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PHYTOCENOLOGICAL CHARACTERISTICS OF HUNGARIAN OAK AND TURKEY OAK WITH HORNBEAM FOREST (*Carpino betuli-Quercetum farnetto-cerris*) IN THE AREA OF BOGOVAĐA

Snežana Stajić, Ljubinko Rakonjac, Vlado Čokeša[1]

Abstract: The results of the study of the vegetation in the series of the sample plots set in the mixed Hungarian oak and Turkey oak forest in Bogovađa are presented in this paper. Having in mind that in this area the Hungarian oak and Turkey oak forest is climatogene and that the stands are in the very vicinity of "Bogovađa" Monastery, the protected area of the cultural-historical values, all these data point to the importance of their study, particularly regarding the determination of the appropriate raising measurements, taken in order to improve their condition, and in the aim of performing all the functions which these forests have. According to the floristic composition, it is determined that all the observed stands belong to the ecological variant of the Hungarian oak and Turkey oak forests, which is here conditioned orographically conditioned – Hungarian oak and Turkey oak forests with hornbeam Carpino betuli-Quercetum farnetto-cerris (Rud.1949) Jov.1979.

Key words: Hungarian oak and Turkey oak forest, floristic composition, Bogovađa.

FITOCENOLOŠKE KARAKTERISTIKE ŠUME SLADUNA I CERA SA GRABOM (*Carpino betuli-Quercetum farnetto-cerris*) NA PODRUČJU BOGOVAĐE

Izvod.- U radu su prikazani rezultati proučavanja vegetacije u serijama oglednih površina postavljenih u mešovitoj šumi sladuna i cera na području Bogovađe. Imajući u vidu da je ovo područje u kome je šuma sladuna i cera klimatogena, i da se radi o sastojinama koje se nalaze u neposrednoj blizini manastira "Bogovađa", kao zaštićenog prostora kulturno istorijske vrednosti, sve ovo ukazuje na značaj njihovog proučavanja, posebno kada se radi o određivanju odgovarajućih uzgojnih zahvata koji treba da dovedu do unapređenja njihovog stanja, a u cilju ispunjavanja svih funkcija koje ove šume imaju.

[1] Snežana Stajić, M. Sc, Ljubinko Rakonjac, Ph.D, Vlado Čokeša, M. Sc. Institute of Forestry, Belgrade, Serbia
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Na osnovu florističkog sastava utvrđeno je da sve istraživane sastojine pripadaju ekološkoj varijanti šume sladuna i cera, koja je ovde orografski uslovljena -šuma sladuna i cera sa grabom *Carpino betuli-Quercetum farnetto-cerris* (Rud.1949) Jov.1979.

Ključne reči: Šuma sladuna i cera, floristički sastav, Bogovađa

1 INTRODUCTION

Hungarian oak and Turkey oak thermophilic forests are dominant in the zonal vegetation of the greatest part of Southeast Europe. According to Tomic, Z. (2004), Horvat, I., Glavač, V. and Elenberg, H. (1974), there are four widely acknowledged regional zones of association *Quercetum farnetto–cerris*: moesiacum in Serbia and North Bulgaria; macedonicum in Macedonia and North Greece; dacicum in South Romania; thracicum in South Bulgaria and the European part of Turkey.

Hungarian oak and Turkey oak forest is the most widely spread zonal forest of Serbia, and has been one of the first associations to be described in our country. It is to be found in all parts of Serbia, from Vojvodina to Kosovo and Metohija, and from Drina to Timok, under the different climate, geological and orographic conditions, which caused the diversity of this forest and the division in a great number of syntaxa. Besides the typical climazonal forest *Quercetum farnetto - cerris* Rud. 1949, a great number of associations, which according to Tomić, Z. (2004) represent different ecological or geographical variants of the typical Hungarian oak and Turkey oak forest, have been described in Serbia.

2 OBJECTIVE AND WORK METHOD

The research was conducted in 2005 in Valjevo in Forest Management Unit "Bogovađa". Phytocenological records were taken by Braun-Blanqet method, aimed at the determination of the phytocenological origion of the research forest. The pedological profiles were opened and soil samples were taken for analysis, in order to define pedological origion.

