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## ECOLOGICAL AND FLORISTIC CHARACTERISTICS OF THE NEW SUBASSOCIATION *ACERI HELDREICHII-FAGETUM* SUBASS. *CARPINETOSUM BETULI* ON MT. RUDNIK

**Abstract:** Ecological and floristic characteristics of the new subassociation of the Balkan beech and Greek maple plant community with hornbeam (*Aceri heldreichii-Fagetum* subass. *carpinetosum betuli*) were studied. This subassociation is recorded and described on Mt. Rudnik, where it occurs at the elevations 950-1,050 m, on moderate to steep inclinations (10-30°), and cold aspects: northern, northwestern and northeastern. Bedrock consists of sandstones and mudstones. The biological spectrum, ecological spectra and spectrum of distribution types of this community were calculated. The community has phanerophyte-hemicryptophyte character, it is mesophilous regarding soil moisture requirements and temperature requirements, it is neutrophilous to soil acidity, according to light requirements it is tolerant to semi-tolerant. The most numerous group of distribution types is Central European, which confirms the mesophilous character of this community.

**Key words:** *Aceri heldreichii-Fagetum* subass. *carpinetosum betuli*, floristic composition, biological spectrum, spectrum of distribution types, ecological spectrum

### ЕКОЛОШКЕ И ФЛОРИСТИЧКЕ КАРАКТЕРИСТИКЕ НОВЕ СУБАСОЦИЈАЦИЈЕ *ACERI HELDREICHII-FAGETUM* SUBASS. *CARPINETOSUM BETULI* НА РУДНИКУ

**Извод:** У раду су презентоване еколошке и флористичке карактеристике нове субасоцијације заједнице планинског јавора и балканске букве са обичним грабом (*Aceri heldreichii-Fagetum* subass. *carpinetosum betuli*). Ова субасоцијација је забележена и проучена на планини Рудник, где расте на надморским висинама 950-1.050 m, на умереним до стрмим нагибима (10-30°) и хладним експозицијама: северној, северозападној и североисточној. Геолошка подлога су пешчари и глинци. За ову заједницу су одређени спектар

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животних облика, спектар ареалтипова и спектри еколошких карактеристика. Заједница је фанерофитско-хемикриптофитског карактера, према захтевима за влажношћу земљишта и топлотом је мезофилна, према захтевима за киселошћу земљишта неутрофилна, према захтевима за светлошћу је сциофилна до полусциофилна. Најбројнија група ареалтипова је централноевропска што потврђује мезофилни карактер ове заједнице.

**Кључне речи:** *Aceri heldreichii-Fagetum* subass. *carpinetosum betuli*, флористички састав, спектар животних облика, спектар ареал типова, спектар еколошке припадности

## 1. INTRODUCTION

Greek maple (*Acer heldreichii* Orph.) is an endemic tree species of the Balkan Peninsula. It is distributed in Serbia, Montenegro, Bosnia and Herzegovina, FYR Macedonia, Bulgaria, Greece and Albania. It grows only in mountain zones, in Serbia it occurs at the elevation span of 1,000-2,000 *m*, but mostly between 1,200-1,800 *m*. Among native species of genus *Acer* L., Greek maple is the most adapted to cold climate. It could be found on all aspects, but mostly on northern ones, on milder slopes and in moist valleys, with deeper, more humid soils, with a prolonged snow cover (Lakušić, 1964).

On Mt. Rudnik, Greek maple was first recorded by Gajić in 1955, on one part of the peak Mali Šturac, at the elevation of 950 *m*. He initially found only one deformed tree, 3 *m* high (Gajić, 1955). Later on, he found a group of Greek maple trees at this locality. Gajić (1959, 1961) concluded that Greek maple grew on the mountain beech site.

Greek maple in Serbia grows as a dominant species in plant communities, almost exclusively in association with Balkan beech (*Fagus moesiaca* (Domin, Maly) Czeckzot) (Tomić, 2004). The plant community of beech and Balkan maple in Serbia was first described by Jovanović on Mt. Goč (Jovanović, 1957) and it was named *Aceri heldreichii-Fagetum*.

