

WEED FLORA OF NATURAL GRASSLANDS IN SERBIA

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Meadow and pasture weed flora in Serbia is surveyed and ecological analysis provided. The acquired data show a very high participation of weed species in grassland areas. Weeds accounted for over 50% of overall floristic composition of the analysed meadow and pasture plant communities (48), which belong to the classes *Phragmitetea*, *Molinio-Arrhenatheretea*, *Festuco-Brometea*, *Festucetea vaginatae*, *Nardo-Callunetea* and *Juncetea trifidi*. The lowest participation of weeds was 50.7% in the class *Festuco-Brometea*, while the highest reached as much as 91.3% in the class *Phragmitetea*.

Viewed from the phytocoenological aspect, weed plants are equal with other (beneficial) coenobions in grassland areas. However, viewed from the aspect of grassland utilization they belong to an undesirable group of plants. Depending on the degree of harmfulness, grassland weeds may be differentiated into several groups: 1. plants of low forage value, consumed by livestock but only reluctantly (e.g. *Nardus stricta*); 2. prickly plants (with thorns, hooks and emergence growths) such as *Carduus sp.*, *Cirsium sp.*, *Ononis spinosa*, *Eryngium campestre*, etc., which may cause injury to the mouth, throat, stomach or intestines; and 3. poisonous species such as *Aristolochia clematitis*, *Atropa belladonna*, *Colchicum autumnale*, *Conium maculatum*, *Euphorbia sp.*, *Hyosciamun niger*, *Veratrum album* and many others, which may

cause disorders of some sort in animals and even produce fatal result when consumed in large amounts.

Key words: meadow, pasture, weeds, flora

INTRODUCTION

Flora and vegetation of natural grasslands in Serbia are remarkably rich and diverse. This wealth comes as a result of many influences of edaphic, chorographic, hydrological and climatic specificities characterizing the local swamps, valleys, hills, mounts and high mountains that are habitats of numerous natural meadows and pastures. Speaking from the phytocoenological point of view, all plant species have equal status regarding their participation in the herbaceous type of vegetation characteristic of natural grasslands. However, considering the aspect of utilization of such grasslands, all coenobions could be divided into two basic groups:

1. Desirable (beneficial) species - plants with high forage value that are preferred by livestock, and

2. undesirable (unuseful or harmful) species - plants with low forage value, prickly and poisonous species mostly avoided by livestock on pastures (MRFAT-VUKELIĆ *et al.*, 1991; KOJIĆ *et al.*, 1993). This second category of grassland coenobions may be described as weeds of meadows and pastures, i.e. undesirable elements in meadow and pasture phytocoenoses. According to data presented by KOJIĆ *et al.* (2000), such species, and their lower taxa, participate with over 50% in natural grasslands in Serbia, considering all species forming their floristic composition.

A number of domestic researchers (MRFAT-VUKELIĆ *et al.*, 1991, 1996; KOJIĆ *et al.*, 1992, 1993, 1994; KOJIĆ and VRBNIČANIN, 1998) have committed their efforts to investigation of weeds in meadows and pastures, approaching the problems from different aspects (floristic, phytocoenological, ecophysiological, practical, etc.). Considering the huge importance of this category of plants in natural meadows, both from the semantic-phytocoenological aspect and the aspect of utilization of meadows and evaluation of their quality, the objective of this investigation was to put more light onto the problem of grassland weeds by way of a floristic analysis.

MATERIALS AND METHODS

Weed flora of natural meadows and pastures in Serbia was analysed based on 48 most widespread communities classified as: *Phragmitetea* (3 associations), *Molinio-Arrhenatheretea* (12), *Festuco-Brometea* (24), *Festucetea vaginateae* (1), *Nardo-Callunetea* (4) i *Juncetea trifidi* (4), which have been described by a number of authors. These analysed communities can be found at locations from the lowest to highest altitudes in Serbia, including swampy grounds.

Determination and categorization of weed species was performed according to ŠOŠTARIĆ-PISAČIĆ and KOVAČEVIĆ (1968), KLAPP (1986) and KOJIĆ *et al.* (2000).

Plant life-forms were determined based on literature including: RAUNKIAER (1934), ELLENBERG (1979) and BRAUN-BLANQUET (1964).

Floral elements were determined using the following literature sources: HORVAT *et al.*, (1974) and GAJIĆ (1984).

Ecological indices and indicators of habitat values for the most important environment factors - humidity (F), soil pH (R), nutrients (nitrogen) in soil (N), light (L) and temperature (T) - are given according to LANDOLT (1977) and KOJIĆ *et al.*, (1997).

RESULTS AND DISCUSSION

A total of 549 weed species was found in 48 most widespread associations in natural grasslands in Serbia (Table 1). Such a high number of undesirable plant species on meadows and pastures can be explained, according to STAHLIN (1977), CAPUTA (1984) and KLAPP (1986), as the result of: excessive soil moisturization, which makes soil insufficiently aired; impoverishment of soil, which raises soil pH; shading; overly fine soil texture; damage caused by frost and erosion; and excessive mowing and pasture. In other words, deterioration of conditions existing on a habitat allows an expansion of species with high competitiveness, and those are precisely the weed species. Table 1 shows that this large number of weed species falls into 231 genera and 52 families. Regarding the number of weed species, the most prominent are the families: *Asteraceae* (85 korovskih vrsta), *Poaceae* (44), *Scrophulariaceae* (37), *Caryophyllaceae* (36), *Lamiaceae* (34), *Rosaceae* (24), *Cyperaceae* (22) and *Fabaceae* (19).

Table 1. Grassland weeds of Serbia

Life form	Weed species	Floral element	Ecological index
1. Fam. Alliaceae			
G	<i>Allium carinatum</i> L.	Euks.	24244
G	<i>Allium cupani</i> Raf.	Subm.	23144
G	<i>Allium flavescens</i> Bess.	Pont.	23244
G	<i>Allium flavum</i> L.	Pont.-subm.	23244
G	<i>Allium moschatum</i> L.	Pont.-subm.	25144
G	<i>Allium pulchellum</i> Don.	Pont.-subm.	14143
G	<i>Allium rotundum</i> L.	Pont.-subm.	24245
G	<i>Allium scorodoprasum</i> L.	Se.	43435
G	<i>Allium vineale</i> L.	Se.	23344

