Management of Sugarbeet Cyst Nematode with In-Furrow and Foliar-Banded Nematicicides

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Introduction
Sugarbeet cyst nematode (SBCN) can negatively affect sugarbeet production in Wyoming and other production areas, and the nematode is difficult to manage. Newer nematicides are becoming available to manage SBCN, but require field testing to determine efficacy, application method, and crop safety over a wide range of agricultural environments.

Objectives
Our objectives were to compare the efficacy of new nematicide treatments on sugarbeet cyst nematode and determine effects on the sugarbeet crop. We tested a (1) new nematicide applied in-furrow (Velum® Prime) in combination with a foliar-banded application of Movento® HL insecticide/nematicide; (2) foliar-banded-only application of Movento HL; and (3) foliar-banded-only application of Movento 240 SC.

Materials and Methods
The study was established in 2017 at the James C. Hageman Sustainable Agriculture Research and Extension Center (SAREC). Two foliar application programs (#2–3, Table 1) and an in-furrow plus two foliar-application treatments (#4, Table 1) were compared to a non-treated check for the management of SBCN (Table 1). A randomized complete block design with four replicates was established on May 16. Each plot was 20 feet long and four rows wide with a five-foot, non-treated, in-row buffer between plots. Parameters measured included treatment effects on crop health and final stands of sugarbeet, SBCN severity, and sugar yield (Table 1). All data were collected from the middle two rows of each plot (40 row ft in total).

Results and Discussion
On June 19, the in-furrow treatment of Velum Prime + the foliar-banded application of Movento HL resulted in less than half the sugarbeet stand compared to the foliar-banded-only treatments and non-treated check (Table 1). Additionally, this treatment exhibited significantly more phytotoxicity compared to the other treatments. Phytotoxicity in the treatments was characterized by plant distortion, but plants recovered within several weeks. An August 29 survey revealed that SBCN infestations were apparent throughout the plot area. On this date, the Velum Prime + Movento HL treatment had significantly lower SBCN cyst rating than the treatments of just the Movento foliar-banded applications and the non-treated check. At harvest, however, there were no significant differences between treatments for cyst ratings or sugar yield.

Acknowledgments
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Table 1. Management of sugarbeet cyst nematode in sugarbeet with in-furrow and foliar-banded nematicide treatments.

<table>
<thead>
<tr>
<th>Treatment, rate, and timing</th>
<th>% Phytotoxicity</th>
<th>Stand count (40 ft)</th>
<th>Cyst rating late season (0–3)²</th>
<th>Cyst rating at harvest (0–3)²</th>
<th>Lb sucrose/ac</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Non-treated check</td>
<td>0.0 a³</td>
<td>69.8 a</td>
<td>3.0 a</td>
<td>3.0 a</td>
<td>2,781.0 a</td>
</tr>
<tr>
<td>2. Movento HL (2.5 oz/ac) B,C + DYNE-AMIC (0.25% v/v) B,C</td>
<td>12.5 a</td>
<td>67.3 a</td>
<td>2.6 a</td>
<td>3.0 a</td>
<td>2,833.6 a</td>
</tr>
<tr>
<td>3. Movento 240 SC (5 oz/ac) B,C + DYNE-AMIC (0.25% v/v) B,C</td>
<td>8.3 a</td>
<td>67.3 a</td>
<td>2.8 a</td>
<td>2.9 a</td>
<td>3,235.6 a</td>
</tr>
<tr>
<td>4. Velum Prime (3 oz/ac) A + Movento HL (2.5 oz/ac) B,C + DYNE-AMIC (0.25% v/v) B,C</td>
<td>41.7 b</td>
<td>30.3 b</td>
<td>1.3 b</td>
<td>2.8 a</td>
<td>3,304.6 a</td>
</tr>
</tbody>
</table>

1In-furrow application rate was adjusted for 30-inch rows. Application dates were as follows: A=May 13 (in-furrow), B=July 10, C=July 17.
Foliar treatments were applied as a 7-inch foliar band.
2Cyst rating scale is as follows: 0=none, 1=1–10 cysts/root, 2=11–100 cysts/root, 3=>100 cysts/root.
3Means followed by different letters are statistically different; Fisher's protected least significant difference (p≤0.05).
4DYNE-AMIC® is a surfactant.
*V/v=volume/volume.