The highest abundance of Greek maple is in the belt of subalpine beech forests, where it forms, alone or with subalpine beech, endemic communities of the Balkan Peninsula: *Aceri heldreichii-Fagetum* B. Jov. 1957 in central Serbia, *Aceri heldreichii-Fagetum subalpinum* Jank. et Stef. 1983 in Kosovo and Metohija, *Aceri visianii-Fagetum* Fuk. et Stef. 1958 in Bosnia and Herzegovina, *Fago-Aceretum visianii* Bleč. et Lkšč. 1970 in Montenegro (Tomić, 2004).

The plant community *Aceri heldreichii-Fagetum* subass. *carpinetosum betuli* is recorded on Mt. Rudnik and it represents a new subassociation of Greek maple and Balkan beech, with hornbeam (*Carpinus betulus* L.) as a differential species (Perović, Cvjetičanin, 2009). The site on Mt. Rudnik is the northernmost site of Greek maple in the world, and at the same time it is the site where Balkan beech and Greek maple community grows at the lowest elevations in Serbia. This research includes the analysis of ecological and floristic characteristics of this community.

## 2. MATERIAL AND METHODS

Five phytocoenological records were taken on Mt. Rudnik in the plant community of Balkan beech and Greek maple using the standard Braun-Blanquet method. The analysed elements were: floristic composition, biological spectrum, spectra of ecological characteristics according to Kojić, Popović, Karadžić (1997), as well as the spectrum of distribution types according to Gajić (1980, 1984). Climatic data were given on the basis of the data of the meteorological station Rudnik, for the period 1965-2004. The Thornthwaite's index, Lang's rain factor, De Marton's drought quotient, and Kerner's quotient were calculated (Perović, 2007) based on the above data.



**Figure 1.** The community of Balkan beech and Greek maple on Mt. Rudnik

**Слика 1.** Заједница балканске букве и планинског јавора на Руднику

### 2.1 Study area

Mountain Rudnik is located in the central part of Serbia, in Šumadija region. The highest summit is Cvijićevo Vrh (Veliki Šturac) at 1,132 m a.s.l. Mt. Rudnik stretches in various directions. To the east, south, southeast and northwest, this massif is clearly defined, while to the west and north its border is unclear and it descends in various lower hills. This massif is rich in streams and brooks, but most of them get dry during summer in the lower courses. The streams which do not get dry are: Despotovica, Jasenica and Gruža (Gajić, 1981).

Balkan beech-Greek maple plant community (*Aceri heldreichii-Fagetum* subass. *carpinetosum betuli*) on Rudnik is researched in the area of the peaks Mali Šturac and Srednji Šturac. The stands grow at the elevation of 950-1,050 m, the aspect is northern, northwestern and northeastern, and the inclination is moderate to steep (10-30 °). Greek maple trees are averagely 19-24 m high, with the diameter of 24-30 cm (1996).

### 2.2. Climatic data

Climatic data are given on the basis of the data of the Rudnik meteorological station (700 m above sea level) for the period 1965-2004. Mean annual temperature is 9.4°C,

Table 1. Meteorological data, Rudnik, 1965–2004, elevation 700 m  
Табела 1. Метеоролошки подаци, Рудник, надморска висина 700 m

