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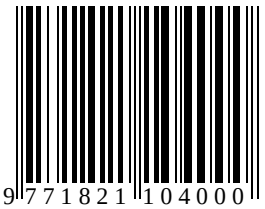

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THE MOST COMMON FOREST PHYTOCOENOSES ENDANGERED BY FALSE INDIGO SPREADING IN SERBIA

Renata GAGIĆ SERDAR[1], Radovan NEVENIĆ[1], Goran ČEŠLJAR[1], SvetlanaBILIBAJKIĆ[1], Tomislav STEFANOVIĆ[1], Zoran PODUŠKA[1], Ilija ĐORĐEVIĆ[1]

Abstract. *False indigo or indigo bush, Amorpha fruticosa L. is a deciduous shrub that belongs to the family Fabaceae. Since its introduction in the early 20th century, the plant had spread rapidly and become naturalised in the entire Balkan region. Indigo bush populations favour moist alluvial habitats; the species grows densely along the banks of lowland rivers, tributaries and streams, spreading into wet habitats, drying out meanders, blocking drainage canals. Occasional or regular flooding favours dispersal of its mature pods. The species was identified in ecological units ranging from hygrophilic wetland to communities in automorphic soils with no excessive wetting. It is common in the following types of forests: narrow-leafed ash and goat willow Salix caprea forests (Saliceto-cinereae-Fraxinetum angustifoliae), narrow-leafed ash and pedunculate oak forests with hygrophilic companion species (Fraxino-Quercetum roboris hygrophyllum), narrow-leafed ash and pedunculate oak forests on occasionally flooded terrains (Fraxino-Quercetum roboris subinundatum), pedunculate oak, hornbeam and narrow-leafed ash communities, flood-prone poplar forests and willow groves. In the south of Serbia, it grows individually along streams in mesophilic forests (Fagetalia Pawl. 1928.). The research findings on Amorpha entomofauna, which are the result of a six-year long study, opened up the opportunity for implementation of biocontrolling strategy, aimed at suppression of generative propagation of this invasive weed.*

For sure and soon this strategy should be tested, convincing that seed propagation of invasive weeds, could be inhibited after bio control agent, precisely useful weevils pods harm reduction experiments. Next step leads to serious expectations of its appliance, also blocking violent aggressors such Amorpha is, to continue making further floristic vanishing of diverse plant species, in wild nature habitats.

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Key words. Indigo bush, forest phytocoenoses, habitats, introduction, Serbia

НАЈЗАСТУПЉЕНИЈЕ ШУМСКЕ ФИТОЦЕНОЗЕ УГРОЖЕНЕ ШИРЕЊЕМ БАГРЕМЦА У СРБИЈИ

Извод. *Багремац, Amorpha fruticosa L. је листопадни жбун из породице Fabaceae. Након интродукције почетком XX века, биљка се брзо проширила и одомаћила на подручју читавог Балкана. Популацијама погодују влажна станишта алувијуми, густо расте уз обале равничарских река, рукаваца и потока, осваја ритска станишта, исушује меандре, блокира мелиоративне канале. Повремено или редовно плављење погодује разношењу његових зрелих махуна. Врста је забележена у еколошким јединицама од типова мочварних хигрофилних, до заједница на аутоморфним земљиштима без суфицитног влажења. Карактеристична је за шуме: пољског јасена са барском ивом Salix caprea (Saliceto-cinereae-Fraxinetum angustifoliae), пољског јасена и лужњака са хигрофилним пратиоцима (Fraxino-Quercetum roboris hygrophyllum), пољског јасена и лужњака на повремено плављеним теренима (Fraxino-Quercetum roboris subinundatum), у заједницама лужњака, граба и пољског јасена, поплавним топољацима и врбацима. На југу Србије, појединачно, расте уз токове речица у саставу и мезофилних шума (Fagetalia Pawl. 1928.). Налази истраживања ентомофауне аморфе, након шестогодишњих студија, отварају могућност примене стратегије биоредуковања генеративног размножавања популација овог инвазивног корова.*

