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ECOLOGICAL-COENOLOGICAL RELATIONSHIP AND VITALITY OF THE STANDS OF COMMON ASH AND AUSTRIAN PINE ESTABLISHED IN THE SITE OF THE HUNGARIAN OAK- TURKEY OAK FOREST TYPE (*Quercetum farnetto-cerridis*) IN MU "LIPOVICA" – BELGRADE, SERBIA

RAJKO MILOŠEVIĆ[1]
MARIJANA NOVAKOVIĆ VUKOVIĆ[1]
MARINA VUKIN[2]
MILAN BIĆANIN[1]

Abstract: Ecological-coenological vitality and structural development of forest ecosystems is the main goal of forest management planning aimed to protect and improve the environment. It particularly applies to special-purpose forests, and even more to the subcategory of forests of special importance located in the narrow urban and suburban zones. The aim and layout of the research conducted in the suburban zone of the city of Belgrade (MU 'Lipovica') were defined following the above stated. The paper presents an analysis of ecological and coenological vitality of artificially established stands of Austrian pine and common ash grown on a secondary site characterised as the Hungarian oak-Turkey oak forest type (*Quercetum farnetto-cerridis*) on brown forest soil. The research results showed that artificially established common ash stands are significantly more vital than artificially established Austrian pine stands. In that sense, if we want to achieve ecological stability and vitality of the stand and the entire complex, the common ash stands should remain in the given site in the following planning periods. Regarding the Austrian pine stands established in the site of Hungarian oak-Turkey oak forest type (*Quercetum farnetto-cerridis*) on brown forest soil, future functional plans should revise the planning procedure to conduct restitution and establish the primary forest type structure. The ultimate goal of future silvicultural measures in the research area is to achieve complete functional stability and vitality of the stands established in the site of the Hungarian oak-Turkey oak forest type, which would, in turn, improve the diverse ambient of this important forest complex.

Keywords: forest type, special-purpose forests, common ash, Austrian pine, ecological stability and stand vitality

АНАЛИЗА ЕКОЛОШКО - ЦЕНОЛОШКОГ ОДНОСА И ВИТАЛНОСТИ САСТОЈИНА БЕЛОГ ЈАСЕНА И ЦРНОГ БОРА ПОДИГНУТИХ

1PhD Rajko Milošević, Ass. Prof., PhD Marijana Novaković, Ass. Prof., Milan Bićanin, master forest engineer, PhD student; University of Belgrade Faculty of Forestry Belgrade

2 PhD Marina Vukin, Research Assotiate, Faculty of Applied Ecology 'Futura' University Metropolitan Belgrade

Извод: Еколошко-ценолошка виталност и структурна изграђеност шумских екосистема представља основни циљ планирања газдовања шумама, у функцији заштите и унапређења животне средине. То је нарочито изражено у шумама посебне намене, посебно у шумама које спадају у подкатегорију шума посебног значаја и налазе се у ужим урбаним и субурбаним зонама. У складу са наведеним, конципиран је циљ и садржај спроведених истраживања на подручју субурбане зоне града Београда, у оквиру ГЈ 'Липовица'. У раду је приказана анализа еколошко-ценолошке виталности вештачки подигнутих састојина црног бора и белог јасена на секундарном станишту, које је окарактерисано као тип шуме сладуна и цера (*Quercetum farnetto-cerridis)* на гајњачи. Резултати истраживања показали су да су вештачки подигнуте састојине белог јасена сигнификантно виталније у односу на вештачки подигнуте састојине црног бора. У том смислу, састојину белог јасена треба задржати на датом станишту, у наредним планским периодима, у циљу постизања еколошке стабилности и виталности састојине, као и целокупног комплекса. Када је у питању састојина црног бора, подигнута на станишту типа шуме сладуна и цера (*Quercetum farnetto-cerridis)* на гајњачи, у наредним функционалним плановима потребно је ревидирање планског поступка и спровођење реституције и успостављања структуре примарног типа шуме. Крајњи циљ будућих узгојних мера на истраживаном подручју је успостављање потпуне функционалне стабилности и виталности састојина подигнутих на станишту шуме сладуна и цера, као и разноврсног амбијеталног садржаја овог значајног шумског комплекса.

