

RESIDUAL EFFICACY OF CHLORANTRANILIPROLE (ACELEPRYN) AGAINST BLACK CUTWORM LARVAE IN CREEPING BENTGRASS TURF 2008

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OBJECTIVE

The primary objective of this study was to describe the residual activity of Acelepryn (chlorantraniliprole) applied at four different rates against larvae of the black cutworm (BCW) in order to assess the potential for season long cutworm control on golf course putting greens in Indiana.

METHODS AND MATERIALS

The experiment was located at the W.H. Daniel Center for Turfgrass Research and Education, Purdue University (West Lafayette, IN) on a stand of creeping bentgrass maintained at putting green height (0.48 cm). Plots measuring 1 x 8 m were arranged in a randomized complete-block design with 0.1 m alleys between plots. Each treatment was replicated 4 times. Liquid treatments were applied on May 8, 2008 using a hand-held CO₂ boom sprayer configured with four 8010 nozzles operating at 30 psi and calibrated to deliver a spray volume of 2 gal/1000ft². Although no post-treatment irrigation was applied, more than 0.25 inches of precipitation was received with 24 hours after the application.

Field conditions on the May 8th treatment date were:

- (1) Soil: moist, 12.0 °C at 10 cm depth
- (2) Air Temp: 10 °C
- (3) Weather – Overcast, wind 4-7 mph
- (4) Thatch: 2.0 cm

Artificial infestations of BCW were created at roughly monthly intervals following the applications (June 6, July 3, August 1, and September 11) by caging approximately 100 BCW eggs on each plot using 20.32 cm diameter PVC cylinders and plastic, snap-cap lids with screens. Approximately 2 weeks after each caging event, efficacy data were obtained by soap flushing each caged area, and the surrounding 0.25 m² of turfgrass within each plot and counting the number of BCW larvae coming to the surface. In this way, both artificially infested and naturally occurring BCW larvae were included. Different sections of the plot were infested and sampled during each of the four experimental runs. Variation in BCW larval populations was analyzed using repeated measures analysis of variance and treatment means for each sampling date were compared using Fisher's LSD test ($\alpha=0.05$).

RESULTS

Table 1. Residual efficacy of chlorantraniliprole for control of black cutworm larvae in creeping bentgrass turf. D.S. Richmond, West Lafayette, IN., 2008. Applications were made on May 8, 2008, artificial infestations were created June 6, July 3, August 1, and September 11, 2008, and efficacy was assessed June 20, July 17, August 15, and September 25.

TRT#	Treatment	Black Cutworm Larvae/0.25 m ² ± SE (% Control)			
		20-Jun	17-Jul	15-Aug	25-Sep
1	Chlorantraniliprole 1.67SC @ 0.026 lb ai/A	0.25±0.25 a (99.5)	42.5±11.98 b (0.00)	94.75±6.49 b (0.00)	50.75±6.97 c (0.00)
2	Chlorantraniliprole 1.67SC @ 0.052 lb ai/A	0.00±0.00 a (100.0)	4.00±1.08 a (90.53)	78.50±6.74 b (14.91)	37.75±12.91 c (0.00)
3	Chlorantraniliprole 1.67SC @ 0.104 lb ai/A	0.00±0.00 a (100.0)	1.25±0.48 a (97.04)	10.00±9.67 a (89.16)	15.50±9.56 b (56.94)
4	Chlorantraniliprole 1.67SC @ 0.209 lb ai/A	0.00±0.00 a (100.0)	0.75±0.48 a (98.22)	0.00±0.00 a (100.00)	0.00±0.00 a (100.00)
5	Imidacloprid 75WP @ 0.3 lb ai/A	34.75±9.60 b (33.17)	55.75±7.28 b (0.00)	95.5±3.86 b (0.00)	66.00±9.03 c (0.00)
6	Untreated Control	52.00±12.03 b ----	42.25±7.28 b ----	92.25±9.98 b ----	36.00±5.66 c ----

Numbers in same column followed by same letters are not significantly different (Fisher LSD, $\alpha=0.05$)
There were no signs of phytotoxicity associated with any of the insecticide treatments.

At one month after application, all treatments significantly reduced BCW larval densities compared to the untreated check, with the exception of imidacloprid which also failed to provide acceptable levels of control throughout the remainder of the experiment. At two months after application, the three highest rates of chlorantraniliprole maintained good levels of control whereas BCW densities in plots treated with the lowest rate of chlorantraniliprole were not different from the untreated control. By three months after application, all but the two highest rates of chlorantraniliprole failed to provide good levels of control. However, by the end of four months, the highest rate of chlorantraniliprole still sustained excellent levels of control at 100%. Although BCW densities in plots treated with imidacloprid, or the lower rates of chlorantraniliprole indicated unacceptable levels of control at various intervals after the applications, BCW larvae in these plots were consistently much smaller than those in untreated plots throughout the experiment. Such sublethal effects may be important from a management perspective because they imply a potential reduction in the amount of damage that may be expected, despite the lack of an effect on BCW densities. This observation may warrant further examination using naturally occurring black cutworm infestations.



Figure 1. Black cutworm damage to creeping bentgrass turf six weeks after applications of Chlorantraniliprole (Acelepryn) or Merit insecticide compared to untreated plots.