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E20

CABBAGE: *Brassica oleracea* L. var. *capitata* L., 'Bronco'

CONTROL OF DIAMONDBACK MOTH ON CABBAGE, 2010

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Diamondback moth (DBM): *Plutella xylostella* (Linnaeus)

Diamondback moth is the key pest of cruciferous crops in southern Florida and has developed resistance to many insecticides. Yield can be seriously impacted when larvae feed directly on the leaves within the head and grade reductions can occur even when feeding is confined to wrapper leaves. The trial was initiated 25 Feb at the Southwest Florida Research and Education Center in Immokalee FL. Greenhouse raised seedlings were transplanted at18-inch plant spacing into 8 beds 240 ft long on 6 ft centers. Fertilizer (13-2-13 N-P-K) had been incorporated into the bed prior to transplanting and then supplemented by daily injection of an 8-0-8 liquid fertilizer through the drip tape. A RCB design was used with 4 replications and 13 treatments plus an untreated control (Table 1). Each plot contained 20 plants with a 4-plant buffer between plots. Foliar treatments were applied with a high clearance sprayer operating at 180 psi and 2.3 mph with delivery through two vertical booms and one centrally located overhead each equipped with a yellow Albuz® hollow cone nozzles and delivering 10 gpa each. Nozzles were added as plants grew in size and gpa by spray date is reported in Table 1. Combination treatments were tankmixed. Induce surfactant was added to Coragen and Synapse foliar spray treatments at 0.50% vol/vol. DyneAmic adjuvant was added to all HGW86 and NAI-2302 experimental foliar spray treatments at 0.25% vol/vol. Drenches of Durivo and Coragen were made on 1 Mar using an EZ-Dose® sprayer at a pressure of 45 psi and a flow rate of 3.7 gpm to apply 120 ml of suspension to the base of each plant. Weekly observations from 13 Apr to 4 May were made by estimating the amount of leaf surface area damaged by DBM feeding and counting the number of larvae and pupae found on each of three fully developed but recently emerged leaves from the upper one third of 5 plants per plot. Ten plants per plot were harvested 10 May by removing the head with generally 4 wrapper leaves. Relative damage was rated on wrapper leaves and outer leaves of the formed head as: 0 = no damage, 1 = less than 2% of surface area damaged, 2 = between 2 and 10% damaged, 3= between 10 and 33%, 4= between 33 and 66% and 5= more than 67% of leaf surface with damage. Data were subjected to ANOVA and means separated using LSD (P = 0.05) are presented.

On 13 and 20 Apr fewer larvae and pupae per leaf were found on all treated plants compared to the untreated check except those sprayed with the low rate of MIB-206 (2 qt/acre) on 20 Apr (Table 2). All products significantly reduced the total number of larvae and pupae found on the leaves on 27Apr and 4 May with no differences among insecticide treatments except for high numbers of DBM with the two rates of MBI-206 which showed a significant rate response. All products reduced the amount of defoliation compared to the untreated control on all sample dates except for the 2 qt/acre rate of MBI-206 on 13 and 20 Apr (Table 3). The 13.0 oz drench of Durivo maintained plants with least damage through 27 Apr, though not significantly different from the foliar treatment of Coragen and the tankmix spray of NAI-2302 15 EC + Warrior, or the high rate of MBI-206 on 13 Apr, or the two highest rates of HGW86, Synapse or any treatment containing the high rate of NAI-2302 15 EC on 20 Apr and 27 Apr. On 4 May, the lowest damage rank included all treatments except for the Coragen drench and the two rates of MBI-206 which showed more damage than the others but were significantly different from each other and the untreated check. Less damage was seen on all treated plants compared to the control at harvest on 10 May. Least damage to both wrapper and head was seen with the two highest rates of HGW86, Synapse or the high rate of NAI2302, followed by this latter product at the low rate or tank mixed with Warrior, then by HGW86 at the low rate and the high rate of Durivo although this latter was not different from the high rate of Coragen in regard to head damage. The two MBI-206 treatments maintained a rate response with respect to head damage only. It is worth noting that apparent differences among results for the various Coragen and Durivo treatments resolve into a rate response for the active ingredient chlorantraniliprole. No phytotoxicity was observed in any of the treatments.

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Table 1.

