REZULTATE EXPERIMENTALE PRIVIND EFICACITATEA UNOR PESTICIDE DESTINATE COMBATERII ACARIENILOR IN LIVEZILE DE MAR ALE SCDVV BLAJ

EXPERIMENTAL RESULTS ON THE EFFECTIVENESS OF PESTICIDES TO CONTROL MITES IN APPLE ORCHARDS OF SCDVV BLAJ

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Abstract

Mites are pests which can cause significant damage to apple orchards, especially during drought years. If the level of mite populations is not properly controlled, the leaves whiter and fall, the attacked trees become weaker, have small fruits and fail to form buds for the next year. Limiting the propagation of phytophagus mites populations by using specific acaricides has been inefficient, due to the mites capacity of rapidly developing breeds resistant to the acaricides that were used repeatedly. This paper contains and interprets data collected during 2008 – 2009 concerning the testing of the biological efficacy for products with acaricide effect and their impact on useful species (predators and parasites). The experiment was conducted in the experimental polygon of SCDVV Blaj, the fruit-growing farm Aiud, on a 9-12 year old apple plantation cultivated with the varieties: Idared, Starkrimson, Jonathan and Florina. Treatments were performed before and after bloosom with: Demitan 200 SC 0.06% 0.05% Torque, Envidor 0.5%, Omit 57 is 0.1%, 0.2% Sanmite. When comparing products, the differences between them were significant. Efficiency coefficient ranged between 95% and 27.91%. The obtained results revealed the selectivity of Demitan and Envidor products over the useful entomofauna present in the studied ecosystem.

Keywords: mites, apple, treatments
Cuvinte cheie: acarieni, mar, tratament

1. Introduction

The tetranychid mites from the species *Panonycus ulmi* and *Bryobia rubrioculus*, can cause significant damage to apple orchards, especially during dry years. The attack of adult mites and larvae upon the leaves causes dislocations of both the epidermis and the deficient parenchymal cells. The result is the appearance of white-gray or gray- reddish spots. If the level of mite populations is not properly controlled, the leaves whiter and fall, the attacked trees become weaker, have small fruits and fail to form buds for the next year. The biological reserve of the pest is only partially reduced through the treatments administered during the dormant state. The limited effect of these treatments is due to the fact that, the majority of eggs and hibernating forms, are located in bark crevices and/or other hidden places, thus managing to escape the pesticide's action. Therefore, the most important treatments are those applied in the first growing period of the trees. The attempt to limit the growth of the phytophagus mite population by using specific acaricides, has failed repeatedly, due to the mites' capacity to quickly develop breeds resistant to usual acaricides. Knowing the control products that can be used, the active substances they contain and their mechanism of action is essential in preventing the resistance phenomenon and ensuring long term protection.

This paper presents and interprets data collected during 2008-2009, from the fruit farm Aiud and aims to improve the technology of eradicating tetranichid mites, by testing the biological efficacy of certain products with acaricide effect. The objective is to protect the apple orchards by maintaining the density of the mite populations below a critical level and to reestablish the biocenotic balance disturbed as a result of intensive pesticide treatments.

2. Material and Methods

The experiments were conducted in the Aiud fruit farm, on a 9-12 year old apple plantation, on which the following varieties are grown:Idared, Starkrimson, Jonathan and Florina. The trees are planted at 4x1m, respectively 4x2m, grafted on MM106. In establishing the optimal timing of treatment, the guiding elements were the evolution of phenological phases of maximum sensitivity of the host plant, dependent on the favourable climatic factors. The necessary climatic data were collected from the local meteorological station.

According to PED, the treatments were uniformly applied, using a water volume of 1000-1500 l/ha, in moments considered critical:

- treatment I, before blooming, or during the hatching of the winter eggs: Demitan 200 SC 0,06%,Torque 0,05% , Envidor 0,5%, Omite 57 E 0,1%, Sanmite 0,2%.