2. Fam. Amaryllidaceae			
G	<i>Narcissus rudiiflorus</i> Sal.	Alp.	33443
3. Fam. Apiaceae			
G	<i>Aegopodium podagraria</i> L.	Evr.-karp.	33423
H	<i>Angelica silvestris</i> L.	Evr.	43333
T	<i>Bupleurum affine</i> Sadl.	Pont.	14244
T	<i>Bupleurum apiculatum</i> Friv.	Mez.	23244
H	<i>Bupleurum ranunculoides</i> L.	Cirk.	24242
H	<i>Bupleurum sibthorpiantum</i> S.S.	Balk.	13143
H	<i>Eryngium campestre</i> L.	Pont.-subm.	14344
G	<i>Oenanthe fistulosa</i> L.	Subse.	54344
H	<i>Oenanthe silaifolia</i> M.B.	Pont.-subm.	43244
T	<i>Orlaya grandiflora</i> (L.) Hoffm.	Subm.	14244
TH	<i>Pastinaca sativa</i> L.	Evr.	34343
H	<i>Peucedanum alsaticum</i> L.	Pont.	24344
H	<i>Peucedanum arenarium</i> W.et K.	Pont.	15144
TH	<i>Torilis anthriscus</i> (L.) Gmel.	Subse.	34433
T	<i>Torilis arvensis</i> (Huds.) Link.	Subevr.	24344
4. Fam. Apocynaceae			
H	<i>Vinca herbacea</i> W.et K.	Pont.	25144
5. Fam. Aristolochiaceae			
G	<i>Aristolochia clematitis</i> L.	SUBM.	34434
6. Fam. Asteraceae			
T	<i>Ambrosia artemisifolia</i> L. 23344	Adv.	
H	<i>Anthemis carpatica</i> Willd.	Karp.	22244
T	<i>Anthemis ruthenica</i> Willd.	Pont.	22244
H	<i>Arctium lappa</i> L.	Evr.	33544
zc	<i>Artemisia absinthium</i> L.	Subj.-sib.	23454
zc	<i>Artemisia campestris</i> L.	Pont.	13244
H	<i>Artemisia vulgaris</i> L.	Cirk.	33443
H	<i>Aster linosyris</i> (L.) Bernh.	Pont.-subm.	14144
H	<i>Bellis perennis</i> L.	Subse.	33343
T	<i>Bidens tripartitus</i> L.	Subse.	43443
H	<i>Carduus acanthoides</i> L.	Subse.	23444
H	<i>Carduus candicans</i> W.et K.	Pont.	33344
H	<i>Carduus carduelis</i> (L.) Kern.	Ilir.-apen.	23244
TH	<i>Carduus nutans</i> L.	Subevr.	24343
H	<i>Carlina acaulis</i> L.	Se.	23243
H	<i>Carlina utzka</i> Hack.	Subm.	23433
H	<i>Carlina vulgaris</i> L.	Evr.	24234
T	<i>Carthamus lanatus</i> L.	Pont.-subm.	13345
H	<i>Centaurea affinis</i> Friv.	Subm.	23344

H	<i>Centaurea arenaria</i> M.B.	Pont.	23144
H	<i>Centaurea dubia</i> Sut.	Pont.	
H	<i>Centaurea jacea</i> L.	Subevr.	33343
H	<i>Centaurea kotschiana</i> Heuff.	End.	23244
H	<i>Centaurea phrygia</i> L.	Se.	33242
H	<i>Centaurea scabiosa</i> L.	Pont.	24243
TH	<i>Centaurea solstitialis</i> L.	Pont.–subm.	23344
TH	<i>Centaurea splendens</i> L.	Subm.	33344
H	<i>Centaurea stoebe</i> L.	Se.	24244
H	<i>Centaurea triumphetti</i> All.	Subse.	24233
H	<i>Chondrilla juncea</i> L.	Pont.–subm.	24344
H	<i>Cichorium intybus</i> L.	Subevr.	24354
H	<i>Cirsium acaule</i> (L.) Scop.	Subse.	24242
TH	<i>Cirsium afrum</i> (Jacq.) DC	Mez.	22244
G	<i>Cirsium arvense</i> (L.) Scop.	Subevr.	33444
H	<i>Cirsium canum</i> (L.) All.	Pont.	43333
H	<i>Cirsium eriophorum</i> (L.) Scop.	Subse.	24343
H	<i>Cirsium lanceolatum</i> (L.) Scop.	Subevr.	33433
G	<i>Cirsium pannonicum</i> (L.) Link.	Pont.	23234
H	<i>Crepis biennis</i> L.	Subse.	33333
H	<i>Crepis conyzifolia</i> (Gou.) D.T.	Se.	32342
TH	<i>Crepis foetida</i> L.	Pont.–subm.	23344
T	<i>Crepis viscidula</i> Froel.	Mez.	23243
T	<i>Crupina vulgaris</i> Cass.	Pont.–subm.	13245
H	<i>Echinops banaticus</i> Roch.	Subm.	32254
H	<i>Erigeron acer</i> L.	Cirk.	24243
TH	<i>Erigeron canadensis</i> L.	Adv.	23344
H	<i>Eupatorium cannabinum</i> L.	Subse.	44333
T	<i>Filago arvensis</i> L.	Subse.	12244
T	<i>Filago germanica</i> L.	Subm.	12245
H	<i>Hieracium bauhini</i> Bess.	Pont.	24245
H	<i>Hieracium cymosum</i> L.	Pont.	24234
H	<i>Hieracium echioides</i> Lumn.	Evr.	14144
H	<i>Hieracium hoppeanum</i> Schult.	Se.	23242
H	<i>Hieracium murorum</i> L.	Subse.	23323
H	<i>Hieracium pavichii</i> Heuff.	Subbalk.	23244
H	<i>Hieracium pilosella</i> L.	Subse.	23143
H	<i>Hieracium piloselloides</i> Vill.	Subse.	24244
H	<i>Hieracium umbellatum</i> L.	Cirk.	22233
H	<i>Inula conyza</i> DC	Subatl.–subm.	24233
H	<i>Inula oculus-cristi</i> L.	Pont.	24244
G	<i>Jurinea mollis</i> Rchb.	Subbalk.	25244
TH	<i>Lactuca quercina</i> L.	Pont.	33233
TH	<i>Lactuca serriola</i> L.	Pont.–subm.	23354
H	<i>Leontodon hispidus</i> L.	Subse.	33343
H	<i>Leucanthemum vulgare</i> Lam.	Evr.	33344
TH	<i>Matricaria inodora</i> L.	Evr.	33333