Meteorological data Метеоролошки подаци	Month Месеци												Annual Год.
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
$T_a$	-0,6	1,1	4,5	8,5	14,0	16,9	18,5	18,7	14,8	10,4	5,6	0,7	9,4
$T_x$	2,6	4,6	8,4	13,2	18,8	21,8	23,5	23,5	19,6	14,5	8,5	3,4	13,5
$T_n$	-3,2	-1,7	1,1	5,1	10,2	13,1	14,7	15,0	11,6	7,3	2,5	-2,1	6,1
aps. max $T$	16,8	22,5	25,0	28,3	33,3	31,9	35,4	36,0	32,5	28,7	25,1	17,3	35,5
aps. min $T$	-18,2	-17,2	-17,3	-6,1	-1,1	3,1	6,0	5,2	-4,5	-7,8	-11,3	-15,5	-18,2
number of summer days	0,0	0,0	0,0	0,3	3,6	8,3	11,8	12,5	4,2	0,5	0,0	0,0	41,4
number of tropical days	0,0	0,0	0,0	0,0	0,3	0,5	2,6	2,6	0,3	0,0	0,0	0,0	6,3
number of frost days	22,0	17,4	13,5	4,4	0,1	0,0	0,0	0,0	0,1	1,9	10,5	20,7	90,6
number of freezing days	11,2	7,0	3,2	0,2	0,0	0,0	0,0	0,0	0,0	0,1	2,5	8,9	33,1
RR	65,8	54,6	58,7	77,8	101,2	131,4	93,9	76,9	76,6	59,5	70,1	72,0	938,6
n.d.RR $\geq$ 0.1	14,2	12,2	12,5	13,9	14,2	13,7	11,0	10,1	10,1	10,1	12,2	13,8	147,9
n.d.RR $\geq$ 10	1,8	1,6	1,5	2,3	3,0	4,2	2,8	2,6	2,4	2,1	2,2	2,1	28,6
cloudiness	6,9	6,3	5,7	5,9	5,4	5,0	4,6	4,1	4,9	4,8	6,2	6,8	5,6
n.d.snow	9,3	8,0	6,2	2,7	0,1	0,0	0,0	0,0	0,0	0,8	4,0	7,8	38,9
n.d.s.c.	22,3	19,2	12,6	2,5	0,0	0,0	0,0	0,0	0,0	0,8	7,4	18,3	83,1
max s.c.	89	149	105	63	11	0,0	0,0	0,0	0,0	18	105	67	149
rel. hum.	84	78	74	73	72	74	74	72	78	77	79	83	76,5

**Legend:**  $T_a$  – Average air temperature (°C),  $T_x$  – Average maximal air temperature (°C),  $T_n$  – Average minimal air temperature (°C), aps. max $T$  – Absolute maximal air temperature (°C), aps. min $T$  – Absolute minimal air temperature (°C), RR – Precipitation (mm), n.d. RR $\geq$ 0.1 – Number of days with precipitation  $\geq$ 0.1 mm, n.d. RR $\geq$ 10 – Number of days with precipitation  $\geq$ 10.0 mm, cloudiness – Cloudiness in decimal values, n.d. snow – Number of days with snow, n.d.s.c. – Number of days with snow cover, max s.c. – Maximal height of snow cover, rel. hum – Relative air humidity (%)

the warmest month is August with the mean temperature 18.7°C, and the coldest month is January, with the mean temperature -0.6°C. Average temperature in the growing season is 15.2°C. The absolute maximal temperature in this period is 36.0°C, and the absolute minimum -18.2°C. Annual precipitation is 939 mm; the rainiest month is June with 131 mm, and the driest month is February with 55 mm. During the growing season, there is averagely 558 mm of precipitation. Annual relative air humidity is 76.5%; relative air humidity is the highest in January (84%), and the lowest in May and August (72%).

The value of Lang's rain factor is 100, which characterizes humid climate, represented with high forests. The value of Kerner's quotient of climate continentality is 9.8%, which represents the transition from mildly continental to littoral climate, which is in accordance with general climatic conditions of our mountain areas, where this quotient varies between 6% and 12% (Kolić, 1988). De Marton's drought quotient is 48.4 which shows that this is a typical forest region. Thornthwaite's index is 50.5 which indicates the intensified humid climate (B3) (Perović, M. 2007).

