Management of Arthropods on Blackberries and Raspberries in Arkansas USA

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23 June 2015
OUTLINE

• Broad Mite and Cyclamen Mite (?)
  • Damage
  • Monitoring
  • Miticide efficacy

• Spotted wing drosophila
  • Monitoring
  • Exclusion
Broad Mite
(white mite, yellow tea mite, yellow jute mite)

- *Polyphagotarsonemus latus* (Banks)
- Arachnida: Acari: Tarsonemidae

**Distribution**: world-wide in tropical and subtropical areas and greenhouses – now on citrus and blackberry

**Identification**:
A) Adult has white, dorsal stripe
B) Male carries immature female
C) Egg has many white, raised spots

(Vincent et al. 2007)
**Cyclamen Mite?**

- *Phytonemus pallidus* (Banks)?
- Arachnida: Acari: Tarsonemidae

**Distribution**: described in New York and spread world-wide and now detected on blackberry in Arkansas

**Identification**:

- Adult - 0.01 inch (0.25 mm) long; pinkish orange and shiny; move fast
- Egg – 0.125 mm oval, translucent, smooth and half the size of oval predator mite egg (0.3 mm)

[Image of mite]
Broad Mite Damage: stunting 
& downward cupping

(A) (B)

(C) (D)

(E) (F)

Vincent el. al 2010)
2015: Cyclamen Mite?: Development of Damage
2015: Broad Mite and Cyclamen Mite (?) Damage Downward and Upward Cupping / Leaf Death
Monitoring Mite Densities

10 leaflets from 2nd expanded terminal leaf
Broad Mites & Phytoseiid Mites in ‘Prime-Ark® 45’ Spring Pruned to Ground (Providence, AR USA in 2015)
Evaluating Miticides

• Location: UA Fruit Station in Clarksville, AR USA
• Treated 22 October 2014
• blackberry selection –
  – 10 plant plots with downward curled leaves and broad mites
• RCB with 3 replicates
• Gas powered, air blast sprayer (Stihl Inc.)
# Miticide Efficacy Against Broad Mite

(Fruit Station in Clarksville, AR on 22 October 2014)

<table>
<thead>
<tr>
<th>Treatment/Formulation</th>
<th>Amt/ Formulation</th>
<th>Number of broad mites per blackberry leaflet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.75 liters</td>
<td></td>
</tr>
<tr>
<td>Agri-Mek</td>
<td>5.9 ml</td>
<td>0.5a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7 DAT</td>
</tr>
<tr>
<td>Oberon</td>
<td>1.5 ml</td>
<td>6.2a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.0b</td>
</tr>
<tr>
<td>Zeal</td>
<td>0.85 g</td>
<td>10.9a</td>
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<tr>
<td></td>
<td></td>
<td>0.0b</td>
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<tr>
<td>Check</td>
<td></td>
<td>8.8a</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.5a</td>
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</table>

\[ P = 0.07 \quad 0.008 \]

\(^z^\) Tukey's Studentized Range (HSD) Test; P > 0.05.

\(^y^\) DAT, days after treatment.
SUMMARY ON TARSONEMID MITES

• Broad mite and cyclamen mite densities begin increasing in blackberries in late-May and June and can reduce yield
• Broad mites cause terminal leaf stunting, downward cupping and deformed flowers
• Cyclamen mites cause terminal leaf upward cupping, bronzing and possibly leaf death
• Applications of Agri-Mek, Oberon or Zeal each significantly reduced broad mite densities
FUTURE STUDIES OF TARSONEMID MITES

1. Seasonal changes in leaf densities and damage
2. Evaluate efficacy of miticides
3. Effects of different dates of pruning primocane to delay primocane flowering
4. Evaluate natural enemies of Tarsonemid mites
5. Determine blackberry germplasm that is susceptible to Tarsonemid mites at the UA Fruit Station
SPOTTED WING DROSOPHILA (SWD)

