

Diversity of the vascular flora of Mt. Zlatar (Southwest Serbia)

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Abstract

The mountain system Starovlaške Planine, which includes Mt. Zlatar, is located at the transition line between the plant-geographical Moesian and the Illyric Provinces. This mountain massif of south-western Serbia has a specific floristic and vegetation composition. The cumulative relationships of the general ecological factors of both pre- and post-diluvium periods have formed special conditions for the development of plant species and communities. The purpose of this investigation was to examine the floristic diversity of the above mentioned region. This is very important for the conservation of flora in Serbia in particular, and the Balkan Peninsula in general. After having collected the plant species, the determination was performed using standard floristic methods. The flora of Mt. Zlatar consists of cca 856 identified species, which taxonomically belong to 92 families and 370 genera. The study of flora indicates that there are 38 significant and rare species and 12 relicts and endemics. According to the plant-geographical analysis, 61 different geoelements were recorded. Based on this data, it was determined that the Moesian Province has the greater impact on the flora on Mt. Zlatar than the Illyric Province.

Keywords: Floristic diversity, plant geographic characteristics, Zlatar.

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INTRODUCTION

Mountain Zlatar belongs to the system of the Starovlaške Planine, situated in the south-western part of Serbia, about 250 km from Belgrade. South-western Serbia and the Zlatar Mountain belong to the transition zone between the Illyrian and Moesian Provinces, in the Central-European biogeographic region (Obratov 1995b). At the foot of Mt. Zlatar, the Mileševka River Canyon is situated. This canyon was a refuge for different plant species during the diluvium period, which has caused a large number of tertiary, endemic and relict species to survive in the region with some of them growing on Mt. Zlatar.

The geographical position, climate, orography, geological layers, soils type and historical development of flora and vegetation have influenced the great vegetation and

floristic diversity on Mt. Zlatar.

It is very important to emphasize that this region has never been completely investigated.

In the book "Flora of Bosnia and Hercegovina and Novi Pazar's Sandzak" Beck-Managetta (1903-1927) names, as a seat for some species, the surroundings of Prijepolje, without concrete localities for the species. Mišić, Popovic, and Dinic (1985) described the fir and spruce forest (*Abieti-Picetum serbicum typicum*) on Mt. Zlatar and compared them with the same forest type on Mt. Kopaonik (Central Serbia). Also, Mišić (1985) described some forest associations of this mountain in a short report about the

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vegetation of Mt. Zlatar. The monograph about plant covers of Prijepolje surroundings done by Matovic (1986) and the study about vegetation of the Mileševka River Canyon (Matovic 1987) are the only reviews of flora and vegetation of the wider region of Mt. Zlatar.

In "Flora of SR Serbia" (1970-1986), numerous authors named Mt. Zlatar, as the seat of certain plant species, such as: *Picea abies* subsp. *alpestris*, *Cornus sanguineus* (Jovanovic 1970, 1973), *Corydalis solyda*, *Pancicia serbica*, (Nikolic 1970, 1973), *Silene vulgaris* var. *puberula*, *Polygonum viviparum*, *Rumex obtusifolius*, *Bilderdykia dumetorum* (Slavnic 1970, 1972), *Ramischia secunda* (Blecic 1972), *Polygala vulgaris* f. *albida*, *Pedicularis heterodonta*, *Carex paniculata* (Jovanovic-Dunji c 1973, 1974, 1976), *Lonicera xylosteum* (Vukicevic, 1973) and *Orchis tridentata*, *Stachys alpina* subsp. *dinarica* (Diklic 1974, 1976).

The forest and meadow communities of Mt. Zlatar are characterized by the eventful dynamics and rich floristic structure. The vegetation succession indicates that the negative impact of anthropogenic factors led to the degradation of many plant communities. Nowadays, instead of them, there are predominantly pastures and meadows with low nutritive value.

Mt. Zlatar belongs to the group of mountains, which does not express vertical zonal. The beech forests of Mt. Zlatar belong to the alliance Fagenion moesiaca montanum Jovanovic, 1976, associations *Fagetum montanum serbicum* Rudski, 1949.(1) and *Abieti-Fagetum calcicolum* Jovanovic, 1995.(2). These forests on the investigated localities developed in the vale as fragments, mainly on the colder northern exposure.

From the sub-alliance Abieti-Piceenion Br.-Bl. 1939 and Pinion silvestris (Achinger 1939) Lakušić 1972, three communities appear very frequently: *Abieti-Piceetum serbicum typicum* Mišić et al. 1985 (3), *Piceetum abietis* Grebenščikov 1950 (4), and *Piceeto-Pinetum moesiacum* Obratov 1992.(5). These communities occur on the colder northern exposures and have also discontinuous areal.

The Mt. Zlatar ass. *Piceetum abietis* is a

dominant forest type and it presents a climaregional community. It has a mosaic extension, alternating with some other forest types. In the past, these forests were richer, but by intensive and unmethodical felling they are degraded and devastated.

On the degraded and devastated habitats of ass. *Piceetum abietis*, ass. *Epilobietum angustifoliae* Soó 1933 (6) have been developed.

Alliance Orno-Ericion Horvatic, 1959 is very important. It consists of a very rare association with *Pinus silvestris* as an edificator named *Pinetum moesiaca calcicolum* Obratov, 1992 (7). Alliance Bruckenthalion spiculifoliae Horvatic, 1949 is presented by the association *Bruckenthalio-Juniperetum* Horvat, 1938 (8) and occupies the upper forest border.

Meadow associations in the wet habitats belong to the alliance Caricion gracilis-vulpinae Tulackova, 1963. It is represented by the association *Caricetum vulpinae-ripariae* Jovanovic, 1958. (9). Alliance Chrysopogoni-Danthonion calycinae Kojic, 1957 and the association *Agrostietum (vulgaris) capillaris* Pavlovic, 1955 (10) are situated in the belt of *Fagetum moesiaca* and *Abieti-Fagetum*. Alliance Nardion strictae Br.-Bl- 1926, represented by the association *Nardetum strictae* Grebenščikov, 1950 (11), is spread on the limestone and on the siliceous parent rock. Association *Festucetum fallacis* Matovic, 1986 (12), alliance Arrhenatherion elatioris Br.-Bl-1925, and assn. *Plantaginetum montanae* (atratae) Horvat, 1939 (13), occupy the highest peaks of the investigated region.

Plant taxa were also collected along the roads (14), from the limestone rocks, (15), rocky scleeteous places (16), farmlands (17), along the creeks (18), wet habitats near the creek (19), forest edges (20), clearings (21) and shrubs (22). Some of the plant taxa collected were parasites (23) or saprophytes (24).

In Serbia, as in other countries, many plant species are endangered due to anthropogenic influence. To protect the vegetation and floristic diversity, it is necessary to undertake adequate measures. The first step in flora

protection is to make a species database of the species found in certain regions.

The region of south-western Serbia, where the investigation was performed, was not investigated completely before.

The aim of this research was to distinguish the vegetation and floristic diversity of Mt. Zlatar. Furthermore, during the investigation endemics, relicts and species of international importance were selected.

The comparison between this region and some similar localities points out that the Mt. Zlatar with Scots pine and spruce forest is completely different.

MATERIAL AND METHODS

Mountain Zlatar is located in the south-western part of Serbia, about 250 km from Belgrade (See Fig. 1). It is located at 43° 23' latitude north and 19° 43' longitude east. It is diffusely spread from south-east to north-west with the base of 23 km and length of 3 km. The difference between the highest and the lowest altitude is 1175 m, with the highest point being at 1625 m.

The relief of the Mt. Zlatar is characterized by a very heterogeneous geological structure. The age of the rocks range from the Paleozoic to Quaternary periods. The largest part of the area is occupied with limestone and diabase chart, magmatic rocks, sandstone, etc. Together with the variety of the geological base, soils are various as well. The most frequent soils are rendzina, brownized rendzina on the limestone, graybrown soil on limestone, black and brownized black soil, brown acid soil on crystalline rocks and skeleton rock soil (Pavicevic et al. 1968).