### 2.3. Geological characteristics

The bedrock of Mt. Rudnik is composed mostly of flysch sediments. Sediments of the golt-Cenomanian and the Senonian are also represented, as well as the sediments of the Hauterivian/Barremian, Barremian-Aptian, ugonic, sandstone-chert, Tertiary, etc. The most abundant sedimentary rocks are sandstones, marls, conglomerates, mudstones and diabases. Apart from sedimentary rocks, there are also volcanic rocks, mostly dacite-andesite (Ađelković, 1957).

On the basis of the collected rock samples from the researched area, it was ascertained that the community of Balkan beech and Greek maple on Mt. Rudnik grew on sandstone and mudstone bedrock (Perović, 2007).

## 3. RESULTS

### 3.1. Phytocoenological characteristics

Five phytocoenological releves were sampled aiming at the identification of phytocoenological characteristics. On the basis of floristic composition, it is ascertained that Greek maple forms a plant community with Balkan beech and hornbeam which is named *Aceri heldreichii-Fagetum* subass. *carpinetosum betuli*. That is a new subassociation of the association of Greek maple and Balkan beech in Serbia. The total number of 21 species is recorded in phytocoenological releves.

The canopy cover in the tree layer is 0.7-0.8, average heights are 11-20 m, average diameters 20-45 cm, average distance between trees is 3-6 m. Apart from Balkan beech and Greek maple, the following tree species are present in this layer: hornbeam (*Carpinus*

*betulus* L), Sycamore maple (*Acer pseudoplatanus* L), Norway maple (*Acer platanoides* L.) and Small-leaved lime (*Tilia cordata* Miller).

The canopy cover in the shrub layer is 0.1 to 0.3, average heights are 2-5 m. The dominant species in this layer is Balkan beech (*Fagus moesiaca* (Domin, Maly) Czeczott). In addition, Black elder (*Sambucus nigra* L.) and Hazelnut (*Corylus avellana* L.) are also found.

The coverage of grass layer is 0.6 to 1.0. Apart from the regeneration of the tree and shrub species, another 13 species were identified. The most widespread is Raspberry (*Rubus hirtus* Walds. et Kit), which was registered in all phytocoenological records and which has the highest abundance and coverage. Apart from raspberry, the presence of Common male-fern (*Dryopteris filix mas* L. (Schott)) was also high.

According to biological spectrum, the most numerous are phanerophytes (43% of all plant species), then hemicryptophytes (38%), geophytes (14%), and finally chamaephytes (5%), which indicates that this plant community has phanerophyte-hemicryptophyte character.

According to soil moisture requirements, the community is mesophilous, because sub-mesophytes comprise 81% and typical mesophytes 19% of all plant species.

According to the requirements to soil acidity, community is neutrophilous, because neutrophilous species account for 86% of all species, neutrophilous-basophilous 10%, and acidophilous 5%.

According to soil nitrogen requirements, mesotrophic species account for 76%, mesotrophic-eutrophic 10%, oligotrophic-mesotrophic 10%, and eutrophic 5%, so it can be concluded that community has moderate requirements to soil nitrogen.

According to light requirements, tolerant-semitolerant species are the most numerous species (62% of the total number), semitolerant (29%), typical tolerant (10%), so the community has tolerant to semitolerant character.

According to temperature requirements, mesophilous species account for 76%, mesophilous-thermophilous 19%, and thermophilous species 5%, so the community has moderate temperature requirements.

The most important in the spectrum of distribution types is the Subcentraleuropan distribution type (29% of all species), then Central-European (19%), cosmopolitan (14%), Moesic and circumpolar (10% each), while Pontic-Eastsubmediterranean, Sub-Eurasian, Eurasian and Central-Balkan comprise 5% each. The most numerous group is that of Central-European distribution types (Central-European and Subcentraleuropan) with 48% of all species, then cosmopolitan and Submediterranean (Moesic and Central-Balkan) with 14% each, circumpolar and Eurasian (Eurasian and Subeurasian) with 10% each, and Pontic-Centralasian with 5%. It can be concluded that plant species of mesophilous character have the highest occurrence (Central-European group of distribution types) with 48%, then the species of broad ecological amplitude (Eurasian and cosmopolitan group of distribution types) with 24%, xero-thermophilous species (Submediterranean

and Pontic groups of distribution types) with 19%, and, finally, plants of northern areas (circumpolar group of distribution types) with 10%.

