Tree Fruit Aphid Biology & Management

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Northern Utah Fruit Growers Meeting
Brigham City, UT
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Common Tree Fruit Aphids in Utah

- **Apple**
  - Rosy Apple Aphid
  - Green Apple Aphid
  - Woolly Apple Aphid
- **Cherry**
  - Black Cherry Aphid
- **Peach**
  - Green Peach Aphid
- **Plum**
  - Mealy Plum Aphid
  - Leaf Curl Plum Aphid

How to identify aphids:
- green, black, pink, purple
- small, soft pear-shaped bodies
- slow moving
- pair of “tailpipes” – cornicles exude defensive fluid
- adults with & without wings

We’ll look at their biology in two ways:

1. phenology in relation to tree development
2. life cycle & host plants
Phenology: Rosy Apple Aphid & Green Apple Aphid

Monitor

eggs on limbs

Monitor

nymphs & adults on new growth

eggs on limbs
Rosy Apple Aphid

- Can be a severe pest of apple
- Early-season pest
- Severe leaf curling
- Fruit distortion
  - Inject a toxin when feeding
  - Affected fruit unmarketable

RAA are purplish with a waxy coating

Severe leaf curling & misshapen fruits
Rosy Apple Aphid

• Winged adults form in late spring
• Migrate to summer host
  • Plantain
    • Buckhorn plantain or ribgrass
    • Broadleaf plantain
• Winged adults form in fall
• Migrate back to apple trees
  • Lay eggs on fruit spurs and twigs
  • Shiny black “small grains of rice”
Green Apple Aphid

• Most common aphid in apple
• Other hosts:
  • pear
  • hawthorn
  • pyracantha
  • quince
• Infest succulent shoots
• Can feed on fruits
• Remain on apple throughout season

Yellow-green body with black cornicles

Feed on new growth
Management of Rosy & Green Apple Aphids

• Green Tip to Half-Inch Green
  • 2% Dormant Oil +
  • Lorsban 4E
  • Diazinon 50W

• Post-Bloom
  • Assail
  • Closer SC
  • Sivanto 200SL
  • Ultor
  • Calypso 4F (RAA)
  • Admire Pro (GAA)
  • Belay (GAA)
  • Lannate (GAA)
  • Insecticidal Soap
  • Neemix
  • 1% Horticultural Oil
Aphid Biological Control

Convergent Lady Beetle

Syrphid or Hover Fly

Green Lacewing

Brown Lacewing
Phenology: Woolly Apple Aphid

Apple

overwinter on roots & in bark crevices

feed on limbs & fruits

twig & root galls

Monitor → Monitor

<table>
<thead>
<tr>
<th>Stages of Development</th>
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<tbody>
<tr>
<td>Dormant</td>
</tr>
<tr>
<td>Fruit Present</td>
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Woolly Apple Aphid

• Can be a severe pest of apple
• Mid- & late-season pest
• Forms galls on roots & twigs  
  • reduced tree vigor  
  • stunted roots & trees
• Contaminate stem bowl of fruit

Root galls
Aphids covered in white woolly wax
Twig galls disrupt transport of nutrients & water
Woolly Apple Aphid Biological Control

Aphid Predators:
- ladybeetles
- lacewings
- syrphid flies

Alyssum planted to attract Syrphid flies to nectar & pollen

Aphid mummies

*Aphelinus mali*
parasitoid wasp of WAA
Management of Woolly Apple Aphid

• Petal Fall
  • Ultor
    • 1 or 2 applications (14 d)

• Post-Bloom when WAA first observed
  • Diazinon 50W
  • Assail 70WP
  • 1 to 1.5% Horticultural Oil
Phenology: Black Cherry Aphid
Sweet Cherry

eggs on limbs → nymphs & adults on new leaves → adults fly to mustard weeds → fly to cherry trees eggs on limbs

<table>
<thead>
<tr>
<th>Stages of Fruit Tree Development</th>
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<tr>
<td>Dormant</td>
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Black Cherry Aphid

• Large shiny metallic black aphid
• Spring pest
• Severe leaf curling
• Distortion of leaves
• Red discoloration of leaves
• Excessive honeydew gums up fruit
• Growth of black sooty mold
Black Cherry Aphid

- Winged adults form in late spring
- Migrate to summer host
  - Mustard family plants
    - Shepherd’s purse
    - Hoary cress
    - Dyer’s woad
- Winged adults form in fall
- Migrate back to cherry trees
  - Lay eggs on limbs
  - Shiny black “small grains of rice”
Management of Black Cherry Aphid