Кључне речи: тип шуме, шуме посебне намене, бели јасен, црни бор, еколошка стабилност и виталност састојина

1. INTRODUCTION

Artificially established stands of numerous autochthonous and allochthonous species show different capacities to adapt to sites of different forest types, i.e. sites that do not favour these species in relation to their bioecological characteristics, and which are outside their natural optimum and natural bioecosystem synergy. Achieving the functional sustainability and stability of these stands, especially the ones that have been established in protection forest complexes and represent special-purpose forests is defined as a planning and primarily sustainable goal. Hence the need to consider the biogeocoenotic approach in forest management planning. In the case of artificially established stands, it means achieving functional sustainability related to the overall potential and quality of the environment on the one hand. On the other hand, the ecological and coenological vitality of different species growing in the sites of primary forest types or different forest types should be considered in order to achieve and maintain the priority function of the forest in the given environmental conditions.

The importance of researching the ecological-coenological relationship of different species in primary forest sites and ecological sustainability of species in sites that do not primarily belong to them in terms of typology, especially in special-purpose forests, has been pointed out by Milošević, R. (1996; 1997; 2003; 2011; 2016); Bićanin, M., Milošević, R. (2015); Milošević, R., Novaković

Vuković M. (2017; 2019); Novaković Vuković M., Milošević, R. (2016); Milošević, R. *et al.* (2019).

Isajev, V. 2006, state that the priority task of the strategic goals of forest and forest land management and use is related to the management and enlargement of forest complexes that surround large urban centers and of other special-purpose forests. These silvicultural activities greatly rely on the proper selection of autochthonous and allochthonous species to be introduced to specific sites. The selection of species should be based on a detailed study of the coenological and ecological characteristics of each surface area where artificial reforestation should be implemented in order to eliminate the patterns that are used in such activities (Vukojevic, V., Isajev, V., 2013). The research studies of conifer stands artificially established in oak sites in the large urban area of the city of Belgrade have revealed interesting data related to the introduction of Atlas cedar (*Cedrus atlantica* Man.) that, in given ecological conditions, proved to be a species that builds very stable and productive stands. (Krstić, M., Kecman, M., 2013).

In secondary sites, different autochthonous and allochthonous species show different ecological-coenological sustainability, which directly correlates with systematic and functionally-sustainable planning whose priority is environmental protection in both the inner and the wider urban zone. It should be emphasised that opinion is divided regarding the impact of artificially established stands on biodiversity conservation (Bremer L.L., Farley, K.A., 2010). Therefore, the research of these man-made forest ecosystems is of particularly great importance for the preservation of the biodiversity structure of our forests. Our research deals with the ecological and functional sustainability of forests in the suburban zone of the City of Belgrade where the introduced autochthonous and allochthonous species growing in secondary sites are function holders.

2. MATERIAL AND METHODS

2.1. Research area

The research area covered artificially established stands of Austrian pine and common ash in the secondary site characterised as the Hungarian oak-Turkey oak forest type (*Quercetum farnetto-cerridis*) on brown forest soil within the "Lipovica" forest complex in the suburban zone of Belgrade. This complex makes the wider part of the so-called 'green ring' around the city, with protetctive-regulatory forest functions and multi-purpose contents aimed to sustain and improve the quality of the environment. "Lipovica" forest complex is located 20 km from the city of Belgrade (Figure 1), at an altitude of 160-290 m. It mainly has a southwestern aspect, but a significant part of the terrain comprises north- and east-facing stream banks and karst depressions.

