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ORIGINAL RESEARCH PAPER

FLORISTIC DIVERSITY OF DUGO POLJE (MODRIČA, N BOSNIA AND HERZEGOVINA)

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SYNOPSIS

Dugo Polje is situated in N Bosnia and Herzegovina nearby Modriča. This area was floristically investigated during vegetation season 2012. A total number of 162 vascular plant taxa were collected and systematically arranged into 129 genera and 53 families. Dicotyledones (86.4%) were the most numerous within Spermatophyta, and Monocotyledones were represented with 21 taxa (13%). The most numerous in species and subspecies were families: Leguminosae (9.9%), Compositae (9.3%), Labiatae (8%) and Gramineae (8%). The life forms spectrum showed that dominant life form were hemicryptophytes (36.4%) and geophytes (20.4%). The most dominant floral element was the Sub-Central European (25.5%). Among the whole flora one taxon is listed in "The List of plant taxa for Red Book of Flora of Bosnia and Herzegovina". Adventive plants were represented with 9 taxa (5.6%).

Ključne riječi:
flora,
Dugo Polje,
Bosna i Hercegovina.

SINOPSIS

FLORISTIČKI DIVERZITET DUGOG POLJA (MODRIČA, S BOSNA I HERCEGOVINA)

Dugo Polje se nalazi u S Bosni i Hercegovini, u blizini Modriče. Ovo područje je floristički istraživano tokom vegetacijske sezone 2012. godine. Ukupno je sakupljeno 162 taksona vaskularnih biljaka svrstanih u 129 rodova i 53 porodica. Dicotyledones (86.4%) su najbrojnije u okviru Spermatophyta, a Monocotyledones su zastupljene sa 21 taksonom (13%). Porodice sa najvećim brojem predstavnika na nivou vrste i podvrste su Leguminosae (9.9%), Compositae (9.3%), Labiatae (8%) i Gramineae (8%). U spektru životnih formi su dominirale hemikriptofite (36.4%) i geofite (20.4%). Najdominantniji florni element je sub-centralnoevropski (25.5%). U okviru ukupne flore jedan takson se nalazi na "Spisku biljnih vrsta za Crvenu knjigu flore Bosne i Hercegovine". Adventivne biljke su zastupljene sa 9 taksona (5.6%).

INTRODUCTION

Flora of Bosnia and Herzegovina is characterized by its considerable diversity and endemism, which largely contributes its position on the Balkan Peninsula. This is meeting area of Mediterranean and Euro-Siberian-North-American floristic regions and in a relatively small area is reflected all the specific flora of the Western Balkans (Turrill, 1929; Polunin, 1997; Stevanović, 2009).

Dugo Polje is situated in N Bosnia and Herzegovina, nearby Modriča. This area is combined lowland-hilly with meadows, pastures, orchards and fields. Phytogeographically, Dugo Polje is situated in the contact zone of Illyrian Province and the Pannonian sector of the Central European Province within Euro-Siberian-North-American region (Horvatić, 1967) and due to its position this area is botanically interesting and its insufficiently investigated flora is an additional motive.

This area is characterized by a moderately continental climate. According to the data of the Hydrometeorological Institute of Republic of Srpska for station Derventa in 2011 the average annual temperature was 11.7 °C and the annual precipitation was 850 mm (Dragić et al., 2012).

MATERIAL AND METHODS

Plant material was collected during the vegetation season 2012 in Dugo Polje (44.959403°N/18.169720°E) and its surroundings. Herbarium specimens are deposited at the Chair of Botany, University of Banja Luka. The plant taxa are identified according to Domac (1967), Jávorka & Csapody (1975), Josifović ed. (1970-1977), Sarić ed. (1986, 1992), Tutin et al. (1964-1980, 1993). Taxonomic treatment and nomenclature follows Flora Europaea (Tutin et al., 1964-1980, 1993). Families, genera, species and subspecies are alphabetically arranged. The life forms spectrum of flora was given according to Raunkiaer (1934) and Kojić et al. (1997) and the abbreviations of life forms used in Table 1 are given in Table 3. Phytogeographical analysis and chorological spectrum were based on the floral elements classification given by Gajić (1980).

RESULTS

The total of 162 taxa on the species and subspecies level, were recorded in Dugo Polje and its surroundings and listed in Table 1.

Table 1. Floristic list of Dugo Polje and its surroundings.

