

# Insecticide Selection and Invasive Insect Update

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PESTICIDE EDUCATION WORKSHOP  
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# Integrated Pest Management (IPM)

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## Sustainable

- Economics and Environment

## Integrated Strategies

- Cultural (plant & site management)
- Mechanical (barriers, disruption, traps)
- Biological (natural enemies)
- Chemical (pesticides)

## Monitor pest numbers/injury

- Treat only when needed



# Utah Pests Online Resources

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

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 Utah State University" on the left, "UTAH PESTS" in the center, and a "UTAH PESTS" logo on the right. Below this is a secondary navigation bar with links: "UTAH PESTS Home", "Utah Plant Pest Diagnostic Lab", "Integrated Pest Management", "School IPM", and "Cooperative Agricultural Pest Survey".

On the left side, there is a "Google™ Search" box and a vertical menu with the following items: "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 "Fact Sheets" and "Video Fact Sheets" items are circled in red.

The main content area features a large image of a pest on a plant. Below this image are four service tiles, each with an icon and a brief description:

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

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

- Invasive Pests vs. Polar Vortex**: Nov 03, 2014
- Customs Agent in Buffalo Intercepts Invasive Tortricid Moth**: Oct 17, 2014
- New Leafhopper Species**: Oct 07, 2014

At the bottom right, there is a paragraph of text: "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!"

# Fact Sheets: over 200 fact sheets on pests of ornamentals, turf, fruits, vegetables, field crops, health-related, nuisance, stored products, structural, etc.

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

Published by Utah State University Extension and Utah Plant Pest Diagnostic Laboratory ENT-054-11 December 2011

## Spruce Health in Utah Landscapes

Ryan S. Davis, Arthropod Diagnostician; Michael Kuhns, Extension Forester; Claudia Nischwitz, Extension Plant Pathologist

### DO YOU KNOW?

- Spruces tend to prefer abundant moisture and may not do well on droughty sites.
- Water stress caused by too little soil moisture or too much heat can predispose spruces to insect attack.
- 80% of spruce trees submitted to the UPPDL are diagnosed with stress due to abiotic conditions such as drought stress and deep planting.
- Spruces are fairly shade tolerant.

### BACKGROUND

Spruces are common trees in cultivated landscapes in Utah. They have varied shapes, attractive foliage color, and can be fairly long-lived. They have pests, but not overly so, and are not very messy. Overall, the spruce genus (*Picea*) is commonly planted because it is a good tree for many landscape situations. There also are many native spruces in our mountains, and some of these come under cultivation when someone builds a cabin or other development occurs.



Blue spruce (*Picea pungens* 'Suecica')<sup>1</sup>.

### SPRUCES IN UTAH

Five species of spruce are commonly found in Utah, and are listed below in order of their commonality in the landscape. A few other species can be found but are very rare, examples include Brewer's spruce (*Picea breweriana*), black spruce (*Picea mariana*), and Oriental spruce (*Picea orientalis*)

#### Blue Spruce (*Picea pungens*)

Our most common planted spruce: highly desirable because of its silver-blue color and dense conical form. Also grows in Utah's mountains on wetter sites, though it is not as common as Engelmann spruce. This is Utah's official state tree. Crown form can vary from fairly open, to dense and conical, to shrubby. Many cultivars exist that tend to focus on



Blue spruce (*Picea pungens* 'Glauca Procumbens')<sup>1</sup>.

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

Published by Utah State University Extension and Utah Plant Pest Diagnostic Laboratory ENT-19-07 May 2007

## Yellowjackets, hornets and paper wasps

Elin Hodgson, Extension Entomology Specialist

Ailan 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 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.



Fig. 1. Yellowjacket.<sup>1</sup>



Fig. 2. Bald-faced hornet.<sup>1</sup>

### Social Wasp General Description

- Have three well-separated body regions, a distinct waist and two pairs of clear wings.
- Care for their young and develop a caste system with different forms living together.
- Regenerate a new nest every year because only the queen overwinters; honey bee colonies overwinter together every year.
- Create their nests out of a wood and saliva paste.
- Capture prey with their legs and jaws and use stinging for defensive purposes only; this is different than solitary wasps that subdue prey with stinging (e.g., spider wasp).
- Go through complete metamorphosis (i.e., egg, larva, pupa, adult); adults and larvae have chewing mouthparts, and larvae are legless.
- Capable of multiple stings because they have "smooth" stingers; bees have barbed stingers (Fig. 2)



Fig. 3. Honey bee (left) and wasp (right) stingers. page 1

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

Published by Utah State University Extension and Utah Plant Pest Diagnostic Laboratory ENT-169-13PR September 2013

## Chinch Bugs

Kelly Kopp, Extension Water Conservation and Turfgrass Specialist, Ryan S. Davis, Arthropod Diagnostician, and Ricardo A. Ramirez, Extension Entomologist

### DO YOU KNOW

- Chinch bugs are occasional pests of turfgrass in Utah.
- Chinch bugs feed on a variety of turfgrass species including Kentucky bluegrass, perennial ryegrass, the fescues, bentgrass and zoysiagrass.
- Damage is usually heaviest in sunny locations during hot, dry periods.
- Sound cultural (non-chemical) practices are the best defense against chinch bug damage.

