Management Tips for Insects in Desert Vegetables

John C. Palumbo
Yuma Ag Center
NOAA: Calls for La Niña this winter

U. S. Seasonal Outlooks (December 2010 - February 2011)

California and the Southwest: **Warmer and drier** than average.

http://www.cpc.noaa.gov/

UA VegIPM, Nov 23, 2010
Aphid Abundance – Rainfall or lack thereof
Yuma Ag Center, 1999-2006

1999-2005, 5 Plantings/Yr - Oct (1), Nov (2), Dec (2)
2006, 2 plantings - Nov (1), Dec (1)

Rainfall (in.) / planting

Seasonal Avg. Aphid/Plant
Keys to Effective Aphid Management

- Scout field thoroughly, pay attention to windward edges
- Don’t treat based solely on presence of winged-adults
- Treat when 10% of plants are colonized with > 2 aphids
- Choose insecticide based on aphid species present
## Relative Efficacy Index For Aphids in Desert

<table>
<thead>
<tr>
<th>Product</th>
<th>IRAC MOA</th>
<th>Green Peach aphid</th>
<th>Potato aphid</th>
<th>A. lactuca</th>
<th>Foxglove aphid</th>
<th>Lettuce aphid</th>
<th>Cabbage aphid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lannate</td>
<td>1A</td>
<td>•</td>
<td>•</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Dimethoate</td>
<td>1B</td>
<td>•</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>MSR</td>
<td>1B</td>
<td>•</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Orthene</td>
<td>1B</td>
<td>•</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Malathion</td>
<td>1B</td>
<td>•</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Endosulfan</td>
<td>2A</td>
<td>•</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Bifenthrin</td>
<td>3</td>
<td>•</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Imidacloprid</td>
<td>4A</td>
<td>•</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Platinum</td>
<td>4A</td>
<td>•</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Assail</td>
<td>4A</td>
<td>•</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Voliam Flexi</td>
<td>4A+28</td>
<td>•</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Fulfill</td>
<td>9B</td>
<td>•</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Beleaf</td>
<td>9C</td>
<td>•</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Movento</td>
<td>23</td>
<td>•</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

- •: Good residual control (7-14 d)
- ●: Marginal residual control (4-6 d)
- ●: Poor residual control (1-3 d)
### Alternatives for Aphids Control in Desert Vegetables

*(in order of preference)*

<table>
<thead>
<tr>
<th>1st choices</th>
<th>2nd choices</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Movento</strong></td>
<td><strong>Endosulfan</strong></td>
</tr>
<tr>
<td>Beleaf</td>
<td>Orthene **</td>
</tr>
<tr>
<td>Assail *</td>
<td>MSR</td>
</tr>
<tr>
<td>Voliam Flexi</td>
<td>Dimethoate *</td>
</tr>
<tr>
<td>Admire Pro <em>(or generics)</em></td>
<td>Pyrethroids *</td>
</tr>
<tr>
<td>Platinum</td>
<td>Lannate **</td>
</tr>
<tr>
<td></td>
<td>** Will provide thrips control</td>
</tr>
<tr>
<td></td>
<td>* May provide thrip suppression</td>
</tr>
</tbody>
</table>
Movento (spirotetramat) in Desert Vegetables

Two-way Systemicity

- Whiteflies, Aphids
- Novel MOA
- IGR like activity
- **Slow Acting**
- Minimal impact on adults
- Population regulation
- **Excellent residual control**

- Foliar – air or ground
- Penetrating adjuvants
Movento Field Performance – Speed of Kill

Green Peach Aphid in Head Lettuce
Yuma Ag Center, Spring 2010

“How long does it take to kill aphids”

- Assail, 4 oz
- Movento, 5 oz
- Untreated

Days After Application

Pre-spray

Days After Application

Aphids / Plant

0 2 4 6 8 10 12 14 16 18 20 22 24

Days After Application
Movento
Green Peach Aphid in Cabbage
Yuma Ag Center, Spring 2007

