RESEARCH ON THE IMPACT OF THE FOLIAR BIO-FERTILISER BIONAT PLUS ON POTATO RESISTANCE TO THE ATTACK BY THE COLORADO BEETLE (*LEPTINOTARSA DECEMLINEATA*) AND ON POTATO YIELD IN THE BANAT HILL AREA

CERCETĂRI PRIVIND INFLUENȚA BIOFERTILIZANTULUI FOLIAR BIONAT PLUS ASUPRA REZISTENȚEI PLANTELOR DE CARTOF LA ATACUL GÂNDACULUI DE COLORADO (*LEPTINOTARSA DECEMLINEATA*) ȘI ASUPRA PRODUCȚIEI DE CARTOF ÎN ZONA COLINARĂ A BANATULUI

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Abstract: *The goal of our research was to monitor the effect of the foliar bio-fertiliser Bionat Plus on potato yield and the increase of plant resistance to the attack by the Colorado beetle (Leptinotarsa decemlineata) as a result of stimulating plant vegetative growth and of the repellent effect of the preparation. This is just the beginning of such research in the field, through which we try to apply simultaneously warned phyto-sanitary treatments and foliar bio-fertiliser complexes. The trial was set on a potato crop – the Ostara cultivar from the Almaj Valley (Caras-Severin County) – in two variants and a control. In variant I we used the foliar bio- fertiliser Bionat Plus together with pesticides in doses of 2 l/ha in the first treatment and 3 l/ha in the second treatment. In variant II, we applied all 3 warned chemical treatments with no bio-fertiliser. The yield increase in the first variant was 3500 kg/ha compared to the second variant (treated with pesticides only), and the percentage of chemical treatment reduction was 33.3%. In the first treatment we no longer applied treatment 3, since by applying the two chemical treatments together with the foliar bio-fertiliser Bionat Plus, the attack by the Colorado beetle was below the economic damage threshold.*

Rezumat: *Scopul cercetărilor a fost urmărirea efectului biopreparatului foliar Bionat Plus asupra producţiei de cartof, cât şi a creşterii rezistenţei plantelor la atacul gândacului din Colorado (Leptinotarsa decemlineata), datorită stimulării creşterii vegetative a plantelor şi a efectului repulsiv al biopreparatului. Este un început în acest domeniu prin care se încearcă aplicarea concomitentă la tratamentele fitosanitare avertizate în complex cu biofertilizanţi foliari. Experienţa s-a amplasat într-o cultură de cartof, soiul Ostara din Valea Almajului, Caraş – Severin, în două variante şi un martor netratat. În varianta I-a s-a folosit Bionat Plus în complex cu pesticide, în doză de 2 l /ha la primul tratament şi 3 l /ha la tratamentul 2. În varianta II-a s-au aplicat toate cele 3 tratamente chimice avertizate, fără biofertilizant.*

Sporul de producţie realizat în varianta I-a cu biofertilizant foliar a fost de 3500 kg /ha faţă de varianta II-a tratată numai cu pesticide, iar procentul de reducere a tratamentelor chimice a fost de 33,3%. În varianta I nu s-a mai aplicat tratamentul 3, deoarece prin aplicarea celor două tratamente chimice în complex cu BIONAT PLUS, atacul gândacului din Colorado a fost sub pragul economic de dăunare (PED).

Key words: *foliar bio-fertiliser, treatments, production, effect*
Cuvinte cheie**:** *biofertilizant foliar, tratamente, producţie, efect*

INTRODUCTION

Potato, a plant originating from the New World, is one of the most important human achievements. Potato production is largely influenced not only by soil and climate conditions, but also by fertilisation with organic and chemical fertilisers and with foliar bio-fertilisers.

Research aimed at monitoring the effect of the foliar bio-fertiliser Bionat Plus on both potato yield and plant resistance increase to the attack by the Colorado beetle (*Leptinotarsa*

decemlineata Say.) due to the stimulation of the plant vegetative growth and to the repellent effect of the bio-preparation. This is but a beginning in the field, by which we try to apply simultaneously warned phyto-sanitary treatments, recommended pesticides, and foliar bio-fertilisers.

MATERIAL AND METHOD

The trial was set after the randomised block method with two variants treated with 4 replications, each variant and a control, on a potato crop (the Ostara cultivar) in the Almaj Valley (at Iablanița, Caraș- Severin County).