The forest complex "Bogovađa" is situated in the upper upstream part of Kolubarski Basin, at a distance of about 4 km to the mouth of Ljig River to Kolubara River to the south.

The total area of this forest management unit managed by Forest Directorate Valjevo is 379.61 *ha*. The complex is located from 130 to 235 meters above sea level, terrain is rather conical, intersected by depressions and valleys of the numerous water flows. The terrains of Bogovađa forests are located in the area where Hungarian oak and Turkey oak forest (*Quercetum farneto-cerris* Rudski 1949) is climatogen, and at the same time most extensive phytocoenosis in this forest complex.

The data by hydrometeorological station Valjevo, located at 174 m above sea level, are used for the definition of the climate conditions in the studied area of Bogovađa.

3 RESEARCH RESULTS AND DISCUSSION

According to the research done by Glišić, M. (1968), climatogene Hungarian and Turkey oak forests *Quercetum farneto-cerris* Rudski is present in the terrains of forest complex Bogovađa in two basic variants:

Rusco-Quercetum farnetto-cerris Jov. 1951. - Hungarian oak and Turkey oak forest with Butcher's broom is the most extensive forest phytocoenosis of Bogovađa. It is located in the different altitudes, expositions and slopes, so can be considered to be basic, climatogene association of this complex. It is understandable, as the Bogovađa terrains gradually descend in the direction to the north, i.e. they are exposed to the Pannonian Plateau, and thereby belong to the area of this variant of forest with Butcher's broom;

Carpino betuli-Quercetum farnetto-cerris (Rud. 1949) Jov.1979. - Hungarian oak and Turkey oak forest with hornbeam, which is orographically conditioned here, and because of it is considered to be the ecological variant of Hungarian oak and Turkey oak forest.

3.1 Climate characteristics

The basic characteristics of air temperature for this area are presented in Table 1. It can be seen from the presented data that the mean annual temperature of the observed area is 10.7° C, and mean temperature of vegetation period is 16.9° C. The coldest month is January, with the mean monthly temperature is 0.2° C, and the warmest month is July, the mean temperature of which is 20.4° C.

Table 1 - Mean monthly air temperature (C°)

	MONTH												Veget. period	Average annual
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII		
	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C	°C
Average	0,2	2,0	6,6	10,5	15,9	18,9	20,4	19,8	16,1	10,7	5,3	2,1	16,9	10,7
Min.	-4,5	-3,4	2,9	8,3	13,4	17,4	19,2	17,3	13,5	8,2	2,5	-0,8	15,9	9,9
Maks.	4,1	6,8	9,0	13,6	18,0	21,1	22,1	21,4	19,2	13,1	8,0	5,1	17,9	11,2

The average sum of the annual precipitation in the analysed period for the observed area is 836.8 mm (Table 2). Out of this quantity 514.8 mm fall in the vegetation period. The most rainy month is June – 119.0 mm, then May and July – 94.6 mm and 84.0 mm of precipitation.

The least quantity of precipitation is reported in February (49.0 mm), and then in January (50.8 mm) and in December (52.5 mm). In regard of the sum of the annual precipitation there are very striking differences between some years in the analysed period.

Table 2- Sums of the monthly precipitation for hydrometeorological station Valjevo

	MONTH												Veg. period	Σ annual
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII		
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
Aver.	50,8	49,0	51,0	68,1	94,6	119,0	84,0	84,9	64,2	60,7	65,1	52,2	514,8	836,8
Min.	10,0	16,0	8,0	40,0	35,0	32,0	9,0	35,0	2,0	11,0	15,0	2,0	411,0	699,0
Maks.	113,0	100,0	113,0	106,0	185,0	193,0	194,0	218,0	143,0	175,0	125,0	113,0	696,0	1010,0

Analysing the climate factors we came to the conclusion that Bogovađa belongs to the zone of the moderate continental climate, with somewhat more humid climate from Posavina and West part of Serbia.