Taxa	Floral element	Life form
PTERIDOPHYTA		
Hypolepidaceae		
Pteridium aquilinum (L.) Kuhn in Kersten (1879)	Cosmopolitan	G
SPERMATOPHYTA		
ANGIOSPERMAE		
DICOTYLEDONES		
Aceraceae		
Acer campestre L. (1753)	Sub-Central European	P
Acer tataricum L. (1753)	Pontic-Pannonian	P
Amaranthaceae		
Amaranthus retroflexus L. (1753)	Adventive	T
Apocynaceae		
Vinca minor L. (1753)	Sub-Central European	wCh
Araliaceae		
Hedera helix L. (1753)	Sub-Atlantic-Sub-Mediterranean	Pl
Aristolochiaceae		
Aristolochia clematitis L. (1753)	Sub-Mediterranean	G
Asclepiadaceae		
Asclepias syriaca L. (1753)	Adventive	G
Berberidaceae		
Epimedium alpinum L. (1753)	Illyrian	G
Betulaceae		
Betula pendula Roth (1788)	Sub-South Siberian	P
Boraginaceae		
Anchusa officinalis L. (1753)	Sub-Central European	H
Echium vulgare L. (1753)	Sub-Central European	H
Myosotis discolor Pers. (1797)	Sub-Atlantic	T
Pulmonaria officinalis L. (1753)	Sub-Central European	H
Campanulaceae		
Campanula patula L. (1753) subsp. *patula*	Sub-Central European	TCh
Cannabaceae		
Humulus lupulus L. (1753)	Sub-South Siberian	H
Caprifoliaceae		
Sambucus nigra L. (1753)	Sub-Central European	Np
Viburnum opulus L. (1753)	Eurasian	Np
Caryophyllaceae		
Dianthus armeria L. (1753) subsp. *armeria*	Central European	TCh
Lychnis flos-cuculi L. (1753)	Sub-South Siberian	H
Silene latifolia Poiret (1789) subsp. *alba* (Miller)	Sub-Eurasian	TCh

Taxa	Floral element	Life form
Greuter & Burdet (1982)		
Stellaria graminea L. (1753)	Eurasian	H
Stellaria holostea L. (1753)	Sub-Eurasian	hCh
Chenopodiaceae		
Chenopodium album L. (1753)	Cosmopolitan	T
Compositae		
Achillea millefolium L. (1753) subsp. *millefolium*	Eurasian	H
Ambrosia artemisiifolia L. (1753)	Adventive	T
Anthemis arvensis L. (1753) subsp. *arvensis*	Sub-Central European	T
Bellis perennis L. (1753)	Sub-Central European	H
Bidens tripartita L. (1753)	Sub-Central European	T
Centaurea jacea L. (1753)	Sub-Eurasian	H
Conyza canadensis (L.) Cronq. (1943)	Adventive	TCh
Erigeron annuus (L.) Pers. (1807)	Adventive	TCh
Galinsoga parviflora Cav. (1795)	Adventive	T
Inula salicina L. (1753) subsp. *salicina*	Sub-South Siberian	G
Leucanthemum vulgare Lam. (1779)	Sub-Central European	H
Solidago gigantea Aiton (1789) subsp. *serotina* (O. Kuntze) McNeill (1973)	Adventive	H
Tanacetum vulgare L. (1753)	Eurasian	H
Taraxacum officinale Weber (1780)	Eurasian	H
Tussilago farfara L. (1753)	Sub-Eurasian	G
Convolvulaceae		
Convolvulus arvensis L. (1753)	Cosmopolitan	G
Cuscuta europaea L. (1753)	Eurasian	T
Cornaceae		
Cornus mas L. (1753)	Pontic-Sub-Mediterranean	Np
Cornus sanguinea L. (1753) subsp. *sanguinea*	Sub-Central European	Np
Corylaceae		
Carpinus betulus L. (1753)	Central European	P
Corylus avellana L. (1753)	Sub-Central European	P
Cruciferae		
Arabidopsis thaliana (L.) Heynh. (1842)	Sub-Eurasian	TCh
Barbarea vulgaris R. Br. (1812)	Sub-Eurasian	TCh
Capsella bursa-pastoris (L.) Medicus (1792)	Cosmopolitan	TCh
Cardamine enneaphyllos (L.) Crantz (1769)	Central European	G
Rorippa pyrenaica (Lam.) Reichenb. (1837)	Sub-Mediterranean	H
Euphorbiaceae		
Euphorbia cyparissias L. (1753)	Eurasian	H
Fagaceae		
Quercus pubescens Willd. (1796)	Sub-Mediterranean	P
Gentianaceae		

