

## CONTROL OF LEPIDOPTERA PESTS ON COLLARDS, 2004

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### **Introduction**

Lepidopterous insects are among the most damaging pests of cole crops. Common caterpillar species encountered in south Georgia include the diamondback moth (DBM), cabbage looper (CL) and imported cabbageworm (ICW). The diamondback moth typically presents the greatest control problem as it has a long history of resistance to insecticides. This test was conducted to evaluate the efficacy of selected insecticides against caterpillar pests of collards and other cole crops.

### **Materials and Methods**

The experiment was conducted in a planting of collard greens at the University of Georgia's Horticulture Farm, Tifton, Georgia. Collards, var. Top Bunch, were transplanted with two rows on a six foot bed (36 inch between rows). Experimental plots were two rows wide by 21 feet, with a fallow bed between adjacent plots. Foliar insecticide treatments were applied with a CO<sub>2</sub> pressurized backpack sprayer (60 PSI) in 30 GPA with three hollow cone nozzles per row (one over-the-top, two on drops). Treatments were applied 29 Sept. and 8 and 16 Oct., 2004.

Products tested included a *Bacillus thuringiensis* based insecticide (Xentari at 1 lb/ac), three unique chemistries recently registered for caterpillar control (SpinTor 2SC at 4 oz/ac; Avaunt 30WDG at 0.065 lb AI/ac, Proclaim 5SG at 3.2 oz/ac), two products in development and near registration (Rimon 0.83EC [novaluron] at 9 and 12 oz/ac; Pyridalyl 4EC at 4.8 and 6.4 oz/ac), and one experimental product (GF968 0.1 g AI/ml at 21.26 g AI/ac). Rimon was tested at both rates with and without addition of a surfactant (Induce at 0.025% v/v). A non-treated control was included for comparison. The entire test was treated with Capture 2EC at 0.08 lb AI/ac on 23 Aug. for control of whiteflies.

Caterpillar densities were monitored with visual inspection of plants. On the first three sample dates, 5 plants were randomly selected from each plot and each plant was visually searched and the number of caterpillars per plot was recorded. Caterpillars were classified by species or as small if they were too small for a reasonable species identification (the classification of small also serves to remove recently hatched larvae from the efficacy evaluation). On the final sample date (21 Oct.), each plot was searched for 3 minutes and the number of larvae recorded as previously described. Also on 21 October, plots were visually examined for presence of damage by caterpillars on the 'new' growth of plants. Each plot was examined and the number of plants with any damage and severe damage (large holes or portions of leaves eaten) was recorded. 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**

**Diamondback moth.** DBM pressure was low throughout the test and no significant differences were detected among treatments.

**Cabbage looper.** Looper pest pressure was moderate in this test, with the highest pressure early. Significant differences were detected on 5 October and in the total number of looper larvae per plot summed across all dates. Generally, all insecticide treatments were in the lowest statistical treatment with the exception of Pyridalyl. Pyridalyl was also the only insecticide treatment with more than one looper per plot on 14 and 21 October. Of possible note, the check, Xentari, Proclaim, Pyridalyl and low rate of Rimon had larvae detected on all four sample dates. Although not significantly different from most of the other treatments, SpinTor, Avaunt and GF 968 were the only treatments that had less than one looper per plot for the total of all four sample dates. Rimon (particularly at the higher rate) performed similarly to SpinTor, Avaunt and GF 968 with the exception of the first sample date. The higher counts on the first sample are a likely result of the 'delayed' mortality response with Rimon's mode of action (insect growth regulator).

**Imported cabbageworm.** ICW pest pressure started low and increased during the test. All insecticides tested gave statistically similar control of ICW. Of possible concern, only Proclaim and the low rate of Pyridalyl had larvae detected on three or more sample dates and a total of two or more larvae across all four samples. However, even these two treatments showed good control as compared to the check.

**Damage ratings.** At termination of the experiment, all insecticide treatments except the low rate of Pyridalyl showed statistically similar reductions in the amount of severe damage. The increase in severe damage in the pyridalyl treatment may be a result of a slight weakness on loopers and imported cabbageworm. Xentari, Proclaim and both rates of Pyridalyl provided reductions in the 'any damage' category, as compared to the check, but were not among the lowest statistical ranking. For Xentari and Proclaim, this appears to have resulted primarily from a slight reduction in control of loopers (these differences did not appear in the looper counts, but support the trends discussed in the looper section and were apparent in the field).