**Table 2.** Phytocoenological releve of ass. *Aceri heldreichii-Fagetum* subass. *carpinetosum betuli* on Mt. Rudnik

**Табела 2.** Фитоценолошка табела ass. *Aceri heldreichii-Fagetum* subass. *carpinetosum betuli* на планини Рудник

Association	<i>Aceri heldreichii-Fagetum</i> B.Jov. 1957.					
Subsociacion	<i>carpinetosum betuli</i>					
Facies	<i>rubosum</i>					Presence level
Locality	Mali Šturac					
Record number	1	3	2	4	5	
Compartment	63	63	63	64	64	
Elevation (m)	950	1,000	1,000	1,050	1,050	
Exposure	NW	NNW	NW	N	N	
Inclination (°)	20	15	25	20	15	
TREE LAYER						
Canopy coverage	0.7	0.7	0.8	0.8	0.8	
Average height (m)	16	11	16	20	18	
Average diameter (cm)	20	25	25	45	35	
Average tree distance (m)	5	4	3	6	5	
<i>Acer heldreichii</i> Orph.	1.1	2.1	1.2	1.2	1.2	V
<i>Fagus moesiaca</i> (Domin, Maly) Czezcott	3.3	2.1	3.3	2.2	2.2	V
<i>Carpinus betulus</i> L.	2.2	2.1	1.1	1.1	2.1	V
<i>Acer platanoides</i> L.			1.1	+	1.1	III
<i>Acer pseudoplatanus</i> L.	2.2	1.1				II
<i>Tilia cordata</i> Miller			1.1		1.1	II
SHRUB LAYER						
Canopy coverage	0.1	0.2	0.3	0.1	0.2	
Average height (m)	3	4	5	2	4	
<i>Fagus moesiaca</i> (Domin, Maly) Czezcott	1.2	1.2	2.2	1.2	1.2	V
<i>Acer heldreichii</i> Orph.			+		+	II
<i>Sambucus nigra</i> L.		+				I
<i>Acer pseudoplatanus</i> L.	+					I
<i>Carpinus betulus</i> L.	+					I
<i>Corylus avellana</i> L.		+				I



**Table 2.** Phytocoenological releve of ass. *Aceri heldreichii-Fagetum* subass. *carpinetosum betuli* on Mt. Rudnik**Табела 2.** Фитоценолошка табела ass. *Aceri heldreichii-Fagetum* subass. *carpinetosum betuli* на планини Рудник

Association	<i>Aceri heldreichii-Fagetum</i> B.Jov. 1957.					
Subsociacion	<i>carpinetosum betuli</i>					
Facies	<i>rubosum</i>					Presence level
Locality	Mali Šturac					
Record number	1	3	2	4	5	
GRASS LAYER						
Coverage	1.0	0.9	0.6	0,6	0.6	
<i>Rubus hirtus</i> Waldst. et Kit.	5.5	5.5	3.3	3.3	3.3	V
<i>Dryopteris filix-mas</i> (L.) Schott	+	+	+	+2	+	V
<i>Glechoma hirsuta</i> Walds. et Kit.	1.2		1.2	1.2	1.2	IV
<i>Lamium galeobdolon</i> L.	+		+	1.2		III
<i>Athyrium filix-femina</i> (L.) Roth.		+		+2	+	III
<i>Polystichum aculeatum</i> (L.) Roth.		+		+	+	III
<i>Circaea lutetiana</i> L.	+	+				II
<i>Asperula odorata</i> L.			+		+	II
<i>Oxalis acetosella</i> L.	+2					I
<i>Fagus moesiaca</i> (Domin, Maly) Czeozott	+					I
<i>Urtica dioica</i> L.		+				I
<i>Viola silvestris</i> Lam.	+					I
<i>Acer pseudoplatanus</i> L.	+					I
<i>Helleborus odoratus</i> Waldst. et Kit.	+					I
<i>Campanula latifolia</i> L.		+				I