Taxa	Floral element	Life form
Centaurium erythraea Rafn (1800) subsp. *erythraea*	Sub-Central European	TCh
Geraniaceae		
Erodium cicutarium (L.) L'Hér. (1789)	Eurasian	TCh
Geranium columbinum L. (1753)	Eurasian	T
Geranium molle L. (1753)	Sub-Eurasian	TCh
Geranium phaeum L. (1753)	Central European	H
Guttiferae		
Hypericum perforatum L. (1753)	Sub-Eurasian	H
Labiatae		
Ajuga reptans L. (1753)	Sub-Central European	H
Clinopodium vulgare L. (1753) subsp. *vulgare*	Circumpolar	H
Galeopsis tetrahit L. (1753)	Eurasian	T
Glechoma hederacea L. (1753)	Eurasian	H
Lamium album L. (1753)	Eurasian	H
Lamium purpureum L. (1753)	Sub-Central European	TCh
Leonurus cardiaca L. (1753)	Eurasian	H
Mentha aquatica L. (1753)	Eurasian	G
Mentha longifolia (L.) Hudson (1762)	Sub-Central European	G
Mentha pulegium L. (1753)	Sub-Central European	G
Prunella laciniata (L.) L. (1763)	Pontic-Sub-Mediterranean	H
Scutellaria altissima L. (1753)	Pontic	G
Scutellaria hastifolia L. (1753)	Sub-Pontic	G
Leguminosae		
Dorycnium pentaphyllum Scop. (1772) subsp. *herbaceum* (Vill.) Rouy (1899)	East-Sub-Mediterranean	wCh
Genista tinctoria L. (1753)	Sub-Central European	wCh
Lathyrus pratensis L. (1753)	Sub-Eurasian	G
Lathyrus sativus L. (1753)	Adventive	T
Lathyrus tuberosus L. (1753)	Sub-South Siberian	G
Lotus corniculatus L. (1753)	Sub-Eurasian	H
Medicago lupulina L. (1753)	Sub-Eurasian	TCh
Melilotus alba Medicus (1787)	Sub-Central European	TCh
Ononis spinosa L. (1753) subsp. *spinosa*	Sub-Central European	hCh
Robinia pseudacacia L. (1753)	Adventive	P
Trifolium arvense L. (1753)	Sub-Central European	TCh
Trifolium pratense L. (1753)	Sub-Eurasian	H
Trifolium repens L. (1753) subsp. *repens*	Central European	H
Vicia cracca L. (1753)	Eurasian	H
Vicia pannonica Crantz (1769) subsp. *pannonica*	Pontic-Central Asian-Sub-Mediterranean	TCh
Vicia sativa L. (1753) subsp. *sativa*	Cosmopolitan	TCh

Taxa	Floral element	Life form
Linaceae		
Linum austriacum L. (1753)	Sub-Pontic-Sub-Mediterranean	H
Lythraceae		
Lythrum salicaria L. (1753)	Pontic-Central Asian-Sub-Mediterranean	H
Malvaceae		
Malva moschata L. (1753)	Sub-Atlantic-Sub-Mediterranean	H
Oleaceae		
Ligustrum vulgare L. (1753)	Sub-Central European	Np
Oxalidaceae		
Oxalis acetosella L. (1753)	Circumpolar	G
Papaveraceae		
Corydalis solida (L.) Clairv. (1811) subsp. *solida*	Sub-Central European	G
Papaver rhoeas L. (1753)	Sub-Eurasian	TCh
Plantaginaceae		
Plantago lanceolata L. (1753)	Eurasian	H
Plantago major L. (1753) subsp. *major*	Eurasian	H
Polygalaceae		
Polygala vulgaris L. (1753)	Eurasian	H
Polygonaceae		
Polygonum aviculare L. (1753)	Cosmopolitan	T
Polygonum persicaria L. (1753)	Eurasian	T
Rumex acetosa L. (1753) subsp. *acetosa*	Eurasian	H
Rumex conglomeratus Murray (1770)	Sub-Eurasian	H
Primulaceae		
Anagallis arvensis L. (1753)	Cosmopolitan	T
Lysimachia nummularia L. (1753)	Sub-Central European	hCh
Lysimachia vulgaris L. (1753)	Eurasian	H
Primula vulgaris Hudson (1762) subsp. *vulgaris*	Sub-Atlantic-Sub-Mediterranean	H
Ranunculaceae		
Anemone nemorosa L. (1753)	Circumpolar	H
Anemone ranunculoides L. (1753)	Sub-Central European	G
Helleborus odorus Waldst. & Kit. (1809)	Central Balkan	H
Ranunculus ficaria L. (1753) subsp. *ficaria*	Sub-Central European	G
Ranunculus repens L. (1753)	Eurasian	H
Ranunculus sardous Crantz (1763)	Sub-Central European	T
Rosaceae		
Aremonia agrimonoides (L.) DC. (1825)	East-Sub-Mediterranean	H
Crataegus monogyna Jacq. (1775) subsp.	Sub-Central European	P

