




Insects in the Vineyard

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North Coast IPM Advisor

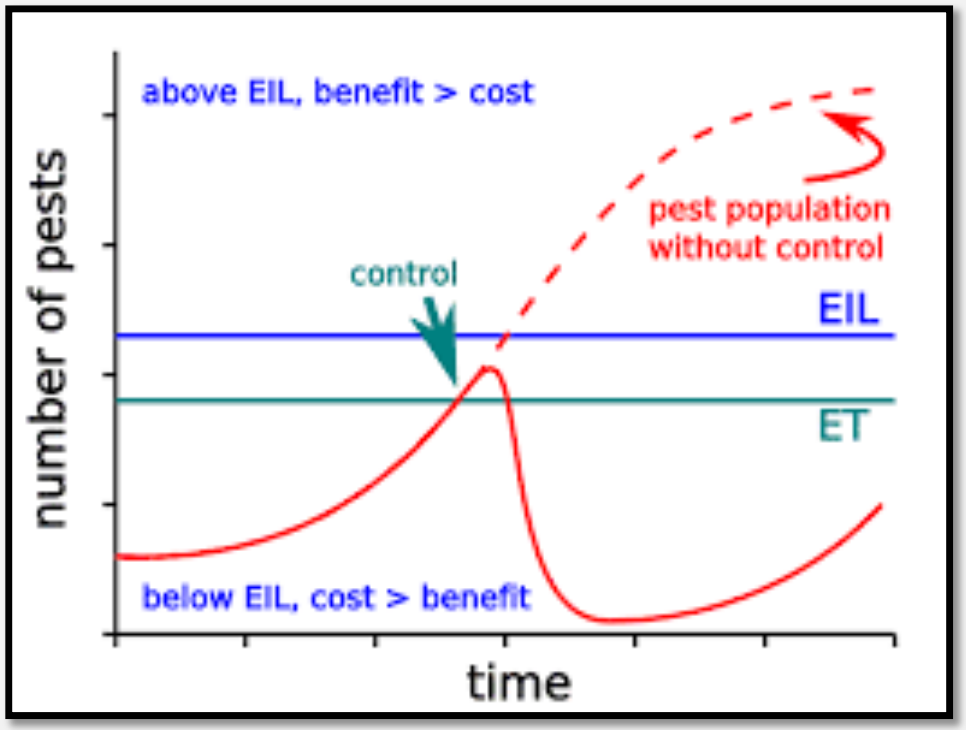


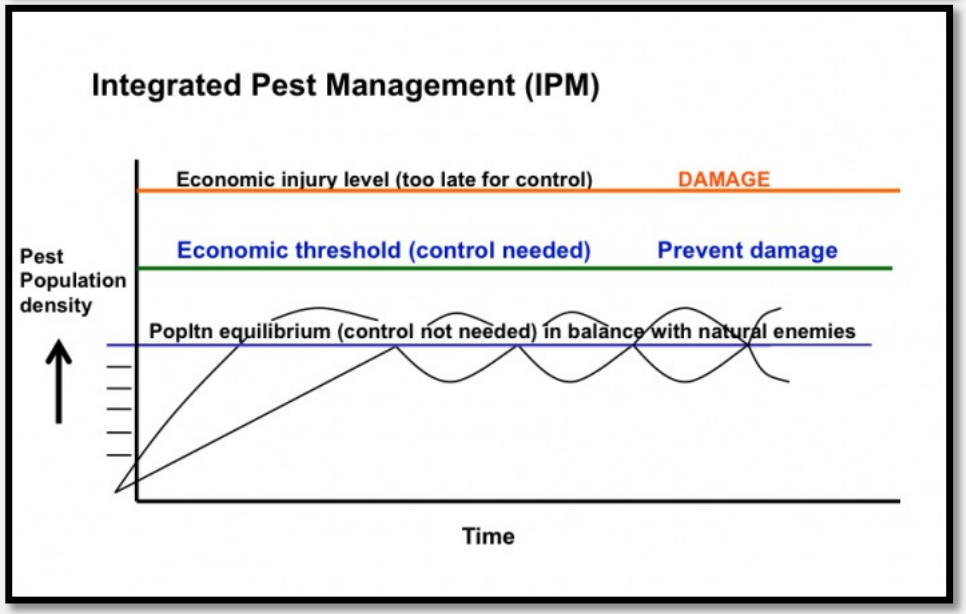

UC IPM | UNIVERSITY OF CALIFORNIA Agriculture and Natural Resources | Statewide Integrated Pest Management Program

Only 2-5% of insects are pest species

What is a pest?

Is this deer a pest ?



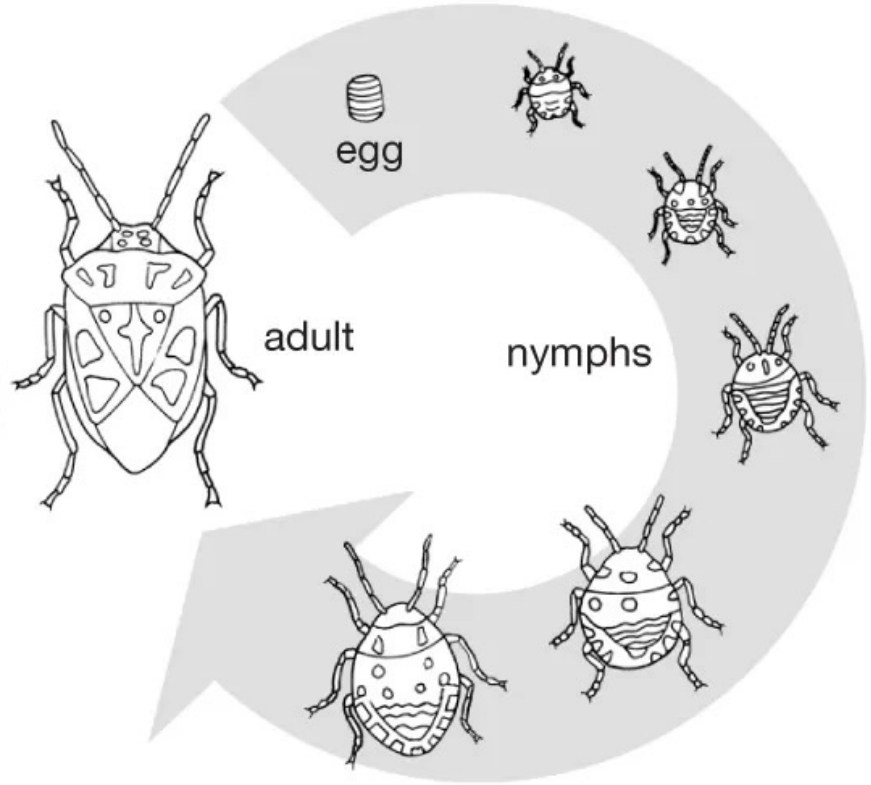


ECONOMIC INJURY LEVEL

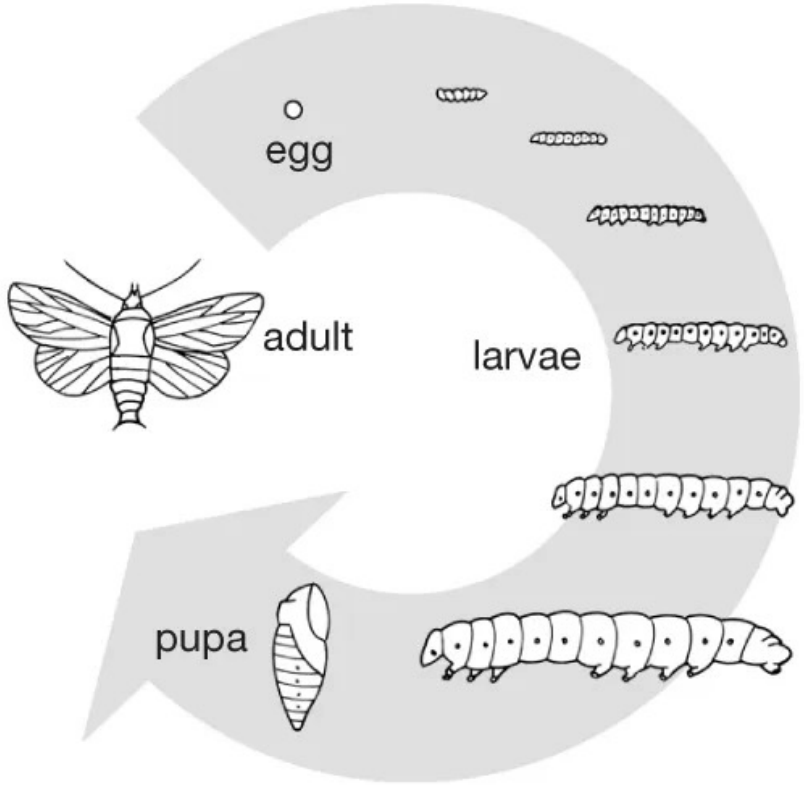
Economic injury level – (EIL) – when the cost of losses equals the cost of control measures

Economic threshold – (ET) – pest density that should trigger management actions to prevent unacceptable damage

