



# INSECT PESTS IN FORESTS OF ČAČALICA MEMORIAL PARK (POŽAREVAC, SERBIA)

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[М. Главендекич, М. Медаревич, А. Попович, Д. Вујичић, С. Обрадовић. Насекомје-вредители в лесах Мемориального парка «Чачалица» (Пожаревац, Сербия)]



## INTRODUCTION

Čačalica Memorial Park is located in the eastern part of the town of Požarevac on the hill of the same name. The first record of Čačalica can be found in Turkish writings, more than 300 years old. In the higher parts, along the edge of the hill, pedunculate oak trees grew in certain places. During the Second World War, the trees that grew in Čačalica were cut down, and it became a hill of death. About 3,000 sympathizers of the National liberation movement and captured partisans were shot in it. The place where their remains rest is marked with a monument (Fig. 1-2). A monument to the executed patriots was unveiled in 1962, and in the same year a memorial ossuary to Red Army soldiers was built, and the remains of Russian soldiers killed in the area from Mladenovac to Rudna glava in October 1944 were transferred to this place. After the Second World War, afforestations followed, and in the 1967 afforestation a total of 782 seedlings were planted. Out of that, 441 birches were planted around the memorial ossuary in memory of the 441 Russian soldiers who died in October 1944 in the area from Mladenovac to Rudna glava. The seedlings were imported from Russia (Fig. 3-5).



Figure 1-2 : Memoiral ossuary to Red Army soldiers in the Memorial park Čačalica

A marked mixed character is imperative in all categories of forests and purpose units as an indicator of stability, more favorable use of space and higher productivity, and in this case a higher degree of natural equipment of the Forest Memorial Park for recreation. A large number of present species of trees and shrubs, the interchange of deciduous and coniferous species, the interchange of species in the microspace and at the same time the equal group and individual tree mixture contribute to the mixed character of the forest. A reliable indicator in that sense is the fact that tree and shrub species interchange at every 2000 m<sup>2</sup> on average. In the forest inventory i.e. full callipering of the Memorial Park except for section v, a total of 89 species of trees and ornamental shrubs were recorded. In addition to what has already been pointed out in a positive sense when the mix and number of species and the current way of using the complex are concerned, the current range of species is very important from the aspect of biodiversity protection in the *ex situ* aspect.



Figure 3 - 5: Birch trees originating from Russia 53 years after planting in the Memorial park Čačalica

## MATERIAL AND METHODS

The research on insect pests was conducted in Memorial park Čačalica from October, 2019 till May, 2020. Visual tree assessment (VTA) was done on the whole territory of the Park with the aim to find out the most important insect pests and their natural enemies. Samples with symptoms of damage caused by insects were collected and reared in the laboratory to obtain adults. Traps multi funnel 11-segment pheromone traps (Witasek®) with lures for *Monochamus galloprovincialis* and *Ips sexdentatus* were used from April to May (Fig. 3-7).

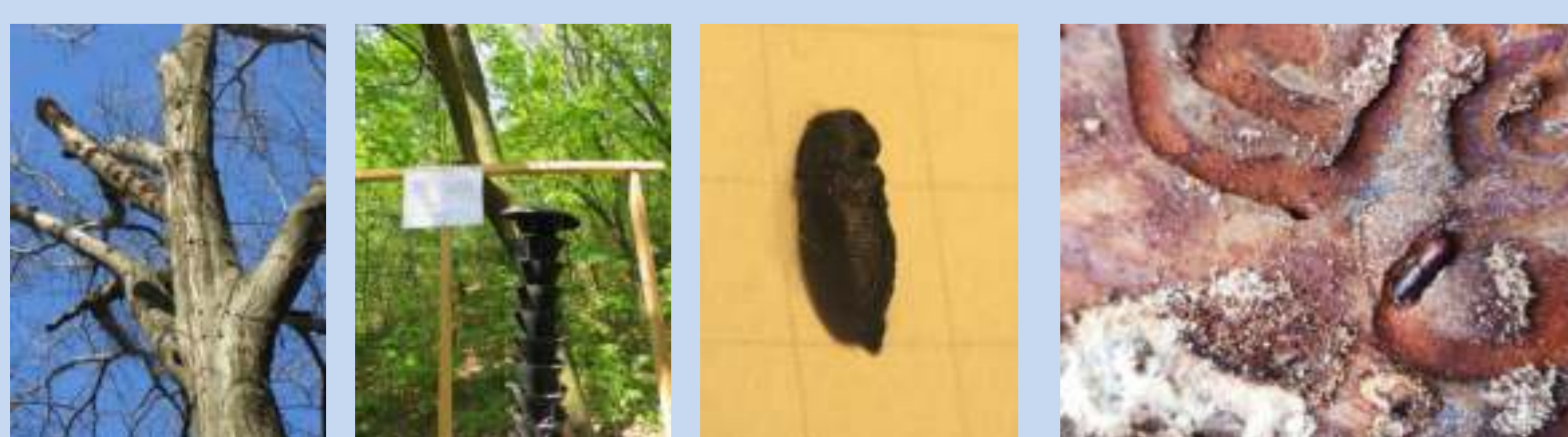


Figure 3-6 VTA, monitoring with pheromone traps, adults reared in laboratory and determination of insects.

