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 fallic-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 različnosti 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.

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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 dystric or even non-carbonate neutral to acidic (pH in H₂O = 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 odorus, 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 Fagetales s. lat., in which we have included rarely represented species from the order Prunetales and class Quercetales. A similar number of species are from the class Vaccinio-Piceetae. The specific humidity of the habitat is indicated by species from the class Betulo-Adenostyletae s. lat. or Malgedio-Aconitetae s. lat. with suitable participation. Of note is the group of species of the order Quercetales pubescensitae 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.
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 *Fagetalia* order and of the *Vaccinio-Piceetum* 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-Dinaric 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) persist 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 & Dakskobler 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. Saxifruga cuneifolia Surina 2001 and Omphalodo-Fagetum (Tregubov 1957 corr. Puncer 1980) Marinček et al. 1993 var. geogr. Calamintha grandiflora Surina 2001. He retained all Trebugov’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-Abietetum Košir 2010 nom. inv., Homogyno sylvestris-Abietetum Košir 2010 nom. inv. and Lycopo-dio-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 | Tr | Pu | Gl | Tr | Tr | Bl | F-S | Pe | Tr |
| Region  | JZH | Sn | Sn | Ko | De | Sn | Sn | Pi | Pe | Pi | Pl | Gr |
| Country | HR | HR | HR | SL | 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 | 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-FAGON | 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-ADENOSTLI. | 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 |
| VACCINIIO-PICEETEA | 14 | 21 | 16 | 10 | 21 | 41 | 9 | 9 | 23 | 16 | 16 | 9 | 13 |
| QUERCETALIA ROB.-PUBESCENTIS | 1 | 3 | 2 | 0 | 3 | 2 | 1 | 0 | 4 | 3 | 2 | 0 |
| CARPINETALIA | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 1 | 0 | 0 | 0 |
| No. of species in tables - Σ | 82 | 128 | 101 | 51 | 53 | 143 | 72 | 32 | 56 | 77 | 88 | 69 | 65 |

Place by no. of species:

| 5th | 2nd | 3rd | 12th | 11th | 1st | 7th | 13th | 10th | 6th | 4th | 8th | 9th |

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 = BLEČIĆ, F-S = FUKAREK-STEVANOVIĆ, 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 (“montenegroinum”) 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, 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. Omphalodos 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 (Peručica) 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 – Peručice 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 Dorenicum columnae. Most convincing is Scrophularia scopolii (east European-west Asian species), whose area of distribution is also the southeast-eastern part of the central Balkan peninsular, here and there also in the Slovenia Alps. We classify there the species Dorenicum 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 Dorenicum 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 enneaphyllus and Prenan-
the 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 australre abietetosum Horvat 1938, (ICPN Ar. 34a) (Horvat 1938) Fagetum illyricum (= croaticum) australre abietetosum Horvat (ICPN Art. 34a) (Horvat, Glavač & Ellenberg 1974).

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 different 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-bukov gozdovi so med najbolj razširjenimi bukovimi gozdovi dinarskega gorstva. Poleg velike razširjenosti so tudi gospodarsko zanimivi, saj v njih uspeva kakovostan bukov in jelov les. Večinoma poraščajo karbonatne, poleg teh pa tudi nekarbonatne (silikatne) nevtralna do zmero kisle kmanine različnih geoloških starosti. Tla so rjava karbonatna evtrična do distrična ali celo nekarbonatna, nevtralna do kisla (pH v H₂O = 5–7,5 pH v KCl = 4–7). Govorimo o slabu bazičnem do kislem bukovem gozd. Doslej smo ga opredeljevali kot bazičen bukov gozd. Ilirski jelovo-bukov gozd gradi v Dinardih montanski vegetacijski pas v vseh nebesnih legah („klimaks“), seže lahko tudi v altimontanski pas na topilih 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 (ilirske, ilirskoidnih) vrst, ki so nekatere značilnice ilirske zveze bukovih gozdov Aremonio-Fagion. Glede na njihovo razširjenost jih uvrščamo v štirje kategorije (po zgledu Borhidija, 1963), v sicer od ožje (specifične) do široke (jugovzhodnoevropske) fitogeografske razširjenosti. V prvo kategorijo z očitno razširjenostjo uvrščamo naslednje vrste: Aremonia agrimonoides, Calamintha grandiflora, Cardamine kitaibelii, C. trifolia, C. waldsteinii, Epiumedium alpinum, Hacquetia epipactis, Homogyne sylvestris, Lamium orvala, Omphalodes verna, Rhamnus fallax, Ruscus hypervuccos, Scopalia carniolica, Scrophularia scopolii v in Vicia oroboides. V drugi kategoriji z nekoliko širšo razširjenostjo so: Aposeris foetida, Cardamine enneaphyllos, Euphorbia carniolica, Helleborus niger, Pulmonaria obscura, Stellaria montana. V tretji kategoriji z zelo široko (specifične) do ožje (specifične) razširjenostjo so Aretum montpelliersii, Epimedium alpinum, Heracleum maximum, Helleborus odorus, Primula vulgaris, Saxifraga hirculus, Polystichum acrostichoides, Scrophularia scopolii v. in Vicia oroboides. V četrto kategoriji z večstikano razširjenostjo stojata: Aretum montpelliersii, Arctium minus, Cardamine trilobata, Cerastium glaucum, Clerodendrum inboen, Crepis biennis, Helleborus odorus, Primula vulgaris, Saxifraga glutinosa, Stellaria montana.  

