Insects in the Home Yard and Garden

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Utah State University Extension
Master Gardener Course
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Lecture Topics

1. Resources on the Web
2. What is an insect?
3. Diagnosing insect problems
4. IPM & reduced-risk (lower toxicity) tools
5. Common insect pests:
   - Ornamentals
   - Vegetables
   - Fruit
Insect & Pest Management Resources on the Web

One-stop shopping for Utah pest management information

http://utahpests.usu.edu
Resources on the Web
“USU Extension Publications”

http://extension.usu.edu
Search for Information on the Web

"Google Search Engine"
What is an insect?

Insects:
- 6 legs
- 3 body regions
- Antennae
- Flight - adults

Arthropods
- Exoskeleton
- Segmented bodies

Non-Arthropods:
- Snails and Slugs

Insect Relatives:
- Spiders (Arachnids)
- Mites (Acari)
- Centipedes
- Millipedes
Most insects are not pests

Beneficial insects & mites
Insect Life Cycles

Complete Metamorphosis

Incomplete Metamorphosis
Proper Diagnosis!

Most plant health problems are not caused by biotic factors (pests: insects, diseases), but by abiotic factors (irrigation, environment, culture & care)
First Step: Proper Diagnosis!

Insect is present

Injury is present

What type of injury?

Friend or Foe?

What life stage is present?
Insect Plant-Feeding Types

Chewing

Piercing-Sucking

Borers

Gall Formers

Diagnosis
Scouting for Pests

- Look at the big picture
  - Pattern of plant decline/injury
    - Pest injury tends to be aggregated
    - Can injury be associated with irrigation or other pattern?
- Look at new growth
- Check for root/crown problems
- Hand lens for small insects and mites
- Scout every 1–2 weeks

Raspberry horntail injury to cane tips
Target & Timing

- **Target susceptible life stages**
  - Usually eggs and/or young

- **Time the control for target life stage(s) and weak points in their life cycle**
  - For severe and recurring pests - early in seasonal cycle when life stages are synchronized and before substantial injury has occurred
  - For occasional pests - wait and see if pest will be abundant
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, economically, and socially sound
IPM Strategies

- Plant selection & planting
  - Site selection

- Irrigation – design for
  - 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 bark beetle-killed spruce trees in Garland, UT cemetery
IPM Strategies

- 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
Traps and Physical Barriers

- **Traps**
  - Yellow jacket wasps, slugs, spiders
- **Sticky bands**
- **Trees and shrubs**
- **Row covers**
- **Diatomaceous earth**
Biological Control

How can I make it work?

Outdoor landscapes - Conservation of natural enemies

- Avoid toxic chemicals
- Maintain a diverse plant environment (avoid monocultures)
- Cultivate plants that provide quality nectar & pollen
- Tolerate some herbivorous insects

Parasitic wasp that attacks caterpillars

Big-eyed bug nymph feeding on an insect egg
List of Plants with Quality Nectar and Pollen


<table>
<thead>
<tr>
<th>FAMILY</th>
<th>GENUS</th>
<th>COMMON NAME</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Caprifoliaceae</td>
<td>Abelia</td>
<td>Abelia</td>
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<td>Fabaceae</td>
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<td>maple</td>
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<td>Aceraceae</td>
<td>Achillea</td>
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<td>A. millefolium var. yarrow</td>
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<td>Asteraceae</td>
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<td>Lamiaceae</td>
<td>Agastache</td>
<td>hyssop</td>
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<tr>
<td>Lamiaceae</td>
<td>Ajuga</td>
<td>carpet bugle</td>
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<td>Malvaceae</td>
<td>Althea</td>
<td>hollyhock</td>
<td>not doubled</td>
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<td>Liliaceae</td>
<td>Alstroemeria</td>
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<tr>
<td>Rosaceae</td>
<td>Amelanchier</td>
<td>serviceberry</td>
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<tr>
<td>Boraginaceae</td>
<td>Anchusa</td>
<td>wild forget-me-not</td>
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<tr>
<td>Apiaceae</td>
<td>Anethum</td>
<td>dill</td>
<td></td>
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<tr>
<td>Ranunculaceae</td>
<td>Aquilegia</td>
<td>columbine</td>
<td>not doubled</td>
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<tr>
<td>Ericaceae</td>
<td>Arctostaphylos</td>
<td>manzanita</td>
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Beneficial Insects & Mites

