Managing Utah's Persistent Insect Pests of Trees & Shrubs

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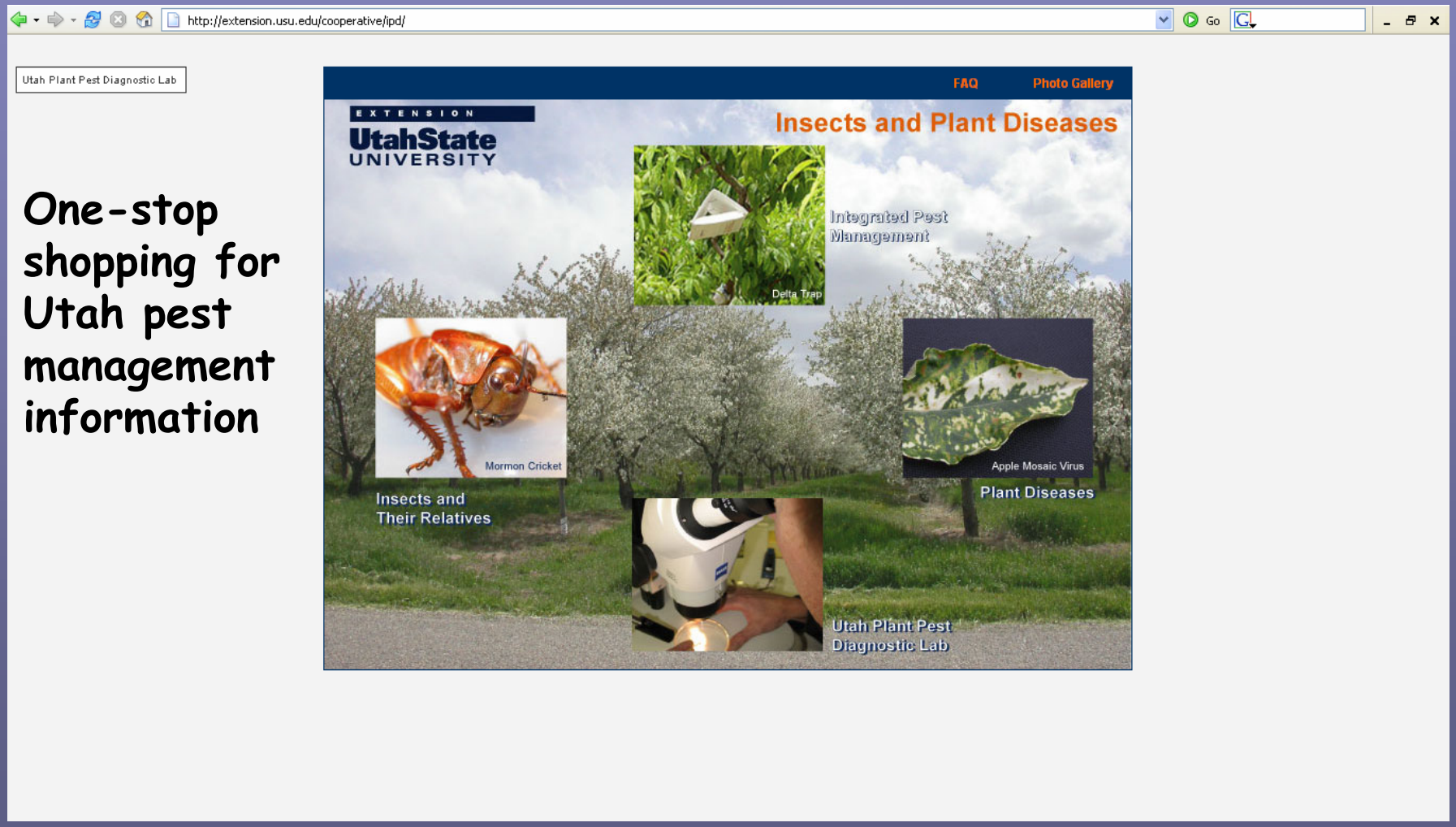
Pest Management Resources on the Web

- Pest fact sheets & photos
- Pest management recommendations
- Pesticide information
- Utah Plant Pest Diagnostic Lab
- Outreach education slideshows

Pest Management Resources on the Web "Insects and Plant Diseases"



One-stop shopping for Utah pest management information

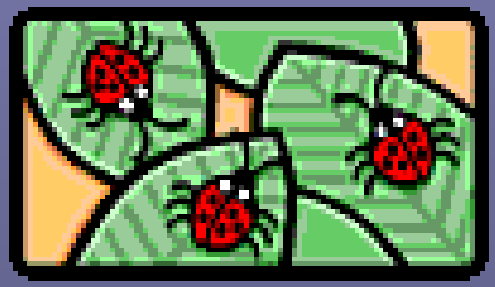
http://extension.usu.edu/cooperative/ipd

