

## VASCULAR FLORA OF THE UVAC RIVER GORGE IN SERBIA

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**Abstract** - During research on the vascular flora of the Uvac River Gorge, 730 species and infraspecific taxa from 87 families were found. The most numerous representatives were from the families Asteraceae (81 taxa), Fabaceae (57), Poaceae (55) and Lamiaceae (47). Hemicryptophytes were the dominant life form (56,6%); in the chorological sense, the most numerous were sub-Central-European (16,3 %) and Euro-Asian species (11,5 %). The following endemic species were recorded: *Alyssum markgrafii*, *Valeriana simplicifolia*, *Cicerbita pancicii*, *Lamium bifidum balcanicum*, *Alyssum corymbosum*, *Fumana bonapartei*, *Euphorbia glabriflora*, and *Potentilla visianii*.

**Key words:** Vascular flora, endemism, Uvac River Gorge, Serbia

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### INTRODUCTION

The Uvac River runs through southwest Serbia (Fig. 1). It arises on Mt. Ozren, 14 kilometers southwest of Sjenica and joins the Lim River at around 5 km downstream from Priboj-on-Lim. The river's source is located at 1,400 m a.s.l. and is a spring of the helocrene type; the delta is at 380 m a.s.l. Length of the Uvac River is 119 km, and area of the watershed is 1,334 km<sup>2</sup>. At elevations of 985-760 m a.s.l. along the stream, the river is partitioned by three dams, which make three artificial lakes (Sjeničko, Zlatarsko, and Radoinjsko Lakes).

Relief of the Uvac River watershed is characterized by very heterogeneous geological structure. The age of rocks ranges from the Paleozoic to Quaternary. Most of the area is occupied by serpentines, marl, limestones, diabase-chert, sandstones, etc. In keeping with variety of the geological base, soils are various as well. The most frequent soils are rendzina and brownized rendzina, gray-brown soil on limestone, black and brownized black soil on serpentines, brown acid soil on crystalline rocks, mineral-pond soil, skeleton-rock soil, etc. (P a v i ć e v i ć *et al.*, 1968).

The examined area is in a zone with the humid temperate-continental and humid alpine types of climate and has average annual precipitation of 700-950 mm. During

the year, there are 98 days with persisting snow. Average monthly temperatures range from -4.6°C to 17.7°C (the average annual temperature is 7°C), and relative humidity varies from 71 to 85%.

Southwest Serbia belongs to the Illyrian Province and the Central-European biogeographic region. The potential forest vegetation would include the following communities: *Quercion frainetto* Horv., 1954; *Alno-Quercion roboris* Ht., 1938; and *Vaccinio-Piceion* Br.-Bl., 1939.

However, due to diversity of the relief, geological base, and soil, vegetation along the Uvac River is quite varied. The forest vegetation consist of substantial Scotch pine forest remains [assoc. *Pinion sylvestris* (Achingen 1933); L a k u š i ć , 1972]. Austrian pine is very rare and appears either as a single tree or in smaller groups (assoc. *Pinetum sylvestris nigrae* Pavl., 1951) (P a v l o v i ć , 1955, 1962, 1964). Through natural succession, the forests of Scotch and Austrian pine were penetrated by elements of deciduous forests, primarily *Quercus sessilis* Ehrh. and *Fagus moesiaca* (K. Malý) Czecz. In the gorges, there are degraded remains of ancient oak forests and deciduous shrub vegetation of the forest-steppe zone from the association *Prunion spinosae* Soó 1940. The part of the gorge from Lupoglava to the very beginning of Lake Zlatar is characterized by the following forest

communities: *Orno-Ostryetum carpinifoliae* Aich., 1933; *Alnetum glutinosae-Carpinetum betuli* Prov.; *Quercetum cerris* Vuk., 1966; *Quercetum petraeae-cerris* Jov., 1979; *Quercu-carpinetum* Rudski, 1949; and *Fagetum montanum* (Rudski, 1949) Jov., 1967. In the limestone areas around Radoinjsko Lake, it is possible to find communities from the association *Ostryo-Carpinion orientalis* Horv., 1954. Along the lower part of the river very near the river banks (where forests are degraded), there is a specific shrub community with *Cotinus coggygria* Scop. and *Corylus avellana* L. as the dominant species.

Occurring with higher or lower frequency along the stream are communities of the association *Alnion incanae* Tatiæ, 1969; *Alnion glutinosae* (Malc., 1929) Meier Drees, 1936; *Salicion albae* Soo, 1940; *Salicion cinereae* Müller et Görs, 1958; *Salicion elegani* Aich, 1933; and *Salici-Populetum* (Tx., 1931) Drees, 1936.

The grasses present in areas which in some places look like steppe form various communities: *Danthonietum calycinae* Cinc. et Kojia, 1956.; *Festucetum pseudoviniae* Horv., 1962; *Agrostidetum albae* Ujv., 1941; and *Molinietum coeruleae* Koch, 1926 (P a v l o v i æ 1955).

Valley meadows are found downriver from Ra-

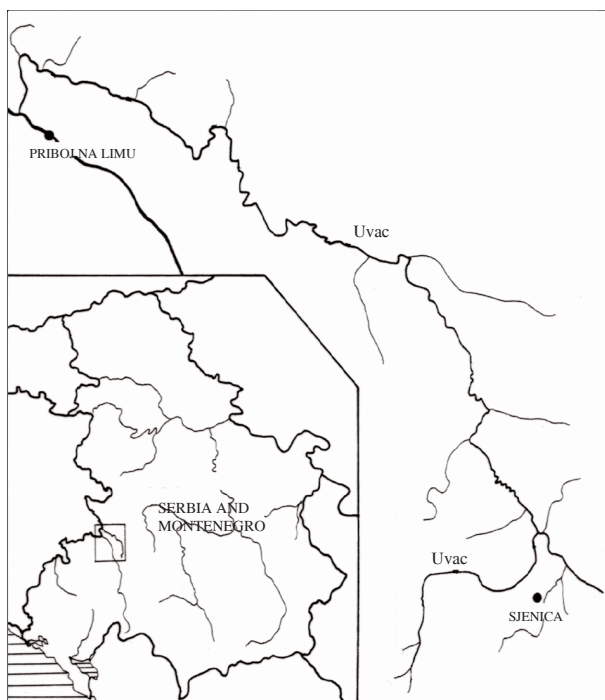


Fig. 1. Map of Serbia and Montenegro and the examined area.

dojnjsko Lake in small valleys between low hills and the river, where soil is deeper, humidity is higher, and warming is medium. This type of meadow is developed on the boundary part, which is drier and dominated by grasses. On the part closer to the water, there are swamp meadows, where *Carex* and *Juncus* species dominate and no clear line exist between the two types. There are also real swamp meadows and ponds along the stream. Throughout most of the year these are either covered with water, or else the level of underground water is very high in that area. It is possible to find bulrush and sedge as well.

