

# **Integrated Pest Management for Organic Growing**

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**Diane Alston**

**Entomologist, Utah State University**

**Organic Growing Workshop, Wheeler Farm, SLC**

**March 29<sup>th</sup>, 2014**

# IPM: Integrated Pest Management

- Prevents pests & plant health problems
- Uses a combination of methods
  - Cultural
  - Mechanical
  - Biological
  - Chemical
- Increases tolerance of plants to pests
- Avoids harm to human & environmental health
- Improves sustainability (environment, economics, and social)

**Preferred  
Order**



# Develop an IPM Program for your Organic Garden

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Organic tools

Practical

Sustainable

# 1. Know Your Resources

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Local & Online

Utah State University Extension

# USU Extension Pest Management Team



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Invasive Pest Survey

# Utah Pests Online Resources

## [www.utahpests.usu.edu](http://www.utahpests.usu.edu)

One-stop shopping  
for pest management  
information

The screenshot shows the homepage of the Utah Pests website. At the top, there is a navigation bar with the Utah State University logo and the text "EXTENSION UtahStateUniversity" and "UTAH PESTS". Below this is a secondary navigation bar with links for "UTAH PESTS Home", "Utah Plant Pest Diagnostic Lab", "Integrated Pest Management", "School IPM", and "Cooperative Agricultural Pest Survey".

The main content area features a search bar, a sidebar with a list of links (Home, Fact Sheets, Video Fact Sheets, Image Galleries, Slideshows, Utah Pests News, Quarterly Newsletter, Bees and Other Pollinators, In the News, Contact Us), and a central grid of four featured sections:

- Utah Plant Pest Diagnostic Lab**: "Just \$7 gets your pest problem diagnosed or insect identified." (Icon: microscope)
- Integrated Pest Management**: "Your source for fruit, vegetable, and landscape pest problems." (Icon: leaf with insect)
- School Integrated Pest Management**: "Teaching responsible pest management for a healthy learning environment." (Icon: apple on a book)
- Cooperative Agriculture Pest Survey**: "CAPS protects Utah agriculture through statewide monitoring of invasive pests." (Icon: envelope)

On the right side, there is an "In the News" section with three articles:

- 2014 Farm Bill, No limit on Forestry Pesticides?** (Mar 03, 2014)
- Stink bug saliva proteins could lead to new control methods** (Mar 03, 2014)
- Example of Invasive Bumblebee** (Jan 27, 2014)

At the bottom of the page, there is a footer with the text: "Utah State University is an affirmative action/equal opportunity institution. © 2014 Utah State University Utah Pests".

# Fact Sheets

Arthropods and plant diseases:

232 fact sheets

- Health-related
- Forage & field crops
- IPM (general)
- Natural enemies
- Nuisance
- Ornamental
- Pantry
- Pollinators
- Small fruit
- Structural
- Tree fruit
- Vegetable

**UTAH PESTS fact sheet**  
Utah State University extension

Published by Utah State University Extension and Utah Plant Pest Diagnostic Laboratory

## Yellowjackets, hornets and paper wasps

Erin Hoagson, Extension Entomology Specialist  
Alan Roe, Insect Diagnostician

**What You Should Know**

- Yellowjackets, hornets and wasps are closely-related social wasps commonly found in Utah.
- All social wasps are capable of repeatedly stinging without dying if they feel threatened.
- Bees are often blamed for most stings, but about 90% of all stings are likely caused by yellowjackets.
- Most social wasps are predatory of other insects and considered beneficial.
- Although providing natural insect control, social wasps can be considered nuisance pests when near humans.

**Social Wasp G**

Social wasps, including yellowjackets, hornets and paper wasps, are common stinging insects in Utah (Figs. 1, 2). The wasps are related to ants and bees, which are also capable of stinging; however, yellowjackets are the most likely to sting. Less than 1% of people are allergic to wasp or bee stings; however, some people are fatally stung every year. Nearly 80% of all serious venom-related deaths occur within one hour of the sting. Most people will only experience a mild local reaction with redness, pain, swelling and itching at the sting site. If symptoms are more serious, a physician should be consulted. Some people may develop venom sensitivity after repeated stinging episodes over a short or long period of time.

**What You Should Know**

- Have three well-separated waist and two pairs of clear wings.
- Care for their young in different forms living together.
- Regenerate a new nest queen overwinters; honey together every year.
- Create their nests out of mud.
- Capture prey with their mandibles for defensive purposes on wasps that subdue prey.
- Go through complete metamorphosis: pupa, adult; adults and larvae eat.
- Capable of multiple stings; "smooth" stingers; bees have barbed stingers.

**Fig. 1. Yellowjacket.**  
**Fig. 3. Honey bee (left).**

**UTAH PESTS fact sheet**  
Utah State University extension

Published by Utah State University Extension and Utah Plant Pest Diagnostic Laboratory

## White grubs

Erin Hoagson, Extension Entomology Specialist

**What You Should Know**

- White grubs are the larval stage of scarab beetles.
- Several different kinds of white grubs are found in Utah.
- White grubs prefer to feed on turfgrass roots.
- Healthy turfgrass can mask white grub feeding.

**Damage Symptoms**

White grubs chew off the turfgrass roots near the surface or just below the thatch layer. Early signs of white grub damage include grass wilting or yellowing; however, the initial feeding injury often goes unnoted until brown patches of turf start to develop. White grub feeding damage can be most apparent in the late summer when grubs are nearly fully developed. Patches of dying turf can quickly join together if grub density is extremely high.