Integrated Pest Management

- Definition
- IPM strategies for landscape pests
- IPM Tools

Integrated Pest Management IPM

- Plan ahead (use preventive strategies where possible)
- Use multiple pest management tools
  - Cultural
  - Mechanical
  - Biological
  - Chemical



- Treat only if needed (thresholds)
- Environmentally and economically sound

Major IPM Strategies for Landscape Pests

- Plant selection & planting site selection
- Irrigation – design for plant needs
  - Amount & application method
  - Group plants with similar needs
- Plant nutrition – prevent stress !!!
- Preventive controls for chronic pests
  - Sanitation
  - Traps, exclusion barriers
  - Oil sprays
  - Spring application of systemic or residual insecticide

Ips-killed spruce trees in Garland, UT cemetery

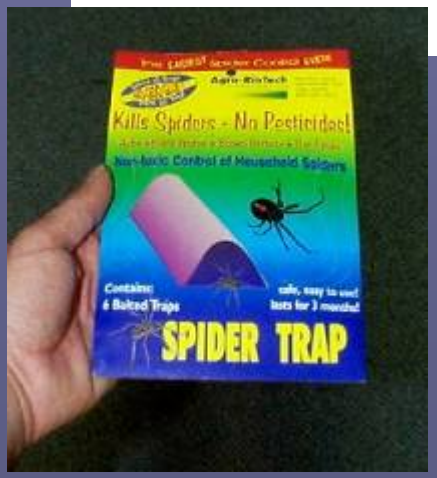
Major IPM Strategies for Landscape Pests

- For "secondary pests"
  - Aphids, Scale, Leaf feeders
  - Exposed feeders
  - Use "soft" (selective) controls
  - Natural biological control is more prevalent
- For "primary pests"
  - Tree borers, Fruit feeders
  - Hidden feeders
  - Target / Timing for susceptible life stage(s) is critical
  - Maintain active residues for critical period
- Conserve natural enemies by avoiding toxic, broad-spectrum insecticides

Elm leaf beetle

Traps and Physical Barriers

- Traps
  - Yellow jacket wasps, slugs, spiders
- Sticky bands
  - Trees and shrubs



Biological Control

- How can I make it work for me?
- Outdoor landscapes - Conservation of natural enemies
  - Avoid toxic chemicals
  - Maintain a diverse plant environment (avoid monocultures)
  - Cultivate plants that provide nectar & pollen
  - Tolerate some herbivorous insects

Parasitic wasp that attacks caterpillars

Big-eyed bug nymph feeding on an insect egg

Aphids

- Suck sap from phloem tubes in leaves and stems
- Curl leaves, produce sticky honeydew that promotes growth of black sooty mold, reduce plant vigor at high densities
- Populations increase rapidly, low numbers can be tolerated
- Only control if honeydew is a nuisance problem or distortion of leaves is severe and aphid numbers are very high
- Many generations per summer

Apple aphid curls leaves


Giant willow aphid feeds on limbs


Sooty mold

Aphid Biology

Alternate hosts

Woody overwintering host

Aphid eggs on tree limbs

Woody or herbaceous summer host

Only females, bear young live
Continual, overlapping generations

Mostly a spring pest

Fruit tree aphids
- plum, peach, rosy apple, cherry

Spirea
Dogwood
Woolly elm
Woolly alder
Honeysuckle
Rose
Woolly Maple
Poplar
Ash
Cottonwood

Aphid Biology

Single host

Produce overwintering eggs in colder climates

Birch aphid

Cinara conifer aphid

Season-long pest

Apple
Birch
Poplar
Cottonwood
Walnut
Conifers
Sycamore
Maple
Pecan
Hackberry
Elm

Aphid Management

- **Delayed Dormant Spray:** Dormant oil + Pyrethroid (at bud break)
- **Spring and Summer control:** hard spray of water, horticultural oil, insecticidal soap, imidacloprid (systemic), Conserve, Aria, azadirachtin, Orthene, pyrethroids, others
- **Biological control:** lady beetles, lacewings, syrphid flies, parasitic wasps

Syrphid fly larva

Lacewing larva

Aphid mummies

Insecticide Resistance Management

- Rotate chemical classes / modes of action
  - Within a generation
  - Between generations within a season