Cast of Characters

- Common Aphid
- Predaceous true bugs & beetles
- Lacewing
- Predaceous Mites
- Predaceous mites
- Syrphid Fly
- Lady Beetle
- Parasitic wasps & flies
“Old” vs. “Reduced Risk” Insecticides

“Old” Insecticides
- Broad-spectrum
- Higher toxicity
- Human safety concerns
- Environmental concerns

“Reduced Risk” Insecticides
- More selective
- Lower toxicity
- Shorter residuals
- Some are easier on natural enemies
<table>
<thead>
<tr>
<th>Active Ingredient</th>
<th>Brand Name(s)</th>
<th>Class</th>
<th>Mode of Action</th>
<th>Toxicity Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>azadirachtin</td>
<td>Aza-Direct, Bioneem, Azatin</td>
<td>Botanical</td>
<td>Growth Regulator</td>
<td>Caution</td>
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<tr>
<td><em>Bacillus thuringiensis</em> (Bt)</td>
<td>Dipel, Javelin, Thuricide</td>
<td>Microbial Bacterium</td>
<td>Larvicide</td>
<td>Caution</td>
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<tr>
<td><em>Beauveria bassiana</em></td>
<td>Botanigard, Naturalis</td>
<td>Microbial Fungus</td>
<td>Larvicide</td>
<td>Caution</td>
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<tr>
<td>beneficial nematodes</td>
<td>Steinernema, Bacteriophora</td>
<td>Biological Nematode</td>
<td>Larvicide, Adulticide</td>
<td>Caution</td>
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<tr>
<td>capsaicin</td>
<td>Hot Pepper Wax</td>
<td>Botanical</td>
<td>Repellent</td>
<td>Caution</td>
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## Insecticides for the Home Garden & Orchard – Organic (cont.)

<table>
<thead>
<tr>
<th>Active Ingredient</th>
<th>Brand Name(s)</th>
<th>Class</th>
<th>Mode of Action</th>
<th>Toxicity Class</th>
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<tbody>
<tr>
<td>diatomaceous earth</td>
<td>Natural Guard</td>
<td>Inorganic</td>
<td>Disrupts cuticle</td>
<td>Caution</td>
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<tr>
<td>horticultural mineral oil (dormant &amp; summer)</td>
<td>Sunspray, Ultrafine, Orchex, Volck</td>
<td>Petroleum distillate</td>
<td>Suffocate</td>
<td>Caution</td>
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<tr>
<td>insecticidal soap</td>
<td>Safer, M-pede</td>
<td>Fatty acids</td>
<td>Disrupts cuticle</td>
<td>Caution</td>
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<tr>
<td>iron phosphate*</td>
<td>Sluggo, Ecar-Go</td>
<td>Inorganic</td>
<td>Feeding arrestant</td>
<td>Caution</td>
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<tr>
<td>Kaolin clay</td>
<td>Surround</td>
<td>Inorganic</td>
<td>Repellent</td>
<td>Caution</td>
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</table>

* Molluscicide (Snails & Slugs)
<table>
<thead>
<tr>
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<th>Brand Name(s)</th>
<th>Class</th>
<th>Mode of Action</th>
<th>Toxicity Class</th>
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</thead>
<tbody>
<tr>
<td>lime sulfur</td>
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<td>Inorganic</td>
<td>Broad-spectrum</td>
<td>Danger</td>
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<tr>
<td>pyrethrins, pyrethrum</td>
<td>Pyrellin, Pyganic</td>
<td>Botanical</td>
<td>Paralyze</td>
<td>Caution</td>
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<tr>
<td>rotenone</td>
<td></td>
<td>Botanical</td>
<td>Neurotoxin</td>
<td>Warning</td>
</tr>
<tr>
<td>spinosad</td>
<td>Entrust</td>
<td>Microbial</td>
<td>Neurotoxin</td>
<td>Caution</td>
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<tr>
<td>sucrose octanoate ester</td>
<td>Sucroicide</td>
<td>Natural product</td>
<td>Disrupts cuticle</td>
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<tr>
<td>sulfur</td>
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<td>Inorganic</td>
<td>Broad-spectrum</td>
<td>Caution</td>
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Insecticides for the Home Garden & Orchard – Conventional