The climate data is taken from the study performed by the Institute for Forestry in Belgrade. Also, the data from the three nearest meteorological stations (Pljevlja, Sjenica and Bijelo Polje) are used and presented with the climate diagrams according to Walter (Figs. 1--3). The examined area is in a zone with periphery moderate continental type climate and has average annual precipitation of 1010 mm, with 462 mm being in the vegetation period. During the year there are 110 days of

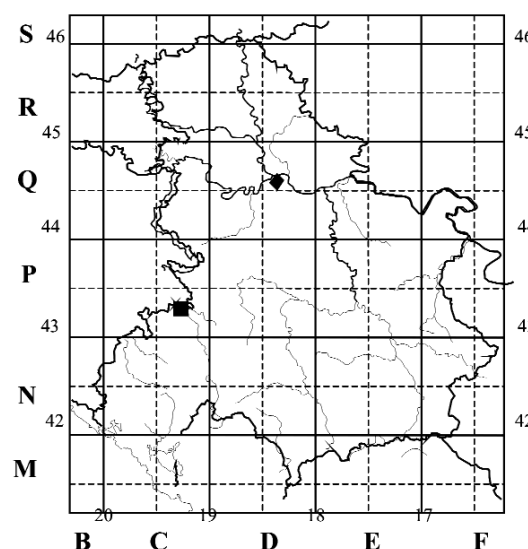


Fig. 1. Map of Serbia and examined area (◆ - Belgrade; ■ - Zlatar).

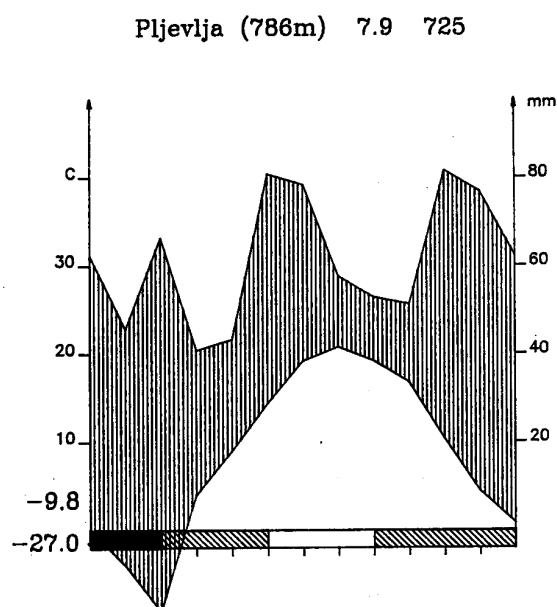


Fig. 2. Climate diagram according to Walter for Pljevlja.

persistent snow. The average annual temperature ranges from 6.8°C to 13°C in the vegetation period. Relative humidity varies from 65 to 72% (Tošić 1986).

The floristic investigation of Mt. Zlatar was performed from May 2003 to September 2006. Plant species were collected during all phaenophases in the forest and meadow associations from the entire area of Mt. Zlatar. The collection has been deposited in the Herbarium of the Faculty of Forestry.

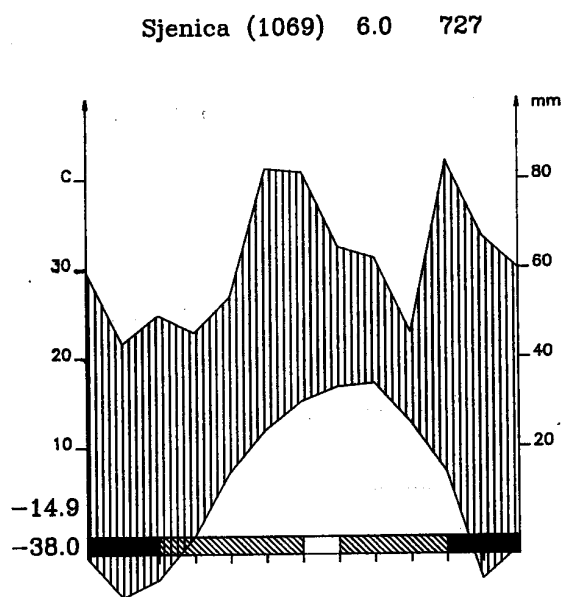


Fig. 3. Climate diagram according to Walter for Sjenica.

For the plants identification the relevant European literature was used: Josifovic (1970-1977), Saric (1986) and Tutin et al. (1964-1980).

The geoelements determination, that we used with the floristic methods predominantly, gave basis for all other floristic investigation (Diels and Mattick, 1958). However, except for this one, we used some other methods, such as ecological, historical and apropos genetic methods, which means that we not only took care of the species areal but also of its environmental conditions, systematic affinity, center of diffusion, migration etc. One of the particularly important factors in horology, which we have also considered, is the anthropogenic factor, because many species have expanded their areal thanks to anthropogenic influence.

The geoelements were selected according to Walter and Straka (1970), Kleopow (from Walter), Adamovic (1909), Wangerin (1932) and Soó (1980).

RESULTS AND DISCUSSION

In examining the flora of Mt. Zlatar, about 800 species, 32 subspecies, 9 varieties, and

15 forms for a total of 856 taxa were recorded. The species have been classified into 370 genera and 92 families. The following pages (7 through 20) provide a review of the flora of Mt. Zlatar.

Review of the Flora of Mt. Zlatar

POLYPODIOPHYTA

Aspidiaceae: *Dryopteris carthusiana* (Vill.) H.P.Fuchs., 1; *D. cristata* (L.) H. Gray., 1; *D. filix-mas* (L.) Schott, 2, 3; *Gymnocarpium robertianum* (Hoffm.) Newman, 1, 4; *Polystichum aculeatum* (L.) Roth., 2; *P. lonchitis* (L.) Roth., 2, 4.

Aspleniaceae: *Asplenium adiantum-nigrum* L., 1; *A. trichomanes* L., 1, 7; *A. ruta-muraria* L., 7; *A. viride* Hudson, 4; *Ceterach officinarum* DC., 15; *Phyllitis scolopendrium* (L.) Newm., 1.

Athyriaceae: *Athyrium filix-femina* (L.) Roth., 1; *Cystopteris fragilis* (L.) Bernh., 1.

Blechnaceae: *Blechnum spicant* (L.) Roth., 4.

Hypolepidaceae: *Pteridium aquilinum* (L.) Kuhn, 1, 5, 13.

Ophioglossaceae: *Botrychium lunaria* (L.) Schwartz, 10; *Ophioglossum vulgatum* L., 19.

Polypodiaceae: *Polypodium vulgare* L., 1.

EQUISETOPHYTA

Equisetaceae: *Equisetum arvense* L., 19; *E. palustre* L., 19; *E. silvaticum* L., 4; *E. ramosissimum* Desf., 19; *E. telmateia* Erhart., 1, 19.

PINOPHYTA

Cupressaceae: *Juniperus communis* L., 1, 4, 7, 12, 13, 15; *J. sibirica* Lodd., 8.

Pinaceae: *Abies alba* Mill., 2, 4, 5, 15; *Picea abies* (L.) Karst., 2, 4, 5, 8, 12, 13; *Pinus nigra* Arnold, 3, 7; *P. silvestris* L., 3, 4, 7.

MAGNOLIOPHYTA

Magnoliopsida

Aceraceae: *Acer campestre* L., 3; *A. pseudoplatanus* L., 4.

Adoxaceae: *Adoxa moschatellina* L., 2, 3.

Amaranthaceae: *Amaranthus retroflexus* L., 17.

Amygdalaceae: *Prunus avium* L., 1, 4, 13.

Araliaceae: *Hedera helix* L., 1, 2.

Aristolochiaceae: *Aristolochia clematitis* L.,

19; *Asarum europaeum* L., 1, 2, 3, 4, 7.

Asclepiadaceae: *Cynanchum vincetoxicum* (L.) Pers., 14.