Aphid giving birth to live nymph

Cooley Spruce Gall Adelgid

- Form galls on new growth of spruce; also attack Douglas fir – cause needle swelling, necrosis and shedding
- Adults lay eggs on new "candle" growth in spring; young feeding at base of needles form the galls
- 2-year alternating life cycle

Cut-open gall showing chambers with adelgids

Old gall that adelgids have vacated

Cooley Spruce Gall Adelgid Management

- Insecticide treatment at egg hatch: Merit, Thiodan
- Check the base of new needles for woolly nymphs
- Avoid planting spruce and Doug fir together
- Prune off green/purple galls

Aggregation of nymphs at base of needles

Young gall

Scale Insects

- Soft scales feed in phloem, produce sticky honeydew
- Armored scales feed on mesophyll of plant cells, do not produce honeydew
- Multiple years of scale feeding can kill limbs; cause dieback

European fruit lecanium scale

San Jose scale & injury

Scale Biology

- 1-2 generations per summer
- Overwinter as eggs or young nymphs
- Females are sessile
- Males have wings
- "Crawler" stage is the best target for control

Oystershell scale female surrounded by crawlers

Scale Management

- Delayed Dormant Control is effective for soft scales & some armored scales: **Dormant oil + Pyrethroid (at first bud break)**
- Use sticky tape in late spring to early summer to time a spray for "crawlers"
- **Soft scales:** Merit (systemic), Precision, Flagship, horticultural oil, insecticidal soap
- **Armored scales:** pyrethroids or others timed with crawlers

Oystershell scale

Pine needle scale

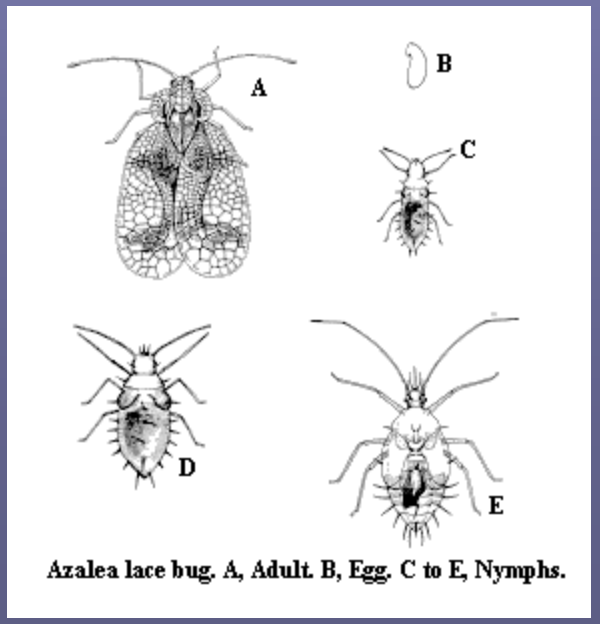
Lace Bugs

- Adults and nymphs suck sap – spots/speckling, black tar spots of excrement

Oak lace bug adult

Feeding injury

Tar spots of excrement



Azalea lace bug. A, Adult. B, Egg. C to E, Nymphs.

Life stages

Lace Bug Management

- Planting site selection
  - Select shady sites
- Hard spray of water from hose
  - Washes nymphs off of plants
- Biological control
  - Natural enemies
- Soft insecticides
  - Insecticidal soap, horticultural oil (repeat applications; cover undersides of leaves)
- Conventional insecticides
  - Talstar, Tempo, Merit, Flagship, Orthene, Sevin

Lace bug feeding injury

Spider Mites

- Very small size; infested plants appear "dirty"; produce webbing, suck sap (remove chlorophyll); leaf speckling
- When severe, cause bronzing or silvering of leaves; populations build quickly in hot weather
- Feed on many species of plants

Two spotted spider mites

Leaf bronzing
"Mite burn"

Spider Mite Management

- **Biological control:** Predaceous mites
- **Soft Controls:** pressurized stream of water, horticultural oils, insecticidal soap
- **New miticides:**
  - Acequinocyl (Kanemite, Shuttle)
  - Bifenazate (Floramite)
  - Pyridazinone (Akari, Nexter, Sanmite)
  - Chlorfenapyr (Pylon)
  - Etoxazole (Tetrazan)
  - Hexythiazox (Ovation, Hexagon)

Spruce spider mite

Predaceous mite feeding on spider mite

Strawberry Root Weevil

- Common hosts: lilac, peony, dogwood, yew, privet, cotoneaster, arbovitae, spruce, others
- Adults chew irregular notches in leaf edges – target with foliar insecticide (Orthene, Merit, Sevin, Azadirachtin, Pyrethroids) – in late spring with first leaf notching
- Larvae feed on roots – target with soil insecticide (Merit), insect-parasitic nematodes, *Beauveria* fungus – late spring or early fall