<table>
<thead>
<tr>
<th>Active Ingredient</th>
<th>Brand Name(s)</th>
<th>Class</th>
<th>Mode of Action</th>
<th>Toxicity Class</th>
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<tbody>
<tr>
<td>bifenthrin</td>
<td>Ortho Lawn Insect</td>
<td>Pyrethroid</td>
<td>Neurotoxin</td>
<td>Warning</td>
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<tr>
<td>carbaryl</td>
<td>Sevin</td>
<td>Carbamate</td>
<td>Neurotoxin</td>
<td>Caution to Danger</td>
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<tr>
<td>cyfluthrin</td>
<td>Tempo, Bayer Adv.</td>
<td>Pyrethroid</td>
<td>Neurotoxin</td>
<td>Caution</td>
</tr>
<tr>
<td>endosulfan</td>
<td>Thiodan</td>
<td>Organo-chlorine</td>
<td>Neurotoxin</td>
<td>Warning</td>
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<tr>
<td>esfenvalerate</td>
<td>Ortho Bug-B-Gone</td>
<td>Pyrethroid</td>
<td>Neurotoxin</td>
<td>Warning</td>
</tr>
<tr>
<td>imidacloroprid</td>
<td>Bayer Adv.</td>
<td>Nicotinoid</td>
<td>Neurotoxin</td>
<td>Warning</td>
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## Insecticides for the Home Garden & Orchard – Conventional (cont.)

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<tr>
<th>Active Ingredient</th>
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<th>Class</th>
<th>Mode of Action</th>
<th>Toxicity Class</th>
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</thead>
<tbody>
<tr>
<td>lambda-cyhalothrin</td>
<td>Triazicide</td>
<td>Pyrethroid</td>
<td>Neurotoxin</td>
<td>Caution</td>
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<td></td>
<td>Soil &amp; Turf</td>
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<td>malathion</td>
<td>Cythion</td>
<td>Organo-phosphate</td>
<td>Neurotoxin</td>
<td>Caution to Danger</td>
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<tr>
<td>permethrin</td>
<td>Astro, Spectracide</td>
<td>Pyrethroid</td>
<td>Neurotoxin</td>
<td>Caution</td>
</tr>
<tr>
<td>spinosad</td>
<td>Success, Conserve</td>
<td>Microbial</td>
<td>Neurotoxin</td>
<td>Caution</td>
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</tbody>
</table>
“New” Insecticides with Broad-Spectrum Activity

Sucking insects

Chewing insects

Borers
Nicotinoids

- Derived from nicotine
- Most have systemic activity; if applied to soil or injected can last for a season
- Neurotoxin - interfere with nerve impulses
  - Imidacloprid
  - Bayer Advanced Tree & Shrub, Bayer Ad. Lawn, Bayer Ad. Flower, GrubEx - Ornamental uses, Pome fruits & Pecans
    - Chewing & Sucking Insects: Aphids, Scale, Leaf beetles, Leafhoppers, Thrips (suppression), Root weevils, Billbugs, White grubs, Cutworms, Flatheaded borers, Roundheaded borers (suppression), Bark beetles (suppression)
Spinosad

- Bacterial fermentation product
- *Saccharopolyspora spinosa* discovered in soil of abandoned rum distillery in the Caribbean
- Neurotoxin – novel binding site in nerve transmission
  - Conserve – Herbaceous & Woody Orn., Turf
  - Success & Entrust (organic) – Fruits & Vegs.
    - Chewing & Sucking Insects: Caterpillars, Beetles, Thrips, Fly larvae, Leafminers, etc.
Beauveria bassiana

- Fungus, natural soil organism
- Fungal hyphae penetrate the insect's exoskeleton
  - Aphids, Plant bugs, Caterpillars, Beetle larvae, Mormon cricket, Grasshoppers, Mites
Ornamental Insect Pests

Chewing Injury
Tent Caterpillars

- **Hosts:**
  - Maple, poplar, cottonwood, plum, cherry, aspen, alder, willow, birch, apple, ash, others

- Eggs hatch in spring

- Larvae aggregate in groups; form webbing - tents
Tent Caterpillar Management

- Early detection
- Remove egg masses or young larvae/ tents - pruning, burning
- Bt (Dipel, Thuricide) & spinosad (Entrust, Success) - good coverage, target young larvae
- Contact insecticides:
  - Sevin, Pyrethroids, Malathion, others
- Systemic insecticide:
  - BAG Tree & Shrub (imidacloprid)
Elm & Cottonwood Leaf Beetles

