



Organic Orchard Pest Management

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Superintendent & Orchard Operations Manager
March 23, 2021



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Today's Presenters



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Agriculture Center





Topics of Today's Webinar

- Degree Day Tracking
- Insects
 - Minor Pests
 - Major Pests
- Disease
 - Minor Pests
 - Major Pests
- Vertebrates
 - Minor Pests
 - Major Pests



Degree Day Tracking

- Extremely important for effective organic pest control
 - No development occurs below base temperature
- Results in fewer sprays but at key times in life cycles of pests
- Orchard Pests and Diseases
 - Codling Moth
 - Western Cherry Fruit Fly
 - Leafrollers
 - Apple Scab

$$\left(\begin{array}{l} \text{Lesser of Maximum} \\ \text{Temperature or} \\ \text{Maximum Threshold} \end{array} + \begin{array}{l} \text{Greater of Minimum} \\ \text{Temperature or} \\ \text{Base Temperature} \end{array} \right)$$

2

- Base Temperature

= Growing Degree Days



Degree Day Information

- **Western Cherry Fruit Fly**
 - Start recording on March 1st
 - Base Temperature: Low = 41
 - First Flight: 950 Degree Days after March 1st
 - First Application: On or Before 1060 Degree Days
- **Leafrollers**
 - Start recording when first moth is caught in pheromone traps
 - Base Temperature: Low = 41 & High = 85
 - Peak Moth Flight: 220-250 Degree Days
 - First Hatch: 420 Degree Days
- **Codling Moth**
 - Start recording when first consistent moths caught in pheromone traps
 - Base Temperature: Low = 50 & High = 88
 - First Control Spray: 250 Degree Days
- **Apple Scab**
 - Start recording at first Green Tips
 - Base Temperature: Low = 32
 - Accelerated Infection Phase: 300 – 700 Degree Days



Apple Bud Stages

Important for Timing Applications





Orchard Insect Pests

Minor Insect Pests

- Pear Slugs (Sawfly Larva)
- Caterpillar species
- Earwigs

Major Insect Pests

- Codling Moth
- Leaf Rollers
- Western Cherry Fruit Fly
- Aphids



Minor Insect Pests

- Pear Slug
- Red Humped Caterpillar
- Earwigs





Corrugated Cardboard for Earwig Management

Corrugated cardboard wrap



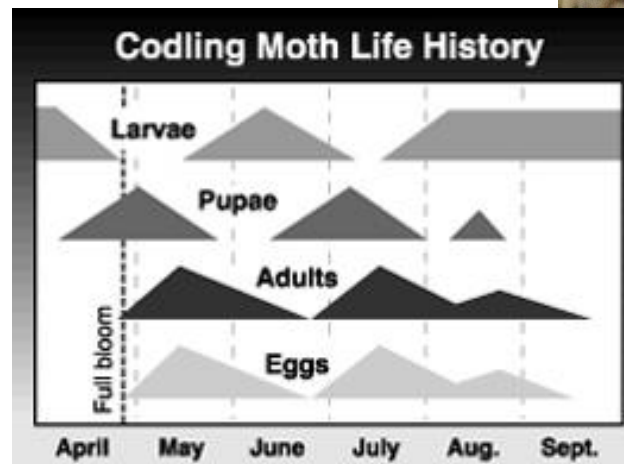
Corrugated cardboard roll





Major Insect Pest: Codling Moth

- Orchardist's Most unWanted List
- Life Cycle
 - Overwinter as larvae in cocoon under loose bark
 - Pupate when first blossoms show pink
 - Adults emerge around full bloom of Red Delicious
 - Peak emergence 17-21 days after full bloom
 - Adults mate and lay eggs within days of emerging
 - 8-14 days to incubate first generation
 - Newly hatched larvae bore into developing fruit
 - 3-4 weeks inside fruit before leaving to spin cocoon
 - Pupate and emerge as second generation or overwinter
- Control
 - Monitoring
 - Pheromone Traps
 - Degree Day Tracking
 - Mating Disruption
 - "Early & Often"
 - Spraying
 - CYD-X – granulosis virus





