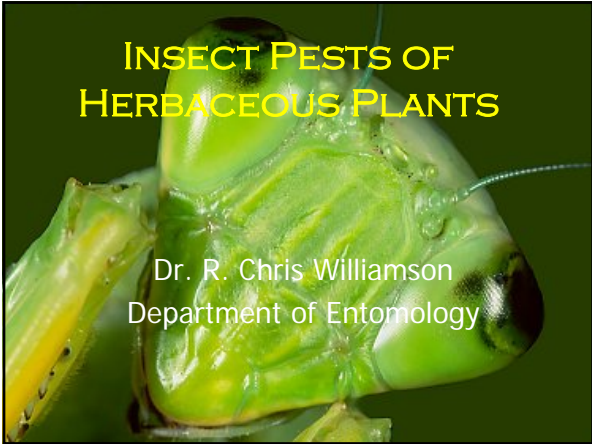


INSECT PESTS OF HERBACEOUS PLANTS

Dr. R. Chris Williamson
Department of Entomology



Iris Borer

- Larvae feed at base of leaves and hollow-out rhizomes
- Pale pink in color, 1 ½ inches long
- Overwinter as eggs, larvae become full grown by mid-summer
- One generation per year



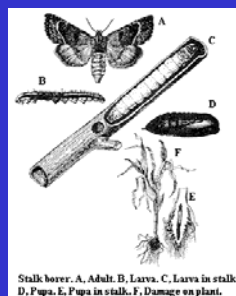


Management

- Sanitation of debris with egg in late summer
- Spring application of contact insecticide before larvae burrow into leaves

Stalk Borer

- Larvae feed in stems of various plants (> 200 species including daisy, gladiolus, hollyhock, iris, peony, rose, etc.)
- Once in plant, can NOT be controlled
- Caterpillars are marked with light stripes laterally
- Eggs are laid in summer (August) on grasses and weeds, hatch following spring
- One generation per year



Stalk borer. A, Adult. B, Larva. C, Larva in stalk. D, Pupa. E, Pupa in stalk. F, Damage on plant.



Management

- Sanitation of debris with eggs in fall
- Spring application of contact insecticide before larvae burrow into leaves

European Earwig

- Adults and nymphs feed on flowers, leaves, silk, etc., especially dahlia, carnations, marigold, zenia.
- Omnivore (plants and insects)
- Adults are ½ inch long with pincers
- One generation per year



Management

- Contact insecticides applied directly to earwig nymphs and adults

Leafminers

- Larvae of flies, small moths, beetles, and sawflies
- Larvae tunnel within leaves creating mines
- Many hosts including chrysanthemums, marigold, and gerbera
- Multiple generations per year



Management

- Timing is critical for contact insecticides
- Systemic insecticides are most effective

White Grubs

- Larvae (grubs) of various beetle species
- Larvae feed on roots and organic matter
- Typically, one generation per year (some exceptions)



Management

- Soil insecticides are necessary, post-treatment irrigation in needed
- Preventative and Corrective treatments

Wireworms

- Larvae of click beetles
- Larvae tunnel into seeds and roots
- Larvae are elongate, hard bodied and light brown



Management

- Soil insecticides are necessary, post-treatment irrigation in needed
- Preventative and Corrective treatments

Black Vine Weevil

- Adults feed on leaves
- Larvae (legless) feed on roots
- Overwinter as larvae
- Hosts = Wide range of many shrubs especially yews (*Taxus*)



Management

- Soil insecticides are necessary, post-treatment irrigation in needed
- Preventative and Corrective treatments

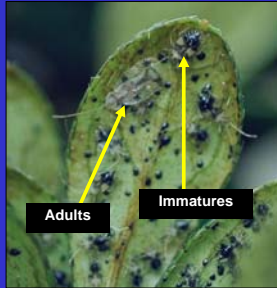
Insects That Suck Fluids or Cell Contents

- Most insects that have a beak have sucking mouthparts (exceptions are weevils)
- Beak or rostrum equipped with stylets
- Stylets are straw-like structures that puncture, inject toxins, and draw out fluids
- Powerful muscle in head to suck fluids

- Honeydew-watery, sweet feces
- Sooty mold fungus

Azalea lace bug

Stephanitis pyriodes



D. Boyd





- Adults and immatures feed
- Overwinter as adults and eggs (north)
- Multiple generations per year
- Adults and 5 nymphal stages


- Suck plant sap
- Stippling
- Feed through the stomates on the underside of leaves
- Feeding more common on older foliage (never stems)
- Significant variation among varieties



D. Boyd

D. Boyd, USDA

 1. 10 Encore Autumn Rose/Hazel	 5. 11 4th of July
 6. 08 Koromo Shikibu	 6. 12 Encore Rouge



- Less susceptible 4th of July Koromo Shikibu Encore Autumn Rouge
- Native does not equal resistant

Azalea Lace Bug Ecology

- Azaleas in the full sun and isolated seem to more damaged
- Natural enemies were more abundant in complex than simple habitats
- Natural enemies were mostly predators (spiders and lacewings adults and immatures)
- Natural enemies preferentially consume more immatures than adults
- Wings as a shield

