# Conference book

# Konferenciakötet

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# Examination of chemical control opportunities of black cherry (*Prunus serotina* Ehrh.)

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**Abstract**

The non-native plants are aggressively spreading and that means they threat the continent. In my thesis I examined *Prunus serotina,* this species also belongs to the group of this species. The area what I investigated was in the property of NEFAG Zrt. There were 26 plots where we used eight different herbicide and herbicide combinations injecting, lubricating and spraying *Punus serotina* individuals. The specific areas where we sprayed, we observed, that the stool-shoot was not growing anymore, withered and re-sprouting was not observed. Phytotoxicity was not observed none of the areas. The specific injected area showed better results than lubrication treated areas. Phytotoxicity appeared on two plots.

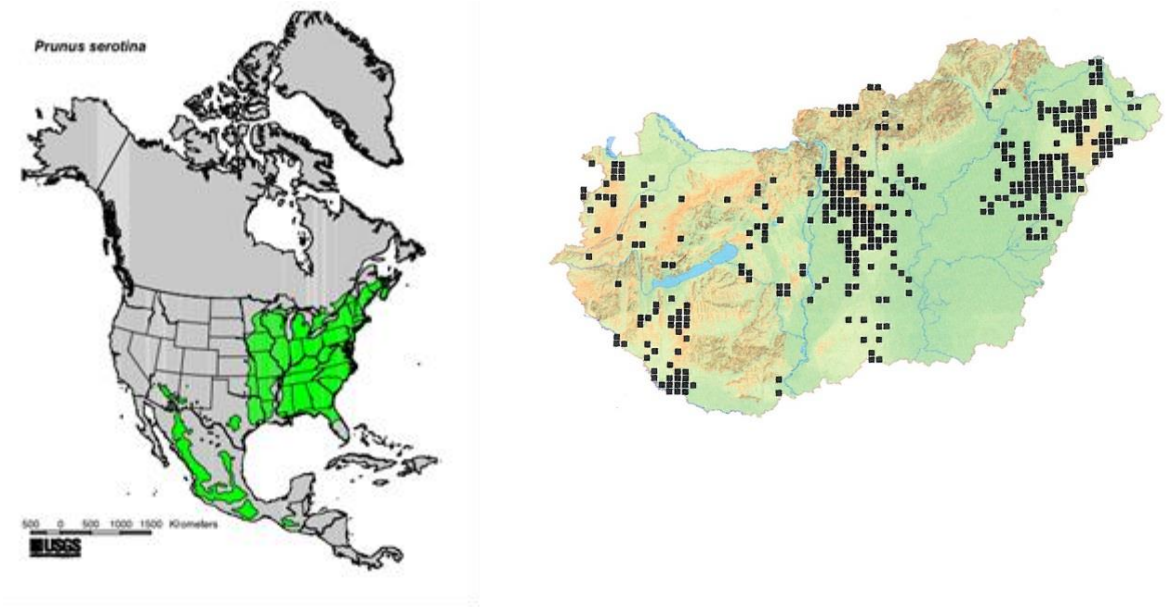
*Keywords: Prunus serotina, non-native, herbicide, control experiments, phytotoxicity*

## I. Introduction

The most important reasons of global and European biodiversity loss could be the biological invasion and climate change. The non-native plants threat the continent with their aggressive spread. The importation of foreign plants can be conscious (introduced) or unconscious (not introduced) (Botta-Dukát et.al 2004a). Usually the non-native plants have vegetative reproductive capacity, broad tolerance fast ontogenesis, efficient seed dispersal and plenty of seeds. These features highly promot in new environments the successful colonization and massive proliferations (Botta-Dukát et.al 2004b). Allelochemicals released by the alien plants are further great benefits to newcomer species of native vegetation conquest (Csiszár 2007). One of the most dangerous invasive woody plant species in the Hungarian forestry is *Prunus serotina*.

## II. Introduction of the *Prunus serotina*

The scientific name of this species is *Prunus serotina* EHRH. Within the Rosaceae family it belongs to the genus *Prunus*, classified within the subgenus *Padus* (Juhász 2012). Four variety can be separated, var. serotina, var. eximia, var. rufula, and var. virens. It's native in the eastern part of North America. Having economically importancewithin the territory where they distributed (Downey-Iezzoni 2000).