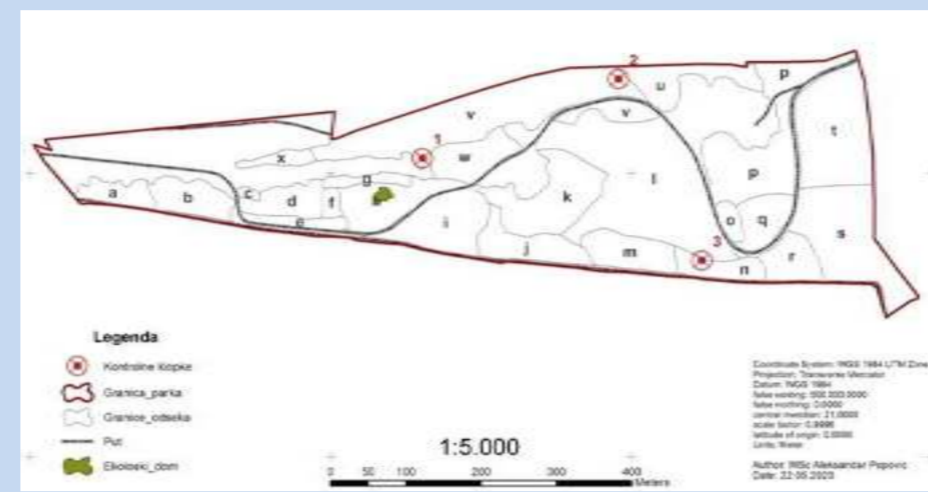


Figure 7: Distribution of pheromone traps

## RESULTS

The mass dieback of Scots pine, Austrian pine, eastern white pine and birch in the Čačalica Memorial Park is evident. In order to gain an insight into the harmful organisms as soon as possible, it was important to obtain reliable data on populations of pests. Sap sucking insects and mites predominate (37 species). Among them, the majority are aphids, scale insects, lace bugs, jumping plant-lice, spider mites and flat mites. Among them are invasive alien species prone to outbreaks: *Aphis spiraecola*, *Metcalfa pruinosa* and *Prociphilus fraxinifolii*. *Metcalfa pruinosa* was accidentally introduced to Serbia and its outbreaks have been recorded in forest complexes and green areas. The abundance of honeydew and jumping insects often cause molestation by disturbing visitors to green spaces (Fig. 8-13)



Figure 8-10: *Aphis spiraecola*, *Metcalfa pruinosa*, and *Neodryinus typhlocybae*

*Physokermes* spp. are autochthonous and very important species because they occur in increased numbers on spruce trees. *Carulaspis juniperi* cause very abundant population on *Juniperus* cultivars. A mass occurrence of oak lace bug (*Corythucha arcuata*) was recorded in the autumn of 2019. On April 22, 2020 the first adults were spotted and their feeding on young leaves began. This is one of important invasive species feeding on oaks and many other deciduous trees and shrubs (Csoka, 2020)



Fig. 11-13 *Physokermes piceae*, *Carulaspis juniperi*, *Corythucha arcuata*

Insects and eriophyid mites that cause galls (11 species) are of no economic importance (14-15). Among them is the invasive alien species black locust gall midge (*Obolodiplosis robiniae*) and *Phytoptus avellanae* on *Corylus colurna*. Both species have no economic significance for now.



Figure 14 - 15: Eriophyid bud mites (*Phytoptus avellanae*) and *Obolodiplosis robiniae*

Wood boring beetles (9 species) are very important, considering that in the forests of Čačalica Memorial Park there are a lot of dry trees, broken trunks and dry branches on deciduous and coniferous trees. The greatest economic significance and abundance was recorded for *Tomicus piniperda*, *Tomicus minor*, *Ips sexdentatus*, *Ips amitinus*, *Monochamus galloprovincialis*, *Phaenops cyanea* on pines, *Tetropium castaneum*, *Ips typographus* and *Pityogenes chalcographus* on spruce, ash bark beetles (*Leperisinus varius* and *Hylesinus crenatus*), *Agrilus sinuatus* on hawthorn (Fig. 16-19).



Fig 16-19: Symptoms of bark beetles, buprestids and longhorn beetles in trunks and branches

Natural enemies, parasitoids and predators, have been reported. Rose aphids, aphids on hawthorn, maple, meadowsweet, spruce, pine and other species were accompanied by pathogens, predators and parasitoids and it can be concluded that the complex of natural enemies is well preserved. The largest number of larvae was recorded for hover flies, parasitoids *Aphidius* spp. and the larvae of green lacewings and ladybugs. Parasitoid wasps from fam. Ichneumonidae and Braconidae were recorded. (Fig. 21).



Figure 20 - 23: Natural enemies of aphids, longhorn beetles and bark beetles.

There is urgent need for monitoring of forest health, especially of coniferous trees. Trees marked for removal should be cut in a proper way and with strictly implementation of forest order measures. Care should be taken to leave up to 30% of the branches of felled trees in the forest in order to provide wintering shelters for parasitoids and predators. Landscape planning in Čačalica Memorial Park is performed with the aim to promote, beside historical context, recreation and wellbeing of citizens who visit Čačalica memorial Park (Fig. 24).



Figure 24: Landscape planning in Čačalica Memorial Park

## CONCLUSIONS

Čačalica Memorial Park is keeping memories to the executed patriots and 441 Russian soldiers who died in October 1944. Afforestation include 441 birches imported from Russia and planted around the memorial ossuary in memory of the 441 Russian soldiers.

The mass dieback of Scots pine, Austrian pine, eastern white pine and birch in the Čačalica Memorial Park is recorded caused by sucking insects, bark beetles, buprestids, long horn beetles. Alien insects are well established (*A. spiraecola*, *Metcalfa pruinosa*, *Corythucha arcuata*) as well as native pests: *T. piniperda*, *T. minor*, *I. sexdentatus*, *I. amitinus*, *M. galloprovincialis*, *P. cyanea* on pines, *T. castaneum*, *I. typographus* and *P. chalcographus* on spruce, *L. varius* and *H. crenatus* on ash and *A. sinuatus* on hawthorn. There is need for permanent monitoring and to apply urgently integrated control measures.

## References

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