Scale Insects and Plant Growth Regulator Update

Bob Beede
UCCE Farm Advisor, Kings County

Website: HTTP://CEKINGS.UCDAVIS.EDU
San Jose Scale

1. Not common in Walnut twenty years ago.

2. On the increase, possibly due to reduced in-season use of organo-phosphate insecticides.

3. Research documents loss of vigor, fruiting wood, large limbs 4 to 6 inch in diameter!

4. Requires close monitoring and treatment of increasing populations.

5. Four generations per year.

6. Parasitism and predation often insufficient.
Considerations for Treatment Timing

1. Population density
2. Coverage
3. Secondary pest outbreaks - Aphids, Mites
4. Loss of beneficials
5. Ability to combine with Codling Moth Spray
6. COVERAGE !!
How About Oil?

- Dormant: NO!!
- In-season: Labeled rates will provide suppression
ReTain For Reducing Pistillate Flower Abortion in Walnut: An Extension Success Story

Bob Beede,
Farm Advisor
University of California
Kings County
WISECARVER FARMS 2010 RETAIN TIMING TRIAL
AVERAGES BASED ON NINE SINGLE-TREE REPS PER TREATMENT

AVERAGE DRY IN SHELL WT.

TREATMENTS

UTC  10-20% FEMALE BLOOM  30-45% FEMALE BLOOM  50-65% FEMALE BLOOM  10-20% 30-45% 30-45% 50-65% 10-20% 30-45% 50-65% 70-85%

C  C  C  C  BC  AB  67  73

45  49  54  55  56  67  73

0  15  30  45  60  75  90
2011 ReTain Timing Trial: Effird Farms

Data represents average dry wt yield of seven single trees
Rate per application: 1 bag/ac, 200 gpa (50 tree/ac)
Refining Ethephon Use in Walnuts

Robert Beede
UCCE Farm Advisor
Kings County
WALNUT ETHEPHON EXPERIMENT: 1200 PPM (3 YEAR AVERAGE)

8 AND 9 DAT ARE FROM 2ND HARVEST
2009 ORCHARD ETHEPHON TRIAL: TULARE cv.

FIRST HARVEST (14 DAT)

- A: 78%
- B: 90%

- P = 0.0008

HULLS

- A: 30%
- B: 22%

- P = 0.0012

9/14/09 we had 0.2" of rain fall from 8:58 a.m. to 11:48 a.m.
WARMERDAM FARMS 2010 ETHREL TRIAL PERCENT REMOVAL
TULARE WALNUTS FIRST SHAKE 9/23/10

PERCENT REMOVAL

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Percent Removal</th>
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<tr>
<td>UNTREATED</td>
<td>86</td>
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<tr>
<td>ETHREL 4PTS</td>
<td>91</td>
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<tr>
<td>ETHREL + 4OZ SILICONE</td>
<td>87</td>
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Ethrel Adjuvant Trial 2011
at the Kearney Ag Center

Seven Treatments applied by 9 AM on August 31, 2011.
Variety: Serr
Temperature: 62°F

- Untreated
- 600 ppm Ethrel
- 750 ppm Ethrel
- 750 ppm + 1 qt./100 Dyne-Amic
- 750 ppm + 2 qts/100 Rocket DL
- 750 ppm + 1 pt/100 Nufilm 17
- 750 ppm + 1pt/100 Silwet HS
Ethrel Adjuvant Trial 2011
at the Kearney Ag Center

Nuts with Hull Crack
(# out of 30)

Days after treatment
0 6 13 26

Nuts fallen
Fully bloomed

- Untreated
- 600 ppm Ethrel
- 750 ppm Ethrel
- 750 ppm + 1 qt./100 Dyne-Amic
- 750 ppm + 2 qts/100 Rocket DL
- 750 ppm + 1 pt/100 Nufilm 17
- 750 ppm + 1pt/100 Silwet HS

Ethrel Adjuvant Trial 2011
at the Kearney Ag Center
Biological Control of Spider Mites in Walnuts: Are we working on a false assumption?

