

Dedicated to Prof. dr. LJUDEVIT ILIJANIĆ on the occasion of his 70th birthday.

»Saum« (fringe) vegetation (*Trifolio-Geranietea*) in the Republic of Macedonia

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The paper deals with the saum (fringe) vegetation of the Republic of Macedonia. A new suballiance *Lathyro laxiflori-Trifolienion velenovskyi* suball. nova of the *Geranion sanguinei* Tx. in Müller 1962 (*Origanetalia* Müller 1962, *Trifolio-Geranietea* Müller 1962) is described as well as the following associations: the *Lathyro laxiflori-Trifolietum balcanici* ass. nova, the *Chaemaecytiso heuffelii-Trifolietum medii* ass. nova and the *Trifolietum velenovskyi-alpestris* ass. nova. Two communities were found and classified according to the deductive method within the *Vicia varia* community [*Geranion sanguinei*] and the *Vicia tenuifolia* community [*Geranion sanguinei*].

Keywords: Grassland, saum, fringe, vegetation, plant community, phytosociology, Macedonia

Introduction

In the transitional zone from forest to non-forest areas, there are two well-defined vegetation types in the form of two long, narrow belts. The first, which is closer to the forest, is dominated by shrubs and is termed »mantle«, while the one closer to the non-forest vegetation dominated by high stalk species and grasses is called »saum«. Saum or fringe vegetation can be further divided into *Galio-Urticetea* Passarge et Kopecký 1969, a class of the nitrophilous saum communities already known from the Republic of Macedonia (ČARNI et al. 2000), and *Trifolio-Geranietea*, a class of saum vegetation that appears on less nitrophilous sites. The latter was the topic of the present research. Rapid changes in ecological conditions account for the high biodiversity at the forest edge.

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Saum vegetation is well developed in Central Europe, where it was first recognized and described (MÜLLER 1962). Since then, many studies have been made at the regional level (e.g., MÜLLER 1978, MUCINA and KOLBEK 1993, ČARNI 1997) as have several general syntheses on a European scale (DIERSCHKE 1974, VAN GILS 1978, DE FOUCAULT et al. 1983). However, no data have been collected from SE Europe.

Communities of the *Trifolio-Geranietea* disappear gradually toward the Pannonian Basin and the Mediterranean area (JAKUCS 1970, WENDELBERGER 1986). The distribution of these communities is limited toward the east and south of Europe by seasonal droughts (VAN GILS and KEYSERS 1977). In the study, it was anticipated that *Trifolio-Geranietea* vegetation would appear in the transitional zone from the *Quercus petraea* forests to the submontane beech forests where the ecological conditions are similar to those of vegetation found in Central Europe. However, beech forests occur at an altitude of 1000 meters, which is much higher than in Central Europe.

Some authors disregard *Trifolio-Geranietea* and classify the communities within the forest syntaxa that they fringe, for example, *Geranion sanguinei* within *Quercetalia pubescentis* Klika 1933, *Trifolion medii* within *Carpinion betuli* Issler 1931 or *Fagion* Luquet 1926, and *Melampyro-Holcetalia* within *Quercetalia roboris* R. Tx. 1931 (GÉHU et al. 1988). On the other hand, other researchers suggest classification within the grasslands, for example, *Geranion sanguinei* within *Festuco-Brometea* Br.-Bl. et R. Tx. ex Klika et Hadač 1944, *Trifolion medii* within *Molinio-Arrhenatheretea* R. Tx. 1937 em. R. Tx. 1970, and *Melampyro-Holcetalia* within *Calluno-Ulicetea* Br.-Bl. et R. Tx. ex Klika et Hadač 1944 (VAN GILS 1978).

BRAUN-BLANQUET established the association on a floristic-sociological basis, but since the floristic-sociological characters of an association are supposed to reflect all other characters, a uniform floristic-sociological association might be expected to be structurally uniform as well (WESTHOFF et al. 1973). For instance, TÜXEN (1952) first described the order of shrub and mantle communities *Prunetalia spinosae* within the class of woodland communities of *Quercus-Fagetalia*, but later he classified it within the separate class *Rhamno-Prunetea* (TÜXEN 1962).

PIGNATTI et al. (1995) classified *Trifolio-Geranietea* within the ecocline classes that appear in gradient environments, and consequently they widely overlap with other classes. *Trifolio-Geranietea* is connected with *Quercus-Fagetalia* on the one hand and with *Molinio-Arrhenatheretea* or *Festuco-Brometea* on the other. Ecocline classes are rich in species and associations and have unclear boundaries. They are often difficult to recognize. It was decided to follow the widely-accepted taxonomical scheme considering *Trifolio-Geranietea* as an independent class.

A similar situation occurs within the riverine forests of *Salicetum albae* Issler 1926. In these communities, only the species *Salix alba* can be taken as a characteristic species of the association, alliance, order, or even of the class. The majority of species in these communities are herbs such as *Angelica sylvestris*, *Galium aparine*, *Phalaris arundinacea*, *Rubus caesius*, and *Urtica dioica*. However, we

classify these communities within the class of riverine forest of *Salicetea purpureae* Moor 1958, since these communities are forests and not within the class of nitrophilous high stalk communities of *Galio-Urticetea* Passarge ex Kopecký 1969, although the majority of species can be classified within the latter class.

Trifolio-Geranietea is divided into two orders: *Origanetalia* (calciphilous and nitrophilous communities) and *Melampyro-Holcetalia* Passarge 1979 (acidophilous communities). *Origanetalia* is divided into two alliances: *Trifolion medii* T. Müller 1962 (mesophilous communities) and *Geranion sanguinei* (thermophilous communities). On the territory under study, only the latter was found.

There is much data on the vegetation of the Republic of Macedonia, for example, EM (1961, 1964), MATVEJEVA (1982), MICEVSKI (1957, 1965, 1967, 1970, 1971, 1978, 1994), MICEVSKI and MATEVSKI (1984), RIZOVSKI (1970), RIZOVSKI and DŽEKOV (1990) to mention only some studies, but forest edge vegetation has hitherto been neglected. The purpose of our work was to sample this type of vegetation. Attempts were made to determine its floristic composition, its syn-taxonomic position, and its distribution in the region and on a larger scale.

Investigated area

The Republic of Macedonia is situated in the center of the Balkan peninsula, bordering FR Yugoslavia in the north, Bulgaria in the east, Greece in the south, and Albania in the west. (Fig. 1)

In Macedonia, submediterranean, Mediterranean, and mountainous climates can be found. The research was carried out mainly in the mountainous zone, since the conditions there are more propitious for the development of this type of vegetation. In the summer there is a lack of precipitation in the lowlands, and the so-called »hydric stress« that is unfavorable to vegetation occurs quite often. It is a limiting factor for the development of saum vegetation (VAN GILS and KEYSERS 1977). If we compare the climates of Skopje, Berovo, and Mavrovo (Fig. 2), it can be seen that conditions regarding temperature and precipitation are the most severe in Skopje. Skopje has an altitude of 240 m and 502 mm of precipitation. In summer, a well-pronounced hydric stress is indicated. The situation is better in Berovo with 632 mm of precipitation at an altitude of 824 m, where hydric stress does not occur. The same also applies to Mavrovo, situated at an altitude of 1240 m with a precipitation of 1100 mm. The last two diagrams present climatic conditions that facilitate the development of saum communities. At the same time, it should be mentioned that relevés were sampled in areas close to lakes (Berovo, Mavrovo, Ohrid, Prespansko) where the local climate is more humid.

The potential natural vegetation in the lowlands is *Quercococciferae-Carpinetum orientalis macedonicum* Rud. 1939 apud Ht 1946, *Juglando-Platanetum orientalis* Em et Džekov 1961, *Quercetum pedunculiflorae macedonicum* Em 1965, *Quercocarpinetum orientalis* H-ić 1939, and *Quercetum frainetto-cerris macedonicum* Oberdorfer 1948 em. Ht 1959, but here *Trifolio-Geranietea* saum does not appear. The species that are elements of *Trifolio-Geranietea* are spread in the forest and do not form saum in a physiognomic sense.

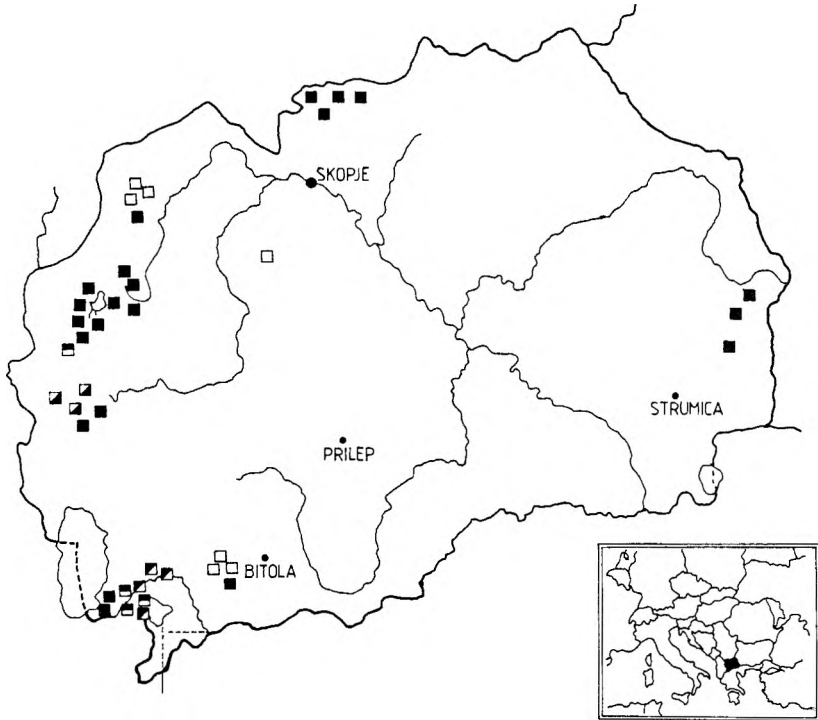


Fig. 1. Localities of the relevés in the Republic of Macedonia. ■ *Trifolietum vele-nouski-alpestris*, □ *Lathyro-Trifolietum balcanici*, ▣ *Chamaecytiso heuffelli-Trifolietum medii*, ▵ *Vicia tenuifolia-comm.* and ▾ *Vicia varia-comm.*

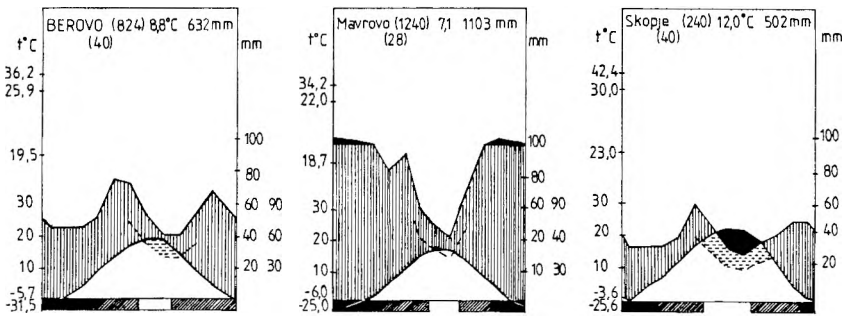


Fig. 2. The climatic diagrams for Berovo, Mavrovo and Skopje (after FILIPOVSKI et al. 1996).

