TESTING LAMDEX 5 EC INSECTICIDE IN THE CONTROL OF THE COLORADO BEETLE

TESTAREA INSECTICIDULUI LAMDEX 5 EC ÎN COMBATEREA GÂNDACULUI DE COLORADO

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Abstract. *In the Republic of Moldova 80% of its territory is occupied by the agrarian sector. The climax conditions are favourable for cultivation of a rich spectrum of crops including those of the Solonaceae variety; potatoes, aubergines, tomatoes. The principal pest of the potatoes is the Colorado beetle. The adults ant their larvae consume up 80 % of plants foliage during the period of their development. The fregvency and high density cause the total defoliage of the plants and the considerable reduction of the harvest. The integral control of the Colorado beetle comprises a number of measures suchas: preventive, agrotechnical, biological and chemical. But the decisive role belongs to the chemical method. At present in the state register morethen 20 pests are homologated. Taking into account the utilisation of the chemical means the Colorado beetle becomes resistant that is why it is necessary to renew the chemical products and active substances in the chemical products and active substances in the control of this pest. For hedge reasons we suggested to test the insecticide Lamdex 5 EC for extending the scale of chemical products recommended for this insect.*

Keyword: *Leptinotarsa decemlineata* Say., test of Lamdex 5 EC

Rezumat. *Din cauza utilizării multiple a aceloraşi substanţe chimice, gândacul din Colorado capătă rezistenţă. Din aceste considerente, am testat insecticidul Lamdex 5 EC, cu scop de-a lărgi gama de produse chimice recomandate pentru această insectă. În anul de cercetare şi testare a produsului chimic Lamdex 5 EC, rezerva biologică a gândacului din Colorado a dezvoltat populaţii suficiente pentru testarea insecticidelor. Stadiul tratat chimic a fost cel de larvă, pentru care s-au întreprins 2 tratamente. Cel mai eficient s-a dovedit a fi preparatul Lamdex 5 EC în doză de 0,4 l/ha. Preparatul Lamdex 5 EC cu norma de consum 0,2 şi 0,3 l/ha, a asigurat eficacitatea biologică mult mai redusă decât etalonul. În baza cercetărilor şi testărilor efectuate, insecticidul Lamdex 5 EC, în doză de 0,4 l/ha, a fost propus pentru includerea în Registrul de Stat al Produselor de uz Fitosanitar şi al Fertilizanţilor.*

MATERIALS AND METHODS

The test of Lamdex 5 EC product was made in the centre of the Republic of Moldova, at the training farm “Petricani”. The experimental lot is situated on the East slope exposed to about 12 ^{o}. The black soil is sandy or clay sandy with a high contents of carbonates. Every plot had by four rows with the length of 10 m and the area made up respectively 28 m ^{2}. As a strip of protection between the lots they were reserved by a potatoes line. The total area of the plot made up approximately 700 m ^{2}. The direction of the lines was North-South.

In the tests were included five versions: three doses of the preparation Lamdex 5 EC – 0,2 l/ha, 0,3 l/ha was the standard and the witness. As a model served the insecticide Decis Forte – 0,06 l/ha. The experiments were effected in four repetitions under the established scheme. The placing of the plots on the compact randomised ground. The treatments were made manually with the portable watering can " Era -1".

RESULTS OF RESEARCHES

In the integrated system of control of the Colorado beetle, an important lot occupies the reduction of the number of hibernated adults as the further development of the populations depend on the biological reserve accumulated the previous year. Some of information sources mention that when the potatoes were planted in the early period they mange to form the foliage apparatus vigorous until the appearance of the hibernated adults, in this case the damage is superficially.

At the some time the hibernated adults in these periods are not enough active and the food consumption is reduced. In such cases the chemical treatment against the hibernated adults are not recommended and in the situation when the density of the hibernated adults is highly and the plantation was late it is recommended chemical treatments.

The appearance evidence of the hibernated phase began at the beginning of the ten-day period of April. In this period the daily average temperature is over 10^{o}C. The observation were effected daily until the going out of hibernation period of the first the adults, further a once a five days.