Some insects are never economic pests the equilibrium position remains below the economic threshold (ET) and economic injury level (EIL)



Incomplete metamorphosis

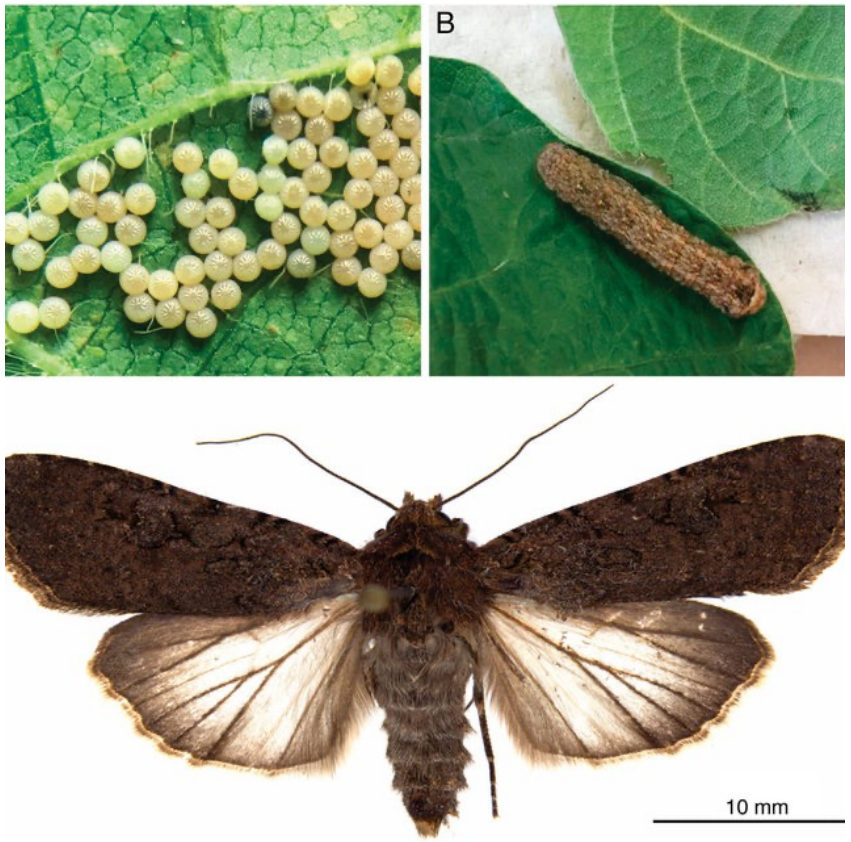


Complete metamorphosis

Pest Insects & Mites of Grapevines

Chewing mouthparts
(Cause damage)
Usually lack noticeable features for ID

Siphoning mouthparts
(Cannot cause damage)
Lays eggs on or near grapevines
Traps can be deployed to catch adults for ID
Most adults are active at night



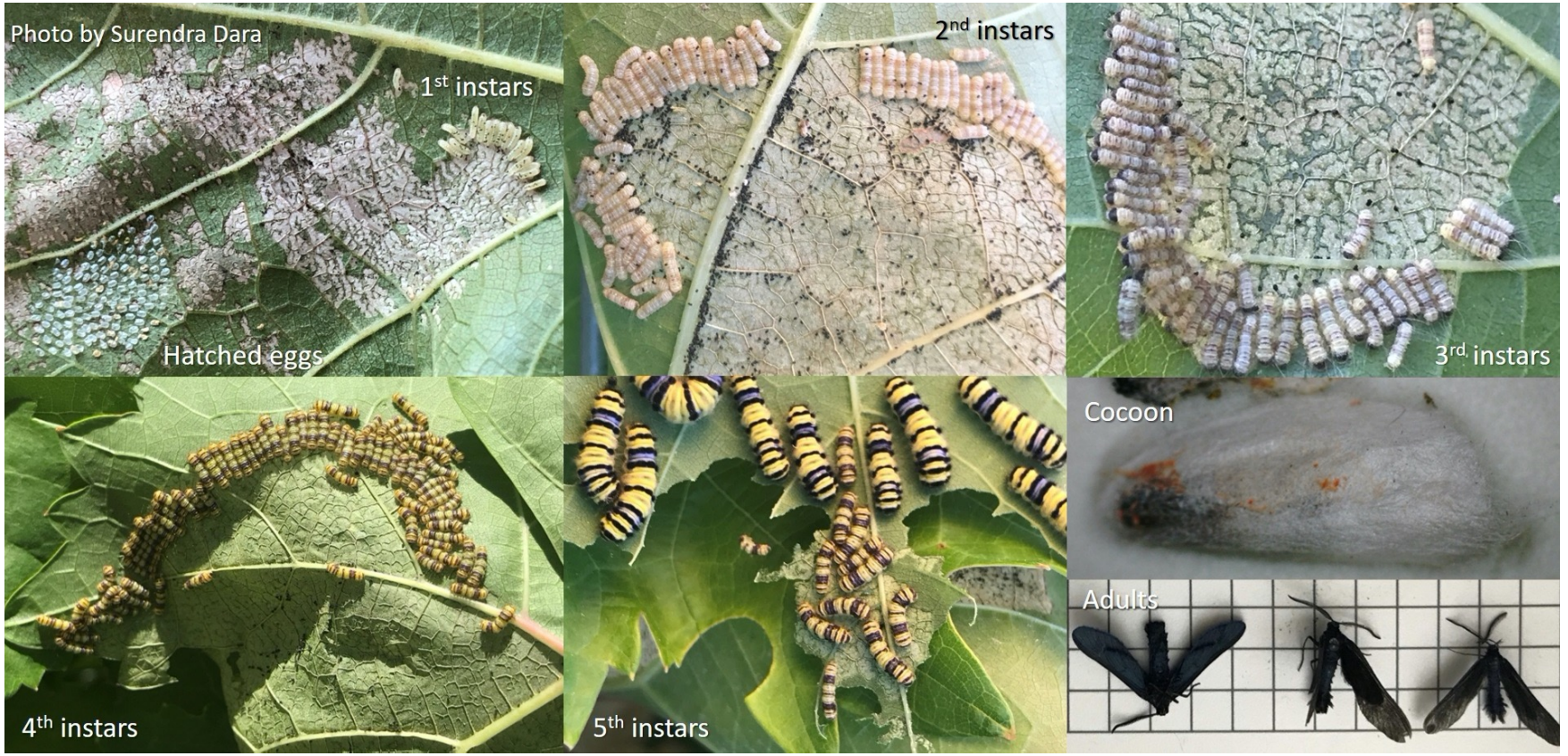
Variegated cutworm

Orange Tortrix

Light Brown Apple Moth (LBAM)

Omnivorous Leafroller

Western Grapeleaf Skeletonizer



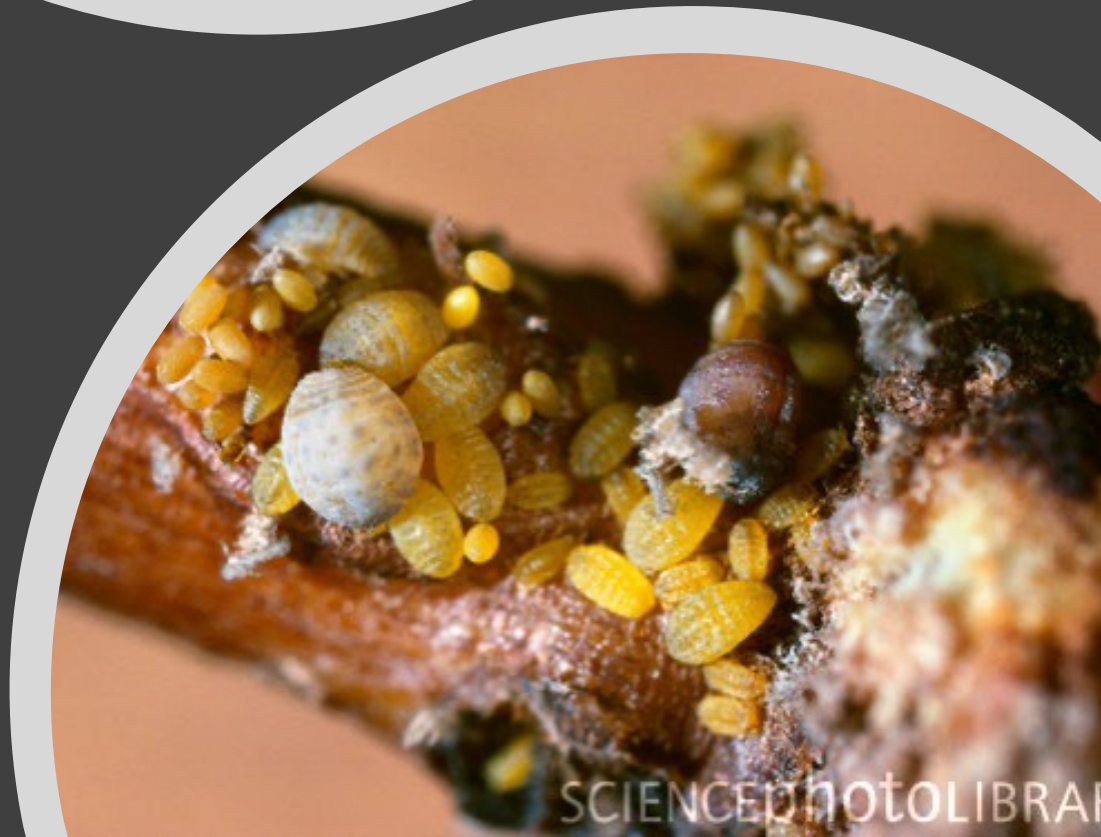
EUROPEAN GRAPEVINE MOTH

- Invasive species
- Detected in Napa in 2009
- Over 2,335 miles^2 were placed under quarantine in Napa, Sonoma, and Solano counties
- Mandatory traps and treatment were required in quarantine areas
- The goal was eradication instead of control

