

EFFICACY OF FOLIAR APPLIED INSECTICIDES AGAINST CATERPILLAR PESTS OF COLE CROPS

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Introduction

Caterpillars are the primary arthropod pest of cole crops in Georgia. These crops are attacked by a complex of caterpillars, with the primary species being diamondback moth, cabbage looper, and imported cabbageworm. This test was conducted to evaluate foliar applications of insecticides for efficacy against this complex of pests.

Materials and Methods

Collards were transplanted at the University of Georgia's Tifton Vegetable Park in Tifton, Georgia, with single rows on 6 foot beds. Plots measuring one row (treated as 36 inch rows) by 23 feet were arranged in a randomized complete block design with four replications. Insecticide treatments were applied with a CO₂ pressurized back pack sprayer (60 PSI) in 40 GPA with 3 hollow-cone nozzles per row (one over the top; two on drops). Treatments were applied on 12 and 24 June, 2008. Treatments evaluated were: SpinTor (5 oz/ac), Radiant (5 oz/ac), Proclaim (3.2 oz/ac), Avaunt (3.5 oz/ac), Rimon (12 oz/ac), Alverde (16 oz/ac + Penetrator Plus at 0.5% v/v), Tesoro (6.4 oz/ac), Coragen (5 oz/ac) and Synapse (3 oz/ac). Coragen and Synapse were evaluated with and without a tank mix with DyneAmic (0.5% v/v). Sufactants have been reported to dramatically effect efficacy of these two products. A non-treated control was included for comparison.

For direct pest counts, five plants were randomly selected in each plot on each sample date and visually examined for caterpillar pests. All caterpillars were identified and counted. Analyses were conducted on the total numbers in each plot (number per five plants). Plot damage ratings were conducted starting at 3 weeks after the second application. Each plot was visually examined for feeding damage with emphasis placed on evaluation of feeding on the 'new' growth. Plots were rated on a 0 to 6 scale as follows: 0 = no damage, 1 = light damage on < ½ of plants, 2 = light damage on > ½ of plants, 3 = moderate damage on < ½ of plants, 4 = moderate damage on > ½ of plants, 5 = heavy damage on < ½ of plants, 6 = heavy damage on > ½ of plants. Acceptable control would be less than a 3, with less than 2 being very good control. A 4 or greater would represent poor control.

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

Cabbage looper numbers were extremely low, never exceeding 0.25 per 5 plants in any treatment until the last sample date (7 July) in which there was 1.00 per plot in the Tesoro treatment, 0.25 in the Synapse treatment and none in any other treatment. Thus, looper data is not discussed, but the numbers are included in the total caterpillar data.

Diamondback moth pressure was relatively light, but all insecticides tested showed good activity against this pest on the first sample date after each application (possible exception of Rimon on the first sample, with the mode of action explaining the delay in mortality).

The majority of pests in this test were Imported cabbageworm (ICW). All products generally provided good control of this pest after each application. Trends indicate good activity with most treatments through 7 to 9 days after application. By 9 to 11 days after treatment, Proclaim, Alverde, SpinTor and Tesoro showed trends for possible loss of residual activity.

Damage ratings were not conducted until 21, 24 and 27 days after the second application. Effects detected at this time should reflect both good control of the pest present and exceptional residual activity. Treatments that showed significant reductions, as compared to the check, across all three dates were Avaunt, Radiant, Coragen and Synapse. Addition of surfactant to Coragen and Synapse did not effect efficacy. Coragen and Synapse were the only treatments rated 4 or below and Coragen with surfactant was the only treatment rated below a 3. While this is not strong evidence, it does suggest that Coragen and Synapse provide longer residual activity than the other treatments, and that addition of the surfactant may aid in residual control.

Collards Efficacy Trial, TVP, Summer, 2008.

Treatment	Number of Diamondback moth larvae per 5 plants							
	16 June	19 June	23 June	26 June	30 June	3 July	7 July*	10 July
	4 DAT-1	7 DAT-1	11 DAT-1	2 DAT-2	6 DAT-2	9 DAT-2	13 DAT-2	16 DAT-2
Check	2.00 a	0.25 a	0.25 a	1.25 a	0.25 a	1.50 a	1.00 a	0.50 a
Rimon	1.25 ab	1.00 a	0.75 a	0.25 b	0.25 a	0.50 b	0.00 a	0.25 a
Proclaim	0.50 b	0.50 a	1.25 a	0.00 b	0.00 a	0.00 b	1.00 a	0.00 a
Avaunt	0.00 b	0.00 a	0.25 a	0.00 b	0.25 a	0.00 b	0.00 a	0.00 a
Alverde	0.00 b	0.00 a	1.00 a	0.00 b	0.00 a	0.25 b	0.50 a	0.00 a
SpinTor	0.25 b	0.25 a	1.25 a	0.00 b	0.00 a	0.00 b	0.00 a	0.00 a
Radiant	0.00 b	0.00 a	1.00 a	0.00 b	0.00 a	0.00 b	0.50 a	0.25 a
Tesoro	0.00 b	0.75 a	0.00 a	0.00 b	0.00 a	0.00 b	0.00 a	0.50 a
Coragen	0.25 b	0.00 a	0.50 a	0.00 b	0.00 a	0.00 b	0.00 a	0.00 a
Coragen+	0.00 b	0.00 a	0.00 a	0.00 b	0.00 a	0.00 b	0.00 a	0.00 a
Synapse	0.00 b	0.00 a	0.25 a	0.00 b	0.00 a	0.00 b	0.25 a	0.00 a
Synapse+	0.00 b	0.00 a	0.50 a	0.00 b	0.00 a	0.00 b	0.00 a	0.00 a

Number within columns followed by the same letter are not significantly different ($P = 0.05$).