#### 4. DISCUSSION

Greek maple (*Acer heldreichii* Orph.) is an endemic tree species of the Balkan Peninsula. In its range it grows exclusively in mountain zone, in Serbia its elevation span is 1,000-2,000 m, but mostly between 1,200-1,800 m. According to Lakušić (1989), mean annual temperatures on its sites are between 2 and 7°C, mean relative humidity is between 65% and 80%, absolute minimal temperatures drop to -35°C (-40°C), and absolute maximal temperatures rise to 30°C. Greek maple can be found on all exposures, but mostly on northern, on milder slopes and valleys with prolonged snow cover (Lakušić, 1964). Among native species of genus *Acer* L., Greek maple is the best adapted to cold climate. Above the subalpine beech belt, Greek maple can be found in the form of low



shrubs in the community of Blueberry (*Vaccinium myrtillus* L.) and Mountain juniper (*Juniperus sibirica* Burgsd.) which indicates its vitality and resistance to low temperatures (Lakušić, 1964).

In the area of the former Yugoslavia, Greek maple grows as the dominant species in plant communities, almost exclusively with subalpine beech. The following communities are described: *Aceri heldreichii-Fagetum* B. Jov. 1957 in central Serbia, *Aceri heldreichii-Fagetum subalpinum* Jank. et Stef. 1983 in Kosovo and Metohija, *Aceri visianii-Fagetum* Fuk. et Stef. 1958 in Bosnia and Herzegovina, and *Fago-Aceretum visianii* Bleč. et Lkšć. 1970. in Montenegro (Tomić, 2004). Greek maple is among the best species for the differentiation of the subalpine from montane beech forests (Mišić, 1997). Very rarely it forms plant communities with Spruce (*Picea abies* (L.) Karst.) (Stefanović, 1970).

The association *Aceri heldreichii-Fagetum* subass. *carpinetosum betuli* described on Mt. Rudnik is the Greek maple - Balkan beech community recorded at the lowest elevations (950-1,050 m) in Serbia, and at the same time it is the northernmost Greek maple site in the world. Mean annual temperature measured in the meteorological station Rudnik (elevation 700 m, period 1965-2004.) is 9.4°C, which indicates that the stands of Greek maple and beech on Mt. Rudnik grow in a somewhat warmer climate than it is usual for this community. Relative air humidity (76.5%) is within the average values for this community. The absolute maximal temperature is 36°C, and the absolute minimum -18°C, which is significantly above the lowest temperatures recorded at Greek maple sites (-40°C) (Lakušić, 1989). Such climatic conditions influence the floristic composition of Greek maple-Balkan beech community on Mt. Rudnik, which resulted in the higher occurrence of typical mesophilous species which do not grow in frigoriphilous conditions of typical Greek maple-Balkan beech stands. First of all, it is connected with the occurrence of hornbeam (*Carpinus betulus* L.) which is a differential species of this sub-community. The dominance of Central-European group of distribution types, the dominance of mesophilous species according to temperature and soil moisture requirements, and the phanerophyte-hemicryptophyte character of the community biological spectrum also indicate the typical mesophilous character of this plant community.

## 5. CONCLUSION

A new subassociation of the association of Greek maple and Balkan beech (*Aceri heldreichii-Fagetum* subass. *carpinetosum betuli*) is described on Mt. Rudnik, at the localities Mali Šturac and Srednji Šturac. This community grows at the elevation of 950-1,050 m, on cold aspects: northern, northwestern and northeastern. Inclination is moderate to steep (10-30°). This is the lowest elevation in Serbia at which Greek maple and Balkan beech community grows and, at the same time, the northernmost site of Greek maple in the world.

The climate is warmer than in the typical stands of Greek maple and Balkan beech.