Osnovne značilnice ilirske zveze bukovih gozdov smo povzeli po Tregubovu in Puncerjah; to so: Aremonia agrimonoides, Calamintha grandiflora, Cardamine trilobata, Rhamnus fallax, Scopalia carniolica, Scrophularia scopolii in Vicia oroboides. 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 posvetlili 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), Fukarek (1958), Fukarek & Štefanović (1958), Blegića (1958) ter tabele v rokopisu Glavača in Pelcerja iz sintetične teorije. Uvod

Glede na sinsistematsko razvrstitev vrst v ilirskih jelovo-bukovih združbah so najstevljivejše iz reda Fagetales s. lat., v katerega smo uvrstili reko zgodov vrste in v reda Prunetales in razreda Querco-Fagetales. Podobno število vrst je tudi iz razreda Vaccinio-Piceeta. Določeno vlagano razširjenost jih uvrščamo v razred Betulo-Adenostyletae s. lat. oz. Mulgedio-Aconitetae. V primernu udeležbo. Omembe vredna je še skupina vrst v reda Quercetalia pubescensitae s. lat., ki v nekaterih nižjih sintaksonomskih enotah – subsociacijah, variantah ali formah – nakazujejo toplejše razmere. Število zgoraj omenjenih vrst po sinsistematskih enotah je glede na avtorje in območja različno.
Njihova največja zastopanost je v jugovzhodni Hrvaški in na območju Delnici ter na Kočevskem v Sloveniji (glej Tabelo 2). Nerazumljiva je njihova majhna zastopanost na Snježniku. 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 manjšo analitično pokazuje, da vseh osem analitičnih vrst v Abietetum Fagetum. To je zato, ker regionalna razlika ter lokalna razlikovalnica - v območju se je nastala in razlikovalnica asocijacije (2012: 155–158, stolpec 13), ki upošteva analitično tabelo Trinajstić s popisi z Male Kapele.

Pozneje je Trinajstić (2008) sodelavci (2009) sledila Kodeksen (2000) in se pridružila prvemu popisovanju ilirsko-dinarskega jelovo-bukovega gozda po Tregubovu (1941) Fago-Aietetum. Asocijacijo je korigiral z novimi značilnicami in razlikovalnimi in izločil subasociacijo zvrst Omphalodes verna, tako da je nastala nova nomenklatura sintaksena Fago-Abietetum Tregubova 1941 corr. Trinajstić 2007. V tabeli so številne vrste ilirske zveze Armoenio-Fagion oz. jugovzhodnoevropsko-ilirsko vrste, med njimi tudi naše značilnice za asocijacijo Rhamno fallici-Fagetum: Aremonia agrimoniae, Calamintha grandiflora in Rhamnus fallax ter razlikovalna asocijacija Abies alba in lokalna razlikovalnica Omphalodes verna. Značilnice in razlikovalnice sintaksena Fago-Abietetum so splošno razširjene vrste v bukovih gozdovih – ne le v ilirski florni provinci, temveč tudi v drugih (npr. srednjeevropski provinčni). Po Kodeksen (2000) se imena Fago-Abietetum ali Abieti-Fagetum ne uporabljajo. Vsekakor Trinajstičev sintaksen Fago-Abietetum pripada sintaksanom Rhamno fallici-Fagetum v nekoliko okrnjeni obliki; sestoj ni optimalen.

Šurina (2001, 2002) je preučeval jelovo-bukove gozdo 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 nakažal možnost novega sintaksena Abieti-Fagetum praealpino-dinaricum Puncer 1979 mscr. Šurina (2001, 2002, Šurina & Daksbole 2013) je rešil problem »vmesn« jelovo-bukove združbe med predalskim in dinarskim območjem z dvema geografskima variantama, in sicer Omphalodes-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. Obrdzal je vse značilnice Tregubovega ozirma dopolnjene Puncerjeve, ki jih danes navajamo za novo imenovano asociacijo Rhamno fallaci-Fagetum z razliko, da vrsto Omphalodes verna uvrščamo kot regionalno razlikovalno, vrsto Abies alba pa kot asociacijo razlikovalnico.

Asociacija Omphalodo-Fagetum vsebuje veliko subsocijacij, ki so glede na ekološke razmere bolj ali manj raznovrstne (topoljubne, skalovite, kisloljubne ipd.), zato je Košir (2010) provizoročno predlagal, da dobijo Surina 2001 in Košir 2010 subsp. vrsto - montenegri Košir 2010 Fagetum (in), ki pa .

Nekaj možnosti je, da členimo ilirske jelovo-bukove združbe. Možnih je več variant:

1. Ponovno uvedemo starejšo nomenklaturo Abieti-Fagetum. Za značilnice in razlikovalnice združbe sprejemamo že znane diagnostične vrste Tregubovega oz. Puncerja (glej stran 245), kot je prikazano v Tabeli 2. Osnovno asociacijo (makroasociacijo) nato delimo na geografske variante z razlikovalnicami, ki ustrezo njihovemu fitogeografskemu območju (po- ložaju), 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 (Peručica) in Črne gore (Piva);
- Abieti-Fagetum (Tregubov 1957) var.geogr. Arenonia 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);
- Calamintha-Fagetum (Tregubov 1957) ass. nova. (delno za območje Snežnika v Sloveniji, Hrvaške – Delnice, Bosne – Peručice in Črne gore – Pive);
- Arenonia-Fagetum (Tregubov 1957) ass. nova. s str. (Hrvaška – Plješevica, Bosna – Grmeč planina).