Stephen C. Welter, Walt Bentley and Frances Cave
Population development of mites in tree canopy

- Biweekly leaf samples 5/4 to 8/31
- 2 cultivars X 10 trees X 6 canopy locations X 5 leaflets/location

Observations (Vina block data only):
- Numbers/leaflet low through mid July (<0.10 spider mites/leaflet)
- Phytoseiid numbers increase in June, (ratio Phytoseiid:SM ranges 5:1 to 10:1)
- Percent leaf samples with mites
  - Phytoseiids well dispersed June onward
  - Spider mites with rapid growth and dispersal in August
Phystoseiid Species Complex

1977 - Tulare County
McMurtry and Flaherty

- *Typhlodromus occidentalis* (= *Galendromus occidentalis*)
- *Typhlodromus citri*
- *Amblyseius hibisci*
- *Typhlodromus caudiglans*

2011 – Hanford walnuts
Welter, Bentley, Cave

- *Amblyseius similoides*
- *Euseius quetzali / Euseius tularensis*
- *Galendromus occidentalis* (<<1% of total sample)

*Euseius sp.* - generalist feeders on pollen, non-webbing mites, small insects, plant sap
- no association with *Tetranychus* mites

*Amblyseius similoides* - generalist feeder
- no known associations with spider mites

Potential food resources on leaf samples included pollen, tydeiid mites and thrips
Despite favorable ratios of phytoseiid mites to spider mites, it appears these species had little to no impact on the spider mite population
Phytoseiid mite composition

- Slide mounted all predator mites on leaf samples
- Graph indicates two timeframes: July, October (release and non-release)

**2011 Walnuts: Predator Mite Species as Percent of Sample**

- A. similoides
- Euseius spp.
- G. occidentalis

Observations:

- Species shift  *A. similoides → Euseius spp.*
- No recovery of *G. occidentalis* from release trees
Future Directions:

• Does predator species complex vary
  – Across regions?
  – Across orchards?

• What is responsible for the loss of *G. occidentalis* and other species from walnuts?
  – Mortality due to new chemistries?
  – Has reduction in OP use removed the selective advantage *G. occidentalis* once had?

• Can *G. occidentalis* be re-established through inoculative releases and management?

• Would other biocontrol organisms work in the walnut system?
Selective Pesticides and the Biological Control of Walnut Pests

Nick Mills
UC Berkeley

Linked with USDA-SCRI project 'Enhancing Western Orchard Biological Control'
WSU, UCB, USDA-ARS, OSU
# Lab bioassays - Summary of effects

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<th>NE tested</th>
<th>Altacor</th>
<th>Cyazypyr</th>
<th>Delegate</th>
<th>Rimon</th>
<th>Warrior</th>
<th>Kumulus</th>
<th>Kocide/Manzate</th>
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<td><strong>Misumenops lepidus</strong></td>
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Note: The chart uses color to indicate the effect measured. Green indicates < 25%, yellow indicates 25 - 75%, red indicates > 75%, and white indicates incomplete data.
Enhancing Western Orchard Biological Control
A multi-state, multi-agency SCRI project

Interactive Short Course

Course highlights:

- Discuss general principles of biological control in perennial crops with examples from apple, pear and walnut orchards.
- Engage in understanding and solving issues related to secondary pest outbreaks and the impact of invasive pests on IPM practices.
- Practice developing IPM programs and strategies that support biological control.
- Learn how to identify key natural enemies and pests they control.
- Discover new tools for monitoring natural enemies.
- Explore web resources and how they can help you to integrate biological control into your management strategy.
- Learn from new research the effects of pesticides on natural enemies.
- Understand the economic consequences of natural enemy removal in orchards.

Please join us for one of these 2-day event:

February 7-8, 2012
Wenatchee, WA, Confluence Technology Center
Pasco, WA, ESD 123

February 22-23, 2012
Stockton, CA, Robert J. Cabral Agricultural Center
THANK YOU!

QUESTIONS WELCOME OVER LUNCH!