ORIGINAL PAPERS

THE STUDY ON ATTACKS AND CONTROL OF APHIDS IN ORGANIC TOMATO AND BEANS

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Key words: *black beans aphid, foxglove aphid, potato aphid, green peach aphid, control*

INTRODUCTION

Some aphid species cause severe loss to many species of vegetable crops (Maria Calin, 2005).
Black beans aphid is a important pests for beans. The aphids: *Aulacorthum solani* (Kaltenbach) - foxglove aphid, *Macrosiphum euphorbiae* (Thomas) - potato aphid, and *Myzus persicae* (Sulzer) - green peach aphid are major pests of tomato.

Aphids have fascinating and complex life-cycles, comprising of several different forms and numerous generations each year (ARKive, 2010).

They are polyphagous species of pest which attacks more than 200 woody species (ornamental shrubs, represent the primary hosts) and herbaceous plants (celery, beanss, broad beanss, poppy, sugar beets, etc., potato, tomato, which are secondary hosts).

Black beans aphid, and aphid of tomato feeds by sucking sap from the shoots tissue and forming colonies on flowers, pods and on the underside of leaves (Godfrey et all., 2005; Pest Management Center, 2010; Rothamsted Insect Survey, 2010, Calin 2005).

The attack cause wrinkling, discoloration and dried of leaves and plants give low yields.

This pest is very dangerous for seed crops, because is pest vector of viruses at beanss, sugar beets, tomato, potato, etc. (Maria Calin, 2005).

Parasites of the species: *Trichogramma evanescens* Westw., *Aphelinus* sp., *Praon dorsale* Hal., *Lisiphlebus fabarum* Marsh., *L. ambiguus* Hal., *Trioxys angelicae* Hal. are very good efficiency in decrease of *Aphis fabae* populations.

Predator as: *Coccinella septempunctata* L., *Hippodamia variegata* L., *Adalia bipunctata* L., *Syrphus* sp., *Leucopis griseola* T., *Chrysopa carnea* Steph. *C. perla* L., have a very good control in aphid populations.

Cultivation of umbeliferes and composites, green manure and plant species that covers all the soil (cereals, grasses herbs, *Phacelia tanacetifolia* Benth., etc.) create the places of refuge for useful fauna and sources of food during flowering plants.

Natural enemies not eradicate all eggs or larvae of aphids, but may reduce infestations to below economic threshold if predators and parasitoids are not disrupted by broad-spectrum insecticides.

The amount of disruption that insecticides cause to natural enemy activity varies depending on which chemicals are used and which natural enemies are active.

Usualy the aphid populations still increased because were applied large amounts of insecticides which kill their natural enemies, created insecticide resistance in pest populations and affected nutritional and bioclimatic factors in host plants (Calin, 2005).

Our research focused on monitoring the attack and control of this pest at beanss and tomato.

MATERIAL AND METHODS

During 2004 – 2015 years, open field experiments were performed in Vegetable Research-Development Station Bacau - Romania, a in order to monitoring and evaluate the attack of *Aphis fabae* in climbing beanss, Aulacorthum solani (Kaltenbach), *Macrosiphum euphorbiae* (Thomas), *Myzus persicae* (Sulzer) in tomato.

The observations were accomplished every 10 days during a first decade of May to first decade of September in Conventional agriculture (CO) and organic agriculture (OA).

The attack estimation was determined using the following indicators:

- Frequency of attack (F%),
- Intensity of attack (I%),
- Degree of attack (DA%).

The results obtained will be use in control of pests in order to decrease the number of treatments in the organic and conventional agriculture of gardens and increase of parasite and predatore populations of vegetable pests.

The folowing insecticides with foliar applied, were evaluated for economic aphid control:
V1 - NeemAzal-T/S - 0,5%
V2 - 75 Neem Oil - 0,5 %
V3 - Diatect V - 13,58%
V4 - Diatect, V - 0,3 %
V5 - Entomax - 0,15 %
V6 - Entomx – 0,1 %

V7 - Untrated

Efficacy was calculated 7 days after the treatment, according to the Sun-Shepard method.

Assessments were also made on fitotoxicity, crop development and visible residues.

Treatment technique: spraying till run-of (1 000 l/ha in tomato, 1 720 l in climbing beans) with Guarany sprayer;

Crop and cultivar: climbing beans – Auria Bacaului, tomato: Siberian and Ace Royal varieties.

Soil type: alluvial medium advanced;

Plot size: 5 m x 1,4 m (40 plants per plot).

RESULTS AND DISCUSSIONS

Our observations revealed the identification of beans aphid since May on weeds and vegetable.

The attack comes in June on climbing beans and continues until the maturity seeds of this species (Table 1).

Table 1.The attack degree of aphids

Month and decade	Attack		
	F%	I %	DA%
Phaseolus vulgaris L. (climbing beans)			
June the second decade	0.2	0.1	0.1
June the third decade	0.9	0.1	0.1
July the first decade	1.5	0.2	0.1
July the second decade	2.3	4.5	0,1
July the third decade	3.6	6.9	0.2
August the second decade	3.6	5.8	0.2
August the third decade	3.6	4.7	0.2
August the first decade	3.6	4.3	0.2
September the second decade	3.6	2.5	0.1
Lycopersicon esculetum Mill. (tomato)			
April the third decade	21,4	16,3	3,5
June the second decade	0,1	0,1	0,1
June the third decade	0,4	0,1	0.1
July the first decade	0,1	0,1	0,1
July the second decade	1,2	0,6	0,1
July the third decade	2,9	1,5	0,1
August the first decade	4,2	7,5	0,3
August the second decade	5,6	8,2	0,5
August the third decade	0,1	0,1	0,1
August the first decade	0,1	0,1	0,1
September the second decade	0,1	0,1	0,1

F% - frequency of attack, I% - intensity of attack, DA% - degree of attack (%)

In August climatic conditions were favorable for pests with a high temperature and low humidity.