### INTRODUCTION

Chinch bugs (Fig. 1) are "true bugs". In Utah, the common chinch bug [*Blissus leucopterus leucopterus* (Say)], and western chinch bug (*Blissus occiduus*) may feed on turfgrass, especially under conditions of severe heat and drought. Coupled with under-irrigation, direct sunlight, and thick thatch, chinch bug numbers can soar from mid-summer to early fall.

### BIOLOGY

Adults overwinter in thatch, clumps of grass, next to buildings and along the edges of sidewalks. They emerge in early spring to mate (when temperatures reach 70°F). Females insert eggs on underground roots, behind leaf sheaths in the crowns of turf plants, in the folds of grass blades, or in the thatch. Eggs hatch in mid to late spring with development of immature stages requiring approximately 1 month. Adults of the first summer generation begin to appear in early to mid summer. Eggs of the second summer generation hatch approximately 1 month later and complete development in early to mid fall. Adults of

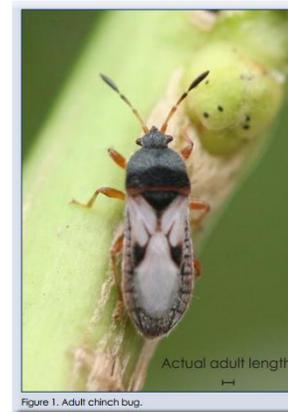


Figure 1. Adult chinch bug.

this generation move to overwintering sites as temperatures cool in the fall.

### IDENTIFICATION

Chinch bugs go through numerous developmental stages (Fig. 2). First stage nymphs of the common chinch bug are tiny (1/64 in) and bright red with a white band across the abdomen (Fig. 2). As they mature through five nymphal stages, they turn orange-brown and then black. Adults are black (1/10 in long) and white with fully developed wings that fold over the back and extend to the end of the abdomen (Figs. 1 & 2). This creates a black triangle pattern behind the pronotum

# Video Fact Sheets

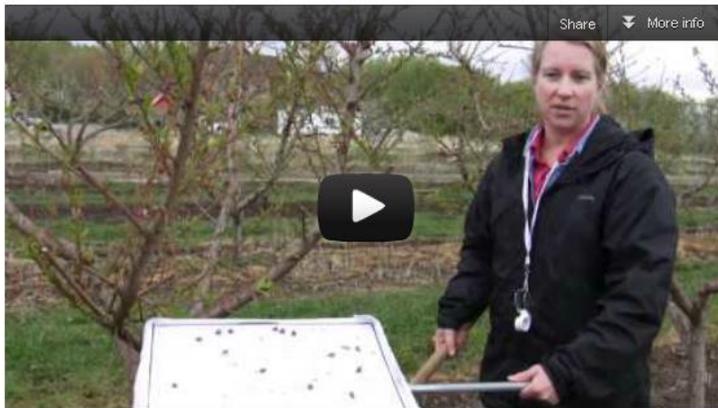
## Paper Wasp Traps

Entomologist Diane Alston discusses the difference between native paper wasps and European paper wasps, and how to make your own traps to combat them.



## Using a Beating Tray

A beating tray is a large cloth frame that is used to catch insects that fall from a shaken branch. It is helpful for monitoring a large area, such as an orchard, quickly.



## Billbug Identification and Detection in Turf

Entomologist Ricardo Ramirez discusses the identifying characteristics of billbugs in turf, and demonstrates how to detect the damaging larval stage.



## Tips for avoiding bed bugs while traveling.

Entomologist Ryan Davis discusses safe travel techniques to avoid falling prey to bed bugs, and how to minimize the chances of bringing bed bugs back to the home.



# IPM Advisories:

ornamentals, turf, fruits, vegetables

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

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UTAH PESTS Integrated Pest Management

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Utah Vegetable Production and Pest Management Guide 2014

The 2014 Utah Vegetable Production and Pest Management Guide is now available.

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."