By Lang's bioclimate classification this area belongs to the humid climate in which weak forests develop, and by Thorntweite climate classification, the observed area is characterised by the humid mean climate.

3.2 Soil conditions

By the detailed research it was determined that the soil is pseudogley luvisol (leached soil with the elements of pseudogleying).

The depth of the soil solum is at least 100 cm. Humus accumulative horizon is from 7 to 14 cm deep, by texture content it belongs to the class of loams, small crusty structures with the unstable structural aggregates. Beneath it the eluvial horizon, of the heavier textural content, which belongs to the class of clay loam, is situated. The clay content increases with the depth of profile, and texture class turns into clay. The down part of the eluvial horizon and iluvial horizon are subject to the processes of pseudogleying. In the down part of eluvial horizon iron and manganese concretions, which means that anaerobic conditions ocassionally occur in these parts of profile as well. The characteristic marbling is notable in the iluvial horizon, which is the consequence of the frequent setting and long duration of the antioxidative conditions.

Although the morhological signs of pseudogleying are clearly present in the profile, index of clay transfer in almost all studied profile is no higher than 2.5. which is, according to the classification of soils of Yugoslavia (Škorić et al., 1985), maximum value for pseudogleys. Because of it, the soil is classified as pseudogley luvisol.

3.3 Floristic composition

The phytocenologic table is made of ten records, and by the floristic composition it was determined as the association of Hungarian oak and Turkey oak with hornbeam - *Carpino betuli-Quercetum farnetto-cerris* (Rud. 1949) Jov. 1979 is present. In the tree layer alongside Hungarian and Turkey oak, hornbeam is also present as the edifier. Of the other species in the tree layer the following types are present: common lime, big-leaved linden, black ash, and Sessile oak.

In the shrub layer besides edifier lame, hornbeam, maple tree, hawthorn, black ash, Tatar maple, dwarf honeysuckle and blackberry, whereas wild rose, wild pear, European cornel and service tree are less frequent.

In the layer of the ground plants, besides the offspring of the mayor edifiers, Hungarian and Turkey oak, the most frequent species are: *Ruscus aculeatus, Carpinus betulus, Lonicera caprifolium, Hedera helix, Glechoma hirsuta, Helleborus odorus, Ligustrum vulgare, Veronica chamaedrys, Acer tataricum, Polygonatum multiflorum, Rosa arvense, Tammus communis.*

Less frequent species are: *Euphorbia amygdaloides, Galium cruciata, Melica uniflora, Fragaria vesca, Viola silvestris, Daucus carota, Calamintha officinalis, Primula vulgaris, Cytisus hirsutus, Ruscus hipoglossum, Asperula odorata, Glechoma hederaceae, Hepatica nobilis, Sorbus domestica, Viola tricolor, etc.*

In the forest phytocenosis of Bogovadja the numerous tertiary relicts are still present, which are typical for the Mediterranean. One of them is *Ruscus aculeatus,* or Butcher's broom, *Tamus communis,* and many other species.

The presence of these species dating from Tertiary and research done by the different authors, particularly Horvat, I. in Croatia and Slovenia, as well as Jovanović, B. and Dunjić, R. in North Serbia (quoted by Glišić, 1968), it was proved that huge water mass of Pannonian Sea during the cold Dilivium (Ice Age) alleviated climate extremes and that the colder weather conditions were not fatal to the Tertiary flora in the area to the South of the former Pannonian Sea. Because of it the tertiary relicts adapting to the recent conditions are still present in this area.

According to floristic composition and greater percentage of mesophilic plants, the association of Hungarian oak and Turkey oak with hornbeam is classified as the separate ecological variant of mesophilic character. This association, as Glišić, M. (1968) reported is floristical and ecological transitive form between the Turkey and Hungarian oak forest and Sessile and Hungarian oak forest.

The specter area of the plant type for Hungarian and Turkey oak with hornbeam - *Carpino betuli-Quercetum farnetto-cerris* (Rud.1949) Jov.1979 is presented in Table 3.