The research was carried out in the upper zone of *Quercetum frainetto-cerris*, in the zones of *Orno-Quercetum petraeae* and *Festuco heterophyllae-Fagetum*, and on sites of *Luzulo-Fagetum*.

Ass. *Quercetum frainetto-cerris macedonicum* Oberd. em. Ht 1959 (Tab. 1/1–3) of *Quercion frainetto* Ht 1954 is spread over silicate bedrock at altitudes of 600 to 900 meters. The associations of this alliance are climazonal in the subcontinental area from the Carpathian Mountains to Metohija and from the Black Sea to the Drina River. In the communities, the dominant species is *Quercus frainetto* (syn. *Quercus conferta*) and occasionally also *Quercus cerris*. It is characteristic of these forests that only a few endemic species appear since the cold winters do not allow submediterranean species to develop and the summer droughts are unsuitable for mesophilous plant species. (RIZOVSKI and DŽEKOV 1990).

Ass. *Orno-Quercetum petraeae* Em 1968 of the *Quercion petraeae-cerris* (Lakušić) Lakušić et Jovanović 1980 (Tab. 1/4–9) is a thermophilous association spread on silicate bedrock throughout the Republic of Macedonia at altitudes from 900 to 1100 meters. In the associations of the alliance, the dominant species is *Quercus petraea*, distributed across Bosnia, Montenegro, Serbia, and Macedonia. These forests are found above those previously mentioned.

Both alliances are of *Quercetalia pubescentis*, the order of thermophilous and xerophilous forests of southeastern Europe.

Ass. *Festuco heterophyllae-Fagetum* Em 1965 (Tab. 1/11) is a submontane beech forest of *Fagion moesicae* Blečić et Lakušić 1970 found mainly at altitudes from 1000 to 1200 meters on carbonate as well as silicate bedrock. The area of distribution of this alliance is the same as that of *Fagus sylvatica* subsp. *moesica*, whose taxonomical status is not clear. The forests appear above the zone of those previously described and are more mesophilous.

Ass. *Luzulo-Fagetum* Em 1965 (Tab. 1/10) is an acidophilous beech forest of the *Fagion moesicae*. It is found only on silicate bedrock over shallow and relatively deep soil layers. Acidophilous beech forests are distributed over a large area of southeastern Europe (RIZOVSKI and DŽEKOV 1990)

On the other side of the saum are grasslands of *Astragalo-Potentilletalia* Micevski 1970 association (an endemic order of the *Festuco-Brometea*), which are spread over large areas within the Republic of Macedonia, in the southern part of Serbia, Kosovo, and in the northern part of Greece over limestone, silicate, and even serpentine bedrock.

The dry grasslands of *Astragalo-Potentilletalia* can be divided into six alliances – *Armerio-Potentillion* Micevski 1978 (Tab. 1/17–20), *Scabioso-Trifolion dalmatici* Horvatić et Ranđelović 1973 (Tab. 1/21–25), *Saturejo-Thymion* Micevski 1970 (Tab. 1/26–28), *Trifolion cherleri* Micevski 1970 (Tab. 1/29–38), *Koelerio-Festucion dalmaticae* Ranđelović et Ružić 1982 (Tab. 1/39), and *Alyssion muralis* Konstantinou 1992 (Tab. 1/40–47) - and into unclassified communities (Tab. 1/48–51). The associations treated in Table 1 are listed in the legend.

The *Armerio-Potentillion* alliance is found on silicate bedrock at altitudes from 1000 to 1500 meters. Due to its vertical distribution, it is in contact with *Trifolion cherleri*.

The *Scabioso-Trifolion dalmatici* alliance is found on silicate bedrock at altitudes from 250 to 700 meters in southeastern Serbia.

The *Saturejo-Thymion* alliance is found on the territory of the Republic of Macedonia and in Kosovo on marl bedrock at altitudes from 100 to 700 meters.

The *Trifolion cherleri* alliance appears on silicate bedrock at altitudes from 50 to 900 meters in the Republic of Macedonia and in northern Greece.

The *Koelerio-Festucion dalmaticae* alliance thrives at altitudes from 600 to 1000 meters on dolomite and serpentine bedrock in Serbia.

Alyssion muralis is an alliance of communities appearing mostly on serpentine bedrock in northern Greece at altitudes from 200 to 1000 meters.

The grasslands of *Calluno-Ulicetea* with a pattern of Atlantic and Sub-Atlantic distribution thriving in Central Europe on silicate bedrock cannot be found (MIČEVSKI 1994). The serpentine vegetation of *Halacsyetalia sendtneri* Ritter-Studenička 1970 appearing in Serbia and Albania does not come into the region.

Material and methods

The methodology of phytosociology was introduced at the beginning of the 20th century as the result of the work of some phytogeographers at the end of the 19th century. Its origin is closely connected with the work of BRAUN-BLANQUET (1964), who elaborated and extended the methodology for the description and systematics of plant communities (stands). Phytosociology is the science studying the vegetation on the basis of associations, abstract units that are defined on the basis of floristic-statistic elements. The basis for the investigation of vegetation is an association that is limited in space and time. When analyzing an association, homogenous relevés of the vegetation must be selected. These relevés are then presented in a table and the syntaxa are thus defined based on characteristic and differential species. The basic syntaxa are associations that are united into alliances, orders, and classes. The associations can be divided into subassociations, races, and facies. An individual syntaxon is defined floristically on the basis of the appearance of characteristic and differential species. The different floristic structure is dependent on various ecological, chorological, and structural factors.

The classical BRAUN-BLANQUET method anticipated inductive classification, where a plant community should be first classified within an association. The associations are then united at a higher level, that of the alliance. Alliances are united into orders and these into classes.

In some cases, however, this kind of classification is not possible, and this is particularly true in cases of anthropogenic vegetation. In the 1970's, Kopecký developed a system for the classification of communities in which the character and differential species of lower syntaxa do not appear (KOPECKÝ and HEJNÝ 1974; KOPECKÝ 1978, 1992). The entire system is based on the BRAUN-BLANQUET methodology, but the classification is deductive. After the floristic analysis of a table, the classification on the class level is defined according to the predominance of species characteristic of classes. In the same way, a community is classified within an order. However, there rarely appear species characteristic of an alliance. When we apply this kind of classification, the syntaxon within which a

community is classified is indicated in brackets. In our case, this methodology of classification was applied to the *Vicia varia* community [*Geranion sanguinei*] and the *Vicia tenuifolia* community [*Geranion sanguinei*].

Since there are tendencies in the literature to break up the *Trifolio-Geranietea* into several classes, there has been an attempt to justify a syntaxonomic position for it independent of *Quercus-Fagetea* forests and the dry grasslands of *Festuco-Brometea* (the *Astragalo-Potentilletalia*). Floristic similarities and differences were indicated, and the syntaxonomic position of the class was confirmed. Some of the tables that are in contact with saum vegetation in the southern Balkans were taken into consideration. Their floristic composition is presented in Table 1.

The relevés were sampled in June and July in 1996 and 1998. They were elaborated according to the standard procedure of the Braun-Blanquet method (BRAUN-BLANQUET 1964) and presented in four analytical tables. The nomenclature of the plant species follows TUTIN et al. (1964–1980), except for following species: *Achillea compacta* Willd. f. *humilis* Dörf., *Acinos arvensis* (Lam.) Dandy ssp. *villosus* (Gaud.) Soják, *Acinos hungaricus* (Simoncai) Šilić, *Aira capillaris* Host f. *ambigua* (De Not.) Asch., *Arenaria leptoclados* (Reichenb.) Guss. var. *viscidula* Williams, *Arenaria serpyllifolia* L. var. *viscida* DC., *Armeria rumelica* Boiss. f. *rhodopaea* (Vel.) Beck., *Astragalus onobrychis* L. var. *chlorocarpus* (Gris.) Stojan. et Stef., *Astragalus spruneri* Boiss. var. *thessalus* Boiss., *Biasolettia balcana* Vel., *Bromus squarosus* L. var. *villosus* (Gmel.) Koch, *Cardamine bulbifera* (L.) Crantz f. *pilosa* Waisb., *Cerastium caespitosum* Hiitonen, *Cerastium glutinosum* Fr., *Daphne oleoides* Schreb. var. *puberula* Jaub. et Sp., *Dorycnium herbaceum* Vill. var. *macedonicum* (Degen et Dörfler) Kuzmanov, *Erysimum kuemmerlei* Jáv., *Euphorbia falcata* L. var. *ecornuta* Boiss., *Euphorbia sequieriana* Necker ssp. *niciciana* (Borbás ex Novák) Rech., *Galium oreophilum* Krendl, *Lotus corniculatus* L. var. *cilliatum* Koch, *Lotus corniculatus* L. var. *tenuis* W.K., *Medicago minima* (L.) Desr. in Lam. var. *longiseta* Ser. in DC., *Medicago prostrata* Jacq. var. *vukovici* Micevski, *Minuartia hirsuta* (Bieb.) Handl. – Mazz. ssp. *falcata* (Griseb.) Mattf. var. *denudata* (Fenzl) Graebn., *Onobrychis alba* (W.K.) Desv. var. *calcarea* (Vand.) Hay., *Pimpinella saxifraga* L. var. *dissecta* (Retz.) Spreng., *Poa bulbosa* L. f. *vivipara* Koel., *Podospermum canum* C. A. Mey., *Potentilla argentea* L. var. *tenuiloba* (Jord.) Schwarz, *Potentilla detommasii* Ten. var. *holosericea* (Gris.) Hausskn., *Potentilla hirta* L. var. *laeta* (Rchb.) Focke in Hal., Wohlf. et Koch, *Potentilla lacinosa* Waldst. et Kitt. ex Nestler var. *subsericea* (Griseb.) Wolf., *Potentilla pedata* Nestler var. *pinna-tifida* (Griseb.) Micevski, *Primula veris* L. ssp. *columnae* (Ten.) Lüdi et Heggi, *Ranunculus oreophilus* Bieb. ssp. *balcanicus* Micevski, *Sanguisorba minor* Scop. var. *gaillardotii* (Boiss.) Hayek, *Sideritis montana* L. var. *comosa* Boiss., *Crepis foetida* L. ssp. *rhoieadifolia* (M.B.) Fiori et Paol., *Thymus moesiacus* Vel. var. *microcalyx* (Deg. et Urum.) Ronn., *Trifolium incarnatum* L. var. *molineri* (Balb.) DC.