Za asociacijo Omphalodo-Fagetum bi bila nesporo 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 Calamintha-Fagetum, ki se pojavlja tudi v združbi Omphalodo-Fagetum. Zanimiv je ilirske jelovo-bukove sestoj v Črni gori (Piva), kjer so pojavljajo tri jugovzhodno-evropsko – ilirske vrste kot relativne razlikovalnice Schrophularia scopoli, Astrantia major in Doronicum columnae. Najbolj prepričljiva je Schrophularia scopoli (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 ilirske jelovo-bukovih združbah na Plješevici (Hrvaška) in Grmeč planini (Bosna) se pojavlja samo značilnica Arenonia agrimonoides, sicer splošno razširjena v vseh treh sintaksionih. Na Grmeč planini v Bosni se poleg nje pojavlja še jugovzhodnoevropsko -ilirska vrsta Doronicum columnae. Združba Arenonia-Fagetum s. lat. ni poseben sintaksen le za omenjeno območje, pač pa ima širši obseg.
Vse tri naštete asociacije nimajo svojih izrazitih značilnic ali razlikovalnic, ki bi brezpogojno nakazovale ali potrjevala njihovo samostojnost. Vse tri asociacije bi lahko razumeli kot relativne združbe fitogeografskega porekla na višji sinistemskega 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 sinistematskim rangom asociacije, kar pa ni zadovoljivo in korektno.

Za Slovenijo smo parcialno reševali sinistematski 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, Calamitha grandiflora, Cardamine trifolia in Rhamnus fallax, po Tregubovu (1957), in opustili njegovi značilnici – Cardamine enneaphyllos in Prenanthes purpurea – zaradi njune splošne razširjenosti v mnogih gozdovih sintaksonih.

Analitična Tabela 2 nam kaže, da so naštete značilnice prisotne v ilirskih jelovo-bukovih združbah osrednjega Balkanskega polotoka in Slovenije. V nekaterih fitocenoah 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 objaviti in brez razloga združiti v enoten sintakson Rhamno fallaci-Fagetum nov. nom.

Mogoče in najbolj ustrezen je verjetno:

3. možnost, da spremenimo sinantaksonomsko no menklaturo 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 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 sylvaeciae montenegrinum abietetosum Bečič 1958 (ICPN Art. 34a) (Bečič 1958).

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

Značilnice so: Aremonia agrimonoides, Calamitha 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 Calamitha grandiflora, severozahodno razširjena vrsta Omphalodes verna ter jugovzhodno razširjena vrsta Doronicum columnae in Scrophularia scopolii. Razlike so še v bogastvu flore, zlasti vrst ilirske zveze Aremonio-Fagion in reda Fagetaalia, delo tudi razreda Vaccinio-Piceetalia (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 rodove opisane tovrstne fitocenoze Horvata, Tregubova, Fukareka, Bečiča in njihove sledilce Glavača, Pelcerja, Puncerja (et Wojterskega & Zupančiča), Stefanoviča 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 ilirskih zvez. Stevilu rastlinskih vrst upada proti jugovzhodu območja ilirskih jelovo-bukovih gozdov, kar verjetno ni le vpada v vprašanje nekoliko drugačnih ekoloških razmer, temveč tudi intenzivnost in izbire časa popisovanja raziskovalcev. Subjektivnih razmer ne smemo zaneset in raziskovati. Problem popisovanja dveh raziskovalcev se razločno vidi na območju Slovenije (Tabela 2). Če bi danes ponovili raziskave ilirskih jelovo-bukovih goz-
do na istih območjih oz. raziskovanih ploskvah, bi verjetno dobili nekoliko drugačno floristično podobo fitocenoze. Novejše in optimalnejše raziskave bi morda odkrile prisotnost še drugih vrst. Pomembno bi bilo odkritje prisotnosti novih jugovzhodno-evropskoilirs-kih in balkanskih vrst, kar bi omogočalo upravičeno razlikovanje asociacije Rhamno fallici-Fagetum na geografske variante ali celo na samostojne asociacije.