Кључне речи. Багремац, шумске фитоценозе, станишта, интродукција, Србија

1. INTRODUCTION

Invasive plant species present a great problem and impediment to preservation of biodiversity (McNeel *et al*, 2001, Finnoff *et al*, 2007), causing significant and irreversible changes of the environment, primarily changes in floristic structure and the course of succession, along with social-economic damage. Invasive species first invade unstable ecosystems (degraded and devastated areas), later spreading into surrounding ecosystems, causing homogenisation of the regional flora (Jordan and assoc., 2009). The entire Pannonian Basin is populated by domestic or introduced leguminous plants of herbaceous form, perennial species, shrubs and tall stem plants, harmful to a different extent in ecological-economic terms. There is a certain number of already naturalised species, while some of them, planted in horticulture, occur only in parks and well-maintained plantations (Vukićević,1996). Some taxa are aggressively invasive and management authorities have no mechanisms for growth control of these populations in nature (Landis, W. G. 2004); as well as areal spreading (geographic) spatial adaptation (adaptation to habitat characteristics). False indigo, indigo bush or Amorpha, scientific name *Amorpha fruticosa* L., taxonomic Fabaceae: Papilionaceae: Amorpheae, is a deciduous woody shrub and the only species of this genus identified in Serbia, since these populations have been monitored (Tucović & Isajev V., 2000). The material had been collected for

six years in Croatia, Bosnia, the Montenegrin coast, along the seashore in Albania and the Skadar Lake shore; although some specimens occur individually, they only confirmed the findings related to distribution of this species of *Amorpha* genus.

A multi-disciplinary scientific approach, but also the engagement of experts from applied bio-technological disciplines (forestry, water-industry, spatial planning, agriculture) enabled perceiving Amorpha as a 'serious problem' and initiating a systematic undertaking aimed at placing the weed under control (Praseeda *et al* 2010). The plant occurred in Serbia at the beginning of the 20th century, since when it has spread rapidly and become naturalised, first in the regions of Posavina and Podunavlje. Today it is, as a rule, an omnipresent floristic element in any location where its unrestricted propagation is facilitated; however, the north part of Serbia belongs to a group of regions in which it has become an unavoidable vegetational 'pestilence'.

The recognised forest phytocoenoses endangered by indigo bush are enumerated and listed according to their system affiliation. The most detailed and comprehensive phytocoenological studies in lowland forests were conducted by Jovanović, B. and Tomić, Z. (1983-1984), with the aim of singling out ecological units (Jović, N. *et al.* 1990; Jović, N. *et al.* 1997), for the purpose of forest management based on typological principles (Jović, D. *et al.*1994.). The issue concerning cultivation of narrow-leafed ash (*Fraxinus angustifolia* Vahl.) in different types of forests in the Srem region was studied by Bobinac, M. (1988.) in his Master thesis, while the same author (1999) in his PhD thesis, studied natural regeneration of pedunculate oak (*Quercus robur* L.) contingent upon habitat and stand conditions. Pedunculate oak and narrow-leafed ash are the species young growth of which and, hence, their forests, are most directly endangered by indigo bush thickets.

The subject of this paper was presentation of the obtained results on floristic-phytocoenological characteristics of localities in which indigo bush is recognised as an important element of the existing vegetation. The main objectives of the research were also: (i) quantification of occurrence of Amorpha as a vegetation element (ii) determining the type of vegetation, (iii) determining the frequency of occurrence of *A. fruticosa* as a weed and dominant inter-species relationships with adjoining vegetation.