The vegetation of the region requires nomenclatural revision; however, this was not the subject of the present research.

Results and discussion

Syntaxonomic position

The synthetic table (Tab. 1) indicates that the sampled vegetation should be classified as an independent class of the saum vegetation *Trifolio-Geranietea*:

Class	<i>Trifolio-Geranietea</i> Müller 1962
Order	<i>Origenetalia</i> Müller 1962
Alliance	<i>Geranion saguinei</i> R. Tx. in Müller 1962
Suballiance	<i>Lathyro laxiflori-Trifolienion velenovskyi</i> Čarni et al. 2000
Association	<i>Trifolietum velenovskyi-alpestris</i> Čarni et al. 2000
Association	<i>Lathyro laxiflori-Trifolietum balcanici</i> Čarni et al. 2000
Association	<i>Chamaecytiso heuffelii-Trifolietum medii</i> Čarni et al. 2000
Community	<i>Vicia varia</i> comm.
Community	<i>Vicia tenuifolia</i> comm.

In comparison with forests and dry grasslands, only a few characteristic species appear. According to its physiognomy, it should also be treated as an independent class. There are numerous differential species; while there are dry grassland species toward the forests and forest species toward the grasslands, it also has some characteristic species that give it uniqueness.

It is evident that *Trifolio-Geranietea* communities thrive in the transition zones from forests to dry grasslands that can be also treated as *limes divergens* or ecoclines (Tab. 1). The main characteristic of such boundaries is numerous small-scale boundaries in phytocoenoses merging continuously into each other, with many species generally represented by a few individuals in a fine-grain pattern. (WESTHOFF and VAN DER MAAREL 1973)

Many forest species of *Quercus-Fageteta* s. lat. appear, differentiating the saum toward the dry grasslands, such as *Abies borisii-regis*, *Aremonia agrimonoides*, *Brachypodium sylvaticum*, *Euphorbia amygdaloides*, *Festuca heterophylla*, *Knautia drymeia*, *Luzula forsteri*, *Myosotis sylvatica*, *Poa nemoralis*, *Primula veris*, and *Viola reichenbachiana*, to mention only the most common.

Characteristic species of suballiance, alliance, order, and class (*Lathyro-Trifolienion*, *Geranion sanguinei*, *Origenetalia* and *Trifolio-Geranietea*) appear, such as *Agrimonia eupatoria*, *Clinopodium vulgare*, *Hypericum barbatum*, *Hypericum perforatum*, *Teucrium chamaedrys*, *Trifolium velenovskyi*, and *Trifolium medium* subsp. *balcanicum*, to mention the most abundant.

The syndynamic contact with the dry grassland can be recognized in Table 1. The floristic similarity is highest with the dry grassland of the *Armerio-Potentillion* alliance growing at a higher altitude on silicate bedrock. The common species are *Agrostis canina*, *Festuca valesiaca*, *Helianthemum nummularium* subsp. *nummularium*, *Hieracium bauchinii*, *Hypochoeris radicata*, *Koeleria macrantha*, *Potentilla argentea*, and *Potentilla inclinata*, to mention only a few.

The floristic similarities are minor with *Scabioso-Trifolion* and *Saturejo-Thymion*. Some common species can also be found in *Trifolion cherleri*, such as *Aira capillaris*, *Trifolium angustifolium*, *Trifolium physodes*, *Petrorhagia velutina*, *Ventenata dubia*, *Vulpia myuros*, etc.

Tab. 1. — continued

	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51						
<i>Mollis pinnata</i> B		II		II	III																																																				
<i>Mollis pinnata</i> C				II	III																																																				
<i>Galium hircicum</i>																																																									
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<i>Chamaecytisus hirsutus</i> C																																																									
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F1. FAMILIA MOESICAE																																																									
<i>Fagus moesica</i> A																																																									
<i>Fagus moesica</i> B																																																									
<i>Fagus moesica</i> C																																																									
<i>Rubus hirtus</i>																																																									
<i>Luzula lucida</i>																																																									
<i>Luzula sylvatica</i>																																																									
<i>Laminium galeobdolon</i>																																																									
<i>Poa choisii</i>																																																									
<i>Rubus scaber</i>																																																									
<i>Rubus uliginum</i>																																																									
F2. FAMILIA SYLVATICAE																																																									
<i>Lapsana communis</i>																																																									
<i>Synphyllum tuberosum</i>																																																									
<i>Lilium martagon</i>																																																									
<i>Gilium odorum</i>																																																									
<i>Mycelis muralis</i>																																																									
<i>Ajuga reptans</i>																																																									
<i>Epipactis helleborine</i>																																																									
<i>Acer pseudoplatanus</i>																																																									
<i>Milium effusum</i>																																																									
<i>Prenanthes purpurea</i>																																																									
<i>Lonicera oligonea</i>																																																									
<i>Dryopteris filix-mas</i>																																																									
<i>Geum: pin: p:boerum</i>																																																									

Tab. 1. – continued

	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51						
<i>Aizoon</i> s.sp. <i>macedonicus</i>																																																									
<i>Thlaspi ovalbum</i>																	II																																								
<i>Helianthemum canum</i>																																																									
<i>Astragalus bransfieldii</i>																																																									
<i>Convolvulus</i> s.sp. <i>compactus</i>																																																									
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<i>Trifolium arvense</i>																																																									
<i>Rumex acetosella</i>																																																									
<i>Leucium</i> s.sp. <i>capitatum</i> *																																																									
<i>Galium divaricatum</i>																																																									
<i>Psilozis incurvus</i>																																																									
<i>Bromus spargosus</i>																																																									
<i>Carex corymbifera</i>																																																									
<i>Erysimum diffusum</i>																																																									
<i>Koeleria splendens</i>																																																									
<i>Agilopsis neglecta</i>																																																									
<i>Astragalus</i> s.var. <i>chlorocarpus</i> *																																																									
<i>Silene conica</i>																																																									
<i>Hypochaeris ruficollum</i>																																																									
<i>Potentilla</i> s.var. <i>tenelloba</i> *																																																									
<i>Cerastium parviflorum</i>																																																									
<i>Trifolium sinuatum</i>																																																									
<i>Potentilla ibanosa</i>																																																									
<i>Thymus</i> s.var. <i>degenii</i> *																																																									
<i>Centaurea</i> s.sp. <i>behersteinii</i>																																																									
<i>Koeleria macrantha</i>																																																									
<i>Xerantherum annuum</i>																																																									
<i>Pentstemon saxifraga</i>																																																									
<i>Scleranthus perennis</i>																																																									
<i>Medicago rigidula</i>																																																									
<i>Anthemis ruthenica</i>																																																									
<i>Thymus sibiricus</i>																																																									
<i>Sedum sarbanianum</i>																																																									
<i>Minuartia</i> s.sp. <i>falcata</i> var. <i>denudata</i> *																																																									

