STUDY REGARDING THE EFFICIENCY OF SOME CONTROLLING METHODS ON COLORADO POTATO BEETLE AT THE POTATO

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Abstract: *Knowing for the first time Colorado beetle, Leptinotarsa decemlineata (Say) (Coleoptera: Chrysomelidae), as being a dangerous pest of potatoes cultures by Edgerton, (1861) it had an profound effect on the employees engaged in investigation and agricultural production (farmers). That insect contributed to the first time in usage of the insecticides on agricultural culture, that meant it stimulated a easily and successfully usage of the applications on a large scale also to the others cultures.Over 80 years the Colorado beetle was controlled with success by the insecticides, influencing agricultural generations to depend by that unilateral approach to manage that pest; but it existed some additional problems associated with the consequences of the insecticides usage on a large scale to control the Colorado beetle: the development to insecticides resistance, the cultures lost caused by an inappropriate pulverization, the costs of environment contamination, the costs of investigation to maintain efficient programs of controlling the beetle. Thus, the control with biological products was famous in the last years. In Romania relatively realized a few investigations about controlling the Colorado beetle with bio products. Taken in view all those quotes the present work proposed to test some insecticides and some bio product in controlling that pest from the potatoes cultures.The immediately practical usage of the investigation results sustained the proposed work. To realize the treatments with chemical and biological products in the year 2012, the experimental field was placed in Didactical Base of Timisoara USAB.In our investigations was tested the efficiency of some biological methods of control comparative with the one chemical. The experimental field was formed from 3 repetitions, every repetition with 4 variants. It were used the following products: V1- untreated species, V2- Calypso 480 SC, V3- Faster 10 CE, V4- extract of chilli.The chemical products tested had a good efficiency in controlling the beetle populations from the potato culture. Analyzing the results it could observe that the best efficiency in controlling the Colorado beetle had Calypso product 480 SC with a efficiency over 90%, followed by Faster 10 CE with a efficiency over 80%.The biologic insecticide used (the extract of chilli) had a lower efficiency (a little over 40%) in controlling the beetle. To conclude, the chemical products tested had a higher efficiency than the biological ones, and thus the contributions proposed regarding the biological insecticides usage to be used in practice would be completed and further improved.*

Key words**:** *Leptinotarsa decemlineata, biological controlling, chemical controlling*

INTRODUCTION

Colorado Potato Beetle was dangerous because of the culture damages. It choosed its controlling, all the more made possible the virus X (PVX) transmission so it could produce total damages, especially in continental climate.

In case of a quickly attack, it was possible crop losses from 50 to 80%, whereas at the late attack, those could arrive until 30%. If before it heard about losses only when more than 20-30% from the green quantity had been affected, today, the losses were registered also at 10% green broken quantity. (http://www.europlantromania.ro/files/gandac_colorado.pdf).

Surely, it existed, more fight methods against Colorado Potato Beetle from the potatoes culture, in general, tried by a lot of the ones who cultivated that crop. Surely, every potatoes cultivators, professional or non-professionals had his personal method, more or less conventional of controlling that pest.

Besides the fact that was hard to control, that species presented also very high prolificacy and multiple possibilities of spread. At the actual hour, to control that pest it was exclusive used only chemical methods. The chemotherapy besides the benefic effects presented, much disadvantages, alarming, fact that made the method, to be viewed with skepticism at least in its classical shape. (MORAR and collab., 2008).

Against chemical insecticides the beetle formed its resistance in a quickly way, especially against carbohydrates and phosphoric minerals, also against the phyrethorids. (http://www.europlantromania.ro/files/gandac_colorado.pdf).

As a alternative to the actual method of controlling (chemical) could be the establishment of a strategy of integrated cultures strategy for applying some natural extractions, extracts obtained from plants that presented insecticide effect. (MORAR and collab., 2008).

In as far as those products standardization was difficult and the content in active substance was variable, it appeared oscillation phenomena of biologic effectiveness. All those products had insecticide effect for a short time (products with beat effect) and didn't let residua. (MORAR and collab., 2008).

MATERIAL AND METHODS

Regarding the avoidance of treatment applying with chemical substances in controlling Colorado Potato Beetle, it was tested with success the method of potato splash with extract of chilli pepper. For chilli pepper infusion were used 10-20 pieces of chilli pepper which were parboiled with water and infused 12-24 hours. Afterwards the water diluted, it put solid soap (40 gr. at 10 liters) or liquid soap, and the solution bit better the leaf. (fig. 1.).

