

ASTRA National Museum Center SIBIU

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Monitoring Xylophages in the Open-Air Section of the ASTRA Museum in Dumbrava Sibiului

Abstract

The present paper handles the observations made as a result of monitoring xylophages in the open-air section of the ASTRA Museum in Dumbrava Sibiului. This process is of great scientific importance, because it has led to the accurate recording of the bio-noxious bugs existing in the units and of the results to insecticide treatments.

Within the monitoring process of xylophages in the open-air section of the ASTRA Museum in Dumbrava Sibiului, the predominant species of xylophages have been identified, as well as the secondary existing ones.

The effect of the insecticide Per Xil 10 has been studied. It is an insecticide with generally persistent remanence, this remanence being influenced by the location of the unit in the field, by increased humidity and shade.

It was noted that June was generally a month of hatching for all the species of caries under observation, fact shown by the evident increase in the number of individuals.

The treatment of the units located in shady places with high humidity (near a source of water - lake, river) is more difficult to carry out because this is a beneficial microclimate for the development of xylophages. The treatment with insecticides in this case needs three successive stages to decimate the population of individuals.

Generally speaking, during the year 2008, the attacks of xylophages had a lower intensity, as it was a warm year, with lower rainfall and more frequent high temperature phases. These characteristics have led to active attacks reduced in intensity, attacks which have been rather insularly than massive. The lack of humidity plays an important role in decreasing the active attacks of xylophages.

INSECTICIDE TREATMENTS WITH Per Xil 10 GAVE GOOD RESULTS, BEING MADE CYCLICALY BY INJECTION. The remanence of this insecticide is obvious, and so the active attacks of this year have been visibly reduced.

1. Introduction

Monitoring xylophages in the open-air section of the ASTRA Museum in Dumbrava Sibiului is of great scientific importance because this process has led to the accurate recording of the bio-noxious bugs existing in the units and of the results to insecticide treatments.

2. Monitoring and treatment

In the open-air section of the ASTRA Museum in Dumbrava Sibiului, the treatment method has been applied in four separate units, selected due to the following reasons:

- The essences of wood used for construction are varied: pine, beech, oak, birch and alder.
- Here live different species of xylophages that are characteristic for wood essences: *Anobium punctatum*, *Xestobium rufovillosum*, *Pthilinus pectinicornis*, *Hylotrupes bajulus*. This monitoring process was conducted during 2008 too.

Two methods of monitoring xylophages have been used:

- Pasting thin sheets of paper (tissue-paper), selecting areas with massive attack (beams, walls, support columns, soles). Carboximetyl cellulose (CMC) was used as adhesive, a non-toxic substance that is ingested by wood bugs.



Photo 1 Sheets of paper - monitoring xylophages

- Traps with adhesive surfaces placed in dark areas.

Xylophages hatch (turn from one stage of development to another) through paper, leaving behind so-called flight holes. These flight holes are periodically counted and thus the number of insects that have hatched can be determined.

By the size and shape of the flight holes the species existing in the unit can be determined.

The traps with adhesive surfaces help capturing adult individuals, counting them regularly and establishing the species living in the units.

The monitoring process has been conducted over four months: May, June, July, August – the development cycle of xylophages.

Insecticide treatments have been applied on certain selected areas, periodically, every six weeks, with the insecticide Per Xil 10, an insecticide belonging to the pyrethroid group.

The counting of individuals and flight holes has been performed regularly every two weeks. At the same time, the species of xylophages have been identified.

The selected units have been: Livada, Ludești, Polovragi and Rucar, the same units monitored in 2008.

Thus, a parallel between the effects of insecticide treatments and their results can be done.

In the Livada unit, the wood used for construction is mainly beech (*Fagus silvatica*).



Photo 2 Livada unit

Characteristic for this wood essence are essentially xylophages *Pthilinus pectinicornis*. In this unit, among other species of mites and arachnoids that have been collected, the predominant population has been that of *Pthilinus pectinicornis*.



Photo 3 Active attack - beech - *Pthilinus pectinicornis*

During this year, it has been noted that the attack in this selected unit has been less massive than in 2008, due to insecticide treatment performed consistently during 2008, and due to the fact that insecticide substances have had remanence and have given satisfactory results. (Table 1).

Table 1 - Monitoring the Livada Unit

Unit Name	Wood Essence	Predominant Xylophages	Secondary Xylophages	Month	Insecticid Treatment Used
Livada	beech (Fagus silvatica)	<i>Pthilinus pectinicornis</i>	Mites, arachnoids:		
		On 100 cm ² surface - 54 flight holes		May	
		On 100 cm ² surface – 60 flight holes			Treatment Per Xil 10 - infusion
		On 100 cm ² surface – 47 flight holes		June	
		On 100 cm ² surface – 49 flight holes			
		On 100 cm ² surface – 53 flight holes		July	Treatment Per Xil 10 - infusion
		On 100 cm ² surface – 31 flight holes			
		On 100 cm ² surface – 16 flight holes		August	Treatment Per Xil 10 - infusion
		On 100 cm ² surface – 0 flight holes			

The study shows that the insecticide treatment has had positive results and showed the remanence of the used substance.