The mean annual air temperature in the observed period (1990-2009) was 12.5°C, with large fluctuations – from 11.1°C to 14.0°C. The mean air temperature in the growing season was 19.0°C. Generally, the coldest month was January, with a mean monthly value of 1.5°C, and the warmest month was August, with a mean

monthly temperature of 22.8°C. In some years, winters could be quite cold, with the air temperature dropping to -26.2°C. In summer, the air temperature reached as high as 43.6°C (Vukin, M., 2017).

The area of Lipovica Forest reflects the geological characteristics of its wider area, that is, the wider surroundings of the city of Belgrade, as the northern edge of the tectonic unit: Šumadija-Kopaonik-Vardar zone. The bedrock comprises limestone and dolomites; green sandstones and sandy limestones (in the northern part of the complex); Upper Cretaceous flysch; clays and sands (occupying the largest area of this complex); the Lower Congerian strata (the western part of the area has a mix of clay, marl and sand, which causes waterlessness and frequent occurrence of slides, which are also common on Sarmatian clay). This is why leached brown forest soil occurs instead of the typical one, which would be expected considering the position and precipitation. Edaphic factors are characterised by two types of soil: leached brown forest soil, underlying the climax forest of Hungarian oak and Turkey oak, and brown acid soil formed over the sandstone bedrock in the rare stands of submontane beech (Vukin, M., 2017).

The most frequent community in the area of Lipovica is the climax community of Turkey oak and Hungarian oak (*Quercetum farnetto-cerridis Rudski 1949*) mostly of coppice origin (Vukin, M., Krstić, M., 2012). There is a small percentage of beech forests forming groups of ecological units of submontane beech forests (*Fagetum moesiacae submontanum* B.Jov. 1967.).

Artificially established stands of the MU "Lipovica" cover 127.85 ha or 11% of the total area. According to 2011: Forest management plan of the MU "Lipovica" (2011-2020), artificially established stands of pedunculate oak, Austrian pine, common ash, large-leaved linden and locust cover the greatest area.

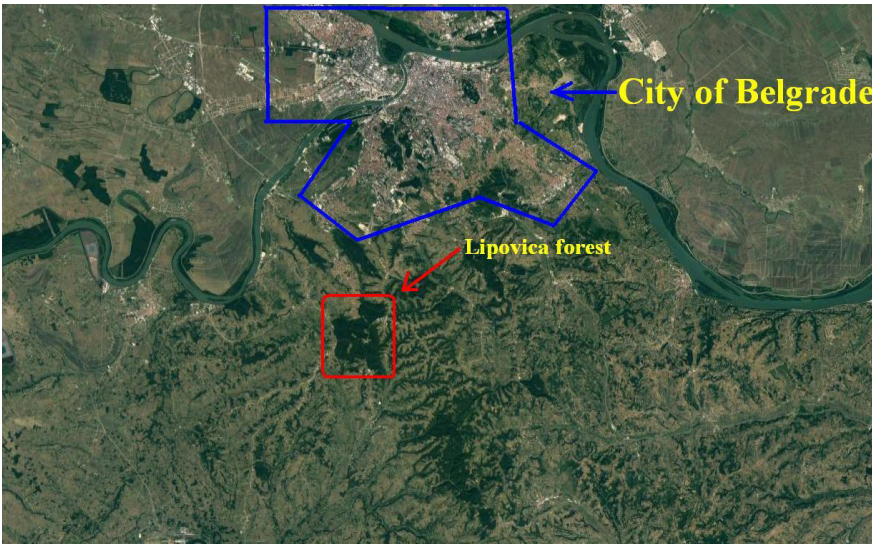

Figure 1 Geographical position of Lipovica in the Republic of Serbia
Слика 1. Географски положај Липовице у Републици Србији

2.2. Data collection and statistical analysis

The ecological-coenological relationship was studied in artificially established stands of common ash and Austrian pine in the site of Hungarian oak-Turkey oak primary forest type (*Quercetum farnetto-cerridis* Rud.1949) on brown forest soil. The aim of the study was defined based on the share of the species in the total area of artificially established stands in Lipovaica Forest and the specific bioecology of these species in terms of their adaptability to site conditions of this forest type. We further investigated the functional vitality of artificially established stands. The study provided a realistic view of the situation which can be a solid basis to design management plans and define priorities of functional planning of these species compared to other species found in the site of this forest type and the species that constitute the structure of the primary forest type. Artificially established stands of common ash and Austrian pine are 50 years old.