Major Insect Pest: Leafrollers

- Leafroller Species

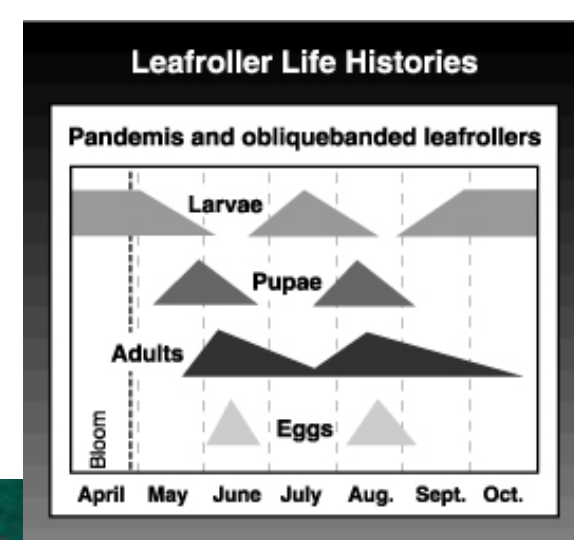
- Pandemis & Obliquebanded

- Life Cycle

- Two Generations per Year
- Overwinter in Crevices and Pruning Scars
- Larvae become active during bud break
- Bore into opening flower and leaf buds
- Larvae full grown and pupate mid-May
- Adults emerge late-May to early-June
- Second Generation active until October

- Control

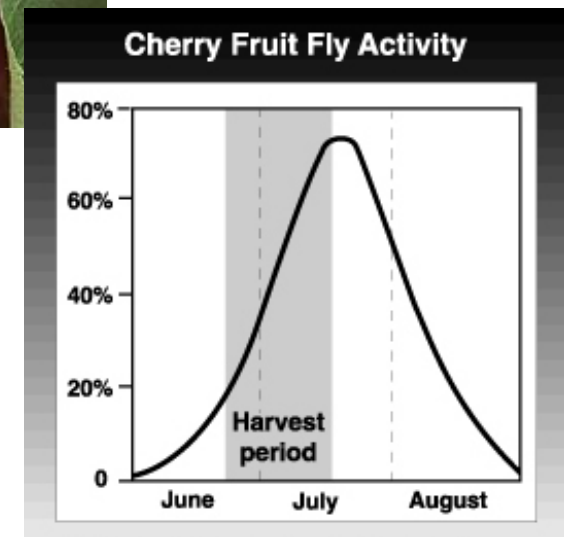
- Monitoring
 - Pheromone Traps
 - Degree Days
- Sprays
 - Bt – *Bacillus thuringiensis*
 - 2-3 Applications between Tight Cluster and Petal Fall – Spring





Major Insect Pest: Western Cherry Fruit Fly

- Life Cycle
 - One Generation Per Year
 - Adults emerge in May
 - Females become sexually mature in 7 – 10 days
 - Lay eggs under skin of fruit
 - Eggs hatch in 5 – 8 days
 - Larvae spend 10 – 21 days feeding
 - Leaves fruit to pupate in soil overwinter
- Damage
- Control
 - Monitoring
 - Trapping
 - Degree Days
 - Spraying
 - Spinosad product
 - 1066 degree days after March 1st
 - Petal Drop
 - 7 – 14 day interval thru harvest





Major Insect Pest: Aphids

- Damage
 - New growth terminals
- Ants
 - Making things worse
 - Tanglefoot
- Control
 - Dormant Oil Sprays
 - High Pressure Spray
 - Biocontrol
 - Lady Bugs
 - Green Lacewing