G	<i>Petasites hybridus</i> (L.) G.M.Sch.	Subse.	43433
H	<i>Picris hieracioides</i> L.	Pont.	24343
H	<i>Scorzonera rosea</i> W.et K.	Alp.-karp.	23244
H	<i>Senecio doria</i> Nath.	Pont.-subm.	43234
H	<i>Senecio erucifolius</i> L.	Subj.-sib.	24244
H	<i>Senecio jacobaea</i> L.	Subevr.	33343
H	<i>Serratula tinctoria</i> L.	Subevr.	34243
H	<i>Sonchus arvensis</i> L.	Evr.	33433
TH	<i>Sonchus oleraceus</i> L.	Subevr.	34444
H	<i>Sonchus palustris</i> L.	Se.	54434
H	<i>Tanacetum corymbosum</i> (L.) Sch.-Bip	Pont.-subm.	242
TH	<i>Tragopogon balcanicus</i> Vel.	Mez.	12244
H	<i>Tragopogon pratensis</i> L.	Evr.	23343
T	<i>Xanthium italicum</i> Morr.	Adv.	33345
T	<i>Xanthium spinosum</i> L.	Adv.	13445
T	<i>Xanthium strumarium</i> L.	Adv.	33445
T	<i>Xeranthemum annuum</i> L.	Pont.-subm.	13245
T	<i>Xeranthemum foetidum</i> Mnch.	Pont.-subm.	22244
7. Fam. Boraginaceae			
H	<i>Anchusa italica</i> Retz.	Subm.	13245
H	<i>Anchusa officinalis</i> L.	Subse.	23345
TH	<i>Echium italicum</i> L.	Subm.	14345
TH	<i>Echium rubrum</i> Jacq.	Pont.	33244
H	<i>Echium vulgare</i> L.	Subse.	13354
TH	<i>Lithospermum arvense</i> L.	Evr.	23333
TH	<i>Myosotis arvensis</i> (L.) Hill.	Subevr.	23332
T	<i>Myosotis collina</i> Hoffm.	Subse.	13243
G	<i>Myosotis palustris</i> (L.) Nath.	Evr.	43333
H	<i>Myosotis silvatica</i> (Ehrh.) Hoffm.	Subevr.	33432
H	<i>Nonnea pulla</i> (L.) Lam.et DC	Pont.	24334
H	<i>Onosma arenarium</i> W.et K.	Pont.	14144
H	<i>Symphytum officinale</i> L.	Subse.	43432
8. Fam. Brassicaceae			
zc	<i>Alyssum montanum</i> L.	Pont.-subm.	14144
TH	<i>Capsella bursa-pastoris</i> (L.) Med.	Kosm.	23343
H	<i>Cardamine pratensis</i> L.	Cirk.	43332
zc	<i>Draba aizoides</i> L.	Alp.-karp.	24242
T	<i>Draba verna</i> L.	Subcirk.	23243
TH	<i>Lepidium campestre</i> (L.) R.Br.	Subm.	24343
H	<i>Lepidium draba</i> L.	Pont.-subm.	24334
H	<i>Rorippa austriaca</i> (Cr.) Bess.	Pont.	43334
H	<i>Rorippa pyrenaica</i> (L.) Rchb.	Subm.	32443
TH	<i>Syrenia cana</i> (P.M.) Neilr.	Pont.	25144

9. Fam. Butomaceae			
G	<i>Butomus umbellatus</i> L.	Evr.	53433
10. Fam. Campanulaceae			
H	<i>Edrianthus graminifolius</i> (L.) DC	Ilir.–apen.	22244
H	<i>Jasione orbiculata</i> Gris.	Subbalk.	21423
11. Fam. Caprifoliaceae			
NP	<i>Lonicera caprifolium</i> L.	Subm.	34234
12. Fam. Caryophyllaceae			
TH	<i>Arenaria serpyllifolia</i> L.	Evr.	23344
zc	<i>Cerastium arvense</i> L.	Cirk.	23243
zc	<i>Cerastium banaticum</i> (Roch.) Heuff.	Mez.	32244
T	<i>Cerastium brachypetalum</i> Pers.	Subatl.–subm.	14144
zc	<i>Cerastium caespitosum</i> Gilib.	Kosm.	33332
H	<i>Cerastium decalvans</i> Schl.–Vukot.	Balk.	22244
T	<i>Cerastium dubium</i> (Host.)Schw.	Pont.–subm.	33234
TH	<i>Cerastium glomeratum</i> Thuill.	Kosm.	33343
H	<i>Cerastium moesiacum</i> Friv.	Mez.	22234
T	<i>Cerastium pumilum</i> Curt.	Subse.	14244
TH	<i>Cerastium semidecandrum</i> L.	Subse.	23242
TH	<i>Dianthus armeria</i> L.	Se.	23244
H	<i>Dianthus barbatus</i> L.	Subm.	33233
H	<i>Dianthus carthusianorum</i> L.	Subm.	23243
H	<i>Dianthus cruentus</i> Gris.	End.	23344
zc	<i>Dianthus deltoides</i> L.	Evr.	22243
H	<i>Dianthus giganteus</i> D'Urv.	Subbalk.	22244
H	<i>Dianthus pallens</i> S.et S.	Subm.	24244
H	<i>Dianthus petraeus</i> W.et K.	End.	35344
H	<i>Dianthus pinifolius</i> S.et S.	Mez.	13144
H	<i>Dianthus pontedere</i> Kern.	Subpan.	24244
H	<i>Dianthus scardicus</i> Wettst.	End.	23244
H	<i>Lychnis coronaria</i> (L.) Desr.	Pont.	23244
H	<i>Lychnis flos-cuculi</i> L.	Subj.–sib.	43343
H	<i>Minuartia glomerata</i> (M.B.) Deg.	Pont.	13244
zc	<i>Minuartia verna</i> (L.) Hiern.	Cirk.	14153
T	<i>Moenchia mantica</i> (L.) Bartol.	Subm.	33234
H	<i>Paronichia kapela</i> (Hacq.) Kern.	Subm.	15144
H	<i>Petrorhagia illyrica</i> Ball.–Heyw.	Subm.	24244
zc	<i>Petrorhagia saxifraga</i> (L.) Link.	Subm.	23244
TH	<i>Scleranthus annuus</i> L.	Subevr.	21233
H	<i>Scleranthus dichotomus</i> Schur.	Subbalk.	14144
zc	<i>Scleranthus perennis</i> L.	Subse.	12143
TH	<i>Silene alba</i> (Mill.) Krause	Subevr.	23443
H	<i>Stellaria graminea</i> L.	Evr.	32333
H	<i>Viscaria vulgaris</i> Rochl.	Subse.	33233

13. Fam. Chenopodiaceae			
T	<i>Corispermum nitidum</i> Kit.	Pont.	14155
T	<i>Kochia arenaria</i> Roth.	Adv.	22245
14. Fam. Cistaceae			
dc	<i>Fumana procumbens</i> (Dun.) Gr. et God	Pont.–subm.	
dc	<i>Helianthemum canum</i> (L.) Baumg.	Subse	25244
dc	<i>Helianthemum nummularium</i> (L.) Mill. 24144	Subse	
dc	<i>Helianthemum oelandicum</i> (L.) DC	Se	25244
T	<i>Helianthemum salicifolium</i> (L.) Mill.	Subm.	13245
T	<i>Tuberaria guttata</i> (L.) Fourr.	Subatl.–subm.	22254
15. Fam. Convolvulaceae			
G	<i>Calystegia sepium</i> (L.) R.Br.	Evr.	44433
zc	<i>Convolvulus canthabricus</i> L.	Pont.–subm.	14145
16. Fam. Crassulaceae			
zc	<i>Sedum acre</i> L.	Subevr.	13153
zc	<i>Sedum album</i> L.	Subse.	13153
TH	<i>Sedum annuum</i> L.	Subevr.	22152
TH	<i>Sedum atratum</i> L.	Alp.–karp.	34252
TH	<i>Sedum hispanicum</i> Boiss.	Subm.	12144
zc	<i>Sedum ochroleucum</i> Chaix	Subm.	14145
H	<i>Sedum sartorianum</i> Boiss.	Mez.	15144
H	<i>Sedum sexangulare</i> L.	Se.	24253
H	<i>Sempervivum marmoreum</i> Gris.	Subpan.	22244
17. Fam. Cuscutaceae			
T	<i>Cuscuta epithimum</i> L.	Subevr.	23143
T	<i>Cuscuta europaea</i> L.	Evr.	22344
18. Fam. Cyperaceae			
H	<i>Carex caryophylla</i> Lat.	Evr.	23243
H	<i>Carex distans</i> L.	Evr.	44344
G	<i>Carex divisa</i> Huds.	Subevr.	44344
H	<i>Carex divulsa</i> Good.	Subcirk.	33234
H	<i>Carex gracilis</i> Curt.	Subse.	43333
G	<i>Carex hirta</i> L.	Subevr.	33333
H	<i>Carex leporina</i> L.	Subcirk.	32233
H	<i>Carex michelii</i> Host.	Euks.	23244
H	<i>Carex montana</i> L.	Subse.	23233
H	<i>Carex panicea</i> L.	Cirk.	43243
H	<i>Carex paniculata</i> L.	Subse.	54243
H	<i>Carex pilulifera</i> L.	Evr.	32333
G	<i>Carex praecox</i> Schreb.	Evr.	23243
G	<i>Carex riparia</i> Curt.	Subcirk.	54344