Legend to the Tab. 1. -- continued

Column	Association	Source	Table	Number of relevés	Region
20	<i>Genista-Agrostideolum byzantiniae</i> Micevski 1978	MIČEVSKI, 1978	Tab. 3	14	Maletš, Pjanec, MK
21	<i>Hypochaeris-Fragariae trichopteri</i> Rand. et Stum. (1983) 1986	RANĐELOVIĆ et al., 1991	Tab. 1	5	Rijan mountain, YU
22	<i>Koeleria-Sileneum fivalidskyanae</i> Rand. et Stum. (1983) 1986	RANĐELOVIĆ et al., 1991	Tab. 2	6	Rijan mountain, YU
23	<i>Scabo-Potentillatum areanae</i> Ružić 1976	RUŽIĆ, 1978	Tab. 1	9	Prokuplje, YU
24	<i>Trifolium-festucetum vallesiae</i> Randjebović et al. 1979	RANĐELOVIĆ et al., 1979	Tab. 7	10	NE Kosovo YU
25	<i>Astragalus-Calmineetum alpinae</i> H.č. et Randj. 1973	RANĐELOVIĆ et al., 1979	Tab. 6	9	NE Kosovo YU
26	<i>Brachypodium-Onobrychietum pinicalcae</i> Micevski 1971	MIČEVSKI, 1971	Tab. 3	44	Central Macedonia, MK
27	<i>Echinops-Covokuletum althaeoides</i> Radžepi 1979	REĐEPI, 1979	Tab. 1	6	Prizen, Kosovo YU
28	<i>Astragalus-Monardetum</i> Micevski 1971	MIČEVSKI, 1971	Tab. 4	27	Central Macedonia, MK
29	<i>Helianthemum-Euphorbietum tessalae</i> Micevski 1973	MIČEVSKI, 1978	Tab. 2	44	Maletš, Pjanec, MK
30	<i>Helianthemum-Euphorbietum tessalae</i> Micevski 1973	MIČEVSKI, 1973	Tab. 1	29	Kočani, Pilip, Veles, MK
31	<i>Erysimum-Triolethum</i> Micevski 1971	MIČEVSKI, 1977	Tab. 2	28	Radoviš, Štip, Kratovo, MK
32	<i>Erysimum-Triolethum</i> Micevski 1977	MIČEVSKI, 1977	Tab. 1	25	Sk.C.Gora, Petracev, Kati, Ramično, MK
33	<i>Erysimum-Triolethum</i> Micevski 1977	MIČEVSKI, 1977	Tab. 3	32	Veles, MK
34	<i>Tanacetum-Triolethum</i> Micevski 1972	MIČEVSKI, 1972	Tab. 7	40	Macedonia
35	<i>Tanacetum-Triolethum myrianthi</i> Micevski 1972	KONSTANTINOU, 1992	Tab. 4	23	N Greece
36	<i>Lino-Dianthetum corymbosi</i> Konstantinou 1992	KONSTANTINOU, 1992	Tab. 7	10	N Greece
37	<i>Achillea-Centaureetum cylindrocephalae</i> Konstantinou 1992	KONSTANTINOU, 1992	Tab. 6	12	N Greece
38	<i>Dianthus-Cistetum incani</i> Micevski et Micevski 1984	KONSTANTINOU, 1992	Tab. 5	15	N Greece
39	<i>Festuca-Plantaginietum serpenitii</i> Rand. et Ružić 1982	RANĐELOVIĆ et al., 1983	Tab. 1	11	SE Serbia
40	<i>Trifolium tenuifolium-legilios</i> Iovetić comm.	KONSTANTINOU, 1992	Tab. 11	10	N Greece
41	<i>Asteroline-Thymetum plosciti</i> Konstantinou 1992	KONSTANTINOU, 1992	Tab. 9	10	N Greece
42	<i>Alyssum heliacthi</i> Konstantinou 1992	KONSTANTINOU, 1992	Tab. 10	10	N Greece
43	<i>Minuartia-Alyssetum muralis</i> Konstantinou 1992	KONSTANTINOU, 1992	Tab. 8	30	N Greece
44	<i>Alyssum repens</i> Centaurea bovinia comm.	KONSTANTINOU, 1992	Tab. 13	7	N Greece
45	<i>Alyssum montanum-Thlaspi octocolearum</i> comm.	KONSTANTINOU, 1992	Tab. 14	10	N Greece
46	<i>Plantago afro-Thlaspi ovalatum</i> comm.	KONSTANTINOU, 1992	Tab. 15	10	N Greece
47	<i>Satureja pilosa-Potentilla estonica</i> comm.	KONSTANTINOU, 1992	Tab. 12	10	N Greece
48	<i>Minuartia bulgarica-Dianthus pinifolius</i> ssp. <i>ilicinus</i> comm.	KONSTANTINOU, 1992	Tab. 19	7	N Greece
49	<i>Micropus tenellum-Silene compacta</i> comm.	KONSTANTINOU, 1992	Tab. 17	10	N Greece
50	<i>Genista lydia-Dianthus pinifolius</i> ssp. <i>pinifolius</i> comm.	KONSTANTINOU, 1992	Tab. 18	7	N Greece
51	<i>Josone heliacthi-Apera spica-venti</i> comm.	KONSTANTINOU, 1992	Tab. 16	10	N Greece

The floristic similarity with alliances appearing on serpentine, the *Koelerio-Festucion* and the *Alyssion muralis*, is very low.

Astragalo-Potentilletalia and *Festuco-Brometea* species are also more abundant in grasslands than in saum.

Galio-Urticetea species (*Cruciata laevipes*, *Epilobium montanum*, *Galium aparine*, and *Geum urbanum*) and *Molinio-Arrhenatheretea* species (*Dactylis glomerata*, *Lotus corniculatus*, *Prunella vulgaris*, *Bellis perennis*, *Cynosurus cristatus*, *Poa sylvicola*, etc.) are good positive differential species of *Trifolio-Geranietea* as against *Festuco-Brometea*. These species indicate the higher moisture of sites.

Species of the classes *Elyno-Seslerietea* Br.-Bl. 1948 and *Caricetea curvulae* Br.-Bl. 1948 (*Campanula spatulata* subsp. *spatulata*, *Galium oreophilum*, *Pimpinella tragium*, *Ranunculus oreophilus* subsp. *balcanicus*, etc.) thrive at higher altitudes and appear only in communities of the classes *Trifolio-Geranietea* and *Festuco-Brometea* (alliance *Armerio-Potentillion*).

***Lathyro laxiflori-Trifolienion velenovskyi* suball. nova hoc loco** (Nom. type *Trifolietum velenovskyi-alpestris* Čarni et al. 2000)

The associations were classified within *Geranion sanguinei*. An attempt was made to classify the associations at a suballiance level. In southeastern Europe there are two suballiances of *Geranion sanguinei*: *Geranienion sanguinei* R. Tx. in Müller 1962 in the area of dry grasslands of the *Brometalia erecti* Br.-Bl. 1936 and *Dictamno-Ferulagenion* van Gils et al. 1975 in the area of distribution of *Scorzonero-Chrysopogonetalia* Horvat et Horvatić 1958 (VAN GILS et al. 1975; ČARNI 1997). The *Dictamno-Ferulagenion* is characterized by only a few characteristic species such as *Knautia illyrica*, *Ferulago galbanifera*, and *Paeonia officinalis* but is well differentiated by many species originating from *Quercetalia pubescentis* and *Festuco-Brometea* (mainly of *Scorzonero-Chrysopogonetalia*).

It was decided to describe the new suballiance *Lathyro laxiflori-Trifolienion velenovskyi*, with the following characteristic species: *Chamaecytisus heuffelii*, *Digitalis viridiflora*, *Dorycnium herbaceum* var. *macedonicum*, *Trifolium medium* subsp. *balcanicum*, and *Trifolium velenovskyi*.

The differential species toward *Geranienion sanguinei* and *Dictamno-Ferulagenion* are those of *Astragalo-Potentilletalia* s. lat (comp. Tab. 1) and certain forest species of *Fagion moesicae*, *Quercion petraeae-cerris*, and *Quercion frainetto* such as *Abies borisii-regis*, *Aremonia agrimonioides*, *Digitalis lanata*, *Knautia drymeia*, *Quercus frainetto*, etc.

The vegetation of *Lathyro-Trifolienion* appears on forest edges in more humid and cooler areas at altitudes from 900 to 1300 meters. It is more frequent on silicate bedrock, since this substratum contains more moisture than carbonate bedrock. The vegetation was sampled all over the Republic of Macedonia, but it can be presumed that this vegetation can appear in the whole distribution area of *Astragalo-Potentilletalia*.

***Trifolietum velenovskyi-alpestris* ass. nova hoc loco** (Tab. 2/20–41, Tab. 1/12, nom. type Tab. 2/13)

Tab. 2. Analytical table of *Trifolium velenovskyi* – *alpestris* association.

Relevé number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Date of relevé	23	23	27	27	28	30	4	4	4	6	6	4	4	4	30	30	30	30	30	30	30	30	
Month of relevé	6	6	6	6	6	6	7	7	7	7	7	7	7	7	6	6	6	6	6	6	6	6	
Year of relevé	98	98	98	98	98	98	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	
Altitude in 10 m	116	117	147	144	144	130	143	133	130	106	118	140	142	103	138	132	137	135	135	142	136	136	
Aspect	S	NW	S	SW	S	E	NW	W	W	WNW	W	NNW	WNW	NW	W	N	NW	W	W	NE	SW	NE	
Slope in degrees (°)	2	10	10	10	20	5	10	5	5	10	5	10	5	10	3	10	10	10	10	35	15	8	
Relevé area – m ²	10	10	20	8	15	10	10	8	8	10	10	15	15	10	8	10	15	10	15	8	5	10	
Number of species	42	46	47	39	54	41	52	44	55	49	44	53	48	39	95	38	47	58	52	52	40	46	
Character species:																							
<i>Trifolium alpestre</i>	5	4	4	4	4	4	2	2	4	2	3	3	4	2	3	4	3	3	2	3	3	3	22
LATHYRO-TRIFOLIENON																							
<i>Trifolium velenovskyi</i>	.	.	.	.	.	+	3	.	.	+	+	2	2	+	+	2	.	1	+	3	2	.	13
<i>Digitalis virdiflora</i>	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	+	.	+	+	.	6
<i>Dorycnium herbaceum</i> var. <i>macedonicum</i>	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	+	.	5
<i>Trifolium medium</i> ssp. <i>medium</i>	.	.	.	.	.	.	2	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	2
<i>Trifolium medium</i> ssp. <i>balkanicum</i>	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
T6 GERANION-SAMGUNEI, ORIGANETALIA, TRIFOLIUM-GERANIETEA																							
<i>Hypericum perforatum</i>	+	+	+	+	+	+	.	+	+	1	+	+	+	.	.	.	.	+	.	+	1	.	14
<i>Cinopodium vulgare</i>	+	+	+	+	2	.	+	.	1	1	.	.	.	.	+	+	1	.	+	.	.	.	13
<i>Teucrium chamaedrys</i>	+	+	+	+	.	.	.	1	+	+	.	.	.	.	+	+	.	.	+	.	.	.	10
<i>Poa pratensis</i> ssp. <i>angustifolia</i>	1	2	+	1	.	.	.	.	.	+	.	.	+	.	+	.	.	.	.	.	.	.	8
<i>Fragaria viads</i>	+	+	+	+	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	6
<i>Agrimonia eupatoria</i>	.	.	.	.	.	1	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	6
<i>Arabis sagittata</i>	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	6
<i>Hypericum barbatum</i>	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	6
<i>Origanum vulgare</i>	2	+	+	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	5
<i>Silene nutans</i>	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	5
<i>Geranium sanguineum</i>	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	2
<i>Gailletium album</i>	.	.	.	.	.	.	+	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	2