Tanglefoot Application





Minor Disease Pests

- Powdery Mildew
- Black Rot & Frogeye Leaf Spot
- Bitter Pit





Major Disease Pest: Apple Scab

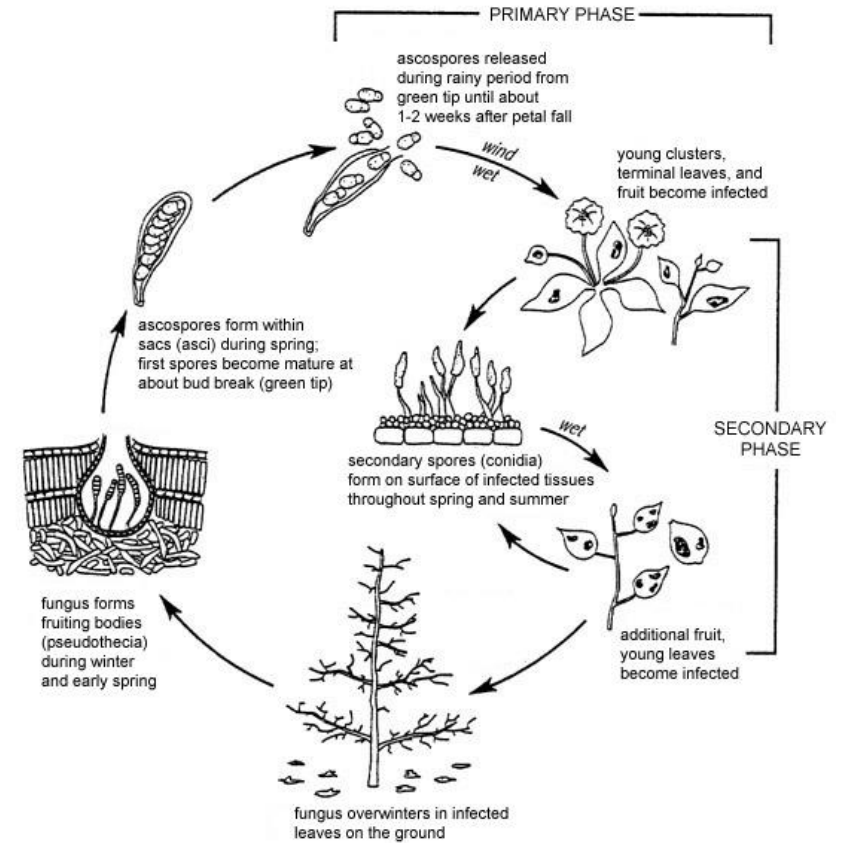
• Life Cycle

- Overwinter in fallen leaves & fruit
- Spores discharged between bud break & petal drop
- Discharged spores act to spread secondary infection
- Needs moisture to spread and infect

• Damage

• Control

- Sanitation & Pruning
- Degree Days
 - 7-14 day interval from 300-700 Degree Days
- Sulfur





Major Disease Pest: Fire Blight

- Life Cycle
 - Overwinters at the edge of cankers
 - Bacterial ooze as spring temperatures rise
 - Bacteria spread by rain or insect
 - Can sit dormant in orchard until favorable conditions
- Damage
 - Blossom Blight
 - Shoot Blight
 - Limb & Trunk Blight
- Control
 - Select resistant varieties
 - Prediction Models – WSU
 - Leaf Wetness & Temperature
 - Avoid over fertilizing with nitrogen
 - Sanitation – tools & debris
 - Prune out infection





Minor Vertebrate Pests

- The Deer Family
 - Deer
 - Elk
 - Moose
- Birds
- Large Rodents
 - Rabbits
 - Woodchucks
 - Beavers





Major Vertebrate Pest: Voles

- Life Cycle
 - Life Span 3-6 Months
 - Females Sexually Mature at 13 Day
 - Gestation of 16-24 Days
 - 5-8 Voles per Litter
 - 2-5 Litters per Female
- Damage
- Control
 - Organic = No Baits/Poisons
 - Mechanical Trapping
 - Cultural Control
 - Hardware Cloth
 - Groundcover
 - Predators





Major Vertebrate Pest: Pocket Gophers

- Life Cycle
 - Life Span: Up to 3 Years
 - Female Sexual Maturity: 12 months
 - 5-8 Pups per Litter
 - 1-2 Litters per Year
 - Burrows 6-12" Deep
 - Solitary except During Mating
- Damage
- Control
 - Mechanical Trapping
 - Underground Barrier
 - Cultural Practice
 - Groundcover
 - Predators





Questions?





Additional Resources

University of Idaho Sandpoint Organic Agriculture Center:

<https://www.uidaho.edu/cals/sandpoint-organic-agriculture-center>

University of Idaho Parma Research and Extension Center:

<https://www.uidaho.edu/cals/parma-research-and-extension-center>

University of Idaho Pomology and Viticulture Program, Esmail Fallahi:

<https://www.uidaho.edu/cals/parma-research-and-extension-center/pomology>

Washington State University Tree Fruit Comprehensive Website: <http://treefruit.wsu.edu/>

Organic Tree Fruit Management by Certified Organic Associations of British Columbia:

<https://www.certifiedorganic.bc.ca/publications/otfm.php>

AgriMet Weather Data: <https://www.usbr.gov/pn/agrimet/wxdata.html>