According to the obtained results it was remarked that the first hibernated adults appeared the 25 of April. The early appearance of the insect was influenced by the positive fluctuation of the temperature. Although the adults have appeared early the attack frequency during 35-40 days was reduced and at the end of the May the adults of the Colorado beetle attacked only 25-30% of plants. This space out is explained by the fact that beginning with the second ten day period of May and finishing with the first ten day period of June it is observed a negative fluctuation of the temperatures in comparison wit the long standing average.

The maxim value of the insect extension occurred the 9 of June and made up no more then 50 %, the beetle being distributed comparatively uniformly on all the area of the experimental lot. That is why they did not effect chemical treatments for the control of the hibernated adults. At the some time with the evidence of the hibernated adults they made observations on the clocks and larvae of the pests. In the results of the researches it was established that the first clocks were discovered the 17^{th} of May but the first larvae the 30^{th} of May. The first treatment was effected the 8^{th} of June on the discovering of L_3 and on the reaching of the damage limit.

The pest evidence was realised by accounting of the larvae and adults at 10 bushes of potatoes, situated on the central lines of the variant. For calculating

of the principal indexes of the biological efficiency the evidence of the numerical density had been affected before the treatment in 3 and 11 days after treatment.

The obtained results are exposed in the table 1, from which it is observed that before the treatment the middle density of the larvae potatoes shrubs made up from 11,3 till 13,3 models.

The treatment effect after three days P_3 presented high values of the standard preparation and of the tested alternative one. At witness the number of larvae increased with three models and made up at this period 15,0 copy. One must mentioned another aspect like this in the period between the first and the second evidence fell precipitation's the 12nd, 13 rd and 14th, of June. It happened in the fifth, sitcom and seventh day after the treatment. The precipitations were insignificant only 5,3 mm of these ones.

Table 1

The biological efficiency of the Lamdex 5 EC insecticide in the control of the Colorado beetle (I – treatment)

Nr. d/o of the models	The type	The middle density to 1 shrub of potatoes			Density after treatment in % in comparison with the initial after days		Reduction of the density with reference to the witness, % after days	
		before the treatment	After treatment, days					
			3	11	3	11	3	11
1.	Witness	12,0	15,0	22,0	125,0	183,3	0	0
2.	Standard, Decis forte (0,06 l/ha)	11,3	0	5,5	0	48,7	100	58,0
3.	Lamdex 5 EC (0,2 l/ha)	13,3	3,8	17,5	28,6	131,6	77,1	13,6
4.	Lamdex 5 EC (0,3 l/ha)	11,3	0	9,8	0	86,7	100	25,1
5.	Lamdex 5 EC (0,4 l/ha)	12,3	0	5,5	0	44,7	100	61,4
	DME la P_{05}						4,4	5,4

But it was sufficiently for diluting the preparation concentration. This diluting led to the further rising of the living larvae number in all the alternatives – living. For these reasons the third evidence was not effected after 14 days after, treatment but after 11 days so the 19th June. From the exposed results in the table it is noted the middle density of the larvae increased essentially in this period both at V_2 and at the standard. The rise made up 44,7% and 48,7% with reference to the initial one. At V_3 the average number of larvae bush constituted 17,5 samples whites with 4,2 samples more that before the treatment. In V_2 the middle density was also enough high and made up in this period in comparison with the initial one 86,7%.

For these reasons it was decided the treatment to be repeated the 19th of June. The evidence results are exposed in the table 2.

From the exposed results in the table we may conclude that in the third day after the treatment the larvae of the beetle of Colorado were discovered only in the V witness and V_3 the average density making up 24,5 and respectively 4,3 samples/bush.

At the evidence of the 11 th day after treatment we established that the living larvae had been in all cases. In V_3 there were discovered 16,8 larvae/bush. This index is only by 0,7 samples smaller than that one of the before the treatment and makes ap 96,0% of the initial density. A number comparatively bigger of larvae in this period – 7,0 models/bush – was discovered at the V4 too, the rise of the living larvae being of 71,4% with the reference to the initial density.