*1. Figure The Prunus serotina distibution teritorry and occurence in the USA and in Hungary (Source: U.S. Geological Survey, Juhász 2012)*

Its first appearance date is 1897 from Hungary (Juhász 2004). Initially it was planted as an ornamental tree, but was also examined economic importance of the forest in the first half of the 20th century.

The *Robonia pseudoacacia* is also native to America. In our days it is one of Hungary's most important economic tree species. Large, unmixed populations are growing in the sandy lowland areas. *Prunus serotina* was planted into the unmixed *Robinia pseudoacacia* forest with the aim to create a second level of the canopy. In terms of the Economic growth they had high hopes, but the Hungarian agricultural areas showed negative formdue to size and shape characteristics were not fulfilled. In the 1970s onward it spread explosively and settled in areas where it was not planted (Figure 1) (Juhász 2012, Internet 1). Spread is still in progress, and the *Robinia pseudoacacia* is one of the most dangerous weeds for the forest regeneration.

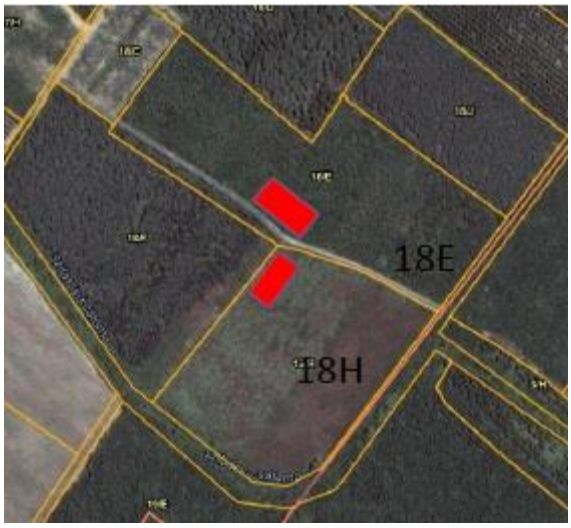
Birds like its fruit, they play significantly role in their dissemination. One problem is that the natural stands of trees and shrubs forming regrowth the fast growing *Prunus serotina* seedlings suppressed. Due to foliage, shoots containing highly toxic cyanogen glycoside, so neither wild nor insects don't eat it. Species behave aggressively, soon to bear fruit, cut out the tribes around the shoots which quickly appear and grow vigorously (Juhász 2004, 2012).

The *Prunus serotina* reduction from a highly infected area is a difficult task. The mechanical control can only be effective if several years old seedlings or saplings are pulled out by the roots and are destroyed. In case of older trees, cutting down trees in itself does not work. The strong sprout more regular training intervention is required. The use of pesticides has a preventable impact in sprout formation, but the shoots may also emerge successfully be suppressed (Nagy 2012)

## III. Materials and methods

I compared the results of 3 different types of plant weed control . The trials have been made tree trunks (injection and lubrication) and into sprouting in forest restoration treatment (spraying).

The area which I investigated was the Forestry and Wood Ltd. of Nagykunság, at a closer part to Üllő, in between 18E and 18H forest subcompartments (Figure 2). The main characteristics of two adjacent subcompartments are similar to each other:




*2. Figure 18E and 18H forest subcompartments*

The forest is located in the steppe climate, hydrology excess water impact, independent genetic type of soil, humid and, topsoil thickness of medium depth, physical kind of sandy soil, topography and slope of the area is flat.