*All you need to sign up for the advisories is an email address*

In the News

- Whats in a name? Fruit Flies Oct 29, 2014
- To Wilt Or Not To Wilt Oct 16, 2014
- Emerald Ash Borer May Have Spread to a Different Tree Oct 10, 2014

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Free subscription  
Timely info on pest activity

-insects

-mites

-diseases

-nutrient deficiencies

-environmental stress

Lots of images!

IPM recommendations

Effective pesticides

# IPM Advisories (2014 Examples)

EXTENSION  
Utah State University

## Landscape IPM Advisory



Pest Update for Woody Ornamentals, Utah State University Extension, July 22, 2014



### What's In Bloom (Salt Lake City area)

Butterfly bush: bloom  
Goldenrain tree: bloom  
Mimosa: end bloom  
Rose-of-Sharon: begin bloom  
Shrub roses: end bloom

Smokebush: end bloom  
Smooth hydrangea: bloom  
Sourwood: bloom  
Sumac: end bloom  
Sweet Autumn clematis: begin bloom  
Trumpet vine: end bloom  
Vibex: full bloom

### Insect/Disease Information

#### DECIDUOUS TREES

##### Honeylocust Spider Mite Hosts: Honeylocust



Honeylocust spider mites can sometimes be a problem, especially on drought-stressed trees. They feed on the undersides of leaves and cause them to turn yellow-bronze in color and eventually drop. Their populations build rapidly in hot

weather, and they are starting to be noticeable now. This pest will not kill trees, but repeated infestations can cause growth to slow.

This spider mite overwinters as orange-colored adult females in cracks and crevices on the bark of the tree. They become active in spring and lay eggs in June. When the weather heats up in July, the time between generations (eggs to adults) changes from 11 days to just 4!

Check for mites at the base of honeylocust leaflets with a hand lens, or shake leaves over a cloth tray. The mites will appear as tiny, slow-moving specks.

**Treatment:**  
Drought-stressed trees are more susceptible, so water trees deeply during dry spells. Mites are easily controlled with miticide sprays for commercial use, or horticultural oil or soap for residential use. Dormant oil is an excellent choice to kill the overwintering adults.

##### Locust Borer Hosts: Black Locust

The locust borer is a beetle that attacks black locust (*Robinia pseudoacacia*) and its cultivars. "Purple Robe" locust is the most common black locust planted in Utah. Honeylocust (*Gleditsia triacanthos*) is not attacked.

Adults of the locust borer will be active in the first week of August in the Salt Lake City area, around the time that goldenrods start blooming. The adults feed on nectar while the larvae cause the damage in the tree.

Locust Borer is continued on next page

Utah State  
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extension

## Turfgrass IPM Advisory



Seasonal Turfgrass Pest Update, Utah State University Extension, Fall 2014

### Turfgrass Integrated Pest Management

An integrative approach to the management of turfgrass insect pests, diseases and weeds is most effective. Often, prevention is the best strategy and management practices can help grasses to resist and recover from pest damage.

#### News/What to Watch For

New information is available regarding billbug activity and management in the state, including a new insecticide option. We also have a new insect pest to contend with in Utah. Crane fly has been found in the state for the first time this year. Of course, routine fall management practices are also a priority now.

### Billbug: Activity in Turf and a New Insecticide Option

Billbugs (*Sphenophorus* spp.) are a primary pest of turfgrass in the Intermountain West. Adult weevils deposit eggs in turf stems. Larvae then emerge from the eggs and feed within the stems. Mature larvae feed on roots below ground, and eventually pupate with adults emerging from the soil.

Although the adults do feed on turf aboveground, the majority of turf damage results from larval feeding and is seen as severe discoloration resembling drought stressed turf, and in severe cases plant death.



Photo by Len Spears

Most of what we know about billbugs comes from research conducted in the eastern U.S., yet we find many differences in Utah and the Intermountain West. In the Intermountain West, there is a complex of three billbug species that occurs simultaneously including the bluegrass, hunting, and Rocky Mountain billbugs. In some isolated spots, the Phoenix billbug also occurs. In other regions of the U.S., only one and sometimes two of these species will be present as major pests.

Current predictive models for billbug activity do not appear to be a good fit for predicting billbug populations in the Intermountain West. For example, first occurrence of billbugs in Logan, UT in 2014 was more than one month earlier (60 degree days<sub>50</sub>; April 12) than what would be predicted by the current Base 50 degree day (DD) model<sup>1</sup> used in the east (280-352DD; May 25-31). Recognizing these differences is key to improving the timing and resulting efficacy of management strategies that are available.

