FALLOPIA JAPONICA HOUTT. AND *ROBINIA PSEUDOACACIA* L., AN INCREASINGLY INTRACTABLE PLANT PROBLEM OR NOT UNDERSTOOD OPPORTUNITY?

Molitoris Ľ.

Department of Landscape Ecology, Faculty of Natural Sciences, Comenius University in Bratislava, Mlynska dolina B-2, 842 15 Bratislava, the Slovak Republic

E-mail: molitoris@fns.uniba.sk

ABSTRACT

This study is dealing with two invasive species Robinia pseudoacacia L. and Fallopia japonica Houtt. in Slovakian microregion Rovina. So far, a lot of studies have focused on their invasion into ecosystems and only few have addressed the management potential and usage to the economy. First was mapped the dispersion using the NATURA 2000 mapping method by Šeffer, J., Lasák, R., Galvánek, D., Dražil, T. (2002) and based on publication Habitat catalogue of Slovakia (Stanová, V., Valachovič, M., et al. 2002). Secondly have been investigated the influence to the ecosystem in the study area. Subsequently was discussed the potential usage of these plants in agriculture and potential to the economy.

Key words: mapping, influence, ecosystem, *Fallopia japonica*, *Robinia pseudoacacia*, microregion Rovina

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INTRODUCTION

Currently the human impact is so intense that the possibility of the existence of undistorted ecosystem is uncontrollably reduced. Therefore, there is always space for alien species (neophytes), which supports the creation of new outbreaks of invasive species, characterized by infiltration of a successful strategy to new environmental conditions, high viability and competitiveness, compared with the original species after overcoming stress conditions. The non-native tree species Black Locust (*Robinia pseudoacacia* L.) and non-native plant species Japanese knotweed (*Fallopia japonica* Houtt.) are invading both anthropogenic and near-natural habitats throughout Europe. So far, a lot of studies have focused on their invasion into ecosystems and only few have addressed the management potential and usage to the economy.

MATERIAL AND METHODS

Field survey was conducted during the vegetation period (May to September) started in 2004, and continuing than from 2009 to 2013 using the NATURA 2000 mapping method by Šeffer, J., Lasák, R., Galvánek, D., Dražil, T. (2002) and based on publication Habitat catalogue of Slovakia (Stanová, V., Valachovič, M., et al. 2002) . In case of black locust we have mapped and record polygons, of full treetop cover bigger than 100m^2, with GPS. In case of knotweed we have proceed the same way, if bush was smaller than 100 m^2 we have recorded it as a point and if bigger than as a polygon. In second step we have investigate the influence to the local ecosystem. In case of Black locust, we have studied the dispersion and influence from aerial photography from 1947 to 2012 in chosen two cadastres (Hraň, Sirník) and observations in last 15 years in the same locality. In case of Japanese knotweed we use records and spontaneous observations after using the pesticides from 2009 to 2013 in the microregion, as well as available literature.

RESULT AND DISCUSSION

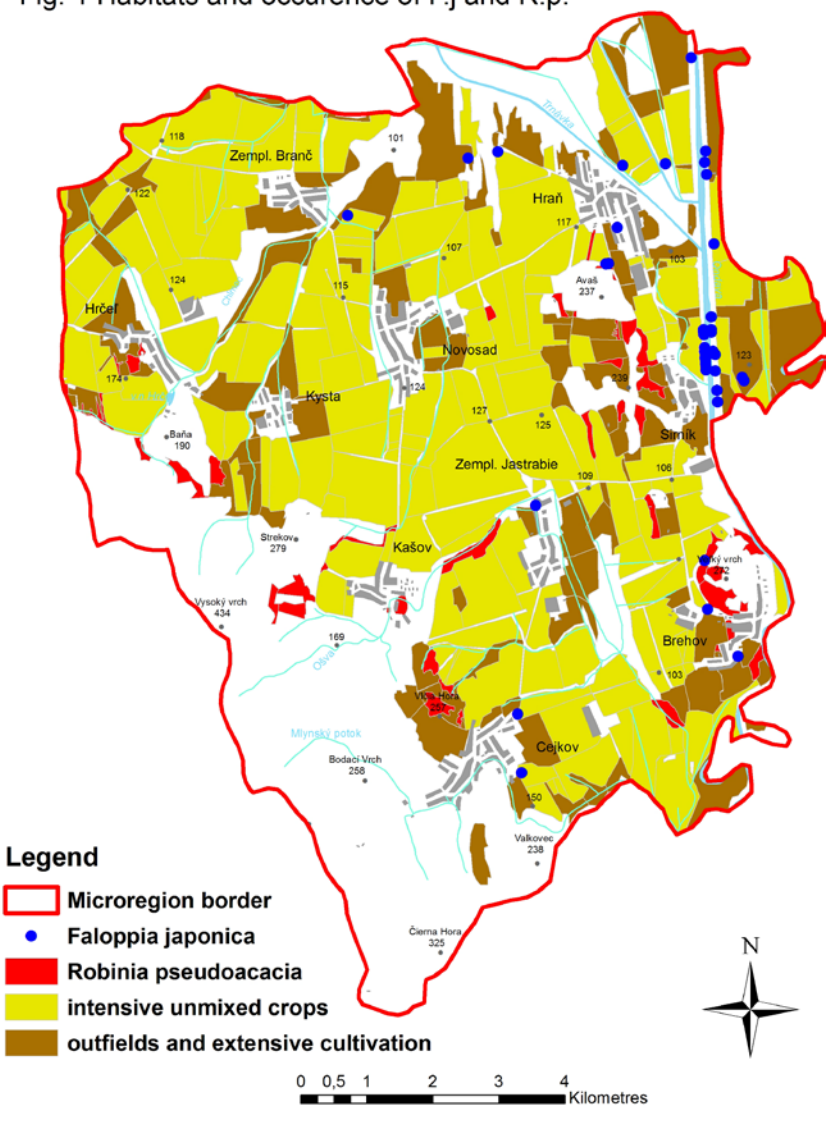
Microregion Rovina has 112,8 km^2 and it consist of 10 cadastres of these villages: Cejkov, Kašov, Zemplínske Jastrabie, Brehov, Sirník, Hraň, Novosad, Kysta, Hrčeľ, Zemplínsky Branč. Overall have been mapped 46 polygons of *Robinia pseudoacacia* covering total area of 223,86 hectares, which is 1,98 % from total microregion area and 41 points of *Fallopia japonica* bushes, which none of them have exceeded more than 100 m^2. In previous research we have also mapped intensive unmixed crops and extensive cultivation. Unmixed crops covers total area of 4717,25 ha in 188 polygons. Extensive cultivation covers total area of 1830,44 ha in 200 mapped polygons.