The bedrock is composed of sandstones and mudstones. According to biological spectrum, the community is phanerophytic-hemicryptophytic, according to moisture requirements, the community is mesophilous, according to soil acidity - it is neutrophilous, according to soil nitrogen content - mesotrophic, according to the light -tolerant to semi-tolerant, according to temperature requirements - mesophilous.

As for the spectrum of distribution types, the most numerous is the group of Central-European distribution types. The most important floristic difference of this plant subassociation from the typical *Aceri heldreichii-Fagetum* B. Jov. 1957 association is the presence of typical mesophilous species, hornbeam (*Carpinus betulus* L), which is a differential species of this sub-community. The dominance of Central-European group of distribution types, the dominance of mesophilous species regarding the temperature and soil moisture requirements, and the phanerophyte-hemicryptophyte character of the community biological spectrum also indicate the typical mesophilous character of this plant community.

## REFERENCES

- Andelković M. (1957): *Stratigrafija i tektonika planine Rudnika*, Zapisnici Srpskog geološkog društva za 1956. godinu, Beograd (89-94)
- Gajić M. (1955): *Jedno novo nalazište planinskog javora (Acer heldreichii Orph. in Boiss.) u Srbiji*, Šumarstvo 7-8, UŠITS, Beograd (480-483)
- Gajić M. (1959): *O dvema novim biljkama u flori Šumadije*, Zaštita prirode 15, Beograd (14-17)
- Gajić M. (1961): *Fitocenoze i staništa planine Rudnik i njihove degradacione faze*, doktorska disertacija u rukopisu, Univerzitet u Beogradu, Beograd
- Gajić M. (1980): *Pregled vrsta flore SR Srbije sa biljnogeografskim oznakama*, Glasnik Šumarskog fakulteta - Serija A - Šumarstvo 54, Univerzitet u Beogradu - Šumarski fakultet, Beograd (111-141)
- Gajić M. (1981): *Florni elementi i fitocenoze planine Rudnik*, Glasnik Šumarskog fakulteta, Serija A-Šumarstvo, Posebno izdanje, Univerzitet u Beogradu - Šumarski fakultet, Beograd (1-140)
- Gajić M. (1984): *Florni elementi SR Srbije*, „Vegetacija SR Srbije I”, Srpska akademija nauka i umetnosti - Odeljenje prirodno-matematičkih nauka, Beograd (317-397)
- Jovanović B. (1957): *O šumi planinskog javora na Goču (Acereto-Heldreichii Fagetum)*, Arhiv bioloških nauka, IX, br.1-4/1957, Beograd ( 15-32)
- Kojić M., Popović R., Karadžić B. (1997): *Vaskularne biljke Srbije kao indikatori staništa*, Institut za istraživanja u poljoprivredi „Srbija” i Institut za biološka istraživanja „Siniša Stanković”, Beograd (1-160)
- Kolić B. (1988): *Šumarska ekoklimatologija sa osnovama fizike atmosfere*, Naučna knjiga, Beograd (1-397)
- Lakušić R. (1964): *Planinski javor (Acer heldreichii Orph)*, Godišnjak Biološkog univerziteta u Sarajevu, Vol. XVII, Sarajevo (117-143)
- Lakušić R. (1989): *Ekologija biljaka - I dio - Idioekologija*, Svjetlost, Sarajevo

