ONION THRIPS MANAGEMENT UPDATE

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New product registrations

Product now registered on onions in the U.S.:
• Agri-Mek SC (abamectin)

Products in the pipeline:
• Movento (spirotetramat) – has federal label on many vegetable crops, but still not on onion (May 2013)
• Benevia (cyantraniliprole) – not labeled yet (target 2\textsuperscript{nd} quarter 2013)
• Tolfenpyrad 15EC (tolfenpyrad) – labeled on greenhouse crops, but not on onion (target 2014)

Section 18 for 2013:
• Movento
Insecticide trial conducted on farm

Goals in 2012:
• compare thresholds to weekly sprays
• determine Radiant rate
• test experimental products in programs

Methods:
• All treatments included non-ionic surfactant (Dyne-Amic, 0.5% v/v)
• 50 gallons per acre, 40 psi, single nozzle boom
• counted thrips weekly on 10 randomly selected plants per plot
• visual rating of thrips damage on two dates
• first insecticide application was on Jun 20, 2012
• three-row beds, 15 ft long plots
Which products were included in the 2012 MSU onion thrips insecticide study?

<table>
<thead>
<tr>
<th>Chemical Class</th>
<th>Products used in onion thrips insecticide trial</th>
<th>Group</th>
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</thead>
<tbody>
<tr>
<td>pyrethroid</td>
<td>-</td>
<td>3A</td>
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<td>organophosphate</td>
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<td>1B</td>
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<td>neonicotinoid</td>
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<td>carbamate</td>
<td>Lannate</td>
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<td>spinosyn</td>
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<td>abamectin</td>
<td>Agri-Mek</td>
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<td>pyrazol</td>
<td>Tolfenpyrad&lt;sup&gt;1&lt;/sup&gt;</td>
<td>21A</td>
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<td>spirotetramat</td>
<td>Movento&lt;sup&gt;2&lt;/sup&gt;</td>
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<td>cyantraniliprole</td>
<td>Benevia&lt;sup&gt;1&lt;/sup&gt;</td>
<td>28</td>
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</tbody>
</table>

<sup>1</sup> experimental product

<sup>2</sup> can only be used under Section 18 Exemption
Which program performed the best overall?

- **Movento**
- **Agri-Mek**
- **Radiant**
- **Lannate**

- Dark green bars – sequence started with Movento
- Light green bars – sequence started with Movento, used thresholds
- Blue bars – sequence didn’t start with Movento or had no Movento

- average onion thrips per plant

Program performance summary:

- Program 16 performed the best overall.
- Program 13 performed the worst overall.

Programs 3, 4, 7, 8, 11, 1, 2, 6, 10, 12, 14, 9, 5, 15, and 16 all showed significant differences in performance compared to the others.

Program 16 is significantly better than programs 3, 4, 7, 8, 11, 1, 2, 6, 10, 12, 14, 9, 5, 15, and 13.

Programs 3, 4, 7, 8, 11, 1, 2, 6, 10, 12, 14, 9, 5, 15, and 13 showed no significant differences in performance.

Programs 13 and 16 had the highest and lowest average onion thrips per plant respectively.
Does using high Radiant rate help in thrips suppression?

Movento
Agri-Mek
Radiant (10 fl oz/A)
Lannate

Radiant - max. 30 fl oz per season
Does it matter if *MBovento* is used at the beginning of the season?

- **green bars** – sequence started with *MBovento* or had no *MBovento*
- **blue bars** – sequence didn’t start with *MBovento* or had no *MBovento*
Is Torac going to be helpful?

Movento
Agri-Mek
Torac
Radiant

Movento
Lannate
Torac+Lannate
Radiant

Movento
Torac
Radiant
Lannate

Torac
Agri-Mek
Radiant
Lannate

average onion thrips per plant

0 10 20 30 40 50 60 70

13 3 7 4 8 11 1 2 6 10 12 14 9 5 15 16

a ab ab ab ab bc bc abc abc bcd cde def ef ef f

Is Torac going to be helpful?
Can *Torac* replace *Movento*?

**Torac**
Agri-Mek
Radiant
Lannate

**Movento**

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<th>Average onion thrips per plant</th>
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Can *Torac* replace *Movento*?
Does the position of *Benevia* matter in the program?

Movento
Lannate
Benevia
Radiant

Movento
Lannate
Benevia
Radiant

Benevia
Movento
Lannate
Radiant

Movento
Benevia
Lannate
Radiant

average onion thrips per plant

13 3 7 4 8 11 1 2 6 10 12 14 9 5 15 16

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Movento
Lannate
Benevia
Radiant

Movento
Lannate
Benevia
Radiant

Benevia
Movento
Lannate
Radiant

Movento
Benevia
Lannate
Radiant
Can using thresholds work as well as weekly sprays?

Programs applied at threshold:
- 3 thrips/leaf – Radiant
- 1 thrips/leaf – all other products
1: Treatments 10 vs. 11

- Threshold (Radiant – 3 thrips/leaf, all other products – 1 thrips/leaf)
- No threshold, weekly applications

**Weekly average thrips numbers**

- Movento
- Movento
- Agri-Mek
- Agri-Mek
- Radiant
- Radiant
- Lannate
- Lannate

**Seasonal average thrips numbers**

- ~$150/A
- ~$199/A

Seasonal averages are not statistically different
2: Treatments 12 vs. 13

- **Threshold** (Radiant – 3 thrips/leaf, all other products – 1 thrips/leaf)
- **No threshold**, weekly applications

**Weekly average thrips numbers**

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**Seasonal average thrips numbers**

- ~$128/A
- ~$229/A

Seasonal averages are statistically different.
3: Treatments 14 vs. 15

- **Black** threshold (Radiant – 3 thrips/leaf, all other products – 1 thrips/leaf)
- **Gray** no threshold, weekly applications

Seasonal average thrips numbers:
- ~$180/A
- Seasonal averages are not statistically different.

No Movento or Radiant.
Blue lines indicate treatments where Movento was applied at the beginning of the season.

- **Black line** – untreated control
- **Dotted line** – Program 1
- **Blue line** – Program 2
- **Red line** – Program 3

<table>
<thead>
<tr>
<th>Week</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<tbody>
<tr>
<td>thrips/leaf</td>
<td>2.5</td>
<td>2.0</td>
<td>4.0</td>
<td>6.0</td>
<td>15.0</td>
<td>10.0</td>
<td>6.0</td>
<td>1.0</td>
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</table>

The graph shows the average number of thrips/leaf per week for different treatments.
Using thresholds and new products

weeks 1 2 3 4 5 6 7 8

1 thrips/leaf Benevia
3 thrips/leaf Radiant
1 thrips/leaf Lannate

Inset: Graph showing thrips counts per leaf over weeks.
Yields

• average yield across treatments: 726.8 cwt/acre

• all insecticide programs yielded significantly more than the untreated control

• all insecticide programs (except 14) had more jumbos than untreated control

• jumbos weighed significantly more in all insecticide programs (except 14, 5) compared to control
Research Plans for 2013

1. Demonstrate effective insecticide rotations that take into account the principles of insecticide resistance management.

2. Test experimental insecticide in program.

3. Continue to develop thresholds for registered and new insecticides.
Acknowledgements

• Krummrey Farms

• The Michigan Onion Growers Association

• The undergraduate students who spent hours counting thrips in the field

• Bayer CropScience, DuPont, Nichino America, Dow AgroSciences, Syngenta Crop Protection