H	<i>Carex rupestris</i> Bell.	Subevr.	24151
H	<i>Carex spicata</i> Huds.	Subse.	33233
G	<i>Carex tomentosa</i> L.	Subj.–sib.	34233
H	<i>Carex vulpina</i> L.	Subevr.	33244
G	<i>Eleocharis palustris</i> (L.) Roem.–Sch.	Kosm.	53243
H	<i>Eriophorum latifolium</i> Hoppe	Subbor.	54243
G	<i>Schoenoplectus lacuster</i> (L.) Palla	Kosm.	53344
G	<i>Scirpus silvaticus</i> L.	Cirk.	43233
19. Fam. Dipsacaceae			
T	<i>Cephalaria transsilvanica</i> (L.) Schr.	Pont.–subm.	13144
TH	<i>Dipsacus laciniatus</i> L.	Pont.–subm.	34445
H	<i>Knautia arvensis</i> (L.) Coult.	Subse.	23243
H	<i>Knautia dinarica</i> (Murb.) Borb.	Iilir.–apen.	33243
H	<i>Knautia drymeia</i> Heuff.	Se.	33323
T	<i>Knautia integrifolia</i> (L.) Bert.	Subm.	33344
H	<i>Scabiosa dubia</i> Vel.	Balk.	24232
H	<i>Scabiosa ochroleuca</i> L.	Pont.	14243
H	<i>Scabiosa portae</i> Kern.	Iilir.–apenin.	24345
H	<i>Scabiosa ucrainica</i> L.	Pont.–subm.	15155
20. Fam. Equisetaceae			
G	<i>Equisetum arvense</i> L.	Cirk.	33333
G	<i>Equisetum palustre</i> L.	Cirk.	43243
G	<i>Equisetum telmateia</i> Erhart.	Cirk.	43233
21. Fam. Ericaceae			
dc	<i>Arctostaphylos uva-ursi</i> (L.) Spr.	Subbor.	23232
dc	<i>Bruckenthalia spiculifolia</i> Rchb.	Mez.	22343
22. Fam. Euphorbiaceae			
H	<i>Euphorbia cyparissias</i> L.	Evr.	23243
H	<i>Euphorbia esula</i> L.	Evr.	34343
T	<i>Euphorbia falcata</i> L.	Pont.–subm.	24344
H	<i>Euphorbia glabriflora</i> Vis.	End.	13144
H	<i>Euphorbia glareosa</i> M.B.	Pont.	24144
T	<i>Euphorbia helioscopia</i> L.	Subevr.	33444
H	<i>Euphorbia lucida</i> W.et K.	Pont.	43233
T	<i>Euphorbia platiphyllos</i> L.	Subm.	33334
H	<i>Euphorbia salicifolia</i> Host.	Pont.	33334
H	<i>Euphorbia seguierana</i> Neck	Pont.	23244
H	<i>Euphorbia virgata</i> W.et K.	Pont.	33334
23. Fam. Fabaceae			
H	<i>Astragalus dasyanthus</i> Pall.	Pont.	14144
H	<i>Astragalus onobrychis</i> L.	Pont.	52434
dc	<i>Chamaecytisus albus</i> (Hacq.) Rothm.	Pont.	24144

dc	<i>Chamaecytisus austriacus</i> (L.) Link	Pont.	14144
dc	<i>Chamaecytisus heuffellii</i> (Wierz.) Rot.	Subpan.	15244
dc	<i>Chamaecytisus hirsutus</i> (L.) Link	Subm.	23234
dc	<i>Chamaecytisus ratisborensis</i> (L.) Rot.	Pont.	24134
dc	<i>Chamaecytisus supinus</i> (L.) Link	Pont.-subm.	13234
H	<i>Chamaespartium sagittale</i> (L.) Gilib.	Subatl.-subm.	22144
H	<i>Coronilla varia</i> L.	Pont.	24233
dc	<i>Dorycnium herabaceum</i> Vill.	Subm.	14234
H	<i>Galega officinalis</i> L.	Subm.	43334
dc	<i>Genista depressa</i> M.B.	Mez.	23244
dc	<i>Genista ovata</i> W.et K.	Pont.	22244
dc	<i>Genista radiata</i> (L.) Scop.	Subm.	14242
dc	<i>Genista tinctoria</i> L.	Subse.	32243
H	<i>Glycyrrhiza echinata</i> L.	Pont.-subm.	33244
zc	<i>Ononis arvensis</i> L.	Subse.	24243
zc	<i>Ononis spinosa</i> L.	Subse.	23245
24. Fam. Genetianaceae			
TH	<i>Centaurium umbellatum</i> Gilib.	Subse.	33343
H	<i>Gentiana asclepiadea</i> L.	Se.	34333
TH	<i>Gentiana austriaca</i> A.et J. Kern.	Subbalk.	32144
H	<i>Gentiana kochiana</i> Peer.et Song.	Alp.-karp.	33242
H	<i>Gentiana lutea</i> L.	Subbalk.	34242
H	<i>Gentiana pneumonante</i> L.	Evr.	43143
T	<i>Gentiana utriculosa</i> L.	Se.	44242
25. Fam. Geraniaceae			
TH	<i>Erodium cicutarium</i> (L.) L'Herit.	Evr.	23343
T	<i>Geranium columbinum</i> L.	Evr.	23343
T	<i>Geranium dissectum</i> Jusl.	Evr.	23344
TH	<i>Geranium molle</i> L.	Subevr.	23343
TH	<i>Geranium pusillum</i> L.	Subse.	23444
H	<i>Geranium sanguineum</i> L.	Pont.	24233
26. Fam. Globulariaceae			
zc	<i>Globularia cordifolia</i> L.	Alp.-karp.	25152
27. Fam. Hypericaceae			
H	<i>Hypericum alpinum</i> W.et K.	Subbalk.	23333
H	<i>Hypericum barbatum</i> Jacq.	Subbalk.	34233
H	<i>Hypericum maculatum</i> Cr.	Subj.-sib.	32232
H	<i>Hypericum perforatum</i> L.	Subevr.	23333
dc	<i>Hypericum richeri</i> Vill.	Subm.	34332
H	<i>Hypericum rumelicum</i> Boiss.	Mez.	25333
28. Fam. Iridaceae			
G	<i>Crocus biflorus</i> Mill.	Subbalk.	23344

