THE IMPACT OF ALIEN SPECIES OF PLANTS ON MURES FLOODPLAIN NATURAL PARK FAUNA

SUCIU CODRUȚA[1], PANDURU ECATERINA BIANCA[1], MARIN DIANA[1], PETROMAN CORNELIA[1], PETROMAN IOAN*[1]

[1]Banat's University of Agricultural Sciences and Veterinary Medicine"King Michael I of Romania" from Timisoara, Faculty of Management and Rural Tourism

*Corresponding author's e-mail: i_petroman@yahoo.com

Abstract. *Amorpha fruticosa L. (indigo bush) is an invasive plant species of plants that occupies large territories from protected areas of Mureș Floodplain Natural Park, therefore displaces the natural habitats of various species of fauna and also Spermophilus citellus L. (European Ground Squirell) – a vulnerable mammal species, according to the IUCN Red List, that lives on grasslands. Mureș Floodplain Natural Park along with researchers planned to reduce the impact of this invasive alien species of plant by rehabilitating the affected agro-ecosystems in order to render them to their natural purpose. The method used was mechanical and no chemicals were used during the intervention and after.*

Key words*: invasive species, vulnerable fauna species, protected areas, Mureș Floodplain Natural Park, grasslands*

INTRODUCTION

Mureș Floodplain Natural Park represent and important protected area from west of Romania, representing the habitats for more than 1000 species of flora and fauna (due to the approval of management plan of Mureș Floodplain Natural Park), some of them are species of community interest [1], but some at least 10 species are invasive [1], causing damages and biodiversity loss.

According to The Convention of Biological Diversity (CBD), one of the major threats of biodiversity [2] is spreading of invasive alien species of plants and until 2020 Target 5 (of CBD) requires that the invasive alien species should be identified and eradicated, or, if not, controlled [3]. IUCN's Red List Index shows that invasive species of plants leads to a decreasing of the diversity of species [2].

Amorpha fruticosa, shrub original from North America [4], was first mentioned in Romania in 1923 that was often used as an ornamental plant in south Romania [5] and then in the '50's when it's appearance was noticed along rivers; nowadays represents one of the most spread invasive species of plants from Romania, along with *Acer negundo* and *Alianthus altissima.*[6]

MATERIAL AND METHOD

The study took place in Mureș Floodplain Natural Park during 20 months. The distribution of invasive alien species in Mureș Floodplain Natural Park, was established by using the following steps: studying the scientific literature, description of habitats of the protected area, description of the invasive alien species, mapping invasive alien species (*Amorpha fruticosa, Acer negundo* and *Fallopia japonica),* GIS integration, estimative distribution of invasive alien species of plants and developing a strategy of combating the shrub. According to the distribution map (Fig. 1), alien species of plants are occupying large areas all over Mureș Floodplain Natural Park. *A. negundo* occupies 1084,81 hectares and is the most spread (6,21% of park's area), *F. japonica* occupies 0,1 hectares of land, while *A. fruticosa,* despite the fact that it's not the most spread, is occupying 633,24 hectares (3,62% of protected area) (Mureș Floodplain Natural Park – GIS data base), is causing big damages on river meadows, abandoned land, pastrures, some habitats for *S. citellus*.