Table 1. Ruderal habitats and occurrence of Robinia pseudoacacia and Fallopia japonica in microregion rovina.

	extensive cultivation	intensive unmixed crops	*Robinia pseudoacacia*	*Fallopia japonica*
no. of mappad polygons/points	200	188	46	41
covering area (ha)	1830,44	4717,25	223,86	
% total study area	16,22	41,81	1,98	

In the figure 1 we show all habitats and occurrence of invasive species together for better visualization. Many studies have shown the negative influence to the local ecosystems of these two species. We try to discuss a different approach in management. We have chosen these two species because of potential economic importance and because we think that we cannot “win the fight” with these plants with present management.

Fig. 1 Habitats and occurence of F.j and R.p.



Robinia pseudoacacia: In study area cadasters of Hraň and Sirník, we have compared from the military photography from 1947 and present occurrence of Robinia the dispersion and influence to the local ecosystem. Robinia have occupied in 66 years only abandoned pastures and land as a strong pioneer tree species. It has never invaded the near semi natural oak and hornbeam forest. It could not handle the dark light condition in these forests. In spite of the allelopathy issues of Black locust, at present time we can observe slow penetration of landrace tree species like oak, hornbeam, wild cherry, amur maple in Black locust polygons. This led us to the opinion that the Robinia is just normal pioneer plant which favors the dry and sunny abandoned areas which have no management. On the other hand Black locust is a fast-growing and nitrogen-fixing tree legume, highly productive in terms of biomass, drought tolerant and well adapted to a large range of soil conditions (Dini-Papanastasi, 2008). Another important use is the plantations in the urban environment, in beekeeping, production of furniture, veneer, vineyard poles (Benčať, 2003). For these reasons, it is a potential biomass crop species for energy, forage and wood production.

Fallopia Japonica: It damages native riparian communities by reducing light availability, through the alteration of the soil environment and through the release of allelochemicals. Soil K and Mn is greater under F. japonica than under native vegetation. Fallopia japonica decreases soil bulk density and increases organic matter content, water content and nutrient levels. Prolific rhizome and shoot growth can damage foundations, walls, pavements, and drainage works, and causes flood hazards by increasing resistance to water flow and damaging flood prevention structures. In our research we have observed several cases when knotweed was cut off and sprayed with Roundup (active glyfosat), but the plant has always recovered. On the other hand Knotweeds are an excellent food source for honeybees, with blooming in September extend collecting pollen season. Young shoots are edible and are consumed in its native range and North America. Secondary compounds isolated from F. japonica include the anti-cancer phytoalexin resveratrol (Bayley, 2003). Also it is good candidate for and phytoremediation of contaminated soil (Nguyen, 2002) and it is producing largest amount of biomass in Slovak conditions 34 t/ha.

CONCLUSIONS

Invasive plants are, simply by occupying a large amount of space in invaded habitats, expected to impose a significant impact on the native vegetation and their associated food webs. There is no quick and easy way to control some invasive plants. Humans always believe that their changes to the ecosystem remain without any consequences. Or if we have screwed something we can always fix it. On the other hand it is our approach correct, do we really understand what is happening. From certain reason nature is producing the biomass. Invasive plants are mostly invading the environment which has been already changed by humans and lately abandoned. Can we really say that *Robinia* or *Fallopia* are invasive with research done in ten, fifty, hundred years? In the native range of Japan, the leaf-feeding chrysomelid beetle *Gallerucida nigromaculata* regulates F. japonica population growth, and is under consideration as a biocontrol agent in the United Kingdom and USA (Barney, 2006) Is this the solution, to bring another alien species? Can the Slovakian State Nature conservation win the “fight” with knotweed using roundup? It is not the same like fighting with weed in conventional agriculture? But it is not so simply, we consider that twenty years of study invasive plants is totally not enough. We brought these questions and much more research is necessary to answer.

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