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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       |   |   |   |   |   |   |   |   |   |    |    |    |    |
| Place of relevés - Kraj popisov      |   |   |   |   |   |   |   |   |   |    |    |    |    |
| Number of relevés - Število popisov  | 15| 32| 6 | 20 |109|12 |10 |20 |12 |17 |17 |20 |    |
| Country - Država                     | HR| HR| HR| SI| SI| SI| SI| SI| SI| ČG| BH| BH|    |
| AREMONIO-FAGETUM nom. nov.           | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| F1 Aremonia agrimonoides (L.) DC.    | III| 5 | 5 | 5 | 5 | 3 | 4-5| 5 | 5 | 5 | 5 | 5 | 4 | 5 |
| F1 Rhamnus fallax Boiss.             | II | 2 | 5 | 3 | 4 | 1 | 1-5| 5 | 4 | 4 | 3 | 2 | 3 | 4 |
| F1 Cardamine trifolia L.             | III| 2 | 5 | 4 | 5 | 5 | 4-5| 5 | 3 | 5 | 5 | 2 | 2 |    |
| F1 Calamintha grandiflora (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 Abies alba Mill.                  | I  | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |    |
| VP Abies alba Mill.                  | II | 5 | 5 | 4 | 3 | 4 | 4-5| 5 | 2 | 3 | 4 | 4 | 5 | 5 |
| VP Abies alba Mill.                  | III| 4 | 5 | 5 | 5 | 5 | 4-5| 5 | 5 | 5 | 5 | 5 | 3 |    |
| LOCAL DIFFERENTIAL SPECIES - LOKALNE RAZLIKOVALNICE | | | | | | | | | | | | | |
| F1 Omphalodes verna Moench           | III| 2 | 4 | 3 | 3 | 3 | 4 | 4-5| 5 | 3 | 3 | 4 | 3 |    |
| A Doronicum columnae Ten.            | III| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |    |
| F1 Scrophularia scopolii Hoppe       | III| 2 | 4 | 5 | 3 | 4 | 4-5|    |    |    |    |    |    |
| SOUTHEAST-EUROPEAN ILLYRIAN SPECIES 1. KATEGORIJE | | | | | | | | | | | | | |
| JUGOVZHODNOEVROPSKO-ILIRSKE VRSTE 1. KATEGORIJE | | | | | | | | | | | | | |
| F1 Aremonia agrimonoides (L.) DC.    | III| 5 | 5 | 5 | 5 | 3 | 4-5| 5 | 5 | 3 | 5 | 5 | 4 | 5 |
| F1 Rhamnus fallax Boiss.             | II | 2 | 5 | 3 | 4 | 1 | 1-5| 5 | 4 | 4 | 3 | 2 | 3 | 4 |
| F1 Cardamine trifolia L.             | III| 2 | 5 | 4 | 5 | 5 | 4-5| 5 | 3 | 5 | 5 | 2 | 2 |    |
| F1 Calamintha grandiflora (L.) Moench| III| 3 | 5 | 4 | 4 | 5 | 3-5| 5 | 3 | 2 | 4 | 1 |    |    |
| F1 Omphalodes verna Moench           | III| 2 | 4 | 5 | 3 | 4 | 4-5|    |    |    |    |    |    |    |
| VP Homogyne sylvestris (Scop.) Cass. | III| 2 | 1 | 2 | 2 | 4 | 1 | 5 |    |    |    |    |    |    |
| F1 Lamium orvala L.                  | III| 4 | 2 | 1 | 1-5| 1 |    |    |    |    |    |    |    |    |
| F1 Hacquetia epipactis (Scop.) DC.   | III| 1 | 3 | 2-3| 1 |    |    |    |    |    |    |    |    |    |
| F1 Vicia oroboides Wulf.             | III| 1 | 1 | 1 | 1 |    |    |    |    |    |    |    |    |    |
| F1 Cardamine kitaibelii Becherer     | III| 4 | 1 | 2 | 1-2|    |    |    |    |    |    |    |    |    |
| F1 Cardamine waldsteinii Dyer        | III| 3 | 2 | 2 | 2 |    |    |    |    |    |    |    |    |    |
| F1 Scopolia carniolica Jacq.         | III| 2 | 1 | 1 | 1-5| 3 |    |    |    |    |    |    |    |    |
| F1 Ruscus hypoglossum L.             | III| 2 | 1 | 1 |    |    |    |    |    |    |    |    |    |    |
| F1 Scrophularia scopolii Hoppe       | III| 2 |    |    |    |    |    |    |    |    |    |    |    |    |
| F1 Epimedium alpinum L.              | III| 1 |    |    |    |    |    |    |    |    |    |    |    |    |

2. CATEGORY - 2. KATEGORIJE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| F1 Cardamine enneaphyllos (L.) Crantz | III| 5 | 4 | 3 | 2 | 1 | 2-5| 5 | 4 | 4 | 3 | 1 |    |
| VP Aposeris foetida (L.) Less.        | III| 1 | 1 | 1 | 1-4| 3 | 1 | 1 |    |    |    |    |    |
| F1 Euphorbia carniolica Jacq.         | III| 1 | 2 | 1-3| 3 |    |    |    |    |    |    |    |    |
| F2 Helleborus niger L.                | III| 1 | 1 | 1-2| 1 |    |    |    |    |    |    |    |    |
| F2 Knautia drymeia Heuff. subsp. drymeia | III| 1 |    |    |    |    |    |    |    |    |    |    |    |

3. CATEGORY - 3. KATEGORIJE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| F2 Cyclamen purpurascens Mill.        | III| 2 | 4 | 2 | 5 | 3 | 2-5| 2 | 5 | 5 | 5 | 1 |    |
| Q Euonymus verrucosa Scop.            | II | 1 | 1 | 2-4| 1 | 3 | 1 |    |    |    |    |    |    |
MITJA ZUPANČIČ: SYNTAXONOMIC PROBLEM OF ILLYRIAN (DINARIC) FIR-BEECH FORESTS

| Succesive Number - Zaporedna številka | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|----------------------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|
| Q Fagus sylvatica L.                   | I | 1 | 1 | - | 2-4| 1  | 3 |
| F2 *Stellaria montana* Pierrat         | III| 1 | - | 5 |
| VP *Erythronium dens-canis* L.         | III| 2 |
| Q Ostrya carpinifolia Scop.            | I | - | 1  |

