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RESEARCH ON CONTROLING *ANISANDRUS DISPAR* (SCOLYTIDAE) IN ORCHARD FROM CĂRAND VILLAGE, ARAD COUNTY, ROMANIA

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Abstract: This study presents the experimental results on the control of *Anisandrus dispar* species in 2003. These experiments took place in an orchard from Cărand village, Arad County. In the first part are presented biological material used, type of traps used and methods of data collection and their processing. The second part is dedicated to presenting the data and their interpretation. Data presented are the following: flight period of decay; climatic conditions in which they flew, Ipidae`s number which flew. The last part of the paper is dedicated to conclusions and recommendations drawn from the results presented in the second part.
Keywords: *Anisandrus dispar*, Carand, Arad, Ipidae, flight period

INTRODUCTION

Ipidae are pest insects popular named ,,cari". In our country these insects damaging fruit tree, are less studied. They include ***Xyleborus dispar*** (F.) (Coleoptera: Scolytidae) called the European ambrosia beetle.

Original description of *Xyleborus dispar* was made for the first time in 1792 by Fabricius. It belongs to *Scolytidae* family or ambrosia beetles. The most recent classification includes Xyleborus dispar (F.) wood cavity like *Xyleborus* from *Xyloborini* tribe and synonymous whit types as: *Anisandrus, Anaeretus* and *Cyclorhipidion*.

Xyleborus dispar (F) has an ectosimbiotical relationship with *Ambrosiella hartigii* Batra (Fungi imperfecti) fungus that carries inside the host tree in specialized glands and which is cultivated on the walls of galleries which digs into trees.

It mainly attacks debilitated tree at the following species: *Acer, Aesculus, Alunus, Betula, Castanea, Crataegus, Corylus, Cydonia, Fagus, Fraxinus, Juglans, Leriodendron, Malus, Platanus, Populus, Prunus, Pyrus, Quercus, Salix, Vitis.*

MATERIAL AND METHODS

The orchard where experiments took place, is bordering with the forest, a very important element in pest's attack.

Below are presented some characteristics of the orchard from Carand village. The orchard was founded in an intensive system. At the establishment it had a total area of 53 hectares, which were distributed across several soil units.

The total of 53 hectares has been distributed by species as follows:

- Morello tree – 10 hectares with an effective of 6480 trees grafted on Mahaleb. Diversity of species cultivated in planting was: Ilva, North Star, Nefris, Morela, Mocăneşti. Trees were planted on embankments in rows at a distance of 2.5 m. this species has dried due to soil.
- Cherry tree - 14 hectares with 4634 grafted trees on Mahaleb with a planting distance of 5/6 m. The species planted were: Boambe de Cotnari, Germersdorf, Van, Hedelfinger.
- Apple tree – 14 hectares grafted onto root stocks M 6, of which 12 hectares with an effective of 9128 trees were planted at a distance of ¾ m with the following species: Prima 3,4 ha; Ionathan 4,9 ha; Starkrimson 2,6 ha. Remaining 2 hectares were planted at a distance of 2/4 m with the following species: Golden 1.5 ha and Starkrimson 0.5 ha.
- Plum tree – 7 hectares planted in single rows with an effective of 4176 trees planting at a distance of 5/3 m. The trees were grafted on cherry plum with the following varieties: Stanley, Tuleu gras, Anna Spath. Were also planted 5 hectares of plum on technological paths, with an effective of 2781 trees at a planting distance of ¾ m (depending on land). On the technological paths were planted the same plume tree varieties as in orchard.

Because of soil, after planting a part of trees are dried: morello tree in proportion of 50 %, cherry trees in proportion of 50 %, apple trees in proportion of 0.5 %, the plum trees from technological paths in proportion of 30 % and that from the single rows 0.6 %. Dried trees were replaced with plum trees.

In this orchard last maintenance works, splashing and cuts, were made in 1998.

CONTROLING METHODS

Because ambrosia beetles live under tree bark or in wood, combating is very difficult. Even treatments with endosulfan in high concentration give only partial efficacy. Applications must be made when the insects start flying and searching for suitable host plants.

Due to its "hidden" lifestyle (mode of life), the researches tried to find some research methods specific to these insects. It is very important to know as much

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data about them (life cycle, periods of flights, mode of feeding and breeding etc.)