Adult & leaf notching


Needle notching on spruce


Larvae feeding on crown & roots

Leaf Beetles

- Elm & Cottonwood
- Adults chew holes in leaf
- Larvae skeletonize lower leaf
- Overwinter as adults in protected sites
- Spring – bright yellow egg masses
- Larvae feed ~ 3 wk
- Pupate at base of tree or on leaves
- 2 generations per summer

Cottonwood LB

Elm LB adult & eggs

Elm LB larvae

Leaf Beetle Management

- Resistant cultivars of Amer. Elm, Zelkova
- Good tree care, prune dying limbs
- Insecticides:
  - Bt var. *san diego* or *tenebrionus*
  - Azadirachtin
  - Orthene
  - Imidacloprid (Merit)
  - Pyrethroids
  - Trunk band to kill descending larvae of Elm LB: Sevin

Zelkova

Elm LB pupae piled up at base of trunk

Cankerworms

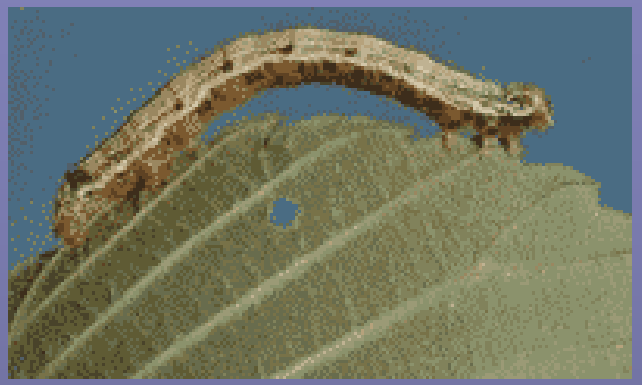
- Native oak, boxelder, maple, elm, beech, linden, cherry
- Fall and spring species
- Females are flightless
- Large numbers of larvae can be a nuisance
- Larvae spin down on webbing

Fall cankerworm larvae, dark form

Spring cankerworm larva

Cankerworm Management

- Soft insecticides:
  - Bt var. *kurstaki* (Dipel)
  - Spinosad (Conserve)
  - Azadirachtin
  - Pyrethroids
  - Sevin
- Small trees:
  - Hard spray of water
- Sticky trunk band
  - Fall or Spring



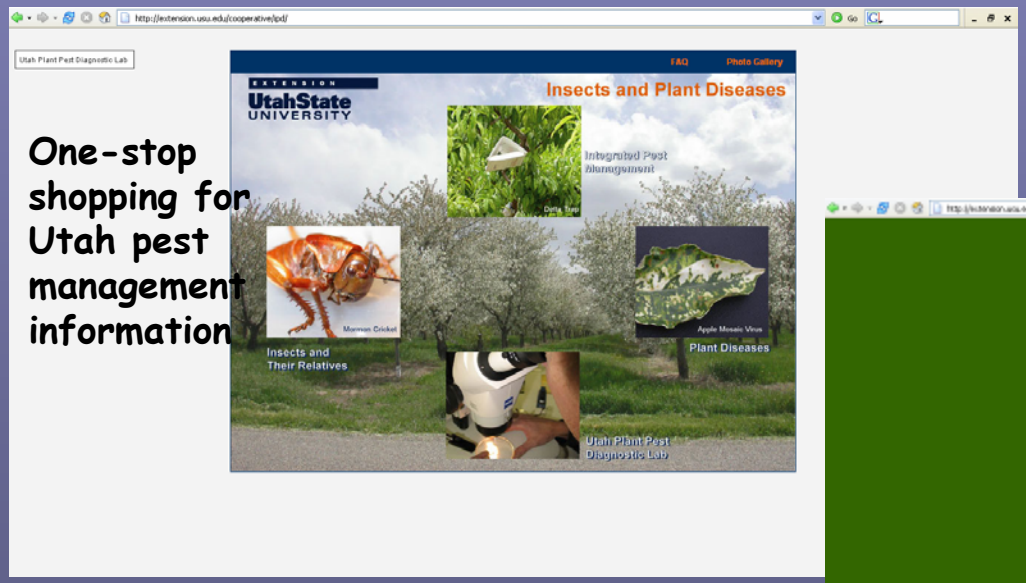
Target larvae with soft insecticides

Target climbing female with sticky trunk bands

USU Extension Pest Management Slideshows

Where can you view this slideshow?

http://extension.usu.edu/cooperative/ipd



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