The gorge of the Uvac River is a landform of rare beauty that has retained many of its features in spite of the formation of many artificial lakes nearby. In addition to great diversity of the geological and pedological structure a wide variety of vegetation is visible as well, and this give rise to the idea of conducting detailed floristic examinations. One of the goals was to confirm the potential presence of rare, endangered, and endemic species in order to protect this unique gorge as a natural wonder in the given part of Serbia. Most of the area is already under protection as a special reservation encompassing the habitat of the griffon vulture (*Gyps fulvus*).

## MATERIALS AND METHODS

Floristic investigation along the Uvac River were performed during the period from May 1998 to July 2000. Material was collected from the source to the delta. The collection has been deposited in the Herbarium of the Department of Plant Morphology and Systematics, Institute of Botany and Jevremovac Botanical Garden, Faculty of Biology in Belgrade.

The following relevant European literature was used

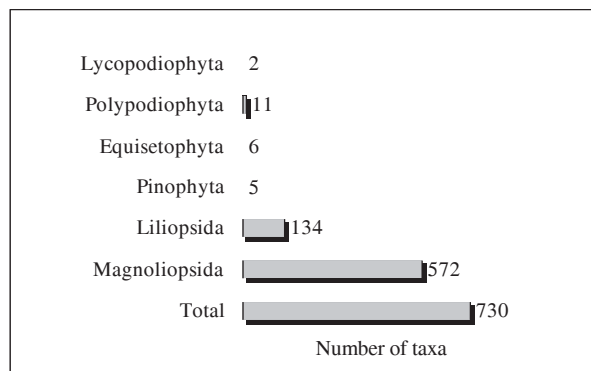


Fig. 2. Systematic units and taxa of the flora of Uvac River Gorge.

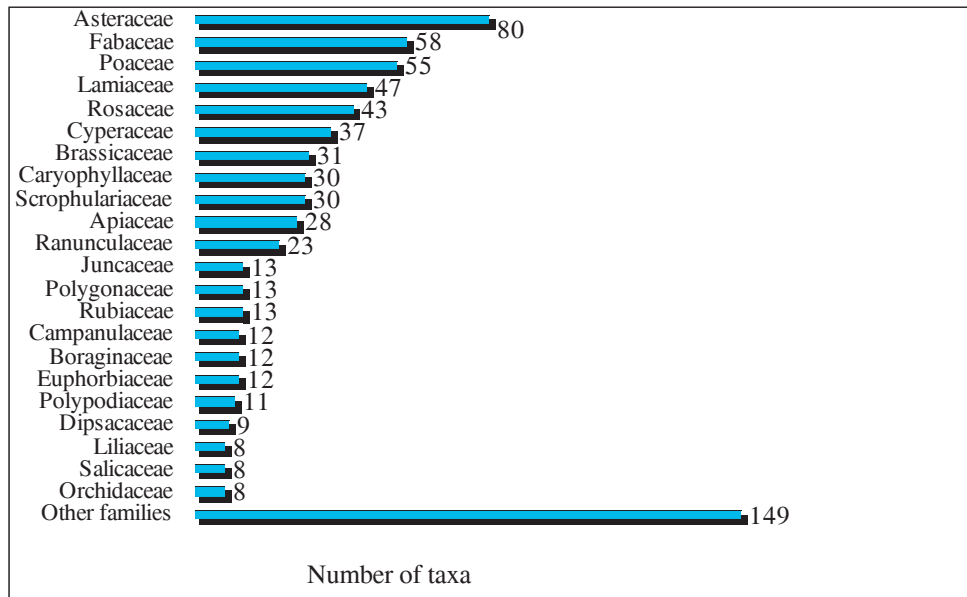


Fig. 3. Family affiliation of taxa.

for identification: J o s i f o v i c (1970–1977), S a r i c (1986), and T u t i n *et al.* (1964–1980). Floristic-geographic data are given according to G a j i æ (1980).

## RESULTS AND DISCUSSION

In examining the vascular flora along the Uvac River Gorge, we recorded 619 species, 29 subspecies, 48 varieties, and 34 forms for a total 730 taxa (Table 1), of all groups, from Lycopodiophyta to Magnoliophyta (Fig. 2). The higher taxa have been classified into 340 genera and 87 families. The families with the most species were Asteraceae (81), Fabaceae (57), Poaceae (55), Lamiaceae (47), Rosaceae (44), Cyperaceae (37), and Brassicaceae (31). They make up about half of the total number of recorded taxa (Fig. 3).

Life form analysis showed that hemicryptophytes (56,6 %) are absolutely dominant. Significant participation was also recorded for therophytes (13,4 %) and phanerophytes (11,2 %). The participation of other forms such as geophytes, chamaephytes, thero(hemicryptophytes), hemi(chamaephytes), hemi(therophytes), hemi(geophytes), geo(hemicryptophytes), chamae(hemicryptophytes) and thero(geophytes) was not substantial (Fig. 4).

As for the chorological spectrum (Fig. 5), half of the flora is of sub-Central-European (16,3 %), Euro-Asian

(11,5 %), sub-Euro-Asian (8,5 %), sub-Mediterranean (7,4 %) and Central-European (6,0 %) elements (Fig. 5). The rest (ca. 40%) are represented by circumpolar, cosmopolitan, sub-south-Siberian, sub-Pontic, Pontic, east-sub-Mediterranean, sub-Illyrian, adventive, and boreal elements or their sub-variants. The rest (ca. 10%) are either groups with three or less representatives or a single species.

The group of eight endemic species (1,1 %) consisted of: the north Scardo-Pindic endemics *Alyssum markgrafii* and *Valeriana simplicifolia*; the west Moesian-south Illyrian endemic *Cicerbita pancicii*; the west Moesian-south Dacian endemic *Lamium bifidum balcanicum*; the southeast Illyrian-northwest Scardo-Pindic endemics *Alyssum corymbosum*, *Fumana bonapartei*, and *Euphorbia glabriflora*; and the west Illyrian-northwest Scardo-Pindic endemic *Potentilla visianii*.