G	<i>Crocus veluchensis</i> Herb.	Subbalk.	23243
G	<i>Gladiolus imbricatus</i> L.	Pont.	23233
G	<i>Iris graminea</i> L.	Pont.–subm.	24334
G	<i>Iris pseudacorus</i> L.	Subse.	53433
G	<i>Iris pumila</i> L.	Pont.	24233
G	<i>Iris sibirica</i> L.	Evr.	44243
29. Fam. Juncaceae			
H	<i>Juncus articulatus</i> L.	Cirk.	43243
H	<i>Juncus atratus</i> Kock.	Subj.–sib.	44233
G	<i>Juncus compressus</i> (L.) Schrad.	Evr.	43343
H	<i>Juncus conglomeratus</i> L.	Cirk.	42343
H	<i>Juncus effusus</i> L.	Kosm.	42333
H	<i>Juncus inflexus</i> L.	Subcirk.	44343
H	<i>Juncus thomasi</i> Ten.	Mez.	52233
H	<i>Juncus trifidus</i> L.	Arkt.	22151
H	<i>Luzula campestris</i> (L.) Lam.et DC	Kosm.	33243
H	<i>Luzula luzuloides</i> (Lam.) Don.	Se.	32223
H	<i>Luzula spicata</i> (L.) Lam.et DC	Arkt.	22141
30. Fam. Lamiaceae			
TH	<i>Ajuga chamaepitys</i> (L.) Schreb.	Subatl.–subm.	24244
H	<i>Ajuga genevensis</i> L.	Evr.	23233
H	<i>Ajuga reptans</i> L.	Subse.	33333
TH	<i>Calamintha acinos</i> (L.) Clairv.	Pont.	14143
H	<i>Calamintha alpina</i> (L.) Lam.	Subm.	24344
H	<i>Calamintha vulgaris</i> (L.) Druce	Cirk.	34243
G	<i>Marrubium perregrinum</i> L.	Pont.	23344
G	<i>Mentha aquatica</i> L.	Evr.	53333
G	<i>Mentha longifolia</i> (L.) Huds.	Subse.	44433
G	<i>Mentha pulegium</i> L.	Subse.	43334
H	<i>Nepeta nuda</i> L.	Pont.	24133
G	<i>Origanum vulgare</i> L.	Evr.	23233
H	<i>Prunella laciniata</i> L.	Pont.–subm.	23244
H	<i>Prunella vulgaris</i> L.	Subevr.	33343
H	<i>Salvia nemorosa</i> L.	Pont.	23244
H	<i>Salvia pratensis</i> L.	Subse.	23344
H	<i>Salvia verticillata</i> L.	Pont.–subm.	32344
G	<i>Scutellaria hastifolia</i> L.	Pont.	43334
T	<i>Sideritis montana</i> L.	Pont.	14345
H	<i>Stachys germanica</i> L.	Pont.–subm.	24344
H	<i>Stachys officinalis</i> (L.) Trev.	Subse.	33243
G	<i>Stachys palustris</i> L.	Cirk.	43333
H	<i>Stachys recta</i> L.	Pont.	24243
H	<i>Stachys scardica</i> Gris.	Sk.–pind.	32344
dc	<i>Teucrium chamaedrys</i> L.	Pont.–subm.	24143
H	<i>Teucrium scordium</i> L.	Subse.	44244

zc	<i>Thymus albanus</i> H.Br.	End.	23244
zc	<i>Thymus glabrescens</i> Willd.	Pont.	14245
zc	<i>Thymus jankae</i> Čel.	Mez.	23244
zc	<i>Thymus marschallianus</i> Willd.	Pont.	23244
zc	<i>Thymus moesiacus</i> Vel.	Subbalk.	13235
dc	<i>Thymus pannonicus</i> All.	Pont.	24133
zc	<i>Thymus pulegioides</i> L.	Subse.	23143
zc	<i>Thymus serpyllum</i> L.	Se.	12143
31. Fam. Liliaceae			
G	<i>Colchicum autumnale</i> L.	Se.	33333
G	<i>Leopoldia comosa</i> (L.) Parl.	Subm.	23344
G	<i>Muscari bortyoides</i> (L.) Mill.	Pont.–subm.	23344
G	<i>Ornithogalum pyrenaicum</i> L.	Subatl.–subm.	33335
G	<i>Ornithogalum umbellatum</i> L.	Subse.	34344
H	<i>Veratrum album</i> L.	Evr.	33343
H	<i>Veratrum nigrum</i> L.	Evr.	24333
32. Fam. Linaceae			
TH	<i>Linum angustifolium</i> Huds.	Subatl.–subm.	23245
H	<i>Linum austriacum</i> L.	Pont.–subm.	14244
TH	<i>Linum catharticum</i> L.	Subse.	33133
H	<i>Linum flavum</i> L.	Pont.	24144
T	<i>Linum gallicum</i> L.	Subm.	13245
H	<i>Linum hologynum</i> Rchb.	Mez.	13143
33. Fam. Lythraceae			
H	<i>Lythrum salicaria</i> L.	Pont.–subm.	43333
H	<i>Lythrum virgatum</i> L.	Subj.–sib.	43333
34. Fam. Malvaceae			
H	<i>Althaea officinalis</i> L.	Pont.	33345
H	<i>Malva moschata</i> L.	Subatl.–subm.	24343
TH	<i>Malva silvestris</i> L.	Evr.	23444
35. Fam. Orchidaceae			
G	<i>Dactylorrhiza incarnata</i> (L.) Soo	Evr.	44243
G	<i>Dactylorrhiza maculata</i> (L.) Soo	Subevr.	33233
G	<i>Dactylorrhiza sambucina</i> (L.) Soo	Se.	33233
G	<i>Gymnadenia conopsea</i> (L.) R.Br.	Evr.	34233
G	<i>Orchis coriophora</i> L.	Subatl.–subm.	34244
G	<i>Orchis laxiflora</i> Lam.	Subatl.–subm.	43245
G	<i>Orchis mascula</i> L.	Subse.	34233
G	<i>Orchis morio</i> L.	Subse.	23233
G	<i>Orchis papilionacea</i> L.	Subm.	14245
G	<i>Orchis ustulata</i> L.	Subse.	33243
G	<i>Traunsteinera globosa</i> (L.) Rchb.	Se.	33223

