BLUEGRASS, ANNUAL: *Poa annua* L.  
CREEPING BENTGRASS: *Agrostis palustris* L.

FIELD EFFICACY OF BIORATIONAL PRODUCTS AGAINST FIRST GENERATION ANNUAL BLUEGRASS WEEVIL, GOLF COURSE FAIRWAY, 2008

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Annual bluegrass weevil (ABW): *Listronotus maculicollis* (Dietz)

Three biorational products (spinosad: Conserve), Novodor (*Bacillus thuringiensis* var. *tenebrionis*), and *Steinernema carpocapsae* (Millenium) were tested for field efficacy against ABW on golf course fairway turf in spring 2008. Each product was applied 3 Jun 2008 or 12 Jun 2008 when small larvae had emerged from eggs, and plots were sampled 24 Jun 2008 to determine the efficacy of the compounds against larvae of the first generation of ABW. The test was conducted at Oak Hill Country Club, in Fitchburg, MA. The conditions at the time of application were as follows: 3 Jun: air temp, 83°F; soil temp (at 2 inches), 64°F; water pH, 5.7; warm and humid with light NW breeze; 12 Jun: air temp, 82°F; soil temperature (at 2.0 inches), 70°F; water pH, 5.4; warm but not humid, calm; soil pH, 6.3; buffered pH, 6.6; CEC, 11.9 Meq/100g; thatch ca. 0.5 inch. Treatment plots were 6 ft by 6 ft, replicated five times, and arranged in a CRB design. All formulations were applied with a watering can (3 qt water per plot), with half the material applied in one direction and the remainder applied in a perpendicular direction. Nematode applications (Millenium) were followed immediately with an additional 4.5 qt water by hand. All plots were irrigated with 0.1 inch within 1 h after application. Product efficacy was evaluated on 24 Jun by removing 10 1.85-inch diameter cores from near the center of each plot, transporting the cores to our laboratory in Amherst, and using a saline solution to extract all stages except eggs. Each core was recorded separately, and all counts were included in statistical analyses (Waller Duncan MRT, F = 3.49; P<0.0001). Larvae per core actually reflects counts of all larvae and pupae. Adults were not included in the analysis because of their mobility.

There were more than 115.0 larvae per sq. ft. in the untreated checks, well above the generally accepted spring threshold of 30 to 80 larvae per sq. ft. Conserve reduced populations significantly on both treatment dates, providing > 90% control. Novodor failed to reduce populations significantly on either treatment date. Millenium reduced larval populations when applied 12 Jun but not when applied 3 Jun.
Table 1

<table>
<thead>
<tr>
<th>Treatment/ formulation</th>
<th>Product per acre</th>
<th>Mean larvae per plug</th>
<th>Mean larvae per sq. ft.</th>
<th>Date</th>
<th>% Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Untreated check</td>
<td>---</td>
<td>2.30a</td>
<td>117.0</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Millenium 1 billion</td>
<td>3 Jun</td>
<td>2.14a</td>
<td>108.9</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>Novodor 3.6 qt</td>
<td>3 Jun</td>
<td>2.44a</td>
<td>124.1</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Conserve 3.3 pt</td>
<td>3 Jun</td>
<td>0.06d</td>
<td>3.1</td>
<td>97.4</td>
<td></td>
</tr>
<tr>
<td>Millenium 1 billion</td>
<td>12 Jun</td>
<td>0.64bcd</td>
<td>32.6</td>
<td>72.2</td>
<td></td>
</tr>
<tr>
<td>Novodor 3.6 qt</td>
<td>12 Jun</td>
<td>1.56ab</td>
<td>79.4</td>
<td>32.2</td>
<td></td>
</tr>
<tr>
<td>Conserve 3.3 pt</td>
<td>12 Jun</td>
<td>0.22cd</td>
<td>11.2</td>
<td>90.4</td>
<td></td>
</tr>
</tbody>
</table>

Numbers followed by the same letter are not significantly different, Waller Duncan MRT, \( P = 0.05 \) (significance level = 0.05); \( F = 3.49; P < 0.0001 \)