European grapevine moth

GRAPE PHYLLOXERA

- Aphid-like insect
- Native to the east coast of the US
- Feed on roots and leaves of grapevines
- Complicated life cycle with up to 18 stages
- Four forms: root, leaf, sexual, and winged



Virginia Creeper Leafhopper	Western Grape Leafhopper	Variegated Leafhopper
		
		
		

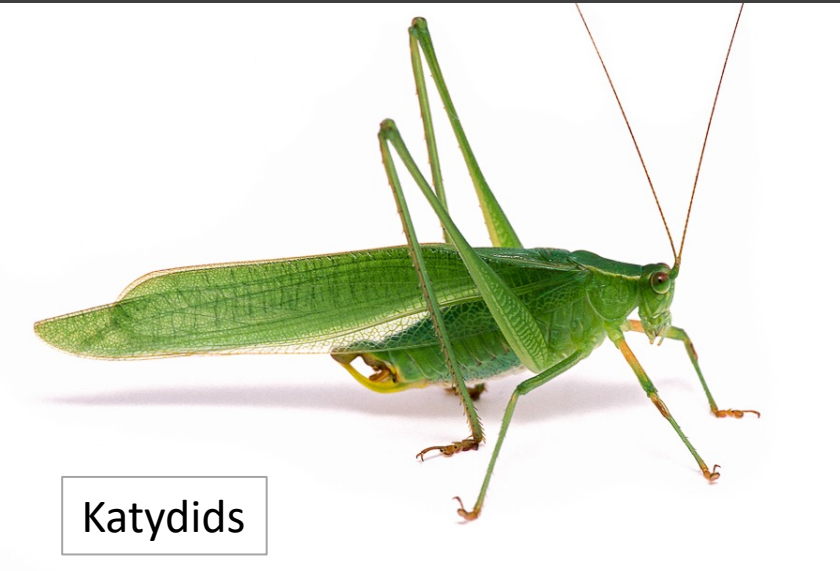
POLL QUESTION

Signs of leafhopper feeding include:

- A) Stippling: White spots on the leaves where the chlorophyl has been removed by insect feeding
- B) Parts of the leaves are missing
- C) Black spots of frass
- D) Both A & C
- E) Both A & B

Grape thrips

Western flower thrips



Katydids

Earwigs

Grasshopper

Branch and twig borer

Click beetle

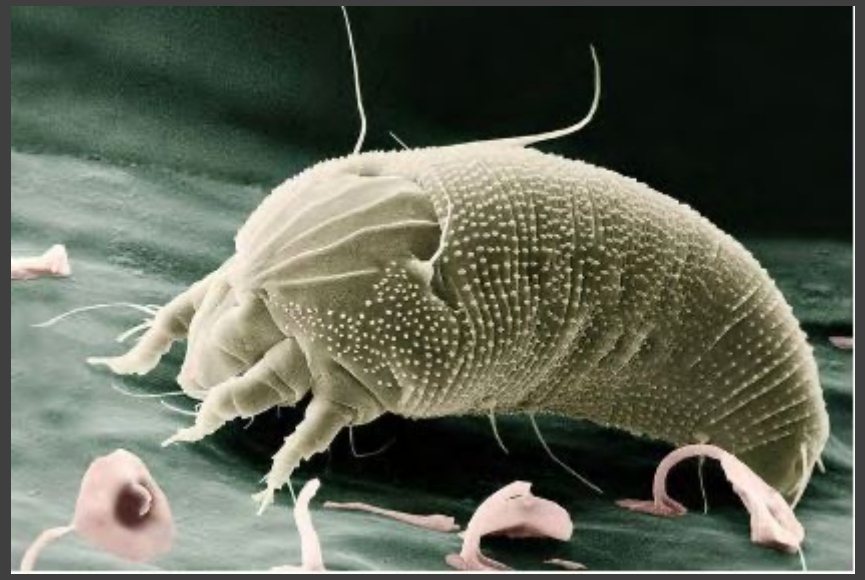
Western grape rootworm

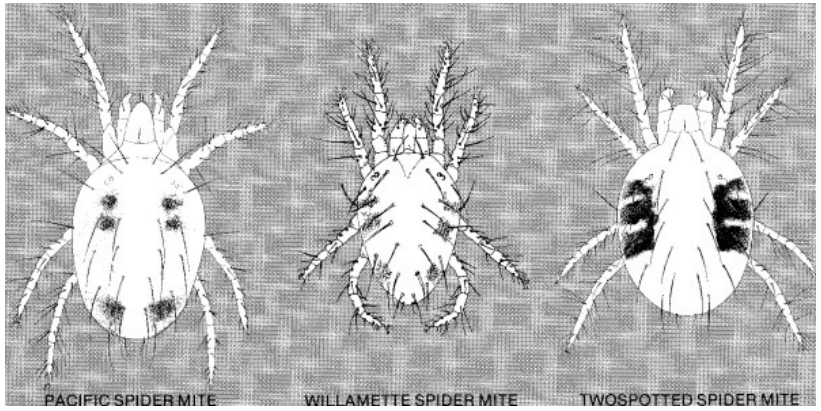
Grape bud beetle

Flea beetle

Black vine weevil

Black widow spider




PACIFIC SPIDER MITE
WILLAMETTE SPIDER MITE
TWOSPOTTED SPIDER MITE

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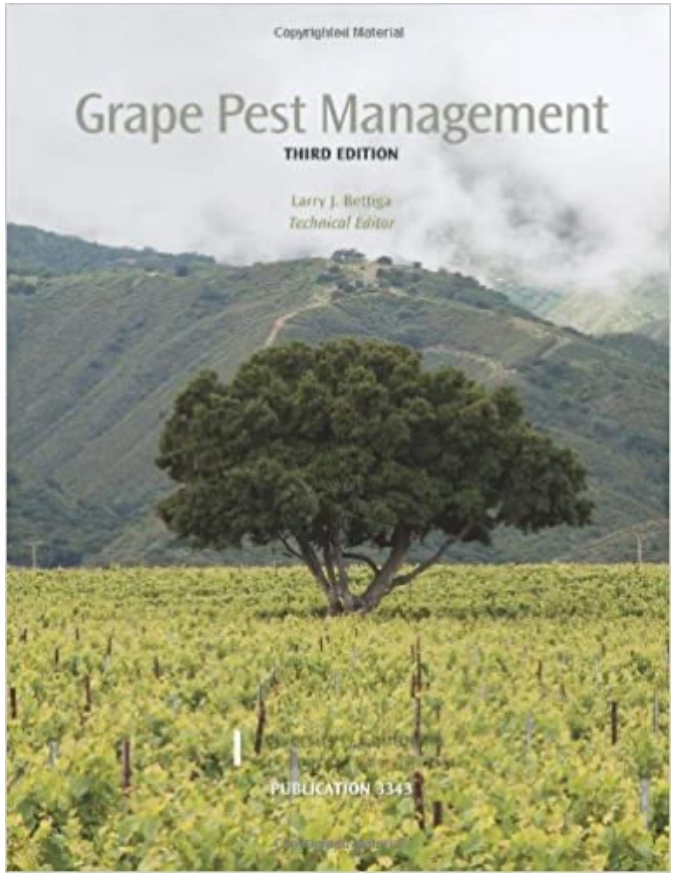
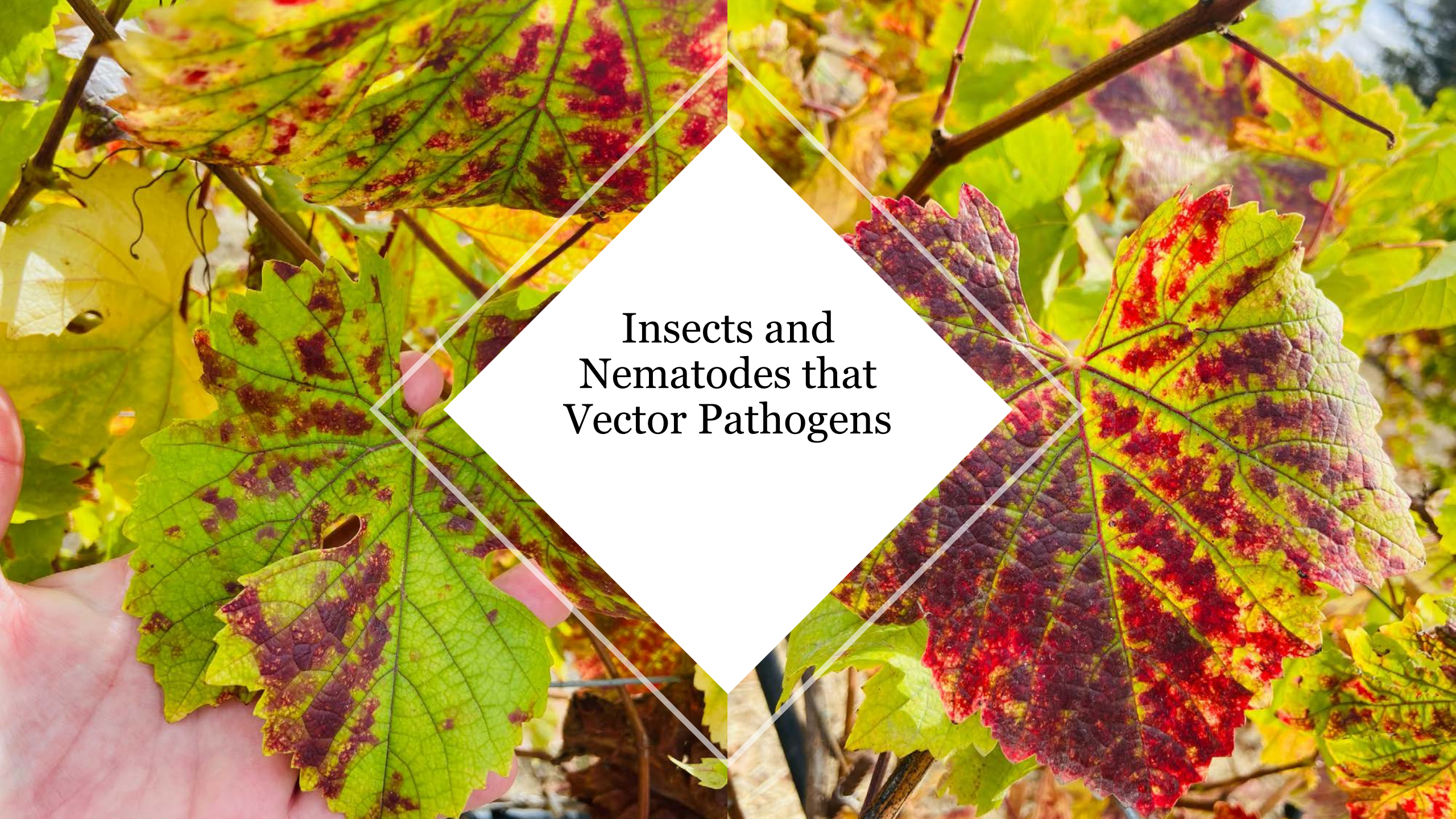