Several species rare in the flora of Serbia were recorded: *Fumana bonapartei*, *Knautia dinarica*, *Scrophularia canina tristis*, *Stachys scardica*, *Linaria dalmatica* var. *dalmatica*, *Gentianella crispata*, *Carex flaca* var. *clavaeformis* f. *dinarica*, *Cerastium declavens durmitoreum*, and *Selaginella selaginoides*.

It can be concluded that the Uvac River and its watershed are worth the full attention of botanists. Even partial examinations have already disclosed a remarkable

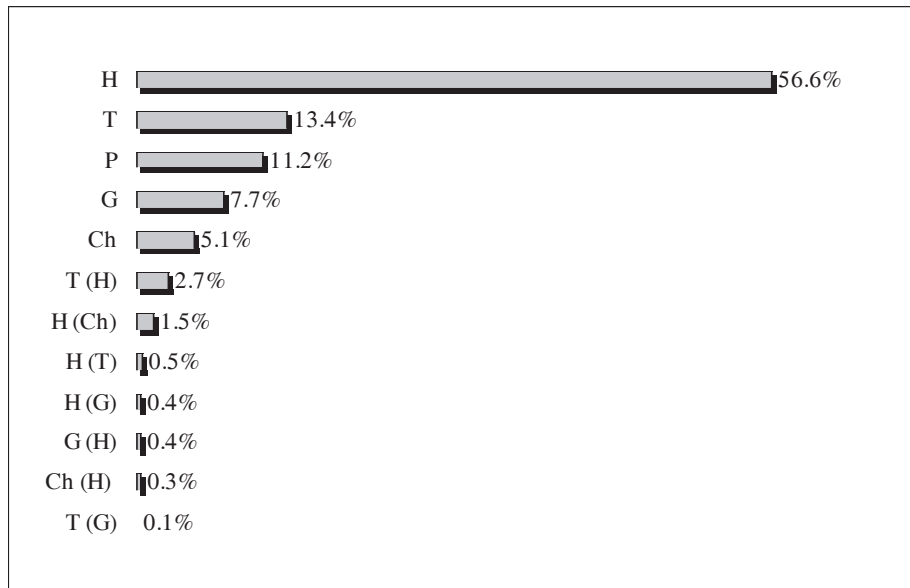


Fig. 4. Spectrum of life forms. Abbreviations: H - hemicryptophytes, T - therophytes, P - phanerophytes, G - geophytes, Ch - chamaephytes, T(H) - thero (hemicryptophytes), H(Ch) - hemi (chamaephytes), H(T) - hemi (therophytes), H(G) - hemi (geophytes), G(H) - geo (hemicryptophytes), Ch(H) - chamae (hemicryptophytes), T(G) - thero (geophytes).

and very interesting diversity of plants.

Table 1. List of taxa of vascular plants observed in the examined area.

#### LYCOPODIOPHYTA

Selaginellaceae: *Selaginella helvetica* (L.) Spring, *Selaginella selaginoides* (L.) Schrank.

#### POLYPODIOPHYTA

Polypodiaceae: *Asplenium adulterinum* Milde, *A. ceterach* L., *A. cuneifolium* Viv., *A. ruta-muraria* L., *A. trichomanes* L., *A. viride* Hudson, *Athyrium filix-femina* (L.) Roth., *Cheilanthes marantae* (L.) Domin, *Cystopteris fragilis* (L.) Bernhardt ap. Schraeder, *Polypodium vulgare* L., *Pteridium aquilinum* (L.) Kuhn.

#### EQUISETOPHYTA

Equisetaceae: *Equisetum arvense* L., *E. hyemale* L., *E. palustre* L., *E. ramosissimum* Desf., *E. sylvaticum* L., *E. variegatum* Schleich.

#### PINOPHYTA

Cupressaceae: *Juniperus communis* L., *Juniperus oxycedrus* L.

Pinaceae: *Picea abies* (L.) Karst., *Pinus nigra* Arn., *P. sylvestris* L.

#### MAGNOLIOPHYTA

Table 1. Continued.

#### MAGNOLIOPSIDA

Aceraceae: *Acer campestre* L., *A. pseudoplatanus* L., *A. tataricum* L.

Amaranthaceae: *Amaranthus retroflexus* L.

Anacardiaceae: *Cotinus coggygia* Scop.

Apiaceae: *Aegopodium podagraria* L., *Angelica sylvestris* L., *Astrantia major* L. *elatior* (Friv.) Maly. var. *elatior*, *Athamantha turbith* (L.) Broth *haynaldii* (Borbas et Uechtr.) Tutin, *Bupleurum sibthorpiatum* Smith in Sibith. & Sm. var. *diversifolium* (Roch.) Hayek, *B. veronense* Turra, *Chaerophyllum aureum* L., *C. aureum* L. var. *balcanicum* (Vel.) Hayek, *C. hirsutum* L., *C. temulum* L., *Conium maculatum* L., *Danaa cornubiensis* (Torn.) Burn., *Daucus carota* L., *Eryngium campestre* L., *Heracleum sphondylium* L., *Laser trilobum* (L.) Borkh., *Laserpitium siler* L., *L. siler* L. var. *latisectum* Thell., *Oenanthe silaifolia* M. B., *Orlaya grandiflora* (L.) Hoffm., *Pastinaca sativa* L., *Peucedanum officinale* L., *P. oreoselinum* (L.) Moenh., *Pimpinella major* (L.) Huds., *P. saxifraga* L., *Sanicula europaea* L., *Seseli rigidum* W. et K., *Torilis nodosa* (L.) Gaertn.

Araliaceae: *Hedera helix* L.

Aristolochiaceae: *Aristolochia clematitis* L., *Asarum europaeum* L.