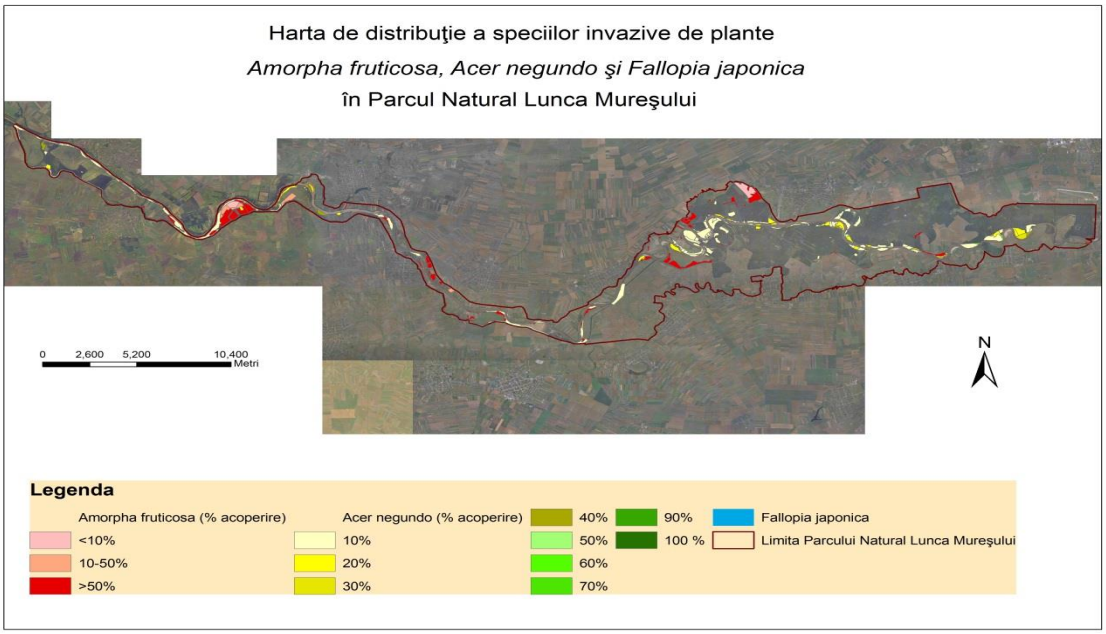

Figure 1. Distribution map of alien species of plants (Amorpha fruticosa, Acer negundo and Fallopia japonica) from Mureș Floodplain Natural Park (source Mureș Floodplain Natural Park Administration, 2016)

RESULTS AND DISCUSSIONS

Mureș Floodplain Natural Park – protected area founded in 2004, fights also with the invasive alien species, especially *Amorpha fruticosa*, thanks to its ability of adapting all kinds of environment: from Danube Delta wetlands riparian ecosystems, displacing poplar (*Populus*) and willow (*Salix*) habitats, sometimes dry lands of Mureș Floodplain Natural Park (Fig. 2). Moreover, studies shown that *A. fruticosa* adapts even on soils that were contaminated with metals like zinc, copper, lead, nickel etc.

A.fruticosa appeared in the protected are immediately after floods, the seeds were dispersed by the water and they occupied wide territories, including grasslands. In the natural park, the grasslands represents 1930 hectares, around 11,1% of the protected area entire surface of 17455,2 hectars (Table 1) [1] and some are invaded by alien species of plants, mainly *A. fruticosa*. According to, *A. fruticosa* represents one of the most important invasive plant species along Mureș river.

Figure 2.Mureș Floodplain Natural Park (near Pecica)-territory invaded by A.fruticosa

Table 1

Land administrators of Mureş Floodplain Natural Park

Zona administrate	**Administrator**	**Suprafaţa -ha-**	**% din suprafaţa parcului**
Fond forestier proprietate publică a statului	Ocolul Silvic Timişoara, Ocolul Silvic Iuliu Moldovan	6373,0	36,7
Fond forestier privat	Ocolul Silvic Iuliu Moldovan	93,6	0,5
Vegetaţie forestieră din afara fondului forestier	Consilii locale	650,0	3,7
Păşune	*Persoane fizice*	*120,0*	*0,7*
Fânețe	*Consilii locale*	*160,0*	*0,9*
Fânețe şi livezi	Persoane fizice	160,0	0,9
Canale	Societatea Naţională de Îmbunătăţiri Funciare	30,0	0,2
Terenuri neproductive	Consilii locale	260,0	1,5
Drumuri	Consilii locale	110,0	0,6
Păşune şi construcţii	*Ministerul Apărării Naţionale*	*100,0*	*0,6*
Păşuni	*Consiliile locale*	*1500,0*	*8,6*
Canale	Consilii locale	40,0	0,2
Terenuri arabile	Persoane fizice	5600,0	32,1
Terenuri arabile	Consilii locale	653,0	3,7
Fânețe	*Persoane fizice*	*50,0*	*0,3*
Mureş	Administraţia Naţională Apele Române, Direcţia Apelor Mureş	1247,0	7,1
Diguri	Administraţia Naţională Apele Române, Direcţia Apelor Mureş	220,0	1,3
Construcții	Persoane fizice	30,0	0,2
Agricol şi construcţii	Biserica ortodoxă	20,0	0,1
Altele	Alţii	5,0	0,0
Total		**17455,2**	**100,0**