In the variant treated with pesticides and with the foliar bio-fertiliser Bionat Plus, we applied two treatments when finding 8 adults of *Leptinotarsa decemlineata* on 10 plants in treatment 1 and 9.3% plants attacked by this pest in treatment 2. the products we used were as follows: T1 – Mospilan 20 SP – 0.08 kg/ha, Dithane M-45 – 2.0 kg/ha, Bionat Plus – 2.0 kg/ha, T2 – Regent 200 SC – 0.1 l/ha, Dithane M-45 – 2.0 l/ha, Bionat Plus – 3 l/ha.

In the second variant treated with pesticides only, we applied 3 treatments, when finding 8 adults on 10 plants in the treatment 1, 11.7% plants attacked in treatment 2 and 8.3% plants attacked in treatment 3, using the pesticides: T1 – Mospilan 20 SP – 0.08 kg /ha, Dithane M-45 – 2.0 kg/ha, T2 – Regent 200 SC – 0.1 l/ha, Dithane M-45 – 2.0 l/ha, T3 – Actara 25 WG – 0.06 kg/ha, Dithane M-45 – 2.0 l/ha.

RESULTS AND DISCUSSION

Results obtained are presented in Tables 1-3.

Table 1

Results in variant I after application of pesticides and of the foliar bio-fertiliser Bionat Plus to control the Colorado beetle and the late blight of potato

Number of variant	Date of treatment application	Products used	Dose (kg/ha)	Attack level	Yield Replication (kg/ha)	
V-1.	**T1 – May 25, 2007**	Mospilan 20 SP	0.08 kg/ha	8 adults per 10 plants (bush)	**R I**	**18.500**
		Dithane M-45	2.0 kg/ha		**R II**	**18.900**
		Bionat Plus	2.0 kg/ha		**R III**	**18.800**
	T2 – June 9, 2007	Regent 200 SC	0.1 l/ha	9.3% plants attacked	**R IV**	**18.600**
		Dithane M-45	2.0 kg/ha			
		Bionat Plus	2.0 kg/ ha		**X**	**18.700**
CONTROL						**4100**

In variant I, as a result of applying the two treatments in which pesticides were applied together with the foliar bio-fertiliser Bionat Plus 2 l/ha in the first treatment and 3 l/ha in the second treatment, we obtained an average production of 18,700 kg/ha, and attack frequency by the Colorado beetle diminished to 0.7% of the bushes attacked (below the economic damage threshold) a third warned treatment being not necessary.

Table 2

Results in variant II without the foliar bio-fertiliser Bionat Plus

Number of variant	Date of treatment application	Products used	Dose (kg/ha)	Attack level	Yield Replication (kg/ha)	
V-2.	**T1 – May 25, 2007**	Mospilan 20 SP	0.08 kg/ha	11.7% plants attacked 8.3% bushes attacked	**RI**	**15.500**
		Dithane M-45	2.0 kg/ha		**RII**	**14.900**
	T2 –September 9, 2007	Regent 200 SC	0.1 l/ha		**RIII**	**15.100**
		Dithane M -45	2.0 kg/ha		**R IV**	**15.300**
	T3 – June 23, 2007	Actara 25 WG	0.06		**X**	**15.200**
		Dithane M -45	2.0			
CONTROL					**4100**	

In the second variant, we did not apply the foliar bio-fertiliser Bionat Plus, and we obtained an average production of 15,200 kg/ha, while the attack frequency by the Colorado beetle after the third treatment was 0.5% (below the economic damage threshold).

Table 3 shows the synthesis of results obtained by applying the foliar bio-fertiliser Bionat Plus, together with warned phyto-sanitary treatment.