Insects and Nematodes that Vector Pathogens

Gill's mealybug

Grape mealybug

Longtailed mealybug

Obscure mealybug

Vine mealybug

Mealybugs vector Grapevine Leafroll-associated viruses

MEALYBUGS

Ants tend and protect mealybugs in the vineyard

Disrupting naturally occurring biocontrol

European lecanium scale

Cottony maple scale

Three-cornered alfalfa hopper Grapevine red blotch virus (GRBV)

- Vector of *Grapevine red blotch virus*
- Native to the US
- Girdles grapevine petioles and shoots

- Legumes are preferred hosts
- Overwintering generation of adults arrive in the vineyard in February, lay eggs and die off
- Immature stages develop on ground cover
- Mid-May first generation adults emerge
- Girdling of grapevines started in June
- One to two generations per year

Glassy winged sharpshooter (GWSS)

- Native to Southeastern US
- Vectors *Xylella fastidiosa,* a bacterium that is the causal agent for Pierce's disease
- Citrus is also a host and oftentimes GWSS gets moved around from nurseries on citrus plants
- Large efforts are in play in California to prevent the movement of GWSS into vineyards in northern California

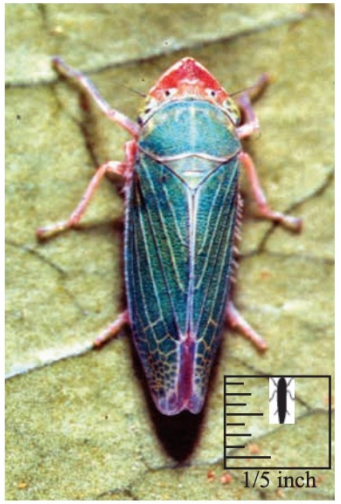
SHARPSHOOTERS/SPITTLEBUG

Blue-green sharpshooter
Graphocephala atropunctata

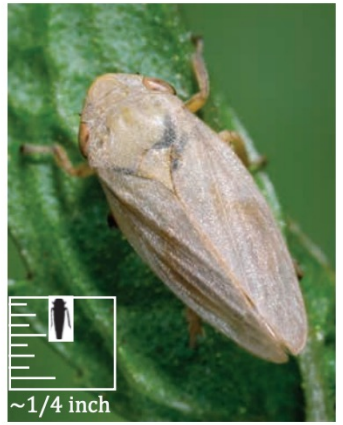
Willow sharpshooter
Graphocephala confluence

Green sharpshooter
Draeculacephala minerva

Red-headed sharpshooter
Xyphon fulgida



Meadow spittlebug
Philaenus spumarius

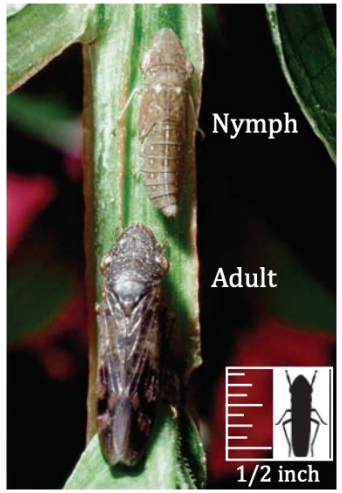


Color variation in meadow spittlebug

Blue-green sharpshooter nymph

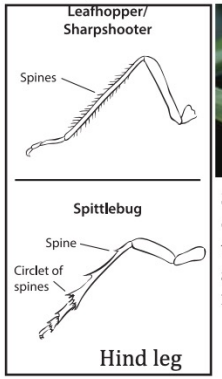
Look-a-like
Thamnotatettix zelleri
This insect can be confused with BGSS, however it is NOT a VECTOR

Glassy-winged sharpshooter
Homalodisca vitripennis



Smoketree sharpshooter
Homalodisca liturata

Smoketree sharpshooter head and back are covered with wavy, light colored lines while glassy-winged sharpshooter is stippled with yellow spots



Spittle conceals one to several spittlebug nymphs

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Authors: Lucia G. Varela, Rhonda J. Smith & Monica L. Cooper, UC Cooperative Extension.

Grapevine Fanleaf Degeneration

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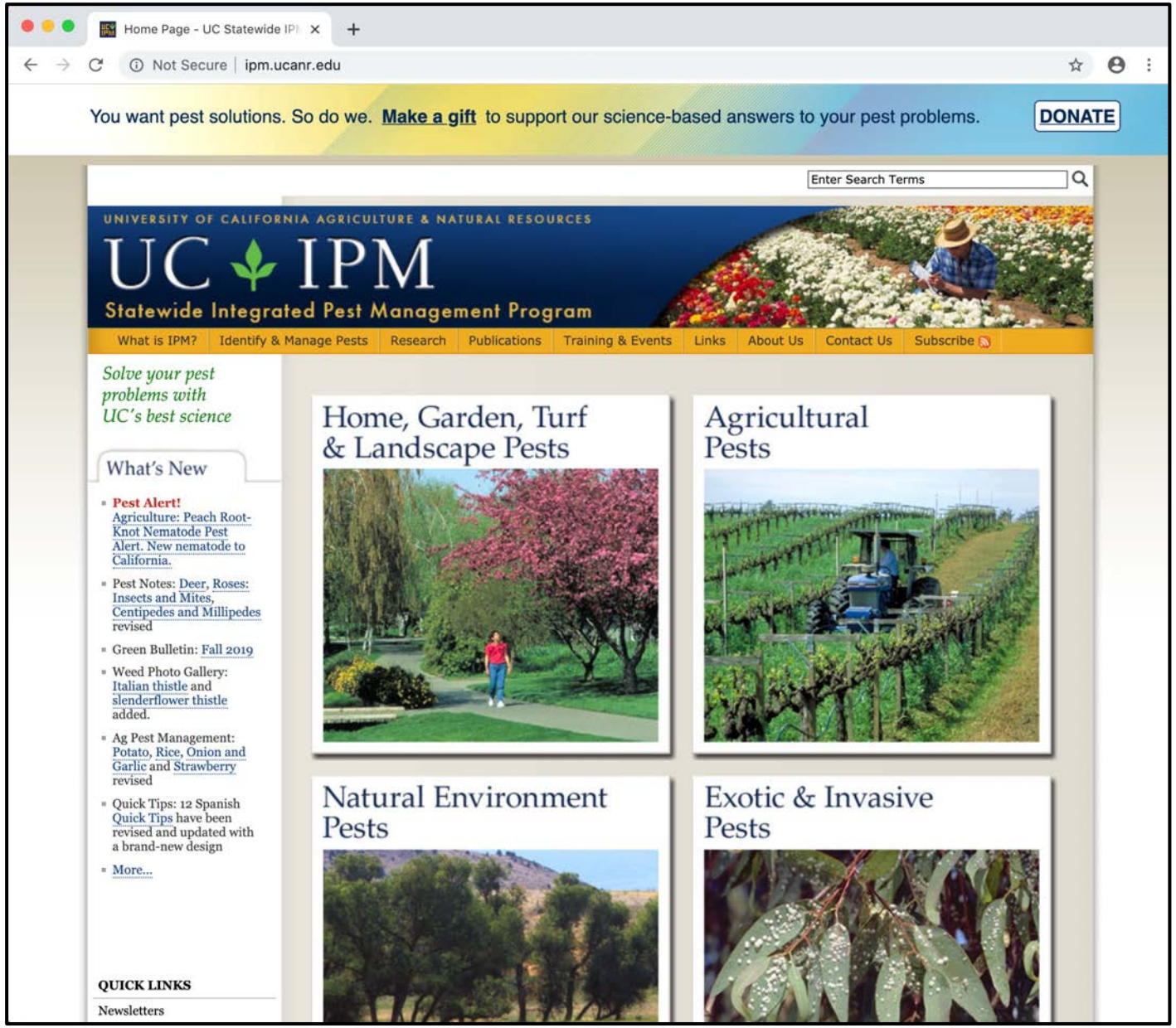