EXTENSION  
Utah State University

## Vegetable IPM Advisory



Pest and Production Update, Utah State University Extension, October 14, 2014

### FRUIT ROTS OF CUCURBITS (Preharvest and Postharvest)

#### Belly Rot:

Belly rot begins on the underside of the fruit and is caused by *Rhizoctonia solani*, which is a common soil inhabitant worldwide. *Rhizoctonia* affects many plant species and can attack most plant parts. Although all of the cucurbits may be infected, cucumber is the most susceptible.

#### Symptoms:

Water-soaked tan to brown lesions, which become sunken, cratered, irregular, and dried as they enlarge appear on the undersides and blossom ends of cucumber fruit. The cratered area has a crusty appearance that may be confused with symptoms of scab. Infection of cucurbit fruit usually does not lead to soft rot of tissue.



#### Disease Cycle:

The pathogen survives in the soil on plant tissue. *Rhizoctonia* invades cucurbit fruit in contact with the soil. Temperature is considered more important than moisture for disease development, although high relative humidity near the soil surface under dense foliage promotes infection. Infection can occur between 46° and 95°F. High proportions of fruit may be invaded at the optimal temperature of 80.6°F.

#### Control:

Fumigate and deep plow (7.9 to 9.8 inches) your field/garden before planting next spring. Use barriers such as plastic mulch, wire, asphalt shingles, or wood between the soil and

produce to prevent fruits from coming in contact with the pathogen. Soil-applied fungicides may be used but generally do not control belly rot consistently.

For this information on belly rot plus more see University of Kentucky's plant pathology fact sheet [http://www2.ca.uky.edu/agcollege/plantpathology/ext\\_files/PPFShtml/PPFS-VG-7.pdf](http://www2.ca.uky.edu/agcollege/plantpathology/ext_files/PPFShtml/PPFS-VG-7.pdf)

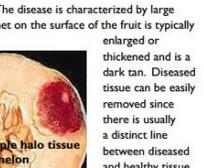
#### Fusarium Rot:

Fusarium rot is one of the more common preharvest and postharvest diseases of cucurbit fruits.

#### Symptoms:

Symptoms of Fusarium fruit rot symptoms can vary depending on the Fusarium species, the host plant, and the stage of lesion development. However, there are striking similarities in symptomatology among some Fusarium rots.

One group of Fusarium species produces brown internal lesions; a cross section of a mature lesion reveals a dry, brown, spongy rot with a white halo. In melon, lesions, which can be detected preharvest, generally remain green around the margin while the rest of the fruit begins to turn yellow at maturity. The disease is characterized by large cracks in skin. The net on the surface of the fruit is typically enlarged or thickened and is a dark tan. Diseased tissue can be easily removed since there is usually a distinct line between diseased and healthy tissue.



Courtesy of B. D. Brannon. <http://www.ars-grin.gov/>

Another group of Fusarium species produces a distinct reddish or purplish pigmentation in the diseased area.

continued on next page

# Pest Diagnostics

Utah Plant Pest Diagnostic Lab

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

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**Current Pest Issues**

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

**Utah's Top 20 Arachnids**

**Submit a Sample**

**Fact Sheets**

**Events**

- Dec 03, 2012  
**State Ambassador Applications Due**
- Dec 03, 2012  
**Menu Planning and Shopping**

More Events...

## Sample Submission



# Topics

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## Considerations for Insecticide Use

- Select an effective chemical
- Prevent resistance in pest populations
- Off-target effects: pollinators, beneficial insects

## Insecticide Classes

- Attributes
- Common active ingredients used in landscapes, fruits, and vegetables
- Examples of IPM Strategies

## Invasive Insect Update

- Spotted wing drosophila, Brown marmorated stink bug, Velvet longhorned beetle, Emerald ash borer