Integrated Pest Mgt of Azalea lace bug



- Avoid planting azaleas in full sun locations where there is no overstory (islands)
- If planting new plants, choose plant less susceptible varieties
- Apply an insecticide to the underside of leaves or use an insecticide that is systemic (Merit) or Orthene

Whiteflies

- Several species
- Many have multiple hosts
- White dusty appearance
- Adults readily fly if disturbed
- Honeydew and sooty mold



UC



Aphids or Plant lice



Scale Insects

Numerous species

- Soft scales versus Armored scales
- Crawlers (immature, dispersing stage)
- Crawlers are most vulnerable life stage



Soft Scales

- Most abundant group
- Very prolific crawler production
- Survive on stems or leaves
- Mobile as immatures
- Phloem feeders
- Honeydew\sooty mold



Calico scale



Leucanium scale



Wax scale



Cottony cushion scale

Armored Scales

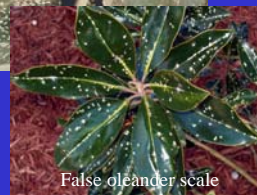
- More cryptic
- Populations slower in developing\slow decline in host
- No honeydew or sooty mold
- Mobile only as crawlers



Euonymus scale



Tea scale



False oleander scale



Pine needle scale

Scale Management is different for each group

Treatment target	Soft scales	Armored scales
Crawlers	Pyrethroids, insecticidal soap, IGR's	
Adults in summer	Systemics (neonicotinoids, acephate, disulfoton)	Oils Di-syston or Safari
Adults in winter	Dormant oil	Dormant oil

Natural enemies help to regulate scale populations



Using systemic, oils or IGR's may reduce the impact on natural enemies

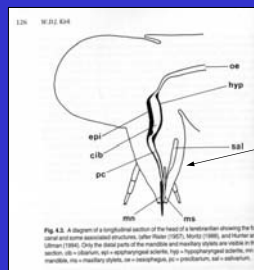
Thysanoptera (Thrips)



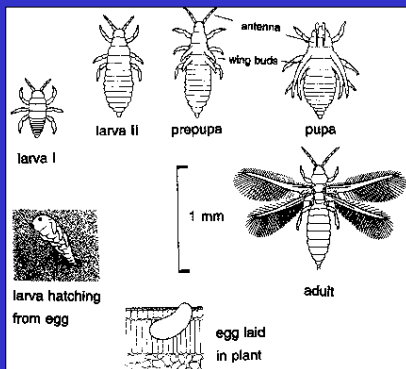
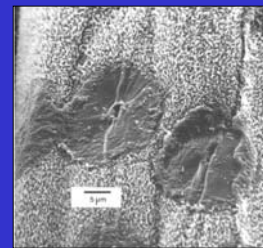
A complex of species

All thrips have fringed wings

Some species vector viruses



Mouthcone



Time from egg to adult ranges from 7-30 d



Western flower thrips

Damage causes speckling or flecking on foliage or flowers.

Attacks numerous plant species

Western flower thrips

Predators

Chemicals

Imidacloprid



Mites

- Arachnida not Insecta
- Tick-like body form*
- Eight legs on adults, six on immatures
- Plant feeders and predators
- Piercing -Sucking (chelicerate) mouthparts



Not all are spider mites

- Tetranychidae (spider mites)
- Tenuipalpidae (false spider mites)
- Tarsonemidae (broad mites)
- Eriophyidae (gall or stunt mites)



Two spotted spider mite

Flat mite/False spider mite

Southern red mite

Broad mite

Gall Mites

- Elongated body form
- Four legs
- Deformed growth or galls



Mites on grass stem

'Finger' galls on elm foliage

Mite Management

- Use miticides first, and insecticides labeled for mites (pyrethroids) as a rotation
- Most miticides are comparable in efficacy but target certain life stages
 - All life stages-Akari, Judo, Shuttle, Floramite, Ultiflora
 - Immature and adult-Pylon, Avid, Triact70, sulfur
 - No adult activity-TetraSan and Ovation

Mite Management

- Use restrictions are important for resistance management
- Fewer studies on broad mites than other species
 - Akari, Kelthane, Judo

Rose Chafer

- Adults feed (skeletonize) on leaves and flowers
- Adults elongate, about ½ inch long with grey/brown wings
- Adults are active in June
- One generation per year