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What's New

- **Pest Alert!** Agriculture: Peac Knot Nematode I Alert. New nemat California.
- Pest Notes: Deer, Insects and Mites, Centipedes and Millipedes revised
- Green Bulletin: Fall 2019
- Weed Photo Gallery: Italian thistle and slenderflower thistle added.
- Ag Pest Management: Potato, Rice, Onion and Garlic and Strawberry revised
- Quick Tips: 12 Spanish Quick Tips have been revised and updated with a brand-new design
- More...

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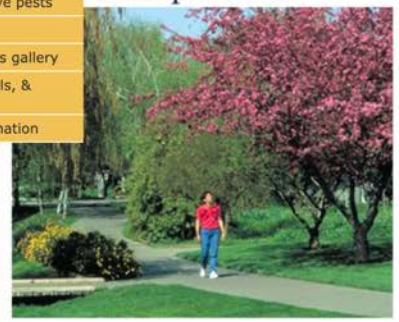

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Natural Environment Pests

Exotic & Invasive Pests

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- Recursos en español
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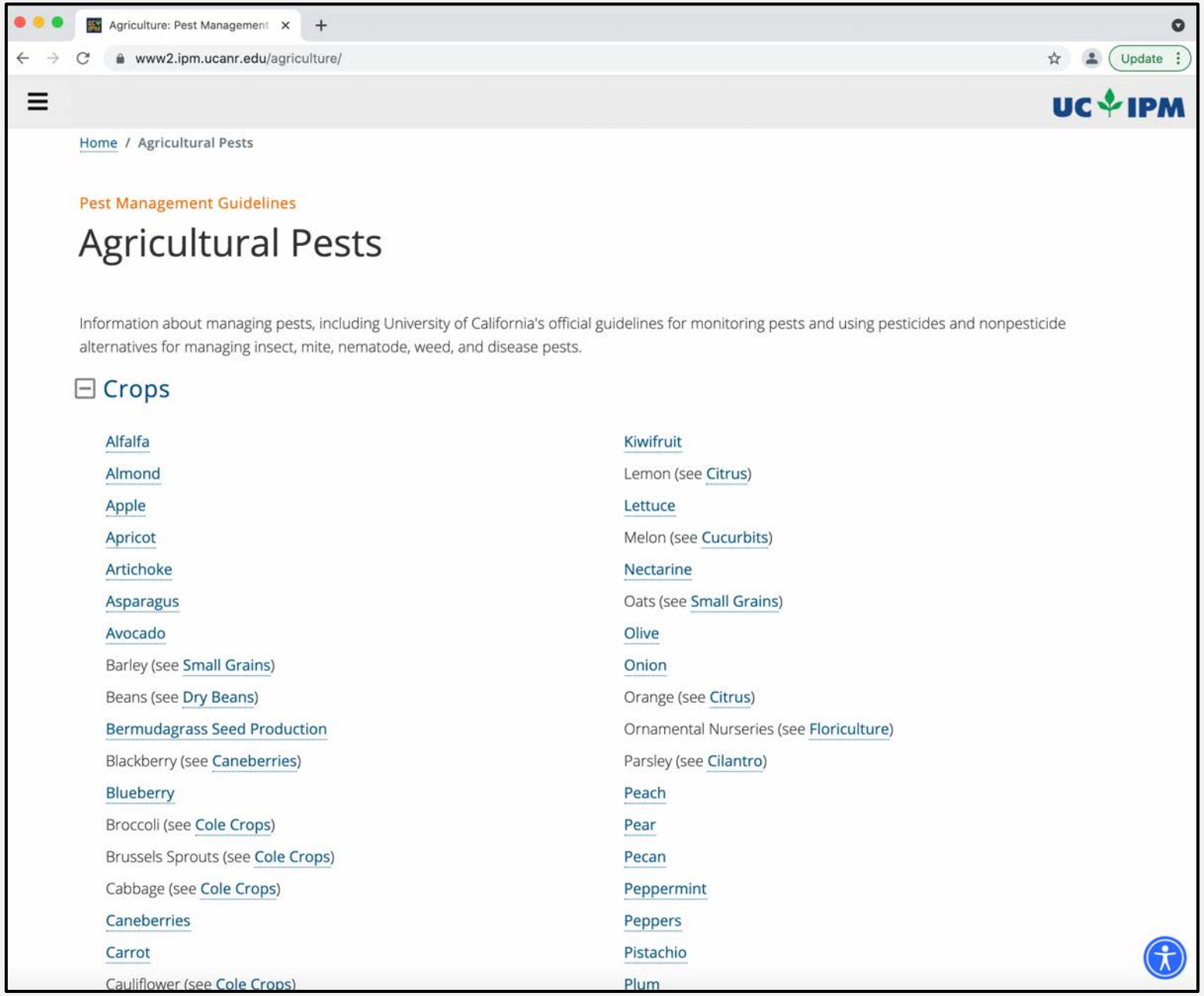
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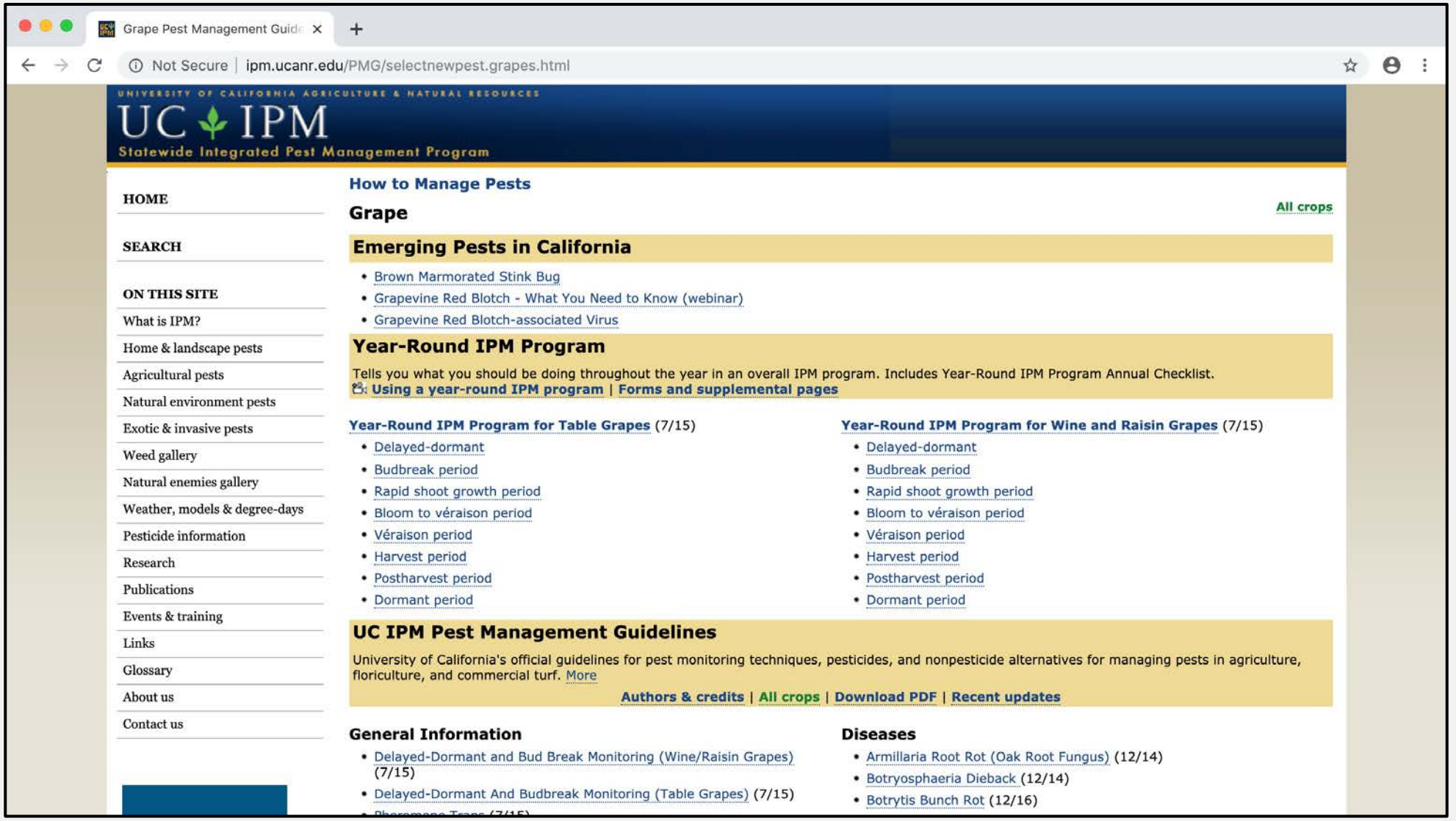
Pest Management Guidelines
Agricultural Pests
Information about managing pests, including University of California's official guidelines for monitoring pests and using pesticides and nonpesticide alternatives for managing insect, mite, nematode, weed, and disease pests.
Crops
Alfalfa
Almond
Apple
Apricot
Artichoke
Asparagus
Avocado
Barley (see Small Grains)
Beans (see Dry Beans)
Bermudagrass Seed Production
Blackberry (see Caneberries)
Blueberry
Broccoli (see Cole Crops)
Brussels Sprouts (see Cole Crops)
Cabbage (see Cole Crops)
Caneberries
Carrot
Cauliflower (see Cole Crops)
Kiwifruit
Lemon (see Citrus)
Lettuce
Melon (see Cucurbits)
Nectarine
Oats (see Small Grains)
Olive
Onion
Orange (see Citrus)
Ornamental Nurseries (see Floriculture)
Parsley (see Cilantro)
Peach
Pear
Pecan
Peppermint
Peppers
Pistachio
Plum