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

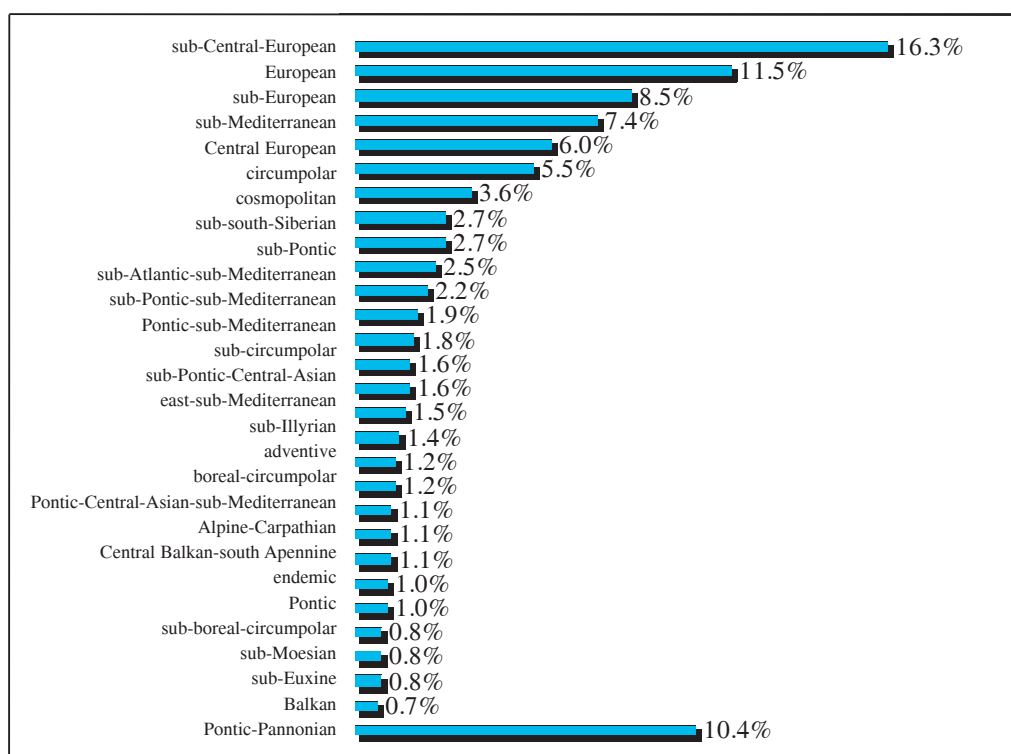


Fig. 5. Chorological spectrum.

Table 1. Continued.

Asteraceae: *Achillea ageratifolia* (Sibth. et Sm.) Boiss. var. *serbica* (Nym.) Adamovič; *A. millefolium* L., *Ambrosia artemisifolia* L., *Anthemis arvensis* L., *A. tinctoria* L., *Arctium lappa* L., *Artemisia absinthium* L., *A. lobelii* All., *A. vulgaris* L., *Aster linosyris* (L.) Bernh., *Bellis perennis* L., *Bidens tripartita* L., *Calendula officinalis* L., *Carduus acanthoides* L., *C. candicans* W. et K., *C. personata* (L.) Jacq., *Carlina vulgaris* L., *Centaurea jacea* L., *C. phrygia* L., *C. scabiosa* L. *spinulosa* (Roch.) Hayek, *C. splendens* L., *C. splendens* L. var. *splendens* f. *brunnea* (Hal.) Gajič; *C. triumfetti* All., *C. triumfetti* All. var. *triumfetti* f. *atrata* (Willd.) Borza, *Chondrilla juncea* L., *Cicerbita pancicii* (Vis.) Beauv., *Cichorium intybus* L., *Cirsium acaule* (L.) Scop., *C. candelabrum* Gris., *C. eriophorum* (L.) Scop., *C. lanceolatum* (L.) Scop., *C. oleraceum* (L.) Scop., *C. palustre* (L.) Scop., *C. rivulare* (Jacq.) Lk., *C. rivulare* (Jacq.) Lk. f. *glabratum* Rohl., *Crepis biennis* L., *C. capillaris* (L.) Wallr., *C. paludosa* (L.) Mnh., *C. setosa* Hall., *Erigeron acer* L., *E. canadensis* L., *Eupatorium cannabinum* L., *Galinsoga parviflora* Cav., *Hieracium bauhini* Bess., *H. murorum* L., *H. pavichii* Heuff., *H. pilosella* L., *H. piloselloides* Vill., *H. sabaudum* L., *H. waldsteinii* Tausch., *Hypochoeris radicata* L. f. *hispida* Peterm., *Inula britannica* L. f. *angustifolia* Mars., *Jurinea mollis* (Torn.) Rchb., *Lapsana communis* L., *L. communis* L. var. *glandulosa* Freyn., *Leontodon autumnalis* L., *L. hispidus* L., *L. hispidus* L. var. *glabratus* (Koch) Hayek, *Leucanthemum vulgare*

Table 1. Continued.

Lam., *Matricaria tenuifolia* (Kit.) Simk., *Mycelis muralis* (L.) Rchb., *Onopordon acanthium* L., *Picris hieracioides* L., *Podospermum canum* C. A. Mey, *Pulicaria dysenterica* (L.) Gaerten, *Scorzonera austriaca* Willd., *S. rosea* W. K., *Senecio rupester* W. et K., *S. vernalis* W. et K., *Solidago virgaurea* L., *Sonchus asper* (L.) Hill. *asper*, *Stenactis annua* (L.) Nees., *Tanacetum corymbosum* (L.) Sch. - Bip., *Taraxacum officinale* Web., *T. officinale* Web. *nigricans* (Kit.) Hegi, *Telekia speciosa* (Schreb.) Baumg., *Tragopogon dubius* Scop., *T. pratensis* L., *Tussilago farfara* L., *Xanthium strumarium* L.

Balsaminaceae: *Impatiens balsamina* L.

Betulaceae: *Alnus glutinosa* (L.) Gaertn., *A. incana* (L.) Moench., *Betula pendula* Roth.

Corylaceae: *Carpinus betulus* L., *Carpinus orientalis* Mill., *Corylus avellana* L., *Ostrya carpinifolia* Scop.

Boraginaceae: *Cerithe minor* L., *Cynoglossum officinale* L., *Echium rubrum* Jacq., *Echium vulgare* L., *Lithospermum officinale* L., *L. purpureo-coeruleum* L., *Myosotis arvensis* (L.) Hill., *M. palustris* (L.) Nath., *M. sylvatica* (Ehrh.) Hoffm., *M. sylvatica* (Ehrh.) Hoffm. *alpestris* (Schm.) Rohl. var. *aspera* (Vel.) Hayek, *Pulmonaria officinalis* L., *Symphytum tuberosum* L., *Aethionema saxatile* (L.) R. Br., *Alliaria officinalis* Andr.,

Table 1. Continued.