2. SUBJECT AND RESEARCH METHOD

The analysis of the structure and floristic composition of plants was performed according to the standard method of the Central-European Phytocoenological School (Braun-Blanquet-a 1964), where communities were not determined in the first year of the study. For all phytocoenological records, the following number and coverage scale (BraunBlanquet, 1928) was used: + (a rare species), 1, 2, 3, 4, and 5 (the largest mark indicates dominance of the species in terms of numbers and coverage). Certain small groups of edificators, which represent an indicative ground and shrub flora in weed-infested habitats, were singled out. In addition, certain species, growing synchronously with Amorpha and capable of endangering natural regeneration by their increased cover and association, were also singled out (Čokeša, *et al* 2008 ; Obratov-Petković *et al*

2009.). For the purpose of sampling, typical locations were selected, in which dense indigo bush thicket is inaccessible, while puny young growth of domestic broadleaved species on alluvium was scarcely visible in the understory, and where, for the same reason, its prospects in terms of dieback were very poor. The localities were selected as the most promising trial fields and in-depth analysed individually through phytocoenological records (Table 1). The selection of the future trial indigo bush plants – shrubs of excellent physical constitution and in perfect condition, as well as the habitus, was performed, along with the assessment and confirmation of abundant fruit bearing in crowns, some of which are in 'the most critical spots' reaching the heights of 5.5 and even 6m. Localities situated in management unit branches were identified in forest-economic management plans, where the data on the original vegetation type of the habitat were obtained. Numerous records were taken and sampling of fresh plant material was performed during several, mainly three aspects, in four vegetational seasons. By means of engagement and work of the researchers from the Institute of Forestry, Belgrade, elementary floristic material was gathered; in some cases, for the purpose of conducting skillfully reconstructed assessment of the origin of the source phytocoenological affiliation. In degraded areas or in areas under intensive succession, regardless of whether it concerned production and exploitation of the cultures, or their negligence and destruction, communities were determined conditionally, or the attempt to perform typological classification was abandoned.

3. RESULTS – OVERVIEW OF FOREST COMMUNITIES

Indigo bush was identified in the following ecological units ranging from hygrophilic wetland forests, over increasingly drier ones, to those on automorphic soils with no excessive wetting: narrow-leafed ash and goat willow forest (*Saliceto-cinereae-Fraxinetum angustifoliae*), narrow-leafed ash and pedunculate oak forest with hygrophilic companion species (*Fraxino-Quercetum roboris hygrophyllum*), narrow-leafed ash and pedunculate oak forests on occassionally flooded terrains (*Fraxino-Quercetum roboris subinundatum*), pedunculate oak, hornbeam and narrow-leafed ash forests (*Carpino-Fraxino-quercetum roboris inundatum*). An example, which concerns the type of forest most frequently invaded in terms of numbers, is presented in the content of a created phytocoenological record **(Table 1)**. In the Kolubara Basin, Amorpha thrives in alder forests *(Alnetalia glutinosae* R.Tx. 1937), as a part of riverine vegetation, occasionally in form of dense, twig-like, 'live' sheaves in Forelands; it grows remarkably successfully in shrub willow communities (*Salicetalia purpureae* Moor 1958.) and flood-prone alluvial forests (*Populetalia albae* Br.-Bl. 1931.). In the south of Serbia, it can be found on several localities, although it grows as a part of mesophilic forests along streams (*Fagetalia* Pawl. 1928.).

Table 1. *A phytocoenological record; a privately-owned forest with a distinctly incomplete canopy; indigo bush invades sunlit areas; the area is of a square shape and small in size, bounded by arable land and roads (regional and not very far - trunk roads)*