Compositae: *Achillea clypeolata* S.S., 13; *A. lingulata* W. et K., 4; *A. millefolium* L., 7, 10, 11, 12; *A. nobilis* L., 16; *Anthemis arvensis* L., 14; *A. tinctoria* L., 14, 16; *A. triumfetti* (All.) DC., 10; *Antennaria dioica* (L.) Gaertn., 7, 8, 10, 11; *Arctium lappa* L., 14; *Artemisia annua* L., 14; *A. vulgaris* L., 14, 21; *Bellis perennis* L., 4, 5, 13; *Carduus acanthoides* L., 14; *C. candicans* W. K., 16; *C. personata* (L.) Jacq., edges of 1; *Carlina acaulis* L., 7, 8, 10, 11, 12; *C. vulgaris* L., 5, 8, 12, 13, 14; *C. utzka* Hacq., 13; *Centaurea atropurpurea* W. et K., 14, 16; *C. cyanus* L., 14; *C. jacea* L., 9, 10, 12; *C. montana* L., 16; *C. phrygia* L., 14, 7, 10, 13; *C. scabiosa* L. f. *heterifolia* Beck., 1, 10, 21; *C. stoebe* L. subsp. *calvescens* (Panc.) Hayek, 10; subsp. *micranthos* (Gmel.) Hayek, 21; *Cicerbita alpina* (L.) Wallr., 1, 2, 4; *Cichorium intybus* L., 14, 17, 10, 11; *Cirsium acaule* (L.) Scop., 15, 2; *C. arvense* (L.) Scop., 8, 10; *C. candelabrum* Gris., 14, 16; *C. canum* (L.) All., 19; *C. lanceolatum* (L.) Scop., 2, 14; *C. pauciflorum* (W. K.) Spreng., 19; *C. rivulare* (Jacq.) Lk., f. *glabratum* Rohl., 19; *Crepis biennis* L., 9, 14; *C. capillaris* (L.) Walr., 14; *C. conyzifolia* (Gou.) D.T., 10; *C. foetida* L., 14, 16; *C. paludosa* (L.) Mnch., 19; *C. setosa* Hall., 11; *C. viscidula* Froel., 16; *Doronicum austriacum* Jacq., 4; *D. columnae* Ten., 4; *Erigeron acer* L., 16; *E. canadensis* L., 14; *Gnaphalium silvaticum* L., 1, 2; *G. uliginosum* L., 19; *Hieracium bauhini* Bess., 1, 11, 12, 13; *H. echinoides* Lumn., 16; *H. hoppeanum* Schult., 9, 10, 11, 12, 13; *H. lachenalii* Gmel., 1, 3. *H. murorum* L., 1, 2, 3, 4, 5, 7, 8; *H. pavichii* Heuff. subsp. *minutiflorum* Zahn., 12, 13; *H. pilosella* L., 5, 8; *H. transsilvanicum* Heuff., 1, 3; *H. umbellatum* L., 19; *Hypochoeris maculata* L. subsp. *pelivanovichii* Petrov., 5; *H. radicata* L., 10, 11, 12; *Inula britannica* L., 14, 8, 13; *I. conyza* DC., 14; *I. helenium* L., 1, 2; *I. hirta* L., 14, 10, 12; *I. oculus-christi* L., 14; *I. salicina* L., 7; *Jurinea mollis* (Torn.) Rchb., 16; *Lactuca serriola* L., 3, 4, 14; *Lapsana communis* L., 1; *Leontodon autumnalis* L., 8, 10; *L. hispidus* L., 11; *Leontopodium alpinum* Cass.,

16; *Leucanthemum vulgare* Lam., 7, 8, 9, 11, 12, 13; *Matricaria chamomilla* L., 14, 17; *M. inodora* L., 14, 10; *Mycelis muralis* (L.) Rchb., 1, 2, 3, 4, 5; *Onopordon acanthium* L., 14, 16; *Petasites hybridus* (L.) Sch., 16; *Picris hieracioides* L., 14; *Prenanthes purpurea* L., 1, 2, 3, 4; *Scorsonera hispanica* L. var. *strictiformis* Domin., 7; *S. rosea* W. K., 16; *Senecio fuchsii* Gmel., 1, 11; *S. nemorensis* L., 14, 2; *S. rupester* W. K., 1, 3, 4; *S. vernalis* W. K., 14, 16; *S. vulgaris* L., 14, 17; *Serratula tinctoria* L., 19; *Solidago virgaurea* L., 2, 3, 7, 14; *Sonchus arvensis* L., 11, 17; *S. asper* (L.) Hill., 4, 5, 7, 8, 14; *S. oleraceus* (L.) Gou., 14; *Stenactis annua* (L.) Ness, 14; *Tanacetum corymbosum* (L.) Sch.-Bip., 4, 10, 13; *T. serotinum* (L.) Sch.-Bip. 10, 13, 19; *T. vulgare* L., 14; *Taraxacum officinale* Web., 1, 8, 11; *Telekia speciosa* (Sch.) Baumg., 18; *Tragopogon pratensis* L. subsp. *orientalis* (L.) Vel., 22; *Tussilago farfara* L., 14, 16; *Xanthium strumarium* L., 14; *Xeranthemum annuum* L., 14, 16.

Balsaminaceae: *Impatiens noli-tangere* L., 2, 4.

Berberidaceae: *Epimedium alpinum* L., 1.

Betulaceae: *Betula pendula* Roth., 2, 7, 3.

Boraginaceae: *Anchusa barrelierii* (All.) Vitm., 16; *A. officinalis* L., 14, 17; *Cynoglossum montanum* Höjer., 16; *C. officinale* L., 16; *Echium rubrum* Jacq., 14; *E. vulgare* L., 14; *Lithospermum officinale* L., 14; *L. purpureo-coeruleum* L., 21; *Myosotis arvensis* (L.) Hill, 14; *M. collina* Hoffm., 11; *M. palustris* (L.) Nath., 9; *M. silvatica* (Ehrh.) Hoffm., 2, 10, 12; *Pulmonaria officinalis* L., 1, 2, 3, 4; *Symphytum officinale* L., 19; *S. tuberosum* L., 1, 2, 3, 4, 5, 7, 8.

Campanulaceae: *Asyneuma trichocalycinum* (Ten.) K. Maly, 4; *Campanula bononiensis* L. var. *cana* Simk., 16; *C. cervicaria* L., 16; *C. glomerata* L., 4, 10; *C. latifolia* L., 4; *C. patula* L., 4, 5, 7, 9, 10, 11, 12; *C. persicifolia* L., 2, 3, 4, 5, 7, 10; *C. phrygia* Jaub. et Sp., 5; *C. rapunculoides* L., 16; *C. rotundifolia* L., 16; *C. trachelium* L., 1, 2, 7; *Edraianthus graminifolius* (L.) DC., 15; *E. tenuifolius* (W. et K.) DC., 16; *Phyteuma spicatum* L., 4, 9, 11.

Cannabaceae: *Humulus lupulus* L., 14.

Caprifoliaceae: *Lonicera caprifolium* L., 1;

L. xylosteum L., 1, 2, 5, 7; *Viburnum lantana* L., 1, 7; *V. opulus* L., 19.

Caryophyllaceae: *Arenaria serpyllifolia* L., 14; *Cerastium arvense* L., 11; *C. brachypetalum* Desp., 14, 7; *C. caespitosum* Gilib., 14, 20; *C. moesiacum* Friv., 15, 21; *Dianthus armeria* L., 14; *D. barbatus* L., 11, 12; *D. carthusianorum* L., 10; *D. corymbosus* Sibth. et Sm., 15; *D. cruentus* Griseb., 16; *D. deltoides* L., 21; *D. ferrugineus* Mil. subs. *liburnicus* (Bartl.) Tutin, 22; *D. petraeus* W. et K., 15, 16; *D. pseudarmeria* M.B., 16; *Holosteum umbellatum* L., 10, 12; *Lychnis coronaria* (L.) Desr., 11; *L. flos-cuculi* L., 9, 10, 11; *Minuartia bosniaca* (Beck.) Maly, 15; *M. verna* (L.) Hiern. subsp. *collina* (Neir.) Hall., 15; *Moehringia muscosa* L., 4, 7; *M. trinervia* (L.) Clairv., 1, 2; *Moenchia mantica* (L.) Bartl., 14; *Petrohragia prolifera* (L.) Ball. et Hey., 16; *P. saxifraga* (L.) Link., 14, 16; *Saponaria officinalis* L., 14; *Scleranthus annuus* L., 14; *S. perennis* L., 14, 11; *S. uncinatus* Schur, 21; *Silene alba* (Mill.) E. Krause, 14; *S. armeria* L., 7; *S. conica* L., 14; *S. dioica* (L.) Clairv., 1, 2; *S. natans* L., 11; *S. roemerii* Friv. subsp. *sendtnerii* (Boiss.) Jord. et Pan., 4, 5, 7, 10, 11; *S. viridiflora* L., 21; *S. vulgaris* (Mnch.) Garke, 4; *Spergula arvensis* L., 14; *Spergularia rubra* (L.) J. et C. Presl., 14, 16; *Stellaria graminea* L., 4, 10, 11, 12; *S. holostea* L., 1; *S. neglecta* Weihe, 14; *S. media* (L.) Vill., 14; *S. nemorum* L., 1; *Viscaria vulgaris* Roehl. subsp. *atropurpurea* (Griseb.) Stoj., 7.