Taxa	Floral element	Life form
monogyna		
Filipendula vulgaris Moench (1794)	Eurasian	H
Fragaria moschata Duchesne (1766)	Sub-Central European	H
Geum urbanum L. (1753)	Eurasian	H
Potentilla erecta (L.) Rauschel (1797)	Eurasian	H
Potentilla micrantha Ramond ex DC. (1805)	Sub-Mediterranean	H
Potentilla recta L. (1753)	Sub-Pontic-Central Asian	H
Potentilla reptans L. (1753)	Eurasian	H
Rosa canina L. (1753)	Sub-Central European	Np
Rubus discolor Weihe & Nees (1824)	Central European	Np
Spiraea media Franz Schmidt (1792) subsp. *media*	Sub-South Siberian	Np
Rubiaceae		
Cruciata glabra (L.) Ehrend. (1958)	Pontic-Sub-Mediterranean	H
Galium aparine L. (1753)	Eurasian	T
Galium lucidum All. (1773)	Sub-Mediterranean	hCh
Galium odoratum (L.) Scop. (1771)	Sub-Eurasian	G
Galium verum L. (1753) subsp. *verum*	Eurasian	G
Salicaceae		
Populus tremula L. (1753)	Sub-Eurasian	P
Salix caprea L. (1753)	Eurasian	P
Scrophulariaceae		
Digitalis grandiflora Miller (1768)	Sub-Central European	H
Linaria vulgaris Miller (1768)	Sub-Central European	H
Melampyrum pratense L. (1753)	Sub-Boreal-European-West-Siberian	T
Veronica chamaedrys L. (1753) subsp. *chamaedrys*	Sub-Central European	G
Solanaceae		
Solanum nigrum L. (1753)	Cosmopolitan	T
Tiliaceae		
Tilia cordata Miller (1768)	Sub-Central European	P
Umbelliferae		
Aegopodium podagraria L. (1753)	Eurasian	G
Daucus carota L. (1753)	Sub-Eurasian	TCh
Urticaceae		
Urtica dioica L. (1753)	Eurasian	H
Verbenaceae		
Verbena officinalis L. (1753)	Cosmopolitan	TCh
Violaceae		
Viola tricolor L. (1753) subsp. *tricolor*	Eurasian	TCh
MONOCOTYLEDONES		
Amaryllidaceae		

Taxa	Floral element	Life form
Galanthus nivalis L. (1753) subsp. *nivalis*	Pontic-Sub-Mediterranean	G
Cyperaceae		
Carex disticha Hudson (1762)	Eurasian	G
Carex divulsa Stokes (1787) subsp. *divulsa*	Sub-Circumpolar	H
Gramineae		
Bromus commutatus Schrader (1806) subsp. *commutatus*	Sub-Central European	T
Bromus hordeaceus L. (1753) subsp. *hordeaceus*	Sub-Mediterranean	T
Bromus sterilis L. (1753)	Sub-Eurasian	T
Cynodon dactylon (L.) Pers. (1805)	Cosmopolitan	G
Cynosurus cristatus L. (1753)	Sub-Central European	H
Dactylis glomerata L. (1753)	Sub-Eurasian	H
Elymus repens (L.) Gould (1947) subsp. *repens*	Eurasian	G
Holcus lanatus L. (1753)	Eurasian	H
Poa compressa L. (1753)	Sub-Central European	H
Poa nemoralis L. (1753)	Circumpolar	H
Poa pratensis L. (1753)	Sub-Circumpolar	H
Setaria viridis (L.) Beauv. (1812)	Sub-Eurasian	T
Sorghum halepense (L.) Pers. (1805)	Cosmopolitan	G
Iridaceae		
Crocus vernus (L.) Hill (1765) subsp. *vernus*	Sub-Illyrian	G
Liliaceae		
Erythronium dens-canis L. (1753)	Sub-Mediterranean	G
Ornithogalum collinum Guss. (1825)	Pontic-Sub-Mediterranean	G
Scilla bifolia L. (1753)	Sub-Atlantic-Sub-Mediterranean	G
Orchidaceae		
Orchis morio L. (1753) subsp. *morio*	Sub-Central European	G