Locality	**Predejane**	Note
First summer aspect, Date	09 July 2008	Gagić R.
Area	Jablaničko	
Forest Management	Leskovac	14October 2008
Forest Administration	Predejane	
Management Unit		09 May 2009
	Privately-owned forest	
Locality	Predejane	
X	47631__	
Y	75715__	
Altitude m	252	
Exposition	NE	
Inclination º	5	
Geological Layer	Granodiorite (granite)	
Soil Type	District Regosols	
State of Preservation	Preserved	except for weed
Origin	Generative	
Age	61-80	
Surface Area m²	500	
Phytocoenosis	*Fraxino-quercetum roboris*	
Tree Layer		
Canopy	0,9	
Mean Height m	25,0	
Mean Diameter cm	35,0	
Mean Distance	4,0	
Quercus robur	3.0	
Quercus cerris	1.0	
Fraxinus angustifolia	1.0	
Robinia pseudoacacia	2,0	
Shrub Layer		
Canopy	0,2	
Mean Height m	2,0	
Cornus mas	2,0	
Rosa canina	2.1	
Salix alba	1.0	
Amorpha fruticosa	2.5	
Ligustrum vulgare	1.0	
Herb Layer		
Coverage	0,8	
Acer tataricum	1.1	
Arum maculatum	1.1	
Geum urbanum	1.1	
Helleborus odorus	1.1	
Lonicera caprifolium	1.1	
Melica uniflora	1.2	
Polygonatum officinale	1.1	
Urtica dioica	1.1	
Viola hirta	1.1	

Table 2. *Research localities in the course of 6 vegetational seasons; the locality code, the present type of vegetation/forest; the phytocoenological affiliation, the number and coverage of indigo bush in sample plots*

CODES	MARK IN SAMPLE CODING SYS.	PRESENT VEGETATION COVER LOCALITY	AUTOCHTHONOUS PHYTOCOENOLOGICAL COMMUNITY AFFILIATION	Evaluation of number and coverage (Indigo bush)
q1	GO	Grabovacko-Vitojevacko ostrvo,Klenak Pedunculate Oak - Ash Young Culture Stand	(*Fraxino-Ulmetum effusae* Slav. 1952.)	**3**
q2	SB	Senajske Bare, Klenak, EA Poplar Culture	(*Fraxino angustifoliae-Quercetum roboris* B. Jov. et Tom. 1979.)	**3**
q3	ZM	Zasavica I - Macv. Mitrovica, Swamp Bank Vegetation	(*Salicetum albae* Issl. 1936	**4**
q4	AO	Ada Ciganlija Lakeshore Greenery *Aster lanceolatus*†	(*Populetum nigrae* Knapp. 1948.	**1**
q5	CD	Cortanovacka Forest, Danube Bank, Willow-Poplar Forest	(Salicetum triandrae Male. 1929.	**3**
q6	SA	Šabac, River Sava Bank, Willow-Poplar-Ash Forest	(*Salicetum triandrae* Male. 1929.	**4**
q7	MA	Makis, Devastated Pedunculate –Ash- Elm Stand *Aster lanceolatus*†	(Alnetum glutinosae Vuk. 1956.)	**2**
q8	OM	Obedska bara A (Matijevica-Kadionica) Kupinovo, Pedunculate Oak Young Forest (20 years old)	(*Carpino- Fraxino -Quercetum roboris* Miš. et Broz 1962.)	**3**
q9	DO	Dobrec, *Juglans nigra* Mature (50 years old) Culture Stand	(*Violo-Quercetum roboris* Jov. et Tom. 1980.)	**1**
q10	SR	Sremska Raca, Visnjicevo, Mature Pedunculate Oak-Ash Forest	(*Carpino- Fraxino -Quercetum roboris* Miš. et Broz 1962.)	**3**
q11	OO	Obedska bara B (Obreške širine) Kupinovo Mixture Pedunculate Oak-Ash Forest (50 years old)	(*Genisto elatae-Ouercetum roboris* Horv. 1938.)	**2**
q12	OK	Obedska bara C (Kupinske grede 39, 40) Kupinovo, Pedunculate Mature Virgin Oak Forest (100 years old)	(*Leucoio-Fraxinetum angustifoliae* Glav. 1959.)	**3**
q13	OP	Obrenovac, Road Buffer Greenery *Ambrosia artemisiifolia* †	Completely anthropogenically modified	**4**
q14	BG	Backo Gradiste, DTD Canal Bank, Willow forest	(*Aceri tatarici-Quercetum* Zol. et Jak. 1957.	**5**
q15	OS	Ostruznica, Bridge Sava River Bank Greenery	(*Salicetum albae* Issl. 1936	**5**
q16	KO	Kovilj, Swamp Bank, Willow-Poplar Forest	(*Salici-Populetum nigrae* Parabuć. 1965.	**3**
q17	VG	Vracev Gaj, Lake Shore Greenery	(*Fraxino-Ulmetum effusae* Slav. 1952.	**2**
q18	BM	Backi Monostor,Siga Pedunculate-Ash Virgin Forest	(*Tilio-Quercetum crassiusculae* Slav. 1952.)	**5**