- 2012: 9 July - 1st detected in fruit in Arkansas
- 2014 season: 24 June - 1st infested raspberries
  - 100% infested blackberries and raspberries
  - < 10% infested blueberries and strawberries
- 2015 season: 2 June - 1st infested blackberry (23%)

• **Ferment = yeast bait** = 32 oz water + 2 tbsp yeast + 4 tbsp sugar
  – Ferment bait 1 day, then pour 4 fl oz into trap, change bait weekly

• **Scentry pouch lure and Trécé dual-lure** held with plastic wire over apple cider vinegar fly drowning solution - changed monthly (Great Lakes IPM or Scentry) (refrigerate; DO NOT STORE Trécé lure IN FREEZER)
Rearing SWD Flies from Egg-Infested Fruit

- Biweekly, collected 30 ripe fruit
- Checked for eggs (% infested)
- 30 fruit in jar for 10-14 days
- Recorded numbers of SWD males and females emerged
Insect Exclusion: 25 g/m² Mesh Insect Net on Sides and Ends of High Tunnel (4 June 2014)

Insect net mesh:
25 g/m² mesh (62% porosity)
80 g/m² mesh (80% porosity)
# SWD Infestation Outside vs. Netted

<table>
<thead>
<tr>
<th>Date</th>
<th>% infested</th>
<th>Males</th>
<th>Females</th>
<th>% infested</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Outside Flies emerged</td>
<td></td>
<td></td>
<td>High tunnel netted Flies emerged</td>
<td></td>
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<tr>
<td>2 Jun.</td>
<td>0.0</td>
<td></td>
<td></td>
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<tr>
<td>20 Jun.</td>
<td>0.0</td>
<td></td>
<td></td>
<td>6.7</td>
<td>13</td>
<td>7</td>
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<tr>
<td>8 Jul.</td>
<td>83.0</td>
<td>7</td>
<td>8</td>
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<tr>
<td>29 Jul.</td>
<td>32.1</td>
<td>12</td>
<td>14</td>
<td>0</td>
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<tr>
<td>5 Aug.</td>
<td>86.7</td>
<td>75</td>
<td>88</td>
<td>0</td>
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<tr>
<td>11 Aug.</td>
<td>100.0</td>
<td>0</td>
<td>18</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>19 Aug.</td>
<td>100.0</td>
<td>6</td>
<td>3</td>
<td>13</td>
<td>13</td>
<td>7</td>
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<td>Column Totals</td>
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<td>131</td>
<td></td>
<td>13</td>
<td>7</td>
<td></td>
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<th>Males</th>
<th>Females</th>
<th>% Infested</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raspberries</td>
<td></td>
<td></td>
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<tr>
<td>28 Jul.</td>
<td>56.7</td>
<td>5</td>
<td>12</td>
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<tr>
<td>5 Aug.</td>
<td>&gt;100</td>
<td>76</td>
<td>135</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>11 Aug.</td>
<td>&gt;100</td>
<td>33</td>
<td>27</td>
<td>0</td>
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<tr>
<td>14 Aug.</td>
<td>&gt;100</td>
<td>21</td>
<td>32</td>
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<tr>
<td>Column Totals</td>
<td></td>
<td>135</td>
<td>206</td>
<td></td>
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</tbody>
</table>
Temperatures in 25g/m² Mesh Insect Screened High Tunnel Averaged 9°F Hotter than Outside (need ventilation and misting)

Proteknet 38% airflow reduction
2015 Screened High Tunnel

80 g/m² Mesh Insect Screened Sides/Ends/Dome High Tunnel since 11 June 2015
SUMMARY FOR SWD

• SWD infested fruit earlier in 2015 than 2013 or 2014
• Insect netting on high tunnel excluded SWD:
  – Insect Net = 18 SWD flies, 0% SWD-infested blackberries
  – Outside = 924 SWD flies, averaged > 60% SWD-infested blackberries
• Need better heat venting system for high tunnel with insect net
ACKNOWLEDGEMENTS

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Berry Growers
Questions