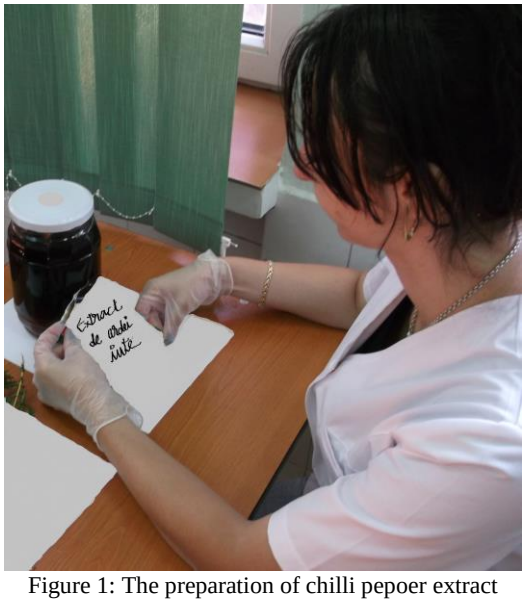

Figure 1: The preparation of chilli pepoer extract

The experiment was organized in the year 2012 to Didactical Base of USAB Timisoara from Timis district. On the experimental parcel planted rows potatoes to common distances and the experiences concerning the control of Colorado Potato Beetle from the potato culture were realized in three repetitions with four variants.

To emphasize the product with the best efficiency in controlling, it were used 3 variants: V_2-Calypso 480 SC-0,08 l/ha, V_3-Faster 10 CE-0,25 l/ha, V_4-chilli pepper extract, its effectiveness was compared with untreated control. For that were cropped samples before the treatment, after 24 h, 48 h, 72 h and 7 days from the treatments execution.

For treatment applying it used the pump ”Gardena” type applying a normal volum of solution (600 liters solution/ha). (fig. 2.).

Figure 2: The treatments made concerning the Colorado Potato Beetle controlling from the potato culture, Didactical Base of USAB Timisoara, 2012

For effectiveness evaluation proceeded to alive larva number in every variant, reporting to one number of treated plants. The effectiveness calculated after the fallowing formula:

$$E\% = 1 - \frac{n}{N} \times 100$$

in which:

n=the average number of larva/plant in the variant with treatment applying

N=the average number of larva/plant in the variant with untreated control

RESULTS AND DISCUSSIONS

It was fallowed the decrease of alive larva populations, after the different insecticide applying, after 24 h, 48 h, 72 h and 7 days from the treatments, and in base of data obtained it calculated the effectiveness coefficient of tested products (table 1.).

Table 1

The effectiveness of chemical and vegetal products in controlling Colorado Potato Beetle

Collecting the entomological material	No. of alive larva/plant				Effectiveness %		
	V_1- untreated specie	V_2- Calypso 480 SC	V_3-Faster 10 CE	V_4- chilli pepper extract	V_2- Calypso 480 SC	V_3-Faster 10 CE	V_4-chilli pepper extract
before the treatments	15.00	16.66	19.00	13.50			
24 hours after treatment	22.50	10.40	16.40	11.33	45.01	34.22	20.60
48 hours after treatment	26.66	6.50	13.80	8.75	74.20	45.66	34.90
72 hours after treatment	31.33	3.00	13.40	6.66	88.00	46.33	50.33
7 days after treatment	35.00	1.50	5.00	7.50	93.00	84.10	70.20

From fig. 3, it could observe that the number of beetles population considerable decreased after treatments applied.

At 24 hours after treatment execution to the variant treated with Calypso 480 SC the alive number of larva diminuished from 16.66 species alive, plant to 10.40 species species alive/plant.

To the same variant after 48 hours those number decreased to 6.50 alive larva/plant and after 72 hours had been registered only 3.00 alive larva/plant.

In the last day of data collecting, such as 7 days from the treatment execution the alive larva number/potato plant was very decreased as 1.50 species/plant.

In case of V_3 variant treated with Faster 10 CE it observed a decreasing of alive larva/plant from 19.00 species registered before the treatment to 16.40 species at 24 hours from the treatments execution, afterwards those number gradually decreased until 5 alive larva/plant in the 7th day of data collecting.

After vegetal product applying (chilli pepper extract) it observed that the alive larva number/ plant decreased from 11.33 species (at 24 hours from the treatment execution) to 7.50 species (at 7 days from the treatment execution).