Table 3- Specter of area types of association Carpino betuli-Quercetum farnetto-cerris (Rud.1949) Jov.1979.

Individual area types	Number	Sum area types	Number	Percentage (%)	
Pontic-pannonian	1	Pontic	3	6,2	27,1
Pontic-sub-mediterranean	1				
Pontic-east-sub-mediterranean	1				
Submediteranski	4	Submediterranean	8	16,7	
East-sub-mediterranean	4				
Sub- balkan	1	Balkan	2	4,2	
Mid- balkan	1				
Mid-european	5	Mid-european	14	29,2	41,7
Sub-mid-european	9				
Sub-atlantic-sub-mediterranean	6	Sub-atlantic	6	12,5	
Eurasian	5	Eurasian	10	20,8	22,9
Sub-eurasian	5				
Cosmopolitan	1	Cosmopolitan	1	2,1	
Circumpolar	3	Circumpolar	4	8,3	8,3
Sub-circumpolar	1				
Total :	48	Total:	48	100	100

In this community the plants of the Mid-European area are dominant, with 29.2%, whereas the plants of the Eurasian area are less dominant (20.8%), followed by the plants of Sub-Mediterranean area (16.7%), Sub-Atlantic (12.5%), circum-polar (8.3%), Pontic(6,2%), Balkans (4.2%), and cosmopolitan plants (2.1%), which are the least frequent.

According to the above facts, it can be said that mesophilic plants (of Mid-European and Sub-Atlantic area type), which account for 41.7%, are more dominant than xero-

termophilic plants (of Pontic, Sub-Mediterranean and Balkan type of area), which account for 27.1%, as well as than the plants of the wide amplitude (of Eurasian and cosmopolitan area types), which account for 22.9%. The least dominant are frigophilic plants (of circum-polar area type), which account for only 8.3%. By the specter of area types in the community of Hungarian and Turkey oak the mesophilic plants are dominant.

Table 4- Phytocenological table

Association	*Carpino betuli-Quercetum farnetto-cerris* (Rud.1949) Jov.1979.										
Number of record	1	2	3	4	5	6	7	8	9	10	
Date of record	21.06.05.										The level of presence
Field mark	OP1	OP1	OP2	OP2	OP3	OP3	OP4	OP4	OP5	OP5	
Location	Bogovađa										
Management unit	Bogovađa										
Department	18	18	10	10	18	18	17	17	17	17	
Size p.p. (m^2)	600	600	600	600	600	600	600	600	600	600	
Altitude (m)	212	211	210	210	207	211	210	210	210	210	
Exposition	N-NE	N-NE	S-SW	S-SW	N	N	N-NW	N-NW	N-NW	N-NW	
Slope	7	5-7	3	-	3	7	4	6	4	7	
Canopy	0.8	0.8	0.7	0.7	0.8-0.9	0.8	0.8-0.9	0.8-0.9	0.8	0.8	
Altitude -mean (m)	29	28	26	26	25	23	24	27	25	25	
Diameter - mean (cm)	35	34	27	27	26	27	27	27	26	26	
Distance (m)	2 -5	2 -5	2 -5	2 -5	2–5	3–5	2–5	2–5	2–5	2–5	
Geological base	Marl and clays										
Soil	Pseudogley luvisol										
I LAYER											
Quercus cerris	3.3	3.3	2.1	2.2	3.3	3.3	3.3	3.3	2.2	2.2	V
Quercus farnetto	2.2	2.2	3.3	3.3	2.2	2.2	2.2	3.3	3.3	3.3	V
Carpinus betulus	2.2	2.2	2.2	1.2	1.1	2.2	1.1	1.1	2.2	2.1	V
Tilia argentea	+.1		+.1	+.1	1.1	+.1		1.1	1.1	+.1	IV
Tilia grandifolia			+.1			+.1	+.1		+.1		II
Fraxinus ornus			+.1	1.1							I
Quercus petraea	+	+									I
II LAYER											
Carpinus betulus	1.1	2.1	2.2	2.3	2.1	1.1	2.1	1.1	2.1	1.1	V
Tilia argentea	1.1	1.1	1.1	+.1	2.1	1.1	1.1	1.1	1.1	1.1	V
Crataegus monogyna	1.1	1.1	1.1	+.1	+.1	1.1	1.1	1.1	1.1	1.1	V
Acer campestre	1.1	1.1	+.1	+.1	+.1	1.1	+.1	+.1	+.1	1.1	V
Fraxinus ornus	1.1	1.1	1.2	1.1	1.1	+.1	1.1	1.1	1.2	2.2	V
Acer tataricum	1.1	1.2	2.1	1.1	+.1	+.1	+.1				IV
Lonicera caprifolium	4.4	3.3	2.2	3.3		2.2			3.2	2.2	IV
Rubus hirtus	2.2	2.2	2.2	1.2			2.2	2.1			III
Pyrus pyraster	+.1	+.1			+.1	1.1		+.1			III
Rosa arvensis	+.1	1.1	2.1	1.1							II
Cornus mas	+.1	1.1	+.1	1.1							II