In the case of the sticky traps (Photo 4), the number of individuals has increased in June, which is the propagation month (from 14 to 30 individuals) and after treatment, it has decreased (from 30 to 12 individuals).

To note is the fact that this year, the active attack of *Pthilinus pectinicornis* has been more evident in the annexes (shed, coop) and less massive in the house. This can be explained by the fact that the area where the house is located is sunnier and brighter.



Photo 4 Sticky trap

In the case of the Ludești Unit, fir (*Abies alba*) is the tree used in construction and the active attack of xylophages is predominantly *Anobium punctatum*.



Photo 5 Anobium punctatum-adult

During this year, the attack of *Anobium punctatum* has decreased, being more pronounced only on the inside. The year has been less rich in precipitations, with higher temperatures, climate conditions which are not favorable for the development of xylophages. (Table 2).



Photo 6 Monitoring insects with paper

Table 2 - Monitoring the Ludesti Unit

Unit Name	Wood Essence	Predominant Xylophages	Secondary Xylophages	Month	Insecticide Treatment Used
Ludești	Fir tree (<i>Abies alba</i>)	<i>Anobium punctatum</i>	Arachnoids:		
		On 100 cm ² surface – 17 flight holes		May	
		On 100 cm ² surface – 42 flight holes			
		On 100 cm ² surface – 61 flight holes		June	Treatment Per Xil 10 - infusion
		On 100 cm ² surface – 17 flight holes			
		On 100 cm ² surface –		July	

		37 flight holes			
		On 100 cm ² surface – 40 flight holes			Treatment Per Xil 10 - infusion
		On 100 cm ² surface – 20 flight holes		August	
		On 100 cm ² surface – 3 flight holes			

In the case of the Ludești unit, the positive effect of insecticide treatment has been evident, but without having the same eradication effect, due to the target location in a shadier area, near the forest.



Photo 7 Monitoring insects with paper in the Ludesti unit

In the case of the Polovragi unit, the building elements are made of alder wood, birch and fir.

It has been observed that birch and alder wood submit to active massive attack, while fir tree shows only active attack islands.

For the first two essences, the active attack of the *Hylotrupes bajulus* species has been observed (Photo 8). In addition to this species, attacks of *Anobium punctatum* and *arachnoids* have also been noted. This is due to the presence of oak (*Quercus Petrea*) in the construction.

This year, the active attack of *Hylotrupes bajulus* has decreased considerably due to the effect of the applied insecticide, Per Xil 10, due to its remanence and the hot and arid weather during this summer. We can only speak of an insular attack of this species.

Table 3 - Monitoring the Polovragi Unit

Unit Name	Wood Essence	Predominant Xylophages	Secondary Xylophages	Month	Insecticide Treatment Used
Polovragi	Birch, alder - mainly oak, fir tree – secondary	<i>Hylotrupes bajulus</i>	<i>Anobium punctatum</i> , Arachnoids:		
		On 100 cm ² surface – 12 flight holes		May	
		On 100 cm ² surface – 20 flight holes			
		On 100 cm ² surface – 27 flight holes		June	Treatment Per Xil 10 - infusion
		On 100 cm ² surface – 14 flight holes			
		On 100 cm ² surface – 17 flight holes		July	Treatment Per Xil 10 - infusion
		On 100 cm ² surface – 8 flight holes			
		On 100 cm ² surface – 0 flight holes		August	
		On 100 cm ² surface – 0 flight holes			

It should be noted that the essence of birch wood - alder is essentially a soft one, heavily attacked by xylophages. The attacked wood is very fragile.

In the Rucar unit, the building elements are predominantly made of oak (*Quercus petraea*).

This unit has been selected because of the active attack of *Xestobium rufovillosum* and *Anobium punctatum*. (Photo 9, 10)



Photos 9 and 10 - Active attack – oak - *Xestobium rufovillosum*

Table 4 – Monitoring the Rucar Unit

Unit Name	Wood Essence	Predominant Xylophages	Secondary Xylophages	Month	Insecticide Treatment Used
Rucăr	oak – <i>Quercus robur</i>	<i>Xestobium rufovillosum</i>	<i>Anobium punctatum</i>		
		On 100 cm ² surface – 46 flight holes		May	
		On 100 cm ² surface – 58 flight holes			
		On 100 cm ² surface – 69 flight holes		June	Treatment Per Xil 10 - infusion
		On 100 cm ² surface – 43 flight holes			
		On 100 cm ² surface – 21 flight holes		July	Treatment Per Xil 10 - infusion
		On 100 cm ² surface – 10 flight holes			
		On 100 cm ² surface – 0 flight holes		August	Treatment Per Xil 10 - infusion
		On 100 cm ² surface – 0 flight holes			



Photo 12 Xestobium rufovillosum-adults

3. Conclusions:

Within the monitoring process of xylophages in the open-air section of the ASTRA Museum in Dumbrava Sibiului, the predominant species of xylophages have been identified, as well as the secondary existing ones.

The effect of the insecticide Per Xil 10 has been studied. It is an insecticide with generally persistent remanence, this remanence being influenced by the location of the unit in the field, by increased humidity and shade.

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