- treatment II, at the shaking of the petals: Demitan 200 SC 0,06%,Torque 0,05%, Envidor 0,5%, Omite 57 E 0,1%, Sanmite 0,2%

The warning period and the date of the treatments;

Year 2008 - treatment I 5.05; treatment II 14.06

Year 2009 - treatment I 25.04; treatment II 10.06

The inventory of the crown's useful entomofauna was done through the method of canopy threading. The observations made during the survey, explored the impact of the tested products upon the useful species(selectivity), compared to a standard product. The selectivity of the products for the useful entomofauna and the effect of the pesticide's toxicity on the useful entomofauna were determined based on mortality percentage recorded after applying the treatments.

3. Results and discussions

The mere presence of harmful mites in a culture does not mean that an intervention is necessary.

A review of the results showed that in order for the mite control to be successful, determining the optimal timing for the treatment is crucial. Establishing the correct timing for the treatment requires knowing and correlating all parameters of the biological, ecological and phenological factors from the orchard. Also, the level of risk that justifies applying the treatment (the financial threshold of the pest) must be determined.

The potential damage that can be caused by tetranichid mites, the species *Panonycus ulmi* and *Bryobia rubrioculus*, is mostly dependent on the incidence of the favorable climatic factors with the phases of maximum sensitivity of the host plant.

During the survey period 2008-2009, the climatic conditions were particularly favorable to the growth and multiplication of the tetranichid mite population, the species *Panonycus ulmi* and *Bryobia rubrioculus*.

The spring of 2008 (March-May) was characterized by a predominantly warm weather with average monthly air temperatures ranging from 6,4 up 16,3^{0}C. High values of the average monthly temperatures, between 4,4 – 16,3 ^{0}C were also registered during the spring of 2009. The absolute maximum air temperature was 28,9 ^{0}C / 10.05.2008 and 30,2 ^{0}C/ 19.05.2009 (tab.1). The first hatchings occurred in the second decade of April. Under these circumstances treatment I was applied in the first decade of May during the phenophase of pink button, in the moment of maximum hatching of the hibernating eggs. Compared to the untreated control, every 4 days after applying treatment I, the mite population levels dropped significantly in all the tested variants.

In 2008 the number of mites dropped from 10 individuals/leaf before treatment, to 1,5 individuals/leaf in the variant treated with Torque and 1,1 individuals/leaf in the variant treated with Envidor and Omite. In 2009, the density of mites/leaf decreased from 9,8 mites/leaf in the untreated control variant to 0,9 mites/ leaf in the variant treated with Sanmite and 0,2 individuals/leaf in the one treated with Demitan (fig. nr.1).

The summer period of 2008-2009 was characterized by drought and high temperatures with hot days, that have boosted the development of the tetranichid mites population. Under these circumstances, treatment II was applied after the shaking of the leaves, in the stage of the larvae hatching, the most susceptible stage to the action of acaricide substances. In 2008, within 4 days after applying the treatment, the density of mites decreased from 9,5 individuals/leaf before treatment, to 1,5 individuals/leaf in the variant treated with Sanmite and 0,5 individuals/leaf in the versions tested with Demitan and Envidor. In 2009, when comparing with the untreated control variant, the number of mites/leaf dropped from 8,8 mites/leaf to 0,9 mites/leaf in the version treated with Omite and 0,2 mites/leaf in the variants treated with Demitan and Envidor (fig.nr.2)

Compared with the untreated control, the effectiveness coefficient registered high values in all the tested variants. After comparing the products, no significant differences were observed. The effectiveness of the products ranged from 87,5% in the variant tested with Sanmite up to 99,99% in the version treated with Demitan.

The experiments have shown that the tolerance of the predators to a particular product is not uniform, it is influenced by the history and the intensity of the treatments. The tested products showed a high selectivity towards the useful entomofauna, present in the studied ecosystem (fig.nr.3). The selectivity of the Demitan and Envidor products was paricularly noted.