**Bud Swell to First White**
- 2% Dormant Oil +
- Diazinon 50W
- Beleaf 50 SG

**Petal Fall to Early Summer**
- Admire Pro
- Assail
- Actara
- Aza-Direct
- Beleaf
- Insecticidal Soap

Aphid Predators:
lady beetle, lacewing, syrphid fly
Phenology: Green Peach Aphid

- Eggs on limbs
- Nymphs & adults on new leaves
- Adults fly to summer hosts
- Fly to peach trees
- Eggs on limbs

Stages of Development:

- Dormant
- Swollen Bud
- 1/4-inch Green
- Pink
- First Bloom
- Full Bloom
- Petal Fall
- Post Bloom/Summer
  - June
  - July
  - August
  - Sept.
  - Post-Harvest
Green Peach Aphid

- Yellow-green body with 3 dark green stripes on back
- Winged adult has black head & thorax, yellow-green body
- Severe leaf curling & honeydew
- Flowers & fruits abort
- Feed on nectarine fruits
  - Fruit bumpy & unmarketable
- Reduce shoot vigor, retard growth
Management of Green Peach Aphid

- **Swollen Bud to First Pink**
  - 2% Dormant Oil +
  - Asana XL
  - Diazinon

- **Shuck Split**
  - Admire Pro
  - Assail
  - Closer SC
  - Actara
  - 1% Horticultural Oil
  - Insecticidal Soap

**Biological Control!**

- Lady beetles, lacewings, syrphid flies, predaceous bugs
Orchard Leafroller Survey 2014 & 2015

Collaboration with Marion Murray, USU
Utah Specialty Crop Block Grant
Leafroller Species Present in Utah Orchards

**Obliquebanded leafroller**
Primary species in N. UT
Commercial orchards
2 gens./yr
June & August/early Sep

**Fruittree Leafroller**
Secondary species
Un- & low-managed orchards
1 gen./yr
Late June/early July

**European Leafroller**
Invasive species
Very few
Utah Orchard Leafroller Survey, 2012-2015

<table>
<thead>
<tr>
<th>Species</th>
<th>No. of orchards</th>
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<tbody>
<tr>
<td>Fruittree LR (A. argyrosphilus)</td>
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<tr>
<td>European LR (A. rosanus)</td>
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<tr>
<td>Omnivorous LR (P. stultana)</td>
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<tr>
<td>Pandemis LR (P. pyrusana)</td>
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*Note: Data marked with an asterisk indicates a significant increase in moth numbers.*
No Leafroller Larvae or Injury Detected

2014 and 2015
Orchard Location

Leafroller species capture by county - 2014

Leafroller species capture by county - 2015
Improving Codling Moth Biofix

New project: funding from UDAF SCBG

• Challenges with setting accurate CM biofix
  • Too few traps
  • Trap checking interval sporadic (daily needed to set biofix)
  • Mating disruption has decreased CM pops.
  • Variable environmental conditions

• WA study (Jones et al. 2013) found biofix predictable using
  • Latitude & elevation formula (WA began using in 2008)
  • No traps

• Validate WA formula
  • Determine first CM larval entry
  • Trap catch, WA formula, temperature, wind speed

• Goal: Improve CM biofix-setting
Invasive Fruit Pest Guide
Supported by UDAF Specialty Crop Block Grant with C. Nischwitz, L. Spears & C. Burfitt

• Pests:
  1. Brown rot
  2. Plum pox virus
  3. Brown marmorated stink bug
  4. Spotted wing drosophila
  5. Plum curculio
  6. Japanese beetle
  7. Velvet longhorned beetle

• Go-to guide
  • Identification, life history, monitoring, management
  • Photos, references, resources
Chlorpyrifos Registration Cancellation

• EPA proposed to revoke all crop tolerances for the insecticide chlorpyrifos (Lorsban)
  • Comment period ended January 5, 2016
• Why?
  • Drinking water concerns in small watersheds with intense agriculture
• Orchard uses
  • Dormant/delayed-dormant applications
    • Aphids
    • Scale
    • Campylomma bug
  • Trunk treatment for greater peachtree (crown) borer
Acknowledge

• USU Extension Tree Fruit Team & IPM Program
  • Marion Murray
• Student Research Assistants
• Funding:
  • UDAF Specialty Crop Block Grant Program
  • Utah Agricultural Experiment Station
  • USU Extension

Aphids Galore!
Find this slideshow and others at www.utahpests.usu.edu

thank you... for your attention...

Contact us