DISCUSSION

Floristic research of Dugo Polje and its surroundings revealed the presence of 162 taxa (159 species and 3 subspecies) belonging to 129 genera and 53 families (Table 1). Division Pteridophyta was represented by one single species and division Spermatophyta with 99.4%. Class Dicotyledones was the most numerous within Angiospermae and represented with 140 taxa on species and subspecies level (86.4%). In the total flora, class Monocotyledones was represented with 21 species and subspecies (13%). Families with highest number of taxa on species and subspecies level were Leguminosae with 16 taxa or 9.9%, Compositae with 15 taxa or 9.3% and Labiatae and Gramineae with 13 taxa or 8% (Table 2).

Table 2: The most numerous families (in species and subspecies) in the flora of Dugo Polje.

Family	Species and subspecies	%
Leguminosae	16	9.9
Compositae	15	9.3
Labiatae	13	8.0
Gramineae	13	8.0
Rosaceae	12	7.4
Caryophyllaceae	6	3.7
Ranunculaceae	6	3.7

The most abundant life forms in the flora of Dugo Polje are hemicryptophytes (36.4%) and geophytes (20.4%), followed by therophytes, therophytes/ chamaephytes, phanerophytes, nanophanerophytes, herbaceous and woody chamaephytes and phanerophytic lianas (Table 3). The ecological analysis showed a pronounced hemicryptophyte character of investigated area, as well as flora of Balkan peninsula (Turrill, 1929). This corresponds to the climate of the entire investigated area – moderate climatic zone. A significantly higher percentage of therophytes reflects ephemerality of most ruderal habitats where anthropogenic impacts hinders the development of perennial plants. Nevertheless, therophytes easily cover the exposed areas and abandoned places, producing a large amount of seeds and consequently, therophytes are easy to spread into new habitats. A large percentage of therophytes quickly completes its life cycle and thus avoiding adverse anthropogenic impacts.

Table 3: The ecological spectrum of the flora of Dugo Polje.

Life form	Abbreviation	Species and subspecies	%
Hemicryptophytes	H	59	36.4
Geophytes	G	33	20.4
Therophytes	T	22	13.6
Therophytes / Chamaephytes	TCh	21	13.0
Phanerophytes	P	11	6.8
Nanophanerophytes	Np	8	4.9
Herbaceous Chamaephytes	hCh	4	2.5
Woody Chamaephytes	wCh	3	1.9
Phanerophytic Lianas	Pl	1	0.6

Phytogeographical analysis classified all plant taxa into 23 floral elements. The largest number, 39 species and subspecies or 25.5%, belongs to Sub-Central European floral element (Table 4). Other well represented floral elements were Eurasian with 35 taxa (22.9%) and Sub-Eurasian with 20 taxa (13.1%). The Illyrian floral element was represented with one species (*Epimedium alpinum*).

Table 4: The most frequent floral elements in the flora of Dugo Polje.

Floral element	Species and subspecies	%
Sub-Central European	39	25.5
Eurasian	35	22.9
Sub-Eurasian	20	13.1
Cosmopolitan	11	7.2
Sub-Mediterranean	7	4.6
Central European	6	3.9
Sub-South Siberian	6	3.9
Pontic-Sub-Mediterranean	5	3.3

Adventive plants in Dugo Polje and its surroundings were represented with 9 taxa (*Amaranthus retroflexus*, *Asclepias syriaca*, *Ambrosia artemisiifolia*, *Conyza canadensis*, *Erigeron annuus*, *Galinsoga parviflora*, *Solidago gigantea* subsp. *serotina*, *Lathyrus sativus* and *Robinia pseudacacia*).

Among the total flora of Dugo Polje taxon *Galanthus nivalis* subsp. *nivalis* is listed in “The List of plant taxa for Red Book of Flora of Bosnia and Herzegovina” (Šilić, 1996) in the Vulnerable threat category.