Table 2

The biological efficiency of the Lamdex 5 EC insecticide in the control of the Colorado beetle (I – treatment)

Nr. d/o of the models	The type	The middle density to 1 shrub of potatoes			Density after treatment in % in comparison with the initial after days		Reduction of the density with reference to the witness, % after days	
		before the treatment	After treatment, days					
			3	11	3	11	3	11
1.	Witness	22,0	24,5	31,3	111,4	142,3	0	0
2.	Standard, Decis forte(0,06 l/ha)	5,5	0	0,5	0	9,1	100	91,9
3.	Lamdex 5 EC (0,2 l/ha)	17,5	4,3	16,8	24,6	96,0	77,9	14,1
4.	Lamdex 5 EC (0,3 l/ha)	9,8	0	7,0	0	71,4	100	36,1
5.	Lamdex 5 EC (0,4 l/ha)	5,5	0	0,8	0	14,5	100	87,0
	DME la P_{05}						3,8	5,0

In $V_{witness}$ the leaves of the plants were consumed totally. The biological calculation gave us the possibility to establish that both after the treatment I and after the II^{-nd} the greatest results were obtained in V_3. Comparing the obtained results in V_5 with $V_{standard}$ it you may observe an essential deviation. In V_4 it was obtained efficiency comparatively bigger only in the first seven days after the treatment. But comparing V_4 with $V_{standard}$ and V_5 it is observed an essential deviation.

This difference is bigger in the evidence after 11 days. The perspective of the pesticide year is reflected in the economical efficiency witch is based on the indexes such as, the harvest and its quality, the surplus to the obtained yield after the application of plant protection methods and others. The results of the harvest of harvest of potatos are exposed in the table 3.

Table 3

The calculations of the yield in the experimental lot

Nr. d/o of the models	The type	The norm of compptio n, l/ha	The midlle quntity of potatoes at one parcel kg	Yeld at 1 ha q/ha	The real addition after using of insecticides, q/ha
1.	Witness	0	250,0	89,7	0
2.	Standard, Decis forte	0,060	689,0	246,1	156,4
3.	Lamdex 5 EC	0,2	276,6	98,8	9,1
4.	Lamdex 5 EC	0,3	314,9	112,5	22,8
5.	Lamdex 5 EC	0,4	685,3	244,8	155,1
	DME la P_{05}				4,9

From the exposed results in the table it is noted that the best results were obtained in V and $V_{standard}$ were the yield was 244,8 and 246,1 q/ha, that is of 2,5 times higher than in $V_{witness}$. Comparing these types we can mention that it is obtained an insignificant increase of yield of 1,3 q/ha.

The treatment of the potatoes with Lamdex 5 EC 0,2 l/ha provides a rise of the harvest with the reference to the witness by 9,1 and 22,8 q/ha, respectively of 17,2 and 6,9 times less than at $V_{standard}$.

CONCLUSIONS AND RECOMMENDATIONS

1. In the year of growth and testing of the chemical product Lambedx 5 EC – the biological reserve of the Colorado beetle developed sufficient populations for the insecticide test.

2. Due to the positive deviations of the average temperatures in March-April, it was established an earlier appearance of the hibernated adults.

3. Although the appearance of the adults was early, they did not effect chemical measures of control, as the frequency of the pests had not overtaken 50%.

4. The stage subjected to chemical treatments was the larva one for which they made two treatments, the most efficient was the preparation Lamdex 5 EC in the dose of 0,4 l/ha.

5. The preparation of Lamdex 5 EC with the consumption norm of 0,2 and 0,3 l/ha provided a biological efficiency much more reduced than the standard.

6. The insecticide Lamdex 5 EC in the dose of 0,2 an 0,3 l/ha submits to the standard at the yield surplus of 17,2 and 6,8 times.

7. On the basis of effected researches and the dose of insecticide Lamdex 5 EC in the dose of 0,4 l/ha was proposed for including in the state Register of the products of Phytosanitary use and of the fertilisers against the Colorado beetle.

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