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Collard: *Brassica oleracea* L. (Acephala group) Var 'Bull Dog'

CONTROL OF DIAMOND BACK MOTH ON COLLARD, 2008

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Diamond Back Moth , *Plutella xylostella* (L.),

Diamondback moth is a key pest crucifers worldwide including south Florida. Insecticidal control is often difficult due to rapid development of resistance, so new products are constantly in demand. For this trial, greenhouse raised plants were transplanted at 18 in spacing into 4 raised beds 235 ft in length covered with black polyethylene mulch. Water and approximately 80% of nutrients were applied through drip with the remaining 20% of fertilizer pre-plant soil incorporated. A randomized complete block (RCB) design was used with 4 treatments, 4 replications, each plot containing 17 plants with an additional three plants between plots as a buffer. Foliar treatments were applied with a high clearance sprayer operating at 180 psi and 2.3 mph

with the spray delivered through two vertical booms and one overhead nozzle using yellow Albuz® hollow cone nozzles that applied 10 gallons per acre each. Volume increased as plant size increased with concentration decreasing accordingly to maintain a constant rate per acre. High frequency treatments were sprayed on all dates while low frequency treatments only received an application 50% of the time. All products were sprayed with the adjuvant Kinetic at 0.05% vol/vol.

Diamondback moth larvae and pupa were monitored weekly on 4 fully developed new leaves on the upper third of the plant from each of 4 plants in a plot. Defoliation caused by larval feeding was rated on randomly selected leaves as: 0 = no damage; 1 = less than 5% of leaf surface with damage; 2 = greater than 5% but less than 15% of leaf surface with damage; 3= greater than 15% but less than 30% of leaf surface with damage; and 4 = more than 30 % of leaf surface with damage.

Significant differences in numbers of DBM larvae were observed on all 4 sample dates and over all dates. All products significantly reduced DBM larvae and pupae on all dates except for 16 May when only the Spintor treatment fit this criterion. At high rate and low frequency effects of VBC-60129 and Dipel were not significantly different except on 17 Apr. At low rate and high frequency the only difference occurred on 1 May. Both cases were in favor of Dipel. There were no significant difference between these two products at high rate and frequency. The only difference between VBC-60129 at the high rate and low frequency compared to low rate and high frequency occurred on 1 May although over all dates there was no difference. The same comparison with Dipel provided

contrary results on 23 and 29 May with no difference over dates. Both Dipel and VBC-60129 at high rate and frequency over all dates was significantly better than the low rate at high frequency but not high rate at low frequency. Therefore, the high rate at low frequency seemed to be the preferable alternative. The high rate of Dipel at high was not significantly different from the Spintor standard although the same could not be said for VBC-60129. Treatment effects on damage became significant at the second reading when Dipel at high rate and frequency appeared to provide more protection than the corresponding treatment with VBC-60129. This and the contrasting rate frequency treatments both favored Dipel on 23 May. At high rate and frequency, Dipel again pulled ahead on 1 and 9 May although there were no such differences over all dates. Less damage was seen on 9 May with VBC-60129 at high rate and low frequency than the same product at low rate and high frequency which was not different from the untreated check. VBC-60129 at high rate and low frequency resulted in less damage than either other treatment using this product whereas Dipel at high rate and frequency did not provide significantly better protection than at high rate and low frequency, indicating again that this was a better alternative than low rate at high frequency. Better protection was afforded by the Spintor standard at low frequency than any of the Bt. products regardless of rate or frequency.

Table 1:

			Application date and gallons per acre									
Product	Rate/acre	Frequency	9-Apr	14-Apr	18-Apr	23-Apr	28-Apr	2-May	7-May	13-May	19-May	27-May
			50	50	50	70	70	70	90	90	90	90
Untreated	N/A	N/A										
Dipel	0.5 lbs	High	X	X	X	X	X	X	X	X	x	X
Dipel	1.0 lbs	High	X	X	X	X	X	X	X	X	x	X
Dipel	1.0 lbs	Low	X		X		X		X		X	
VBC-60129	0.5 lbs	High	X	X	X	X	X	X	X	X	x	X
VBC-60129	1.0 lbs	High	X	X	X	X	X	X	X	X	x	X
VBC-60129	1.0 lbs	Low	X		X		X		X		X	
Spintor	6.0 oz	Low	X		X		X		X		X	