To study these insects and even for pest control, the researchers have built several types of traps: "sandwich" trap, with phloem for observing Ambrosia beetles, the associated predators and parasites.

This study was made in 1981 by de Americans: Donald N. Kinn and Mitchel C. Miller. But to study Ambrosia beetles from Carand, especially of *Xyleborum dispar*, it was used another type of trap who is base on ethanol.

It is known for many years, that ambrosia beetles species are attracted to ethanol. This type of trap it was also used in American forests in 1975 by Roling and Kearby, for monitoring ambrosia beetles. During 1983-1988 in Switzerland have been made different types of tests concerning ethanol traps, discovering that there is a more efficiency trap [E. Mani, U. Remund and F. Schwaller- „Attack of the Bark Beetle, *Xyleborus dispar* F., (Coleoptera: Scolytidae) in Orchards and Vineyards" Acta Phytopathologica et Entomologica Hungarica 27 (1-4), pp.425-433 (1992)].

Although there are more effective traps in caching ambrosia beetles, it was used a trap called "window trap": a 1 liter plastic flash with 250 ml ethanol as ….with fixed funnel and a plexiglas window about it. The whole trap has to be protected by a plastic roof against rains. This trap is specially realized to study Anisandrus pest. The trap works with ethanol, like substance attraction, which was put in a plastic flash, in quantity of 250 ml, having a concentration of 50 %.

In the orchard from Carand village I used two window traps, for flight monitories at X. dispar.

Once was placed at the top of the hill between cherry trees, where due to relief was formed a kind of depression with a specific microclimate. This trap is situated near the forest edge.

The second trap was placed between apple species, which are located towards the base of the hill.

DATA PROCESSING METHODS

Traps were installed in the days when it started to register positive temperature of 10^0C.

Sampling, respective of insects caught with the help of traps, was done at a distance of two days. Once with the sampling, was also mode an addition with ethanol if it was necessary (at every 4-6 day, in the hot days). The collected insects were preserved in alcohol until the end of the flight period, then they were identified and counted.

In the early August were installed traps again to watch the existence of a second flight period and it was observed (noted) that in the conditions of our country, the species is monovoltina.

RESULTS

Experimental results recorded in 2003; trap I

This trap was set in microdepresion, namely at the top of the orchard, closer to the forest. The fruit-growing species where the tape was set is the cherry tree.

Traps were installed on 26th March, 2003, but the first insects flew not for several days, on 28th March, when temperature recorded several days in a row over 10 degrees positive.

Experimental results are registered starting with 28th March since the first flight took place then.

The results are presented in table 3.1., along with temperatures and precipitations recorded in that period.

Table 3.1.
The number of Ipidae caught with the help of the first trap in 2003

Periode	Middle temperatures	Rainfall	Ipidae
26.march	11,5	0	0
28.march	13,2	0	6
30. march	14,6	2,5	16
01.april	9,2	1	3
03.april	13,7	0	71
05.april	6,5	0	4
07.april	3	0	0
09.april	3,5	0,5	0
11.april	11,5	5	0
13.april	9,2	1	4
16.april	12,7	6	175
18.april	13,2	0	32
20.april	14,7	0	25
22.april	16,7	0	61
24.april	11	16	5
26.april	14,6	0	15
28.april	15,5	5	68
30.april	22,2	0	139
02.may	23,1	0	90
04. may	20	0	4
06. may	23,4	0	22
08. may	25,5	0	0
10. may	25,5	0	2
12. may	25	5	2
14. may	24,2	1	2
16. may	14,7	0	0
18. may	18,8	0	1
20. may	22,5	0	4
22. may	16,7	17	0
24. may	21,2	0	2
26. may	22,7	2	4
28. may	22,7	3	0
30. may	23,2	0	0

