

EFFECTS OF APPLICATION METHOD ON RESIDUAL CONTROL OF CATERPILLAR PESTS OF COLE CROPS WITH CORAGEN AND HGW86

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Introduction

Coragen has shown excellent activity against a variety of caterpillar pests in cole crops. It has shown long residual activity when applied as a drench treatment. HGW86 is a related product being developed by DuPont, the manufacturers of Coragen. This test was conducted to evaluate the residual control of these two products when applied as a drench treatment. Further, the effects of drench type on the residual control were evaluated.

Materials and Methods

A small plot trial was conducted in transplanted collards at the University of Georgia's Horticulture Farm in Tifton, Georgia. Collards were transplanted into single row plots (36 inch row spacing) with 12 plants per plot (18 feet). Plants were grown with a 1.5 foot in-row spacing to aid in monitoring of insects and damage; however, insecticide rates were calculated for a per plant basis with an assumed 1 foot spacing (common commercial plant spacing). The experimental design was a randomized complete block with four replications. Collards were transplanted on 9 June, 2009.

Insecticides evaluated were Coragen 1.67SC (at 3.5 and 5 oz/ac) and HGW86 20SC (at 6.75 and 13.5 oz/ac). Each treatment and rate were applied with three drench approaches: greenhouse drench, transplant drench, and a row drench. A non-treated control was included for comparisons.

In the greenhouse drench treatments, insecticides were applied in 1ml of water to the root ball of the transplants the day before transplanting (8 June, 2009). Rates per plant were calculated based on a 12 inch plant spacing (14520 plants per acre). For the transplant drench treatments, insecticides were applied in 4 oz of transplant water per plant. As with the greenhouse drench, rates per plant were based on a 12 inch spacing. The row drench treatments were applied in 3 liters of water per plot (attempting to simulate a drip application). The treatments were poured over the plants through a fanned hose nozzle in a narrow band (approximately 4 inches). Rates were based on the area of the plot (3 ft by 18 ft).

Insects were monitored on five randomly selected plants in each plot. Plants were visually searched on each sample date. All caterpillars were identified and counted.

Data are shown for total caterpillars per five plants. For damage ratings, all plants in each plot were visually examined. Those with moderate or severe damage (holes in leaves) were counted. All data were analyzed with the PROC ANOVA procedure of PC-SAS. Where significant differences were detected ($P < 0.05$), means were separated with LSD ($P = 0.05$).

Results and Discussion

Pest pressure was extremely light early and light to moderate through most of the test. Caterpillars did not exceed one per five plants in any treatment until 30 June (21 days after treatment [DAT]). From 30 June through 13 July (34 DAT), the transplant drench and greenhouse drench generally performed better than the row drench. By 20 July (41 DAT) caterpillar densities exceeded one per five plants in all but the high rate of Coragen transplant drench and the high rates of Coragen and HGW86 greenhouse drench.

Trends in damaged plant counts were very similar to those for insect counts. The row drench treatments appeared to begin “playing out” as early as 22 DAT (1 July). The transplant and greenhouse drench treatments maintained less than one damaged plant per plot through 35 DAT (14 July), with the exception of the low rate HGW86 transplant drench. By 42 DAT, only the HGW86 greenhouse drench treatments had less than one damaged plant per plot.

The transplant and greenhouse drenches consistently provided longer residual activity than the row drench. The row drench treatments appeared to provide less than 3 weeks of strong residual activity; whereas, the transplant drench and greenhouse drench appeared to provide excellent control through at least 35 DAT.

Table 1. Coragen/HGW86 drench methodology test, Horticulture Farm, Tifton, Georgia, 2009.