The coenological relationship between the species in the stands artificially established in the site of Hungarian oak-Turkey oak forest type (*Quercetum farnetto-cerridis*) on brown forest soil was defined based on the analysis of its floristic composition. The floristic composition of the investigated areas was studied using phytosociological relevés (Bićanin, M., 2015) produced by the standard Braun-Blanquet method (Braun-Blanquet, J., 1964). The names of syntaxa were given according to (Tomić, Z., Rakonjac, Lj., 2013). DCA analysis of vegetation data was performed using the statistical software CANOCO 4.5 (Lepš, J., Šmilauer, P., 2002). The ecological relationship was analysed using the methodology commonly used to define the typology of forests and stands artificially established in sites of other forest types (Milošević, R., 2012).

3. RESEARCH RESULTS AND DISCUSSION

Table 1 shows the relevés of the investigated stands. The two groups of phytocoenological relevés can be seen in the graph shown in Figure 2. The first group contains the relevés made in the artificially established stand of common ash (*Fraxinus excelsior*). Besides common ash, the graph includes species that tend to be mesophilic: *Brachypodium sylvaticum, Glechoma hirsuta, Acer campestre,* etc. The relevés presented in the second group were taken in the artificially established stand of Austrian pine (*Pinus nigra*). Besides Austrian pine, it includes other species that tend to be mesophilic: *Carpinus betulus, Tilia tomentosa, Melica uniflora*, etc. Since all the stands were established in the same site, i.e. the site of the Hungarian oak-Turkey oak forest (*Quercetum frainetto-cerridis*), they have a lot of species in common: *Ulmus minor, Viola sylvestris, Geranium robertianum, Clematis vitalba*, etc. It can be concluded that both artificially established stands are characterized by significant floristic richness. They share a lot of common species, but also have many different species which makes their floristic composition different. Hungarian oak (*Quercus frainetto*) and Turkey oak (*Quercus cerris*) were also recorded in the relevés, which confirmed that the stands were established in the site of the Hungarian oak-Turkey oak forest (*Quercetum frainetto-cerridis*). In

the artificially raised stand of common ash, Turkey oak was observed in the tree layer, while in the artificially established stand of Austrian pine, Hungarian oak was recorded in the ground flora layer.

The comparison of the floristic characteristics of the forest of Hungarian oak-Turkey oak with hornbeam (*Quercetum frainetto-cerridis subass. carpinetosum betuli Rudski 1949*) in the area of Bogovađa (Stajić, S. *et al*., 2011) with the floristic composition of artificially established stands of common ash and Austrian pine (Table 1) in the site of the Hungarian oak-Turkey oak forest type in the area of MU 'Lipovica' reveals both similarities and differences. If we compare the species with the highest degree of presence in the studied stands, a lot of common species can be observed, which is expected, because they have the same potential vegetation: *Quercus cerris, Quercus frainetto, Carpinus betulus*, *Glechoma hirsuta*, *Viola sylvestris*, etc. Some species, characterised by great abundance and cover in natural stands, were not observed in the artificially established stands in the research area (*Rubus hirtus, Lonicera caprifolium, Ruscus aculeatus*, etc.). A comparison of the floristic composition of the investigated stands shows that artificially established stands of Austrian pine contain more common species with a high degree of presence with Hungarian oak and Turkey oak forests than artificially established stands of common ash (*Mycelis muralis, Tamus communis, Fraxinus ornus, Prunus avium, Melica uniflora*, etc).

We can thus conclude that progressive succession occurs faster in artificially established stands of Austrian pine than in artificially established stands of common ash. Artificially established, artificially established stands of common ash in the site of the Hungarian oak-Turkey oak forest type (*Quercetum farnetto-cerridis*) on brown forest soil are more stable and vital in coenological terms than artificially established Austrian pine stands in the site of this type of forest.