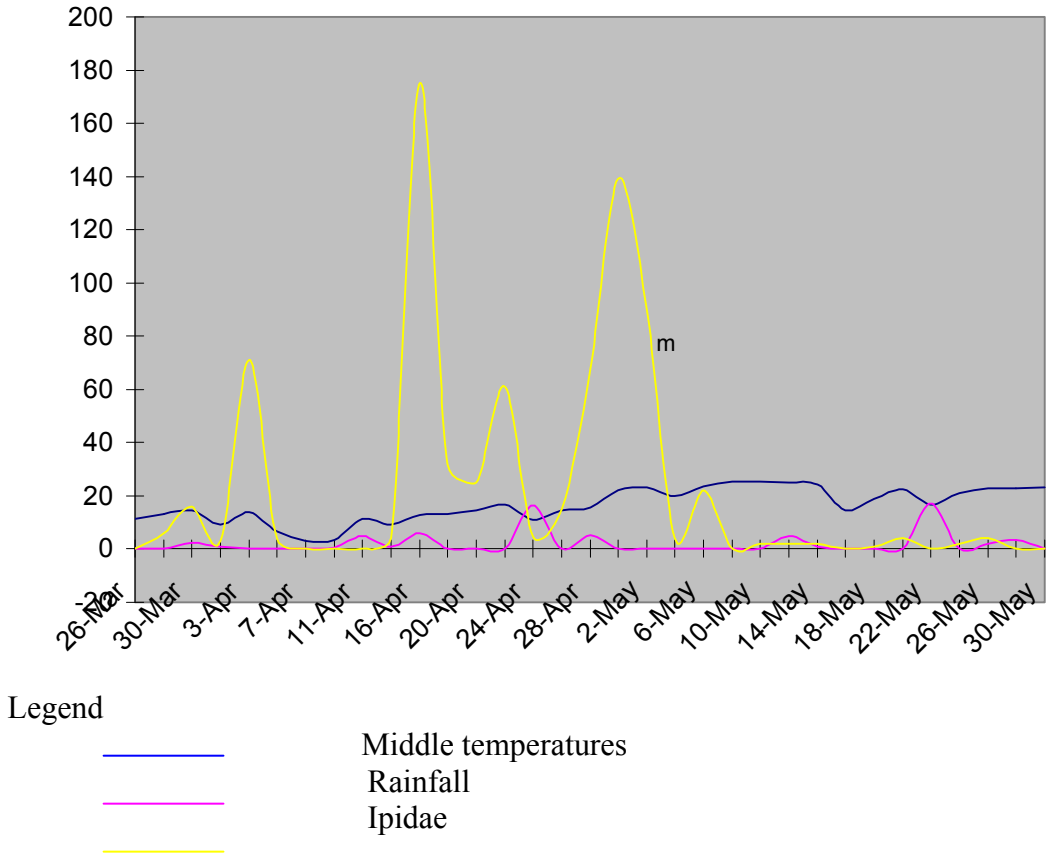

Fig.3.1. Graphic representative of the flight test results and Ipidaes number caught with the help of the first trap, in 2003

The insects flight is correlated with temperature during this period, as we can see in table 3.1. and fig. 3.1. At temperatures below 10 degrees, the insects flight is completely stopped, but if it has recorded two consecutive days of temperatures over 10 degrees, the insects flight ….register significant values.

The highest number of Ipidae caught with the help of the first trap in 2003 was 175. These insects flew on 16th April, 2003, when it recorded on average temperature of 12,7^{0}C and fell precipitation in quantity of 5 mm/m^2.

It can be seen from the study of fig. 3.1 that there were three flights distinguishing: first took place between 28th March and 5th April, the second between 13th April – 24th April, and the third flight in 24th April – 6th May.

Falling precipitation during the flight period have influenced the number of insects that have flown. So, it can be observed that in those days when precipitation fell and in the next days, after precipitation, insects` number that flew was lower even if temperatures were raised.

Experimental results recorded in 2003; trap II

The second trap was placed in the bottom of the hill on which is posted the orchard. The fruit – growing species where the trap was set was on apple tree.

The second trap was installed on 26th March, 2003.

Ipidae`s number caught with the help of the second trap, are presented in table 3.2.