Celastraceae: *Evonymus europaeus* L., 3; *E. verrucosus* Scop., 4.

Chenopodiaceae: *Chenopodium album* L., 17.; *Ch. striatum* (Kraš.) Murr., 17.

Cistaceae: *Helianthemum nummularium* (L.) Mill. subsp. *glabrum* (Koch.) Wil., 3, 4, 7, 8, 10, 11, 13;

Cruciferae: *Alliaria officinalis* Andrz., 1, 2, 14; *Alyssum campestre* L., 16; *A. montanum* L., 2, 3, 4, 7; *Arabidopsis thaliana* (L.) Heynh., 14; *Arabis hirsuta* (L.) Scop. f. *sagittata* (Beit.) Rchb., 2; *Barbarea vulgaris* R. Br., 14; *Berteroa incana* DC., 14; *Capsella bursa-pastoris* (L.) Medik., 11, 12, 14; *Cardamine amara* L., 19; *C. bulbifera* (L.) Crantz., 1, 2, 3; *C. enneaphyllos* (L.) Crantz., 2, 3; *C. flexuosa* With., 2; *C. hirsuta* L., 14;

C. impatiens L., 1, 4; *C. maritima* Port., 16; *C. savensis* Schulz., 1, 2; *Descurainia sophia* (L.) Webb., 14; *Diploaxis muralis* L., 14; *Draba aizoides* L., 8, 15; *D. lasiocarpa* Roch., 15; *D. muralis* L., 15; *Erophila verna* (L.) Chev., 3, 4; *Erysimum comatum* Panc., 15; *E. crepidifolium* Reichb., 15; *E. diffusum* Ehrh., 15; *Lepidium campestre* (L.) R. Br., 15; *L. draba* L., 15; *Lunaria rediviva* L., 4; *Rorripa pyrenaica* (L.) Rchb., 11; *R. silvestris* (L.) Bess., 14; *Sysimbrium officinale* (L.) Scop., 14; *Thlaspi ochroleucum* Boiss. et Heldr., 7; *T. perfoliatum* L., 14; *T. praecox* Wulf., 16; *Turritis glabra* L., 1.

Convolvulaceae: *Calystegia sepium* (L.) L. Br., 19; *Convolvulus arvensis* L., 12.

Corylaceae: *Carpinus betulus* L., 1; *Corylus avellana* L., 3, 4, 7, 13; *Ostrya carpinifolia* Scop., 15.

Crassulaceae: *Sedum acre* L., 14, 15; *S. album* L., 15; *S. dasyphyllum* L., 16; *S. hispanicum* L., 16; *S. ochroleucum* Chaix, 16; *S. telephium* L., 16.

Dipsacaceae: *Dipsacus laciniatus* L., 14; *D. silvester* Huds., 14; *Knautia arvensis* (L.) Colut., 12; *K. dinarica* (Murb.) Borb., 11; *K. dipsacifolia* (Host.) Gren. et Godr., 4; *K. drymeia* Heuff., 2; *K. midzorensis* Form. var. *pancici* (Szabo) Hayek, 5, 7, 8, 10, 11, 12; *Scabiosa columbaria* L., 14, 7; *S. dubia* Vel., 8, 11; *S. ochroleuca* L., 5, 9, 12, 13; *Succisa pratensis* Moench, 9, 12; *Succisella inflexa* (Kluk.) Beck., 9;

Euphorbiaceae: *Euphorbia amygdaloides* L., 1, 2, 3, 4, 8, 13; *E. carniolica* Jacq., 10; *E. cyparissias* L., 1, 7, 10, 11, 13, 14; *E. helioscopia* L., 14; *E. myrsinites* L., 15; *E. platyphyllos* L., 14, 21; *Mercurialis perennis* L., 1, 2, 3.

Ericaceae: *Bruckenthalia spiculifolia* Rchb., 8; *Erica carnea* L., 5, 7.

Fagaceae: *Fagus silvatica* L., 1, 2, 4.

Fumariaceae: *Corydalis cava* (L.) Koerte, 1; *C. solida* (L.) Sw., 1; *Fumaria officinalis* L., 14; *F. vaillantii* Lois., 14, 17.

Gentianaceae: *Centaurium umbellatum* Gilib., 9; *Gentiana asclepiadea* L., 2, 4, 5, 7; *G. nivalis* L., 11; *G. kochiana* Perr. et Song., 4; *G. pneumonanthe* L., 10; *G. punctata* L., 8, 16; *G. tergestina* Beck., 21; *G. verna* L., 11; *G. utriculosa* L., 19; *Gentianella austriaca*

Dost., 12, 13; *G. axillaris* (Murb.) Dunjic, 10; *G. bulgarica* (Velen.) Holub, 12; *G. ciliata* (L.) Borkh., 10, 12; *G. praecox* (A. et J. Kern.) Dost., 10.

Geraniaceae: *Geranium columbinum* L., 10; *G. bohemicum* Torn., 16; *G. dissectum* Jusl., 11; *G. lucidum* L., 16; *G. macrorrhizum* L., 2; *G. phaeum* L., 1, 2; *G. sanguineum* L., 7, 12; *G. silvaticum* L., 4; *G. robertianum* L., 4, 5, 7; *G. villosum* Ten., 10; *Erodium cicutarium* (L.) L'Hér., 14.

Grossulariaceae: *Ribes alpinum* L., 16; *R. grossularia* L., 22.

Guttiferae: *Hypericum alpinum* W. K., 3; *H. barbatum* Jacq. f. *epirotum* Hal. f. *pindicolum* Haussk., 3, 4, 7, 15, 16; *Hypericum hirsutum* L., 1; *H. maculatum* Crantz, 2, 11, 14; *H. montanum* L., 1; *H. perforatum* L. subsp. *lineolatum* (Jard.) Rony, 3; *H. transilvanicum* Cel., 7; *H. umbellatum* A. Kern., 2.

Labiatae: *Ajuga genevensis* L., 14, 21; *A. reptans* L., 1, 3, 5, 7; *Ballota nigra* L., 14, 3; *Calamintha acinos* (L.) Clairv., 19; *C. alpina* (L.) Lam. var. *elatior* (Gris.) Diklic, 22; *C. nepeta* (L.) Savi, 14; *C. officinalis* Moench, 7, 10, 12; *C. vulgaris* (L.) Druce, 7; *Galeopsis ladanum* L., 20; *G. speciosa* Mill., 1, 3, 10, 14; *G. tetrahit* L., 2; *Glechoma hederacea* L., 20; *G. hirsuta* W. et K., 1, 5; *Lamium galeobdolon* (L.) Cr., 1; *L. maculatum* L., 1, 3; *L. purpureum* L., 14, 17; *Leonurus cardiaca* L., 14; *Lycopus europaeus* L., 9; *Marrubium peregrinum* L., 4, 9, 11; *Melissa officinalis* L., 17; *Melittis melissophyllum* L., 4, 7; *Nepeta nuda* L., 10; *Mentha aquatica* L., 9; *M. arvensis* L., 19; *M. longifolia* (L.) Huds., 19; *M. pulegium* L., 19; *Origanum vulgare* L., 19; *Prunella grandiflora* (L.) Sch., 11; *P. laciniata* (L.) L., 10, 12, 13; *P. vulgaris* L., 1, 5, 9, 12; *Salvia glutinosa* L., 1; *S. nemorosa* L., 14; *S. verticillata* L., 10, 14; *Scutellaria altissima* L., 1; *S. columnae* All., 1; *Stachys alpina* L. subsp. *dinarica* Mur., 4; *S. germanica* L., 14; *S. officinalis* (L.) Trev., 5, 10, 11, 12, 13; *S. scardica* Gris., 7; *S. serbica* Panc., 4; *S. silvatica* L., 1; *S. recta* L., 7; *Teucrium chamaedrys* L., 7, 14; *T. montanum* L., 15; *Thymus glabrescens* Willd., 8, 10, 11; *T. marschallianus* Willd., 14; *T. moesiacus* Vel., 15; *T. pulegioides* L., 4, 7; *T. serpyllum* L.,

7, 8, 12, 13.