# Why do we care about insecticide classification?



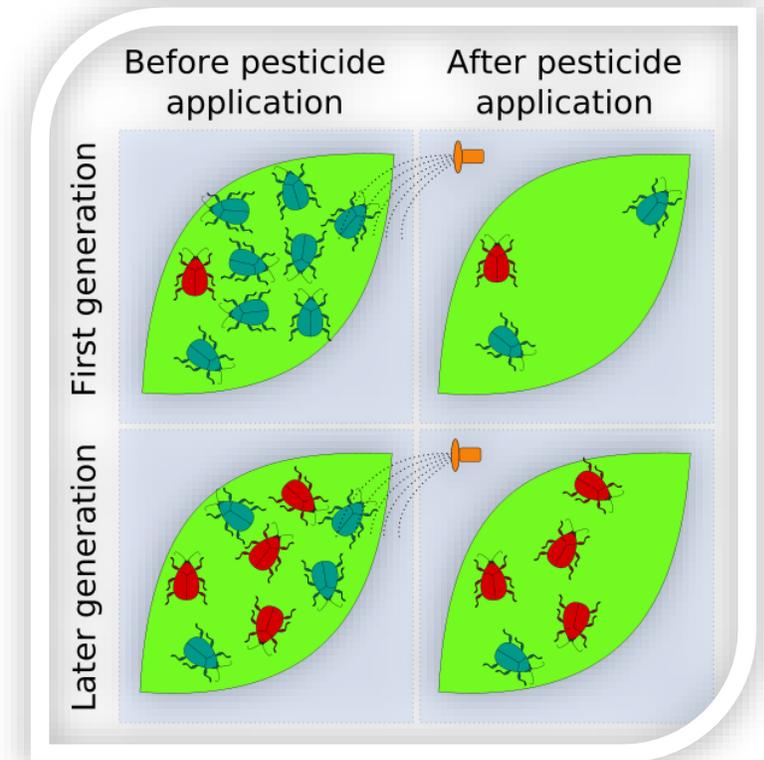
Understand the chemical's mode-of-action (MOA) (how it kills the insect)

Select products that will be effective and appropriate for the situation

Avoid developing resistance in the pest population

- Chemicals in the same class have the same MOA
- Risk for resistance is greater for chemicals with same and related MOA
- Overuse of the same MOA can select for resistant individuals in the population
- Insects with short generation time, high birth rate, and many generations each year are more prone to resistance

Develop short- and long-range strategies for IPM practices and use of chemicals



# Considerations for Insecticide Use

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Prevent resistance

Sustain economics and health of environment

Sustain effective insect control

Select least toxic option that is effective

- Protect pollinators
  - Managed bees: honeybee, alfalfa leafcutter bee, alkali bee
  - Wild & native bees: solitary nesters
    - blue orchard bee, squash bee, bumblebees
- Protect beneficial insects, mites, and spiders
  - Predators of pest insects
  - Parasitoids of pest insects



Alkali bee, *Nomia melanderia*



# Insecticide Classes (IRAC\*)

Mode of Action	Class	Active Ingredient Examples
Acetylcholinesterase inhibitors (nerve synapse)	1A. Carbamates	carbaryl, methomyl, oxamyl
	1B. Organophosphates	acephate, diazinon, malathion
Sodium channel modulators (nerve membrane)	3A. Pyrethroids	bifenthrin, cyfluthrin, cypermethrin, esfenvalerate
Nicotinic acetylcholine receptor agonists (nerve synapse)	4A. Neonicotinoids	acetamiprid, dinotefuran, imidacloprid
Nicotinic acetylcholine receptor allosteric activator (nerve synapse)	5. Spinosyns	spinetoram, spinosad
Juvenile hormone mimics (growth regulation)	7. Juvenile hormone analogs	hydroprene, kinoprene, methoprene
Microbial disruptors of insect midgut membranes (selective gut poison)	11. <i>Bacillus thuringiensis</i>	<i>Bt israelensis</i> , <i>Bt kurstaki</i> , <i>Bt tenebrionis</i> , transgenic cry proteins
Ryanodine receptor modulators (nerve & muscle action)	28. Diamides	chlorantraniliprole, cyantraniliprole

# Insecticide Attributes

Class	Product examples	Persistence*	Plant penetration	Rainfastness
Carbamates	Carbaryl, Sevin, Vydate	Short - Medium	Cuticle penetration	Moderate
Organophosphates	Imidan, Malathion, Orthene	Medium - Long	Surface	Low
Pyrethroids	Asana, Brigade, Mustang, Permethrin	Short - Medium	Cuticle penetration	Moderate - High
Neonicotinoids	Admire Pro, Assail, Merit, Safari	Medium	Translaminar & Acropetal (up & out)	Moderate
Spinosyns	Entrust, Radiant, Success	Short - Medium	Translaminar	Moderate - High
Insect Growth Regulators	Distance	Medium - Long	Translaminar	Moderate
<i>Bacillus thuringiensis</i>	Deliver, Dipel, Javelin	Short	Surface	Low
Diamides	Altacor, Belt, Exirel	Medium - Long	Translaminar	Moderate - High

\*Short = 2-5 days; Medium = ~1 week; Long = 1.5-3 weeks

# Insecticides with Physical Modes of Action

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## Horticultural Oils

- Dormant or in-season
- Suffocation, clogs the spiracles (openings for air/respiration)