Tab. 2. – continued

Reljevi number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	2	1		
<i>Lychnis viscaria</i>												+	+													
SM STELLARIEA MEDICAE																										
<i>Vicia villosa</i>							+						2			2	+				+					
<i>Vicia tetrasperma</i>	+								+		+											+				
<i>Gemma nolle</i>		+						1				+														
<i>Onyia daucifolia</i>			+																							
<i>Cerastium glomeratum</i>										+																
A ARTEMISIETEA, GALIC-URUCIETEA																										
<i>Cnicus laevipes</i>		+					+		+					+			+	+	+							
<i>Gemma urbarium</i>			+	+																						
<i>Anthriscus lincaria</i>				+									+													
<i>Tanacetum vulgare</i>	1	2	+	+																						
<i>Artemisia alba</i>			+	+																						
<i>Silene alba</i>			+																							
MA MOLINIO-ARPHENATHERETEA																										
<i>Dactylis glomerata</i>	+	1	1	+	1		+	1	+		+	1			1	+		+	+	1						
<i>Fisetum flavescens</i>	+	2			2	+		+		2		+		2	1	1	+	1	1	1	+	+				
<i>Festuca rubra</i> ssp. <i>rubra</i>					1			+																		
<i>Plantago lanceolata</i>		+																								
<i>Arrhenatherum odoratum</i>		2																								
<i>Trifolium repens</i>								+			+															
<i>Leucanthemum vulgare</i>		+						1	1	+	+	+					1		1	+						
<i>Rumex acetosella</i>																										
<i>Lathyrus pratensis</i>		+						3		+		1		1												
<i>Hieracium pilosella</i>		+																								
<i>Cynosurus cristatus</i>		+						+		+																
<i>Bellis perennis</i>																										
<i>Trifolium pratense</i>								1				+														
<i>Campanula patula</i>																										
<i>Poa sylvatica</i>																										
<i>Rhinanthus minor</i>																										
<i>Stellaria graminea</i>																										
<i>Lotus corniculatus</i> var. <i>corniculatus</i>																										
<i>Achillea millefolium</i>		+																								
<i>Ranunculus millefoliatus</i>		+																								
<i>Tragopogon pratensis</i>		+		+																						

Tab. 2. — continued

Reliev. number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
<i>Prunella vulgaris</i>					+	+														+		
<i>Festuca pratensis</i> ssp. <i>pratensis</i>								1		+												
<i>Thalictrum lucidum</i>										+												
<i>Knautia arvensis</i>										+												
<i>Roripa pyrenaica</i>										+												
FESTUCA-BROMETEA																						
<i>Helianthemum nummularium</i> ssp. <i>nummularium</i>	1	2	+	2	2	1	1		+	1	1	1	+	2	1	+			1	+	1	
<i>Galium verum</i>				+	+	+	+	1	+	+								2		3	2	
<i>Brachypodium pinnatum</i>				2	+				1	+			+	3	3	+	3	2	4	3	2	3
<i>Festuca valesiaca</i>	1	+	+		1	+	+		+	+				3			1	2				+
<i>Euphorbia cyparissias</i>													1	+					+			
<i>Scabiosa columbata</i>	+	+							+	+	+	+	+	+				1	1	+	+	1
<i>Thymus rosei</i> var. <i>doganii</i>								2	+	+	+	+	+	1	+			1		+	+	1
<i>Achillea setacea</i>									+	+	+	+	+	+				+	+	+	+	1
<i>Eryngium campestre</i>									+	+	+	+	+	+				+	+	+	+	1
<i>Koeleria macrantha</i>									+	+	+	+	2	+	+			+	+	+	+	1
<i>Hieracium proscialthum</i> ssp. <i>baulinii</i>	+	+											+	+	+			+	+	+	+	1
<i>Briza media</i>		1											+	+	2	1		+	2	2		+
<i>Carex caryophyllaea</i>										+				+								
<i>Linum catharticum</i>	+								+	+	1	1	+	+				+	+	+		
<i>Stachys germanica</i>	+								+	+			+	+				+	+	+		
<i>Sonchus oleraceus</i>	+		1	+	1																	
<i>Leonodon crispus</i> ssp. <i>crispus</i>								1														
<i>Pimpinella saxifraga</i>																						
<i>Infolium campestre</i>																						
<i>Thymus longicaulis</i>	1								+		+	+	+			1						
<i>Aspirothlas albus</i>									+	+												
<i>Thesium divaricatum</i>									+	+												
<i>Veronica jacquinii</i>									+	+												
<i>Leonodon hispidus</i>									+	+												
<i>Lotus corniculatus</i> var. <i>ciliatus</i>									+	+												
<i>Medicago lupulina</i>									+	+												
<i>Bromus squarrosus</i> et var. <i>villosus</i>									+	+												
<i>Cerastium pumilum</i>									+	+												
<i>Silene afoites</i>									+	+												
<i>Aira caespitosa</i>									+	+												
<i>Gymnadenia conopsea</i>									+	+												

Tab. 2. – continued

Relevé number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22			
<i>Festuca thurcica</i> ssp. <i>violaceo-sordida</i>	+	+					1					2	+										3	I	
<i>Potentilla incanata</i>	+																						2	I	
<i>Prunella laciniata</i>	+		+																				2	I	
<i>Trifolium physodes</i>		+																					2	I	
<i>Potentilla argentea</i> var. <i>tenuiflora</i>				+					+					+				+					3	I	
<i>Bromus erectus</i>					+		+																2	I	
<i>Arenaria leptocladus</i> f. <i>viscida</i>							+												+				2	I	
<i>Campanula glomerata</i>							+																2	I	
<i>Coronilla varia</i>							+										+						2	I	
<i>Potentilla sulphurea</i>									+								+						2	I	
<i>Nepeta pannonica</i>										+													2	I	
<i>Nepeta cinnadifolia</i>											+												2	I	
<i>Asperula cynanchica</i>												+											2	I	
<i>Filipendula vulgaris</i>												+											2	I	
<i>Muscari comosum</i>										2													2	I	
<i>Dianthus cruentus</i>											+												2	I	
<i>Ornithogalum comosum</i>												+											2	I	
<i>Euphorbia glaberrima</i>														+					2				2	I	
<i>Achillea collina</i>																		+		+			2	I	
<i>Carlina acanthifolia</i>																		+					2	I	
CC. CARNICEA-CURVULAE																									
<i>Acanis alpinus</i> ssp. <i>meridionalis</i>	+	+	+	+	+			+								+							9	III	
<i>Senecio papagayus</i> ssp. <i>papposus</i>								+							+		+						6	II	
<i>Paucaudium oligophyllum</i>																							3	I	
<i>Campanula sputatorica</i> ssp. <i>spatiolata</i>	+	+																					2	I	
<i>Silene roemerii</i>	+	+																					2	I	
ES. EYMOSSENERIETEA																									
<i>Gallium oreophilum</i>	2	+	+	+	+		+		+							+	1		1	+	+		11	III	
<i>Ranunculus oreophilus</i> ssp. <i>balkanicus</i>		+					+	1											+	+			10	III	
<i>Primipella tragium</i>	+			+																			2	I	
OF. QUERCO-FAGETEA RHAMNO-PRUNETEA																									
<i>Poa nemoralis</i>			1	+	+	+	+		+	3	1	1		1	1		2	1			1		14	IV	
<i>Luzula roemerii</i>						+	+					+			+			+	+			1	11	III	
<i>Primula veris</i> ssp. <i>suaveolens</i>		+					1	+	+		+	1						+	+			+	11	III	
<i>Campanula sparsa</i>								+	+									+	+			+	8	II	
<i>Arenaria agrimoniaoides</i>					+	1	+	+				+	+						+	+		+	8	II	

Tab. 2. – continued

Relevé number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
<i>Viola kitzeblana</i>								+															2
<i>Verbascum nigrum</i>									+														2
<i>Vicia lathyroides</i>										+						+							2
<i>Viola</i> sp.																	+						2
<i>Cuscuta</i> sp.																		+					2
<i>Potentilla inclinata</i>																			+				2

Species of low frequency: 1. *Bromus hordeaceus* ssp. *hordeaceus* +, *Potentilla obscura* +, *Ranunculus psilostachys* +; 2. *Chaerophyllum temulentum* +, *Cichorium intybus* +, *Dianthus leucophoeniceus* +, *Eryngium palmatum* +, *Ostrya carpinifolia* +, *Stachys sylvatica* +; 3. *Cerastium brachypetalum* 1, *Silene viridiflora* 1, *Anthyllis vulneraria* ssp. *macedonica* var. *macedonica* +, *Asyncema limonifolium* +, *Crupina vulgaris* +, *Elymus hispidus* ssp. *barbulatus* +, *Festuca hirtovaginata* +, *Geranium columbinum* +, *Lactuca vinea* +, *Stachys recta* +; 4. *Muscari racemosum* +, *Petrorhagia saxifraga* +, *Potentilla pedata* +, *Silene italica* +; 5. *Agrostis canina* 1, *Cerastium petricola* 1, *Cruciata pedemontana* 1, *Phleum phleoides* 1, *Achillea coarctata* +, *Arabis laxa* +, *Bromus tectorum* +, *Centaurea napulifera* +, *Cynosurus echinatus* +, *Erysimum diffusum* +, *Hypochoeris cretensis* +, *Linaria dalmatica* ssp. *macedonica* +, *Potentilla detommasii* var. *holosericea* +, *Rubus schleicheri* +, *Scabiosa trinitifolia* +, *Scleranthus perennis* +, *Torilis arvensis* +, *Trifolium glomeratum* +, *Trifolium ochroleucon* +, *Trifolium phleoides* +, *Veronica dilenii* +, *Vicia sativa* ssp. *nigra* +, *Carlina vulgaris* +, *Cerastium gracile* +, *Erophila verna* +, *Hypochoeris radicata* +, *Leontodon incanus* +, *Cardamine bulbifera* f. *pilosa* +, *Taraxacum officinale* +; 7. *Brachythecium* sp. +, *Capsella bursa-pastoris* +, *Galium schultesii* +, *Scleranthus annuus* +; 8. *Colchicum autumnale* +, *Elymus repens* +, *Euphorbia serrulata* +, *Pulmonaria officinalis* +; 9. *Ajuga genevensis* +, *Cirsium lanceolatum* +, *Dicranum scoparium* +, *Lathyrus nissolia* +, *Lathyrus sativus* +, *Lathyrus sphaericus* +, *Moehringia trinervia* +, *Phleum pratense* +, *Rhynchospora triquetus* +; 10. *Galium aparine* +, *Geranium reflexum* +, *Holcus lanatus* +, *Hypericum cerastoides* +, *Inula spiraeifolia* +, *Lysimachia punctata* +, *Meniha aquatica* +; 11. *Thymus macedonicus* 2, *Cruciata glabra* +, *Hypericum olympicum* +, *Lathyrus aphaca* +, *Linum hologynum* +, *Physospermum cornubiense* +, *Rubus canescens* var. *canescens* +, *Trifolium arvense* +; 13. *Asphodeline lutea* +, *Fagus sylvatica* +, *Picnemon acarna* +, *Verbascum densiflorum* +; 14. *Calamagrostis arundinacea* +, *Hylocomium splendens* +, *Plantago holosteum* +, *Rubus caesius* +; 15. *Vicia hirsuta* +; 16. *Abies borisii-regis* +, *Erysimum kuemmerlei* +, *Hieracium racemosum* +, *Neotia nidus-avis* +; 17. *Cornus mas* +, *Draba muralis* +, *Potentilla laciniosa* +, *Ribes alpinum* +; 18. *Anchusa officinalis* +, *Chamaecytisus austriacus* +, *Viola odorata* +; 19. *Cirsium appendiculatum* +, *Daphne moschata* +, *Festuca drymeia* +, *Poa compressa* +, *Prunus spinosa* juv. +; 20. *Lathyrus latifolius* +, *Linaria peloponnesiaca* +, *Malva moschata* +, *Platanthera bifolia* +, *Platanthera chloranta* +; 21. *Lembotropis nigricans* +; 22. *Polygala comosa* +, *Rumex thyrsiflorus* +.