Grape Pest Management Guide
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Emerging Pests in California
Brown Marmorated Stink Bug
Grapevine Red Blotch - What You Need to Know (webinar)
Grapevine Red Blotch-associated Virus
Year-Round IPM Program
Tells you what you should be doing throughout the year in an overall IPM program. Includes Year-Round IPM Program Annual Checklist.
Using a year-round IPM program | Forms and supplemental pages
Year-Round IPM Program for Table Grapes (7/15)
Delayed-dormant
Budbreak period
Rapid shoot growth period
Bloom to véraison period
Véraison period
Harvest period
Postharvest period
Dormant period
Year-Round IPM Program for Wine and Raisin Grapes (7/15)
Delayed-dormant
Budbreak period
Rapid shoot growth period
Bloom to véraison period
Véraison period
Harvest period
Postharvest period
Dormant period
UC IPM Pest Management Guidelines
University of California's official guidelines for pest monitoring techniques, pesticides, and nonpesticide alternatives for managing pests in agriculture, floriculture, and commercial turf. More
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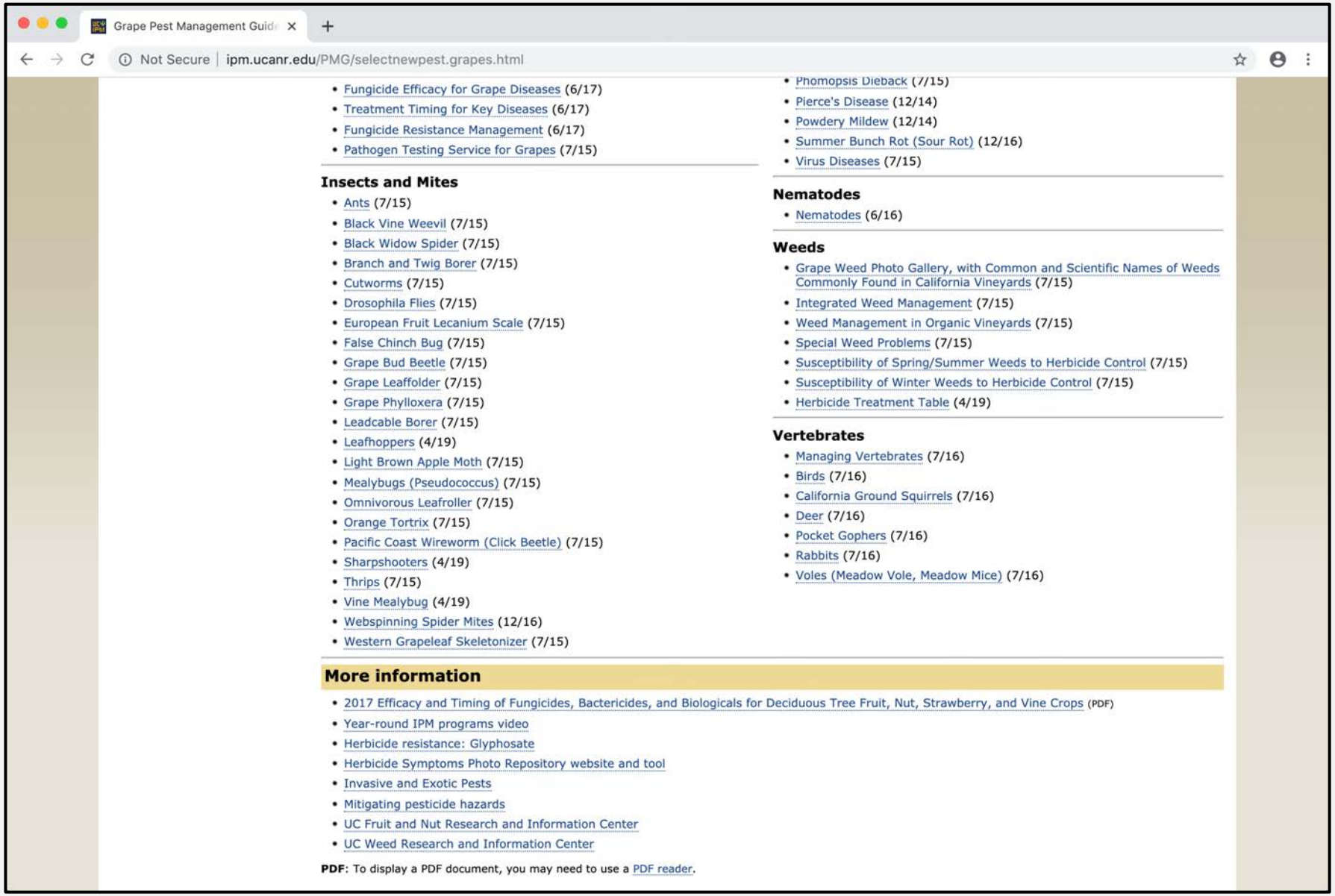
General Information
Delayed-Dormant and Bud Break Monitoring (Wine/Raisin Grapes) (7/15)
Delayed-Dormant And Budbreak Monitoring (Table Grapes) (7/15)
Diseases
Armillaria Root Rot (Oak Root Fungus) (12/14)
Botryosphaeria Dieback (12/14)
Botrytis Bunch Rot (12/16)



- Fungicide Efficacy for Grape Diseases (6/17)
- Treatment Timing for Key Diseases (6/17)
- Fungicide Resistance Management (6/17)
- Pathogen Testing Service for Grapes (7/15)

Insects and Mites

- Ants (7/15)
- Black Vine Weevil (7/15)
- Black Widow Spider (7/15)
- Branch and Twig Borer (7/15)
- Cutworms (7/15)
- Drosophila Flies (7/15)
- European Fruit Lecanium Scale (7/15)
- False Chinch Bug (7/15)
- Grape Bud Beetle (7/15)
- Grape Leaffolder (7/15)
- Grape Phylloxera (7/15)
- Leadcable Borer (7/15)
- Leafhoppers (4/19)
- Light Brown Apple Moth (7/15)
- Mealybugs (Pseudococcus) (7/15)
- Omnivorous Leafroller (7/15)
- Orange Tortrix (7/15)
- Pacific Coast Wireworm (Click Beetle) (7/15)
- Sharpshooters (4/19)
- Thrips (7/15)
- Vine Mealybug (4/19)
- Webspinning Spider Mites (12/16)
- Western Grapeleaf Skeletonizer (7/15)

- Phomopsis Dieback (7/15)
- Pierce's Disease (12/14)
- Powdery Mildew (12/14)
- Summer Bunch Rot (Sour Rot) (12/16)
- Virus Diseases (7/15)

Nematodes

- Nematodes (6/16)

Weeds

- Grape Weed Photo Gallery, with Common and Scientific Names of Weeds Commonly Found in California Vineyards (7/15)
- Integrated Weed Management (7/15)
- Weed Management in Organic Vineyards (7/15)
- Special Weed Problems (7/15)
- Susceptibility of Spring/Summer Weeds to Herbicide Control (7/15)
- Susceptibility of Winter Weeds to Herbicide Control (7/15)
- Herbicide Treatment Table (4/19)