* Differences were detected at $P = 0.1$.

Collards Efficacy Trial, TVP, Summer, 2008.

Treatment	Number of Imported cabbageworm larvae per 5 plants							
	16 June	19 June	23 June	26 June	30 June	3 July	7 July	10 July
	4 DAT-1	7 DAT-1	11 DAT-1	2 DAT-2	6 DAT-2	9 DAT-2	13 DAT-2	16 DAT-2
Check	0.50 a	1.75 a	7.25 a	8.75 a	3.75 a	3.25 a	0.75 a	0.25 a
Rimon	0.00 b	0.25 a	2.25 bc	2.00 b	0.00 b	0.25 a	0.50 a	0.25 a
Proclaim	0.00 b	0.50 a	8.50 a	0.00 b	0.00 b	0.25 a	1.50 a	0.25 a
Avaunt	0.00 b	0.75 a	1.75 bc	0.00 b	0.00 b	0.25 a	1.00 a	1.00 a
Alverde	0.25 ab	0.25 a	1.75 bc	0.00 b	0.00 b	3.00 a	0.50 a	0.00 a
SpinTor	0.00 b	0.75 a	5.75 ab	0.00 b	0.00 b	0.25 a	0.75 a	0.25 a
Radiant	0.00 b	0.25 a	3.75 abc	0.00 b	0.00 b	0.25 a	0.00 a	0.25 a
Tesoro	0.00 b	0.50 a	7.25 a	0.00 b	0.00 b	2.75 a	0.75 a	0.50 a
Coragen	0.00 b	0.00 a	2.25 bc	0.00 b	0.00 b	0.00 a	0.00 a	0.00 a
Coragen+	0.00 b	0.00 a	0.50 c	0.00 b	0.00 b	0.25 a	0.00 a	0.00 a
Synapse	0.00 b	0.00 a	3.75 abc	0.00 b	0.00 b	0.00 a	0.00 a	0.00 a
Synapse+	0.00 b	0.00 a	1.25 bc	0.00 b	0.00 b	0.00 a	0.25 a	0.00 a

Number within columns followed by the same letter are not significantly different (P = 0.05).

Collards Efficacy Trial, TVP, Summer, 2008.

Treatment	Total number of larvae per 5 plants							
	16 June	19 June	23 June	26 June	30 June	3 July*	7 July	10 July
	4 DAT-1	7 DAT-1	11 DAT-1	2 DAT-2	6 DAT-2	9 DAT-2	13 DAT-2	16 DAT-2
Check	2.75 a	2.25 a	7.50 ab	10.00 a	4.00 a	4.75 a	2.00 a	0.75 a
Rimon	1.50 ab	1.25 a	3.00 bcd	2.25 b	0.25 b	1.00 a	0.50 a	0.50 a
Proclaim	0.75 b	1.00 a	9.75 a	0.00 b	0.00 b	0.25 a	2.50 a	0.25 a
Avaunt	0.00 b	0.75 a	2.00 cd	0.00 b	0.25 b	0.25 a	1.00 a	1.00 a
Alverde	0.25 b	0.25 a	2.75 bcd	0.00 b	0.00 b	3.25 a	1.00 a	0.00 a
SpinTor	0.25 b	1.00 a	7.00 abc	0.00 b	0.00 b	0.25 a	0.75 a	0.25 a
Radiant	0.00 b	0.25 a	5.00 abcd	0.00 b	0.00 b	0.25 a	0.75 a	0.50 a
Tesoro	0.00 b	1.50 a	7.25 ab	0.00 b	0.00 b	2.75 a	0.75 a	2.00 a
Coragen	0.25 b	0.00 a	2.75 bcd	0.00 b	0.00 b	0.00 a	0.00 a	0.00 a
Coragen+	0.00 b	0.00 a	0.50 d	0.00 b	0.00 b	0.25 a	0.00 a	0.00 a
Synapse	0.00 b	0.00 a	4.00 bcd	0.00 b	0.00 b	0.00 a	0.25 a	0.25 a
Synapse+	0.00 b	0.00 a	1.75 d	0.00 b	0.00 b	0.00 a	0.25 a	0.00 a

Number within columns followed by the same letter are not significantly different (P = 0.05).

* Differences were detected at P = 0.1.

Collards Efficacy Trial, TVP, Summer, 2008.

Treatment	Plot damage ratings		
	15 July	18 July	21 July
	21 DAT-2	24 DAT-2	27 DAT-2
Check	5.75 a	5.63 a	5.75 a
Rimon	4.63 abc	4.88 ab	4.75 bc
Proclaim	5.38 ab	5.13 ab	5.50 ab
Avaunt	4.00 cd	4.25 bc	4.63 bc
Alverde	4.38 bcd	4.63 ab	5.25 ab
SpinTor	4.88 abc	4.75 ab	5.13 ab
Radiant	4.25 bcd	4.25 bc	4.63 bc
Tesoro	4.25 bcd	4.63 ab	5.13 ab
Coragen	3.38 d	3.38 cd	3.13 de
Coragen+	2.00 e	2.25 d	2.88 e
Synapse	3.75 cd	4.00 bc	3.88 cd
Synapse+	3.25 d	3.38 cd	3.38 de

Number within columns followed by the same letter are not significantly different (P = 0.05).