36. Fam. Orobanchaceae			
G	<i>Orobanche purpurea</i> Jacq.	Pont.–subm.	23244
37. Fam. Plantaginaceae			
H	<i>Plantago altissima</i> L.	Subm.	43244
H	<i>Plantago holosteum</i> Scop.	Subm.	23244
H	<i>Plantago major</i> L.	Evr.	33343
H	<i>Plantago media</i> L.	Evr.	24243
38. Fam. Poaceae			
H	<i>Agrostis rupestris</i> All.	Karp.	22141
T	<i>Aira capillaris</i> Host.	Subm.	12155
T	<i>Alopecurus utriculatus</i> Pers.	Subatrl.–subm.	33345
H	<i>Andropogon ischaemum</i> L.	Pont.–subm.	23255
H	<i>Beckmannia eruciformis</i> (L.) Host.	Cirk.	34233
H	<i>Brachypodium pinnatum</i> (L.) P.B.	Subj.–sib.	24333
H	<i>Brachypodium silvaticum</i> (L.) P.B.	Subj.–sib.	33333
H	<i>Briza media</i> L.	Evr.	33243
T	<i>Bromus arvensis</i> L.	Evr.	23334
T	<i>Bromus hordeaceus</i> Beck.	Subm.	33333
H	<i>Bromus pannonicus</i> Kumm.–Send.	Subpan.	24244
T	<i>Bromus racemosus</i> L.	Se.	43333
T	<i>Bromus secalinus</i> L.	Subevr.	33334
T	<i>Bromus squarrosus</i> L.	Subm.	23344
T	<i>Bromus sterilis</i> L.	Subevr.	23433
T	<i>Bromus tectorum</i> L.	Evr.	13344
H	<i>Calamagrostis epigeios</i> (L.) Roth.	Evr.	33333
H	<i>Chrysopogon gryllus</i> (L.) Trin.	Pont.–subm.	23245
G	<i>Cynodon dactylon</i> (L.) Pers.	Kosm.	23345
H	<i>Deschampsia caespitosa</i> (L.) P.B.	Subcirk.	43433
H	<i>Deschampsia flexuosa</i> (L.) Trin.	Cirk.	32223
H	<i>Festuca ovina</i> L.	Subevr.	22243
H	<i>Holcus lanatus</i> L.	Evr.	33343
H	<i>Koeleria eriostachya</i> Panč.	Subbalk.	14242
H	<i>Koeleria glauca</i> DC	Evr.	24133
H	<i>Koeleria gracilis</i> Pers.	Cirk.	14143
H	<i>Koeleria nitidula</i> Vel.	Euks.	12244
H	<i>Koeleria pyramidata</i> (Lam.) Dom.	Se.	23243
H	<i>Koeleria splendens</i> Presl.	Subm.	14245
H	<i>Molinia coerulea</i> (L.) Mnch.	Cirk.	43143
H	<i>Nardus stricta</i> L.	Subbor.	31242
G	<i>Phragmites communis</i> Trin.	Kosm.	53333
T	<i>Psilurus aristatus</i> (L.) Duv.–Jouve	Subm.	22244
H	<i>Sesleria coeruleans</i> Friv.	Subbalk.	12244
H	<i>Sesleria tenuifolia</i> L.	Iilir.–apen.	24244
T	<i>Setaria viridis</i> (L.) P.B.	Subevr.	23444
H	<i>Sieglingia decumbens</i> (L.) Bernh.	Subse.	32143

G	<i>Sorghum halepense</i> (L.) Pers.	Kosm.	22345
H	<i>Stipa capillata</i> L.	Pont.-subm.	14255
H	<i>Stipa joannis</i> Čel.	Pont.	13253
H	<i>Stipa sabulosa</i> (Pacz.) Slj.	Subj.-sib.	24143
T	<i>Tragus racemosus</i> (L.) Desf.	Kosm.	14355
T	<i>Vulpia ciliata</i> (Dant.) Lk.	Subm.	12345
T	<i>Vulpia myuros</i> (L.) Gmel.	Kosm.	12244
39. Fam. Polygalaceae			
H	<i>Polygala comosa</i> Schk.	Subj.-sib.	14143
G	<i>Polygala major</i> Jacq.	Pont.-subm.	14144
H	<i>Polygala vulgaris</i> L.	Evr.	23143
40. Fam. Polygonaceae			
T	<i>Polygonum arenarium</i> W. et K.	Pont.	13244
T	<i>Polygonum aviculare</i> L.	Kosm.	33443
H	<i>Polygonum bistorta</i> L.	Subbor.	43333
T	<i>Polygonum lapathifolium</i> L.	Subcirk.	33433
T	<i>Polygonum persicaria</i> L.	Evr.	33433
H	<i>Polygonum viviparum</i> L.	Arkt.	33242
H	<i>Rumex acetosa</i> L.	Evr.	33343
H	<i>Rumex acetosella</i> L.	Subcirk.	21153
H	<i>Rumex conglomeratus</i> Murr.	Subevr.	43444
H	<i>Rumex crispus</i> L.	Evr.	33343
H	<i>Rumex hydrolapatum</i> Huds.	Subse.	53433
H	<i>Rumex pulcher</i> L.	Subm.	23344
H	<i>Rumex thyrsoiflorus</i> Fing.	Evr.	23343
41. Fam. Polyodiaceae			
G	<i>Pteridium aquilinum</i> (L.) Kuhn.	Kosm.	32233
42. Fam. Primulaceae			
T	<i>Anagallis arvensis</i> L.	Kosm.	33333
zc	<i>Lysimachia nummularia</i> L.	Subse.	43323
H	<i>Lysimachia punctata</i> L.	Pont.	43333
H	<i>Lysimachia vulgaris</i> L.	Evr.	43333
H	<i>Primula elatior</i> (L.) Grubf.	Subj.-sib.	33423
H	<i>Primula veris</i> Huds.	Subse.	24243
43. Fam. Ranculaceae			
H	<i>Adonis vernalis</i> L.	Pont.	14245
zc	<i>Clematis recta</i> L.	Pont.	24234
P	<i>Clematis vitalba</i> L.	Subatl.-subm.	34333
H	<i>Helleborus odoratus</i> W. et K.	Subbalk.	31234
H	<i>Ranunculus acer</i> L.	Subj.-sib.	33333
H	<i>Ranunculus auricomus</i> L.	Evr.	43334
H	<i>Ranunculus bulbosus</i> L.	Subse.	24243

H	<i>Ranunculus millefoliatus</i> Vahl.	Subm.	23244
H	<i>Ranunculus montanus</i> Willd.	Alp.-karp.	34332
H	<i>Ranunculus oreophilus</i> M.B.	Se.	24242
H	<i>Ranunculus polyanthemus</i> L.	Pont.	23234
H	<i>Ranunculus repens</i> L.	Evr.	43333
T	<i>Ranunculus sardous</i> Cr.	Subse.	43344
TH	<i>Ranunculus sceleratus</i> L.	Cirk.	44544
G	<i>Ranunculus steveni</i> Andrz.	Pont.-subm.	43244
H	<i>Ranunculus velutinus</i> Ten.	Subm.	43344
H	<i>Thalictrum foetidum</i> L.	Evr.	24232
H	<i>Trollius europaeus</i> L.	Subbor.	43342
44. Fam. Rosaceae			
H	<i>Agrimonia eupatoria</i> L.	Evr.	24343
P	<i>Crataegus monogyna</i> Jacq.	Subse.	34243
dc	<i>Dryas octopetala</i> L.	Arkt.	24251
H	<i>Filipendula hexapetala</i> Gilib.	Evr.	23244
H	<i>Fragaria vesca</i> L.	Evr.	33333
H	<i>Geum montanum</i> L.	Alp.-karp.	32242
H	<i>Potentilla anserina</i> L.	Subcirk.	33443
zc	<i>Potentilla arenaria</i> Borkh.	Subj.-sib.	14244
H	<i>Potentilla argentea</i> L.	Pont.	13143
H	<i>Potentilla aurea</i> L.	Subm.	32242
H	<i>Potentilla erecta</i> (L.) Räusch.	Evr.	33232
H	<i>Potentilla heptaphylla</i> Jusl.	Subse.	24234
H	<i>Potentilla hirsuta</i> L.	Pont.-subm.	32244
H	<i>Potentilla recta</i> L.	Pont.	13245
H	<i>Potentilla reptans</i> L.	Evr.	33233
H	<i>Potentilla ternata</i> Koch.	Mez.	23244
NP	<i>Prunus spinosa</i> L.	Pont.	24344
NP	<i>Rosa arvensis</i> Huds.	Subatl.-subm.	34334
NP	<i>Rosa canina</i> L.	Subse.	33233
NP	<i>Rosa gallica</i> L.	Pont.-subm.	23234
NP	<i>Rosa pendulina</i> L.	Se.	34232
NP	<i>Rubus caesius</i> L.	Subj.-sib.	43534
NP	<i>Rubus canescens</i> DC	Pont.-subm.	23344
NP	<i>Rubus idaeus</i> L.	Cirk.	33433
45. Fam. Rubiaceae			
H	<i>Asperula cynanchica</i> L.	Pont.-subm.	14244
H	<i>Galium album</i> Mill.	Subse.	24333
G	<i>Galium boreale</i> L.	Cirk.	34233
G	<i>Galium constrictum</i> Chaub.	Subm.	43235
G	<i>Galium cruciatum</i> (L.) Scop.	Subse.	33343
H	<i>Galium mollugo</i> L.	Subse.	33333
G	<i>Galium palustre</i> L.	Subevr.	53233
T	<i>Galium pedemontanum</i> All.	Subm.	23254