Grub-damaged turfgrass becomes loosely attached to the soil as the roots are consumed. Heavily damaged turfgrass can feel spongy and easily pull away from the soil surface. Drought conditions can make turfgrass appear worse.

**Description**

Adult scarab beetles are identified by size and color pattern. Adults range in size from 2/16 - 1" and can be tan, brown or black (Fig. 1). Scarab beetles are all oval-shaped, and have clubbed antennae. Adult a pair of hardened forewings called elytra and a pair of membranous hindwings for flight. The first pair of legs are modified to help burrow in the soil to lay eggs; adults are nocturnal and are only active at night.

Many of the white grub species established in Utah are similar to each other but vary in size. Mature grubs in size from 3/8 - 2". In general, grubs are C-shaped, have three pairs of thoracic legs (Fig. 2). The head is dark, but the body is usually creamy white. White grub species identification is often not needed because the cultural control practices are similar. The arrangement of hairs and spines on the posterior end of the grub, called the raster, is a distinguishing feature between species (Fig. 2).

**Fig. 1. White grubs are actually scarab beetles. Common scarab beetle adults are shown here (NOT TO SCALE).**

May/June beetle<sup>1</sup>, Black turfgrass Atoenius<sup>2</sup>, Masked chafers<sup>3</sup>, Japanese beetle<sup>4</sup>

**Fig. 2. Common white grub body characters.**

**UTAH PESTS fact sheet**  
Utah State University COOPERATIVE EXTENSION

Published by Utah State University Extension and Utah Plant Pest Diagnostic Laboratory

## European Earwig (Forficula auricularia)

Diane G. Alston, Entomologist • Andrew Tebeau, Graduate Student

**Do You Know?**

- The European earwig is an omnivore; it feeds on detritus, fungi, plants, and insects.
- Earwigs can injure the buds, leaves, flowers, and fruits of a broad range of plants, including fruits, vegetables, and ornamentals; they can be a nuisance pest by entering buildings.
- Earwigs are active at night and seek protected shelter during the daytime.
- Optimal management is a balance of protecting plants from injury while reaping benefits from biological control and organic matter decomposition.

The European earwig (Order Dermaptera, which means "skin wings" to describe their leathery wings) (Fig. 1) is native to Europe, western Asia, and parts of Africa. The common name "earwig" comes from a myth that the insect would climb into the ears of humans and chew into the brain, but this is false. The European earwig was first introduced into Utah in the early 1900s. Establishment and population growth have been remarkably successful in northern Utah. It has become an insect of concern and interest because of its abundance and omnivorous feeding behaviors that make it both a pest and beneficial insect.

**FEEDING HABITS AND INJURY**

The diverse diet of earwigs includes primitive plants (mosses, lichens, and algae), vascular plants, fungal spores, small invertebrate animals, and decaying organic matter. As opportunistic predators, they provide a benefit by preying upon plant pests such as aphids, scales, caterpillars, maggots, and mites. In contrast, their herbivorous eating behavior makes them a common pest in agricultural crops, home gardens, and landscapes; they often require intervention to reduce their damage to plants. They can also be a nuisance when they seek shelter in homes and workplace buildings.

The European earwig can feed upon and damage a broad range of agricultural products that may include tree fruits, berries, vegetable fruits, leafy vegetables and herbs, grasses, grains, and ornamentals. They prefer ripe fruits over firm, premature fruits. Earwigs feed on the buds, flowers, fruits, and leaves causing direct plant damage, reduced crop yields, and aesthetic injury (Fig. 2). They will occasionally damage a variety of stored food products.

**LIFE HISTORY**

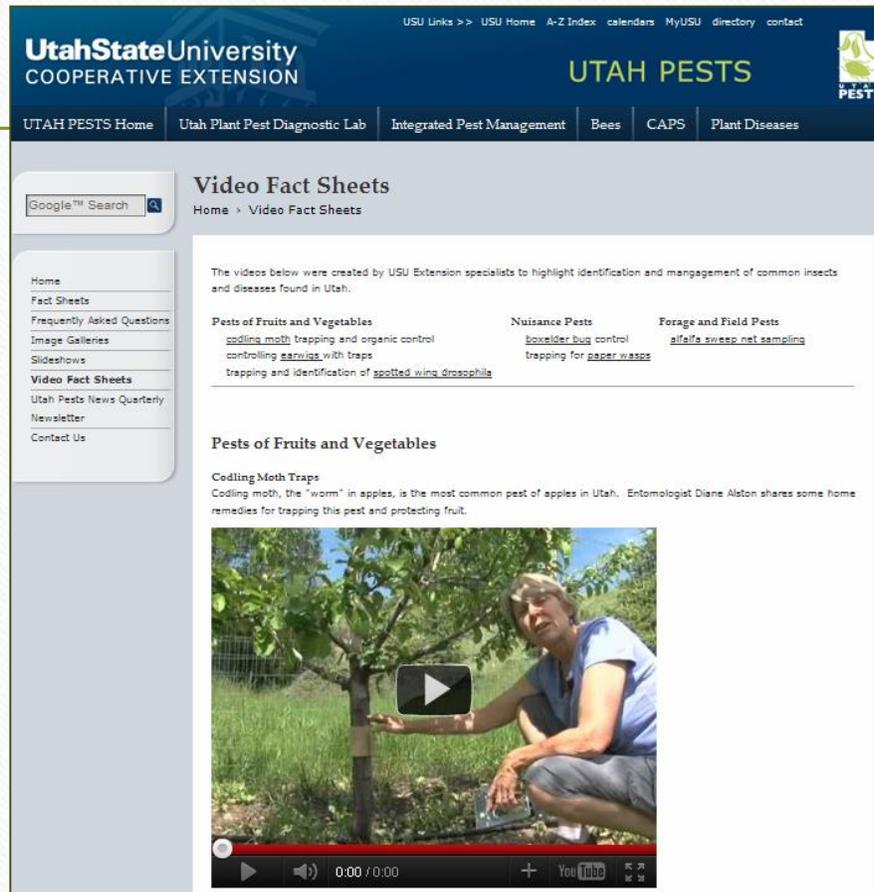
Two biotypes of the European earwig occur in the U.S. which differ by location (western vs. eastern states), life history, and European origin. In the western U.S., the European earwig has two or more generations per year, and populations tend to build to their highest densities in mid to late summer.