Among the studied species reported in the studied fruit ecosistema, the most active antagonists of the mites species *Panonycus ulmi* and *Bryobia rubrioculus* belong to the *Phytoseiidae* Family, the species: *Thyphlodromus pyrii (Sheuten), Phytoseiului persimilis, Kampimodorus aberrans (Oudemans) Amblyseius aberrans,* and to the Coccinellidae Family, the species *Stethorus bifidus.*

4. Conclusions

In the fruit- growing ecosystem Aiud, the tetranichid mite species *Panonycus ulmi* and *Bryobia rubrioculus,* can cause significant damage to the apple orchards, especially during drought years. A review of the results showed that for a successful mite control determining the optimal timing for treatment application, is crucial in achieving a high efficiency. Compared to the untreated control, the effectiveness coefficient registered high values in all the tested variants.The potencial danger represented by the tetranichid mites, the species *Panonycus ulmi* and *Bryobia rubrioculus* is dependent on the incidence of the favorable climatic factors with the phases of maximum sensitivity of the host plant.The Phytoseid mites play an important part in reducing the pest populations and reestablishing on a natural way, the biocenotic balance disturbed as a result of the intensive treatments with pesticides.

5. References

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Tables and figures

Table 1. Climatic data, years 2008-2009 (March – September)

Month	Air temperature ºC							
	2008				2009			
	Average	Min.	Max.	Rainfall	Average	Min.	Max.	Rainfall
III	6,4	-4,0	17,1	31,5	4,4	-6,2	17,5	30,1
IV	11,4	2,5	23,5	69,0	13,0	1,0	23,2	11,3
V	16,3	4,4	29,5	78,3	16,3	1,6	30,2	33,1
VI	21,1	9,5	32,0	100,8	19,0	5,6	32,0	98,4
VII	21,5	9,5	33,6	105,5	21,1	10,0	34,0	51,5
VIII	22,0	9,0	34,0	22,7	20,8	12,0	34,4	42,9
IX	14,9	2,0	35,0	62,1	17,0	6,0	33,2	0

Table 2. The effectiveness of the products used in controlling the tetranichid mites from the apple orchards of SCDVV Blaj, nursery Aiud, in 2008

Product	Concentration %	Effectiveness %			
		Treatment I		Treatment II	
		After 4 days	After 10 days	After 4 days	After 10 days
Sanmite	0,20	89,5	93,4	91,0	96,2
Torque	0,05	90,2	94,4	90,8	93,2
Demitan	0,06	93,4	97,9	95,3	96,9
Omite	0,10	90,0	95,4	92,2	95,0
Envidor	0,50	89,3	93,2	90,4	96,2

Table 3. The effectiveness of the products used in controlling the tetranichid mites from the apple orchards of SCDVV Blaj, nursery Aiud, in 2008

Product	Concentration %	Effectiveness %			
		Treatment I		Treatment II	
		After 4 days	After 10 days	After 4 days	After 10 days
Sanmite	0,20	87,5	94,4	91,9	97,2
Torque	0,05	91,2	95,4	95,8	98,2
Demitan	0,06	92,4	97,0	97,3	99,9
Omite	0,10	90,0	95,8	95,2	94,0
Envidor	0,5	88,3	92,2	94,4	95,2

