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THE BEHAVIOR OF SOME PLANT SPECIES TO ATTACK OF BLACK BEAN APHID

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INTRODUCTION

Some aphid species cause severe loss to many species of vegetable crops (Maria Calin, 2005).

Black bean aphid is an important pests for many cultivated and wild plant species. Aphids have fascinating and complex life-cycles, comprising of several different forms and numerous generations each year (ARKive, 2010). It is a polyphagous species of pest which attacks more than 200 woody species (ornamental shrubs, represent the primary hosts) and herbaceous plants (celery, beans, broad beans, poppy, sugar beets, etc., which are secondary hosts).

Black bean aphid, feeds by sucking sap from the shoots tissue and forming colonies on flowers, pods and on the underside of leaves (Godfrey et al., 2005; Pest Management Center, 2010; Rothamsted Insect Survey, 2010). The attack cause wrinkling, discoloration and dry of leaves, the pods remain low and give low yields. This pest is very dangerous for seed crops, because is pest vector of viruses at beans, sugar beets, 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. have 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 the flowering time of plants.

Natural enemies not eradicate all eggs or larvae, 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 large amounts of insecticides were applied, insecticids which kill their natural enemies, creating insecticide resistance in pest populations and affecting nutritional and bioclimatic factors in host plants (Calin, 2005).

Our research focused on monitoring the attack of this pest at vegetables and weed species from gardens.

MATERIAL AND METHODS

During 2012 – 2015 years, open field experiments were performed in Vegetable Research-Development Station Bacau - Romania, in order to monitor and evaluate the attack of *Aphis fabae* vegetable crops and weed species.

The aphid attack was detected and monitored at the following species of:

- vegetables: *Phaseolus vulgaris* L., *Levisticum officinale* L., *Spinacea oleracea* L.
- weed species: *Chenopodium album* L., *Cirsium arvense* (L.), Scop., *Cichorium intybus* L. weed.

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 used 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.

RESULTS AND DISCUSSIONS

Our observations revealed the identification of aphid since May on weeds and vegetable. The attack comes in May on spinach and lovage, in June on climbing bean and continues until the maturity seeds of these species (Table 1).

Table 1. The attack frequency,intensity and degree of aphids

Month and decade	Attack		
	F%	I %	DA%
1	2	3	4
Spinacea oleracea L.			
May the first decade	2.5	20.4	0.5
May the second decade	4.2	30.9	1.3
May the third decade	6.2	28.6	1.8
June the first decade	6.2	15.4	1.0
June the second decade	6.2	4.3	0.3
June the third decade	8.1	7.5	0.6
July the first decade	15.2	7.6	1.2
July the second decade	15.2	4.3	0.7
July the third decade	15.2	2.1	0.3
Levisticum officinale L. in CA			
May the first decade	0.1	0.1	0.1
May the second decade	1.5	10.3	0.2
May the third decade	3.9	12.4	0.5
June the first decade	5.2	13.5	0.7
June the second decade	5.2	15.6	0.8
June the third decade	5.2	10.3	0.5
July the first decade	5.2	6.3	0.3
July the second decade	5.2	1.5	0.1
July the third decade	5.2	0.2	0.1
May the first decade	0.1	0.1	0.1
May the second decade	1.5	10.3	0.2
May the third decade	3.9	12.4	0.5
June the first decade	5.2	13.5	0.7
June the second decade	12.5	15.6	2.0
June the third decade	12,5	10.3	1.3
July the first decade	12,5	6.3	0.8
July the second decade	12,5	1.5	0.2
July the third decade	12,5	0.2	0.1
Levisticum officinale L. in OA			
May the first decade	0.1	0.1	0.1
May the second decade	0.1	0.1	0.1
May the third decade	1.8	2.9	0.1
June the first decade	2.0	8.4	0.2
June the second decade	8.1	12.5	1.0
June the third decade	8.1	9.3	0.8
July the first decade	8.1	8.6	0.7
July the second decade	8.1	5.2	0.4
July the third decade	8.1	1.7	0.1
Phaseolus vulgaris L. (climbing bean)			
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
July the second decade	3.6	2.5	0.1
July the third decade	3.6	1.6	0.1

F% - frequency of attack, I% - intensity of attack, DA% - degree of attack (%), CA - conventional agriculture, OA - organic agriculture

Climatic conditions with a high temperature and low humidity were favorable for pests. The aphid attack in spinach ranges between 2.5 - 15.2%. The intensity of attack was higher in second decade of May - 30.9%. The degree of attack was under 1.8%.