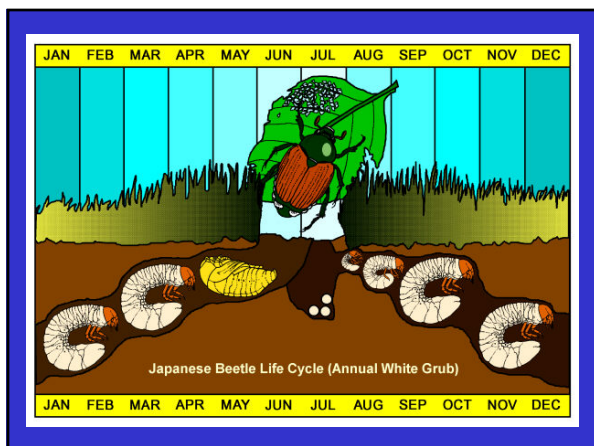
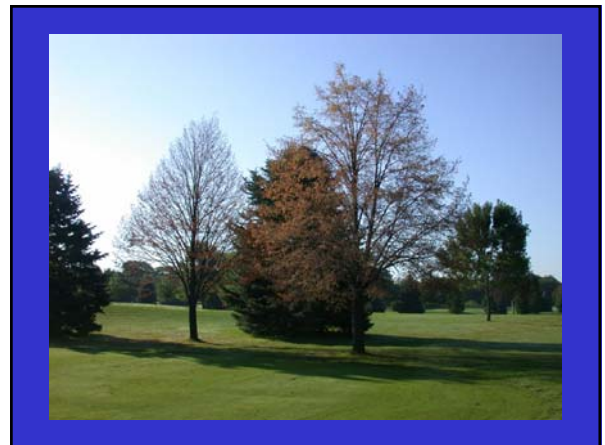
Management

- Contact insecticide applied to active adults
- Insecticidal soaps can be effective but ONLY last < 24 hours

Japanese Beetle

- Adults feed (skeletonize) on leaves and flowers
- Adults broadly-oval, about ½ inch long with coppery/brown wings
- Adults are active in June-September
- Attacks > 300 species of plants
- One generation per year





Management

- Systemic insecticides soil drenched or injected
- Trans-laminar products applied to foliage prior to or during adult activity
- Contact insecticides applied directly to active adults (in afternoon, under sunny conditions)
- Replace susceptible or install non-susceptible hosts!

Gypsy Moth

- Larvae (caterpillars) defoliate leaves
- Larvae have FIVE pairs of blue dots on dorsal (top) side of thorax
- Attacks > 300 species of plants
- One generation per year



Management

- Timing of control strategy is critical for maximum efficacy
- *Btk* is most effective against 1st and 2nd instars
- Various other contact insecticides perform well on older larvae (3rd – 6th instars)
- GPSO provides excellent control of egg masses from Sept. – 3 days prior to egg hatch

European Pine Sawfly

- Larvae (caterpillars) are gregarious and defoliate only mature leaves (previous years growth)
- Hosts = Pines including red, Scots, Jack, Mountain, and Mugo.
- One generation per year



Colony



Biology

- Adults are wasplike
- Adults lay egg in Sept. – Oct. near tips of branches
- Eggs overwinter, hatch in spring

Biology

- Larvae begin feeding in mid-May and continue through June
- Larvae are gray-green with a longitudinal stripe down the back and two light-green stripes and one dark-green or black stripe on each side

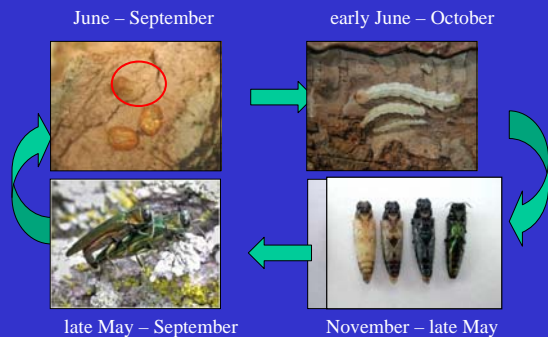
Management

- Insecticidal soaps work well for low population densities
- Various contact insecticides, including biorational and conventional, perform well

Emerald Ash Borer

- Adults are larger and brighter green than any other *Agrilus* spp. (e.g., Bronze birch borer)
- Slender, elongate, 0.3 – 0.5" long, metallic green
- Larvae feed (mine) in cambial area of ash (green, white, black, blue, velvet, pumpkin)

Life Cycle





Biology

- Eggs are laid on the bark surface or in crevices on the trunk or branches
- Eggs typically hatch in 7-10 days
- After hatching, young larvae chew through the bark and into the cambial region
- Larvae thereafter feed on the phloem and outer sapwood for several weeks

Biology

- Larvae create S-shaped feeding galleries that wind back and forth, extending over 7.5 – 12" in length
- Galleries are typically packed with fine frass
- In some instances, woodpeckers feed on larvae



Biology

- EAB overwinters as full-grown larvae in shallow chambers excavated in the sapwood
- Pupation occurs in late April – early May
- Newly eclosed adults remain in pupal chamber for 1-2 weeks
- As adults emerge, they create D-shaped exit holes that are 1/8" in diameter



Distribution and Hosts

- Indigenous to Asia and is known to occur in China, Korea, Japan, Russia, and Taiwan
- Chinese literature reports a high incidence on numerous ash species
- EAB has killed > 20 million ash trees

Control Options?

- All native ash trees appear to be susceptible!
- Systemic insecticides and bark spray applications appear to provide good control when applied preventatively

Additional Information

www.entomology.wisc.edu/emeraldashborer