Table 3.2.
The number of Ipidae caught with the help of the second trap in 2003

Periode	Middle temperatures	Rainfall	Ipidae
26.mart	11,5	0	0
28.mart	13,2	0	1
30.mart	14,6	2,5	4
01.april	9,2	1	0
03.april	13,7	0	28
05.april	6,5	0	0
07.april	3	0	0
09.april	3,5	0,5	0
11.april	11,5	5	0
13.april	9,2	1	0
16.april	12,7	6	91
18.april	13,2	0	9
20.april	14,7	0	6
22.april	16,7	0	18
24.april	11	16	1
26.april	14,6	0	5
28.april	15,5	5	27

Periode	Middle temperatures	Rainfall	Ipidae
30.april	22,2	0	72
02.mai	23,1	0	31
04.mai	20	0	2
06.mai	23,4	0	6
08.mai	25,5	0	0
10.mai	25,5	0	0
12.mai	25	5	0
14.mai	24,2	1	1
16.mai	14,7	0	0
18.mai	18,8	0	1
20.mai	22,5	0	2
22.mai	16,7	17	0
24.mai	21,2	0	0
26.mai	22,7	2	1
28.mai	22,7	3	0
30.mai	23,2	0	0

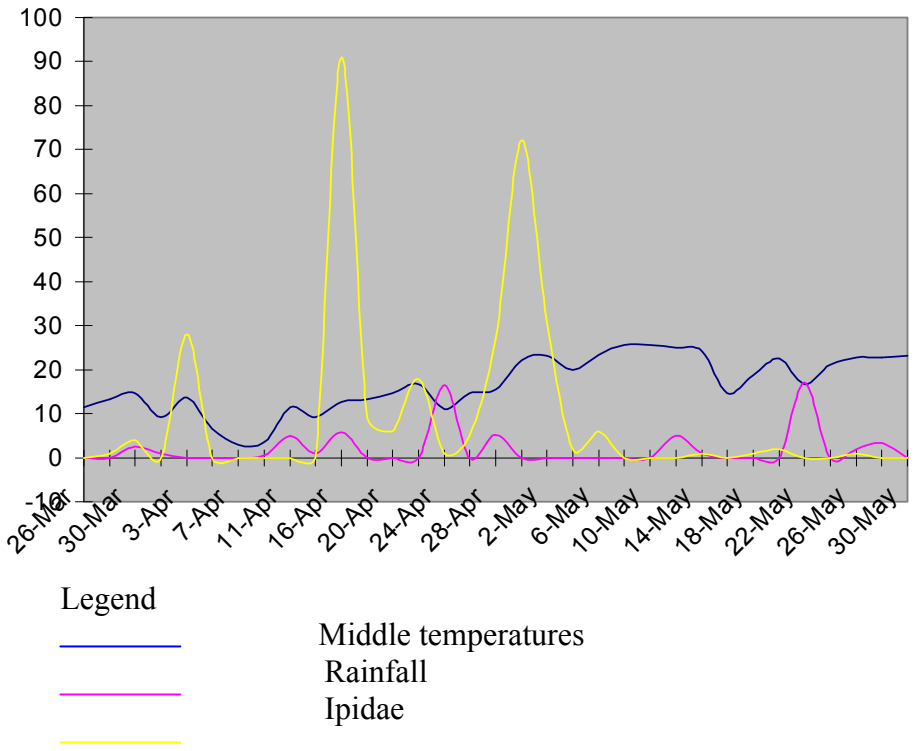

Fig.3.2. Graphic representative of the flight test results and Ipidaes number caught with the help of the second trap, in 2003

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CONCLUSIONS

It can be seen that in table 3.2. and fig.3.2., insects` number that flew and were caught with help of the second trap, in the conditions of registered temperature and precipitation in the respective flight days.

The highest number of I caught with the help of the second trap it was 91, registered on 16 April.

It can be seen also in Fig. 3.1. and Fig.3.2. the three distinctive flights of 2003. There were recorded three flights peaks: in 3rd April on 16th April and 30th April.

Total flight period of 2003 was from 28th March to 26th May, almost two months.

Comparing Ipidae`s number caught with the help of the first trap, with the Ipidae`s number caught with the help of the second trap, it can be seen that the first trap collected a greatest number of insects, even if the conditions of temperature and precipitation were the same.

Conclusions

From our studies it can be draw the following:

- Ipidae`s flight is influenced by temperature and precipitation;
- This pest can attack different other species in the same condition;
- Anisandrus dispar is a monovoltin species in the condition of our country.

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