| 4th CATEGORY - 4. KATEGORIJE         | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---------------------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|
| F2 *Daphne laureola* L.               | III| 1 | 3 | 4 | 1-5| 4 | 4 | - | 2  | 1  | 1 |
| VP *Saxifraga rotundifolia* L.        | III| 1 | 1 | 1 | -  | 1 | 2 | 3 | 1  | 2  |
| A *Doronicum austriacum* Jacq.       | III| 1 | 1 | 1 | 1  | 2-4| 1 | 2 |
| F2 *Tamus communis* L.                | III| 1 | 1  | 1 |
| C *Primula vulgaris* Huds.            | III| 2 | - | 1-4| 1 |
| F2 *Helleborus odoratus* W. & K. ex Willd. | III| 1 | 3  | 1 |
| A *Doronicum columnae* Ten.           | III| 1 |
| A *Astrantia major* L.                | III| 1 |

| F2 FAGETALIA s.lat.                   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---------------------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|
| *Fagus sylvatica* L.                  | I | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| *Fagus sylvatica* L.                  | II| 5 | 4 | 5 | 2 | 1 | 5 | 5 | 1 | 1  | 2 | 5 | 5 |
| *Fagus sylvatica* L.                  | III| 4 | 4 | 5 | 3 | 1 | 1-4| 5 | 2 | 2  | - | 4 | 3 |
| *Euphorbia amygdaloides* L.           | III| 5 | 5 | 4 | 5 | 4 | 2-5| 4 | 4 | 2  | 5 | 5 | 5 |
| *Lonicera alpigena* L.                | II| 3 | 5 | 3 | 2 | 2 | 2-3| 1 | 4 | 3  | 4 | 2 | 4 |
| *Myecis muralis* (L.) Dum.            | III| 5 | 5 | 5 | 5 | 5 | 4-5| 3 | 5 | 4  | 3 | 5 | 5 |
| *Paris quadrifolia* L.                | III| 5 | 5 | 4 | 3 | 2 | 3-4| 4 | 1 | 4  | 2 | 3 | 4 |
| *Prenanthes purpurea* L.              | III| 3 | 5 | 3 | 4 | 3 | 3-5| 5 | 4 | 5  | 5 | 5 | 5 |
| *Sanicula europaea* L.                | III| 5 | 5 | 4 | 5 | 2 | 2-5| 4 | 3 | 2  | 5 | 5 | 5 |
| *Ulmus glabra* Huds.                  | I  | - | 1  | - | 3 | 1 | 1-4| 2 | 2 | 1  | - | 2 | 1 |
| *Ulmus glabra* Huds.                  | II | - | 1  | - | 3 | 1 | 2-4| 2 | 2 | 1  | - | 1 | 2 |
| *Ulmus glabra* Huds.                  | III| 1 | 1 | 1 | 1 | 2 | 1-3| 5 | 1 | 2  | - | 2 | 1 |
| *Anemone nemorosa* L.                 | III| 5 | 5 | 5 | 2 | 2 | 2-5| 5 | 3 | 5  | 2 | 1 | 4 |
| *Epilobium montanum* L.               | III| 1 | 3 | 4 | 1 | 1 | 2-4| 1 | 2 | 3  | 4 | 4 | 1 |
| *Lamiastrum galeobdolon* (L.) Ehrend. & Polatschek* | III| 2 | 5 | 4 | 4 | 4 | 4-5| 5 | 4 | 3 | 5 | 2 | 3 |
| *Viola reichenbachiana* Jordan ex Boreau | III| 5 | 4 | 5 | 4 | 3 | 2-5| 1 | 2 | 5  | 3 | 4 | 4 |
| *Carex sylvatica* Huds.               | III| 3 | 5 | 5 | 5 | 3 | 4-5| 5 | 1  | 1  | 4 | 4 |
| *Polystichum aculeatum* (L.) Roth     | III| 4 | 5 | 4 | 1 | 4-5| 5 | 3 | 2  | 3 | 1 |
| *Acer pseudoplatanus* L.              | I  | 1 | 4 | 4 | 2 | 3 | 2-5| 4 | 4 | 3  | 4 | 3 | 4 |
| *Acer pseudoplatanus* L.              | II | 3 | 5 | 4 | 5 | 2 | 2-5| 3 | -  | 1  | 2 | 4 | 4 |
| *Acer pseudoplatanus* L.              | III| - | 4 | 3 | 5 | 3 | 2-5| 5 | 3 | 3  | - | 1 | - |
| *Actaea spicata* L.                   | III| 2 | 4 | 2 | 3 | 2 | 2-4| 4 | 2  | 4 | 4 | 2 |
| *Gallium odoratum* (L.) Scop.         | III| 5 | 5 | 3 | 4 | 3-5| 5 | 5 | 4  | 5 | 5 |
| *Daphne mezereum* L.                  | II | 2 | 5 | 3 | - | 5 | 5 | 2  | 2 | 2  | 2 |
| *Festuca altissima* All.              | III| 2 | 3 | 3 | 4 | 2-5| 4 | 4 | 5  | 5 | 1 |
| *Hordelymus europaeus* (L.) C.O. Harz | II | 2 | 1 | 1 | 4 | 1 | 1-4| - | 2 | 2  | 4 | 2 |
| *Polygonatum multiflorum* (L.) All.    | III| 1 | 4 | 1 | 4 | 1-4| 3 | 1  | 1  | 2 | 2 |