Association	*Carpino betuli-Quercetum farnetto-cerris* (Rud.1949) Jov.1979.										
Number of record	1	2	3	4	5	6	7	8	9	10	
Quercus cerris									1.1	+.1	I
Sorbus domestica	+.1	1.1									I
Sorbus torminalis				+.1							I
Prunus avium										+.1	I
III LAYER											
Quercus cerris	1.1	1.1	1.1	1.1	1.1	1.1	1.1	2.1	+.1	1.1	V
Quercus frainetto	1.1	1.1	2.1	1.1	1.1	1.1	1.1	1.1	+.1	+.1	V
Carpinus betulus	+.1	1.1	2.2	3.2	+.1	1.1	+.1	1.1	1.2	2.2	V
Rubus hirtus	2.2	1.2	1.2	+.2	1.2	2.2	1.2	+.2	2.2	2.2	V
Lonicera caprifolium	3.3	2.2	2.2	4.3	1.1	2.2	1.1	2.1	3.3	2.3	V
Hedera helix	1.1	1.1	1.2	1.1	+.1	1.1	+.1	1.1	1.1	+.1	V
Ruscus aculeatus	3.3	3.2	1.2	2.2	1.2	+.2	1.2	2.2	2.2	2.1	V
Glechoma hirsuta	2.1	1.1	1.1		2.2	2.1	2.2	1.2	2.2	2.2	V
Veronica chamaedrys	+.1	1.1	+.1	1.2	+.1	+.1		+.1		+.1	IV
Helleborus odorus	+.1	+.1			+.1	+.1	+.1	+.1	+.1		IV
Ligustrum vulgare	1.2	+.2			1.2	1.2		1.2	1.2	+.2	IV
Galium silvaticum			1.1	+.1	+.3	1..3		+.3	2.2	2.1	IV
Euphorbia amygdaloides	+.1		1.2	+.1	+.1		+.1		+.1		III
Acer tataricum	1.1	1.2				+.1		+.1	+.1	+.1	III
Polygonatum multiflorum	+.1	+				+.1	+.1	+.1			III
Viola silvestris		1.2			+.1	+.1	1.1	+.1			III
Rosa arvense	+.1	1.1	+.1	1.1					+.1		III
Cardamine bulbifera	+.1				+.1	+.1	+.1				II
Mycelis muralis	+.1				+.1		+.1	+.1			II
Tamus comunis	+.1	+	1.1	+.1							II
Fraxinus ornus		+							3.2	2.2	II
Melica uniflora	+.1		+.1	+.2							II
Prunus avium					+.1	+.1		1.1			II
Galium cruciata	+.2		+.2	+.2							II
Fragaria vesca	+.1		+.1	1.1							II
Daucus carota	+.1		+.1	+.1							II
Musci sp.					+	+		+			II
Ruscus hypoglossum									1.1	+.1	I
Primula vulgaris	+.1					+.1					I
Calamintha officinalis	+.1	1.1									I
Veronica pseudochamedrys			+.1	1.1							I
Stelaria holostea									1.1	+.1	I
Crataegus monogyna			+.1	1.1							I
Poa nemoralis			1.2	+.2							I
Tilia argentea			1.2	1.1							I
Carex pilosa						+.1	1.1				I
Nefrodium filix mas					+.1			+.1			I