Leguminosae: *Anthyllis vulneraria* L. var. *vulgaris* (Koch.) Kerner, 4, 5, 7, 8, 10, 11, 12; *Astragalus cicer* L., 14; *A. glycyphyllos* L., 17; *Chamaecytisus austriacus* (L.) Link, 11; *Ch. hirsutus* (L.) Link, limestone rocks, 5, 7; *Ch. supinus* (L.) Link, 5, 7; *Ch. tommasinii* (Vis.) Rothm., 12; *Chamaespartium sagittale* (L.) Gibbs, 8, 11, 12, 13; *Cytisus procumbens* Link., 15; *Coronilla varia* L., 11, 14; *Dorycnium herbaceum* Vill., 5, 7, 12, 13; *Genista depressa* Bieb., 5, 7, 12; *G. ovata* W. et K., 15; *Lathyrus aphaca* L., 9; *L. latifolius* L., 11; *L. hirsutus* L., 11; *L. niger* (L.) Bernh., 1; *L. nissolia* L., 12; *L. pratensis* L., 5, 7, 9, 10, 11; *L. sylvestris* L., 10; *L. tuberosus* L., 4, 10, 12; *L. venetus* (Mill.) Wohl., 1, 2; *L. vernus* (L.) Bernh., 5, 12; *Lotus corniculatus* L., 4, 5, 7, 9, 10, 11, 13; *Medicago falcata* L., 10, 13; *M. lupulina* L., 9; *M. orbicularis* (L.) All., 10; *M. sativa* L., 14; *Melilotus albus* Medic., 14; *M. officinalis* (L.) Pall., 14; *Ononis spinosa* L., 13, 21; *Trifolium alpestre* L., 4, 5, 7, 10, 13; *T. arvense* L., 14; *T. campestre* Schreb., 19; *T. fragiferum* L., 14; *T. hybridum* L., 10; *T. medium* Huds., 10; *T. meneghinianum* Clem., 11; *T. montanum* L., 5, 8, 10, 12, 13; *T. ochroleucum* Huds., 14; *T. pallens* Schreb., 14; *T. patens* Schreb., 19; *T. pannonicum* L., 12; *T. pratense* L., 4, 5, 9, 11, 13; *T. repens* L., 3, 4, 8, 9, 11, 14; *T. strepens* Crantz, 10, 11; *Vicia angustifolia* L., 11; *V. cracca* L., 5, 7; *V. grandiflora* Scop., 10; *V. hirsuta* (L.) Gray, 17; *V. incana* Gouan, 14; *V. lutea* L., 14; *V. pannonica* Cr., 14; *V. sativa* L., 11; *V. sepium* L., 14; *V. silvatica* L., 4, 7, 12; *V. striata* Bieb., 17; *V. tenuifolia* Roth, 11; *V. tetrasperma* (L.) Schreb., 20; *V. villosa* Roth., 14, 17.

Linaceae: *Linum capitatum* Kit., 4; *L. catharticum* L., 16; *L. flavum* L., 16.

Loranthaceae: *Viscum album* L., 23.

Lythraceae: *Lythrum salicaria* L., 9.

Malaceae: *Cotoneaster integerrimus* Med., 4, 15; *C. tomentosa* (Ait.) Lindl., 7; *Crataegus monogyna* Jacq., 4, 5, 7, 13, 14; *Malus silvestris* Mill., 1, 2.; *Pirus piraster* Burgs., 5, 7; *Sorbus aucuparia* L., 1, 2, 3, 4, 6; *S. torminalis* (L.) Crantz, 1, 2; *S. aria* (L.) Crantz, 1, 2.

Malvaceae: *Malva moschata* L., 10; *M.*

silvestris L., 14.

Monotropaceae: *Monotropa hypopitys* L., 24.

Oenotheraceae: *Chamaenerion angustifolium* (L.) Scop., 16; *Circaea alpina* L., 3; *C. lutetiana* L., 1; *Epilobium collinum* Gmel., 16; *E. hirsutum* L., 9; *E. lanceolatum* Seb. et Mauri, 15; *E. montanum* L., 3, 4, 16; *E. palustre* L., 9.

Oleaceae: *Fraxinus excelsior* L., 8; *Ligustrum vulgare* L., 1.

Orobanchaceae: *Orobanche caryophyllacea* Sm., 23 on the roots of *Galium silvaticum*; *O. gracilis* Sm., 23 on the roots of *Trifolium, Cytisus*.

Oxalidaceae: *Oxalis acetosella* L., 1, 2, 3, 4, 5.

Papaveraceae: *Chelidonium majus* L., 1, 20.

Parnassiaceae: *Parnassia palustris* L., 19.

Phytolaccaceae: *Phytolacca americana* L., 14.

Pirolaceae: *Pirola chlorantha* Sw., 7; *P. minor* L., 3, 4; *Ramischia secunda* (L.) Opiz., 2, 3, 4, 5.

Plantaginaceae: *Plantago argentea* Chaix, 19; *P. atrata* Hoppe, 1, 3; *P. lanceolata* L., 4, 7, 9, 10, 11, 12; *P. major* L., 13, 14; *P. media* L. subsp. *urvilleana* Rapin, 10.

Polygalaceae: *Polygala amara* L., 11, 21; *P. comosa* Schk. var. *podolica* (DC) Hegi 7, 9, 12; *P. major* Jacq., 5, 8, 10, 12; *P. vulgaris* L., 21.

Polygonaceae: *Bilderdykia convolvulus* (L.) Dum., 17; *Polygonum bistorta* L., 19; *P. persicaria* L., 19; *P. viviparum* L., 14; *Rumex alpinus* L., 13; *R. acetosa* L., 10; *R. acetosella* L., 1, 9, 10, 11, 12; *R. kernerii* Borb., 4; *R. crispus* L., 14; *R. obtusifolius* L., 1; *R. pulcher* L., 14; *R. sanguineus* L., 1.

Primulaceae: *Anagallis arvensis* L., 14; *Lysimachia nemorum* L., 1; *L. nummularia* L., 11; *L. punctata* L., 19; *Primula acaulis* (L.) Grufb., 3, 7; *P. elatior* (L.) Grufb., 21; *P. veris* Huds., 14.

Ranunculaceae: *Aconitum variegatum* L., 1; *A. vulparia* Rchb., 1, 2; *Actaea spicata* L., 2; *Anemone nemorosa* L. f. *purpurea* (DC) Graebn., 3, 7, 16; f. *hirsuta* Wierzb., 7; *A. ranunculoides* L., 1, 2, 4, 9, 11; *A. silvestris* L., 1; *Aquilegia vulgaris* L., 15; *Caltha*

palustris L., 7, 9; *Clematis vitalba* L., 1, 14; *Consolida regalis* S.F. Gray., 14, 17; *Ficaria verna* Huds, 1; *Helleborus odorus* W. et K., 1, 2, 3, 4, 7, 8, 13; *Hepatica nobilis* Mill., 4; *Isopyrum thalictroides* L., 3, 7; *Nigella arvensis* L., 14, 21; *Ranunculus acer* L., 14, 12; *R. arvensis* L., 14, 17; *R. auricomus* L., 1; *R. bulbosus* L., 14; *R. lanuginosus* L., 14; *R. montanus* Willid., 4, 7, 11; *R. nemorosus* DC., 3, 4; *R. polyanthemus* L. f. *villosus* (Beck) Nyar., 7, 14; *R. repens* L., 3, 4; *R. sardous* Cr., 14; *R. steveni* Andrz., 11; *Thalictrum aquilegifolium* L., 1, 4, 15; *Th. flavum* L., 21; *Th. minus* L., 16, 20; *Trollius europaeus* L., 9.