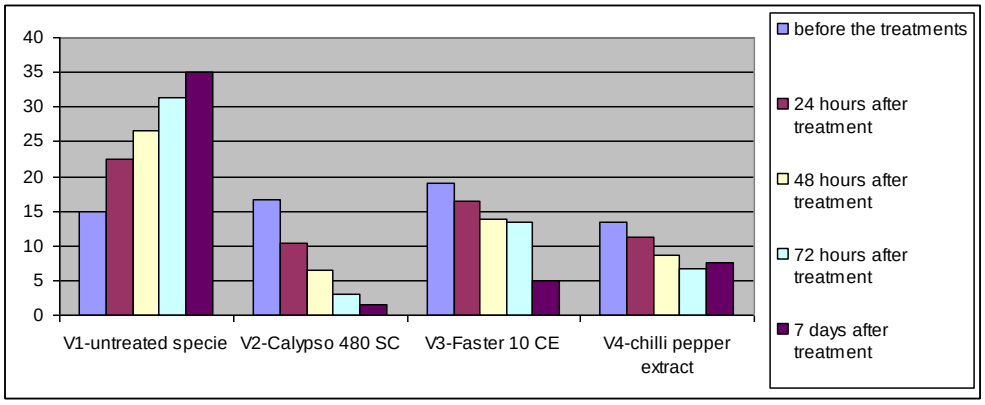

Figure 3: The influence of some insecticides on larva of Colorado Potato Beetle in the potato culture, Didactical Base of USAB Timisoara, 2012

In the variants treated with chemical insecticides was signaled a high effectiveness and over 80% (V_3-Faster 10 CE-84.10%), respectively 90% (V_2-Calypso 480 SC-93%).

The variant in which were used the vegetal extract obtained from chilli pepper, the treatment effectiveness in controlling the larva of Colorado Potato Beetle was over 70% (70.20%), the effectiveness which was comparable with the ones obtained with the help of synthesis insecticides. (fig. 4.).

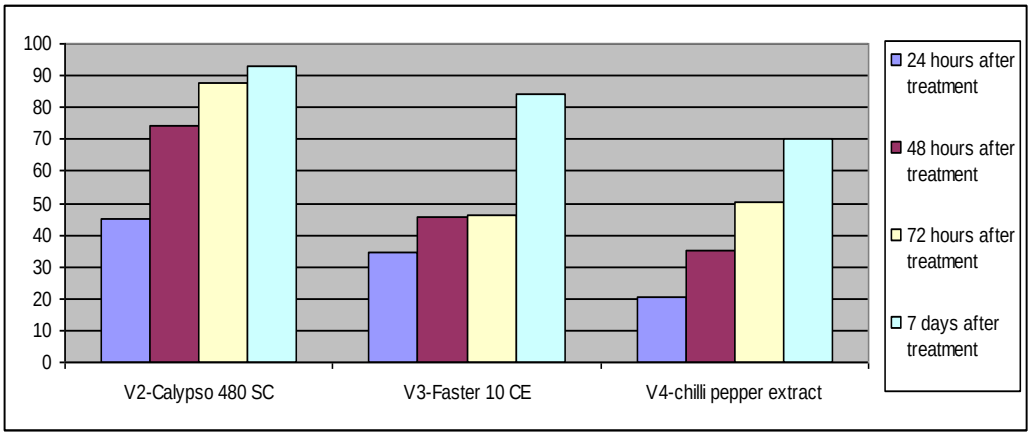

Figure 4: The effectiveness of some insecticides used in controlling Colorado Potato Beetle in the potato culture, Didactical Base of USAB Timisoara, 2012

The larva which had contact with the extract or consumed leaves treated and also the one that hatched after the treatment applying didn't survive; it was signaled the survive of larva age, that were on plants in the moment of treatment applying.

Larva of first age and also the one hatched after the treatment effectiveness were affected by the all three products tested.

The treatment effectiveness over 70% demonstrated the fact that through the treatment repetition it could obtain results in the cultures where it desired to obtain some ecological crop.

CONCLUSIONS

The biologic treatment effectiveness in controlling larva of 70.20% was comparable with the ones obtained with the help of synthesis insecticides.

After applying to those two chemical products, the biggest effectiveness registered in case of V_2 variant treated with Calypso 480 SC as 93.00% in report with the variant V_3 treated with Faster 10 CE with an effectiveness of 84.10%.

Vegetal extracts could constitute an alternative in controlling Colorado Potato Beetle inside the potato cultures, especially in the field where it supposed to be an ecological production.

That experiment could continue also by the others investigations to establish the best report of biologic insecticide necessary in controlling that pest also was very good to establish the efficiency of others biological products to be recommended in the potatoes cultures regarding the control of Colorado Potato Beetle.

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