Source: Mureș Floodplain Natural Park Administration management plan – p. 20)

Studies carries out by Dumitrașcu M et al. In 2013 shown that *A. fruticosa* in Mureș Floodplain Natural Park occupied in 2013 forest openings, roads edges, agriculture lands

and pastures, river meadows nearby the following villages: Pecica, Sânpetru German, Igriș and Șeitin, according to Fig. 3.

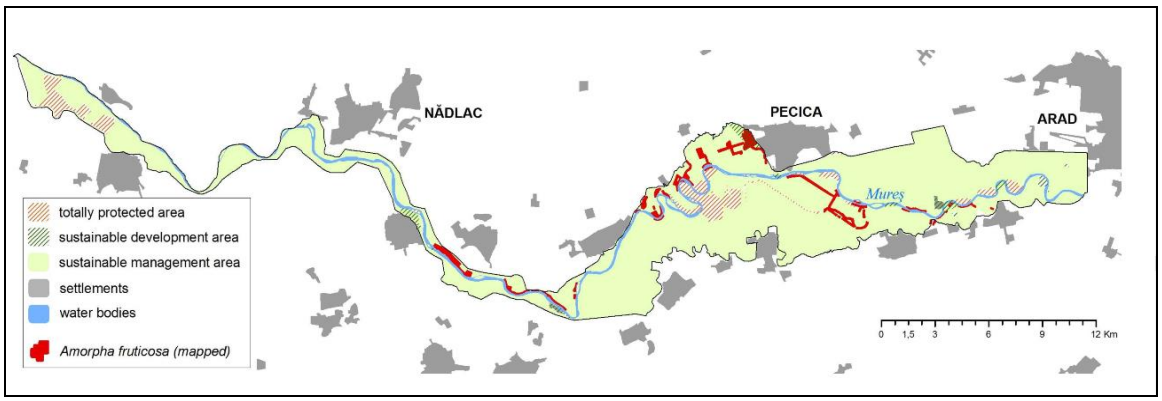

Figure 3. Amorpha fruticosa in Mureș Floodplain Natural Park

One of the animal species that lives on grasslands is European ground squirrel (*Spermophilus citellus L.*) – an endemic mammal species that has its range in central – eastern European continent which is often affected by pasture degradation, flooding and extending human settlements or infrastructure or by land abandonment of grazing which generates tall-grass meadows – conditions improperly for *S. citellus* to survive. [11,] (Fig. 4, 5)

Pasture degradation along with land abandonment or poor land management represent ideally condition for *A.fruticosa* and others alien species of plants to extend and therefore the pastoral value of the land is decreasing. The potential of invasive species of plants has increased in the last period, which leads to a major impact on native vegetation and in Mureș Floodplain Natural Park one of the most aggressive plant with negative effect on biodiversity is *A. fruticosa*.

Figure 4. Spermophillus citellus burrow – near Felnac village

Figure 5. Spermophillus citellus - near Felnac village

CONCLUSIONS

In order to eradicate *A. fruticosa* from the protected area, Mureș Floodplain Natural Park Administration used mechanical control, by repeated cutting of the sprouts of *A. fruticosa*, as recommended by literature, non-chemical method that is encouraged to be used in protected area. After selecting the most affected territories by indigo bush, the shurbs were cut by a forest cutter, the wood debris were left on the ground for soil enrichment; the roots were dislocked by a scarifier and they were used by the local communities for heating. The soil was powed and prepared for sowing with a mix of grasses typicaly for this region.

The mechanical method appylied by Mureș Floodplain Natural Park Administration was a succsesful one; 100 hectares of invaded land with *A. fruticosa* or with a high risk of being invaded were cleaned and rendered to their natural purpose: agriculture or grassland. To aviod resettlement of A. fruticosa it is recommended for the mechanical procedure to be repeted for at least 5 years in a row, to ensure the repeated cut of the sprout.

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