**Adult - Overwintering, Dispersal, and Damaging Stage**

- Elongate brown body with a red-brown head; 1/2 to 1/3 inch long.

**Fig. 1. European earwig adult and nymphs.**  
**Fig. 2. Clockwise from top left: injury to peach fruit, earwigs inside split pit of peach fruit, injury to new growth of ornamental tree, and injury to a flower.**

# Video Fact Sheets



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UTAH PESTS

USU Links >> USU Home A-Z Index calendars MyUSU directory contact

UTAH PESTS Home Utah Plant Pest Diagnostic Lab Integrated Pest Management Bees CAPS Plant Diseases

Google™ Search

## Video Fact Sheets

Home > Video Fact Sheets

The videos below were created by USU Extension specialists to highlight identification and management of common insects and diseases found in Utah.

Pests of Fruits and Vegetables	Nuisance Pests	Forage and Field Pests
<a href="#">codling moth</a> trapping and organic control	<a href="#">boxelder bug</a> control	<a href="#">alfalfa swiss net</a> sampling
controlling <a href="#">sawflies</a> with traps	trapping for <a href="#">paper wasps</a>	
trapping and identification of <a href="#">spotted wing drosophila</a>		

### Pests of Fruits and Vegetables

#### Codling Moth Traps

Codling moth, the "worm" in apples, is the most common pest of apples in Utah. Entomologist Diane Alston shares some home remedies for trapping this pest and protecting fruit.



0:00 / 0:00

4-7 min how-to videos

homemade insect traps

low toxicity pest management options

insect identification

insect monitoring

# Utah Pests Newsletter



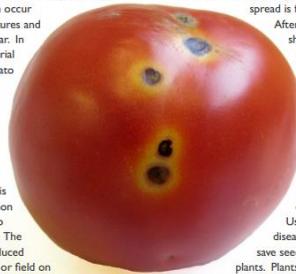
## UTAH PESTS News

Utah Plant Pest Diagnostic Laboratory and USU Extension

Vol. VII, Fall 2013

### Bacterial diseases of tomato

Infections on tomato fruits by bacterial pathogens often occur before fruit matures and symptoms appear. In Utah, two bacterial diseases of tomato have been found in the last two years: bacterial speck and bacterial canker.



Bacterial speck causes black spotting with yellow halos.

Bacterial speck is the most common bacterial tomato disease in Utah. The disease is introduced into the garden or field on contaminated seed or infected transplants. It is caused by *Pseudomonas syringae* pathovar *tomato*. Infected ripe tomatoes have characteristic black spots with yellow halos. Fruit infections occur early in the season, but symptoms are not visible until fruit matures. Foliar symptoms are evident right after infection, consisting of brown spots that may also be surrounded by a yellow halo. If transplants show brown spots on leaves they should not be purchased or planted.

Transmission of bacterial speck occurs through contaminated seed, splashing water, and pruning tools. Plants grown from infected seed will develop brown spots on leaves soon after transplanting. Rain or irrigation water spreads bacteria, causing new infections on nearby plants. The bacteria can also spread from last year's crop residue, where it can survive for up to six months, or from asymptomatic weeds



On foliage, bacterial speck symptoms may be visible at any time of the season.

continued on next page

#### What's Inside

Challenges of Growing Heirloom Tomatoes

Preventing Invasive Pests

Kestrels on Farmlands

Pest Monitoring in Schools

Barriers and Exclusion for Arthropods

Self Defense in Plants

#### News Highlights

##### UPDATE ON INVASIVE INSECTS

The Cooperative Agricultural Pest Survey program reports that a few brown marmorated stink bugs have been found in Salt Lake County traps, and a single bug was found in Utah County in September, the first for that county. Spotted wing drosophila is just now showing up in traps in Davis County, in much lower numbers than in nearby states. Also in September, the emerald ash borer, a pest that has killed millions of ash trees in the eastern US, was identified in Boulder, Colorado.

##### NEW FACT SHEETS

Chinch Bugs  
Pest Monitoring Calendars for fruit trees

[www.utahpests.usu.edu](http://www.utahpests.usu.edu)

Free, quarterly newsletter  
Current pest topics  
New research results  
Useful resources  
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# Pest Advisories

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Utah State University

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UTAH PESTS  
Integrated Pest Management

UTAH PESTS

UTAH PESTS Home Utah Plant Pest Diagnostic Lab Integrated Pest Management School IPM Cooperative Agriculture Pest Survey

Google™ Search

Plant Pests by Crop  
Fruit IPM  
Vegetable IPM  
Landscape IPM  
Field Crops IPM  
Pest Advisories  
Fact Sheets  
Image Galleries  
Slideshows  
Utah IPM & SA Mini-Grant Program  
Pesticide Information  
Weather Info  
Resources and Links  
Contact Us

Spring Advisories are Here!