Table 3

Synthesis of results obtained by applying the foliar bio-fertiliser Bionat Plus, together with warned phyto-sanitary treatment to control the Colorado beetle and the late blight potato

Variant	Number of treatments Date of application	Pesticide + Foliar fertiliser	Dose (kg/ha)	Yield
1.	T1 May 25, 2007	Mospilan	0.08 kg/ha	18.700
	8 adults/10 plants	Dithane M-45	2.0 l/ha	
		Bionat Plus	2.0 l/ha	
	T2 June 9, 2007	Regent	0.1l/ha	
	9.3% plants attacked	Dithane M-45	2.0 kg/ha	
		Bionat Plus	3.0 l/ha	
CONTROL NOT TREATED WITH BIONAT, WARNED TREATMENTS				
2.	T1 May 25, 2007	Mospilan	0.08 kg/ha	15.200
	8 adults/10 plants	Dithane M-45	2.0 l/ha	
	T2 June 9, 2007	Regent	0.1l/ha	
	9.3% plants attacked	Dithane M-45	2.0 kg/ha	
	T3 June 23, 2007	Actara 25 WG	0.06 kg/ha	
	8.3% plants attacked	Dithane M-45	2.0 kg/ha	
CONTROL NOT TREATED WITH PESTICIDES				4.100

Total warned treatments – 3

Total treatments with pesticides – 3

Total treatments with pesticides and the foliar bio-fertiliser Bionat Plus – 2

Percentage of diminution of treatments due to the repellent effect of the foliar bio-fertiliser Bionat Plus on the Colorado beetle 33.3%.

Yield increase – 3,500 kg/ha.

Data presented in Table 3 show that by applying on potato crops two warned phyto-sanitary treatments to control the Colorado beetle (*Leptinotarsa decemlineata* Say) and the foliar bio-fertiliser Bionat Plus together with recommended pesticides, we obtained a yield increase of 3,500 kg/ha, compared to the variant treated with pesticides.

CONCLUSIONS

- In potato crops (the Ostara cultivar), by applying phyto-sanitary treatments to control the Colorado beetle (*Leptinotarsa decemlineata* Say) and the foliar bio-fertiliser Bionat Plus together with recommended pesticides, we obtained a yield increase of 3,500 kg/ha.

- Use doses of the foliar bio-fertiliser Bionat Plus are 2 l/ha in the first treatment and 3 l/ha in the second treatment.

- The percentage of treatment diminution due to the stimulation of vegetative growth and of the repellent effect of the foliar bio-fertiliser Bionat Plus on the Colorado beetle was 33%.

LITERATURE

1. ANDREI ANA-MARIA, 1998 – Lucrări ştiinţifice IV. Protecţia mediului prin metode şi mijloace biologice şi biotehnice, 75-79. Universitatea Transilvania Braşov.
2. BARBULESCU AL., 2001- Realizări şi perspective în combaterea bolilor şi dăunătorilor unor culturi de câmp. Ed. GEEA, Bucureşti.

3. DAVIV GH, PARSAN PAUL, IMBREABREA F., 2006 – Tehnologia plantelor de câmp. Ed. Eurobit, Timişoara.
4. MARINKOVICI B., GRCIC SVETLANA, 1996 – Kontrola upotrebe azotnih dubriva u cilju ocuvanja ekosistema. Monografia proizvodnja zdravstveno – bezbedne hrane ekonomskoekololoski aspect, Institut za ekonomiku poljoprivrede Beograd, 92-102, Novi-Sad.
5. PERJU TEODOSIE, 2004- Dăunătorii din principalele ecosisteme şi combaterea integrată a lor. Ed. Academic pres., Cluj- Napoca.
6. ROTARU VASILE şi col., 1999- Avertizarea aplicării tratamentelor (PED-pragurile economice de dăunare pentru culturile horticole). Rev. Sănătatea plantelor nr. 6/1999. Bucureşti.
7. SIMERIA GH., 2002 – Profilaxia şi terapia integrată a bolilor şi dăunătorilor plantelor vol.I Ed. Mirton, Timişoara.
8. POPESCU GH., GIUCHICI CAMELIA, 2000- Combaterea non- poluantă. Ed. Brumar. Timişoara.
9. POPESCU GH., 2005 – Tratat de patologia plantelor vol II. Ed. Eurobit Timişoara.
10. SIMERIA GH., POPESCU GH., GIUCHICI CAMELIA 2001 – Combaterea biologică în sens strict a patogenilor şi dăunătorilor plantelor. Ed. Mirton, Timişoara.
11. SIMERIA GH., PARŞAN P., SNEJANA DAMIANOV, 2007 – Strategii non- poluante pentru combaterea patogenilor şi dăunătorii plantelor. Ed. Eurobit, Timişoara.
12. PĂLĂGEŞIU I., şi col. 2000 – Entomologie agricolă şi horticolă, Ed. Mirton. Timişoara.