Treatment	Drench method	Number of caterpillars (all species) per 5 plants						
		19 June	24 June	30 June	6 July	13 July	20 July	27 July
		10 DAT	15 DAT	21 DAT	27 DAT	34 DAT	41 DAT	48 DAT
Check		0.00 a	0.50 a	3.75 a	2.25 abc	2.00 a	3.25 bcd	5.75 abc
Coragen 3.5oz	Row	0.00 a	0.00 a	2.75 abc	1.75 abcd	2.25 a	1.50 cde	4.00 bcde
Coragen 5oz	Row	0.00 a	0.00 a	1.00 cde	2.25 abc	1.50 ab	4.00 abc	5.50 bcd
HGW86 6.75oz	Row	0.00 a	0.25 a	3.25 ab	3.00 a	1.50 ab	6.00 a	3.25 bcde
HGW86 13.5oz	Row	0.00 a	0.00 a	2.00 abcd	2.75 ab	0.75 ab	4.00 abc	6.00 abc
Coragen 3.5oz	Transplant	0.00 a	0.00 a	0.50 de	1.00 bcd	0.00 b	2.00 cde	2.25 de
Coragen 5oz	Transplant	0.00 a	0.25 a	0.00 e	0.00 d	0.00 b	0.50 e	2.75 cde
HGW86 6.75oz	Transplant	0.00 a	0.00 a	0.25 de	1.25 abcd	0.25 b	5.50 ab	5.75 abc
HGW86 13.5oz	Transplant	0.00 a	0.00 a	0.50 de	1.00 bcd	0.00 b	4.00 abc	9.00 a
Coragen 3.5oz	Greenhouse	0.00 a	0.00 a	1.50 bcde	0.50 cd	0.25 b	1.75 cde	3.75 bcde
Coragen 5oz	Greenhouse	0.00 a	0.00 a	0.00 e	0.00 d	0.75 ab	0.75 de	4.75 bcde
HGW86 6.75oz	Greenhouse	0.00 a	0.00 a	0.25 de	0.00 d	0.00 b	1.50 cde	6.25 ab
HGW86 13.5oz	Greenhouse	0.00 a	0.00 a	0.25 de	0.00 d	0.00 b	0.25 e	1.50 e

DAT = Days After Transplanting

Table 2. Coragen/HGW86 drench methodology test, Horticulture Farm, Tifton, Georgia, 2009.

Treatment	Timing of application	Number of plants with moderate or severe feeding damage				
		1 July	14 July	21 July	27 July	31 July
		22 DAT	35 DAT	42 DAT	48 DAT	52 DAT
13 Check		5.50 a	6.00 a	7.50 ab	10.25 ab	9.25 abcd
9 Coragen 3.5oz	Row	1.50 bcd	2.75 b	7.00 bc	10.50 ab	10.25 ab
10 Coragen 5oz	Row	1.75 bc	1.25 bcd	7.00 bc	9.25 abc	8.50 bcde
11 HGW86 6.75oz	Row	2.25 b	5.75 a	10.00 a	11.00 a	9.75 abc
12 HGW86 13.5oz	Row	1.25 bcd	2.75 b	8.00 ab	10.25 ab	10.75 a
5 Coragen 3.5oz	Transplant	0.25 cd	0.25 cd	4.00 de	6.75 cd	7.50 def
6 Coragen 5oz	Transplant	0.00 d	0.00 d	2.00 ef	6.25 d	5.75 fg
7 HGW86 6.75oz	Transplant	0.25 cd	2.00 bc	5.75 bcd	9.75 ab	10.00 abc
8 HGW86 13.5oz	Transplant	0.00 d	0.25 cd	4.75 cd	8.00 bcd	9.00 abcde
1 Coragen 3.5oz	Greenhouse	0.00 d	0.50 cd	4.75 cd	8.00 bcd	8.75 bcde
2 Coragen 5oz	Greenhouse	0.00 d	0.00 d	3.50 de	7.00 cd	7.25 ef
3 HGW86 6.75oz	Greenhouse	0.00 d	0.00 d	0.75 f	5.50 d	8.25 cde
4 HGW86 13.5oz	Greenhouse	0.00 d	0.00 d	0.25 f	1.75 e	4.75 g