

EVALUATION OF FOLIAR INSECTICIDES FOR THE CONTROL OF COLORADO POTATO BEETLE IN POTATOES IN VIRGINIA - 2008

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Introduction

The Colorado potato beetle is the most important foliar pest of potatoes. In order to achieve control of this insect, neonicotinoid insecticides (imidacloprid, thiamethoxam) applied through the soil are the primary choice of growers in Virginia. Resistance concerns therefore arise since this pest is well known for having developed resistance to many classes of insecticides. The search for efficacious insecticides to be employed as part of a resistance management strategy is of continued interest. The objective of this experiment was to evaluate the efficacy of foliar insecticides for the control of Colorado potato beetles.

Experimental design & materials

The experiment was conducted at the Virginia Tech ESAREC, Painter, VA on 'Superior' potatoes. The trial consisted of 18 treatments arranged in a RCB design with four replicates. Potatoes were planted on 21 Mar at the Virginia Tech Eastern Shore AREC near Painter, VA. Plots were 2 row wide and 20 ft long with unplanted guard rows on each side. Rows were planted on a 3 ft row center with 12 inches between plants, in a 6 tier field design with 8 ft alleys between tiers and a 16 ft center alley. Insecticide treatments were applied at 38 gpa using a 4-nozzle boom equipped with 110003VS spray tips spaced 20 in apart, spraying 2 rows at a time, and powered by a CO₂ backpack sprayer set at 40 psi. All seed pieces were treated with 8% alder bark at 16 oz / cwt. All insecticide treatments were applied twice (on 15 and 23 May) after CPB eggs had hatched and small larvae were feeding. All plots were maintained according to standard commercial practices.

Procedures

Numbers of CPB small larvae (1st and 2nd instars), large larvae (3rd and 4th instars), and adults were counted on 10 randomly picked stems per plot on 20, 23, 27 May, 2 and 9 Jun. On 9 Jun, potato leafhopper (PLH) nymphs were counted on 10 randomly picked, fully expanded compound leaves per plot. On 11 Jun, plots were assessed for % defoliation from CPB. On 1 Jul, potato tubers were mechanically harvested from each two-row plot, graded to size (Chef, Large A, Small A, and B), and weighed. All data were analyzed using ANOVA. Proportion data were arcsine square root transformed prior to analysis. Means were separated using Fisher's Protected LSD at the 0.05 level of significance.

Results

Colorado potato beetle pressure (CPB) was high in this trial with total (small + large) larval counts averaging ~ 167 per 10 stems in the untreated control plots. All insecticide treatments provided comparable and significant control of CPB larvae compared to the untreated check on all dates (Table 1). Defoliation ratings mirrored the CPB larval count data. Potato leafhopper pressure (PLH) was relatively low in this trial with nymphal counts averaging ~ 4 per 10 leaves in the untreated control plots. Most treatments were not significantly different from the untreated control except for Admire Pro + Coragen 1.67SC, Coragen 1.67SC + Asana XL, Endigo and Voliam Express. Yields were mildly variable with all treatments leading to significantly higher yields than the untreated control except HGW86 at the lowest rate and HGW86 at the mid rate + MSO (Table 2). No visible signs of phytotoxicity were observed from any treatment.

Table 1. Summary of efficacy of foliar insecticides for the control of Colorado potato beetles in potatoes; Painter, VA 2008