Small Fruits & Vegetables IPM Advisory  
Landscape IPM Advisory  
Tree Fruit IPM Advisory  
Turf IPM Advisory

Subscribe now for the Utah IPM Pest Advisories  
Pest management info sent to your email 1 2 3

Subscribe to IPM Pest advisories  
HERE

Integrated Pest Management (IPM):  
"a comprehensive approach to pest control that uses a combined means to reduce the status of pests to tolerable levels while maintaining a quality environment."

In the News  
Pest Control with Stink Bug Saliva  
Mar 03, 2014  
Moths Trapped with Plant Pheromone  
Feb 28, 2014  
Adapting to Climate Change  
Jan 21, 2014

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[www.ipm.usu.edu](http://www.ipm.usu.edu)

Free subscription: e-mail  
Timely info on pest activity

-insects

-mites

-diseases

-nutrient deficiencies

-environmental stress

Lots of images!

IPM recommendations

Effective pesticides

# Pest Diagnostics

USU Links >> USU Home A-Z Index calendars MyUSU directory contact

**Utah State University**  
COOPERATIVE EXTENSION

**UTAH PESTS**  
Utah Plant Pest Diagnostic Lab



UTAH PESTS Home Utah Plant Pest Diagnostic Lab Integrated Pest Management Bees CAPS Plant Diseases

Google™ Search

- Home
- Fact Sheets
- Frequently Asked Questions
- Image Galleries
- \$7.00 Diagnosis
- Recent Pests
- Alfalfa Hay Testing
- Tick Survey
- Contact Us

**Current Pest Issues**

- Top 20 Insects
- Top 20 Arachnids
- Bed Bug Travel Tips
- Hobo Spiders

**Utah's Top 20 Arachnids**



1 2 3

**Submit a Sample**



**Fact Sheets**



**Events**

- Sep 18, 2011  
**What Works! 2011**
- Sep 20, 2011  
**Planning for a Low-Cost Holiday Season**
- More Events...

Utah Plant Pest Diagnostic Lab

[www.uppdl.usu.edu](http://www.uppdl.usu.edu)

# Look for this slideshow and others at [utahpests.usu.edu](http://utahpests.usu.edu)

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On the left side, there is a "Google™ Search" box and a vertical menu with links: "Home", "Fact Sheets", "Video Fact Sheets", "Image Galleries", "Slideshows", "Utah Pests News", "Quarterly Newsletter", "Bees and Other Pollinators", "In the News", and "Contact Us".

The main content area features a large image of insects on a red apple. Below this image are four featured sections:

- Utah Plant Pest Diagnostic Lab**: "Just \$7 gets your pest problem diagnosed or insect identified." (Icon: microscope)
- Integrated Pest Management**: "Your source for fruit, vegetable, and landscape pest problems." (Icon: leaf with insect)
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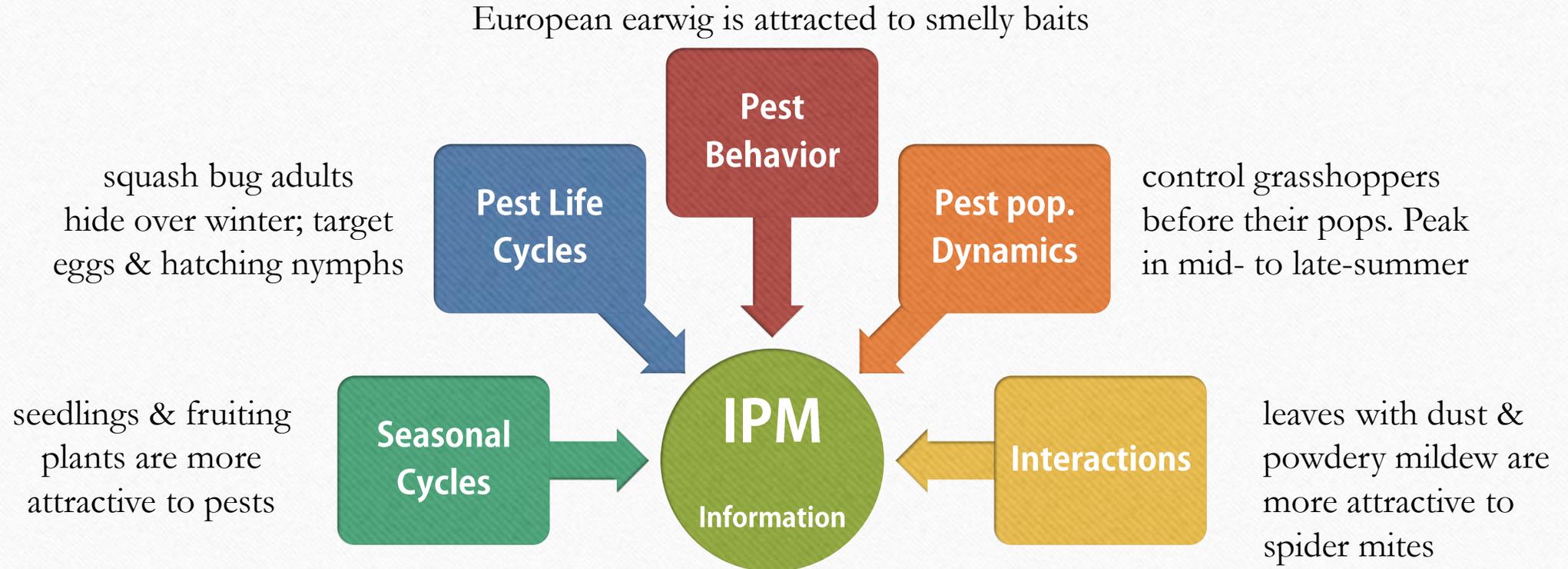
At the bottom right, there is a text box explaining the website's purpose: "UTAH PESTS' is a group of Extension entomologists and plant pathologists that helps to solve the thousands of plant pest issues that concern Utah citizens every day. The UPPDL **identifies**, the IPM Program **educates**, and the CAPS Program **investigates**. Open one of the websites to get answers!"