“I though you said this stuff worked”
Movento

Green Peach Aphid in Cabbage
Yuma Ag Center, Spring 2007

“I though you said this stuff worked”

Aphids / Plant

Assail, 4 oz
Movento, 5 oz

March 26
April 24

UA VegIPM, Nov 23, 2010
Movento

Green Peach Aphid in Cabbage
Yuma Ag Center, Spring 2007

“I though you said this stuff worked”

Aphids / Plant

- Assail, 4 oz
- Movento, 5 oz

March 26

April 24

UA VegIPM, Nov 23, 2010
"I though you said this stuff worked"

"This is what a PCA sees"

"Too many aphids"

Note: no untreated control shown in this graph

Movento
Green Peach Aphid in Cabbage
Yuma Ag Center, Spring 2007

UA VegIPM, Nov 23, 2010
“This is what I see in the untreated control”
Performance of Movento

*Green Peach Aphid* in Cabbage
Yuma Ag Center, Spring 2007

**Aphids / Plant**

- Red: Assail, 4 oz
- Blue: Movento, 5 oz
- Black: Untreated

*Untreated Control*: > 1500 aphids / plant

**March 26**

- DAA-1: Pre-spray
- DAA-1: 3
- DAA-1: 7
- DAA-1: 14
- DAA-1: 7

**April 24**

- DAA-2: 14
- DAA-2: 21

98% control

UA VegIPM, Nov 23, 2010
Western Flower Thrips in Lettuce
WFT Management in Leafy Vegetables

Temperature

Influence of Temperature on WFT Management in Leafy Vegetables

UA VegIPM, Nov 23, 2010
WFT Management in Leafy Vegetables

Influence of Rainfall

Seasonal Rainfall
Yuma Ag Center, 2003-2005

2003 = 0.03"

2004 = 0.46"

2005 = 3.77"

UA VegIPM, Nov 23, 2010
Mean Western Flower Thrips / Plant

**WFT Management in Leafy Vegetables**

_Influence of Rainfall_

**Yuma Valley - 2010**

- **3.12” rainfall (22 Jan)**
- **0.45” rainfall (6-10 Feb)**

<table>
<thead>
<tr>
<th>Date</th>
<th>Mean Western Flower Thrips / Plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 Jan</td>
<td>Adults: 10, Larvae: 15</td>
</tr>
<tr>
<td>18 Jan</td>
<td>Adults: 10, Larvae: 15</td>
</tr>
<tr>
<td>25 Jan</td>
<td>Adults: 10, Larvae: 15</td>
</tr>
<tr>
<td>29 Jan</td>
<td>Adults: 15, Larvae: 30</td>
</tr>
<tr>
<td>1 Feb</td>
<td>Adults: 20, Larvae: 35</td>
</tr>
<tr>
<td>3 Feb</td>
<td>Adults: 25, Larvae: 35</td>
</tr>
<tr>
<td>8 Feb</td>
<td>Adults: 30, Larvae: 35</td>
</tr>
<tr>
<td>12 Feb</td>
<td>Adults: 25, Larvae: 35</td>
</tr>
<tr>
<td>16 Feb</td>
<td>Adults: 20, Larvae: 15</td>
</tr>
</tbody>
</table>

*UA VegIPM, Nov 23, 2010*
Early detection of thrips populations is important
“A few probably means a lot”

Treat before larvae become established

Use insecticides at effective rates

By ground when possible
### Alternatives for Thrips Control in Desert Vegetables

<table>
<thead>
<tr>
<th>Radiant / Success</th>
<th>1st choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lannate*</td>
<td></td>
</tr>
<tr>
<td>Orthene*</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Endosulfan</th>
<th>2nd choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethoate</td>
<td></td>
</tr>
<tr>
<td>Pyrethroids *</td>
<td></td>
</tr>
<tr>
<td>Abamectin</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Beleaf</th>
<th>3rd choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assail</td>
<td></td>
</tr>
<tr>
<td>Movento</td>
<td></td>
</tr>
</tbody>
</table>
WFT Management in Leafy Vegetables