Treatment	Rate / acre	Mean no. Colorado potato beetles / 10 stems										Mean no. potato leafhopper nymphs / 10 compound leaves
		20-May		23-May		27-May		2-Jun		9-Jun		
		Egg Masses	Large larvae	Small larvae	Large larvae	Small larvae	Large larvae	Small larvae	Large larvae	Small larvae	Large larvae	
Untreated Control		7.0 ab	8.8 a	98.3 a	25.0 a	110.8 a	56.5 a	43.5 a	92.8 a	4.5	13.8 a	3.8 b
HGW86 10 OD	6.75 fl. oz	11.3 a	0.0 c	2.3 e	1.0 c	0.0 c	0.0 b	0.5 b	0.0 b	0.3	0.0 d	3.0 b
HGW86 10 OD	13.5 fl. oz	3.5bc	0.0 c	0.0 e	0.0 c	0.0 c	0.0 b	0.0 b	0.0 b	0.0	0.0 d	3.5 b
HGW86 10 OD	20.56 fl. oz	4.8 bc	0.0 c	0.5 e	0.0 c	0.0 c	0.0 b	0.0 b	0.0 b	0.0	0.0 d	2.3 bc
HGW86 10 OD + MSO	13.5 fl. oz + 0.5% v/v	6.3 bc	0.0 c	0.0 e	0.0 c	0.3 c	0.3 b	0.0 b	0.0 b	0.0	0.0 d	3.0 b
HGW86 10 SE	13.5 fl. oz	4.8 bc	0.0 c	0.0 e	0.0 c	0.0 c	0.0 b	0.0 b	0.0 b	0.0	0.0 d	2.8 bc
Admire Pro + Coragen 20SC (as needed)	7 fl. oz + 3.5 fl. oz	6.3 bc	4.8 b	44.3 bc	5.5 b	10.0 bc	2.5 b	1.0 b	0.0 b	0.3	0.0 d	0.0 c
Coragen 20SC + Asana XL	3.5 fl. oz + 4 fl. oz	6.0 bc	0.0 c	11.3 de	1.0 c	0.5 c	0.0 b	0.5 b	0.3 b	2.0	0.0 d	0.0 c
Coragen 20SC	5 fl. oz	2.3 c	3.3 bc	6.3 de	1.8 c	2.0 bc	1.0 b	0.0 b	0.0 b	0.0	0.0 d	2.8 bc
Spintor 2SC	6 fl. oz	3.5 bc	2.0 bc	62.0 b	2.5 bc	3.8 bc	0.8 b	3.0 b	4.3 b	2.0	5.3 bc	3.3 b
Alverde	5.8 fl. oz	5.5 bc	0.0 c	16.5 de	0.0 c	2.0 bc	0.0 b	0.3 b	0.5 b	0.0	0.3 d	3.0 b
Radiant	6 fl. oz	6.5 bc	1.0 c	8.0 de	1.0 c	0.0 c	0.0 b	1.0 b	0.0 b	3.5	8.3 b	7.3 a
Rimon 0.83 EC	12 fl. oz	4.0 bc	0.0 c	30.8 cd	0.3 c	21.0 b	1.8 b	2.8 b	2.8 b	0.0	1.0 cd	1.0 bc
Endigo	4.5 fl. oz	2.3 c	0.0 c	0.3 e	0.3 c	0.0 c	0.0 b	0.0 b	0.0 b	0.0	0.0 d	0.0 c
Voliam Express	8.2 fl. oz	4.8 bc	0.3 c	1.3 e	0.0 c	1.0 c	0.0 b	0.0 b	0.0 b	2.3	0.3 d	0.0 c

* Admire Pro applied 15 Apr; Coragen applied once on 23 May.

Table 2. Summary of yield results

Treatment	Rate / acre	% defoliation	Total Marketable Yield (A grade) (in lbs)	Total Marketable Yield (in lbs)
Untreated Control		77.5 a	16.6 d	29.9 d
HGW86 10 OD	6.75 fl. oz	7.5 bc	28.6 cd	42.5 cd
HGW86 10 OD	13.5 fl. oz	4.5 c	48.6 a	59.4 a
HGW86 10 OD	20.56 fl. oz	5.0 c	50.1 a	63.4 a
HGW86 10 OD + MSO	13.5 fl. oz + 0.5% v/v	4.0 c	32.1 bc	43.9 bcd
HGW86 10 SE	13.5 fl. oz	5.7 bc	49.2 ab	63.4 a
Admire Pro + Coragen 20SC (as needed)*	7 fl. oz + 3.5 fl. oz	5.0 bc	44.4 ab	54.5 abc
Coragen 20SC + Asana XL	3.5 fl. oz + 4 fl. oz	5.0 bc	40.4 abc	52.8 abc
Coragen 20SC	5 fl. oz	6.7 bc	36.0 abc	49.0 abc
Spintor 2SC	6 fl. oz	13.8 b	48.5 abc	62.0 a
Alverde	5.8 fl. oz	5.5 bc	41.6 a-e	53.7 abc
Radiant	6 fl. oz	6.5 bc	38.6 a-e	50.8 abc
Rimon 0.83 EC	12 fl. oz	5.5 bc	45.2 a-d	58.6 ab
Endigo	4.5 fl. oz	5.0 bc	48.8 abc	61.5 a
Voliam Xpress	8.2 fl. oz	6.3 bc	47.5 abc	60.5 a

* Admire Pro applied 15 Apr; Coragen applied once on 23 May.