

ALTERNATIVE PROTECTION OF POTATOES IN ORGANIC FARMING

TOMÁŠEK, J.¹ & DVOŘÁK, P.¹

Key words: Colorado beetle, late blight, protection, vegetable extract, organic farming

Abstract

There were tested water extracts from *Syringa vulgaris* and *Pyrethrum parthenium*. They did not prove significant differences of decrease of the air attack of Colorado potato beetle (*Leptinotarsa decemlineata*), the activity of eggs – laying and the occurrence of larvae in comparison to the control. Interesting trends of lower-eggs lying and a lower larvae occurrence were discovered. The liquid spray against the late blight (*Phytophthora infestans*) did not significantly decrease neither occurrence of late blight or the yield.

The production of the bio-potatoes is only 0,2 % of all potatoes production in the Czech Republic. The aim of this experiment was to try alternative methods of regulation of Colorado potato beetle and late blight (the biggest harmful organisms of potatoes).

For biological agriculture could be also suitable water extracts. These are possible to use as protection of potatoes against unfavorable factors (Colorado potato beetle and late blight) and increase yield and quality of production.

Materials and methods

The trial was conducted in year 2008 at Experimental station of Department of Crop Production of the Czech University of Life Science Prague-Uhřetěves. The altitude of the site is 295 m a.s.l., the average of annual temperature is 8.4 °C and annual precipitation is 575 mm. The type of soil is brown soil with high nutrient reserve. Texture class of soil is clay loam. Organic matter content is 1.74–2.12%.

Experimental station Uhřetěves is certified organic for conductance of experiments in organic agriculture.

Pyrethrum parthenium, *Syringa vulgaris* and *Juglans regia* were chosen as plants, which could have favourable effect on the regulation of the mentioned harmful organisms. For these purposes were prepared extracts from mentioned plants and subsequently liquids for the application on potatoes in organic farming. During selection these plants were used results and experience publicize from laboratory experiments. The next liquid was used skimmed bio-milk and commercial preparation Bioan or Kuprikol 50 (table 1).

¹ Czech University of Life Science Prague, Faculty of Agrobiolgy, Food and Natural Resources, Department of Crop Production, Kamýcká 129, 165 21 Prague-Suchdol, Czech Republic (e-mail: tomasek@af.czu.cz)

Tab. 1: Review spray liquids used during experiments in experimental station Uhřetěves.

The spray liquids against Colorado beetle – 4 applications per vegetation	
PYR	5 % liquid from <i>Pyrethrum parthenium</i> . (300 l/ha)
SYR	5 % liquid from <i>Syringa vulgaris</i> (300 l/ha)
The spray liquids against the late blight – 3 applications per vegetation	
CU	Kuprikol 50 (84 % cuprum oxychloride) 1 application = 0,4 kg in 300 l Kuprikol 50/ha
ML	5 % liquid from the skimmed milk (300 l/ha)
JUG	5 % extract from <i>Juglans regia</i> (300 l/ha)
B	5 % liquid of preparation Bioan (20 % lecithin, 10 % albumin + milk casein) (300 l/ha)

Results

The liquids used for regulation of Colorado beetle (*Pyrethrum parthenium*, *Syringa vulgaris*) did not prove significant differences in fly-attack of beetles, the activity of laying the eggs and occurrence of larvae in comparison to control (table 2). Though during this experiment were there discovered interesting trends of lower eggs-lying (*Pyrethrum p.* -24,5 % and *Syringa v.* -19,4 %) and trends of larvae lower occurrence (*Pyrethrum p.* -26,8 % and *Syringa v.* -12,6 %). These liquids were applied from the first beetle fly-attach till ablation tops (interval 7–10 days).

Tab. 2: The influence spray liquids to beetle-occurrence (Colorado beetle).

treatment	the number of Colorado beetle for 10 plants	the number of larvae for 10 plants	the nest of eggs for 10 plants
Controle	1,23 a	31,08 a	0,98 a
Pyrethrum	1,42 a	22,76 a	0,74 a
Syringa	1,55 a	27,17 a	0,79 a
(LSD) 0,05	0,5644	14,7	0,173

Note: Means with a different letters are significant for $P < 0.05$

Tab. 3: The influence spray liquids to their final effect on production of consumer bulb (valued during harvest).

Spray liquids	Yield of potatoes (t/ha)
Kuprikol 50	30,8 a
Skimmed milk spray	27,6 a
<i>Juglans regia</i>	26,4 a
Bioan	26,2 a

Note: Means with a different letters are significant for $P < 0.05$

The use of liquids Kuprikol 50, skimmed milk and extract from *Juglans regia* did not prove significant differences in late blight bulb attack and consequently the yield of potatoes. The liquid spray against the late blight did not significantly decrease neither occurrence of late blight or the yield. The use of Kuprikol 50 reached the biggest yield.

Discussion

The liquid plants extracts are suitable solution for alternative protection in organic farming (Zídek, 1992). Lamparski a Wawrzyniak (2004) found out, that plant extracts from *Geranium sanguineum* a *Pelargonium hortorum* investigated inhibit feeding and development of Colorado potato beetle. Wawrzyniak et Lamparski (2006) tried extracts from fennel (*Foeniculum capillaceum* Gilib.), garden angelica (*Archangelica officinalis* Hoffm.), common caraway (*Carum carvi* L.), garden lovage (*Levisticum officinale* Koch.) and coriander (*Coriandrum sativum* L.). Under lab conditions there was observed an inhibition of larva and beetle development and decrease in feeding effectiveness of all the extracts tested. The highest antifeedant activity was shown by the extracts from *Carum carvi* and *Archangelica officinalis*. Any preparation in our experiments did not prove significant differences in number of beetles and larvae lying. It is necessary to continue in plants extracts-research.

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