- Adults over winter under bark, debris
- Females lay eggs on new growth in spring/early summer
- Skeletonize leaves; aggregate feeders
- Elm LB: pupate on ground at base of tree
- Cot LB: pupa hangs from leaves
- Multiple generations per summer
Leaf Beetle Management

- **Insecticide Bark Bands (ELB Only)**
  - Apply when mature larvae seen on leaves (May-June) - Sevin, Pyrethroids, Thiodan

- **Foliar Sprays of Selective Insecticides**
  - Summer oils - target young larvae
  - *Bacillus thuringiensis* var. *tenebrionis*
  - Spinosad (Entrust, Success)

- **Insecticides:** Merit, Imidan, Orthene, pyrethroids (Talstar, Tempo)

- **Biological Control**
  - Conserve Predators & Parasites
Lilac Root Weevil

- Drought related
- Observed heavy injury to shrubs & small trees

- Prevention of stress is the first & most important step (irrigation, soil, planting site)
Lilac Root Weevil
*Otiorhynchus meridionalis*

- Common hosts: lilac, peony, dogwood, yew, privet, cotoneaster, arbovitaes, spruce, others

- Adults chew irregular notches in leaf edges – target with foliar insecticide (*Azadirachtin, Pyrethrum, Spinosad*) – in late spring at first leaf notching

- Larvae feed on roots – target with soil insect-attacking nematodes (*Heterorhabditis*, *Beauveria* fungus) – late spring or early fall

*Needle notching on spruce*

*Larvae feeding on crown & roots*

*Adult & leaf notching*
European Earwig

- Primarily feed on decaying organic matter (saprophytic)
- Feed on young, tender plants; chew holes in flower petals, fruits; nuisance pest
- Adults are also predators; **nocturnal**
European Earwig

- Cultural & mechanical controls: avoid overuse of mulch and damp debris where they hide during the day; place and remove rolled newspaper; attractant traps: tuna can with bacon grease
- Chemicals: pyrethrum, azadirachtin, diatomaceous earth; target young in nests
- Tanglefoot on base of trunks, stems
Grasshoppers

- Young (nymphs) & adults chew holes in leaves, completely consuming foliage
- Move into yards from nearby rangeland, grassy areas, undeveloped lots
- Treat borders of property when young grasshoppers are first seen moving in
- Young are much easier to kill than adults
- Insecticidal baits: wheat bran + insecticide (carbaryl) – effective on young & adults
- Malathion, Sevin, Permethrin – most effective on young
- *Nosema locustae* (No-Lo-Bait) – natural pathogen of grasshoppers – treat young
Major Turf Insect Pests

- Surface / Thatch Feeders (leaf, stem):
  - Armyworm
  - Cutworm
  - Sod webworm
  - Mites

- Surface / Crown Feeders (burrow into stem, crown):
  - Billbug
  - Subterranean webworm

- Subsurface (root):
  - May & June beetles
White Grubs
May and June Beetles (*Phyllophaga*)
Black Turfgrass Ataenius (*Ataenius*)

- Scarab beetle family
- C-shaped white larvae
  - Brown head, legs
  - Eat roots
  - Turf “roll-back”
- 1-3 year life cycle
White Grubs
1-3 year life cycle

Spring

Summer

Fall/Winter

Can spend 1-2 years as 2nd to 3rd instar larva

2nd-3rd instars move 3” to 12” deep for winter

Pupate
White Grub Control

- Target small larvae (late spring-early summer)
- Target larvae before they dig deep for the winter (late summer to early fall)
- Threshold: 3-4 grubs/sq ft
- Irrigate to move chemicals to grubs in the upper root zone
  - Imidacloprid (Merit™, BAG Lawn)
  - Halofenozide (Mach 2™)
  - Carbaryl (Sevin™)
  - Trichlorfon (Dylox™)
  - Beneficial Nematodes - Heterorhabditis bacteriophora (Cruiser™), Steinernema carpocapsae (Scanmask™)
  - Fungus - Beauveria bassiana (Botanigard™, Naturalis™)
Ornamental Insect Pests
Piercing-Sucking Injury
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 Management