The aphid attack in climbing beans began in second decade of June, frequency of attack being 0.2 %. From the end of July to August it had reached 3.2%. The intensity of the attack in climbing beans was also low, ranging between 0.1 and 6.9%.

The degree of aphid attack not exced 0,2%.

The aphid attack in tomato had frequency ranges between 0,1 – 21,4%. The intensity of attack was higher in third decade of April – 16,3%, in seedling stage. The degree of attack was under 3,5%.

The efficacy of sprayed insecticides against black beans aphid is shoved in Table 1.

Table 1. The efficiency of insecticides against black beans aphid

No.	Plot	Efficacy (%) after 7 days
1	NeemAzal-T/S - 0,5%	94,9
2	75 Neem Oil - 0,5 %	95,2
3	Diatect V - 13,58%	93,6
4	Diatect, V - 0,3 %	91,1
5	Entomax - 0,15 %	95,8
6	Entomx – 0,1 %	91,2
7	Martor netratat	x

It can be seen that the effectiveness of the products: NeemAzal-T / S - 0.5%, 75 Neem Oil - 0.5% Diatect V - 13.58% Diatect, V - 0.3%, Entomax - 0.15% Entomx - 0.1% were very good, being above 90.1%. Diatect V product we recommend to use in concentration of 0.3%.

The number of aphides decreased strongly after 3, 5 and 7 days after treatment of insecticides (fig. 1). Treatment was significantly different to the untreated.

The insecticide effect of plot was very good against black beans aphid. The surviving aphides in the treated plot were very small.

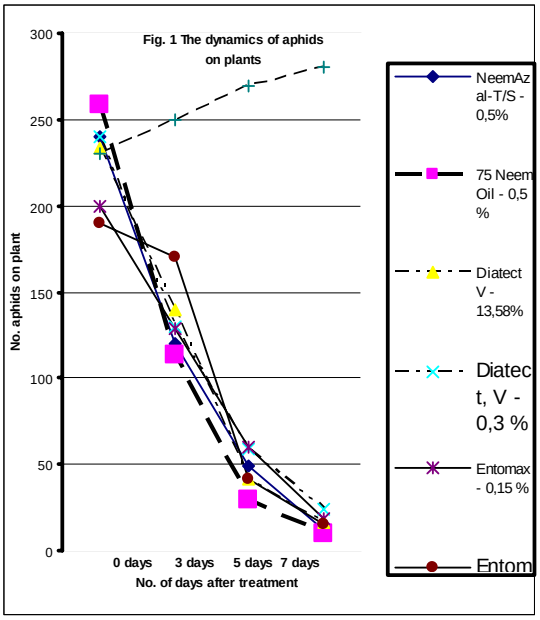

Fig. 1. The dinamic of aphids on plants

The efficacy of sprayed insecticides against tomato aphid is shoved in Table 2.

Table 2. The efficiency of insecticides against tomato aphids

No.	Plot	Efficacy (%) after 7 days
1	NeemAzal-T/S - 0,5%	92,9
2	75 Neem Oil - 0,5 %	93,1
3	Diatect V - 13,58%	94,2
4	Diatect, V - 0,3 %	89,5
5	Entomax - 0,15 %	92,8
6	Entomx – 0,1 %	90,1
7	Martor netratat	x

The data presented show that the efficacy of: NeemAzal-T / S - 0.5%, 75 Neem Oil - 0.5% Diatect V - 13.58% Diatect, V - 0.3%, Entomax - 0.15% , Entomx - 0.1% was above 89.5%, in downward dynamics of aphid populations in untreated variant (Fig. 2).

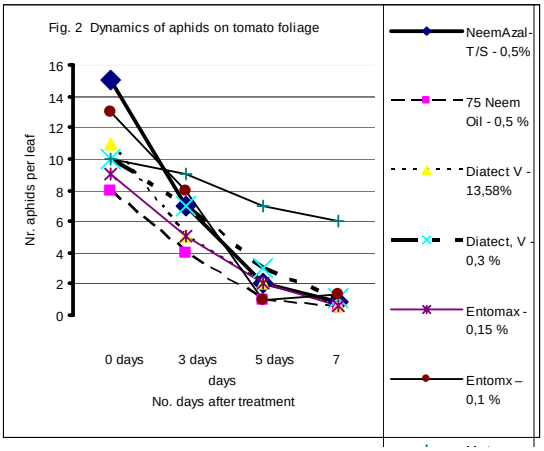

Fig. 2. Dinamics of aphids on tomato foliage

CONCLUSIONS

The beans aphid was identification since May on weeds and vegetable.

The attack comes in June on climbing beans and continues until the maturity seeds of this species.

In August climatic conditions were favorable for pests with a high temperature and low humidity.

The aphid attack in climbing beans began in second decade of June, frequency of attack being 0.2 %. From the end of July to August it had reached 3.2%. The intensity of the attack in climbing beans was also low, ranging between 0.1 and 6.9%. The degree of aphid attack not exced 0,2%.

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