Vertebrates

- Managing Vertebrates (7/16)
- Birds (7/16)
- California Ground Squirrels (7/16)
- Deer (7/16)
- Pocket Gophers (7/16)
- Rabbits (7/16)
- Voles (Meadow Vole, Meadow Mice) (7/16)

More information

- 2017 Efficacy and Timing of Fungicides, Bactericides, and Biologicals for Deciduous Tree Fruit, Nut, Strawberry, and Vine Crops (PDF)
- Year-round IPM programs video
- Herbicide resistance: Glyphosate
- Herbicide Symptoms Photo Repository website and tool
- Invasive and Exotic Pests
- Mitigating pesticide hazards
- UC Fruit and Nut Research and Information Center
- UC Weed Research and Information Center

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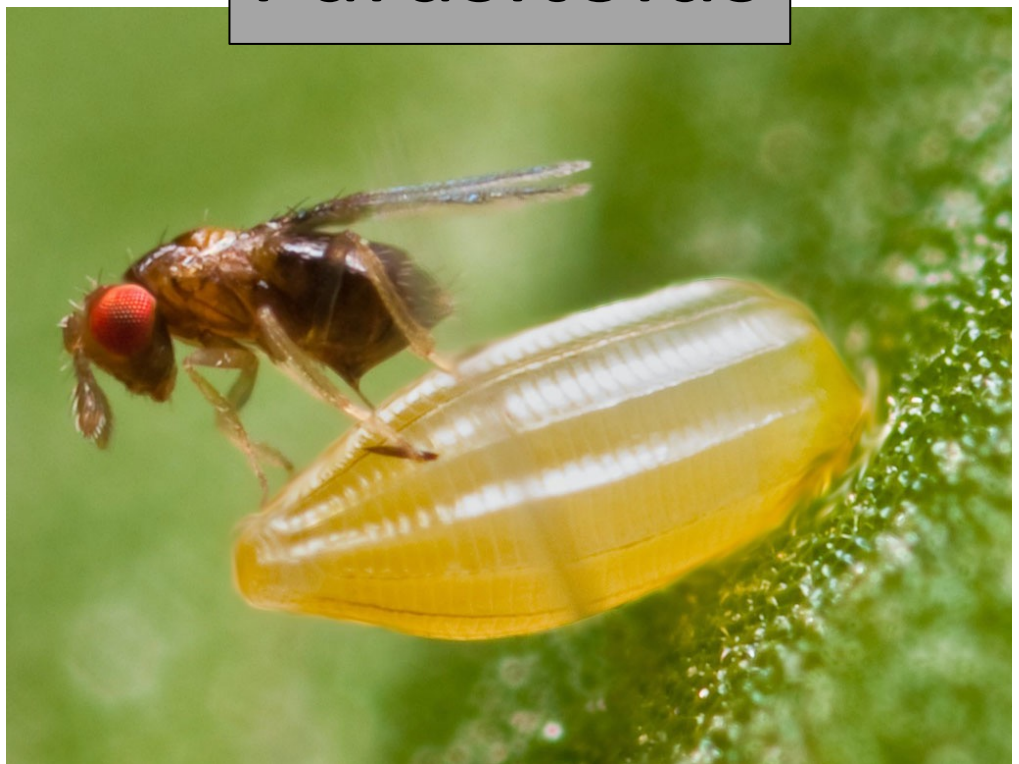
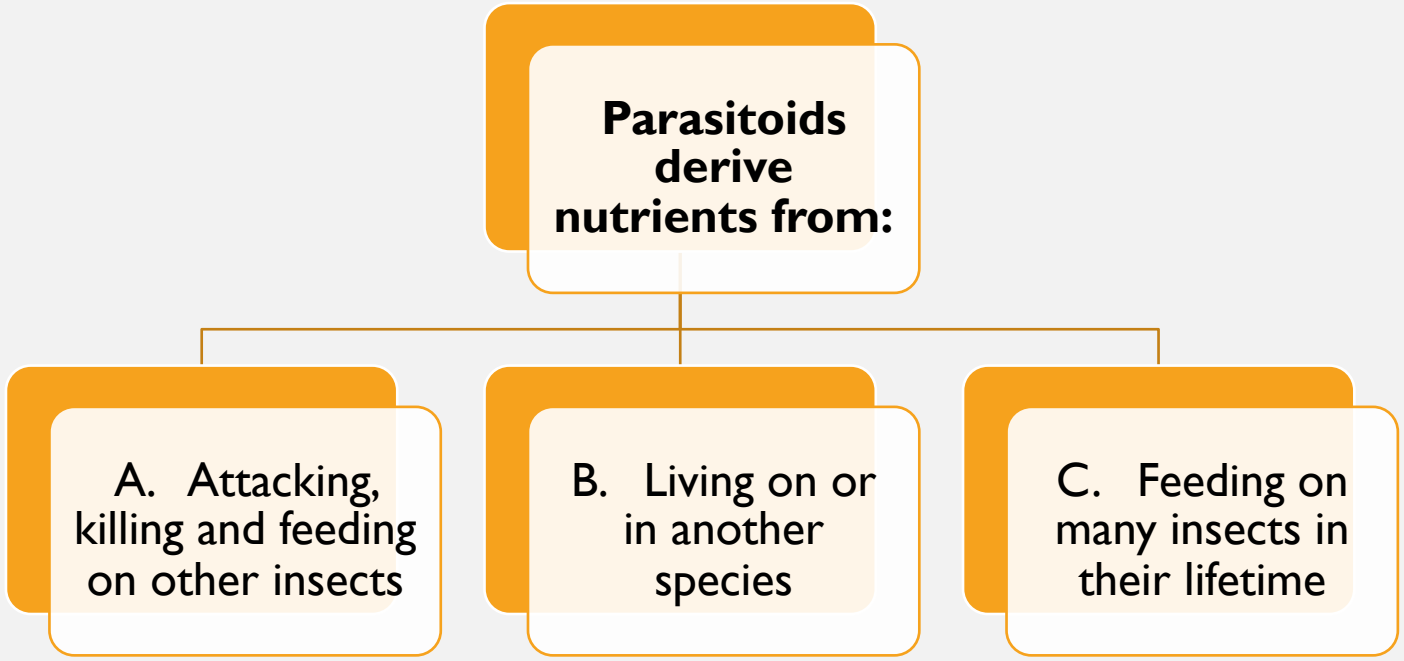
Beneficial Insects in the Vineyard

Predators

Parasitoids



POLL QUESTION



Hemiptera

Assassin bug
(11-14 mm)

Minute pirate bug
(3-5 mm)

Damsel bug
(4-9 mm)

Predatory stink bug
(13-22 mm)

Bigeyed bug
(3-6 mm)

Beetles

Soft-winged flower beetle
(4-5 mm)

Soldier beetle
(5-15 mm)

Rove beetles
(2-8 mm)

Checkered beetles
(5-12 mm)

Ground beetles
(2-35 mm)

Ladybird beetles
(1-10 mm)

