Onion thrips research round-up from 2019

Empire State Producers EXPO
January 15, 2020

Karly H. Regan and Brian A. Nault
Department of Entomology
Cornell AgriTech

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Onion thrips (*Thrips tabaci*)

- Major pest of onion
- Feeding reduces bulb weights 30-60%
- Vector of multiple plant pathogens

**Management of onion thrips**

- Reliant on insecticide use
  - Effective
  - Economical

![Onion thrips damage and IYSV]

Minkus Family Farms
Management of onion thrips

- Multiple insecticides are available
  - At least 6 active ingredients and 6 IRAC classes

- Movento (IRAC 23) is systemic and highly effective when plants are small (not great against adults; not very effective after bulbing) EARLY

- Agri-Mek SC (IRAC 6) is moderately effective; 30-d pre-harvest interval EARLY/ MIDDLE

- Exirel (IRAC 28) is moderately to highly effective MIDDLE/ LATE

- Minecto Pro (IRAC 6 & 28) is a premix of Exirel and Agri-Mek SC; 30-d pre-harvest interval EARLY/ MIDDLE

- Radiant SC (IRAC 5) reduces very high populations MIDDLE/ LATE

- Lannate LV (IRAC 1A) and Warrior II w/zeon tech. (IRAC 3A) are not effective individually, but provide moderate control in a tank mix LATE

Information known about efficacy of insecticides for thrips control
Insecticide Resistance Management (IRM) Principles

- Use a sequence of insecticides belonging to different classes

- Do NOT use the same product more than twice during the season and apply consecutively 7-10 days apart

- Scout fields and use an action threshold to determine whether or not to spray
Insecticide Resistance Management (IRM) Principles

- Use a sequence of insecticides belonging to different classes
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- Scout fields and use an action threshold to determine whether or not to spray

Guidelines for 2020 onion thrips management

- Assumes 6 insecticide applications within a growing season
- Assume action threshold of 1 thrips per leaf, unless specified otherwise
Guidelines for 2020 onion thrips management

- 0.6-1 thrips per leaf; prebulbing
  - Assumes 6 insecticide applications within a growing season
  - Assume action threshold of 1 thrips per leaf, unless specified otherwise

- Movento
- 7-10 days

- OPTION A
  - 0.8-1 thrips per leaf

- OPTION B
  - 1-2 thrips per leaf

- OPTION C
  - 3-5 thrips per leaf
Guidelines for 2020 onion thrips management

- Agri-Mek and Exirel should not be used in sequence with Minecto Pro.

- Warrior II w/ Zeon technology.
Guidelines for 2020 onion thrips management

- Assumed 6 insecticide applications within a growing season
- Assume action threshold of 1 thrips per leaf, unless specified otherwise

Agri-Mek can be tank mixed with Warrior II if needed

OPTION A
- Agri-Mek 1
  - Agri-Mek 1
  - 2-3 thrips per leaf
- Exirel
- Radiant
- Exirel

OPTION B
- Minecto Pro 1
  - Minecto Pro 1
  - 0.8-1 thrips per leaf
- Radiant
- Lannate + Warrior II
- Exirel

OPTION C
- Radiant
- Radiant
- Lannate + Warrior II
- Exirel

0.6-1 thrips per leaf; prebulbing
7-10 days

0.8-1 thrips per leaf

1 thrips per leaf

0.8-1 thrips per leaf

Management of onion thrips

- Onion fields scouted weekly for thrips
- Scouts convey results to growers
- Decisions made following guidelines

C. Hoepting

Muck Donut Hour in Elba

Guidelines for 2020 onion thrips management program
Management of onion thrips

- Onion thrips management program has been successfully adopted
  - 1-5 fewer sprays per field
  - Saved $60 per acre in insecticide costs
  - No resistance to Radiant, Movento and others

Elba onion growers received 2019 NYS IPM Award

Management of onion thrips

Alternative control tactics?
Management of onion thrips

Alternative control tactics?