| *Brachypodium sylvaticum* (Huds.) P. Beauv. | III| 1 | 3 | 1 | 2 | 2 | 2-5| 3 | -  | 3 | 1 |
| *Geranium robertianum* L.             | III| 3 | 3 | 3 | 2-5| 2 | 2 | 3  | 5 | 4 |
| *Salvia glutinosa* L.                 | III| 4 | 2 | 1 | 2-5| 4 | 1 | 1  | 2 | 2  | 4 |
| *Symphytum tuberosum* L.              | III| 2 | 1 | 4 | - | 2-3| 4 | 3  | 2 | 4  |
| *Cardamine bulbifera* (L.) Crantz     | III| 4 | 3 | 4 | 2-5| - | 4 | 2 | 3 | 2  | 4 |
| *Carex digitata* L.                   | III| 3 | 1 | 2 | 2 | 2-5| 2 | 3 | 2  |
| *Corylus avellana* L.                 | II | 1 | 4 | 2 | 3 | 1-5| 3 | -  | 3 | 1  |
| *Mercurialis perennis* L.             | II | 2 | 5 | 2 | 1-5| 3 | -  | 1 | 1  |
| *Pulmonaria officinalis* L.           | III| 2 | 1 | 1 | 1 | 1 | 1-4| - | 4 | 1  | 1 | 2 |
| *Lathyrus vernus* (L.) Bernh.         | III| 1 | 1 | 1 | 1 | 2 | 2  | 3 | 1  |
| *Lilium martagon* L.                  | III| 2 | 3 | 3 | 1 | 2 | 3  | 1 |
| *Lonicera xylosteum* L.               | II | 2 | 1 | 2-5| 2 | 3 | 2  | 1 |
| *Neottia nidus-avis* (L.) C.O. Rich. | III| 2 | 2 | 1 | 2 | 2 | -  | 1 |
| *Phyteuma spicatum* L.                | III| 2 | 1 | 1-2| 3 | 2 | 2  | 1 |
| *Prunus avium* L.                     | II | 4 | 4 | 4 | - | 3 | 3 | 2  | 2 |
| *Arum maculatum* L.                   | III| 1 | 2 | 1 | 1 | - | 1  | 1 | -  | 1 | 1 |
| Succesive Number - Zaporedna številka | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|--------------------------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|
| *Asarum europaeum* L. \(^2\)         | III | 4 | 1 | 2-5 | 3 | 3 | 3 |
| *Euphorbia dulcis* L.                | III | 1 | 1 | 2 | 2 | 2 | 1 |
| *Melica nutans* L.                   | III | 1 | 1 | 1 | 1 | 1 | 1 |
| *Platanthera bifolia* (L.) Rich.     | III | 2 | 1 | 2-3 | 1 | 2 | 1 |
| *Allium ursinum* L.                  | III | 1 | 2 | 1 | 1 | 1 |
| *Epipactis helleborine* (L.) Crantz  | III | 1 | 1 | 2 | 1 | 1 | 2 |
| *Euonymus latifolia* (L.) Mill.      | II  | 2 | 1 | 1 | 1 | 1 | 2 |
| *Ranunculus lanuginosus* L.          | III | 1 | 1 | 2 | 3 | 1 |
| *Rosa arvensis* Huds.                | II  | 4 | 2 | 1 | v |
| *Scrophularia nodosa* L.             | III | 2 | 2 | 1-5 | 1 | 1 |
| *Acer obtusatum* W. & K. ex Willd.   | I   | - | - | - | - | - | - |
| *Acer obtusatum* W. & K. ex Willd.   | II  | - | - | - | 3 | 1 | 1 |
| *Acer obtusatum* W. & K. ex Willd.   | III | 1 | 1 | - | - | - |
| *Galium sylvaticum* L. (incl. G. laevigatum L.) | III | 1 | 2 | 3 | 2 |
| *Hepatica nobilis* Schreber          | III | 1 | 2 | 1 | 4 |
| *Anemone ranunculoides* L.           | III | 1 | 3 | 1 |
| *Campanula trachelium* L.            | III | 1 | 2 |
| *Clematis vitalba* L.                | II  | 2 | 2-4 | 1 |
| *Fraxinus excelsior* L.              | I   | - | 1 | - |
| *Fraxinus excelsior* L.              | II  | 2 | 1 | 1 |
| *Glechoma hirsuta* Waldst. & Kit.    | III | 1 | 3 | 1 |
| *Moehringia trinervia* (L.) Clairv.  | III | 1 | 2 | 1 |
| *Phyllitis scolopendrium* (L.) Newm. | III | 2 | 1-3 | 2 |
| *Carex pilosa* Scop.                 | III | 1 | 1 |
| *Crataegus monogyna* Jacq.           | II  | 1 | 2 |
| *Ilex aquifolium* L.                 | II  | 1 |
| *Scilla bifolia* L.                  | III | 1 | 1 |
| *Viburnum lantana* L.                | II  | 1 | 1 |
| *Pyrus pyraster* (L.) Burgsd.         | II  | 1 |

Q QUERCETALIA PUBESCENTIS s.lat.  