*Alyssoides utriculata* (L.) Medic., *Alyssum corymbosum* (Gris.) Boiss., *A. markgrafii* O. E. Schultz., *Arabis hirsuta* (L.) Scop., *A. hirsuta* (L.) Scop. *hirsuta* f. *angustifolia* (Vis.) V. Nikolić, *A. procurrens* Waldst. et Kitaib., *A. turrata* L., *Barbarea vulgaris* R. Br., *Berteroa incana* (L.) DC., *Capsella bursa-pastoris* (L.) Medik. f. *bursa-pastoris*, *Capsella bursa-pastoris* (L.) Medik. f. *pinnatifida* (Schlecht.) Dunjić, *Cardamine glauca* Spreng. var. *glauca*, *C. glauca* Spring., *C. impatiens* L., *Diplotaxis muralis* (L.) DC., *Draba aizoides* L. var. *athoa* (Gris.) Hayek, *Erysimum diffusum* Ehrh., *Isatis tinctoria* L., *Lepidium campestre* (L.) R. Br., *Nasturtium officinale* R. Br., *Raphanus raphanistrum* L., *Roripa silvestris* (L.) Bess., *Sisymbrium altissimum* L., *Syrenia cuspidata* (M. Bieberst.) Reichenb., *Thlaspi alliaceum* L., *T. perfoliatum* L., *T. praecox* Wulf., *T. praecox* Wulf. f. *praecox*, *T. praecox* Wulf. f. *pumilum* Beck.

Campanulaceae: *Campanula bononiensis* L., *C. glomerata* L., *C. lingulata* W. K., *C. patula* L., *C. persicifolia* L., *C. persicifolia* L. var. *persicifolia* f. *angustifolia* (Grec.) Morariu, *C. rapunculoides* L., *C. rapunculus* L., *C. rotundifolia* L., *C. rotundifolia* L. *rotundifolia*, *Edraianthus tenuifolius* (W. K.) DC., *Phyteuma spicatum* L. var. *coerulescens* Bogenh.

Cannabaceae: *Humulus lupulus* L.

Caprifoliaceae: *Lonicera alpigena* L., *L. xylosteum* L., *Viburnum lantana* L.

Caryophyllaceae: *Arenaria serpyllifolia* L. f. *viscida* DC., *Cerastium arvense* L., *C. caespitosum* Gilib., *C. decalvans* Schloss. et Vuk. *adamovici* (Vel.) Stoj. et Stef., *C. decalvans* Schloss. et Vuk. *dollineri* (Beck) Gajić, *C. decalvans* Schloss. et Vuk. *dollineri* (Beck) Gajić f. *dollineri*, *C. decalvans* Schloss. et Vuk. *durmitoreum* (Rohl.) Gajić, *C. sylvaticum* Waldst. et Kit., *Dianthus petraeus* Waldst. et Kit. *petraeus*, *D. pontederiae* Kerner, *D. sylvestris* Wulfen *sylvestris*, *Herniaria hirsuta* L., *H. incana* Lam., *Lychnis flos-cuculi* L., *Minuartia bosniaca* (Beck) K. Maly, *Moehringia muscosa* L., *M. trinervia* (L.) Clairv., *Petrorhagia prolifera* (L.) P. W. Ball. et Heywood, *P. saxifraga* (L.) Link., *Sagina saginoides* (L.) Karsten, *Saponaria officinalis* L., *Scleranthus annuus* L., *Silene alba* (Mill.) Krause, *S. nutans* L. var. *livida* (Willd.) Othl., *S. pusilla* W. et K. *quadridentata* (Murr.) Neumayer, *S. vulgaris* (Moench) Garcke., *Stellaria graminea* L., *S. holostea* L., *S. nemorum* L., *Viscaria vulgaris* Röhl., *Evonymus europaeus* L., *E. verrucosus* Scop., *E. verrucosus* Scop. var. *minor* Schm.

Ceratophyllaceae: *Ceratophyllum submersum* L.

Chenopodiaceae: *Atriplex patula* L., *Chenopodium album* L., *C. bothrys* L.

Cistaceae: *Fumana bonapartei* Maire et Pet., *Helianthemum nummularium* (L.) Mill.

Table 1. Continued.

Convolvulaceae: *Calistegia sepium* (L.) R. Br., *Convolvulus arvensis* L.

Cornaceae: *Cornus mas* L., *C. sanguinea* L.

Crassulaceae: *Sedum acre* L., *S. hispanicum* L., *S. ochroleucum* Chaix

Dipsacaceae: *Dipsacus laciniatus* L., *Knautia arvensis* (L.) Coult., *K. arvensis* (L.) Coult. var. *arvensis* f. *agrestis* (Schm.) Szabo, *K. dinarica* (Murb.) Borb., *K. dipsacifolia* (Host) Grem. et Godr., *Scabiosa columbaria* L., *S. dubia* Vel., *S. ochroleuca* L., 264. *Succisa pratensis* Moench

Ericaceae: *Erica carnea* L., *Vaccinium myrtillus* L.

Euphorbiaceae: *Euphorbia agraria* M. B. var. *subhastata* (Vis. et Panč.) Gris., *E. amygdaloides* L., *E. carniolica* Jacq., *E. chamaesyce* L., *E. cyparissias* L., *E. glabriflora* Vis., *E. helioscopia* L., *E. myrsinites* L., *E. salicifolia* Host., *E. stricta* L., *E. verrucosa* L., *E. villosa* Waldst. et Kitaib.