Rhamnaceae: *Rhamnus fallax* Boiss., 2; *R. saxatilis* Jacq., 15.

Rosaceae: *Agrimonia eupatoria* L., 2, 4, 5, 7, 12, 13; *Alchemilla glabra* Neug., 10, 13; *A. flabellata* Buser., 5, 10, 13; *A. heterophylla* Rothm., 8, 9, 10, 12, 13; *A. monticola* Opiz., 10; *A. plicatula* Gand., 16; *Aphanes arvensis* L., 14, 17; *Filipendula hexapetala* Gilib., 10, 11, 12, 13; *F. ulmaria* (L.) Maxim., 9; *Fragaria moschata* Dausch., 21; *F. vesca* L., 1, 2, 3, 4, 5, 11, 12, 13; *F. viridis* Dausch., 21; *Geum molle* Vis. et Panc., 1; *G. urbanum* L., 13; *Potentilla alba* L., 5, 7; *P. anserina* L., 19; *P. arenaria* Bor., 16; *P. argentea* L., 8, 10, 11, 14; *P. aurea* L., 3, 4; *P. erecta* (L.) Rausch., 4, 5, 7, 8, 9, 10, 13; *P. heptaphylla* L., 5, 7; *P. hirta* L., 5, 7; *P. inclinata* Vill., 14; *P. micrantha* Ram., 5, 7; *P. recta* L., 4, 5, 7, 17; *P. reptans* L., 2, 10; *Rosa canina* L., 3, 4; *R. gallica* L., 3, 4; *R. pendulina* L., 2, 4, 5, 7, 11, 12, 13; *Rubus caesius* L., 17; *R. hirtus* W. et K., 3; *R. idaeus* L., 2, 3, 4, 5, 7; *R. saxatilis* L., 3, 5, 7, 15; *Sanguisorba minor* Scop., 5, 7, 8, 10, 11, 12, 13; *S. officinalis* L., 17.

Resedaceae: *Reseda lutea* L., 14.

Rubiaceae: *Asperula cynanchica* L. subsp. *montana* (W. K.) Stoj., 16; *A. odorata* L., 1, 2; *A. taurina* L., 1; *Galium album* Mill., 1, 11, 12, 20; *G. aparine* L., 1, 2; *G. corrudifolium* Vill., 16; *G. cruciata* (L.) Scop., 3, 10; *G. lucidum* All., 7, 13; *G. mollugo* L., 2, 8; *G. palustre* L., 9; *G. pedemontanum* All., 4; *G. pseudoaristatum* Schur, 1, 2; *G. purpureum* L., 7, 15; *G. rotundifolium* L., 4, 5, 7, 13; *G. schultesii* Vest., 1, 2, 4; *G. silvaticum* L., 1, 2, 4, 5, 7; *G. verum* Scop., 3, 5, 7, 10, 11;

G. verum L., 3, 12, 13; *Sherardia arvensis* L., 14.

Salicaceae: *Populus tremula* L., 2, 3, 6, 7; *Salix caprea* L., 2.

Sambucaceae: *Sambucus ebulus* L., 14, 21; *S. nigra* L., 1, 2; *S. racemosa* L., 2, 3, 4.

Santalaceae: *Thesium alpinum* L. var. *tenuifolium* (Saut.) A. DC., 4.

Saxifragaceae: *Chrysosplenium alternifolium* L., 3; *Saxifraga aizoon* Jacq., 5, 7, 11, 15; *S. moschata* Wulf., 15; *S. rotundifolia* L., 1, 2, 3, 4.

Scrophulariaceae: *Digitalis ambigua* Murr., 1, 2, 4; *D. ferruginea* L., 11; *Euphrasia pectinata* Ten., 16; *E. salisburgensis* Funck, 16; *E. stricta* Host, 7, 11; *E. tatarica* Fisc., 11; *Gratiola officinalis* L., 9; *Lathraea squamaria* L., 1; *Linaria vulgaris* Mill., 14, 17; *Melampyrum cristatum* L., 20; *M. nemorosum* L., 1; *M. silvaticum* L., 1, 3, 5, 7; *Odontites rubra* Gilib., 14; *Pedicularis comosa* L., 8, 11, 12; *P. heterodonta* Panc., 16; *Rhinanthus angustifolius* Gmel., 19; *R. minor* L., 9; *R. rumelicus* Velen., 10, 12; *Scrophularia laciniata* W. K., 16; *S. nodosa* L., 1, 2, 3, 5; *Verbascum blattaria* L., 19; *V. lychnitis* L., 14; *V. nigrum* L., 1; *V. phlomoides* L., 10; *V. speciosum* Schrad., 16; *Veronica anagalis-aquatica* L., 19; *V. arvensis* L., 12; *V. beccabunga* L., 9; *V. chamaedrys* L., 1, 3, 4, 5, 7, 12, 13; *V. hederifolia* L., 1; *V. montana* L., 1; *V. officinalis* L., 1, 3, 4, 5, 7, 11, 12, 13; *V. persica* Poir., 14; *V. polita* Fr., 14; *V. serpyllifolia* L. f. *intergerrima* (Beck) Ghisa., 21; *V. spicata* L., 11; *V. teucrium* L. var. *subfoccoso-tomentosa* Bormn., 7; *V. vindobunensis* (Fisc.) Fisc., 5, 7; *V. urticifolia* Jacq., 3, 4, 5.

Solanaceae: *Atropa belladonna* L., 1; *Solanum dulcamara* L., 2; *S. nigrum* L., 14.

Spireaceae: *Aruncus vulgaris* Adans., 1, 2; *Spiraea chamaedryfolia* L., 1, 2, 3, 4.

Thymelaeaceae: *Daphne mezereum* L., 1, 2, 3, 4, 5, 7.

Tiliaceae: *Tilia tomentosa* Moench., 1.

Umbelliferae: *Aegopodium podagraria* L., 1, 3, 5; *Angelica sylvestris* L., 7; *Anthriscus silvestris* (L.) Hoffm., 2; *Astrantia major* L., 1, 4, 10, 13; *Bupleurum apiculatum* Friv., 7; *B. praealtum* L., 14, 16, 5, 7; *B. sibthorpiatum*

Smith., 16; *Chaerophyllum aromaticum* L., 4; *Ch. hirsutum* L., 1, 3; *Ch. temulum* L., 1; *Daucus carota* L., 13; *Danaa cornubiensis* (Torn.) Burn., 1; *Eryngium campestre* L., 16; *Ferulago sylvatica* (Bess.) Rchb., 15; *Heracleum sphondylium* L., 14; *Laser trilobum* (L.) Borkh., 20; *Laserpitium marginatum* W. et K. var. *scabrosum* Rchb., 5, 10; *L. latifolium* L., 16; *L. siler* L., 16; *Oenanthe silaifolia* M.B., 19; *Oe. stenoloba* Schur, 19; *Pancicia serbica* Vis. f. *multisectata* Obratov, 7, 11, 21 f. *vladanii* Obratov (1993); *Pastinaca sativa* L., 14; *Peucedanum alsaticum* L., edges of 5 and 7; *P. austriacum* (Jacq.) Koch, 16; *P. cervaria* (L.) Guss., 16; *P. oreoselinum* (L.) Moench, 12; *Pimpinella major* (L.) Huds., 10; *P. saxifraga* L., 5, 11; *Sanicula europaea* L., 1, 2, 3, 4, 5, 7; *Smyrniium perfoliatum* L., 20; *Torilis anthriscus* (L.) Gmel., 14; *Trinia glauca* (L.) Dum., 16, edges of 7.