This is the most widely spread association of the suballiance. It can be found on silicate bedrock and sporadically on carbonate bedrock at altitudes from 1100 to 1400 meters all across the Republic of Macedonia. The dominant species is *Trifolium alpestre*, but a new association was described. Because a suballiance character species exists, a new association should be described (OBERDORFER 1968, MUCINA 1991). The association appears at sunny forest edges on the following localities: 1. Stogovo; 2. Stogovo near the village Gari; 3,4 under mountain pass on Galičica; 5. Pelister, near the hotel Molika, forest edge; 6. village Lisec above cableway, forest edge; 7,9,12,13 Skopska Crna Gora; 8. above Mavrovo; 10. Berovo, near the lake; 11. Berovo, Ogažden; 14. Berovo beside the lake; 15,18 above the road between Mavrovo and Nikiforovo; 16. above the road between Mavrovo and Gostivar; 17,21,22 Mavrovo; 19. above Mavrovo; 20. Mavrovi Anovi.

***Lathyro laxiflori-Trifolietum balcanici* ass. nova hoc loco.**

(Tab. 3/1–7; Tab. 1/13; nom. type Tab. 3/1)

The association appears in the western part of the Republic Macedonia (Pelister, Popova Šapka, Patiška Reka) on silicate bedrock. The sites of this community are the most sciophilous of all the communities studied. Not many species of meadows and dry grasslands appear here, but forest species are well represented.

Tab. 3. Analytical table of the *Lathyro laxiflori-Trifolietum balcanici* association.

Relevé number	1	2	3	4	5	6	7		
Date of relevé	28	28	30	30	26	28	30		
Month of relevé	6	6	6	6	6	6	6		
Year of relevé	98	98	98	98	98	98	98		
Altitude in 10 m	141	138	137	130	103	128	117		
Aspect	NE	NW	SW	E	N	N	E		
Slope in degrees (°)	40	25	10	10	55	20	20		
Relevé area - m ²	10	10	8	10	7	10	10		
Number of species	35	32	24	29	39	20	52		
Character species									
<i>Trifolium medium</i> ssp. <i>balcanicum</i>	4	4	4	5	4	5	5	7	V
TG GERANION SANGUINEI, ORIGANETALIA, TRIFOLIO-GERANIETEA									
<i>Clinopodium vulgare</i>	+	1	2	1	1	+	+	7	V
<i>Hypericum barbatum</i>	.	+	1	+	.	.	.	3	III
<i>Vicia tenuifolia</i>	+	+	.	.	.	+	.	3	III
<i>Fragaria vesca</i>	1	1	.	.	.	2	.	3	III
<i>Fragaria moschata</i>	.	.	+	+	.	.	+	3	III
<i>Hypericum perforatum</i>	+	.	.	.	+	.	.	2	II
<i>Trifolium velenovskyi</i>	.	.	.	+	.	.	+	2	II
<i>Coronilla varia</i>	.	.	.	+	1	.	.	2	II
<i>Fragaria viridis</i>	.	.	.	.	2	.	.	1	I
<i>Digitalis viridiflora</i>	1	.	.	.	.	.	.	1	I
<i>Origanum vulgare</i>	.	.	.	.	+	.	.	1	I

Tab. 3. – continued

Relevé number	1	2	3	4	5	6	7		
GU GALIO-URTICETEA									
<i>Heracleum sphondylium</i>	+	+	.	.	.	.	.	2	II
<i>Epilobium montanum</i>	+	.	+	.	.	.	.	2	II
<i>Geranium robertianum</i>	.	.	.	.	+	+	.	2	II
MA MOLINIO-ARRHENATHERETEA									
<i>Dactylis glomerata</i>	+	.	.	.	.	1	+	3	III
<i>Rumex acetosella</i>	+	.	.	.	+	.	.	2	II
<i>Holcus lanatus</i>	.	+	.	.	.	.	+	2	II
<i>Trifolium repens</i>	.	.	+	.	.	.	+	2	II
<i>Leucanthemum vulgare</i>	.	.	.	+	.	.	+	2	II
<i>Poa trivialis</i> subsp. <i>sylvicola</i>	.	.	.	.	.	+	+	2	II
FB FESTUCO-BROMETEA									
<i>Euphorbia cyparissias</i>	+	.	1	.	.	.	1	3	III
<i>Cerastium brachypetalum</i>	.	+	+	.	.	.	+	3	III
<i>Hieracium praealtum</i> ssp. <i>bauhinii</i>	.	.	+	+	.	.	+	3	III
<i>Thymus longicaulis</i>	.	.	+	+	.	.	+	3	III
<i>Achillea setacea</i>	.	.	+	+	.	.	.	2	II
<i>Carlina vulgaris</i>	.	.	+	.	.	.	+	2	II
QF QUERCO-FAGETEA									
<i>Poa nemoralis</i>	2	1	2	+	+	.	1	6	V
<i>Viola reichenbachiana</i>	+	+	+	.	+	.	+	5	IV
<i>Brachypodium sylvaticum</i>	3	1	.	.	3	.	.	3	III
<i>Rubus schleicheri</i>	2	1	.	.	+	.	.	3	III
<i>Anemone nemorosa</i>	+	+	.	+	.	.	.	3	III
<i>Sanicula europaea</i>	+	3	.	.	1	.	.	3	III
<i>Mycelis muralis</i>	+	+	.	.	1	.	.	3	III
<i>Primula vulgaris</i>	+	+	.	.	1	.	.	3	III
<i>Euphorbia amygdaloides</i>	+	+	.	.	.	+	.	3	III
<i>Veronica officinalis</i>	+	.	.	+	+	.	.	3	III
<i>Festuca heterophylla</i>	+	.	.	1	.	+	.	3	III
<i>Myosotis sylvatica</i>	.	.	+	.	+	+	.	3	III
<i>Lathyrus laxiflorus</i>	+	+	.	.	.	.	.	2	II
<i>Calamintha grandiflora</i>	1	+	.	.	.	.	.	2	II
<i>Abies borisii-regis</i>	1	1	.	.	.	.	.	2	II
<i>Cardamine bulbifera</i> t. <i>pilosa</i>	+	.	.	+	.	.	.	2	II
<i>Scrophularia nodosa</i>	.	.	.	+	+	.	.	2	II
<i>Luzula forsteri</i>	.	.	.	.	1	+	.	2	II
<i>Auremonia agrimonoides</i>	.	.	.	.	+	+	.	2	II
<i>Pteridium aquilinum</i>	.	.	.	.	1	.	+	2	II
<i>Knautia drymeia</i>	.	.	.	.	.	+	2	2	II
OTHER SPECIES									
<i>Veronica chamaedrys</i>	1	+	+	+	+	+	+	7	V
<i>Carex echinata</i>	+	+	.	+	.	.	.	3	III
<i>Epilobium angustifolium</i>	+	+	.	+	.	.	.	3	III
<i>Ajuga reptans</i>	+	+	.	.	.	.	.	2	II
<i>Oxalis acetosella</i>	.	3	.	.	1	.	.	2	II
<i>Salix caprea</i>	.	+	.	.	+	.	.	2	II
<i>Geum molle</i>	.	.	+	+	.	.	.	2	II
<i>Picris hieracioides</i>	.	.	+	.	.	.	+	2	II
<i>Ventenata dubia</i>	.	.	+	.	.	.	+	2	II
<i>Vicia hirsuta</i>	.	.	.	+	.	.	+	2	II
<i>Populus tremula</i> juv.	.	.	.	.	+	.	+	2	II