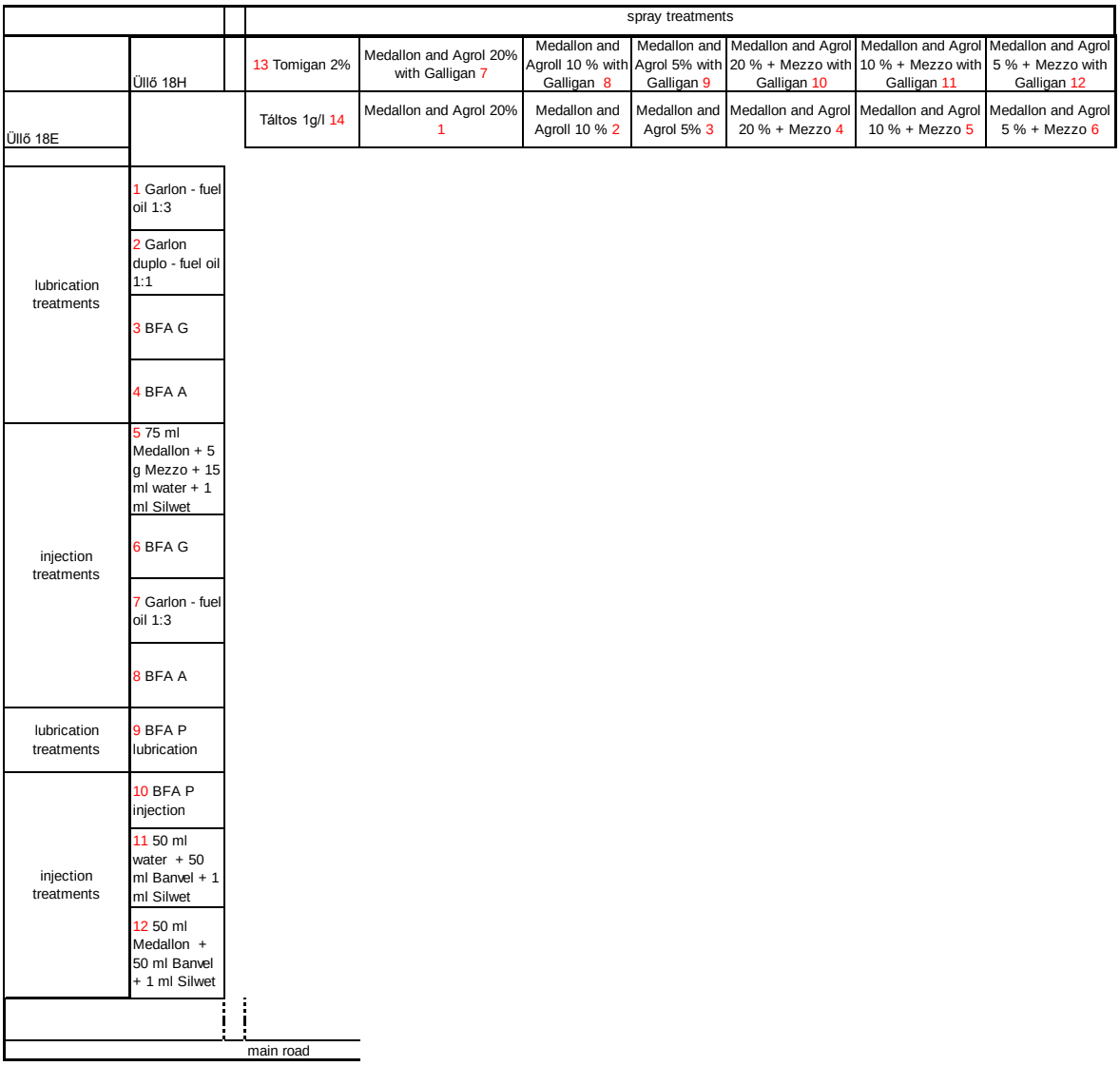
The trunk treatments were carried in 18E of forest subcompartment. The Tree Holdings on the subcompartment: 90% locust *Robinia pseudoacacia* and 10% *Populus* x *euramericana* cv "I-58/57". The age of the population is 12 years.

The treatments were performed on 27. 05. 2012. and on 08. 06. 2102. In the trunk of *Prunus serotina* at the lubrication trials, each individual has been treated with 30 cm stem length. Depending on the diameter of the trunk for each plant protection product is 0.2-0.4 litre was applied to the surface.

During injection, not all individuals were treated. Specimens with a diameter of less than 5 cm remained, they were untreated. In all plants treated 3 holes were prepared, a 45 ° slope, the helically disposed strain, and at breast height. These holes injected with 1-1 ml of herbicides, by the help of veterinary public extinguisher. The potential leaching, spillage, evaporation in order to inhibit the drug exit to the environment after the introduction of the chemical silicone adhesive sealant holes were closed. The treatments were performed on 27. 05. 2012. and on 08. 06. 2102.

The scion of the treatments was done in 18H forest subcompartment. *Populus* mixed *Robinia pseudoacacia* forestwas produced before last autumn. The examination was performed during the forest restoration. The areas were treated with hydraulic knapsack sprayers. *Prunus serotina* freshly sprouted shoots were sprayed. Treatment date: 20. 05. 2012.

The two replications of total forest area, 26 samples of eight different herbicide or herbicide combination were used for the injection, lubrication and spraying of *Prunus serotina* (Figure 3).