Chemical Control

- Small plot efficacy trials
- 3 trials / yr, 2-3 sprays/ test
- 7 DAT evaluations

2008 Radiant used at 5-7 oz

WFT Larvae In Lettuce

WFT Control (% reduction compared to UTC)

Lannate+Pyrethroid

Success/Radiant

UA VegIPM, Nov 23, 2010
WFT Management in Leafy Vegetables

Chemical Control

- Small plot efficacy trials
- 3 trials / yr, 2-3 sprays/ test
- 7 DAT evaluations

* 2005, began testing Lannate at 0.5 lb/ac

WFT Adult In Lettuce

WFT Control (% reduction compared to UTC)

Lannate+Pyrethroid
Success/Radiant

UA VegIPM, Nov 23, 2010
Seed corn maggot

• Seedlings are more susceptible during a wet, cold spring in which seed germination is slowed.

• Adults lay eggs in soil; larvae begin to emerge in 2-4 days

• Adults attracted to fields with high organic matter (i.e., manure, heavy broccoli/lettuce residue)

• Larvae will also attack transplants (i.e., watermelons)

• No control alternatives once field is infested
### Seed Corn Maggot control alternatives

<table>
<thead>
<tr>
<th>Insecticide</th>
<th>AI</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cruiser</td>
<td>Thiamethoxam</td>
<td>Seed Tmt</td>
</tr>
<tr>
<td>Supresto *</td>
<td>Clothianidin+imidacloprid</td>
<td>Seed Tmt</td>
</tr>
<tr>
<td>Entrust *</td>
<td>spinosad</td>
<td>Seed Tmt</td>
</tr>
<tr>
<td>Radiant *</td>
<td>spinetoram</td>
<td>In-furrow</td>
</tr>
<tr>
<td>Brigade</td>
<td>bifenthrin</td>
<td>In-furrow</td>
</tr>
<tr>
<td>Diaz-AG500</td>
<td>diazinon</td>
<td>In-furrow</td>
</tr>
<tr>
<td>Aza-Direct</td>
<td>Azidirachtin</td>
<td>In-furrow</td>
</tr>
<tr>
<td>Belay</td>
<td>clothianidin</td>
<td>In-furrow</td>
</tr>
<tr>
<td>Coragen</td>
<td>chlorantraniliprole</td>
<td>In-furrow</td>
</tr>
<tr>
<td>Durivo</td>
<td>chlorantraniliprole+thiamethoxam</td>
<td>In-furrow</td>
</tr>
</tbody>
</table>

*These use patterns not presently labeled in cucurbits*

UA VegIPM, Nov 23, 2010
Seed Corn Maggot – Insecticide Alternatives

Trial 1, Feb 2010  Cantaloupes

Seed treatments
- Cruiser ST
- Supresto ST

In-furrow spray treatments
- Belay (4 oz)
- Durivo (5 oz)
- Admire Pro (7 oz)
- Fungicide Check

% Seedling Emergence

* Not significantly different from the fungicide check

UA VegIPM, Nov 23, 2010
Trial 2, Feb 2010

Cantaloupes

Seed treatments

Entrust, 0.5 mg
Farmore, DI400

In-furrow spray treatments

Brigade, 5 oz
Radiant, 5 oz
Diazinon, ½ pt
Belay, 4 oz
Coragen, 5 oz
Entrust, 1 oz
Aza-Direct, 2 pts
Fungicide Check

% Seedling Emergence

* Not significantly different from the fungicide check

UA VegIPM, Nov 23, 2010
Keys to Effective Seed Corn Maggot Management

- Encourage growers to avoid planting into *excessive residue*.
- Check with nursery – avoid infested transplants.
- Consider using a seed treatment or in-furrow sprays under less than ideal growing conditions.
- *Wet and cool weather encourage slow germination, and maggots have the advantage.*