Flies

Syrphid fly

Predaceous midge

Aphid flies

Robber flies

Wasps

Spider wasp

Sphecid wasp

Velvet ant

Vespid wasp

Snakeflies and Lacewings

Snakeflies

Green lacewings

Brown lacewings

Mantids

Egg case

Praying mantis

Dragonflies

Damselflies

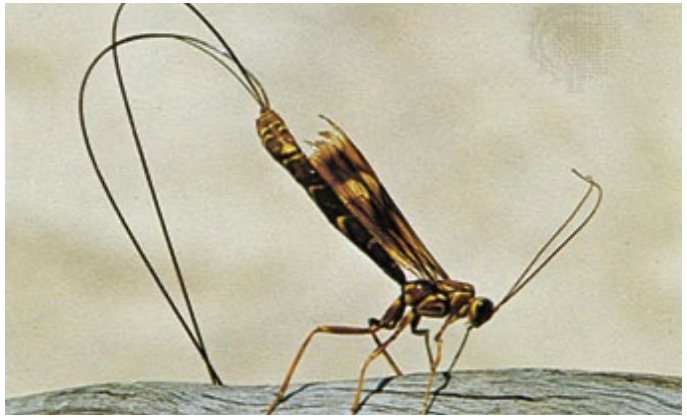
Sixspotted thrips

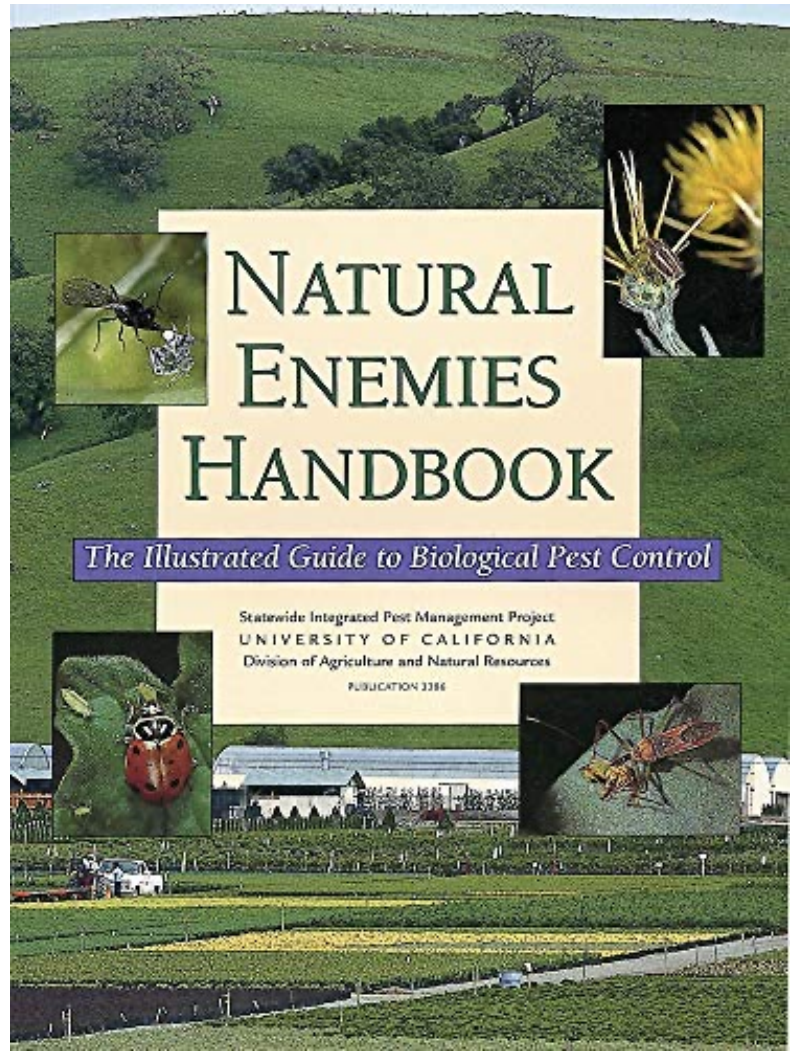
Black hunter thrips

Spiders

Predatory Mites

Signs of parasitism





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What's New

- Pest Notes: Wood… Mistletoes revise… Turkeys and Pok… added
- Ag Pest Managen… Cole Crops and Floriculture and Ornamental Nurseries revised
- Agriculture: 2022 Fungicides, Bactericides, Biocontrols, and Natural Products for Deciduous Tree Fruit and Nut, Citrus, Strawberry, and Vine Crops in California (PDF)
- Three new videos about the invasive shothole borers' biology, trapping, and management were published
- Green Bulletin: Winter 2022
- More...

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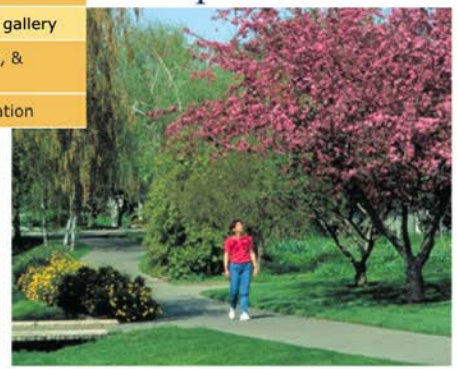

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Spotted lanternfly (*Lycorma delicatula*)

- Planthopper (~1” x 0.5”) native to northern China
- First found in the United States (Pennsylvania) in 2014
- Has since been documented in New York and Delaware (2017) and New Jersey, Maryland and Virginia (2018)
- Found in both agricultural and urban areas

Spotted lanternfly (*Lycorma delicatula*)

- Host range of 70+ plant species with at least 40 occurring in North America
- Hosts include grapevines, stone fruits, apple, cherry, hops and woody ornamentals
- Preferred host is tree of heaven (*Ailanthus altissima*)

Spotted lanternfly (*Lycorma delicatula*)

- One generation per year documented in Pennsylvania
- Nymphs emerge between April and June and progress through 4 immature stages
- Adults emerge in late July
- Spotted lanternfly overwinter as eggs laid between August and November
- Produces large amounts of honeydew

Spotted Lanternfly eggs

- Each female lays one to two egg masses of 30 to 50 eggs each
- Eggs are laid in multiple successive rows and covered with a yellowish-brown waxy deposit
- Eggs are laid on smooth tree surfaces and inanimate objects such as telephone poles, stones, pallets, outdoor furniture, railway cars, firewood, vehicles, etc…
- Laying eggs on non-plant items contributes to SLFs wide dispersal ability and likelihood of unintentional introduction into new areas

Spotted Lanternfly nymphs

1st through 3rd instars

4th instar

Spotted Lanternfly nymphs and adults

4th instars and adults

Adult with wings spread

Report any sightings

If you find what you believe to be any of these insects, collect it in a sealed container and document the location and date when found before taking it to your local county agricultural commissioner or UC Cooperative Extension office.


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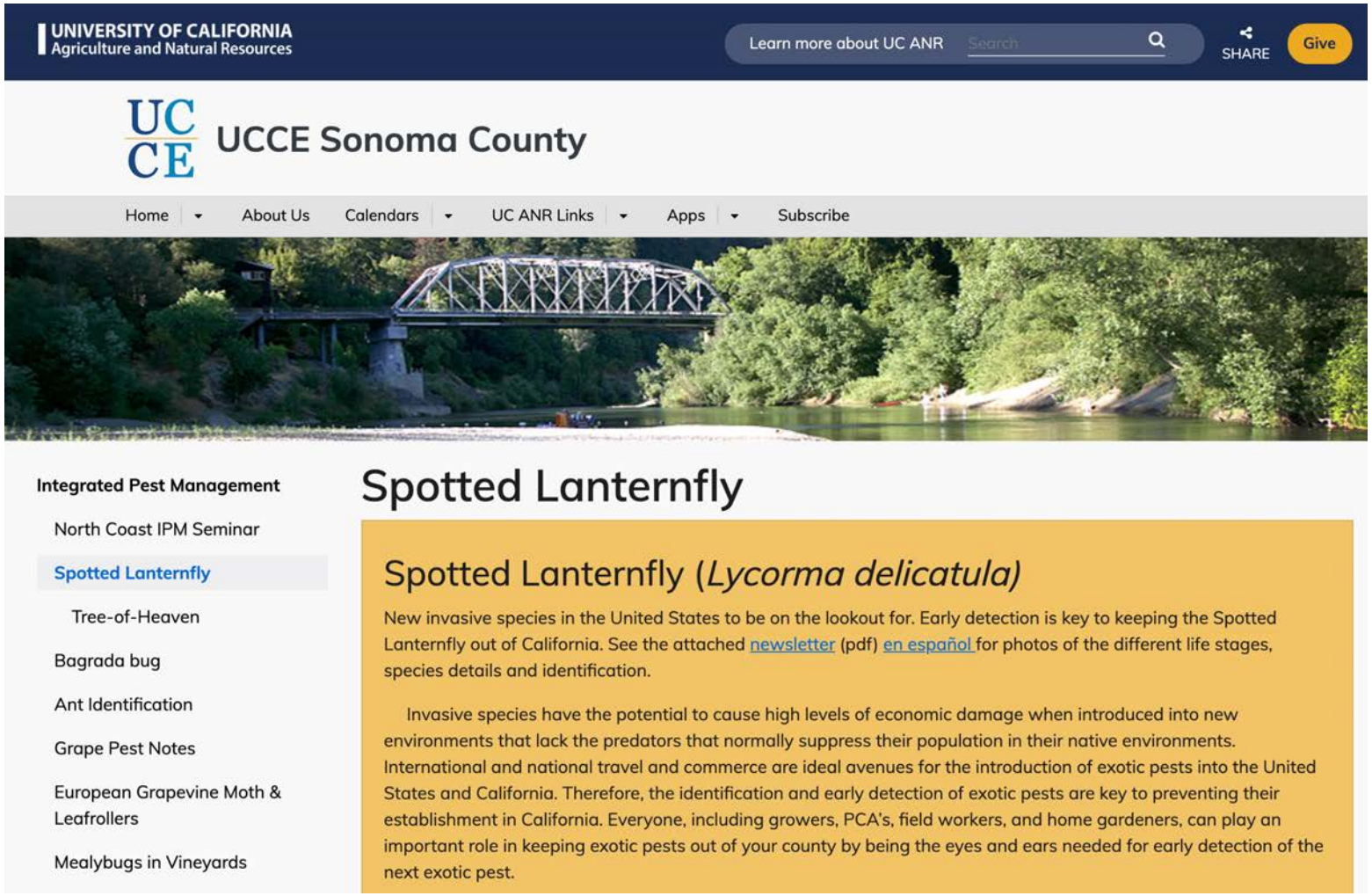
Natural enemies gallery
Weather, models, & degree-days
Pesticide information
Solve your pes
problems with
UC's best scie
What's New
Pest Alert!
Agriculture: Peac
Knot Nematode
Alert. New nema
California.
Pest Notes: Deer,
Insects and Mites,
Centipedes and Millipedes
revised
Green Bulletin: Fall 2019
Weed Photo Gallery:
e, Garden, Turf
ndscape Pests
Agricultural
Pests

UCANR.EDU/NCIPM



Still have questions?

Email me!

ckron@ucanr.edu