*3. Figure The investigated area with used herbicides in plots*

I went back to the forest subcompartments four times to check the effectiveness of the herbicides and them combinations. The reviews were on 06. 23. 2012; 10. 20. 2012; 04. 29. 2013 and on 09.16. 2013. The effectiveness was evaluated visually. Those treatments has successful been considered in which the treated plants withered, and there were not shoots

developed. Examining during the evaluation of the effects of treatments on *Robinia pseudoacacia* flocks.

## IV. Results

IV.1. Assessmentof lubrication and injection experiments

The core areas of the sample treated with lubrication, diesel Garlon 1: 3 mixture of BFA P code-named combination of the chemical. Areas treated with this combination could successfully defend against the *Prunus serotina,* the individuals completely destroyed in this two case (Table 1 and Table 2).

After the experiments carried out by injection of *Prunus serotina*, observed powerful destruction and minimal germination. The Banvel-Silwet-water and Banvel-Medallon-Silwet combinations of the effect is so powerful that can cause full decay on the nearby *Robinia pseudoacacia* (Figure 2).

*2. Figure: One efficient and one non efficient result in the trunk treatments*

**Table 1: Results of lubrication experiments**

| No. | Treatment | Active substance | Dose | Treated plants | Phytotoxicity | Affects on *Prunus serotina* |
|---|---|---|---|---|---|---|
| 1 | Garlon 4E : fuel oil | 480 g/l triklopir | 1 : 3 | 59 | - | Effective |
| 2 | Garlon Duplo : fuel oil | 84 g/l triklopir<br>+ 29 g/l fluroxipir-metilheptil-ester | 1 : 1 | 37 | - | Not effective |
| 3 | BFA G | glyphosate<br>+ additive<br>+ adhesive | 0,2-0,4 l | 17 | - | Not effective |
| 4 | BFA A | glyphosate<br>+ additive<br>+ adhesive | 0,2-0,4 l | 52 | - | Not effective |
| 5 | BFA P | glyphosate<br>+ additive<br>+ adhesive | 0,2-0,4 l | 8 | - | Effective |

**Table 2: Results of injection experiments**

| No. | Treatment | Active substance | Dose | Treated plants | Phytotoxicity | Affects on *Prunus serotina* |
|---|---|---|---|---|---|---|
| 1 | Medallon Premium<br>Mezzo<br>water | 360 g/l glyphosate<br>20 % metsulphuron-methyl | 75 ml<br>5 g<br>15 ml | 51 | - | Effective |
| 2 | BFA G | glyphosate<br>+ additive<br>+ adhesive | 0,2-0,4l | 48 | - | Effective |
| 3 | Garlon 4E : fuel oil | 480 g/l triklopir | 1 : 3 | 55 | - | Effective |
| 4 | BFA A | glyphosate<br>+ additive<br>+ adhesive | 0,2-0,4l | 75 | - | Effective |
| 5 | BFA P | glyphosate<br>+ additive<br>+ adhesive | 0,2-0,4 l | 11 | - | Effective |
| 6 | Banvel 480 S<br>water<br>Silwet L-77 | 480 g/l dicamba<br>+ 84 % polyalkilenoxid<br>+ 16 % polypropilen isomer | 50 ml<br>50 ml<br>1 ml | 10 | + | Effective |
| 7 | Banvel 480S<br>Medallon Premium<br>Silwet L-77 | 480 g/l dicamba<br>+ 360 g/l glyphosate<br>+ 84 % polyalkilenoxid<br>+ 16 % polypropilen isomer | 50 ml<br>50 ml<br>1 ml | 19 | + | Effective |

IV.2. Assessmentof spraying experiments

The majority of the different doses tested treatments effectively destroyed the intensively developing stump shoots. The Medallon-Agrol is an effective combination of technology without adding Galigan and Mezzo. Minimum of 5% and 5% of the dose formulations of experiments have achieved good results in the suppression of sprouts and shoots successfully prevented the further formation (Table 3, Figure 3).