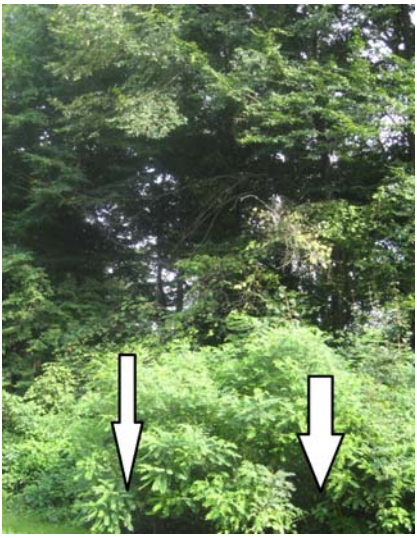
q19	CB	Carska Bara, Perlez, Swamp Bank,	(*Salicetum albo-amygdalino-purpureae* Slav. 1952	4
q20	BO	Borkovac, Lakeshore Greenery	Completely anthropogenically modified	+
q21	AM	Ada Ciganlija, Willow-Poplar Bank Forests, Sava River *Aster lanceolatus*†	Completely anthropogenically modified	4
q22	AT	Ada Ciganlija, Taloznik,Oak-Elm-Ash Forest *Ailanthus altissima*†	Completely anthropogenically modified	5
q23	FU	Futog Adica, River Danube Bank- Willow-Poplar Forests	(*Salicetum albo-amygdalinae* Slav. 1952.	2
q24	DJ	Đerdap Gorge, Dobra, Road Buffer Greenary *Robinia pseudoacacia*†	Completely anthropogenically modified	5
q25	SI	Simanovci, Ruderal Vegetation, *Ambrosia artemisiifolia* †	Completely anthropogenically modified	1
q26	VL	Vlasina River Bank, Vlasotince,Willow	(*Salicetum purpureae* Zel. 1952.)	+
q27	PL	Predejane, Leskovac, Road Buffer Greenery (*Robinia pseudoacacia*†	Completely anthropogenically modified	2+
q28	ZJ	Zoljevo, Jelasnica and Korbevacka Rivers, Bank-Willow-Elm Beech, latitude ≈≈1000m	(*Salicetum purpureae* Zel. 1952.)	1, +, +
q29	KD	Kamenjar, Danube River Bank, Oak-Elm-Ash forest, *Reynoutria japonica & Reynoutriax bohemica*†	(*Desčampsio-Quercetum roboris* B. Jov. 1979.	2
q30	BA	Barunovac, 0,5 ha Homogenous Stand of *A.fruticosa* *Ambrosia artemisiifolia* †	Completely anthropogenically modified	5
q31	TO	Topcider, Ruderal Vegetation *Ailanthus altissima*†	Completely anthropogenically modified	2

The forest vegetation groups, in terms of typology forest vegetation alliances, in which Amorpha occurs in the medium layer, are the following: pioneer shrub communities of goat willow (*Salicion cinereae* Muli. et Gors 1958), marshy Europan alder and narrow-leafed ash forests (*Alnion glutinosae* Male. 1929.), shruby almond willow and purple willow communities (*Salicion triandrae* Muli. et Gors 1958), flood prone willow and poplar forests (*Salicion albae* Soo 1940.), hygrophilic pedunculate oak and alder forests (*Alno-Quercion roboris* Horv. 1938), mesophilic hornbeam forests (*Carpinion betuli illiirico-moesiacum* Horv. 1956), thermophilic pedunculate oak and Tatar maple forests (*Aceri tatarici-Quercion* Zol. et Jak. 1957.) and thermophilic Hungarian oak and Turkey oak forests (*Quercion frainetto* Ht. 1954).