- **Delayed Dormant Spray:** Dormant oil + Pyrethroid (at bud break)
- **Spring and Summer control:** hard spray of water, horticultural oil, insecticidal soap, BAG T&S (systemic), Conserve, azadirachtin, Orthene, pyrethroids, others
- **Biological control:** lady beetles, lacewings, syrphid flies, parasitic wasps
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
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: BAG T&S (systemic), horticultural oil, insecticidal soap
- Armored scales: Pyrethroids or others timed with crawlers
Box Elder Bug

- Primarily a nuisance pest
- Exclusion of insects from buildings is most effective management
- Removal of female boxelder trees can be helpful (trees with winged seeds)
- Targeted removal of adults from problem areas (mechanical removal: hard spray of water, sweep, vacuum), chemical sprays
Ornamental Insect Pests

Tree Borers
Tree Borers

- Avoid planting trees with borer problems (birch, poplars, aspen, ash)
- Maintain good tree health - stressed trees are more prone to attack
- Preventive trunk insecticide sprays
- Systemic insecticide (BAG T&S) - beetles
Tree Borer Management

- **Preventive Trunk Treatments**
  - **Timing is critical (northern Utah)**
    - Ash/Lilac borer – May 1- late June
    - Bronze birch borer – late May – June
    - Aspen borer – May-July
    - Peachtree (Crown) borer – late June – August
    - Locust borer – August – Sept.
    - Shothole borer – May and Sept.

- **Insecticides:** Orthene, Sevin, Thiodan, Pyrethroids, BAG T&S
Ornamental Insect Pests

Gall Formers

Cooley Spruce Gall Adelgid

Poplar Twig Gall Fly
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 forms galls
- Insecticide treatment at egg hatch (BAG T&S, Orthene, Malathion)
- Avoid planting spruce and Doug fir together
- Prune off green/purple galls
Poplar/Willow Twig Galls

- Twig Gall Flies
- Females lay eggs on new shoots
- Disfigure tree, but do not seem to threaten life of tree
- High rates of parasitism by parasitic wasps
Vegetable and Herb Garden
Insect Pests
Chewing Injury
Mexican Bean Beetle

- “Black sheep” of the lady beetle family
- Skeletonize leaves; scar stems & pods
- Cultural controls: Adults over winter in plant debris, clean up garden in fall
- Some beans are more resistant (Asian)
- Plant early and late crops; avoid major activity period of beetle (late July & August)
- Hand pick or squish
- Chemicals: Sevin, Permethrin, Neem oil, Success
Corn Earworm

- **Corn**: caterpillars feed on new silks & ear tips; reduce pollination & damage ear tips; allow entry of molds & attract other insects (sap beetles, earwigs)
- **Tomato & Pepper**: caterpillars feed on leaves & fruit
- **Cultural control**: Early crops avoid injury
- Protect young silk; difficult to control worms once inside ear tip
- **Chemicals**: Sevin, permethrin, pyrethrin, neem oil, oils applied to silks (reapply every few days)
- **Bt & Success** effective for tomato & pepper worms
Tomato Hornworm

- LARGE green caterpillars with horn on tail
- Feed on tomato, eggplant, potato
- Consume large amounts of foliage and buds in a short time period
- Remove by hand
- Chemicals: Bt (Dipel, Thuricide), Success, many others
- Parasitic wasp – white cocoons on caterpillars
Cabbage Worms

- Caterpillars chew large holes in leaves; produce abundant frass (excrement)
- Bt (Dipel, Thuricide), Success - very effective
- Row cover fabric) - cover plants to prevent egg-laying
Leafminers in Leafy Veggies

- Adults - Small flies
- Larvae - White to cream maggots
- Winding trails on leaves, white blotches
- Scout regularly, >1 mine/leaf
- Natural enemies (Paper wasp)
- Row covers
- Spinosad (Success, Entrust) insecticide
Vegetable & Herb Garden Pests

Piercing-Sucking Injury
Squash Bug

- Adults & nymphs suck fluids from plant leaves, stems & fruit; may transmit Yellow Vine Disease (bacteria)
- Congregate in plant debris under plants
- Cultural controls: Remove garden debris in fall, nearby woodpiles or other protected sites (adults over winter)
- Hand pick or destroy eggs & nymphs
- Chemicals: spray when first detect nymphs, drench undersides of leaves & stems
- Malathion, Sevin, permethrin, Neem oil, Thiodan, Surround (kaolin clay)
Spider Mites

- Very small; 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
- Suppress mite population before it explodes
- Controls: pressurized stream of water, horticultural oils, insecticidal soap
- Don’t recommend Vendex or other miticides unless a rescue treatment
- Biological control: Predaceous mites
Fruit Pests