At the very bottom, a footer reads: "Utah State University is an affirmative action/equal opportunity institution. © 2014 Utah State University Utah Pests"

Over 100  
slideshows posted

This one posted under  
“Home Yard and Garden”

# 2. Know Your Plant & Pest Biology

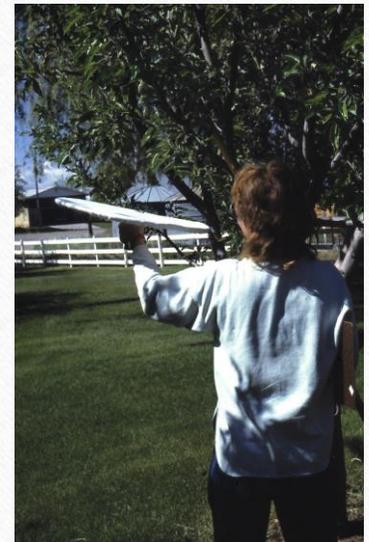


# 3. Pest Monitoring

- **Look for big picture patterns of plant injury first**
- **Where to look?**
  - new growth, undersides of leaves, on/in stems, inside fruits, on roots in soil, under bark, etc.
  - look at night with a light! - many insects are nocturnal
- **Use a hand lens - most insects are small**
- **Dislodge insects onto a light-colored surface**
- **Use appropriate traps**
  - sticky traps with attractant colors & baits
- **Check for crown & root problems**



Squash bug eggs & nymphs



Beating tray

# 4. Treatment Thresholds

- **Develop personal guidelines**
  - vary with gardener & situation
    - value of plants, costs to manage
- **Invasive & quarantine pests may have lower thresholds**
- **Timing controls with degree-days**
  - what are DDs? - heat units
  - where to get DDs? - USU Ext. IPM Advisories

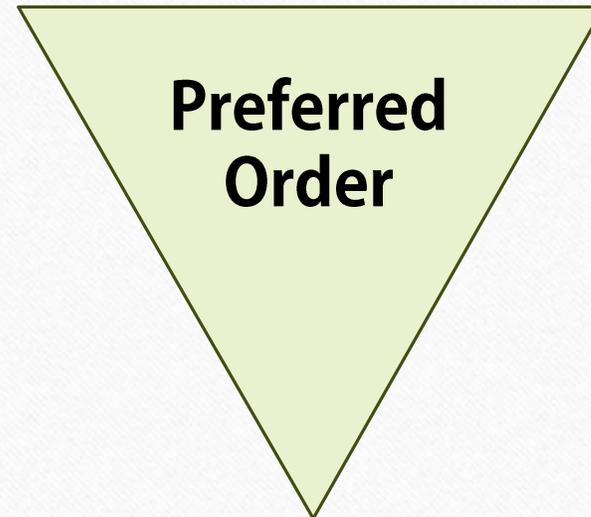


Traps for codling moth (above) & cherry fruit fly

# 5. IPM Tactics

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- Cultural
- Mechanical
- Biological
- Chemical



# Cultural Control:

## “Best Practices for Healthy Plants

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- **Select plant species and cultivars adapted to the site**
- **Use good plant production practices**
  - fertility, water, sunlight, etc.
- **For annual plants, rotate location across years**
  - avoid build-up of soil pests
- **Stressed plants are more attractive and susceptible to pests**



# Cultural Control: Enhance Landscape Biodiversity

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- “Hides” host plants from pests
- Avoid large monocultures to reduce pest attraction
- Spreads the risk of plant injury (do not put all your eggs in one basket)
- Attracts beneficial insects - diverse food resources



# Cultural Control: Sanitation

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- Pick up / chop up dropped fruit
- Remove structures / sites where insects may overwinter (wood piles, garden debris, etc.)
- Prune out diseased limbs (cankers)