Table 1 Phytocoenological table of investigated stands
Табела 1. Фитоценолошка табела проучаваних састојина

Association / Асоцијација	*Quercetum frainetto-cerridis* Rudski 1949				
Locality / Локалитет					
Number of relevés / Број снимка	10/14	7/14	3/14	4/14	
Section / Одсек	1e	48d	18e	18	
Altitude / Надморска висина (m)	190	280	270	213	
Aspect / Експозиција	NW	NE	WEW	NW	
Slope / Нагиб (◦)	5	1	6-10	5	Degree of presence / Степен присутности
Bedrock / Матични супстрат	sandstone/ пешчар	sandstone/ пешчар	sandstone/ пешчар		
Soil / Земљиште	illimerised/ илимеризовано	eutric cambisol/ еутрично смеђе	eutric cambisol/ еутрично смеђе		

Layer I / I спрат					
Canopy closure / Склоп	0.5	0.7	0.7	0.6	
Mean height / Средња висина (m)	16	14	15	20	
Mean distance / Средње растојање (m)	5	4	5	2	
Fraxinus excelsior	2.2	4.4			III
Carpinus betulus	+		+		III
Robinia pseudoacacia	+	+			III
Pinus nigra			3.3	3.3	III
Quercus cerris	+				II
Fraxinus pensylvanica	+				II
Acer pseudoplatanus		+			II
Ulmus minor			1.1		II
Prunus avium				+	II
Hedera helix				+	II
Layer II / II спрат					
Canopy closure / Склоп	0.6	0.6	0.3	0.2	
Mean height / Средња висина (m)	3	5	4		
Ulmus minor	+	+	+	+	V
Acer pseudoplatanus		+	+.2		III
Acer campestre	1.1	2.2			III
Robinia pseudoacacia	+	+			III
Fraxinus ornus			+.2	+.2	III
Tilia tomentosa			+.2	+	III
Carpinus betulus			+	+	III
Evonymus europaeus	+.2				II
Crataegus monogyna	+				II
Crataegus oxyacantha	+				II
Fraxinus excelsior		+			II
Cornus sanguinea				+.2	II
Philadelphus coronarius				1.1	II
Sambucus nigra				+	II
Prunus avium				+	II
Layer III / III спрат					
Coverage / Покривеност	0.7	1.0	0.6	0.8	
Viola sylvestris	+.2	+	+.2	+.2	V
Clematis vitalba	+		+	+	IV
Glechoma hirsuta	1.1	1.1		+.2	IV
Acer campestre	+	+.2		+	IV
Tamus communis	+		+	+.2	IV
Geranium robertianum	+.2		+.2		III
Cornus sanguinea	+		+.2		III
Carpinus betulus	+.2		+		III

Fraxinus ornus	+.2			+.2	III
Ulmus minor	+		+		III
Rosa arvensis		+		+	III
Geum urbanum		+.2		+.2	III
Aremonia agrimonioides		+		+.2	III
Hedera helix			+	2.2	III
Tilia tomentosa			+	+	III
Melica uniflora			2.2	1.1	III
Evonymus europaeus	+.2				II
Hypericum perforatum	+.2				II
Quercus cerris	+				II
Prunus cerasifera	+				II
Cardamine impatiens	+				II
Robinia pseudoacacia	1.1				II
Helleborus odorus	+				II
Brachypodium sylvaticum		5.5			II
Crataegus monogyna		+			II
Carex divulsa		+.2			II
Rumex sanguineus		+			II
Fragaria vesca		+			II
Calamintha officinalis		+.2			II
Polygonatum odoratum		+.2			II
Alliaria officinalis		+			II
Acer pseudoplatanus			+		II
Rubus hirtus			1.2		II
Circaea lutetiana			+.2		II
Ajuga reptans			+.2		II
Scutellaria altissima			+.2		II
Dryopteris filix-mas			+.2		II
Polystichum aculeatum			+.2		II
Stellaria media			+.2		II
Sambucus nigra			+		II
Rubus tomentosus				+.2	II
Quercus frainetto				+	II
Cardamine bulbifera				+.2	II
Philadelphus coronarius				2.3	II
Asperula odorata				+.3	II
Prunus avium				+	II
Cornus sanguinea				1.1	II
Mycelis muralis				+	II
Melttis melysophyllum				+	II
Solanum dulcamara				+.2	II
Physocarpus opulifolius				+.2	II
Raphanus raphanistrum				+	II

