	2-5	1		1		2	1
<i>Homogyne sylvestris</i> (Scop.) Cass.	III	2	1		2		2-4	1		5			

Succesive Number - Zaporedna številka		1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Carex alba</i> Scop.	III		1		1	4	3		2	2				
<i>Laserpitium krapfii</i> Crantz	III	1	1	2				1			2	2		
<i>Luzula sylvatica</i> (Huds.) Gaud.	III	2	1	1			3-5			1		2		
<i>Maianthemum bifolium</i> (L.) F.W. Schmidt	III	2	3				2-3		2				1	3
<i>Dryopteris dilatata</i> (Hoffm.) A. Gray ^{*4}	III		1	1		5	2-4			2				
<i>Luzula luzulina</i> (Vill.) Dalla Torre & Sarnth.	III		1	1			1					3		2
<i>Ctenidium molluscum</i> (Hedw.) Mitten (= <i>Hypnum molluscum</i>)	IV				5	3			5	5				
<i>Luzula luzuloides</i> (Lam.) Dandy & Wilm.	III		1	1				1				2		
<i>Luzula pilosa</i> (L.) Willd.	III		1	1			1-5				2			
<i>Rhytidiadelphus triquetrus</i> (Hedw.) Warnst.	IV				1	5	1-5			3				
<i>Huperzia selago</i> (L.) Bernh. ex Schrank & Mart.	III					5	2-5			1				
<i>Lycopodium annotinum</i> L.	III					5	1-4			1				
<i>Monotropa hypopitys</i> L.	III		1	1							2			
<i>Rhytidiadelphus loreus</i> (Hedw.) Warnst.	IV					4	1-4			2				
<i>Bazzania trilobata</i> (L.) Gray	IV					1	1-3							
<i>Blechnum spicant</i> (L.) Roth	III					1	1							
<i>Clematis alpina</i> (L.) Mill.	II						2			2				
<i>Gymnocarpium dryopteris</i> (L.) Newm.	III					1				2				
<i>Melampyrum sylvaticum</i> L.	III										2	1		
<i>Valeriana tripteris</i> L.	III					2				3				
<i>Adenostyles glabra</i> (Mill.) DC.	III						5							
<i>Dicranum polysetum</i> Sw.	IV						2							
<i>Dicranum scoparium</i> (L.) Hedw.	IV						1-5							
<i>Dryopteris carthusiana</i> (Vill.) H.P. Fuchs	III						1-2							
<i>Goodyera repens</i> (L.) R. Br.	III						1-5							
<i>Hylocomium splendens</i> (Hedw.) B. S. G.	IV						1-5							
<i>Hypnum cupressiforme</i> Hedw.	IV						1-2							
<i>Leucobryum glaucum</i> (Hedw.) Aongstr.	IV						2							
<i>Mnium orthorrhynchium</i> Brid. (= <i>Atrichum tenellum</i>)	IV						2-3							
<i>Mnium spinosum</i> (Voit) Schwaegr.	IV						1-2							
<i>Peltigera aphthosa</i> (L.) Willd. (incl. <i>P. leucophlebia</i>)	IV						1-5							
<i>Plagiochila asplenoides</i> (L.) Dum. var. <i>major</i>	IV						2							
<i>Plagiothecium neglectum</i> Mönk. (= <i>Plagiothecium nemorale</i>)	IV						1-3							
<i>Polytrichum formosum</i> Hedw.	IV						2-4							
<i>Erythronium dens-canis</i> L.	III										2			

Legende - Legenda:

F1 = Aremonio-Fagion

Ht = Horvat

Tr = Tregubov

Pu = Puncer

Gl = Glavač

Bl = Blečić

FS = Fukarek & Stefanović

Pe = Pelcer

JZ HR = Southwest Croatia - Jugozahodna Hrvatska

HR = Croatia - Hrvatska

SI = Slovenia - Slovenija

ČG = Montenegro - Črna Gora

BH = Bosnia and Herzegovina - Bosna in Hercegovina

Nomenclature according to Martinčič et al. 2007 - Nomenklatura po Martinčič et al. 2007:

^{*1} *Galeobdolon montanum*, alternatively/lahko tudi *G. flavidum*^{*2} *Asarum europaeum* ssp. *europaeum* and/in *Asarum europaeum* ssp. *caucasicum*^{*3} *Aconitum lycoctonum* subsp. *vulparia* or/ali *Aconitum lycoctonum* subsp. *lycoctonum* or/ali *Aconitum lycoctonum* subsp. *ranunculoides*^{*4} alternatively/lahko tudi *Dryopteris expansa*