- Mišić V. (1997): *Red šuma bukve - Fagetalia sylvaticae Pawl. 1928. - Podred šuma mezijske bukve - Fagenalia moesiacaе B.Jov. 1986*, „Vegetacija Srbije II” 1. Srpska akademija nauka i umetnosti, Beograd (159-270)
- Perović M. (2007): *Taksonomske, ekološke i anatomske karakteristike planinskog javora (Acer heldreichii Orph.) u centralnoj Srbiji*, magistarski rad u rukopisu, Univerzitet u Beogradu - Šumarski fakultet, Beograd (1-140)
- Perović M., Cvjetićanin R. (2009): *Aceri heldreichii-Fagetum subass. carpinetosum betuli-new subassociation of beech and greek maple plant community in Serbia*, 5<sup>th</sup> Balkan botanical congress (book of abstracts). Faculty of biology, University of Belgrade, Belgrade (70-71)
- (1996): *Posebna osnova gazdovanja šumama gazdinske jedinice „Rudnik”*, Šumsko gazdinstvo „Kragujevac”, Kragujevac
- Stefanović V. (1970): *Aceri visianii-Piceetum subalpinum-die neue Gesellschaft des Griechischen Ahorn und der Fichte der Dinariden*, Mittl. Ostalp.-din. Ges. f. Vegetkde. Band 11. Obergurgl, Innsbruck (205-212)
- Tomić Z. (2004): *Šumarska fitocenologija*, Univerzitet u Beogradu - Šumarski fakultet, Beograd (1-261)

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**ЕКОЛОШКЕ И ФЛОРИСТИЧКЕ КАРАКТЕРИСТИКЕ НОВЕ СУБАСОЦИЈАЦИЈЕ  
*ACERI HELDREICHII-FAGETUM SUBASS. CARPINETOSUM BETULI* НА РУДНИКУ**

**Резиме**

Планински јавор (*Acer heldreichii* Orph.) је ендемична врста Балканског полуострва. Распрострањен је у Србији, Црној Гори, Босни и Херцеговини, Македонији, Бугарској, Грчкој и Албанији. Расте само у планинској зони, у Србији је у распону надморских висина 1.000-2.000 m, али углавном између 1.200 и 1.800 m. То је најфригорифилнија аутохтона врста рода *Acer* L. Може се наћи на свим експозицијама, али је најчешћи на северним, на блажим нагибима и у влажним удолинама са развијенијим дубљим, хумознијим земљиштима, на местима где се дуже задржава снег. У Србији ова врста гради шумске заједнице, скоро увек са субалпском буквом (асоцијација *Aceri heldreichii-Fagetum* V. Jov. 1957).

Станиште планинског јавора на планини Рудник представља његово најсеверније налазиште на свету, а у раду је описана заједница планинског јавора са буквом и обичним грабом (*Aceri heldreichii-Fagetum* subass. *carpinetosum betuli*) која представља нову субасоцијацију заједнице *Aceri heldreichii-Fagetum* V. Jov. 1957. Проучена је на подручју Малог и Средњег Штурца, на надморским висинама од 950 до 1.050 m, на хладним експозицијама (северна, северозападна и североисточна) и умереним до стрмим нагибима (10-30°). Налази се на геолошкој подлози од пешчара и глинаца.

У сврху одређивања флористичких карактеристика заједнице планинског јавора, букве и обичног граба (*Aceri heldreichii-Fagetum* subass. *carpinetosum betuli*) у раду су за ову заједницу приказани спектри животних облика, ареал типова и еколошке припадности. Према спектру животних облика заједница има фанерофитско-хемикриптофитски карактер. Према влажности заједница је изразито мезофилног карактера, према киселости

земљишта изразито неутрофилна, по захтевима према азоту мезотрофна, по захтевима према светлости сциофилна до полусциофилна, по захтевима за топлотом мезофилна. Према спектру ареал типова преовлађује група средњоевропских ареалтипова.

Заједница *Aceri heldreichii-Fagetum* subass. *carpinetosum betuli* на Руднику се налази на најнижим надморским висинама на којима се образује заједница планинског јавора и букве у Србији и карактерише се нешто топлијом климом, што се одражава на флористички састав, у првом реду на масовно присуство типично мезофилне врсте, граба (*Carpinus betulus* L.) који је и диференцијална врста ове субасоцијације. Преовлађивање групе средњоевропских ареал типова, доминација мезофилних врста по захтевима према топлоти и влажно-сти, као и доминација фанерофита и хемикриптофита у спектру животних облика, такође указују на мезофилан карактер ове заједнице.