CONCLUSIONS

- Floristic research of Dugo Polje and its surroundings revealed the presence of 162 taxa (159 species and 3 subspecies) belonging to 129 genera and 53 families.
- Families with highest number of taxa on species and subspecies level were Leguminosae (9.9%), Compositae (9.3%) and Labiatae and Gramineae (8%).
- The most abundant life forms in the flora of Dugo Polje are hemicryptophytes (36.4%) and geophytes (20.4%).
- Phytogeographical analysis classified all plant taxa into 23 floral elements.
- The largest number taxa of the total flora belongs to Sub-Central European floral element (25.5%).
- Adventive plants in Dugo Polje and its surroundings were represented with 9 taxa.

• One taxon is listed in “The List of plant taxa for Red Book of Flora of Bosnia and Herzegovina” (Šilić, 1996) in the Vulnerable threat category (*Galanthus nivalis* subsp. *nivalis*).

REFERENCES:

Domac, R. 1967: Ekskurzijska flora Hrvatske i susjednih područja. - *Medicinska naklada*, Zagreb, 543 pp.

Dragić, N., Vitor, V., Crnogorac, Č., Nikolić, N., Cvijić Amulić, S., Borojević, D., Rudan, N., Slijepčević, G. & Ristić, N. 2012: Geographical and Meteorological data. In: Čičković, R. (Ed), *Statatistical Yearbook of Republika Srpska* 2012. - Republika Srpska Institute of Statistics, Banja Luka. pp: 30-43.

Gajić, M. 1980: Pregled vrsta flore SR Srbije sa biljnogeografskim oznakama. - *Glasnik Šumarskog fakulteta - Serija A – Šumarstvo,* Univerzitet u Beogradu, Šumarski fakultet, Beograd, 54: 111-141.

Horvatić, S. 1967: Fitogeografske značajke i raščlanjenje Jugoslavije. In: Horvatić. S. (Ed), Analitička flora Jugoslavije 1 (1). – *Šumarski fakultet Sveučilišta u Zagrebu, Sveučilišna naklada Liber*, Zagreb. pp: 23-61.

Jávorka, S. & Csapody, V. 1975: Közép-Európa délkeleti részének flórája képekben. - *Akadémiai Kiadó*, Budapest, 73+XL+576 pp.

Josifović, M. (Ed) 1970-1977: Flora Srbije I-IX. - *Srpska Akademija Nauka i Umetnosti*, Beograd.

Kojić, M., Popović, R. & Karadžić, B. 1997: Vaskularne biljke Srbije kao indikatori staništa. - *Institut za istraživanja u poljoprivredi "Srbija", Institut za biološka istraživanja "Siniša Stanković"*, Beograd, 160 pp.

Polunin, O. 1997: Flowers of Greece and the Balkans. - *Oxford University Press*, Oxford, 567 pp.

Raunkiaer, C. 1934: The life forms of plants and statistical plant geography. - *Clarendon Press*, Oxford, 632 pp.

Sarić, M. (Ed) 1986: Flora SR Srbije X: Dodatak 2. - *Srpska Akademija Nauka i Umetnosti*, Beograd, 400 pp.

Sarić, M. (Ed) 1992: Flora Srbije I (2. izd.). - *Srpska Akademija Nauka i Umetnosti*, Beograd, 429 pp.

Stevanović, V. 2009: Exploration of Balkan flora after Turrill's time – the current situation and future challenges. P. 9. In: Stevanović, V. (Ed): 5th Balkan Botanical Congress: Book of Abstracts. *Faculty of Biology, University of Belgrade*, Belgrade, 9 p.

Šilić, Č. 1996: Spisak biljnih vrsta (Pteridophyta i Spermatophyta) za Crvenu knjigu flore Bosne i Hercegovine. - *Glasnik Zemaljskog muzeja Bosne i Hercegovine u Sarajevu,* Prirodne nauke, Nova Serija, 31: 323-367.

Turrill, W.B. 1929: The plant life of Balkan Peninsula: A phylogeographical study. - *Clarendon Press*, Oxford, 490 pp.

Tutin, T.G., Burges, N.A., Chater, A.O., Edmondson, J.R., Heywood, V.H., Moore, D.M., Valentine, D.H., Walters, S.M. & Webb, D.A. (Eds) 1993: Flora Europaea 1, ed. 2. - *Cambridge University Press*, Cambridge, 581 pp.

Tutin, T.G., Heywood, V.H., Burges, N.A., Valentine, D.H., Walters, S.M. & Webb, D.A. (Eds) 1964-1980: Flora Europaea 1-5. - *Cambridge University Press*, Cambridge.

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