Urticaceae: *Parietaria officinalis* L., 1; *Urtica dioica* L., 2, 4, 14; *U. urens* L., 14.

Vacciniaceae: *Vaccinium myrtillus* L., 1, 2, 3, 4, 7, 8, 11, 12, 13.

Valerianaceae: *Valeriana officinalis* L., 19; *V. montana* L., 4, 16; *Valerianella dentata* Pall., 1, 14; *V. dioica* L., 9.

Verbenaceae: *Verbena officinalis* L., 14.

Violaceae: *Viola aetolica* Boiss. et Heldr., 4; *V. alba* Bess., 1; *V. arvensis* Murr., 14, 17; *V. canina* L., 10; *V. hirta* L., 12; *V. odorata* L., 16; *V. rupestris* Schm., 13; *V. silvestris* Lam., 1, 2, 3, 4, 5, 7, 11; *V. tricolor* L., 4, 8, 10, 12, 14.

LILIOPSIDA

Alismataceae: *Alisma plantago-aquatica* L., 9.

Alliaceae: *Allium flavum* L., 11; *A. fuscum* W. K., 16; *A. oleraceum* L., 1, 16; *A. pulchellum* Don., 16; *A. saxatile* M.B., 15; *A. ursinum* L., 1, 2, 7.

Amarylidaceae: *Galanthus nivalis* L., 1, 2, 3.

Araceae: *Arum maculatum* L., 1, 4.

Asparagaceae: *Convallaria majalis* L., 4; *Paris quadrifolia* L., 2, 3, 4; *Polygonatum multiflorum* (L.) All., 2; *P. odoratum* (Mill.) Druce., 16; *P. verticillatum* (L.) All., 2, 3; *Ruscus hypoglossum* L., 1.

Cyperaceae: *Carex caryophyllea* Lat., 10, 11; *C. digitata* L., 1; *C. gracilis* Curt., 9; *C.*

flacca Schre., 9; *C. leporina* L., 11; *C. montana* L., 5; *C. paniculata* L., 9; *C. pendula* Huds., 9; *C. remota* L., 19; *C. riparia* Curt., 9; *C. silvatica* Huds., 7; *C. vulpina* L., 9; *Eriophorum angustifolium* Roth., 19; *E. latifolium* Hoppe, 9; *Scirpus silvaticus* L., 9; *Shoenoplectes setaceus* (L.) Pall., 19.

Gramineae: *Achnatherum calamagrostis* (L.) P. Beauv., 15; *Agropyrum repens* (L.) Beauv., 10, 14; *Agrostis capillaris* L., 1, 4, 10, 11, 12; *Alopecurus geniculatus* L., 9; *A. pratensis* L., 9; *Anthoxanthum odoratum* L., 1, 8, 10, 11, 12; *Arrhenatherum elatius* (L.) Mert. et Koch, 10; *Brachypodium pinnatum* (L.) P. Beauv., 5, 7, 9, 11, 12; *B. silvaticum* (Huds.) P. Beauv., 2, 7, 8; *Briza media* L., 4, 8, 9, 10, 11, 12, 13; *Bromus arvensis* L., 14, 17; *B. commutatus* Schrad., 9; *B. erectus* Huds., 7, 11; *B. inermis* Leyss., 9; *B. mollis* L., 14; *B. pannonicus* Kumm. et Sendth., 15; *B. ramosus* Huds., 2; *B. sterilis* L., 11, 14; *B. tectorum* L., 10, 12; *Calamagrostis arundinacea* (L.) Roth., 8; *C. epigeios* (L.) Roth., 4, 7; *Cynosurus cristatus* L., 4, 9, 11; *C. echinatus* L., 14; *Dactylis glomerata* L., 2, 3, 5, 7, 9, 10, 12, 13; *Danthonia provincialis* Lam. et DC., 2; *Deschampsia caespitosa* (L.) P.B., 9; *D. flexuosa* (L.) Trin., 3, 8; *Festuca drymeia* Mert. et Koch, 1, 3; *F. heterophylla* Lam., 2, 5, 7; *F. ovina* L., 14, 16; *F. pratensis* Huds., 12; *F. rubra* L., 10, 12, 13; *F. silvatica* (Poll.) Vill., 2; *F. vallesiaca* Sch., 3, 15; *Holcus lanatus* L., 9; *H. mollis* L., 1; *Hordeum europaeum* (L.) All., 3; *H. murinum* L., 14; *Koeleria gracilis* Pers., 21; *K. eriostachya* Panc., 15; *K. splendens* Presl, 15; *Lolium multiflorum* Lam., 14; *L. perenne* L., 14; *Melica ciliata* L., 15; *M. nutans* L., 2, 7; *M. transsilvanica* Schur, 16; *M. uniflora* Retz., 1; *Milium effusum* L., 4; *Molinia coerulea* (L.) Moench, 20; *Nardus stricta* L., 8, 10, 11, 12. *Phleum alpinum* L., 9; *Ph. michelii* All., 11; *Ph. montanum* C. Koch, 10; *Ph. pratense* L., 10; *Poa annua* L., 13, 14; *P. bulbosa* L., 13, 14; *P. chaixii* Vill., 10; *P. nemoralis* L., 3, 5, 10; *P. pratensis* L. subsp. *angustifolia* (L.) Sm., 10; *P. trivialis* L., 11; *Sesleria autumnalis* (Scop.) F. Schultz, 7; *S. calcaria* Opiz. var. *angustifolia* Hach. et Bach., 15; *S. coerulea* Friv., 16; *Setaria glauca* (L.) P.B., 12; *S. latifolia* (Adam.) Deg., 16.

Iridaceae: *Crocus vernus* Hill., 1, 2; *Gladiolus imbricatus* L., 19; *Iris graminea* L., 19.

Juncaceae: *Juncus articulatus* L., 9; *J. conglomeratus* L., 19; *J. effusus* L., 2, 4, 9; *J. inflexus* L., 2, 4, 9; *Luzula campestris* (L.) Lam. et DC, 12; *L. forsteri* (Sm.) DC., 1, 5, 7; *L. luzulina* (Vill.) Dalla Tore et Sarnth., 5, 9, 11; *L. luzuloides* (Lam.) Dandy et Wil., 3, 4, 10; *L. pilosa* (L.) Willd., 3; *L. silvatica* (Huds.) Gaud., 4, 5, 7, 8.

Liliaceae: *Colchicum autumnale* L., 9, 10; *Gagea lutea* (L.) Ker., 21; *Erythronium dens-canis* L., 1; *Leopoldia comosa* (L.) Parl., 11; *Lilium martagon* L., 1, 2, 4, 7; *Muscari botryoides* (L.) Mill., 20, 21; *M. racemosus* (L.) Mill., 19; *Ornithogalum pyramidale* L., 10; *O. umbellatum* L., 10; *Scilla bifolia* L., 1; *Veratrum album* L. subsp. *lobelianum* (Bernh.) Rchb., 2, 4, 7, 9, 10, 11, 12; *V. nigrum* L., 4, 7.

Orchidaceae: *Anacamptis pyramidalis* (L.) Rich., 16; *Cephalanthera longifolia* (L.) Fritz., 1, 2; *C. rubra* (L.) Rich., 1; *Coeloglossum viride* (L.) Hartm., 10; *Corallorrhiza trifida* Chat., 4; *Dactylorhiza incarnata* (L.) Soó, 9; *D. maculata* (L.) Soó, 8, 11; *D. sambucina* (L.) Soo', 10; *Epipactis atrorubens* (Hoffm.) Schult., 4; *E. latifolia* (L.) All., 2; *Gymnadenia conopsea* (L.) R. Br., 9; *Listera ovata* (L.) R.Br., 19; *L. cordata* (L.) R.Br., 1, 3; *Neottia nidus-avis* (L.) Rich., 1; *Nigritella nigra* (L.) Rchb., 10; *Orchis morio* L., 9; *O. coriophora* L., 9; *O. mascula* L., 21; *O. pallens* L., 4; *O. tridentata* Scop., 7, 8; *O. ustulata* L., 16; *Platanthera bifolia* (L.) Rich., 7; *Traunsteinera globosa* (L.) Rich., 9.

