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PHANEROPHYTE IN THE FLORA OF BILEĆA (THE REPUBLIC OF SRPSKA, BOSNIA AND HERZEGOVINA)

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Summary

The paper presents the data of the research on dendroflora collected in the municipality of Bileća. The floristic study was conducted during the 2017 and 2018 vegetation seasons. The presence of 114 species and subspecies of plants was confirmed, grouped into 73 genera and 35 families. In terms of life forms, phanerophytes from the group of deciduous trees were dominant. Phytogeographical analysis showed that species are most often from Sub-Mediterranean, Eurasian and Sub-Atlantic areal groups. The analysis of ecological indices for basic ecological factors determined the dominance of submezophytes. Most species prefer neutrophilic and basophilic soil reactions. In relation to light, the most numerous species are semi-sciophyte, half-shaded plants; in relation to temperature, the prevalent group is located at the transition between mesothermal and thermophilic plant species.

Key words: dendroflora, life forms, floristic elements, ecological indices, Bileća

INTRODUCTION

In Bosnia and Herzegovina, the naturally-occurring dendroflora has been studied by many authors (Fukarek, 1959; Horvat, 1949, 1950; Stefanović, 1955; Šilić 1990, 2005; Janjić, 1966, 1984, 1996, 1998, 2002; Ljujić-Mijatović *et al.*, 2000; Muslić, 2006). According to Fukarek (1959) vegetation in Bosnia and Herzegovina covers 279 types and hybrids of trees, shrubs and semi-shrubs with many subspecies and varieties. Within these species, 14 are conifer and others are deciduous.

The municipality of Bileća is located in south-east Republic of Srpska and is a part of the East Herzegovina region. Its territory is situated among 42°46' and 43°9' northern latitude and 18°31' and 18°10' eastern longitude. The altitude of the municipality ranges from 400 m to 700 m and there are four karst fields as follows: Bilečko, Plansko, Fatničko and Dabarsko. Bileća covers the surface of 633 km² and is surrounded by the mountains of Baba, Bjelašnica, Viduša and Sitnica (File, 2020a).

The geological base of the area is mostly composed of limestone and dolomite dating back from the Mesozoic and the Tertiary with different types of soil (alluvial, gley soil, brown soil, lithosol, sierozem). It is a typical holokarst region and the physiognomy and relief are rich in coves, sinkholes, pits, caves, etc. The climate is Continental Mediterranean with long, dry and warm summers and mild winters. South to Bileća, there is the source of the

Trebišnjica River, the longest European subterranean river. It was in 1966/67 that a concrete dam 105 meters high was constructed on the river 17 km south from Bileća, which resulted in an artificial accumulation known as Bilečko jezero, 18 km long and 3-5 km wide (File, 2020b).

Natural characteristics of the Bileća municipality (geographical position, climate, geology, geomorphology, pedology, and hydrology) created the diversity of vascular plants (Gnjato, 1991).

The aim of the paper was to provide an inventory of dendroflora in the municipality of Bileća based on which the taxonomic, ecological and phytogeographical analyses were conducted.

MATERIALS AND METHODS

The investigated area covered urban parts of Bileća and the neighboring sub-Mediterranean and highland areas. The research was performed at 400-1000 m altitudes covering the area of around 200 km². The floristic study included 2017 and 2018 vegetation seasons. The floral species were determined in line with relevant references (Beck, 1903, 1927; Domac, 1967; Horvatić, 1954; Jávorka and Csapody, 1975, 1979; Josifović ed., 1970-1977; Šilić 1973, 1990, 2005). The taxonomic status, family rank and nomenclature were displayed according to Euro+Med PlantBase (2006–). Floral elements were determined following Oberdorfer (2001). Indicator values of plants for basic ecological factors were calculated in line with Kojić *et al.* (1997). The following ecological indices were analyzed: soil moisture (V), soil chemical properties (K), soil nitrogen level (N), light (S) and temperature (T). Life forms were determined following Ellenberg and Mueller-Dambois (1974) based on Raunkiaer's principles (1934) as suggested in the Flora in Serbia (Stevanović, 1992).

RESULTS AND DISCUSSION

Following the field research during 2017 and 2018 vegetation seasons, the total of 114 species and subspecies of plants were identified (Table 1).