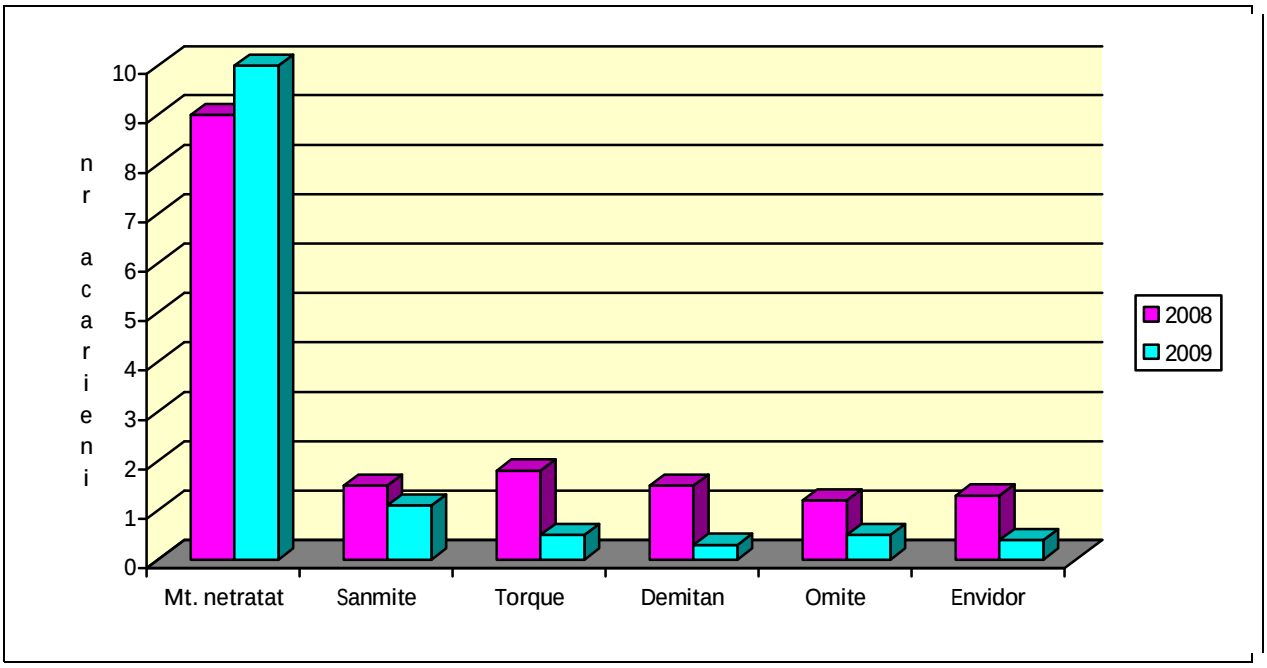

Fig. 1. The level of mite population after applying the treatment in the phenophase of treatment

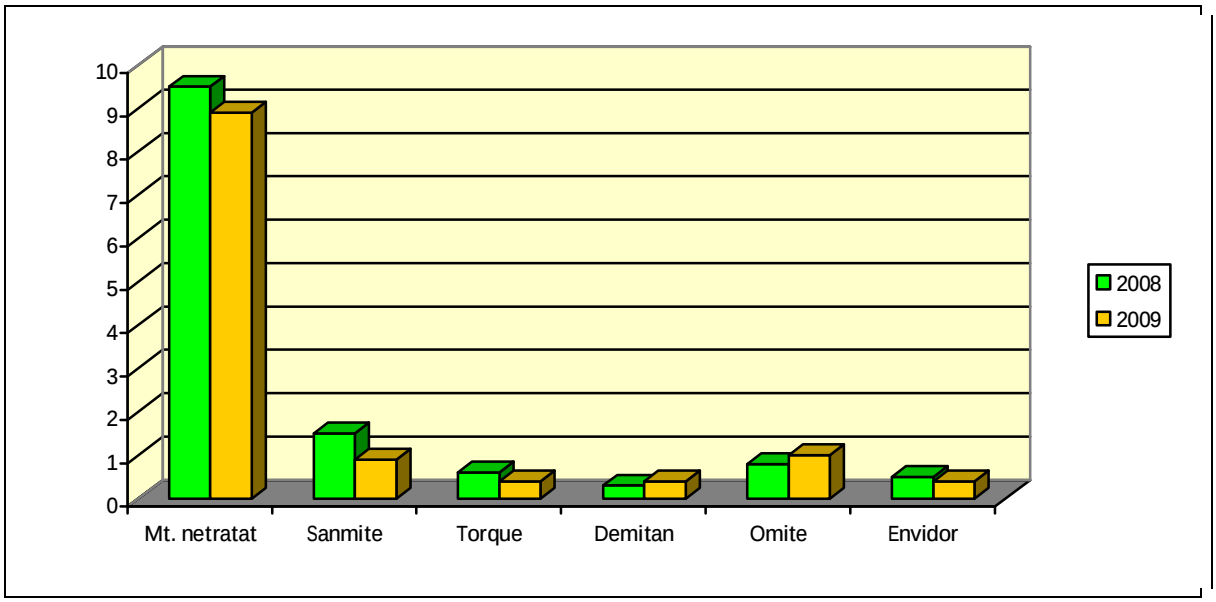

Fig. 2. The level of mite population after applying the treatment in the phenophase of treatment II