Fabaceae: *Amorpha fruticosa* L., *Anthyllis vulneraria* L. *polyphylla* (De Cand.) Nym., *Astragalus glycyphyllos* L. f. *bosniaca* Beck, *A. onobrychis* L. var. *chlorocarpus* (Gris.) Boiss., *Chamaecytisus ciliatus* (Wahlenb.) Rothm. var. *alpestris* (Schur) Diklić, *C. ciliatus* (Wahlenb.) Rothm. var. *ciliatus*, *C. hirsutus* (L.) Link, *C. leiocarpus* (A. Kern.) Rothm., *C. supinus* (L.) Link, *Chamaespartium sagittale* (L.) Gibbs, *Coronilla varia* L., *C. varia* L. f. *microphylla* Beck, *Cytisus decumbens* (Dur.) Spach. var. *decumbens*, *C. scoparius* (L.) Link., *Dorycnium germanicum* (Grem.) Rouy., *D. herbaceum* Vill., *Genista ovata* Waldst. et Kit., *G. ovata* Waldst. et Kit. var. *nervata* (Kit.) Fuss., *Hippocrepis comosa* L., *Lathyrus latifolius* L., *L. luteus* (L.) P. term., *L. niger* (L.) Bernh., *L. pannonicus* (Kram.) Gar., *L. pratensis* L., *L. tuberosus* L., *L. venetus* (Mill.) Wohlf., *L. vernus* (L.) Bernh., *Lembotropis nigricans* (L.) Gris., *Lotus corniculatus* L., *Medicago falcata* L., *M. lupulina* L., *M. lupulina* L. var. *willdenowiana* Koch, *M. sativa* L., *Melilotus albus* Medic., *M. officinalis* (L.) Pallas, *Ononis arvensis* L., *O. repens* L., *O. spinosa* L., *Robinia pseudo-acacia* L., *Trifolium alpestre* L., *T. arvense* L., *T. campestre* Schreb., *T. dalmaticum* Vis., *T. dubium* Sibth., *T. incarnatum* L., *T. medium* Huds., *T. montanum* L., *T. patens* Schreb., *T. pratense* L., *T. repens* L., *Vicia cracca* L., *V. cracca* L. var. *linearis* Peterm., *V. hirsuta* (L.) S. F. Gray f. *fissa* (Fröll.) Beck, *V. incana* Gouan, *V. incana* Gouan var. *stabiliana* (Ten.) Strobl., *V. sepium* L., *V. tetrasperma* (L.) Schreber, *V. villosa* Roth.

Fagaceae: *Fagus sylvatica* L., *Quercus cerris* L., *Q. petraea* (Mattuschka) Liebl.

Fumariaceae: *Corydalis ochroleuca* Koch. *leiosperma* (Conr.) Hayek.

Gentianaceae: *Centaurium umbellatum* Gilib., *Gentiana ascle-*

Table 1. Continued.

*piadea* L., *G. pneumonanthe* L., *G. utriculosa* L., *G. verna* L., *Gentianella crispata* (Vis.) Holub f. *crispata*.

Geraniaceae: *Geranium dissectum* Jusl., *G. phaeum* L., *G. robertianum* L.

Globulariaceae: *Globularia cordifolia* L.

Grossulariaceae: *Ribes petraeum* Wulf.

Hypericaceae: *Hypericum acutum* Mnch., *Hypericum barbatum* Jacq. f. *microphyllum* Novak, *Hypericum hirsutum* L., *Hypericum montanum* L., *Hypericum perforatum* L.

Juglandaceae: *Juglans regia* L.

Lamiaceae: *Ajuga chamaepitys* (L.) Schreb., *A. genevensis* L., *A. reptans* L., *Calamintha acinos* (L.) Clairv., *C. alpina* (L.) Lam. *hungarica* (Simk.) Hayek, *C. officinalis* Moench, *C. vulgaris* (L.) Druce, *Galeopsis angustifolia* Ehrh., *G. pubescens* Bess., *G. speciosa* Mill., *Glechoma hirsuta* W. et K., *Lamium bifidum* Cyrillo *balcanicum* Vel., *L. galeobdolon* (L.) Cr., *L. maculatum* L., *L. maculatum* L. var. *nemorale* Rchb., *Lycopus europaeus* L., *Melittis melissophyllum* L., *Mentha aquatica* L., *M. longifolia* (L.) Huds., *M. longifolia* (L.) Huds. f. *hollosyana* (Borb.) Hayek, *M. pubescens* Willd., *Micromeria thymifolia* (Scop.) Fritsch., *Nepeta nuda* L., *Origanum vulgare* L., *Prunella grandiflora* (L.) Schell., *P. laciniata* L., *P. vulgaris* L., *Salvia nemorosa* L., *S. pratensis* L., *S. verticillata* L., *Satureia montana* L., *Scutellaria altissima* L., *S. galericulata* L., *Stachys annua* L., *S. germanica* L., *S. officinalis* (L.) Trev., *S. recta* L., *S. recta* L. *baldaccii* (K. Maly) Hayek var. *malyi* Hayek, *S. recta* L. var. *recta*, *S. scardica* Gris., *S. sylvatica* L., *Teucrium chamaedrys* L., *T. chamaedrys* L. var. *glanduliferum* Haussk., *T. montanum* L., *T. montanum* L. var. *parnassicum* Čel., *Thymus pulegioides* L., *T. pulegioides* L. *montanus* (W.K.) Ronn.

Linaceae: *Linum austriacum* L., *L. catharticum* L. *suecicum* Hay.

Lythraceae: *Lythrum salicaria* L., *Lythrum salicaria* L. var. *tomentosus* (Mill.) DC.

Malvaceae: *Althaea hirsuta* L., *Hibiscus trionum* L.

Moraceae: *Morus alba* L.

Oenotheraceae: *Epilobium hirsutum* L.

Oleaceae: *Fraxinus ornus* L., *Ligustrum vulgare* L.

Oxalidaceae: *Oxalis acetosella* L.

Papaveraceae: *Chelidonium majus* L.

Parnassiaceae: *Parnassia palustris* L.

Table 1. Continued.

Plantaginaceae: *Plantago gentianoides* Sibth. et Smith, *Plantago holosteum* Scop., *Plantago lanceolata* L., *Plantago lanceolata* L. var. *sphaerostachya* Mert. et Koch., *Plantago major* L., *Plantago major* L. var. *intermedia* (Gilib.) Decne, *Plantago media* L.

Plumbaginaceae: *Armeria rumelica* Boiss.

Polygalaceae: *Polygala amara* L., *Polygala comosa* Schkuhr, *Polygala major* Jacq., *Polygala supina* Schreb.

Polygonaceae: *Bilderdykia convolvulus* (L.) Dum., *B. dumetorum* (L.) Dum., *Polygonum aviculare* L., *P. bistorta* L., *P. lapathifolium* L., *P. mite* Schr., *Rumex acetosa* L., *R. acetosella* L., *R. obtusifolius* L., *R. patientia* L., *R. pulcher* L., *R. sanguineus* L., *R. scutatus* L.

Portulacaceae: *Portulaca oleracea* L.