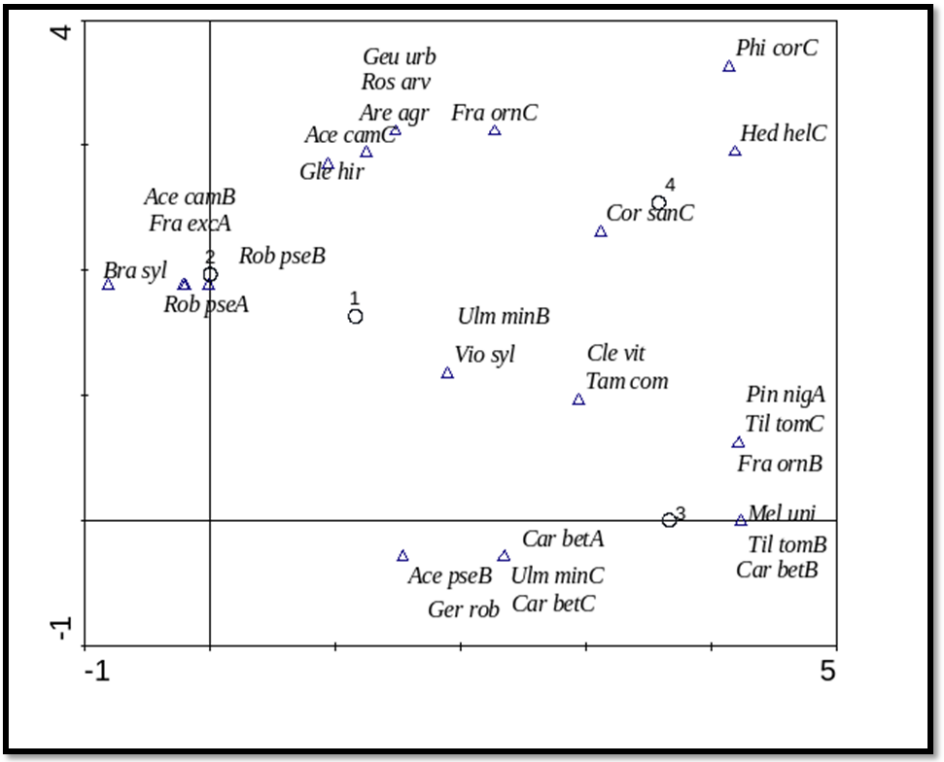

Figure 2 Biplot graph of DCA analysis, range of species fit 15-100%, 33 species (○ -representative relevé)

Слика 2. Биплот график ДЦА анализе, опсег уклапања врста 15-100%, 33 врсте (○-репрезентативни снимак)