H	<i>Galium purpureum</i> L.	Subm.	33344
G	<i>Galium verum</i> L.	Evr.	24243
T	<i>Sherardia arvensis</i> L.	Kosm.	24344
46. Fam. Sambucaceae			
G	<i>Sambucus ebulus</i> L.	Pont.	34444
47. Fam. Scrophulariaceae			
H	<i>Digitalis laevigata</i> W.et K.	Iilir.–apen.	23244
G	<i>Digitalis lanata</i> Ehrh.	Subbalk.	25244
T	<i>Euphrasia rostkoviana</i> Hayne	Subse.	33244
T	<i>Euphrasia stricta</i> Host.	Subse.	34334
G	<i>Gratiola officinalis</i> L.	Cirk.	53234
H	<i>Linaria genistifolia</i> (L.) Mill.	Pont.	24244
H	<i>Linaria vulgaris</i> Mill.	Subse.	33343
T	<i>Melampyrum pratense</i> L.	Subbor.	31233
H	<i>Pedicularis campestris</i> Gris.–Schenk.	Mez.	34444
H	<i>Pedicularis comosa</i> L.	Subm.	33332
H	<i>Pedicularis heterodonta</i> Panč.	End.	34243
T	<i>Rhinanthus angustifolius</i> Gmel.	Subse.	33242
T	<i>Rhinanthus minor</i> L.	Subse.	33243
T	<i>Rhinanthus rumelicus</i> Vel.	Subbalk.	33243
H	<i>Scrophularia nodosa</i> L.	Evr.	33323
TH	<i>Verbascum banaticum</i> Roch.	Mez.	23343
H	<i>Verbascum chaixii</i> Vill.	Subm.	23244
TH	<i>Verbascum longifolium</i> Ten.	End.	13154
H	<i>Verbascum lychnitis</i> L.	Pont.	13444
H	<i>Verbascum nigrum</i> L.	Evr.	23433
TH	<i>Verbascum phlomooides</i> L.	Pont.–subm.	24345
H	<i>Verbascum phoeniceum</i> L.	Pont.	24245
H	<i>Veronica anagallis–aquatica</i> L.	Subcirk.	53343
T	<i>Veronica arvensis</i> L.	Subse.	33333
zc	<i>Veronica austriaca</i> L.	Pont.–subm.	14143
H	<i>Veronica beccabunga</i> L.	Subevr.	53433
H	<i>Veronica bellidioides</i> L.	Alp.–karp.	21141
G	<i>Veronica chamaedrys</i> L.	Subse.	33333
H	<i>Veronica crassifolia</i> Wierzb.	Mez.	23144
H	<i>Veronica jacquinii</i> Baumg.	Pont.	22133
T	<i>Veronica peregrina</i> L.	Adv.	43444
T	<i>Veronica polita</i> Fries.	Subse.	24433
zc	<i>Veronica prostrata</i> L.	Evr.	23344
G	<i>Veronica serpyllifolia</i> L.	Subcirk.	33333
H	<i>Veronica spicata</i> L.	Pont.	13144
zc	<i>Veronica teucrium</i> L.	Evr.	24233
T	<i>Veronica verna</i> L.	Subse.	12144

48. Fam. Solanaceae			
dc	<i>Solanum dulcamara</i> L.	Subevr.	43433
T	<i>Solanum nigrum</i> L.	Kosm.	33443
49. Fam. Urticaceae			
H	<i>Urtica dioica</i> L.	Evr.	33533
50. Fam. Vacciniaceae			
dc	<i>Vaccinium myrtillus</i> L.	Subbor.	31222
dc	<i>Vaccinium uliginosum</i> L.	Subbor.	41233
dc	<i>Vaccinium vitis-idaea</i> L.	Subbor.	32232
51. Fam. Valerianaceae			
H	<i>Valeriana officinalis</i> L.	Evr.	44333
TH	<i>Valerianella carinata</i> Lois.	Pont.–subm.	24344
T	<i>Valerianella dentata</i> (L.) Pall.	Pont.–subm.	23343
52. Fam. Violaceae			
TH	<i>Viola arvensis</i> Murr	Evr.	33333
H	<i>Viola canina</i> L.	Cirk.	32143
H	<i>Viola dacica</i> Borb.	Mez.	24234
H	<i>Viola hirta</i> L.	Subj.–sib.	24133
T	<i>Viola kitaibeliana</i> R.et Schult.	Subpont.	23244
TH	<i>Viola tricolor</i> L.	Evr.	33333

Biodiversity of weeds on natural grasslands appears even greater when infraspecies diversity is considered. The total number of infraspecies taxa is 945, including 249 subspecies, 347 varieties and 349 forms.

Table 2. The spectrum of life forms in Serbia's grassland weed flora

Life forms	No. of species	%
Hemikriptofite (H) / Hemicryptophytes	281	50.57
Geofite (G) / Geophytes	86	15.46
Terofite (T) / Therophytes	82	14.91
Terohemikriptofite (TH) / Therohemicyptophytes	41	7.73
Zeljaste hamefite (zc) / Herbaceous chameophytes	27	4.84
Drvenaste hamefite (dc) / Weedy chameophytes	21	4.33
Nanofanerofite (nP) / Nanopharenophytes	9	1.81
Fanerofite (P) / Phanerophytes	2	0.32
Ukupno / Total	549	100