*3. Figure: One efficient and one non efficient result in the scion of the treatments*

**Table 3: Results of spraying experiments**

| No. | Treatment | Active substance | Dose | Treated plants | Phytotoxicity | Affects on *Prunus serotina* |
|---|---|---|---|---|---|---|
| 1 | Medallon Premium | 360 g/l glyphosate | 20% | 11 | - | Effective |
| | Agrol Plus | 90 % oil (paraffin) | 20% | | | |
| 2 | Medallon Premium | 360 g/l glyphosate | 10% | 18 | - | Effective |
| | Agrol Plus | 90 % oil (paraffin) | 10% | | | |
| 3 | Medallon Premium | 360 g/l glyphosate | 5% | 11 | - | Effective |
| | Agrol Plus | 90 % oil (paraffin) | 5% | | | |
| 4 | Medallon Premium | 360 g/l glyphosate | 20% | 19 | - | Effective |
| | Agrol Plus | 90 % oil (paraffin) | 20% | | | |
| | Mezzo | 20 % metsulphuron-methyl | 100 g/ha | | | |
| 5 | Medallon Premium | 360 g/l glyphosate | 10% | 8 | - | Effective |
| | Agrol Plus | 90 % oil (paraffin) | 10% | | | |
| | Mezzo | 20 % metsulphuron-methyl | 100 g/ha | | | |
| 6 | Medallon Premium | 360 g/l glyphosate | 5% | 13 | - | Effective |
| | Agrol Plus | 90 % oil (paraffin) | 5% | | | |
| | Mezzo | 20 % metsulphuron-methyl | 100 g/ha | | | |
| 7 | Medallon Premium | 360 g/l glyphosate | 20% | 21 | + | Effective |
| | Agrol Plus | 90 % oil (paraffin) | 20% | | | |
| | Galigan 240 EC | 240 g/l oxyfluorfen | 3% | | | |
| 8 | Medallon Premium | 360 g/l glyphosate | 10% | 13 | + | Effective |
| | Agrol Plus | 90 % oil (paraffin) | 10% | | | |
| | Galigan 240 EC | 240 g/l oxyfluorfen | 3% | | | |
| 9 | Medallon Premium | 360 g/l glyphosate | 5% | 8 | - | Effective |
| | Agrol Plus | 90 % oil (paraffin) | 5% | | | |
| | Galigan 240 EC | 240 g/l oxyfluorfen | 3% | | | |
| 10 | Medallon Premium | 360 g/l glyphosate | 20% | 11 | - | Effective |
| | Agrol Plus | 90 % oil (paraffin) | 20% | | | |
| | Mezzo | 20 % metsulphuron-methyl | 100 g/ha | | | |
| | Galigan 240 EC | 240 g/l oxyfluorfen | 3% | | | |
| 11 | Medallon Premium | 360 g/l glyphosate | 10% | 10 | - | Effective |
| | Agrol Plus | 90 % oil (paraffin) | 10% | | | |
| | Mezzo | 20 % metsulphuron-methyl | 100 g/ha | | | |
| | Galigan 240 EC | 240 g/l oxyfluorfen | 3% | | | |
| 12 | Medallon Premium | 360 g/l glyphosate | 5% | 19 | - | Effective |
| | Agrol Plus | 90 % oil (paraffin) | 5% | | | |
| | Mezzo | 20 % metsulphuron-methyl | 100 g/ha | | | |
| | Galigan 240 EC | 240 g/l oxyfluorfen | 3% | | | |
| 13 | Tomigan 250 EC | 360 g/l fluroxipir-meptil | 3% | 27 | - | Not effective |
| 14 | Taltos 450 WG | 355 g/kg potassium aminopyralide + 150 g/kg florasulam | 50 g/ha | 37 | - | Effective |

## V. Conclusion

The protection of Prunus serotina infected Robinia pseudoacacia stands should be performed by combined methods. Prior to the final cut to older flocks slaughter strain treatment is suggested. The 5 cm diameter at breast height specimens with thinner body should be chosen for lubrication, the thicker trees should be treated by injection. It shall be done during the growing season. Upon a successful defense after the final cut there won't grow any sprout formations. This two methods more environmentally friendly but more expensive than spraying, but in this case the drift of the herbicides is not so intensive.

The treatment of individuals recovering from vigorous treatment may be left out and the thinner sprouts stock down after the formation of granulation production-intensive produce. It is recommended to use knapsack sprayers against the proposed treatment shoots. The treatment should be carried out at spring time, as have not yet been very strong leaves.

Efficient products are presented in the Results section, only those recommended, which the Robinia pseudoacacia phytotoxic symptoms do not provoke. To be continued experiments is suggested at lower doses, as well.

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