The flora of Mt. Zlatar disclosed a remarkable and very interesting diversity of plants. The comparison between this region and some other mountain massifs with similar parent rock and climate such as Jastrebac (Gajic, 1992.), Golija (Gajic, 1989.) and Tara (Gajic, 1989) shows that Mt. Zlatar has greater floristic diversity.

In the spectrum of flora, the families with the majority of species are Compositae (98), Gramineae (65), Leguminosae (60), Labiatae (49), Ranunculaceae (44), Scrophulariaceae (38) and Umbelliferae, Cruciferae and Rosaceae (35) (Fig. 5). They make up more

than half of the total number of recorded taxa of all groups, from Lycopodiophyta to Magnoliophyta.

According to the IUCN (Anonymous 1994), in the group of rare species and species of international importance there are: *Asyneuma trichocalycina*, *Bruckenthalia spiculifolia*, *Cerastium moesiacum*, *Circaea alpina*, *Coeloglossum viride*, *Coralorhiza trifida*, *Dianthus cruentus*, *D. petraeus*, *Dryopteris cristata*, *Edraianthus graminifolius*, *E. tenuifolius*, *Epilobium colinum*, *Erysimum commatum*, *Euphorbia carniolica*, *E. myrsinithes*, *Euphrasia minima*, *Genista depressa*, *Gentiana nivalis*, *G. tergestina*, *Gentianella axillaris*, *G. bulgarica*, *G. ciliata*, *Hypochoeris maculata subsp. pelivanovichii*, *Leontopodium alpinum*, *Listera cordata*, *L. ovata*, *Knautia dinarica*, *K. midzorensis*, *Nigritella nigra*, *Phleum michelii*, *Pirola chlorantha*, *Plantago atrata*, *Ramischia secunda*, *Rumex alpinus*, *Schoenoplectus setaceus*, *Stachys alpina*, *St. serbica* and *Viola aetolica*.

According to the IUCN and the Vegetation of SR Serbia, in flora of the Mt. Zlatar relict species are: *Cardamine glauca*, *Carpinus betulus*, *Centaurea stoebe subsp. calvescens*, *Erythronium dens-canis*, *Hedera helix*, *Ispourum thalictroides*, *Ostrya carpinifolia*, *Pancicia serbica*, *Tamus communis*, *Trolius europaeus*, *Viscum album* and *Viola silvestris*. All of them are tertiary relicts, whereas species *Pancicia serbica* is also an endemic species.

As far as the chorological spectrum is concerned, during our study, 61 geoelements were recorded within 10 groups of geoelements. The groups of geoelements are presented in Fig. 6. From the figure we can see the following. The Central-European group has 26.96% of the species with 5 geoelements, the Euro-Asian group has 23.63% of the species with 3 geo-elements, the sub-Mediterranean group has 16.63% of the species with 26 geo-elements, the Pontic-Central-Asian group has 13.36% of the species with 14 geo-elements, the Circumpolar group has 7.84% of the species with 2 geo-elements, Boreal and subBoreal groups have 4.26% of the species with 7 geo-

Bijelo Polje (586m) 10.3 813

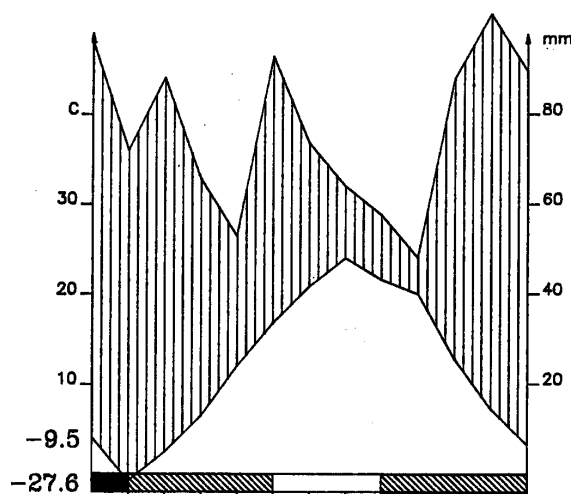


Fig. 4. Climate diagram according to Walter for Bijelo Polje.

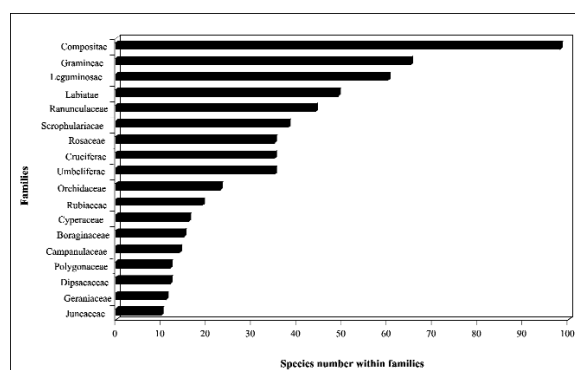


Fig. 5. Family affiliation of taxa.

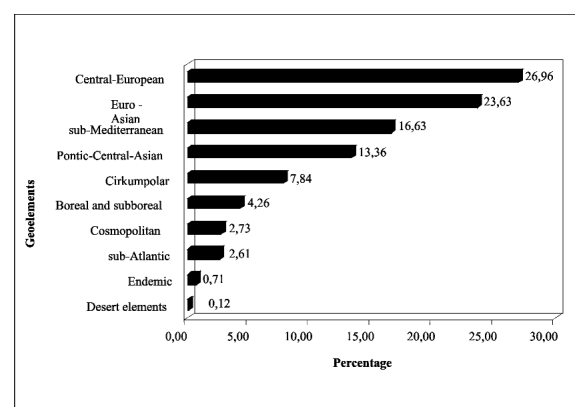


Fig. 6. Chorological spectrum.

elements. The remaining species are 2.73% cosmopolitan, 2.61% sub-atlantics group, 0.71% endemics, and finally 0.71% belonging to the Desert elements. As you can

see more than half of the flora is Central-European, Euro-Asia, sub-Mediterranean, and Pontic-Central-Asian.

An important question for the plant-geographical analysis is the relationship between the Moesian and the Illyrian group. On the basis of this analysis, it could be concluded that the Moesian group and the Moesian Province (20 species, 2.73%), were dominant, where the Illyrian Province only

consisted of a smaller number of species (11 species 1.30%).

Despite intensive anthropogenic influence, Mt. Zlatar is distinguished with great vegetation and floristic diversity. Protection and conservation of vegetation and flora is necessary. Because of that, the Institute for Nature Conservation has been put in charge for putting certain areas of Mt. Zlatar under different regimes of protection.

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Zlatar Dagi (Güneybati Sirbistan) Vasküler Florasi Cesitliliđi

Ozet

Zlatar Dagi'ni da iceren Starovlaske Planine dag sistemi, bitki cografyasi acisindan Moesian ve Illyric Bolgeleri'nin gecis hattinda yer almaktadır. Güneybati Sirbistan'daki bu daglar, spesifik bir flora ve bitki kompozisyonuna sahiptir. Diluvyum oncesi ve sonrasi donemlerin genel ekolojik faktorlerinin kumulatif etkileri, bitki tur ve topluluklarinin gelismesi icin ozel sartlar olusturmustur. Bu calismanin amaci, adi gecen bolgedeki flora cesitliliđini incelemektir. Bu, ozelde Sirbistan, genelde Balkan Yarimadası'ndaki floranin korunmasi icin cok onemlidir. Bitki ornekleri toplandıktan sonra, standart metotlar kullanilarak tanimlamalar yapılmıstır. Zlatar Dagi florası, 92 familya ve 370 cinse ait 856 tanımlanmış turden olusmaktadır. Bu flora calismasi sonunda, 38 onemli ve nadir ve 12 endemik ve relik tur oldugunu tespit edilmistir. Bitki-cografyasi analiz sonuclarına gore, 61 farklı jeo-element gosterilmektedir. Bu bilgilere dayanarak, Zlatar Dagi florası uzerinde Moesian Bolgesinin Illyric Bolgesi'nden daha büyük etkisi oldugu tespit edilmistir.

Anahtar Kelimeler: Bitki cografyasi karakteristikleri, flora cesitliliđi, Zlatar.