Primulaceae: *Lysimachia nummularia* L., *L. punctata* L., *L. vulgaris* L., *Primula acaulis* (L.) Grufb.

Ranunculaceae: *Anemone nemorosa* L., *Aquilegia vulgaris* L., *Caltha laeta* S. N. et Ky., *C. palustris* L., *Clematis recta* L., *C. vitalba* L., *Consolida regalis* S. F. Gray, *Helleborus odoratus* Waldst. et Kit., *Hepatica nobilis* Mill., *Ranunculus acris* L., *R. auricomus* L. var. *variifolius* Schur., *R. bulbosus* L., *R. lanuginosus* L., *R. montanus* Willd., *R. oreophilus* M. B. var. *oreophilus*, *R. polyanthemos* L. f. *villosus* (Beck) Nyar., *R. repens* L., *R. sardous* Cr., *R. stevenii* Andr., *R. trichophyllus* Chaix, *Thalictrum aquilegifolium* L., *T. flavum* L., *T. lucidum* L.

Resedaceae: *Reseda phyteuma* L.

Rhamnaceae: *Frangula alnus* Mill., *Rhamnus catharticus* L., *R. fallax* Boiss., *R. tinctorius* Wald. et Kit. f. *glabrescens* Beldie,

Rosaceae: *Agrimonia eupatoria* L., *Alchemilla vulgaris* L., *Amelanchier ovalis* Medic., *Aremonia agrimonioides* (L.) Neck., *Aruncus vulgaris* Raf., *Crataegus monogyna* Jacq., *Filipendula hexapetala* Gilib., *F. ulmaria* (L.) Max., *F. ulmaria* (L.) Max. f. *glaberrima* Beck, *F. ulmaria* (L.) Max. f. *ulmaria*, *Fragaria vesca* L., *Geum rivale* L., *G. urbanum* L., *Malus silvestris* L., *Pirus domestica* Medicus, *P. piraster* Burgsd., *Potentilla arenaria* Borkh., *P. argentea* L., *P. australis* Krašan *malyana* Novak, *P. erecta* (L.) Rauschel var. *erecta*, *P. hirta* L., *P. recta* L., *P. reptans* L., *P. reptans* L. var. *mollis* Borb. f. *microphylla* (Tratt.) Asch. et Graeb., *P. rupestris* L. var. *mollis* (Panč.) Asch. et Graebn., *P. visianii* Pančić, *P. cerasus* L., *P. mahaleb* L., *P. padus* L., *P. spinosa* L., *Rosa arvensis* Huds., *R. cannina* L., *R. pendulina* L. f. *pendulina*, *R. spinosissima* L., *Rubus caesius* L., *R. candicans* Weihe, *R. discolor* Weihe et Nees, *R. idaeus* L., *Sanguisorba minor* Scop. *minor*, *S. minor* Scop. *muricata* (Spach) Asch. et Graeb., *S. officinalis* L., *Sorbus austriaca* (Beck.) Hedl., *Spiraea media* Schm.

Table 1. Continued.

Rubiaceae: *Asperula cynanchica* L., *A. longiflora* W. et K., *Galium aparine* L., *G. boreale* L., *G. cruciata* (L.) Scop., *G. lucidum* All. f. *scabrum* (DC) Hal., *G. mollugo* L., *G. palustre* L., *G. schultesii* Vest., *G. sylvaticum* L., *G. verum* Scop., *G. verum* L., *Sherardia arvensis* L.

Salicaceae: *Populus alba* L., *P. nigra* L., *P. tremula* L., *Salix alba* L., *S. caprea* L., *S. eleagnos* Scop., *S. fragilis* L., *S. purpurea* L.

Sambucaceae: *Sambucus ebulus* L., *Sambucus nigra* L.

Saxifragaceae: *Saxifraga adscendens* L. *adscendens*, *S. aizoon* Jacq. var. *aizoon*, *S. aizoon* Jacq. var. *brevifolia* Engl.

Scrophulariaceae: *Digitalis ambigua* Murr., *D. ferruginea* L., *Euphrasia stricta* Host., *Gratiola officinalis* L., *Linaria concolor* Gris., *L. concolor* Gris. var. *rubroides* (Vis. et Panč.) Maly, *L. dalmatica* (L.) Mill. var. *dalmatica* (Gris.) Frenzl, *L. vulgaris* Mill., *Melampyrum nemorosum* L., *M. pratense* L., *M. sylvaticum* L., *Odontites rubra* Gilib., *Pedicularis campestris* Gris. et Schenk, *Rhinanthus rumelicus* Velen, *Scrophularia canina* L. *bicolor* (Smith) Greuter, *S. canina* L. *tristis* (K. Maly) V. Nikolić, *S. nodosa* L., *S. umbrosa* Dumort., *Verbascum blattaria* L., *V. densiflorum* Bertol., *V. phlomoides* L., *V. speciosum* Schrad., *Veronica anagallis-aquatica* L., *V. beccabunga* L., *V. chamaedrys* L., *V. officinalis* L., *V. persica* Poir., *V. serpyllifolia* L., *V. teucrium* L., *V. urticifolia* Jacq.

Simarubaceae: *Ailanthus altissima* (Mill.) Swing.

Solanaceae: *Solanum dulcamara* L., *S. lycopersicum* L., *S. nigrum* L.

Staphyleaceae: *Staphylea pinnata* L.

Thymelaeaceae: *Daphne blagayana* Frey., *Daphne mezereum* L.

Tiliaceae: *Tilia cordata* Miller, *T. tomentosa* Moench

Ulmaceae: *Ulmus glabra* Hudson

Urticaceae: *Urtica dioica* L.

Valerianaceae: *Valeriana montana* L., *V. montana* L. f. *integrifolia* Beck, *V. officinalis* L., *V. simplicifolia* (Reichend.) Kadath, *Valerianella locusta* (L.) Betcke, *V. rimosa* Bast. in Desv., *Verbena officinalis* L.

Violaceae: *Viola arvensis* Murr., *V. odorata* L., *V. silvestris* Lam., *Viola tricolor* L.

Vitaceae: *Vitis vinifera* L.

## LILIOPSIDA

Table 1. Continued.

Alismataceae: *Alisma plantago-aquatica* L.