Association	*Carpino betuli-Quercetum farnetto-cerris* (Rud.1949) Jov.1979.										
Number of record	1	2	3	4	5	6	7	8	9	10	
Chamaecytisus hirsutus		+.1		+.1							I
Dactuylis glomerata			+.1							+.1	I
Asarum europeum	1.1	+									I
Asperula odorata	+.2										I
Glechoma hederaceae	1.1										I
Hepatica nibilis	+										I
Geranium robertianum	+.1										I
Sorbus domestica	+.1										I
Viola tricolor	+.1										I
Polygonatum odoratum										+.1	I

The ratio of plants to life forms in the community of Hungarian oak and Turkey oak is presented in Table 5.

Table 5- Life forms of plants from association Carpino betuli-Quercetum farnetto-cerris (Rud.1949) Jov.1979

Life form						
Fanero-phytes	Nano-fane-rophytes	Fanerophyte lianas	Herbeceous hamephytes	Hemi-cryptophytes	Geophytes	Terophytes/ hamephytes
P	np	pl	zc	H	g	th
24%	17%	2%	6%	24%	21%	6%
43%						

In this association fanerophytes are dominant, since they account for 43% (pure fanerophytes, nanofanerophytes and fanerophyte lianas), whereas chemiocrytophytes, accounting for 24%, followed by geophytes, which account for 21%, are less frequent, which points to the moisturer climate and edaphic conditions. The least dominant are terrophytes, accounting for 6%, the percentage of which is equal to the percentage of herbaceous hamephytes. It means that this community is of fanerophytic-hemicriptophytic character, with a high percentage of geophytes.

4 CONCLUSION

By the phytocoenosis research conducted in the series of the sample plots it was determined that the observed stands belong to Hungarian oak and Turkey oak with hornbeam *Carpino betuli-Quercetum farnetto-cerris* (Rud.1949) Jov.1979. This variant of Hungarian and Turkey oak belongs to the mesophilic variant of Hungarian oak and Turkey oak forest, with a significant percentage of mesophilic species.

Differential species is hornbeam, which alongside Hungary and Turkey oak edifier dominate in the tree layer. In the bush floor alongiside edifiers lame, hornbeam, maple tree, hawthorn, black ash, Tatar maple, dwarf honesuckle and blackberry are present, whereas wild rose, wild pear, European cornel and service tree are less frequent.

In the layer of the ground plants, alongside the offspring of the mayor edifiers, Hungarian and Turkey oak, the most frequent species are: *uscus aculeatus, Carpinus betulus, Lonicera caprifolium, Hedera helix, Glechoma hirsuta, Helleborus odorus,*

Ligustrum vulgare, Veronica chamaedrys, Acer tataricum, Polygonatum multiflorum, Rosa arvense, Tammus communis.

Less frequent species are: *Euphorbia amygdaloides, Galium cruciata, Melica uniflora, Fragaria vesca, Viola silvestris, Daucus carota, Calamintha officinalis, Primula vulgaris, Cytisus hirsutus, Ruscus hipoglossum, Asperula odorata, Glechoma hederaceae, Hepatica nobilis, Sorbus domestica, Viola tricolor, etc.*

According to the specter of area types in Hungarian oak and Turkey oak community with hornbeam mesophilic plants are dominant (Mid-European and Sub-Atlantic area type), which account for 41.7%. By the analysis of the forms of the plants of the association of the Hungarian oak and Turkey oak with hornbeam, it was determined that this association is of fanerophyte- chemicryptophyte character with a high percentage of geophytes.