Chewing Injury
Codling Moth

- Caterpillars bore into fruit; over winter as larvae inside silken coocoons on trunk; eggs laid by moth on leaf & fruit surfaces

- Chemical controls: target newly hatched larva; timing based on moth trap catch info. & degree-days in your area
  - Sevin (7-10 d), Permethrin (5-7 d), Malathion (5-7 d), Bt (3-5 d), CM Virus (CydX, Virusoft; 7 d)

- Sanitation: pick up dropped fruit

- Trunk banding: place corrugated cardboard bands (3-4” wide) around trunks (Jun-Sep)

- Fruit bagging (May-Aug)
Mechanical Codling Moth Controls

- Corrugated cardboard strip with codling moth pupa inside silk cocoon
- Fruit bags to exclude codling moth
- Place bags over 3/4” diameter fruit
Peach Twig Borer

- Over winter as young larvae on limbs; brown caterpillars burrow inside twigs from bloom to petal fall; a second generation enters fruit, usually at the stem end

- Delayed Dormant Spray: Dormant oil + Pyrethroid or Thiodan (by first pink) - targets twig boring OR At-Bloom Sprays: 2 Bt or Success sprays (early & full to late bloom)

- Fruit protection: Success, Permethrin, or Thiodan timed with trap catch and degree-day info. or apply at shuck-fall & repeat if needed
Western Cherry Fruit Fly

- Larvae feed in sweet & tart cherries; female flies lay eggs in ripening fruit; fruit doesn’t become soft enough for egg-laying until it turns straw to salmon colored

- Cultural controls: Landscape fabric or barrier under tree canopy

- Chemical control: Malathion (5 d), Sevin (5-7 d), Permethrin (5 d), Success (7 d), GF-120 Fruit Fly Bait (7 d)
Fruit Pests

Piercing-Sucking Injury
Grape & Virginia Creeper Leafhoppers

- Adults overwinter in leaf litter
- Lay eggs on new leaves
- 2 generations per season
- Natural enemies
- Vigorous vine growth
- Remove or incorporate leaves & debris
- Insecticides: Kaolin clay (Surround), Malathion, Spinosad (Success) - target young nymphs
Aphids

- Suck fluids from leaves & stems; curl leaves; produce sticky honeydew; black sooty mold growth
- Protect young trees, older trees can tolerate more aphid feeding
- Controls: Dormant oil + Pyrethroid or Thiodan (at green tip stage)
- Insecticidal soap, horticultural oil, Malathion, Pyrethroids, Thiodan, imidaclorpid (apple & pear)
- Biological control: lady beetles, lacewings, syrphid flies, parasitic wasps
San Jose Scale

- Scales encrust limbs; can kill limbs after several years of feeding; scales and feeding spots on fruit
- Controls: Dormant oil + Pyrethroid or Thiodan (at green tip or pink)
- Use sticky tape in May to time a spray for “crawlers”
- Horticultural oil, insecticidal soap, imidacloprid (apple & pear), Malathion, Thiodan
Spider Mites

- Feed on leaves; produce webbing; injury appears as white speckles; severe feeding leads to bronzing
- Mites build up on broadleaf weeds (bindweed, knotweed, mallow, prickly lettuce); reproduce rapidly in hot weather
- Cultural controls: Avoid mowing, herbicides, drying of vegetation - prompts mites to move into trees
- Avoid multiple applications of pyrethroid insecticides
- Biological control: naturally occurring predatory mites & small lady beetle
- Chemicals: horticultural oil, insecticidal soap
Fruit Pests

Tree and Cane Borer
Peachtree Borer

- Female clear-winged moths lay eggs on lower trunk or in cracks in soil near the base; larvae bore into the cambium in lower trunk; trees may be girdled & die; adults begin activity in late June to early July in northern Utah

- Control: Trunk spray with Thiodan or Pyrethroid during first week of July; repeat in first week of August
There are many other reasons that trees sap or bleed

Fungus canker  Winter injury
Raspberry Horntail

- Wood wasp
- Cane tips wilt; larvae tunnel within pith
- Prune & destroy infested cane tops
- Parasitic wasp attacks horntail larvae
- Chemicals - treat in at bud break, repeat; avoid bloom: Sevin, Malathion, Permethrin