4. CONCLUSION AND DISCUSSION

The anthropogenic impact on indigo bush spreading is currently reflected in the fact that neglecting the increase of ruderal areas facilitates plant survival and provides it with a needed space. When the opinion, in the framework of field research conducted throughout Serbia, was sought from local, rural population (in

form of short uniform surveys – a set of few questions), on the issue of aggressive indigo bush spreading, the conclusion drawn was that the level of ecological awareness is currently low and that the concept of invasiveness is generally insufficiently well-known. Unfortunately, this is also the case in numerous instances when the forestry profession itself is insufficiently aware of the scope of the problem. However, it is a general belief that it is not rational to exert impact on weeds through forestry and nature protection interventions conducted by means of use of large amounts of herbicides on terrains that are protected areas or areas of exceptional features. There is a possibility that such procedure takes place in the proximity of valuable water springs; it is not harmless, and given the required active substances that prevent spreading of indigo bush by final stump coating, it is far from being ecologically justified.



Photograph 1. *Impact of the A. Fruticosa layer; The arrows indicate places where, in* ***undisturbed*** *conditions, young growth of pedunculate oak would stand a chance to grow. The Amorpha canopy in the shrub layer, on a small forest clearing. A mature pedunculate oak with hornbeam stand, Visoka šuma Lošinjci, Forest Management Kupinovo, July 2009, (Photo: Orig).*

Photograph 2. *Young plants growing around a pond that retained the flood water. A mixed pedunculate oak and hornbeam stand with forest fruit trees. Management Unit Karakuša, Forest Management Klenak, August 2008 (Photo:Orig).*

Despite all efforts, Amorpha increasingly invades neglected agricultural lands in rural areas, in rural communities in the proximity of settlements, areas neglected on account of the fact that cultivation of more valuable forest species and pursuing agricultural work on infertile soil are not cost-effective. Corridors, natural or artificial, rivers, streams, whose flood-waters distribute its seed, and road networks where man directly participates in supporting its generative and

vegetative propagation and enables its spreading, present even more serious problem when they border with forests.

Communities, however, must be preserved in their original form and natural regeneration is the only way to eliminate excessive and aggressive members from the exceptionally rare, complex existing communities. Indigo bush presents one of the largest problems in natural regeneration of the Serbian lowland flood-prone forests, since it grows densely in the understory of old pedunculate oak trees and narrow-leafed ash trees and other autochthonous trees and shrubs. With its dense canopy, it completely prevents seed development of forest tree young growth, by blocking its source of light, usurping a necessary space and absorbing nutrient matter and water from forest land (photographs 1 and 2). Unless a solution is found, which is not only a combined application of extremely expensive mechanical suppression and spraying by, in long-term, barely acceptable pesticides, expansion of indigo bush will become impossible to prevent. Without timely and effective engagement, forestry professionals could resign themselves to inevitability of facing a serious problem in near future.

Given the fact that the presence of insects – indigo bush spermophagus, identified as a significant reduction factor of indigo bush generative propagation (Gagić Serdar *et a*l, 2012), has been recorded in Serbia, it is necessary to continue the phytocoenological research and, concurrently, the research of indigo bush entomofauna, for the purpose of indigo bush suppression. By recording new instances of its occurrence in autochthonous forests, where it acts as an impediment or disturbs the balance in any other way, the scope and the characteristics of what actually indigo bush as 'conflict species' represents in phytocoenological and interspecies terms, will be understood more clearly. This deservedly obtained attribute has been confirmed in numerous forest ecosystems in Serbia

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THE MOST COMMON FOREST PHYTOCOENOSIS ENDANGERED BY FALSE INDIGO SPREADING IN SERBIA