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PHYTOCENOLOGICAL CHARACTERISTICS OF HUNGARIAN OAK AND TURKEY OAK WITH HORNBEAM FOREST (*Carpino betuli-Quercetum farnetto-cerris*) IN THE AREA OF BOGOVAĐA

Summary

Hungarian oak and Turkey oak forest is most widely spread zonal forest of Serbia, and has been one of the first associations to be described in our country. The results of the study of the vegetation in the series of the sample plots set in the mixed Hungarian oak and Turkey oak forest within the forest complex Bogovađa are presented in this paper. Bogovađa belongs to the zone of the moderate continental climate.

The terrains of Bogovađa forests are located in the area in which Hungarian oak and Turkey oak forest (*Quercetum farneto-cerris* Rudski 1949) is climatogene. By the floristic composition it was determined that this forest belong to the ecological variant Hungarian oak and Turkey oak forest, which is in this area orographic – Hungarian and Turkey oak forest with hornbeam *Carpino betuli-Quercetum farnetto-cerris* (Rud.1949) Jov.1979. Differential species is hornbeam, which besides Hungarian oak and Turkey oak edifier dominates in the tree layer. In the shrub layer besides edifier

lame, hornbeam, maple tree, hawthorn, black ash, Tatar maple, dwarf honey suckle and blackberry.

In the layer of the ground plants, besides the offspring of the mayor edificators, Hungarian and Turkey oak, the most frequent species are: *uscus aculeatus, Carpinus betulus, Lonicera caprifolium, Hedera helix, Glechoma hirsuta, Helleborus odorus, Ligustrum vulgare, Veronica chamaedrys, Acer tataricum, Polygonatum multiflorum, Rosa arvense, Tammus communis.*

According to the specter of area types in Hungarian and Turkey oak community with hornbeam mesophilic plants are dominant (Mid-European and Sub-Atlantic area type), which account for 41.7%. By the analysis of the forms of the plants of the community of the Hungarian and Turkey oak with hornbeam, it was determined that this community is of fanerophyte- chemicryptophyte character with a high percentage of geophytes.

FITOCENOLOŠKE KARAKTERISTIKE ŠUME SLADUNA I CERA SA GRABOM (*Carpino betuli-Quercetum farnetto-cerris*) NA PODRUČJU BOGOVAĐE

Snežana Stajić, Ljubinko Rakonjac, Vlado Čokeša

R e z i m e

Šuma sladuna i cera je najšire rasprostranjena zonalna šuma Srbije, i predstavlja jednu od prvih asocijacija opisanih sa našeg područja. U radu su prikazani rezultati proučavanja vegetacije u serijama oglednih površina postavljenih u mešovitoj šumi sladuna i cera u okviru šumskog kompleksa "Bogovađa". Bogovađa pripada zoni umereno kontinentalne klime.

Tereni bogovađskih šuma nalaze se u području gde je šuma hrastova sladuna i cera (*Quercetum farneto-cerris* Rudski 1949) klimatogeno uslovljena. Na osnovu florističkog sastava utvrđeno je da je ovo ekološka varijanta šume sladuna i cera, koja je ovde orografski uslovljena - šuma sladuna i cera sa grabom *Carpino betuli-Quercetum farnetto-cerris* (Rud.1949) Jov. 1979. Diferencijalna vrsta je grab, koji pored edifikatora sladuna i cera dominira u spratu drveća.

U spratu žbunja pored edifikatora javljaju se najčešće lipa, grab, klen, glog, crni jasen, žešlja, orlovi nokti i kupina, itd. U sloju prizemnog bilja, pored podmlatka glavnih edifikatora, sladuna i cera, najveću stalnost imaju: *Ruscus aculeatus, Carpinus betulus, Lonicera caprifolium, Hedera helix, Glechoma hirsuta, Helleborus odorus, Ligustrum vulgare, Veronica chamaedrys, Acer tataricum, Polygonatum multiflorum, Rosa arvense, Tammus communis.*

Prema spektru areal tipova u zajednici sladuna i cera sa grabom preovlađuju mezofilne biljke (srednjeevropskog i subatlanskog areal tipa) koje učestvuju sa 41,7%. Analizom životnih oblika biljaka zajednice sladuna i cera i grabom utvrđeno je da je ova zajednica fanerofitsko-hemikriptofitskog karaktera sa velikim učešćem geofita.

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