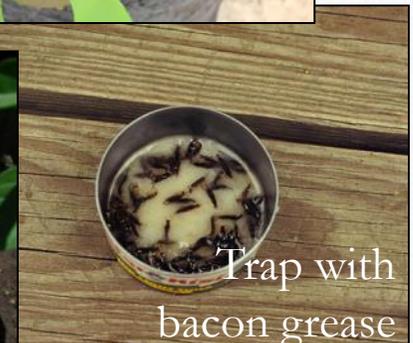
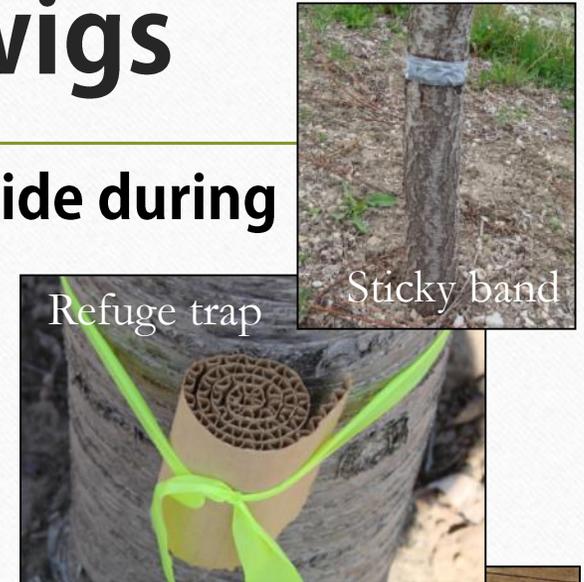
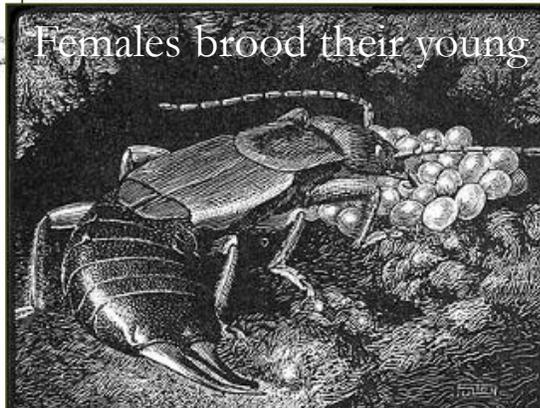
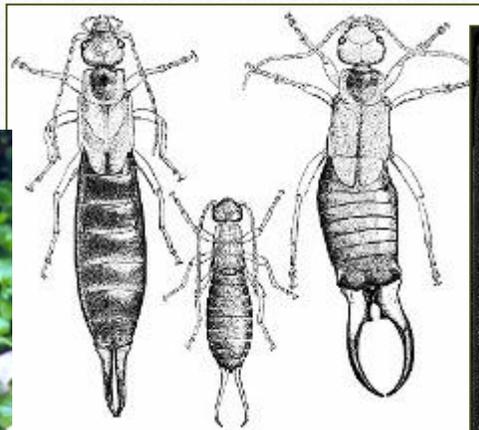
# Mechanical Control: Traps and Barriers

- **Traps**
  - yellow jacket wasps, slugs, spiders
- **Sticky bands**
  - trees and shrubs
- **Row covers**
- **Diatomaceous earth**



# Mechanical Control: Traps & Exclusion for Earwigs

- Avoid overuse of mulch and damp debris (earwigs hide during the day)
- Traps: fat-based baits, protected refugia
- Exclusion: Tanglefoot on base of trunks, stems



# Mechanical Control: Exclusion of Cabbage Worms

- Caterpillars chew large holes in leaves; produce abundant frass (excrement)
- Exclusion: Row cover fabric - cover plants to prevent egg-laying



Floating  
row cover



Imported  
cabbage  
butterfly

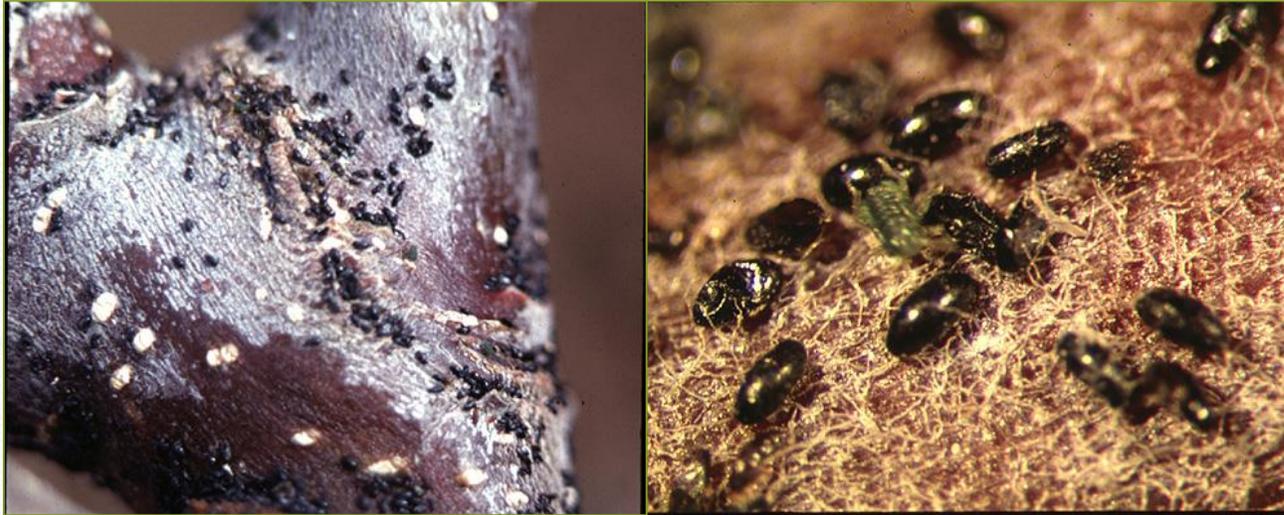


Cabbage  
looper



# Mechanical Control: Oil Sprays (Dormant and In-Season)

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Aphids overwinter as eggs on their woody host plants (trees & shrubs)  
Dormant oil applied at bud break targets hatching aphid young



San Jose scale  
overwinters on  
tree limbs



# Biological Control: Conserve Natural Enemies

- Enhance biodiversity
- Spatial diversity across the landscape
- Temporal diversity, throughout the season and from year to year
- Genetic diversity
- Needs to be the right kind of diversity!!