1 2 3 4 5 6 7 8 9 10 11 12 13

| *Euonymus verrucosa* Scop.            | II | 1 | 1 | 2-4 | 1 | 3 | 1 |
| *Acer platanoides* L.                 | I  | 1 | 1 | - | 3 | 2 | 2 |
| *Acer platanoides* L.                 | II | 1 | - | - | - | - |
| *Acer platanoides* L.                 | III | 1 | 1 | 1 | 3 | |
| *Sorbus aria* (L.) Crantz             | II  | 1 | 1 | 2 | 1 | 1 |
| *Cephalanthera rubra* (L.) Rich.      | III | 1 | 1 | 1 | 1 |
| *Cephalanthera longifolia* (L.) Fritsch | III | 2 |
| *Fraxinus ornus* L.                   | I   | 1 | 1 | 2-4 | 1 | 3 |
| *Potentilla micrantha* Ramond ex DC.  | III | 1 | 1 |
| *Sorbus torminalis* (L.) Crantz       | II  | 1 | 1 |
| *Acer campestre* L.                   | I   | 1 | 1 | 2 |
| *Camptothecium lutescens* (Hedw.) Schimp. | IV  | 1-3 |
| *Laserpitium latifolium* L.           | III | 1 |
| *Melitits melissophyllum* L.          | III | 2 |
| *Ostrya carpinifolia* Scop.           | I   | 1 |

C CARPINETALIA s.lat.  

1 2 3 4 5 6 7 8 9 10 11 12 13

| *Primula vulgaris* Huds.               | III | 2 | 1-4 | 1 |
| *Carpinus betulus* L.                 | I   | 1 |
| *Galanthus nivalis* L.                | III | 1 |
| *Betonica officinalis* L.             | III | 1 |
| *Cornus sanguinea* L.                 | II  | 2 |
| *Oryzopsis virescens* (Trin.) G.Beck   | III | 1-2 |
| *Cruciata glabra* (L.) Ehrend. (= *Galium vernum* Scop.) | III | 2 |
| *Ilex aquifolium* L.                  | II  | 1 |
| *Ligustrum vulgare* L.                | II  | 2 |
| *Stellaria holostea* L.               | III | 2 | 2 |
| *Quercus petraea* (Mattuschka) Liebl. | I   | 1 |
| *Rosa arvensis* Huds.                 | II  | 2 |
### A  BETULO-ADENOSTYLETEA s.lat. / MULGEDIO-ACONITETEA s.lat.

| Succesive Number - Zaporedna številka | 1 2 3 4 5 6 7 8 9 10 11 12 13 |
|--------------------------------------|---------------------------------|

| Betulo-Adenostyletea s.lat. / Mulgedio-Aconitetea s.lat. | 1 2 3 4 5 6 7 8 9 10 11 12 13 |
|----------------------------------------------------------|---------------------------------|
| Dryopteris filix-mas (L.) Schott | III 4 5 4 5 4 5 4 5 4 5 4 5 |
| Rubus idaeus L. | II 4 3 4 4 4 4 4 2 2 3 4 |
| Cirsium erisithales (Jacq.) Scop. | III 4 1 2 2 3 2 3 1 1 |
| Myosotis sylvatica Ehrl. ex Hoffm. | III 2 1 1 1 1 1 1 3 |
| Milium effusum L. | III 1 1 1 1 1 1 2 2 |
| Dornicium austriacum Jacq. | III 1 1 1 1 2-4 1 2 2 |
| Senecio nemorensis L. | III 3 5 2 5 2 4 4 2 |
| Aconitum vulgaria Rchb. | III 1 1 1 1 1 1 2 2 |
| Adenostyles alliariae (Gouan) A. Kerner | III 1 1 2 3 1 2 3 4 |
| Veratrnum album L. | III 2 1 1 2 1 2 |
| Circaea lutetiana L. | III 5 1 1 5 1 |
| Corydalis solida (L.) Sw. (= Corydalis bulbosa (L. emend. Mill.) DC.) | III 1 1 1 1 2 |
| Aruncus dioicus (Walter) Fernald | III 1 1 |
| Athyrium filix-femina (L.) Roth | III 4 4 3 3 |
| Adoxa moschatellina L. | III 2 |
| Cicerbita alpina (L.) Wallr. | III 2 3 |
| Dornicum columnae Ten. | III |
| Polygonatum verticillatum (L.) All. | III 1-5 |
| Ranunculus platantifolius L. | III 1 |
| Cardamine impatiens L. | III |
| Chrysosplenium alternifolium L. | III | 4 |
| Geum urbanum L. | III | 1-2 |
| Glechoma hirsuta Waldst. & Kit. | III |
| Impatiens noli-tangere L. | III |
| Astrantia major L. | III |
| Senecio rupestris Waldst. & Kit. | III 2 |

### RP  QUERCETALIA ROBORIS-PETRAEAE s.lat.

| Succesive Number - Zaporedna številka | 1 2 3 4 5 6 7 8 9 10 11 12 13 |
|--------------------------------------|---------------------------------|

| Quercetalia roboris-petraeae s.lat. | 1 2 3 4 5 6 7 8 9 10 11 12 13 |
|------------------------------------|---------------------------------|
| Polypodium vulgare L. | III 1 2 |
| Veronica officinalis L. | III 1 2 |
| Pteridium aquilinum (L.) Link | II 2 1 4 4 |
| Veronica chamaedrys L. | III 1 2-4 1 |
| Betula pendula Roth | III 1 |
| Populus tremula L. | I |