Alliaceae: *Allium carinatum* L., *Narcissus poeticus* L., *N. radiiflorus* Salisb., *Arum maculatum* L., *Convallaria majalis* L., *Polygonatum odoratum* (Mill.) Druce, *Blysmus compressus* (L.) Panz., *Carex bueckii* Wimm., *C. caespitosa* L., *C. caryophyllea* Lat., *C. depauperata* Good., *C. diandra* Schrank, *C. distans* L., *C. divulsa* Good., *C. elongata* L., *C. flacca* Schreb. var. *clavaeformis* (Hoppe) Beck. f. *dinarica* (Heuff.) Kükenth., *C. flava* L., *C. flava* L. *lepidocarpa* (Tausch.) Schinz et Keller, *C. goodeanowii* J. Gay., *C. gracilis* Curt., *C. hirta* L., *C. hostiana* DC., *C. leporina* L., *C. montana* L., *C. nitida* Host., *C. oederi* Retz., *C. ornithopoda* Willd., *C. pairaei* F. Schultz., *C. pallescens* L., *C. paniculata* L., *C. paradoxa* Willd., *C. pendula* Huds., *C. remota* L., *C. riparia* Curt., *C. rostrata* Stokes. in With., *C. stellulata* Good. f. *stellulata*, *C. tomentosa* L., *C. vulpina* L. f. *nemorosa* (Rebent.) Koch, *C. vulpina* L. f. *vulpina*, *Cyperus fuscus* L., *Eriophorum latifolium* Hoppe, *Heleocharis palustris* (L.) R. Br., *Scirpus sylvaticus* L.

Dioscoreaceae: *Tamus communis* L.

Iridaceae: *Iris graminea* L., *Iris reichenbachii* Heuff.

Juncaceae: *Juncus acutiflorus* Ehrh., *J. alpinus* Vill., *J. articulatus* L., *J. articulatus* L. var. *articulatus*, *J. bufonius* L. var. *bufonius*, *J. compressus* Jacq., *J. conglomeratus* L., *J. effusus* L., *J. inflexus* L., *J. thomasi* Ten., *Luzula campestris* (L.) Lam. et DC. *campestris*, *L. luzulina* (Vill.) T. et Sar., *L. pilosa* (L.) Willd.

Liliaceae: *Colchicum autumnale* L., *Erythronium dens-canis* L., *Lilium martagon* L., *Muscari botryoides* (L.) Mill., *M. racemosum* (L.) Mill., *Ornithogalum gussonei* Ten., *O. pyramidale* L., *O. umbellatum* L.

Orchidaceae: *Dactylorhiza maculata* (L.) Soo, *D. maculata* (L.) Soo. *saccifera* (Brongn.) Diklić, *D. sambucina* (L.) Soo., *Epipactis latifolia* (L.) All., *Listera ovata* (L.) R. Br., *Orchis morio* L., *O. ustulata* L., *Platanthera bifolia* (L.) Rich.

Poaceae: *Achnatherum calamagrostis* (L.) P. Beauv., *Agropyrum caninum* (L.) P. Beauv., *A. intermedium* (Host.) P. Beauv. var. *villosum* (Sadl.) Hayek f. *villosum*, *A. repens* (L.) P. Beauv., *Agrostis alba* L. var. *alba*, *A. capillaris* L., *Alopecurus pratensis* L., *Andropogon ischaemum* L., *Anthoxanthum odoratum* L., *Arrhenatherum elatius* (L.) Mert. et Koch, *Brachypodium pinnatum* (L.) P. Beauv., *B. silvaticum* (Huds.) R. et Sch., *Briza media* L., *Bromus erectus* Huds. *fibrosus* (Hack.) St. et Stef., *B. erectus* Huds. var. *transsilvanicus* (Stend.) Beck, *B. mollis* L., *B. squarrosus* L., *Cynosurus cristatus* L., *Dactylis glomerata* L., *Danthonia provincialis* Lam. et DC., *Deschampsia caespitosa* (L.) P. B. var. *caespitosa*, *Digitaria sanguinalis* (L.) Scop., *Eragrostis minor* Host., *Festuca pratensis* Huds., *F. rubra* L., *Glyceria plicata* Fries., *Holcus lanatus* L., *Hordeum murinum*



Table 1. Continued.

L., *Koeleria gracilis* Pers. var. *colorata* (Heuff.) Dom., *K. pyramidata* (Lam.) Dom., *K. pyramidata* (Lam.) Dom. *ciliata* (Kern.) K. c. Kern., *K. splendens* Presl., *Lolium perenne* L., *Melica ciliata* L., *M. ciliata* L. var. *nebrodensis* (Parl.) Coss., *M. nutans* L., *M. picta* C. Koch., *M. uniflora* Retz., *Molinia coerulea* (L.) Moench. var. *arundinacea* (Schrk.) Aschers., *M. coerulea* (L.) Moench. var. *coerulea*, *Panicum crus-galli* L., *Phleum phleoides* (L.) Simk., *P. pratense* L. var. *pratense*, *Phragmites communis* Trin., *Poa bulbosa* L. f. *vivipara* Koel., *P. compressa* L., *P. nemoralis* L., *P. pratensis* L., *P. trivialis* L., *P. violacea* Bell., *Sesleria tenuifolia* Schrad., *Setaria glauca* (L.) P. B., *S. viridis* (L.) P. B., *Triticum villosum* (L.) M. B., *Typhoides arundinacea* (L.) Mnch.

Sparganiaceae: *Sparganium ramosum* Huds. *polyedrum* Asch. et Gr.

Typhaceae: *Typha latifolia* L., *Typha minima* Funck.

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## ВАСКУЛАРНА ФЛОРА КАЊОНА РЕКЕ УВАЦ У СРБИЈИ

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Истраживањима васкуларне flore кањона реке Увац у југозападној Србији констатовано је 730 таксона који представљају 340 родова и 87 фамилија. Најбројније фамилије су Asteraceae (81 таксон), Fabaceae (57), Poaceae (55) и Lamiaceae (47). Од животињних форми доминирају хемикриптофите (56,6%), док су у

хоролошком смислу најзаступљеније субсредњеевропске (16,3 %) и евроазијске (11,5 %) врсте. Следећи таксони су ендемити: *Alyssum markgrafii*, *Valeriana simplicifolia*, *Cicerbita pancicii*, *Lamium bifidum balcanicum*, *Alyssum corymbosum*, *Fumana bonapartei*, *Euphorbia glabriflora* и *Potentilla visianii*.