➢ Reducing fertilizer

• 23-70% fewer onion thrips when N reduced
  (Buckland et al. 2013, Malik et al. 2009)

• Less bulb rot when N reduced
  (Diaz-Perez et al. 2003, Pfeufer et al. 2018, Wright et al. 1993)
Would reducing fertilizer reduce thrips infestations in NY?

In small-plot field trials
✓ no reduction in thrips infestations when N and P were reduced
  (Leach et al. 2017, Leach 2019)

✓ onion yield was similar despite reduction in N and P
  (Leach et al. 2017, Leach 2019)
Questions
Will reducing fertilizer reduce onion thrips populations, but not onion yield, in commercial fields?

Questions
Will insecticide frequency (weekly sprays vs. action threshold-based sprays) impact onion thrips populations and onion yield?
Objective

➢ To compare onion thrips control and bulb yield in onions grown using **varying levels of fertilizer** and **different insecticide application frequency**

Methods

*Elba Muck*

Four fields managed by three different farms in 2019
Methods
Fertilizer

Amount of fertilizer (N-P-K) applied in each field

* Width of fertilizer spreader (≥ 30 ft)

2019 Cornell Vegetable Production Guide
Methods
Fertilizer

<table>
<thead>
<tr>
<th></th>
<th>Nitrogen</th>
<th>Phosphorus</th>
<th>Potassium</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Half</td>
<td>Full</td>
<td>Half</td>
</tr>
<tr>
<td>Fields 1 &amp; 2</td>
<td>63</td>
<td>125</td>
<td>70</td>
</tr>
<tr>
<td>Field 3</td>
<td>55</td>
<td>112</td>
<td>50</td>
</tr>
<tr>
<td>Field 4</td>
<td>45</td>
<td>89</td>
<td>75</td>
</tr>
<tr>
<td>Recommended Rate</td>
<td>100-125 lb/acre</td>
<td>50-150 lb/acre</td>
<td>50-150 lb/acre</td>
</tr>
</tbody>
</table>

2019 Cornell Vegetable Production Guide

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Methods
Insecticides

- Whole field sprayed if ≥1 thrips larva/leaf
- Informed by area scouting reports
**Methods**

**Insecticides**

- Whole field sprayed if ≥ 1 thrips larva/leaf
- If grower didn't spray, we did in “weekly” subplots

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**Results**

**Thrips**

Fertilizer had no impact

Insecticide program did have an impact

No interaction between the two

**Statistics**

<table>
<thead>
<tr>
<th>Effect</th>
<th>df</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fertilizer</td>
<td>2,39</td>
<td>0.13</td>
</tr>
<tr>
<td>Spray Program</td>
<td>1,39</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Fert * Spray</td>
<td>2,39</td>
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**Results Thrips**

### Statistics

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*Action-threshold program allowed 2-5 fewer sprays while maintaining below EIL*
Results

Yield

Fertilizer had no impact!

Insecticide program had no impact!

No interaction between the two!

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Results

Yield

![Graph showing marketable yield by fertilizer rate and action threshold or weekly]

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<thead>
<tr>
<th>Fertilizer Rate</th>
<th>Marketable Yield (kg/100 onions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero</td>
<td>![Graph data points]</td>
</tr>
<tr>
<td>Half</td>
<td>![Graph data points]</td>
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<tr>
<td>Full</td>
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Results
Yield

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<tbody>
<tr>
<td>Zero</td>
<td>15</td>
</tr>
<tr>
<td>Half</td>
<td>17</td>
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<tr>
<td>Full</td>
<td>19</td>
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How different were soil nutrient levels mid-season?
Results

Soil nutrient results

![Bar chart showing nutrient levels in four fields: Field 1, Field 2, Field 3, and Field 4. The chart displays nitrogen, phosphorus, and potassium levels in 'Zero', 'Half', and 'Full' application rates for each field.](chart.png)
Fertilizer did not affect thrips populations or onion yield, even when none was applied.

Action-threshold based insecticide programs controlled thrips at an economically acceptable level, but with 2-5 fewer sprays.

Acknowledgements

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