### VP  VACCINIO-PICEETEA s.lat.

| Succesive Number - Zaporedna številka | 1 2 3 4 5 6 7 8 9 10 11 12 13 |
|--------------------------------------|---------------------------------|

| Vaccinio-Piceetea s.lat. | 1 2 3 4 5 6 7 8 9 10 11 12 13 |
|-------------------------|---------------------------------|
| Abies alba Mill. | I 5 5 5 5 5 5 5 5 5 5 5 5 |
| Abies alba Mill. | II 5 5 4 3 4 5 5 5 3 4 4 5 5 |
| Abies alba Mill. | III 4 5 5 5 5 5 5 5 5 5 5 3 |
| Oxalis acetosella L. | III 5 5 5 5 5 5 5 5 5 5 5 5 |
| Picea abies (L.) Karsten | I 2 2 1 4 4 1-3 |
| Picea abies (L.) Karsten | II 2 2 1 4 5 3-5 |
| Picea abies (L.) Karsten | III 1 1 1 1 1-2 |
| Gentiana asclepiadea L. | III 1 4 2 2 2 2 5 2 |
| Hieracium murorum L. | III 1 1 2 4 2 1 2 1 4 |
| Lonicera nigra L. | II 1 3 2 4 5 1-4 |
| Vaccinium myrtillus L. | III 1 2 2 5 2-4 |
| Veronica urticifolia Jacq. | III 4 1 2 1 3 1 3 |
| Galium rotundifolium L. | III 3 3 1 2-4 1 3 2 4 4 |
| Rosa pendulina L. | II 2 3 4 1-5 4 4 4 2 3 3 |
| Orthilia secunda (L.) House | III 1 1 2 3 2 2 3 |
| Saxifraga rotundifolia L. | III 1 1 1 1 1 2 3 1 2 |
| Polyjstichum lonchitis (L.) Roth | III 1 1 1 1-5 1 3 1 |
| Aposeris foetida (L.) Less. | III 1 1 1 1-4 3 1 1 1 |
| Solidago virgaurea L. | III 3 2 2 5 1 1 2 1 |
| Homogyne sylvstris (Scop.) Cass. | III 2 1 2 2 4 1 5 5 |
| Succesive Number | Zaporedna številka |
|------------------|---------------------|
| Carex alba Scop. | III 1 1 1 4 3 2 2 |
| Laserpitium krapfii Crantz | III 1 1 2 1 2 2 |
| Luzula sylvatica (Huds.) Gaud. | III 2 1 1 3-5 1 2 |
| Maianthemum bifolium (L.) F.W. Schmidt | III 2 3 2-3 2 1 3 |
| Dryopteris dilatata (Hoffm.) A. Gray* | III 1 1 5 2-4 2 |
| Luzula luzulina (Vill.) Dalla Torre & Sarnth. | III 1 1 1 3 2 |
| Clenidium molluscum (Hedw.) Mitten (= Hypnum molluscum) | IV 5 3 5 5 |
| Luzula luzuloides (Lam.) Dandy & Wilm. | III 1 1 1 2 |
| Luzula pilosa (L.) Willd. | III 1 1 1-5 2 |
| Rhytidiadelphus triquetrus (Hedw.) Warnst. | IV 1 5 1-5 3 |
| Huperzia selago (L.) Bernh. ex Schrank & Mart. | III 5 2-5 1 |
| Lycopodium annotinum L. | III 5 1-4 1 |
| Monotropa hypopitys L. | IV 3 |
| Rhytidiadelphus loreus (Hedw.) Warnst. | IV 4 1-4 2 |
| Bazzania trilobata (L.) Gray | IV 1 1-3 |
| Blechnum spicant (L.) Roth | III 1 1 |
| Clematis alpina (L.) Mill. | II 2 2 |
| Gymnocarpium dryopteris (L.) Newm. | III 1 2 |
| Melampyrum sylvaticum L. | III 2 1 |
| Valeriana tripteris L. | III 2 |
| Adenostyles glabra (Mill.) DC. | III 2 3 |
| Dicranum polysetum Sw. | IV 5 2 |
| Dicranum scoparium (L.) Hedw. | IV 1-5 |
| Dryopteris carthusiana (Vill.) H.P. Fuchs | III 1-2 |
| Goodyera repens (L.) R. Br. | III 1-5 |
| Hylocomium splendidum (Hedw.) B. S. G. | IV 1-5 |
| Hymenophyllum cupressiforme Hedw. | IV 1-2 |
| Leucobryum glaucum (Hedw.) Aongstr. | IV 2 |
| Mnium orthorrhynchium Brid. (=Atrichum tenellum) | IV 2-3 |
| Mnium spinosum (Voit) Schwaegr. | IV 1-2 |
| Peltigera aphthosa (L.) Willd. (incl. P. leucophlebia) | IV 1-5 |
| Plagiochila asplenioideae (L.) Dum. var. major | IV 2 |
| Plagiothecium neglectum Mönk. (=Plagiothecium nemorale) | IV 1-3 |
| Polytrichum formosum Hedw. | IV 2-4 |
| Erythronium dens-canis L. | III 2 |

Legende - Legenda:

F1 = Aremonio-Fagion

Ht = Horvat
Tr = Tregubov
Pu = Puncer
Gl = Glavač
Bl = Blečić
FS = Fukarek & Stefanović
Pe = Pelcer

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

*1 Galeobdolon montanum, alternatively/laško 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/laško tudi Dryopteris expansa
