Residual Activity of Meridian 25WG and Two Rates of Acelepryn 1.67SC Against Second and Third Instar Black Cutworm Larvae on Creeping Bentgrass Turf

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**Summary:** The residual activity of chloronicotinyl and anthranilic diamide insecticides may create opportunities to achieve extended control of certain insect pests with only one application. This study examined the residual activity of Meridian 25WG and Acelepryn 1.67SC against second and third instar black cutworm larvae on creeping bentgrass turf maintained under normal putting green management regimes of fertilization, mowing and irrigation.

**Materials and Methods**
The experiment was conducted at the W.H. Daniel Turfgrass Research and Diagnostic Center on the campus of Purdue University (West Lafayette, IN). The site was a stand of turfgrass consisting primarily of Pennlinks creeping bentgrass maintained at 1/8 inch. Plots measuring 0.6 x 1.2 m were arranged in a randomized complete-block design with 0.3 m alleys between plots. Treatment were applied on August 3 and each treatment was replicated 4 times 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. Three days prior to each evaluation date, one PVC cage (8” diameter) was installed on each plot and 10, 2nd – 3rd instar black cutworms were placed into each cage in order to create an artificial infestation.

Field conditions on the August 3 application date were:

1. Soil Temp.: 26.7 °C  
2. Air Temp: 28.9°C  
3. Weather: clear, wind 0-5 mph  
4. Thatch: 2.0 cm

On each assessment date (Aug, 6th, 13th, 20th, Sept 4th and 17th) cutworms were flushed from the turf using a standard soapy water flushing solution. Larvae emerging from each plot were collected into vials containing 70% ethanol as a preservative. All larvae were then taken to the laboratory where they were counted and weighed.

Treatment effects on larval mortality and average larval mass were examined using repeated measures ANOVA and between treatment comparisons were performed using Fishers LSD test (α=0.05).

**Results and Discussion**
Acelepryn initially provided excellent control of black cutworm (BCW) larvae regardless of application rate with BCW mortality reaching 92-95% at 3 days after treatment (DAT). The higher rate of Acelpepryn provided acceptable levels of control up to 10 DAT with BCW mortality reaching 70%. However, neither rate of Acelpepryn provided acceptable levels of control thereafter. Meridian 25WG failed to have any significant impact on BCW mortality even at 3 days after application.

Sub-lethal effects, measured as reduced average larval mass were significant for Acelpepryn regardless of application rate for up to 17 DAT with the higher rate of Acelpepryn significantly reducing average larval mass for the entire duration of the study.

Conversely, Meridian had no significant influence on average larval mass at any time during the experiment.
These results illustrate the potential for Acelepryn to provide excellent control and some degree of extended residual activity against BCW larvae even at relatively low rates. However, results also confirm previous findings indicating that Meridian has relatively little activity against BCW larvae.

**Table 1.** Mortality (%) and average mass of 2nd and 3rd instar black cutworm larvae at 3, 10, 17, 32 and 43 days after application on creeping bentgrass plots treated with Meridian 25WG or Acelepryn 1.67SC. Applications were made on August 3 and 10 black cutworm larvae were caged on treated plots 3 days prior to each evaluation date (Aug. 6, Aug. 13, Aug. 20, Sept. 4 and Sept. 17).

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate Product/Acre</th>
<th>AUGUST 6</th>
<th>AUGUST 13</th>
<th>AUGUST 20</th>
<th>SEPTEMBER 4</th>
<th>SEPTEMBER 17</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mort. (%)</td>
<td>Average Mass (g)</td>
<td>Mort. (%)</td>
<td>Average Mass (g)</td>
<td>Mort. (%)</td>
<td>Average Mass (g)</td>
</tr>
<tr>
<td>Untreated</td>
<td>---</td>
<td>10.0 (±5.8a)</td>
<td>0.13 (±0.01a)</td>
<td>20.0 (±4.1a)</td>
<td>0.09 (±0.01a)</td>
<td>12.5 (±4.8a)</td>
</tr>
<tr>
<td>Meridian 25WG</td>
<td>17.0 oz</td>
<td>15.0 (±8.7a)</td>
<td>0.10 (±0.01a)</td>
<td>17.5 (±4.8a)</td>
<td>0.07 (±0.00a)</td>
<td>7.5 (±2.5a)</td>
</tr>
<tr>
<td>Acelepryn 1.67SC</td>
<td>4.0 floz</td>
<td>92.5 (±4.8b)</td>
<td>0.02 (±0.01b)</td>
<td>70.0 (±10.8b)</td>
<td>0.04 (±0.00b)</td>
<td>50.0 (±12.3b)</td>
</tr>
<tr>
<td>Acelepryn 1.67SC</td>
<td>2.0 floz</td>
<td>95.0 (±5.0b)</td>
<td>0.01 (±0.01b)</td>
<td>65.0 (±11.9b)</td>
<td>0.04 (±0.00b)</td>
<td>7.5 (±2.5a)</td>
</tr>
</tbody>
</table>

*Numbers within a column followed by different letters are significantly different at alpha=0.05*