Table 1. The list of dendroflora of Bileća

Taxon	Life form	Floral element	Ecological indices				
PINOPSIDA							
Pinaceae							
<i>Abies alba</i> Miller	MesPscap	pralp(-smed)	3	3	3	1	2
<i>Pinus nigra</i> Arnold	MesPscap	SE Europe	2	4	2	4	4
<i>Larix decidua</i> Miller	MesPscap	pralp(-Eurasian con.)	3	3	2	4	2
Cupressaceae							
<i>Juniperus oxicedrus</i> L.	MiPcaesp	Med					
<i>Cupressus sempervirens</i> L.	MesPscap	Med					
MAGNOLIOPSIDA							
Anacardiaceae							

<i>Cotinus coggigria</i> Scop.	MiPcaesp	osmed	2	4	2	4	5
<i>Pistacia lentiscus</i> L.	MiPcaesp	sub-Med–Med					
<i>Pistacia terebinthus</i> L.	MiPcaesp	sub-Med–Med	1	4	2	4	5
<i>Rhus coriaria</i> L.	MiPcaesp	N-Am					
Apocyniaceae							
<i>Periploca graeca</i> L.	NPcaesp	S Europe					
Araliaceae							
<i>Hedera helix</i> L.	S lig	sub-Atl–sub-Med	3	3	3	2	4
Asparagaceae							
<i>Ruscus aculeatus</i> L.	NPcaesp	sub-Atl–sub-Med	3	3	3	2	5
Berberidaceae							
<i>Berberis vulgaris</i> L.	NPcaesp	osmed- Moderate con.	2	4	2	3	3
Betulaceae							
<i>Alnus glutinosa</i> (L.) Gaertner	MesPscap	Eurasia – sub-Med	5	3	3	3	3
<i>Betula pendula</i> Roth.	MesPscap	boreal-Eurasia	3	3	2	4	3
Buxaceae							
<i>Buxus sempervirens</i> L.	MiPcaesp	(w)sub-Med					
Cannabaceae							
<i>Humulus lupulus</i> L.	SH herb	(boreal)Eurasia, circ	4	3	4	3	3
Caprifoliaceae							
<i>Lonicera caerulea</i> L.	NPcaesp	Eurasia(cont)-sub-Med					
<i>Lonicera xylosteum</i> L.	NPcaesp	Boreal con-pralp, circ	3	3	3	3	3
Celastraceae							
<i>Euonymus europaeus</i> L.	MiPcaesp	sub-Atl–subMed	3	4	3	3	4
<i>Euonymus latifolius</i> (L.) Miller	MiPcaesp	pralp(smed)	3	4	3	3	4
<i>Euonymus verrucosus</i> Scop.	MiPcaesp	SE Europe	2	4	3	3	4
Cornaceae							
<i>Cornus mas</i> L.	MiPcaesp	osmed	3	4	3	3	4
<i>Cornus sanguinea</i> L.	MiPcaesp	sub-Med(sub-Atl)	3	4	3	3	3
Corylaceae							
<i>Carpinus betulus</i> L.	MesPscap	mod.cont(sub-Med)	3	3	3	2	4
<i>Carpinus orientalis</i> Miller	MesPscap	osmed	2	5	1	4	4
<i>Corylus avellana</i> L.	MiPcaesp	sub-Atl-sub-Med (Eurasia)	3	3	3	3	3
<i>Ostrya carpinifolia</i> Scop.	MesPscap	osmed	2	4	3	3	5
Ericaceae							
<i>Calluna vulgaris</i> (L.) Hull	NPcaesp	boreal-Eurasia-sub-oc	3	1	1	3	3
<i>Vaccinium myrtillus</i> L.	NPcaesp	(Arctic)boreal(Eurasia- sub-oc)	3	1	2	2	2
Fabaceae							
<i>Cercis siliquastrum</i> L.	MesPscap	N-Am					
<i>Colutea arborescens</i> L.	MiPcaesp	sub-Med	2	4	1	3	4
<i>Cytisus hirsutus</i> L.	MiPcaesp	osmed					
<i>Genista tinctoria</i> L.	Ch suffrut	Eurasia(sub-Med)	3	2	2	4	3
<i>Hippocrepis emerus</i> (L.) Lassen subsp.emerus	MiPcaesp	osmed	2	5	1	3	4
<i>Petteria ramentacea</i> (Sieber) C. Presl	MiPcaesp						
<i>Robinia pseudoacacia</i> L.	MesPscap	N-Am	2	3	4	3	4
<i>Spartium junceum</i> L.	MiPcaesp	Med					
Fagaceae							