Table 2:

Average Total Number of Larvae and Pupa per Leaf

Product	Rate/acre	Frequency	11-Apr	17-Apr	24-Apr	1-May	9-May	16-May	23-May	29-May	All dates
Untreated	N/A	N/A	0.98 a	0.95 a	1.56 a	0.98 a	0.33 a	0.34 ab	0.63 a	0.55 a	0.79 a
VBC-60129	1.0 lbs	Low	0.39 b	0.33 b	0.46 bc	0.28 c	0.22 abc	0.30 b	0.30 bcd	0.38 abc	0.33 bc
Dipel	1.0 lbs	Low	0.42 b	0.09 d	0.72 b	0.25 c	0.22 abc	0.38 ab	0.14 de	0.44 ab	0.33 bc
Dipel	0.5 lbs	High	0.50 b	0.16 cd	0.23 cde	0.25 c	0.13 bcd	0.52 a	0.34 bc	0.19 cd	0.29 bcd
VBC-60129	0.5 lbs	High	0.44 b	0.27 bc	0.42 cd	0.52 b	0.27 ab	0.31 ab	0.42 b	0.31 bc	0.37 b
VBC-60129	1.0 lbs	High	0.28 bc	0.19 bcd	0.17 de	0.13 cd	0.08 cd	0.30 b	0.22 cd	0.30 bc	0.21 cd
Dipel	1.0 lbs	High	0.25 bc	0.09 d	0.16 de	0.11 cd	0.05 d	0.17 bc	0.13 de	0.31 bc	0.16 de
Spintor	6.0 oz	Low	0.11 c	0.11 cd	0.03 e	0.00 d	0.00 d	0.02 c	0.02 e	0.06 d	0.04 e

Means within a column followed by the same letter are not significantly different (LSD $P<0.05$)

Table 3:

			Average Defoliation Rating per Leaf								
Product	Rate/acre	Frequency	11-Apr	17-Apr	24-Apr	1-May	9-May	16-May	23-May	29-May	All dates
Untreated	N/A	N/A	2.19 a	2.28 a	2.63 a	2.04 a	1.36 a	1.15 a	1.68 a	1.47 a	1.85 a
Dipel	0.5 lbs	High	2.16 a	1.34 b	0.84 bc	1.18 bc	0.77 b	1.13 ab	0.95 cd	0.88 c	1.15 bcd
Dipel	1.0 lbs	High	1.83 a	0.93 c	0.58 c	0.63 d	0.34 c	0.77 c	0.75 d	1.02 bc	0.86 e
Dipel	1.0 lbs	Low	1.53 a	0.85 c	1.09 b	1.22 bc	0.74 b	0.94 abc	0.86 d	0.91 c	1.02 cde
VBC-60129	0.5 lbs	High	1.67 a	1.34 b	1.07 b	1.20 bc	1.30 a	1.11 ab	1.19 b	1.23 ab	1.26 b
VBC-60129	1.0 lbs	High	1.67 a	0.93 c	0.77 c	0.94 c	0.67 b	0.83 bc	0.84 d	1.11 bc	0.97 de
VBC-60129	1.0 lbs	Low	1.69 a	1.47 b	1.09 b	1.38 b	0.91 b	1.14 ab	1.13 bc	1.16 bc	1.24 bc
Spintor	6.0 oz	Low	1.7 a	0.97 c	0.23 d	0.11 e	0.08 c	0.02 d	0.08 e	0.25 d	0.42 f

Means within a column followed by the same letter are not significantly different (LSD $P<0.05$)

Part II: Materials Tested for Arthropod Management

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Common name	Trade name/ Cultivar	Concentration/ Formulation	Chemical name	Manufacture/source
Bacillus thuringiensis	Dipel	1 DF	*Bacillus thuringiensis* *Kurstaki strain* ABTS - 351	Valent Biosciences Corporation 870 Technology Way Suite 100 Libertyville IL 60048
Bacillus thuringiensis	VBC - 60129	1 DF	*Bacillus thuringiensis*	Valent Biosciences Corporation 870 Technology Way Suite 100 Libertyville IL 60048

Spinosad	Spintor	2 SC	Spinosad(a mixture of spinosyn A and spinosyn D)	Dow AgroSciences LLC 9330 Zionsville Road Indianapolis, IN 46268-1189