# Beneficial Insects & Pollinators Need a Diverse Diet & Shelter

- **Protein and carbohydrate (sugar) food sources**
  - Protein
    - Insect prey, pollen, bird droppings
  - Carbohydrate
    - Nectar, plant nectaries, aphid honeydew
- **Shelter & varied habitat**



Flowering perennials & annuals  
Trees & shrubs  
Herbs  
Wildflowers



# Native Pollinators



# Gardening for Pollinators & Beneficial Insects

[www.utahpests.usu.edu](http://www.utahpests.usu.edu) – Fact sheets: Insects-Beneficial



## UTAH PESTS fact sheet

Utah State University  
COOPERATIVE EXTENSION



Published by Utah State University Extension and Utah Plant Pest Diagnostic Laboratory      ENT-133-09      September 2009

### Gardening for Native Bees in Utah and Beyond

James H. Cane      Linda Kervin  
Research Entomologist, USDA ARS      Logan, UT  
Pollinating Insect-Biology, Management, Systematics Research

**Do You Know?**

- 900 species of native bees reside in Utah.
- Some wild bees are superb pollinators of Utah's tree fruits; raspberries, squashes, melons and cucumbers.
- Few of our native bees have much venom or any inclination to sting.
- Our native bees use hundreds of varieties of garden flowers, many of them water-wise.
- A garden plant need not be native to attract and feed native bees.



Fig. 1. Carder bee (*Anthidium*) foraging at lavender (*Lavendula*: Lamiaceae).<sup>1</sup>

Utah is home to more than 20 percent of the 4,000+ named species of wild bees that are native to North America. Except for bumblebees and some sweat bees, our native bees are solitary, not social, many with just one annual generation that coincides with bloom by their favorite floral hosts. In contrast, the familiar honey-bee is highly social, has perennial colonies, and was brought to North America by settlers from Europe. Regardless of these differences, however, all of our bees need pollen and nectar from flowers. The sugars in sweet nectar power their flight; mother bees also imbibe some nectar to mix with pollen that they gather. Pollen is fortified with proteins, oils and minerals that are essential for the diets of their grub-like larvae back at the nest.

Our flower gardens can become valuable cafeterias for local populations of diverse native bees. In our cities and towns, native plant communities have been displaced by pavement, buildings and lawns. In the countryside, grain and hay crops likewise



Fig. 2. A pollinator garden can also be water-wise. Purple *Penstemon albidus*, front, firecracker penstemon (*P. eatonii*), center, and blue fox (*Linum perenne*), background, combine to make a pleasing design.<sup>2</sup>

## Garden Plant Recommendations for Wild Bees of North America

This table contains nearly 200 garden plant genera with species whose flowers are sought by wild bees of North America.

The **Code** column is useful for Utah gardeners. Some additional species not coded as G or U are suitable for Utah but only in the hot, southernmost climates (e.g. *Larrea* or creosote bush).

- G - grows in Utah
- U - Utah native
- W - water-wise
- F - food product

**Form** tells whether the usable species in the genus are

- A - annual
- P - perennial
- S - shrub
- T - tree

Plants in **bold italic>** are great choices for Utah gardeners.

Genus	Family	Common Name	Code	Forms	Notes
<i>Abelia</i>	CAPRIFOLIACEAE	abelia		S	
<i>Acacia</i>	FABACEAE	acacia	W	ST	
<i>Acer</i>	ACERACEAE	maple	GU	T	
<i>Achillea</i>	ASTERACEAE	yarrow	GUW	P	<i>A. millefolium</i> weedy
<i>Aconitum</i>	RANUNCULACEAE	monkshood	GU	P	
<i>Agastache</i>	LAMIACEAE	hyssop	G	P	<b>see Fig. 10</b>
<i>Ajuga</i>	LAMIACEAE	carpet bugle	G	P	
<i>Allium</i>	LILIACEAE	ornamental onions	GUW	P	
<i>Althea</i>	MALVACEAE	hollyhock	G	P	not double-flowered
<i>Amelanchier</i>	ROSACEAE	serviceberry	GU	S	
<i>Amorpha</i>	FABACEAE	false indigo	G	S	
<i>Anchusa</i>	BORAGINACEAE	wild forget-me-not		AP	
<i>Anethum</i>	APIACEAE	dill	G	A	
<i>Aquilegia</i>	RANUNCULACEAE	columbine	GU	P	not double-flowered
<i>Arctostaphylos</i>	ERICACEAE	manzanita	GUW	S	

# Chemical Control: Organic Products

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- **Derived from plant, animal, or naturally occurring rock or petroleum oil sources**
  - **Minerals (rock):**
    - Lime
    - Sulfur
    - Copper
    - Diatomaceous earth
    - Boric acid
  - **Natural petroleum sources (oil):**
    - Horticultural oils (dormant & in-season)
  - **Natural animal fats (animal)**
    - Fatty acids - insecticidal soaps

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# Chemical Controls: Organic Products

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## ❑ Organic insecticides:

### ○ Botanicals (Plant):

- pyrethrum, ryania, sabadilla, rotenone, nicotine

### ○ Microbials:

- Bacteria (*Bacillus thuringiensis*, spinosyn)
- Viruses (codling moth granulosis virus)
- Fungi (*Beauveria*, *Metarhizium*)