<i>Castanea sativa</i> Miller	MesPscap	sub-Med-sub-Alp	3	2	2	3	4
<i>Fagus sylvatica</i> L.	MesPscap	sub-Atl(sub-Med)	4	3	3	2	3
<i>Quercus cerris</i> L.	MesPscap	osmed	2	3	2	4	4
<i>Quercus frainetto</i> Ten.	MesPscap	osmed	2	4	2	4	4
<i>Quercus pubescens</i> Willd.	MesPscap	sub-Med	2	4	2	3	5
<i>Quercus robur</i> L.	MesPscap	Eurasia-sub-Med	3	3	3	3	4
<i>Quercus trojana</i> L.	MesPscap	Med	2	4	3	4	5
Juglandaceae							
<i>Juglans regia</i> L.	Messcap	osmed(euras)	3	4	3	3	4
Lamiaceae							
<i>Clinopodium thymifolium</i> (Scop.) Kuntze	Ch suffrut	Illyric					
<i>Satureja montana</i> L.	Ch suffrut	Med					
<i>Satureja subspicata</i> Bartl. ex Vis. subsp. <i>subspicata</i>	Ch suffrut	Illyric					
<i>Rosmarinus officinalis</i> L.	Ch suffrut	Med					
<i>Salvia officinalis</i> L.	Ch suffrut	Med	2	5	2	4	5
Lauraceae							
<i>Laurus nobilis</i> L.	NPcaesp	E-Asia					
Loranthaceae							
<i>Viscum album</i> L.	semp par	sub-Atl-sub-Med					
Lythraceae							
<i>Punica granatum</i> L.	MiPceasp	Med					
Malvaceae							
<i>Tilia cordata</i> Miller	MesPscap	Moderate con.	3	3	3	2	3
<i>Tilia plathyphilos</i> Scop.	MesPscap	sub-Atl-sub-Med	3	3	3	2	4
Moraceae							
<i>Ficus carica</i> L.	MesPscap	Med					
Oleaceae							
<i>Fraxinus ornus</i> L.	MesPscap	osmed	2	4	2	3	4
<i>Ligustrum vulgare</i> L.	MiPceasp	sub-Med	3	4	2	3	4
<i>Olea europaea</i> L.	MiPceasp	sub-Med					
<i>Syringa vulgaris</i> L.	MiPceasp	SE Europe	3	3	2	3	5
Ranunculaceae							
<i>Clematis vitalba</i> L.	S lig	sub-Med-sub-Atl(circ)	3	4	3	3	3
Rhamnaceae							
<i>Frangula alnus</i> Miller	MiPceasp	boreal-Eurasia-sub-oc	3	2	2	3	4
<i>Frangula rupestris</i> (Scop.) Schur	MiPceasp	Illyric -Scand-Pind	1	4	2	3	5
<i>Paliurus spina-cristi</i> Miller	MiPceasp	Med-sub-Med	1	4	2	3	5
<i>Rhamnus alpinum</i> L. subsp. <i>fallax</i> (Boiss.) Maire & Petitm.	MiPceasp	Balkans	2	3	2	4	3
<i>Rhamnus cartharticus</i> L.	MiPceasp	Erasia-sub-Med	3	4	2	3	3
<i>Rhamnus saxatilis</i> Jacq.	P rept	pralp-smed	1	4	1	3	4
Rosaceae							
<i>Amelanchier ovalis</i> Medicus	NPcaesp	smed-pralp	2	4	1	4	4
<i>Cotoneaster integerrimus</i> Medicus	NPcaesp	osmed(moderate con.)	1	4	1	4	3
<i>Cotoneaster nebrodensis</i> (Guss) Koch	NPcaesp	pralp(osmed)					
<i>Crataegus monogyna</i> Jacq.	MesPscap	sub-Med(sub-Atl)	3	4	2	4	3
<i>Crataegus rhipidophylla</i> Gand.	MesPscap	sub-Atl-sub-Med	3	3	3	3	3
<i>Malus sylvestris</i> Miller	MesPscap	Eurasiasub-oc-sub-Med	3	3	3	3	3