## Insecticidal Soaps

- Breaking down wax layers on insect cuticle

## Kaolin Clay

- Hydrophobic - desiccation
- Repellent

## Diatomaceous Earth & Boric Acid

- Abrasive
- Form cuts in insect cuticle - desiccation



Apply horticultural oil to suffocate scale insects

# Common Insecticides

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## LANDSCAPE ORNAMENTALS

Insect pest	Class	Example
Aphids	Carbamate Pyrethroid Neonicotinoid	Orthene Talstar Merit
Caterpillars	IGR Microbial Spinosyn	Azatrol (neem) Bt Conserve
Leaf miners	Carbamate Pyrethroid	Sevin Defense, Talstar
Thrips	Spinosyn Pyrethroid	Conserve Battle, Scimitar
Spider mites	Physical	Oils, soaps

## TURFGRASS

Insect pest	Class	Example
Billbugs	Carbamate Pyrethroid Neonicotinoid Diamide	carbaryl deltamethrin imidacloprid Acelepryn
Sod webworm	Pyrethroid Spinosyn	Talstar spinosad
White grubs	Diamide Neonicotinoid	chlorantraniliprole imidacloprid

# Woody Plants: Scale Insects



European  
Elm  
Scale

Soft Scales



Lecanium  
Scale



Oystershell  
Scale

Armored Scales



Black  
Pineleaf  
Scale

# Scale Infestation Symptoms



Twigs & limbs encrusted in scale insect bodies

Chlorotic leaves

Necrotic spots on leaves & fruit



Limb dieback when scales are abundant

Soft Scales: honeydew (because feeding in tree phloem)



Feeding spots (halo) & scale on fruit

# Scale Mechanical Control & Monitoring

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Prune out infested limbs in winter/spring pruning

Place sticky bands on tree limbs to trap the young “crawler” stage

- Primarily a monitoring tool



Tangletrap™ sticky band & crawlers



Black pineleaf scale crawlers



San Jose scale crawlers

# Timing for Scale Insecticides



➔ Delayed dormant oil

Dormant Oil Spray (2-4%)

- Spring – at bud break – smothers overwintering scales
- Combine with a compatible insecticide

➔ Systemic post-bloom

Systemic soil drench or injection

- Spring (Post-bloom)
  - Soft Scales – imidacloprid (Merit, Bayer Advanced, others)
  - Armored Scales – dinotefuran (Safari) – ornamentals only

➔ Late spring to early summer  
when “crawlers” are active  
*IPM Advisories provide  
timing info*

Target Crawlers

- June to July (varies with species; sticky bands to monitor)
  - horticultural oil, insecticidal soap, carbaryl (Sevin), dinotefuran (Safari), pyriproxyfen (Distance), buprofezin (Talus), azadirachtin (Azatin, Neem oil), synthetic pyrethroids (Tempo, Talstar, others), malathion

# Common Insecticides

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## FRUITS

Insect pest	Class	Example
Codling moth	Diamide Neonicotinoid IGR	Altacor Assail Intrepid
Aphids	Neonicotinoid Tetranic acid Physical	Admire Pro Ultor Oils, soaps
Scale	Organophosphate IGR	Lorsban Esteem
Stink bugs	Pyrethroid	Asana Warrior

## VEGETABLES

Insect pest	Class	Example
Tomato russet mite	Carbamate Organophosphate	Vydate Malathion
Corn earworm	Carbamate Pyrethroid	Sevin Warrior
Earwig	Spinosyn	Success

# Aphids: Common!!

Small, soft-bodied  
Live in groups (colonies)  
Suck phloem sap  
“Tail pipes” (cornicles)

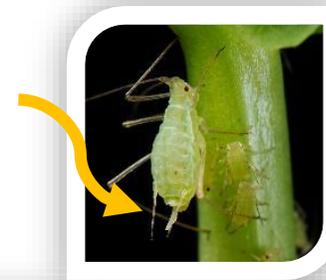


Woolly ash aphid

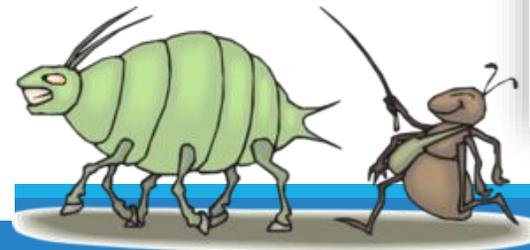
Symptoms:  
Curled leaves & shoots  
Sticky honeydew  
Black sooty mold  
Tending ants



Rose aphid



Linden aphid



# Aphid Life Cycle Variations

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Species with broad or specific host ranges

During the growing season:

- crowding & food availability determine if adults are winged or wingless
  - most aphids are females
  - give birth to live young without mating

Temperate regions = Utah:

- most aphids lay overwintering eggs on woody host
  - autumn: winged adults fly to deciduous tree/shrub host, mate, lay eggs
  - spring: generation(s) on woody host, winged adults fly to vegetative hosts (weeds, vegetables, ornamentals)
  - conifer aphids are usually host specific



# Aphid Insecticides

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dormant (2-4%) and horticultural oils (1%) (many brands)

insecticidal soap (many brands)

imidacloprid (Merit, Bayer Advanced, generics)

- systemic, post-bloom only
- new bee protection labels

pyrethroids (many brands)

- bifenthrin (Talstar), cyfluthrin (Tempo), lambda-cyhalothrin (Scimitar, Battle), pyrethrin

pymetrozine (Endeavor) – antifeedant

acephate (Orthene) – locally systemic

acetamiprid (Assail, Tristar)

malathion (many brands)



# Aphid Biological Control



Convergent  
Lady Beetle



Hover or  
Syrphid Fly



Green Lacewing

# Aphid Mechanical Control

---

Stiff spray of water  
applied to plants  
every 2-3 days  
until aphid numbers  
decline

Works best if  
initiated before  
leaves are curled

(also good for spider mites)



# Aphid Cultural Control

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Avoid excess nitrogen applications

- balance annual growth
- avoid excessive, lush growth





# Invasive Insect Pests

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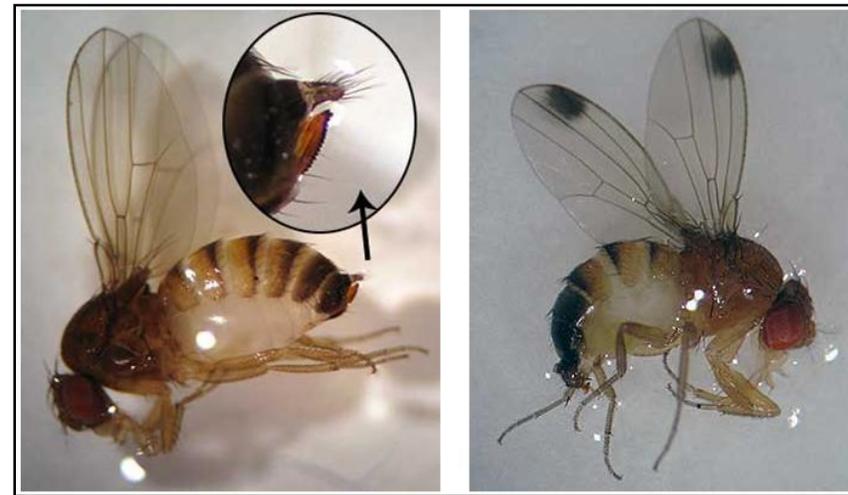
RESIDENT IN UTAH AND NOT HERE YET

Spotted wing drosophila and brown marmorated stink bug slides courtesy of Lori Spears, USU CAPS Coordinator