The frequency of aphid attacks in lovage was higher in conventional agriculture, ranging between 0.1 % and 12.5%. In the Jun and July the F% was the highest - 15.2%. Climatic conditions (summer rains rushed), parasites and predators from colonies of aphids decreased the intensity of pests attack from 15.6% to 0.2%. In organic agriculture the frequency of aphid attack was less, ranging 0.1% and 8.1%. The intensity of aphid attack was lower (0.1 - 12.5%) compare with conventional agriculture attack, due to the higher number of parasites and predators from aphid colonies.

The aphid attack in climbing bean 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 bean was also low, ranging between 0.1 and 6.9%.

The intensity, frequency and degree of aphid attack were very high on the weeds in May (fig. 1, 2 and 3).

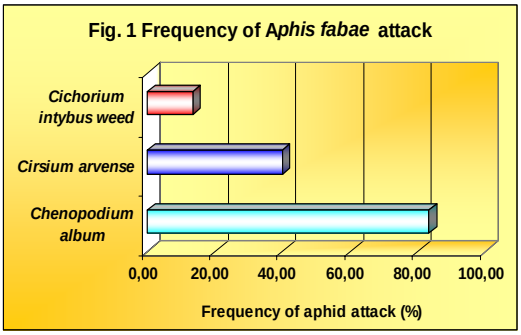

Fig. 1. Frequency of *Aphis fabae* attack

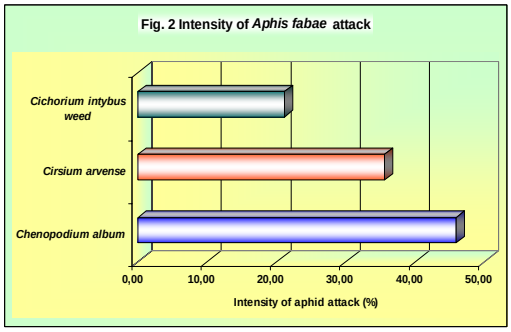

Fig. 2. Intensity of *Aphis fabae* attack

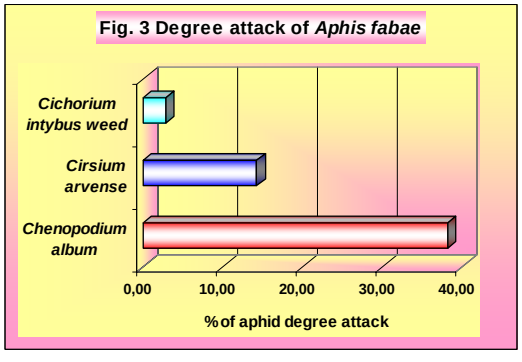

Fig. 3. Degree attack of *Aphis fabae*

It can be seen the *Chenopodium album* had the highest frequency, intensity and degree of aphid attack.

Cirsium arvense had a lower intensity a degree of aphid attack.

Cicorium intybus had the lowest aphid infestation.

CONCLUSIONS

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

The attack comes in May on spinach and lovage, in June on climbing bean and continues until the seeds maturity of these species.

The aphid attack in spinach ranges between 2.5 - 15.2%. The intensity of attack was higher in second decade of May - 30.9%. The degree of attack was under 1.8%.

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The intensity, frequency and degree of aphid attack were very high on the weeds.

The *Chenopodium album* had the highest frequency, intensity and degree of aphid attack.

Cirsium arvense had a lower intensity a degree of aphid attack.

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ABSTRACT

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