<i>Prunus avium</i> L.	MesPscap	sub-Atl-sub-Med						
<i>Prunus cerasifera</i> Ehrh	MesPscap	Asia	2	3	3	4	5	
<i>Prunus domestica</i> L.	MesPscap	Asia	4	3	3	3	4	
<i>Prunus mahaleb</i> L.	MiPscap	sub-Med						
<i>Prunus padus</i> L.	MesPscap	boreal-Eurasia(cont)						
<i>Prunus spinosa</i> L.	MiPscap	Eurasiasub-oc-sub-Med	2	4	3	4	4	
<i>Pyrus communis</i> L.	MesPscap	sub-Med(moderate cont)						
<i>Rubus caesius</i> L.	NPcaesp	Eurasia(sub-oc)sub-Med	4	3	5	3	4	
<i>Rosa canina</i> L.	MiPcaesp	Eurasia(sub-oc)sub-Med	3	3	2	3	3	
<i>Rubus idaeus</i> L.	NPcaesp	Eurasia-boreal	3	3	4	3	3	
<i>Rubus plicatus</i> Weihe & Nees		sub-Atl	3	2	3	4	3	
<i>Rosa spinosissima</i> L.	NPcaesp	Eurasia-sub-con-sub-Med	2	4	2	4	3	
<i>Sorbus aria</i> (L.) Crantz	MesPscap	sub-Med(perialp)	2	4	2	3	4	
<i>Sorbus aucuparia</i> L.	Messcap	boreal- Eurasia-sub-oc	3	3	2	3	3	
<i>Sorbus austriaca</i> (Beck) Hedl.	MesPscap	opralp	2	5	3	4	4	
<i>Sorbus torminalis</i> (L.) Crantz	MesPscap	sub-Med – sub-Atl	2	4	2	3	4	
Salicaceae								
<i>Populus alba</i> L.	MesPscap	Med-sub-Med-Eurasia	3	4	3	4	5	
<i>Populus nigra</i> L.	MesPscap	sub-Med-Eurasia	4	4	4	3	4	
<i>Populus tremula</i> L.	MesPscap	boreal(Eurasia)	3	3	3	4	3	
<i>Salix alba</i> L.	MesPscap	sub-Med-Euroasia – sub-oc	4	4	4	3	3	
<i>Salix caprea</i> L.	MesPscap	boreal(Eurasia)	3	3	3	3	3	
<i>Salix purpurea</i> L.	MesPscap	pralp-smed	3	4	3	4	3	
Solanaceae								
<i>Solanum dulcamara</i> L.	S herba	Eurasia-sub-Med	4	3	4	3	3	
Sapindaceae								
<i>Acer campestre</i> L.	MesPscap	sub-Med-sub-Atl	3	4	3	3	4	
<i>Acer monspessulanum</i> L.	MesPscap	sub-Med	2	4	2	3	5	
<i>Acer obtusatum</i> Waldst. & Kit	MesPscap	subatl-smed(pralp)						
<i>Acer platanoides</i> L.	MesPscap	moderate cont.	3	3	3	2	3	
<i>Acer pseudoplatanus</i> L.	MesPscap	subatl-smed(pralp)	3	3	3	2	3	
<i>Acer tataricum</i> L.	MesPscap	pont-pan	2	4	1	4	5	
Thymelaeaceae								
<i>Daphne blagayana</i> Freyer	P rept	SE Europe	2	3	2	4	4	
<i>Daphne laureola</i> L.	P rept	sub-Med-Atl	2	4	2	2	4	
<i>Daphne mezereum</i> L.	NPcaesp	Eurasia(cont.)	3	4	3	2	3	
<i>Daphne malyana</i> Blečić	P rept	Balkans						
Ulmaceae								
<i>Celtis australis</i> L.	MesPscap	N-Am						
<i>Ulmus glabra</i> Hudson	MesPscap	Eurasia-sub-oc- sub-med	4	3	4	2	3	
Viburnaceae								
<i>Sambucus nigra</i> L.	MiPscap	sub-Atl-sub-Med	3	3	4	3	4	
<i>Sambucus racemosa</i> L.	MiPcaesp	Eurasia-sub-oc (sub-Atl)sub-Med	3	3	4	3	3	
<i>Viburnum lantana</i> L.	MiPcaesp	sub-Med	2	4	2	3	4	
<i>Viburnum opulus</i> L.	MiPcaesp	Europe(sub-oc)	3	3	3	3	4	
Vitaceae								
<i>Vitis vinifera</i> L.	S herba	sub-Med	3	4	3	3	5	

The taxonomic analysis of phanerophytes resulted in 114 species covering 73 genera, 35 families, and 2 classes of Pinopsida and Magnoliopsida (Table 2). Most ligneous plants (107) belonged to Magnoliopsida class and were divided into 68 genera and 33 families. The Pinopsida class covered 5 species distributed into 5 genera and 2 families. The most frequent family based on the number of species and subspecies was Rosaceae (22).