			Application dates					
Product/ formulation	Application Method	Rate amt product/acre	1-Mar 120 mls/plant	7-Apr 30 GPA	14-Apr 50 GPA	21-Apr 50 GPA	28-Apr 50 GPA	5-May 50 GPA
Untreated								
Coragen 20 SC	Foliar	3.5 oz		X		x		x
Coragen 20 SC	Drench	5.0 oz	x					
Durivo	Drench	10.0 oz	x					
Durivo	Drench	13.0 oz	x					
HGW 86 10 SE	Foliar	6.75 oz		X	x	x	x	x
HGW 86 10 SE	Foliar	10.1 oz		X	x	x	x	x
HGW 86 10 SE	Foliar	13.5 oz		X	x	x	x	x
Synapse 24 WG	Foliar	3.0 oz		X	x	x	x	x
NAI-2302 15 EC	Foliar	17.0 oz		X	x	x	x	x
NAI-2302 15 EC	Foliar	21.0 oz		X	x	x	x	x
NAI-2302 15 EC	Foliar	21.0 oz						
Warrior II		1.92 oz		X	x	x	x	x
MBI-206	Foliar	2 qt		X	x	x	x	x
MBI-206	Foliar	4 qt		x	x	x	x	x

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Table 2.

Treatment/ formulation	Rate amt product/acre	Application	Number of Larvae/pupae per leaf			
			13-Apr	20-Apr	27-Apr	4-May
Untreated			0.17a	0.22a	0.53a	4.40a
Coragen 20 SC	3.5 oz	Foliar	0.03bc	0.00b	0.00d	0.00d
Coragen 20 SC	5.0 oz	Drench	0.00c	0.03b	0.08d	0.15d
Durivo	10.0 oz	Drench	0.00c	0.00b	0.03d	0.12d
Durivo	13.0 oz	Drench	0.00c	0.00b	0.02d	0.00d
HGW 86 10 SE	6.75 oz	Foliar	0.00c	0.00b	0.02d	0.00d
HGW 86 10 SE	10.1 oz	Foliar	0.02bc	0.02b	0.00d	0.00d
HGW 86 10 SE	13.5 oz	Foliar	0.00c	0.00b	0.00d	0.00d
Synapse 24 WG	3.0 oz	Foliar	0.00c	0.00b	0.00d	0.00d
NAI-2302 15 EC	17.0 oz	Foliar	0.07b	0.02b	0.00d	0.00d
NAI-2302 15 EC	21.0 oz	Foliar	0.02bc	0.00b	0.00d	0.00d
NAI-2302 15 EC	21.0 oz	Foliar	0.05bc	0.03b	0.00d	0.00d
Warrior II MBI-206	1.92 oz 2 qt	Foliar	0.05bc	0.28a	0.33b	1.98b
MBI-206	4 qt	Foliar	0.05bc	0.02b	0.19c	1.02c

Means followed by the same letter within a column are not statistically different (LSD P>0.05).

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Table 3.

Treatment/ formulation	Rate amt product/acre	Application	Percentage of leaf area defoliated			Damage Rating at Harvest on 10-May		
			13-Apr	20-Apr	27-Apr	4-May	Wrapper	Head
Untreated			16.75ab	14.53a	24.17a	41.83a	4.63a	3.60a
Coragen 20 SC	3.5 oz	Foliar	2.12de	1.42cd	1.55efgh	0.88e	1.18e	0.85e
Coragen 20 SC	5.0 oz	Drench	2.07de	3.17c	2.97def	4.93d	1.80c	1.30d
Durivo	10.0 oz	Drench	4.75cd	3.75c	2.73defg	0.80e	1.50d	1.23d
Durivo	13.0 oz	Drench	0.00e	0.08d	0.55h	0.67e	0.85f	0.63ef
HGW 86 10 SE	6.75 oz	Foliar	6.25c	8.92b	4.37cd	2.10e	0.78fg	0.50fg
HGW 86 10 SE	10.1 oz	Foliar	5.28cd	2.87cd	0.92fgh	0.32e	0.45h	0.20h
HGW 86 10 SE	13.5 oz	Foliar	6.25c	1.53cd	0.75gh	0.63e	0.38h	0.13h
Synapse 24 WG	3.0 oz	Foliar	6.42c	2.48cd	0.77gh	0.03e	0.48h	0.18h
NAI-2302 15 EC	17.0 oz	Foliar	18.41a	4.07c	3.60cde	1.20e	0.55gh	0.25gh
NAI-2302 15 EC	21.0 oz	Foliar	4.5cd	1.83cd	2.28efgh	0.35e	0.38h	0.13h
NAI-2302 15 EC	21.0 oz	Foliar	3.75cde	2.87cd	1.37fgh	0.22e	0.50gh	0.33gh
Warrior II	1.92 oz							
MBI-206	2 qt	Foliar	13.90b	15.42a	16.00b	28.92b	3.83b	3.05b
MBI-206	4 qt	Foliar	3.75cde	3.23c	5.65c	18.17c	3.55b	2.68c

Means followed by the same letter within a column are not statistically different (LSD P>0.05).