# Organic Insecticides

Active Ingredient	Brand Name(s)	Class	Mode of Action	Toxicity Class
azadirachtin	Aza-Direct, Bioneem, Azatin	Botanical	Growth Regulator	Caution
<i>Bacillus thuringiensis</i> (Bt)	Dipel, Javelin, Thuricide	Microbial Bacterium	Larvicide	Caution
<i>Beauveria bassiana</i>	Botanigard, Naturalis	Microbial Fungus	Larvicide	Caution
beneficial nematodes	<i>Steinernema</i> , <i>Bacteriophora</i>	Biological Nematode	Larvicide, Adulticide	Caution
capsaicin	Hot Pepper Wax	Botanical	Repellent	Caution

# Organic Insecticides

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

\* Molluscicide (Snails & Slugs)

# Organic Insecticides

Active Ingredient	Brand Name(s)	Class	Mode of Action	Toxicity Class
lime sulfur		Inorganic	Broad-spectrum	Danger (caustic)
pyrethrins, pyrethrum	Pyrellin, Pyganic	Botanical	Paralyze	Caution
rotenone		Botanical	Neurotoxin	Warning
spinosyn	Entrust	Microbial	Neurotoxin	Caution
sucrose octanoate ester	Sucrocide	Natural product	Disrupts cuticle	Caution
sulfur		Inorganic	Broad-spectrum	Caution

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**Utah TRAPS**  
Timing Resource and Alerts for Pests

Utah TRAPS is a degree-day calculator and pest management tool for Utah. Degree days are used to predict insect emergence and life stages, and this tool provides dates for treating and monitoring certain pests. Using **degree days** and insect life stages (phenology) is an important component of integrated pest management.

TRAPS can currently predict treatment timings for codling moth, peach twig borer, western cherry fruit fly, greater peachtree borer, San Jose scale, and fire blight, and also provides general growing degree days. Please email Marion Murray ([marion.murray@usu.edu](mailto:marion.murray@usu.edu)) for comments, feedback, or questions.

For biofix dates from previous years, refer to [biofix page](#).  
Need help using traps? [Text Help](#) [Video Tutorial](#)

For a more detailed map [Click Here](#)

F=Fruit grower location, M=DOT, airports, and other locations

Salt Lake City (M)



1. Select a station from the map or the drop down.  
2. View *Weather Data* (if available), *Pest Summary* or select pest from drop-down menu.  
3. Hit *Submit*, or you may use your own start and end dates.

Station Name: Salt Lake City (M)

Pest Management Information

Pest Summary

Individual Pest Details

Pest: Codling Moth

Submit

Enter your own Dates

Latitude: 39.2375 Longitude: -111.007

Is Your Location Missing? [Send a request](#)

UTAH PESTS  
Utah Traps is a collaboration of the USU Extension IPM program, Utah Pests, and the USU Climate Center

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## IPM Resources

# Utah TRAPs Timing Resource & Alerts for Pests

Select weather station location  
 Select pest or pest summary  
 Recommends mgmt. actions  
 Based on cumulative temperature  
 Degree-days (DDs)



## Spray Timing - Codling Moth

County	Location	Option A		Option B
		Apply oil	Apply first spray	Apply first spray
<b>Box Elder</b>	Perry	May 25	June 7	May 27
	Tremonton	May 25	June 5	May 27
<b>Cache</b>	River Heights	May 30	June 11	June 1
	Smithfield	June 2	June 14	June 4
<b>Carbon</b>	Price	May 29	June 9	May 31
<b>Davis</b>	Kaysville	May 24	June 4	May 26
<b>Grand</b>	Castle Valley	passed	May 22	passed
<b>Juab</b>	Tintic	June 2	June 15	June 4
<b>Salt Lake</b>	Holladay	May 17	May 29	May 20
	Taylorsville	May 22	June 6	May 24
<b>Sevier</b>	Monroe	May 21	June 3	May 23
<b>Tooele</b>	Erda	May 27	June 7	May 29
	Grantsville	May 21	June 2	May 23
<b>Uintah</b>	Vernal Airport	May 29	June 10	May 31
	Alpine	May 30	June 11	June 2
<b>Utah</b>	American Fork	May 25	June 5	May 27
	Genola	May 22	June 4	May 24
	Lincoln Point	May 25	June 7	May 27
	Orem	May 21	June 1	May 23
	Payson	May 24	June 4	May 26
	Provo	May 19	May 30	May 21
	Santaquin	May 25	June 6	May 27
	West Mountain	May 22	June 2	May 24
	<b>Weber</b>	Pleasant View	May 21	June 1
<b>Wasatch</b>	Heber City	June 4	June 15	June 6
<b>Wayne</b>	Torrey	May 18	May 30	May 21

Choose either Option A or B when starting your codling moth sprays:

Option A uses horticultural oil (1%) as the first spray, followed by a regular insecticide at a later date. The oil kills eggs that have been laid on fruit up to that point. Good coverage of the oil (to dripping) is very important.

Option B is uses regular insecticide at the recommended date. Repeat at intervals until this advisory provides the end date for generation 1.

# Pest Advisories

## Interpreting pest mgmt. timing information

**Precautionary Statement:** Utah State University Extension and its employees are not responsible for the use, misuse, or damage caused by application or misapplication of products or information mentioned in this document. All pesticides are labeled with ingredients, instructions, and risks. The pesticide applicator is legally responsible for proper use. USU makes no endorsement of the products listed herein.

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