Table 2. Taxonomic outline of dendroflora in Bileća

Class	Species/subspecies No	Genus No	Family No
Pinopsida	5	5	2
Magnoliopsida	109	68	33
Total	114	73	35

Areal analysis (Table 3) indicates the predominance of sub-Mediterranean taxa (35 taxa or 32.71%). The following are the most frequent sub-Mediterranean ligneous species and subspecies within the forest vegetation: *Ostrya carpinifolia*, *Quercus pubescens*, *Fraxinus ornus*, *Quercus frainetto* i *Quercus cerris*.

Table 3. Areal spectrum of dendroflora in Bileća

Areal group	No.of species/subspecies	%
Sub-Mediterranean	35	32.71
Eurasian	17	15.89
Sub- Atlantic	14	13.08
Endemic	5	4.67
Boreal	9	8.41
Pre-Alpine	7	6.54
Moderate-continental	3	2.80
European	5	4.67
Mediterranean	10	9.35
Arctic	1	0.94
Ponto-Pannonian	1	0.94
Total	107	100

Secondly, there are Eurasian species and subspecies (17 taxa or 15.89%). It is *Alnus glutinosa* and *Quercus robur* that cover the lowest vegetation belt. Frequently occurring shrubs are *Prunus spinosa*, *Rosa canina* and *Rubus idaeus*. Thirdly, there are sub-Atlantic species (14 taxa or 13.08%). The following endemic species occur: *Daphne malyana*, *Clinopodium thymifolium*, *Satureja subspicata* subspecies *subspicata*, *Rhamnus alpinum* subspecies *fallax* and *Frangula rupestris*. The fact that sub-Mediterranean and Eurasian floral species are most common suggests that our target area is the transition region between sub-Mediterranean and Mediterranean-mountain vegetation sub-region.

In relation to Mostar where Mediterranean species are most common (Maslo, 2014), the Bileća dendoflora covers mostly sub-Mediterranean and Eurasian species.

The biological specter analysis (Table 4) suggests that the prevailing phanerophytes are deciduous species and subspecies 5-50 meters high (fo dec MesP scap) with 44 taxa or 38.60%

of total phanerophytes, and the following are most common ones: *Ostrya carpinifolia*, *Fagus sylvatica*, *Quercus frainetto*, *Quercus petraea* and *Quercus pubescens*.

Table 4. The structure of phanerophytes and scandentophytes in Bileća dendoflora

Phanerophyte	No. of species/subspecies	%
fo dec MesP scap (deciduous trees 5-50 m high)	44	38.60
fo dec MiP caesp (small deciduous trees 2-5 m high)	33	28.94
fo dec NP caesp (deciduous shrubs smaller than 2 m)	15	13.16
fo dec Ch suffrut (deciduous semi-wood dwarf shrubs)	6	5.26
ac dec MesP scap (conifer trees 5-50 m high)	4	3.50
fo semp P rept (creeping trees or shrubs with evergreen leaves)	3	2.63
S herb (crawling chemicryptophytes)	3	2.63
fo dec P caesp (deciduous shrubs with branching base)	1	0.88
fo dec P rept (creeping trees or shrubs)	1	0.88
ac dec MiP caesp (small conifer trees 2-5 m high)	1	0.88
dec S lig (green summer creeping plants)	1	0.88
dec semp S lig (evergreen wood crawling plants)	1	0.88
semp par (evergreen parasites)	1	0.88
Total	114	100