Species of low frequency: 1. *Galium divaricatum* +, *Geranium macrorrhizum* +, *Lonicera alpigena* ssp. *formanekiana* +, *Sorbus aria* juv. +, *Thalictrum aquilegifolium* +; 2. *Geranium phaeum* 2, *Athyrium filix-femina* +, *Hieracium murorum* +, *Lamiastrum galeobdolon* +, *Lilium martagon* +, *Lysimachia punctata* +; 3. *Campanula spatulata* ssp. *spatulata* +, *Cirsium* sp. +, *Galium album* 2, *Leontodon crispus* ssp. *crispus* +, *Trifolium pratense* +; 4. *Lathyrus pratensis* 1, *Ajuga genevensis* +, *Fagus moesica* +, *Galium oreophilum* +, *Lychnis coronaria* +, *Melica uniflora* +, *Quercus pubescens* +, *Silene dioica* +; 5. *Dryopteris filix-mas* 1, *Aegopodium podagraria* +, *Asperula cynanchica* +, *Dactylorhiza cordigera* +, *Doronicum columnae* +, *Linum catharticum* +, *Moehringia trinervia* +, *Omalotheca sylvatica* +, *Prunella vulgaris* +, *Rosa* sp. +, *Ranunculus repens* +, *Rubus idaeus* +, *Saxifraga rotundifolia* +, *Tussilago farfara* +; 6. *Brachypodium pinnatum* 3, *Festuca hirtovaginata* 2, *Equisetum arvense* 1, *Astragalus glycyphyllos* +, *Galium aparine* +, *Silene vulgaris* +; 7. *Hypochoeris maculata* 1, *Alchemilla acutiloba* +, *Anthoxanthum odoratum* +, *Atropa belladonna* +, *Briza media* +, *Chaerophyllum aureum* +, *Crepis biennis* +, *Cynosurus cristatus* +, *Daucus carota* +, *Euphrasia pectinata* +, *Festuca pratensis* ssp. *pratensis* +, *Festuca rubra* ssp. *rubra* +, *Festuca valesiaca* +, *Galium verum* +, *Gymnadenia conopsea* +, *Hypochoeris radicata* +, *Linum hologynum* +, *Listera ovata* +, *Lotus corniculatus* var. *ciliatus* +, *Luzula campestris* +, *Plantago lanceolata* +, *Polygala vulgaris* +, *Potentilla laciniosa* +, *Ranunculus oreophilus* ssp. *balcanicus* +, *Sanguisorba minor* +, *Stellaria graminea* +, *Stellaria holostea* +, *Trifolium campestre* +, *Trisetum flavescens* +.

Locatities: 1,2. Pelister, Palisnopje; 3. above Tetovo, forest edge; 4. village Lisec under Popova Šapka, forest edge; 5. Patiška Reka, forest edge; 6. Pelister, behind the children's holiday home, forest edge; 7. village Gajre, above cable railway, forest edge.

Chamaecytiso heuffelii-Trifolietum medii ass. nova hoc loco

(Tab. 4/1–4, Tab. 1/14, nom. type Tab. 4/2)

Tab. 4. Analytical table of the *Chamaecytiso heuffelii-Trifolietum medii* association.

Relevé number	1	2	3	4
Date of relevé	27.6.	27.6.	27.6.	24.6.
Year of relevé	98	98	98	98
Altitude in m	930	960	910	1120
Aspect	SW	SW	S	E
Slope in degrees (°)	2	2	20	2
Relevé area – m ²	10	15	15	20
Number of species	45	44	24	50
Character species				
<i>Trifolium medium</i> ssp. <i>medium</i>	4	4	3	4
LATHYRO-TRIFOLIENION				
<i>Dorycnium herboaceum</i> var. <i>macedonicum</i>	1	2	2	3
<i>Chamaecytisus heuffelii</i>	2	3	3	3
<i>Vicia sativa</i> ssp. <i>nigra</i>	.	+	+	3
<i>Vicia villosa</i> ssp. <i>varia</i>	+	.	.	1

Tab. 4. – continued

Relevé number	1	2	3	4	
TG GERANION SANGUINEI, ORIGANETALIA, TRIFOLIO-GERANIETEA					
<i>Hypericum perforatum</i>	1	+	+	+	4
<i>Clinopodium vulgare</i>	2	2	.	1	3
<i>Agrimonia eupatoria</i>	1	1	+	.	3
<i>Silene viridiflora</i>	+	+	.	.	2
<i>Silene vulgaris</i>	+	+	.	.	2
<i>Vicia dalmatica</i>	+	+	.	.	2
<i>Fragaria viridis</i>	.	1	.	+	2
<i>Arabis sagittata</i>	.	+	.	+	2
<i>Poa pratensis</i> ssp. <i>angustifolia</i>	+	.	.	.	1
<i>Teucrium chamaedrys</i>	.	.	.	+	1
MA MOLINIO-ARRHENATHERETEA					
<i>Dactylis glomerata</i>	+	+	+	.	3
<i>Plantago lanceolata</i>	+	+	.	+	3
<i>Prunella vulgaris</i>	+	.	+	.	2
<i>Tragopogon pratensis</i>	+	.	+	.	2
<i>Trisetum flavescens</i>	.	+	.	2	2
<i>Poa sylvicola</i>	.	+	.	+	2
FB FESTUCO-BROMETEA					
<i>Hieracium praealtum</i> ssp. <i>bauhinii</i>	+	+	+	.	3
<i>Trifolium campestre</i>	+	+	+	.	3
<i>Lotus corniculatus</i> var. <i>ciliatus</i>	+	+	.	3	3
<i>Sanguisorba minor</i>	+	+	.	2	3
<i>Thymus longicaulis</i>	+	.	1	+	3
<i>Cynosurus echinatus</i>	1	+	.	.	2
<i>Crucianella graeca</i>	.	+	.	+	2
<i>Medicago lupulina</i>	.	+	.	+	2
<i>Achillea setacea</i>	.	.	+	3	2
QF QUERCO-FAGETEA					
<i>Brachypodium sylvaticum</i>	1	1	+	.	3
<i>Quercus frainetto</i> juv.	+	+	1	.	3
<i>Vicia grandiflora</i>	+	+	+	.	3
<i>Poa nemoralis</i>	1	.	+	.	2
<i>Lathyrus laxiflorus</i>	+	.	1	.	2
<i>Luzula forsteri</i>	+	.	+	.	2
OTHER SPECIES					
<i>Veronica chamaedrys</i>	+	+	+	.	3
<i>Poa bulbosa</i> f. <i>vivipara</i>	+	+	.	+	3
<i>Geranium columbinum</i>	+	+	.	.	2
<i>Picris hieracioides</i>	+	.	+	.	2
<i>Cerastium brachypetalum</i>	.	1	.	1	2
<i>Galium oreophilum</i>	.	1	.	+	2
<i>Veronica arvensis</i>	.	+	.	+	2
<i>Pimpinella tragium</i>	.	.	.	+	1
<i>Ranunculus millefoliatus</i>	.	.	.	+	1

The association was sampled in the western part of the country on silicate bedrock. The dominant species is *Trifolium medium* subsp. *medium*. It is the same dominant species as in the *Trifolio-Agrimonietum* of the *Trifolion medii* found in Central Europe. However, *Trifolion medii* appears alone only in Central Europe, while in the rest of Europe, the species of *Geranion sanguinei* and *Trifolion medii* grow together and the communities are classified within *Geranion sanguinei*. This classification into another alliance was the reason for the

classification within an autonomous association; otherwise, we would lose the hierarchy. The sites are dry and more exposed to the sun than those of the *Lathyro-Trifolietum balcanici*. The association can be found at altitudes from 900 to 1400 meters.

Species of low frequency: 1. *Bellis perennis* +, *Bilderdykia convolvulus* +, *Cichorium intybus* +, *Convolvulus althaeoides* ssp. *tenuissimus* +, *Epipactis atrorubens* +, *Galium schultesii* +, *Helianthemum nummularium* ssp. *nummularium* +, *Hordeum bulbosum* +, *Lathyrus sphaericus* +, *Lepidium campestre* +, *Phleum phleoides* +, *Symphytum tuberosum* +, *Torilis arvensis* +, *Trifolium ochroleucon* +; 2. *Festuca heterophylla* 1, *Arenaria leptoclados* var. *viscidula* +, *Astragalus glycyphyllos* +, *Campanula ramosissima* +, *Carex caryophyllea* +, *Erophila verna* +, *Geum urbanum* +, *Myosotis sylvatica* +, *Silene italica* +, *Sorbus torminalis* +, *Vicia hirsuta* +, *Vicia loiseleurii* +; 3. *Lathyrus niger* +, *Trifolium angustifolium* +, *Trifolium arvense* +; 4. *Coronilla varia* 3, *Leucanthemum vulgare* 2, *Anthoxanthum odoratum* 1, *Clematis vitalba* 1, *Agrostis canina* +, *Carex echinata* +, *Cirsium* sp. +, *Cruciata laevipes* +, *Cynosurus cristatus* +, *Eryngium campeste* +, *Euphrasia pectinata* +, *Festuca rubra* ssp. *rubra* +, *Festuca valesiaca* +, *Galium verum* +, *Hieracium pilosella* +, *Hypochoeris radicata* +, *Luzula campestris* +, *Muscari comosum* +, *Ononis spinosa* +, *Petrorhagia saxifraga* +, *Polygala vulgaris* +, *Potentilla argentea* var. *tenuiloba* +, *Potentilla reptans* +, *Ranunculus bulbosus* ssp. *aleae* +, *Rhinanthus rumelicus* +, *Tanacetum vulgare* +, *Taraxacum officinale* +, *Trifolium pratense* +.

Localities: 1–3 above the village Carina, forest edge; 4. village Bituše, forest edge.

Vicia varia comm. [*Geranion sanguinei*]

(Tab. 5/1–4, Tab.2/15)

Vicia varia is the dominant species of the community. It was classified on the suballiance level since the ecological niche of the dominant species is too wide to describe an association. This community was found above Prespansko Lake at forest edges and in areas in the intensive process of reforestation.

Tab. 5. Analytical table of the *Vicia varia* and *Vicia tenuifolia* community.