Δ- representative species/ репрезентативна врста; (1-2)- artificially established stands/ вештачки подигнуте састојине *Fraxinus excelsior*; (3-4)- artificially established stands/ вештачки подигнуте састојине *Pinus nigra,* species name abbreviation/ скраћеница назива врста: *Geu urb-Geum urbanium; Phi cor-Philadelphus coronarius; Ros arv- Rosa arvensis; Are agr- Aremonia agrimonioides; Fra orn-Fraxinus ornus; Ace cam- Acer campestre; Hed hel- Hedera helix; Gle hir- Glechoma hirsute; Cor san- Cornus sanguine; Fra exc- Fraxinus excelsior; Rob pse- Robinia pseudoacacia; Ulm min- Ulmus minor; Bra syl- Brachypodium sylvaticum; Vio syl- Viola sylvestris; Cle vit- Clematis vitalba; Tam com- Tamus communis; Pin nig- Pinus nigra; Til tom- Tilia tomentosa; Mel uni- Melica uniflora; Car bet- Carpinus betulus; Ace pse- Acer pseudoplatanus; Ger rob- Geranium robertianum* (Abbreviations following the species indicate A-tree layer, B- shrub layer, C- ground flora layer vegetation/ Скраћенице које следе иза врсте означавају А-спрат дрвећа, Б-спрат жбуња, Ц-спрат приземне вегетације).

Artificially established Austrian pine stands (relevés 3 and 4) differ from the typical set of the primary forest type (Table 1), which further affects the floristic biodiversity. However, when it comes to anthropogenic forests, opinion is divided as to whether these differences increase the floristic diversity (Nagaike, T., 2002), reduce it (Gomez-Aparicio, L. *et al.*, 2009), or do not affect it (Hofstede, RGM.

et al., 2002). There is no doubt that in the given conditions of the primary forest, artificially established stands of Austrian pine show limited ecological and coenological vitality, in terms of their functional durability (Kanjevac, B., Vukin, M., 2015). However, this species growing in the site of the forest type in the first phase of functional revitalisation can be a solid basis for the establishment of progressive succession and preservation of its permanent function and overall potentials related to different environmental contents (Milošević, R., Novaković Vuković, M., 2017; Vukin, M., Krstić, M., 2012; Vukin, M., Bjelanović, I., 2010; Vukin, M. *et al*., 2019; Krstić, M. *et al*., 2015a; 2015b).

Stands of common ash (relevés 7 and 10) artificially established in the site of the Hungarian oak-Turkey oak forest type (*Quercetum farnetto-cerridis*) on brown forest soil (Table 1), show very pronounced coenological stability and vitality, i.e. they are significantly more stable and vital in terms of ecology and coenology than the Austrian pine stands artificially established on this type of forest. They show significant differences and pronounced mesophilic character compared to the typical set of the primary type of forest. Common ash is dominant in the overstorey; it has a well-preserved canopy; it can be found in the third storey as well. Coenological stability of common ash in site conditions of Hungarian oak-Turkey oak forest type (*Quercetum farnetto-cerridis*) on brown forest soil, in MU "Lipovica", has been defined in earlier research studies (Bićanin, M., Milošević, R., 2015; Bićanin, M., 2015; Vukin, M., 2015; 2017).

Figure 3 Soil image 3/14 – artificially established Austrian pine stand
(Photo: M. Bićanin, 2014)
Слика 3. Педолошки снимак 3/14 - вештачки подигнута састојина црног бора
(Фото: М. Бићанин, 2014)

Figure 4 Soil image 7/14 in an artificially established common ash stand (Photo: Bićanin, M., 2014)
Слика 4. Педолошки снимак 7/14 у вештачки подигнутој састојини белог јасена (Фото: М. Бићанин, 2014)

4. CONCLUSIONS

Special-purpose forests located near large urban areas in our country belong to the subcategory of forests of special importance that provide valuable socio-cultural and protective-regulatory functions of forests. Artificially established stands in the area of a large homogeneous forest complex of Lipovica Forest, in the suburban zone of Belgrade, are middle-aged, with different degrees of acclimatization and naturalization of some introduced autochthonous and allochthonous tree species. Our research is based on the basic planning concept of improving various functional contents of special-purpose forests – forests of special importance, and improving the overall environmental potential of large urban units. In order to make full use of the functional potential of these anthropogenic forest ecosystems, it is necessary to conduct thorough bio-geocenotic studies that would provide a suitable point for future forest management planning, primarily from the aspect

of endangered urban and suburban areas. It is crucial to provide such a basis for the stands artificially established in secondary sites.