Secondly, there are small deciduous trees 2-5 meters high (fo dec MiP caesp) with 33 taxa or 28.4%. Some of the species are *Frangula rupestris*, *Sambucus racemosa*, *Cotinus coggygia*, *Prunus spinosa*, *Prunus mahaleb*, *Colutea arborescens*, *Petteria ramentacea*, *Spartium junceum*, *Frangula rupestris* etc. Deciduous shrubs lower than 2 m (fo dec NP caesp) occupy the third place with 15 taxa or 13.16%: *Lonicera caerulea*, *Cotoneaster integerrimus*, *Rubus idaeus*, *Rosa spinosissima*. There are 4 taxa or 3.50% of conifer trees 5-50 meters high (ac dec MesP scap). *Juniperus oxicedrus* is one of small conifer trees and it is 2-5 meters high (ac dec MiP caesp). The conifer species of *Abies alba* and *Picea abies* are widely present in the higher altitudes of our target area. Deciduous semi-wood dwarf shrubs (fo dec Ch suffrut) have six representatives or 5.26 %. The following species belong to the group fo dec Ch suffrut: *Clinopodium thymifolium* and *Satureja montana*, whereas these species belong to the group fo dec P caesp: *Rubus plicatus*, *Rubus hirtus* and *Rubus canescens*. Given the life form structure of phanerophytes, 2 species (*Daphne blagayana* and *Daphne laureola*) are creeping green shrubs (fo semp P rept) and one species is a creeping deciduous tree (fo dec P rept) – *Rhamnus saxatilis*. Crawling plants are crawling chemicryptophytes (*Humulus lupulus*, *Clematis vitalba* and *Clematis recta*), and evergreen wood crawling plants is *Hedera helix*. Speaking of evergreen semi-parasitic species, there is *Viscum album*.

The analysis of ecological indices for basic ecological factors accounted for the ecological specificities of the dendoflora habitat (soil moisture, soil acidity, mineral content of the soil, light, and temperature) (Table 5).

Table 5. Ecological indices for basic ecological factors of Bileća dendoflora

IV (indicator value)	V		K		N		S		T	
	No. of species/subspecies	%	No. of species/subspecies	%	No. of species/subspecies	%	No. of species/subspecies	%	No. of species/subspecies	%
1	5	5.81	2	2.33	8	9.30	1	1.16	-	-
2	28	32.56	4	4.65	31	36.06	12	13.95	3	3.49
3	44	51.17	36	41.86	37	43.02	48	55.82	33	38.37
4	8	9.30	40	46.51	9	10.46	25	29.07	35	40.70
5	1	1.16	4	4.65	1	1.16	-	-	15	17.44
Total	86	100	86	100	86	100	86	100	86	100
Mean value	2.67		3.47		2.58		3.13		3.72	

The analysis of the ecological index for soil moisture suggests the prevalence of submesophytes with 44 taxa or 51.17% of total species. The mean value for the soil moisture index is 2.67, which indicates that our target area dendoflora grown mostly on damp habitats, but can also be detected in xerophilic ones. In terms of chemical reactions of soil, most species had the ecological indices K₃, i.e. neutrophilic plants (36 taxa or 41.86%) and K₄, i.e. transition group plants between neutrophilic and basophilic habitats (40 taxa or 46.51%). The analysis of the mineral content of the soil (N) suggests the prevalence of mesotrophic plants (37 taxa or 43.02%). Secondly, there are transition plants between oligotrophic and mesotrophic groups (31 taxa or 36.06%). Also, there is a significant ratio of plants with ecological indices N₄ (9 taxa or 10.46%), N₁ (8 taxa or 9.30%) and N₅ (1 taxon or 1.16%). In relation to light, the most numerous species of Bileća dendoflora are semi-sciophyte, half-shaded plants (48 taxa or 55.82%). 25 taxa or 29.07% are transition plants between semi-sciophytes and heliophytes. The mean value of the light index is 3.13, which suggests that light conditions are favorable. The analysis of the temperature ecological index shows that the prevalent group is located at the transition between mesothermal and thermophilic plant species (35 taxa or 40.70%). There are 33 taxa or 38.37% of mesothermal plants. The mean value of the temperature index being 3.72, we may infer that the region is mesothermal. Finally, there is a visible indirect contact between plants and plant communities of dry and warm habitats and plants and plant communities of shaded, moist and cold habitats.

CONCLUSION

In terms of phanerophytes, in the municipality of Bileća there are 114 species and subspecies distributed in 73 genera and 33 families from the 2 classes of Pinopsida and Magnoliopsida. The areal analysis resulted in 11 areal groups. The primary phytogeographical property of dendoflora suggests the presence of species of sub-Mediterranean and Eurasian areal groups. The phanerophyte dendoflora analysis suggests that the prevailing phanerophytes are deciduous species and subspecies 5-50 meters high (fo dec MesP scap) with 44 taxa or 38.60% of total phanerophytes, The analysis of ecological indices of basic ecological factors estimated the prevalence of submesophytes. Most species prefer

neutrophilic and basophilic soil reactions of soil which is poor in nutrients. Given the light index, most common species are semi-scyophytes, i.e. half-shaded plants; in relation to temperature, the prevalent group is located at the transition between mesothermal and thermophilic plant species.

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