Fig Day 2006

2005 Research: Monitoring, Sanitation, and Insect Pest Management in Figs

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Background: previous findings

• Two pests collectively responsible for majority of damage:
  – Nitidulid beetles (driedfruit beetle + \textit{C. freemani} + \textit{C. mutilatis})
  – Navel orangeworm (NOW)
• Nitidulids generally cause greater loss than NOW, but...
• Depends on year and location
## Characteristics of NOW and nitidulids

<table>
<thead>
<tr>
<th>Insect Pest (Order)</th>
<th>NOW (Lepidoptera)</th>
<th>Nitidulids (Coleoptera)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pheromone biology</strong></td>
<td>Sex pheromone, attractive to males only, no food co-attractant and not outcompeted by food</td>
<td>Aggregation pheromone, attractive to both sexes, but outcompeted by ripe fruit</td>
</tr>
<tr>
<td><strong>Feeds as adult</strong></td>
<td>No, adults short-lived</td>
<td>Yes, adults long-lived</td>
</tr>
<tr>
<td><strong>Stage entering fig</strong></td>
<td>Neonate larva</td>
<td>Adult</td>
</tr>
</tbody>
</table>
2005 Research

Objectives

• Examine association of trap counts with damage (can we predict damage?) (Madera County)
• Examine association of infestation in breba crop with infestation of fall crop (potential of sanitation for reduction of loss) (Madera County)
• Compare efficacy of current and candidate insecticides against infestation by nitidulids and NOW (UCKAC)

Items to note:

• Dependent on two sampling and evaluation efforts—one in Madera County, and one at Parlier
• First of these recently completed; second in early stages
• Analysis and conclusions presented today are preliminary and tentative
Fall Harvest, Madera County

- 50-fig samples taken from windrowed figs at 16 points in a 40-acre plot
- Conadria sampling schedule (BU, AR, IR)
  - Week 1: week of Mon 8/15
  - Week 2: week of Mon 8/22
  - Week 3: week of Mon 9/5
- Calimyrna sampling schedule
  - Arnold Ranch: Weeks of 8/22, 8/29, 9/5, and 9/19
  - Other sites (BU, IR, A12, A18): Weeks of 8/22, 9/5, and 9/19
Infestation by nitidulid beetles in fall ’05 Calimyrna harvest samples

- Nitidulid infestation high compared to previous years
- Greater infestation at two sites
Infestation by lepidopteran larvae in fall ’05 Calimyrna harvest samples

- NOW responsible for a majority of these infestations
- Low compared to nitidulids in ’05 and leps in some previous years
- Increases with later harvest
Damage by pest category: comparison of 2005 and previous years

- Pooled data for all harvests for year
- Nitidulids and navel orangeworm cause most damage
- Considering all years and locations, nitidulids show greater potential for damage (# of defects) compared to navel orangeworm
Comparison of insect pest damage, to Calimyrna and Conadria figs

- Generally much greater damage in Calimyrnas
- Greater similarity between amount of Conadria damage at these three sites
- Possibly greater proportion of damage due to navel orangeworm in Conadria compared to Calimyrna
1) Monitoring for DFP and NOW and association of trap counts with damage

- Monitoring occurred in 40-acre plots of Calimyrna and Conadria figs described for the fall harvest
- Four trap for each species place at even intervals and monitored through the growing season

![Graph showing Navel orangeworm traps and Nitidulid traps distribution.](chart.png)
Traps used for monitoring

**Navel orangeworm:**
Live females as a pheromone source.

**Nitidulid beetles:**
Rubber septa containing commercial aggregation pheromone, fermenting fruit co-attractant, and a Vapona kill strip.
Nitidulid Trapping Data

Cumulative trap counts, nitidulid beetles (x 1,000)

- A12
- A18
- Ar
- Bu
- IR

6/1  7/1  8/1
Association of nitidulid trap counts with fig damage

- Significant correlation with first harvest, but not with subsequent harvests
- Orchard history and manager experience a more useful guide
NOW Trapping Data

Cumulative sum of males in traps

- A12
- A18
- Ar
- Bu
- IR

6/1  7/1  8/1  9/1  10/1
Association of NOW trap counts with fig damage

Cumulative count NOW males captured end of flight 2

Cumulative count NOW males captured end of flight 3
2) Examine association of infestation in breba crop with infestation of fall crop

- Fifteen trees chosen at random from within 40-acre plots of Conadrias at Buchanan Hollow, Arnold Ranch, and Indian Ranch
- Samples of 15 breba figs each taken from top of canopy, bottom of canopy, and orchard floor on four sampling dates: 6/20, 6/28, 7/11, and 7/25
- All figs transported back to our laboratory for analysis of stage of development/decay and for insect infestation
- Full counts taken on 6/28
## Density of breba figs at selected locations

<table>
<thead>
<tr>
<th>Location</th>
<th>Brebas in tree</th>
<th>Brebas on ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arnold Ranch</td>
<td>56±9.4a</td>
<td>121±20.4a</td>
</tr>
<tr>
<td>Buchanan Hollow</td>
<td>39±5.6ab</td>
<td>95±29.1ab</td>
</tr>
<tr>
<td>Indian Ranch</td>
<td>25±4.4b</td>
<td>41±12.4b</td>
</tr>
</tbody>
</table>
Nitidulids—breba infestation and infestation of nearby Calimyrnas in fall crop

- Based on breba count multiplied by infestation...
- 2.6, 5.6, and 4.6 infested brebas per tree for AR, BU, and IR, respectively
- These data suggest association of nitidulid load in Conadria brebas and subsequent damage in nearby Calimyrnas (not surprising), but...
- They do not support hypothesis that low breba load means less damage to fall crop Calimyrnas
3) Compare efficacy of current and candidate insecticides against infestation by nitidulids and NOW

- Treatments: Water only, Malathion, Success, Diazonon, and Intrepid (highest label rate)
- Applied to 20 single-tree plots on 7/26 and 8/9
- Harvested figs weeks of 8/15, 8/22, and 8/29
- All assessment in our laboratory
- Currently have assessed 352 of 4,637 figs (all from first week)
## Nitidulid data, UCKAC figs

<table>
<thead>
<tr>
<th>Treatment</th>
<th>n</th>
<th>% Infest</th>
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<tbody>
<tr>
<td>Control</td>
<td>108</td>
<td>55%a</td>
</tr>
<tr>
<td>Malathion</td>
<td>57</td>
<td>54%a</td>
</tr>
<tr>
<td>Success</td>
<td>85</td>
<td>54%a</td>
</tr>
<tr>
<td>Diazinon</td>
<td>35</td>
<td>20%b</td>
</tr>
<tr>
<td>Intrepid</td>
<td>67</td>
<td>16%b</td>
</tr>
</tbody>
</table>

Based on evaluation of only 8% of sample, all from week 1
Thank you!