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Summary

Gradually invaded by indigo bush, as a result of insufficiently developed legislation in the field of nature and forest protection, increasingly large spaces of commercial and protected forest areas in Serbia are facing a serious problem, of which neither expert, scientific nor broader public is aware, and which may escalate in near future, This problem may be the cause of disturbances of water regime in Serbian alluvial forest ecosystems, eutrophication of wet habitats, and prevention of succession in its normal course. The lack of adequate measures for weed control resulted in presence of Amorpha in numerous phytocoenoses and forest complexes that are either managed by or a part of protected areas throughout Serbia. This type of legume has been identified in ecological units of a hydrophilic marshy species type, but also in those where soils are without excessive wetting.

They include the following types of forests: the ash and goat willow forest (*Saliceto-cinereae-Fraxinetum angustifoliae*), the ash and pedunculate oak forest with marshy vegetation (*Fraxino-Quercetum roboris hygrophyllum*), the ash and pedunculate oak forest on flooded terrains, stands with pedunculate oak as an edificator (*Fraxino-Quercetum roboris subinundatum*), the pedunculate oak, elm and ash forest, along with

flood-prone poplar forests and willow groves. In the south of Serbia, it grows individually within mesophilic forests along streams (*Fagetalia* Pawl. 1928.). Sensitive biotopes ought to be recognised, their reconstruction or recultivation conducted; it is also necessary to monitor and analyse the success of the interventions themselves; application of biocontrol by means of use of their natural enemies would be the most desirous method, in the spirit of sustainability. By studying the agents of suppression, through scientific studies and experimental methods, weeds should be eliminated in the period when their seed is in the phase of maximum exposure. Spermophagus, as potential reducers of invasive plant population and potential means of biological combat against their adverse impact on environment, should become tools of sustainable forest ecosystem management.

NAJZASTUPLJENIJE ŠUMSKE FITOCENOZE UGROŽENE ŠIRENJEM BAGREMCA U SRBIJI

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Rezime

Полако запоседнути багремцем простори у привредним и заштићеним шумске области у Србији се због недовољно разрађеног законодавства из области заштите природе ишума суочава са великим проблемом који може ескалирати у блиској будућности, а кога још нису потпуно свесни нити, нити стручна ни научна шира јавност. Ово може бити разлог поремећаја водних режима у нашим алувиалним шумским екосистемима, еутрофикације влачних станишта, и стопирања сукцесија у њиховом нормалном току. Недостатак адекватних мера за контролу коровима, узроковао је присуство аморфе и бројним фитоценозама шумских комплекса којима се или управља, или су у заштићеним подручјима широм Србије. Ова врста махунарки је забележена у еколошким јединицама хидрофилних мочварних врста, али и у онима где су земљишта без вишка додатног влажење.

То су шуме: јасена са барском ивом (*Saliceto-cinereae-Fraxinetum angustifoliae*) јасена и лужњака са барсом вегетацијом (*Fraxino-Quercetum roboris hygrophyllum*), јасена и лужњака на поплавним стаништима, станишта салужњаком као едификатором (*Fraxino-Quercetum roboris subinundatum*), лужњака, бреста и јасена, са поплавним шумама тополе, и врбаци. На југу Србије појединачно расте дуж водотока, и речица у заједници мезофилних шума (*Fagetalia* Pawl. 1928.). Осетљиве биотопе потребно је препознати, урадити реконструкцију истих или рекултивацију, а неопходно је пратити и испитати успехе самих интервенција, од којих би примена метода биконтроле контрова њиховим природним непријатељима био најпожењнији, у духу одрживости. Проучавајући био агенсе сузбијања, путем научних студија и експерименталним путем корове би требало елиминисати, онда када им је семе у фазама максималне изложености., Семеноједи као потенцијални редуценти популација инвазивних биљака и кандидати за биолошку борбу против њиховог негативног дејства на околину требало би да постану кандидати - инструменти за одрживо управњање шумским екосистемима.