Relevé number	1	2	3	4	5	6	7		
Date of relevé	28	27	28	28	23	23	23		
Month of relevé	6	6	6	6	6	6	6		
Year of relevé	98	98	98	98	98	98	98		
Altitude in 10 m	91	91	87	87	149	148	143		
Aspect	E	E	-	E	NW	NW	NW		
Slope in degrees (°)	5	15	-	3	30	25	15		
Relevé area - m ²	15	25	15	8	20	20	20	A	B
Number of species	31	43	33	47	32	36	40		
<i>Vicia varia</i> comm.									
<i>Vicia villosa</i> ssp. <i>varia</i>	4	4	4	4	.	.	.	4	0
<i>Vicia tenuifolia</i> comm.									
<i>Vicia tenuifolia</i>	.	.	.	.	3	3	4	0	3
TG	GERANION SANGUINEI, ORIGANETALIA, TRIFOLIO-GERANIETEA								
<i>Clinopodium vulgare</i>	2	2	2	1	.	.	+	4	1
<i>Hypericum perforatum</i>	.	+	+	1	+	+	.	3	2

Tab. 5. – continued

	1	2	3	4	5	6	7		
Relevé number									
<i>Agrimonia eupatoria</i>	+	3	2	+				4	0
<i>Teucrium chamaedrys</i>	.	+	.	.	+	+	.	1	2
<i>Trifolium medium</i> subsp. <i>balkanicum</i>	1	.	.	.	.	.	.	1	0
<i>Poa pratensis</i> ssp. <i>angustifolia</i>	.	+	.	.	.	.	.	1	0
<i>Arabis sagittata</i>	.	.	.	.	+	.	.	0	1
<i>Origanum vulgare</i>	.	.	.	.	.	+	.	0	1
<i>Fragaria viridis</i>	.	.	.	.	.	.	1	0	1
<i>Hypericum barbatum</i>	.	.	.	.	.	.	+	0	1
A	ARTEMISIETEA, GALIO-URTICETEA								
<i>Tarlis arvensis</i>	1	+	1	.	.	.	.	3	0
<i>Galium aparine</i>	+	+	+	.	.	.	.	3	0
<i>Cruciata laevipes</i>	.	.	+	+	.	.	+	2	1
<i>Cirsium arvense</i>	+	+	.	.	.	.	.	2	0
<i>Bromus sterilis</i>	.	+	+	.	.	.	.	2	0
<i>Poa compressa</i>	.	+	+	.	.	.	.	2	0
<i>Geranium aristatum</i>	.	.	.	.	.	1	2	0	2
<i>Geum urbanum</i>	.	.	.	.	.	+	+	0	2
MA	MOLINIO-ARRHENATHERETEA								
<i>Dactylis glomerata</i>	+	+	+	+	1	2	2	4	3
<i>Plantago lanceolata</i>	.	+	+	1	.	+	.	3	1
<i>Tragopogon pratensis</i>	+	+	+	.	.	.	.	3	0
<i>Trifolium pratense</i>	+	+	.	+	.	.	.	3	0
<i>Poa trivialis</i> subsp. <i>sylvicola</i>	+	.	.	1	.	.	.	2	0
<i>Rumex acetosella</i>	.	.	.	+	.	+	.	1	1
<i>Cynosurus cristatus</i>	.	.	.	+	.	.	+	1	1
<i>Achillea millefolium</i>	.	.	.	.	.	1	1	0	2
<i>Trisetum flavescens</i>	.	.	.	.	.	+	1	0	2
FB	FESTUCO-BROMETEA								
<i>Lotus corniculatus</i> var. <i>ciliatus</i>	+	.	+	.	+	+	+	2	3
<i>Trifolium palidum</i>	+	+	1	2	.	.	.	4	0
<i>Eryngium campestre</i>	+	+	+	.	.	.	.	3	0
<i>Trifolium campestre</i>	.	+	.	2	+	.	.	2	1
<i>Leontodon crispus</i> ssp. <i>crispus</i>	.	+	.	.	.	+	+	1	2
<i>Helianthemum nummularium</i> ssp. <i>nummularium</i>	+	.	.	.	+	+	.	1	2
<i>Thymus longicaulis</i>	.	.	.	.	+	+	+	0	3
<i>Sanguisorba minor</i>	.	+	1	.	.	.	.	2	0
<i>Cynosurus echinatus</i>	.	.	+	+	.	.	.	2	0
<i>Galium verum</i>	.	+	.	+	.	.	.	2	0
<i>Crucianella graeca</i>	.	+	.	.	.	.	.	1	0
<i>Linaria dolmatica</i> ssp. <i>macedonica</i>	.	.	+	.	.	.	.	1	0
<i>Cerastium gracile</i>	.	.	.	+	.	.	+	1	1
<i>Achillea setacea</i>	.	.	.	+	+	.	.	1	1
<i>Hieracium praeanthum</i> ssp. <i>bauhinii</i>	.	.	.	+	+	.	.	1	1
<i>Onobrychis arenaria</i>	.	.	.	.	+	1	.	0	2
<i>Rhinanthus rumelicus</i>	.	.	.	.	+	.	2	0	2
ES	ELYNO-SESLERIETEA								
<i>Galium oreophilum</i>	.	+	.	.	1	+	1	1	3
<i>Pimpinella tragium</i>	.	+	.	.	+	1	.	1	2
<i>Daphne oleoides</i>	.	.	.	.	2	+	.	0	2
<i>Hieracium pannosum</i>	.	.	.	.	+	+	.	0	2
<i>Thalictrum minus</i> ssp. <i>majus</i>	.	.	.	.	+	+	.	0	2
<i>Acinus alpinus</i> ssp. <i>meridionalis</i>	.	.	.	.	+	+	.	0	2
QF	QUERCO-FAGETEA								
<i>Brachypodium sylvaticum</i>	3	3	+	1	4	4	3	4	3

Tab. 5. – continued

Relevé number	1	2	3	4	5	6	7		
<i>Vicia grandiflora</i>	1	+	+	+	.	.	.	4	0
<i>Hellebarus odorus</i>	.	+	.	.	+	+	+	1	3
<i>Rubus canescens</i> var. <i>canescens</i>	1	+	+	.	.	.	.	3	0
<i>Poa nemoralis</i>	2	.	+	1	.	.	.	3	0
<i>Knautia drymeia</i>	.	.	.	+	+	+	.	1	2
<i>Primula veris</i> ssp. <i>columnae</i>	.	.	.	.	+	+	+	0	3
<i>Clematis vitalba</i>	3	3	.	.	.	.	.	2	0
<i>Myosotis sylvatica</i>	.	.	.	+	.	.	+	1	1
<i>Aremonia agrimonoides</i>	.	.	.	.	.	1	+	0	2
<i>Stachys sylvatica</i>	.	.	.	.	.	+	+	0	2
OTHER SPECIES									
<i>Veronica chamaedrys</i>	+	+	.	+	.	.	+	3	1
<i>Orlaya daucorlaya</i>	+	+	+	.	.	.	.	3	0
<i>Poa bulbosa</i> f. <i>vivipara</i>	+	+	.	1	.	.	.	3	0
<i>Cirsium</i> sp.	.	+	.	+	+	.	.	2	1
<i>Carduus</i> sp.	.	.	.	.	1	2	3	0	3
<i>Juniperus communis</i>	.	.	.	.	+	+	+	0	3
<i>Ranunculus oreophilus</i> ssp. <i>balkanicus</i>	.	.	.	.	1	+	+	0	3
<i>Mentha spicata</i> ssp. <i>tomentosa</i>	+	.	+	.	.	.	.	2	0
<i>Polygala vulgaris</i>	.	.	.	.	+	+	.	0	2

***Vicia tenuifolia* comm. [*Geranium sanguinei*]**

(Tab. 5/5–7, Tab. 2/16)

This community was sampled on Mount Stogovo on carbonate bedrock at a relatively high altitude (above 1400 m). In the table, some alpine grassland elements of *Elyno-Seslerietea* and *Caricetea curvulae* can be found. The dominant species has too wide an ecological niche to be described as an association.

Species of low frequency: 1. *Ventenata dubia* 1, *Bromus tectorum* +, *Hordeum bulbosum* +, *Lathyrus aphaca* +, *Lathyrus latifolius* +, *Lathyrus niger* +, *Medicago sativa* ssp. *falcata* +, *Vicia pannonica* ssp. *striata* +; 2. *Salvia nemorosa* 2, *Acer campestre* juv. +, *Campanula ramosissima* +, *Coronilla varia* +, *Lathyrus hirsutus* +, *Ononis spinosa* +, *Picris hieracioides* +, *Silene vulgaris* +, *Sonchus asper* +, *Vicia sativa* ssp. *nigra* +; 3. *Aegilops neglecta* +, *Carex echinata* +, *Dasypyrum villosum* +, *Lactuca viminea* +, *Lolium perenne* +, *Potentilla canescens* +, *Rumex pulcher* +, *Trifolium physodes* +; 4. *Holcus lanatus* 3, *Daucus carota* 1, *Trifolium incarnatum* 1, *Vicia hirsuta* 1, *Vicia tetrasperma* 1, *Agrostis canina* +, *Aira capillaris* +, *Anagallis arvensis* +, *Anthoxanthum odoratum* +, *Bellis perennis* +, *Cichorium intybus* +, *Dianthus viscidus* +, *Festuca heterophylla* +, *Moenchia mantica* +, *Phleum phleoides* +, *Potentilla argentea* var. *tenuiloba* +, *Prunella vulgaris* +, *Quercus frainetto* juv. +, *Ranunculus neapolitanus* +, *Scutellaria columnae* +, *Veronica officinalis* +; 5. *Achillea clusiana* +, *Astragalus hypoglottis* ssp. *gremlii* +, *Dianthus minutiflorus* +, *Euphorbia myrsinites* +, *Festuca bosniaca* +, *Hippocrepis comosa* +; 6. *Euphorbia amygdaloides* +, *Festuca rubra* ssp. *rubra* +, *Rumex acetosa* +; 7. *Digitalis grandiflora* 2, *Festuca hirtovaginata* +, *Trifolium repens* 2, *Campanula spatulata* ssp. *spatulata* 1, *Luzula forsteri* 1, *Chaerophyllum temulentum* +, *Fes-*

tuca pratensis ssp. *pratensis* +, *Festuca valesiaca* +, *Leucanthemum vulgare* +, *Linaria concolor* +, *Linum catharticum* +, *Scabiosa columbaria* +, *Stachys germanica* +; 8. *Linum hologynum*.

Localities: 1. village Carina above the Prespansko Ezero, forest edge; 2. close to Prespansko Ezero near the village Carina; 3. village Oteševo near the Prespansko Ezero, forest edge; 4. village Stenje above Prespansko Ezero, 6–8 Stogovo.

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