Table 3. Participation of floral elements in the grassland weed flora of Serbia

Floral elements	No. of species	%
Evroazijski (Evr.) / Eurasian	75	13.66
Subsrednjeevropski (Subse.) / Sub-Central-European	68	12.39
Submediteranski (Subm.) / Sub-Metedierranean		
Srednjeevropski (Se.) / Central-European	54	9.83
Cirkumpolarni (Cirk.) / Circumpolar		
Pontsko-submediteranski (Pont.-subm.) / Pontic-Sub-Mediterranean	52	9.47
	45	8.20
Subevroazijski (Subevr.) / Sub-Eurasian	36	6.56
Pontski (Pont.) / Pontic		
Kosmopolitski (Kosm.) / Cosmopolitan	33	6.01
Adventivni (Adv.) / Advenive	30	5.46
Subpontsko-submediteranski (Subpont.-subm.) / Sub-Pontic-Sub-Mediterranean	28	5.10
	17	3.10
Subatlansko-submediteranski (Subatl.-subm.) / Sub-Atlantic-Sub-Mediterranean	17	3.10
Subjužnosibirski (Subj.-sib.) / Sub-South-Siberian	16	2.91
Subcirkumpolarni (Subcirk.) / Sub-Circumpolar		
Subbalkanski (Subbalk.) / Sub-Balkan	13	2.37
Mezijski (Mez.) / Mesian		
Subborealni (Subbor.) / Sub-Boreal	11	2.00
Alpsko-karpatiski (Alp.-karp.) / Alps-Carpathian		
Endemski (End.) / Endemic	11	2.00
Ilirsko-apeninski (Ilir.-apen.) / Illirian-Apenine	11	2.00
Subpanonski (Subpan.) / Sub-Panonian	8	1.46
Arktički (Arkt.) / Arctic	5	0.91
Euksinski (Euks.) / Euxin		
Balkanski (Balk.) / Balkan	5	0.91
Karpatiski (Karp.) / Carpathian	4	0.73
	4	0.71
	2	0.36
	2	0.36
	1	0.18
	1	0.18
Total	549	100.00

Besides the high taxonomic diversity of weeds in meadows and pastures, ecological diversity is highly pronounced and reflects in a large number of life forms. A total of 8 life forms was determined: hemicryptophytes, geophytes, therophytes, therohemcryptophytes, herbaceous chameophytes, weedy chameophytes, nanopharenophytes, and phanerophytes (Table 2).

In floro-geographic respect, weeds of meadows and pastures are considerably diverse. As many as 25 geo-elements are represented in the weed flora of natural grasslands. The most widespread and most important are the following geo-elements: Eurasian, Sub-Middle-European, Sub-Mediterranean, Circumpolar, Sub-Pontic and Central-European floral elements (Table 3).

Table 4. Participation of weed species of particular categories

Class	Total No. of species	Very poisonous species	Slightlypoisonous species	Worthless species
<i>Phragmitetea</i>	interval 56.8-91.3	4.3	11.4-15.8	45.4-73.9
	x= 72.2	4.3	13.4	59.3
<i>Molinio-Arrhenatheretea</i>	interval 56.9-75.6	1.1-5.0	4.8-19.7	43.4-58.5
	x= 67.6	3.1	13.2	51.5
<i>Festuco-Brometea</i>	interval 50.7-70.0	0.9-5.0	7.7-20.0	35.0-53.2
	x= 60.3	3.8	12.8	45.7
<i>Festucetea vaginatae</i>	interval 74.6	3.2	11.1	60.3
	x= 74.6	3.2	11.1	60.3
<i>Nardo-Callunetea</i>	interval 58.7-64.4	1.4-4.8	11.9-15.1	42.9-47.9
	x= 60.3	2.1	13.1	45.2
<i>Juncetea trifidi</i>	interval 58.3-71.1	1.6-3.4	5.0-13.5	53.3-55.7
	x= 65.5	1.7	9.5	54.3

Such geographic structure of grassland weeds indicates a somewhat continental character of the analysed flora, which agrees with the general character of the entire herbaceous flora and vegetation of the Serbian region (JANKOVIĆ, 1985). The highest number of species was found in swampy grassland communities of the class *Phragmitetea* - 72.2%, while the lowest number belonged to the classes *Festuco-Brometea* and *Nardo-Callunetea* - 60.3%. Participation of some weed categories (very poisonous, slightly poisonous and worthless) varies and is shown in Table 4.

Especially interesting is the group of very poisonous weeds, including 23 species (4.19%) found in this investigation. The highest number of species (11) belong to the family *Euphorbiaceae*, genus *Euphorbia* (spurges). Following on the list are species of the family *Equisetaceae* (3 species of the genus *Equisetum*) and as many species of the family *Liliaceae*. These are followed by two species each of the families *Ranunculaceae* and *Scrophulariaceae* and one each poisonous weed species of the families *Polypodiaceae* and *Aristolochiaceae*. The most poisonous and consequently most dangerous weeds of natural grasslands in Serbia are: *Aristolochia clematitis*, *Equisetum* sp., *Euphorbia* sp., *Colchicum autumnale*, *Veratrum album*, *Digitalis lanata*, *Ranunculus* sp., *Pteridium aquilinum*, *Rhinanthus* sp., etc.

Weeds of natural grasslands require special attention as they may cause considerable difficulties and problems when consumed in any way by grazing livestock or humans. These justified reasons have inspired us to chose to focus our future research on very poisonous weeds of natural grasslands of Serbia.

CONCLUSION

Based on our analysis of 48 meadow and pasture plant communities across Serbia, the following conclusions are suggested:

- weeds on natural grasslands participate significantly in the floristic composition of meadow and pasture phytocoenoses, ranging between 50.7% and as much as 91.3% of the total number of species;
- a total of 549 weed species belonging to 231 genera and 52 families were found;
- the number of infraspecies taxa was found to be very high: 249 subspecies, 347 varieties and 349 forms;
- hemicryptophytes (56.57%) are the largest category of the 8 weed life forms found;
- grassland weeds are characterised by high floro-geographic diversity
- 25 geo-elements were found, including predominantly Eurasian, Sub-Middle-European, Sub-Mediterranean, Circumpolar and Sub-Eurasian;
- poisonous plants, the most dangerous category of weeds on grasslands, account for 4% of all species.

Due to such high participation of weed species in the total flora of meadows and pastures in Serbia, this problem requires more attention in future research, both from the floristic and phytocoenological aspect, and from the practical aspect, in the sense of taking certain steps to control and suppress them.

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KOROVSKA FLORA PRIRODNIH TRAVNJAKA SRBIJE

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I z v o d

U radu je analizirano 48 travnjačkih zajednica Srbije. Ispitivane su i močvarne i vlažne livade, submontane, montane i alpske travnjačke fitocenoze.

Utvrđeno je ukupno 549 vrsta na travnjačkim staništima korova. Ove korovske vrste klasifikovane su u 231 rod iz 52 familije. Sledeće familije su naročito bogate u pogledu broja korovskih vrsta: *Asteraceae* (85 korovskih vrsta), *Poaceae* (44), *Scrophulariaceae* (37), *Caryophyllaceae* (36), *Lamiaceae* (34), *Rosaceae* (24), *Cyperaceae* (22) i *Fabaceae* (19).

Korovske vrste pokazuju veliku infraspecijsku raznovrstnost i uključuju 249 podvrsta, 347 varijeteta i 349 formi. Što se tiče biološkog spektra, dominiraju hemikriptofite (50,57%). Horološka analiza pokazuje da u korovskoj flori travnjaka Srbije učestvuje 25 različitih geoelemenata, od čega više od 50% pripada flornim elementima velikih površina rasprostranjenja: evroazijskom, subevroazijskom, srednje-evropskom i kosmopolitskom.

Procenat prisustva korovskih vrsta je od 50,7% (u klasi *Festuco-Brometea*) do 91,3% (u klasi *Phragmitetea*).

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