The research of ecological-coenological relationship and vitality of artificially established stands of common ash and Austrian pine in the site of Hungarian oak-Turkey oak forest type (*Quercetum farnetto-cerridis*) on brown forest soil in Lipovica Forest provided the planning guidelines related exclusively to the stability and vitality of specific stands on this type of forest, intending to achieve the functional sustainability and protection of various structural contents and overall environmental protection. They imply a different planning approach in the following ten-year planning period regarding these two investigated species. It also points to the need for a bio-geocoenotic approach to be adopted in the research of ecological-coenological relationships and vitality of species that act as the bearers of the functional stability of a specific forest and its structure and thus help fulfill its planning purpose.

In terms of ecology and coenology, the artificially established stands of common ash are significantly more vital than the artificially established stands of Austrian pine in the site of the Hungarian oak-Turkey oak forest type (*Quercetum farnetto-cerridis*) on brown forest soil. This conclusion directly affects the future functional-planning procedure. The artificially established stand of common ash should have a regular planning procedure implemented and the functional rotation extended (infrastructural ecological effects of a forest on a specific type of forest). In the artificially established stand of Austrian pine, it is necessary to revise the planning procedure and start the process of restitution to establish the structure of the primary type of forest.

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АНАЛИЗА ЕКОЛОШКО - ЦЕНОЛОШКОГ ОДНОСА И ВИТАЛНОСТИ САСТОЈИНА БЕЛОГ ЈАСЕНА И ЦРНОГ БОРА ПОДИГНУТИХ НА СТАНИШТУ ТИПА ШУМЕ СЛАДУНА И ЦЕРА (*Quercetum farnetto-cerridis*) У ГЈ „ЛИПОВИЦА“ – БЕОГРАД, СРБИЈА

Rajko Milošević
Marijana Novaković Vuković
Marina Vukin
Milan Bićanin

Rezime

У раду је приказана анализа еколошко-ценолошке виталности вештачки подигнутих састојина црног бора и белог јасена на секундарном станишту које је окарактерисано као тип шуме сладуна и цера (*Quercetum farnetto-cerridis)* на гајњачи. Истраживања су извршена у оквиру шумског комплекса ‘Липовачка шума’, на подручју субурбане зоне града Београда. Овај комплекс чини шири део тзв. ‘зеленог прстена’ око велике градске целине, са израженим социјално-културним и заштитним функцијама шума, те вишенаменским садржајем, везаним за одрживост и побољшање квалитета животне средине. Шумски комплекс „Липовачка шума“ налази се на 20 km удаљености од града Београда, на надморској висини 160-290 m. Карактеришу га еколошки чиниоци који условљавају појаву станишта климатогене шуме сладуна и цера (*Quercetum farnetto-cerridis Rudski 1949.*), по пореклу, највећим делом, изданачке. У оквиру овог комплекса, вештачки подигнуте састојине заступљене су на укупној површини од 127,85 ha, односно, на 11% укупне површине. Резултати истраживања указали су да вештачки подигнуте састојине белог јасена на типу шуме сладуна и цера (*Quercetum farnetto-cerridis*) на гајњачи постижу веома изражену ценолошку стабилност и виталност, односно, сигнификантно су стабилније и еколошко-ценолошки виталније, у односу на вештачки подигнуте састојине црног бора на овом типу шуме, на конкретном подручју. У односу на карактеристичан скуп примарног типа шуме, ове састојине показују значајну разлику, са израженим мезофилним карактером. Бели јасен је доминантан у првом спрату, очуваног је склопа, са заступљеношћу и у трећем спрату. У вештачки подигнутој састојини белог јасена, у наредном десетогодишњем планском периоду, треба спровести редован плански поступак и продужење функционалне опходње (инфраструктурни еколошки учинци шуме на конкретном типу шуме). У вештачки подигнутој састојини црног бора потребно је извршити ревидирање планског поступка, у наредним функционалним плановима, односно, отпочети процес реституције и успостављања структуре примарног типа шуме.