Overall, relatively minor differences occurred among treatments, and all treatments were better than the non-treated control. Xenatri had the most consistent damage at the end of the test, probably as a result of short residual control. Proclaim and Pyridalyl appeared to be a little weak on loopers as compared to the other treatments. Rimon provided excellent control with the exception of the first sample date (a likely result of its mode of action) and showed a slight trend for a rate response.

**Table 1. Cabbage looper densities, collard greens efficacy study, Tifton, Georgia, 2004.**

Treatment	Number of Looper larvae per 5 plants				
	1 Oct.	5 Oct.	14 Oct.	21 Oct.**	Total
Check	3.00 a	2.50 a	1.25 a	1.25 a	8.00 a
Xentari	0.75 a	0.50 cd	0.25 a	0.75 a	2.25 cd
Proclaim	1.25 a	0.75 cd	0.50 a	0.75 a	3.25 bcd
Pyridalyl 4.8	1.75 a	1.75 ab	1.00 a	1.50 a	6.00 ab
Pyridalyl 6.4	1.25 a	1.00 bc	2.00 a	0.25 a	4.50 abc
SpinTor	0.00 a	0.00 d	0.00 a	0.25 a	0.25 d
Avaunt	0.25 a	0.25 cd	0.00 a	0.00 a	0.50 d
GF 968	0.25 a	0.00 d	0.00 a	0.00 a	0.25 d
Rimon 9	1.75 a	0.75 cd	0.75 a	0.25 a	3.50 bcd
Rimon 12	1.50 a	0.25 cd	0.00 a	0.00 a	1.75 cd
Rimon 9 + Surf.	1.75 a	0.50 cd	0.00 a	0.50 a	2.75 bcd
Rimon 12 + Surf.	1.50 a	1.00 bc	0.00 a	0.00 a	2.50 bcd

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

\*\*Differences were significant at P=0.1

**Table 2. Imported cabbageworm densities, collard greens efficacy study, Tifton, Georgia, 2004.**

Treatment	Number of Imported Cabbageworm larvae per 5 plants				
	1 Oct.	5 Oct.	14 Oct.	21 Oct.	Total
Check	0.50 a	3.50 a	10.25 a	1.75 a	16.00 a
Xentari	0.00 a	0.50 b	0.00 b	0.00 b	0.50 b
Proclaim	0.50 a	0.25 b	1.25 b	0.00 b	2.00 b
Pyridalyl 4.8	0.50 a	0.75 b	0.50 b	0.50 b	2.25 b
Pyridalyl 6.4	0.00 a	0.00 b	0.00 b	0.75 b	0.75 b
SpinTor	0.00 a	0.75 b	0.00 b	0.00 b	0.75 b
Avaunt	0.00 a	0.25 b	0.00 b	0.00 b	0.25 b
GF 968	0.00 a	0.25 b	0.00 b	0.00 b	0.25 b
Rimon 9	0.00 a	0.75 b	0.25 b	0.00 b	1.00 b
Rimon 12	0.00 a	0.00 b	0.00 b	0.00 b	0.00 b
Rimon 9 + Surf.	0.25 a	0.25 b	0.00 b	0.00 b	0.50 b
Rimon 12 + Surf.	0.50 a	0.25 b	0.00 b	0.00 b	0.75 b

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

**Table 3. Plant damage at termination of collard greens efficacy study, Tifton, Georgia, 2004.**

Treatment	Number of damaged plants per plot	
	Any damage	Severe damage
Check	18.00 a	13.50 a
Xentari	9.25 b	0.75 bc
Proclaim	7.00 bcde	0.25 c
Pyridalyl 4.8	7.75 bc	2.50 b
Pyridalyl 6.4	7.50 bcd	0.50 c
SpinTor	2.50 f	0.00 c
Avaunt	3.75 def	0.25 c
GF 968	3.00 f	0.00 c
Rimon 9	5.00 cdef	0.25 c
Rimon 12	3.50 ef	0.00 c
Rimon 9 + Surf.	4.75 cdef	0.25 c
Rimon 12 + Surf.	5.25 cdef	0.25 c

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