# Spotted Wing Drosophila

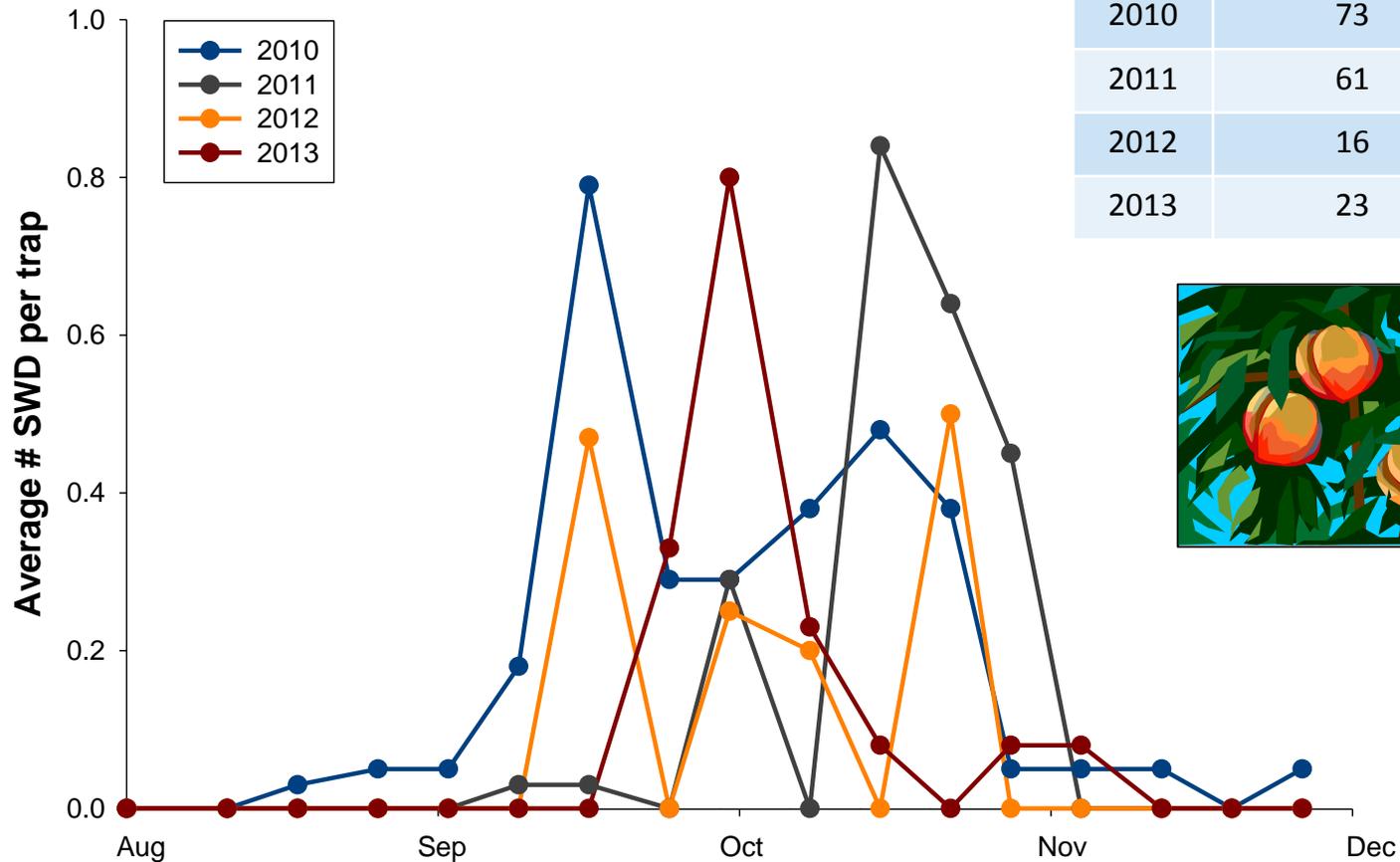


- Native to southeast Asia
- Most *Drosophila* spp. attack rotting fruit
- *Drosophila suzukii* (SWD) preferentially infests ripe and ripening fruit



# SWD Activity in Davis County

2010-2013



Year	Total # of SWD	Date of 1 <sup>st</sup> trap capture
2010	73	Aug 18
2011	61	Sep 8
2012	16	Sep 17
2013	23	Sep 25



# SWD Activity in Northern Utah

2014

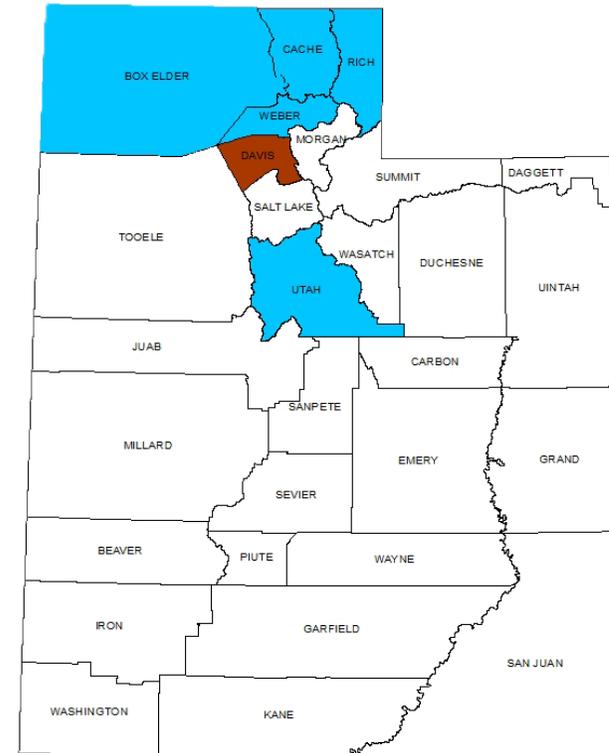
1st trap capture: June 2

- A single male was found in a wild habitat in Davis County that included river hawthorn and other feral fruits

5 new county detections:

- Rich
- Cache
- Box Elder
- Weber
- Utah

SWD abundances sharply increased in 2014



# SWD Activity in Northern Utah

2010-2014

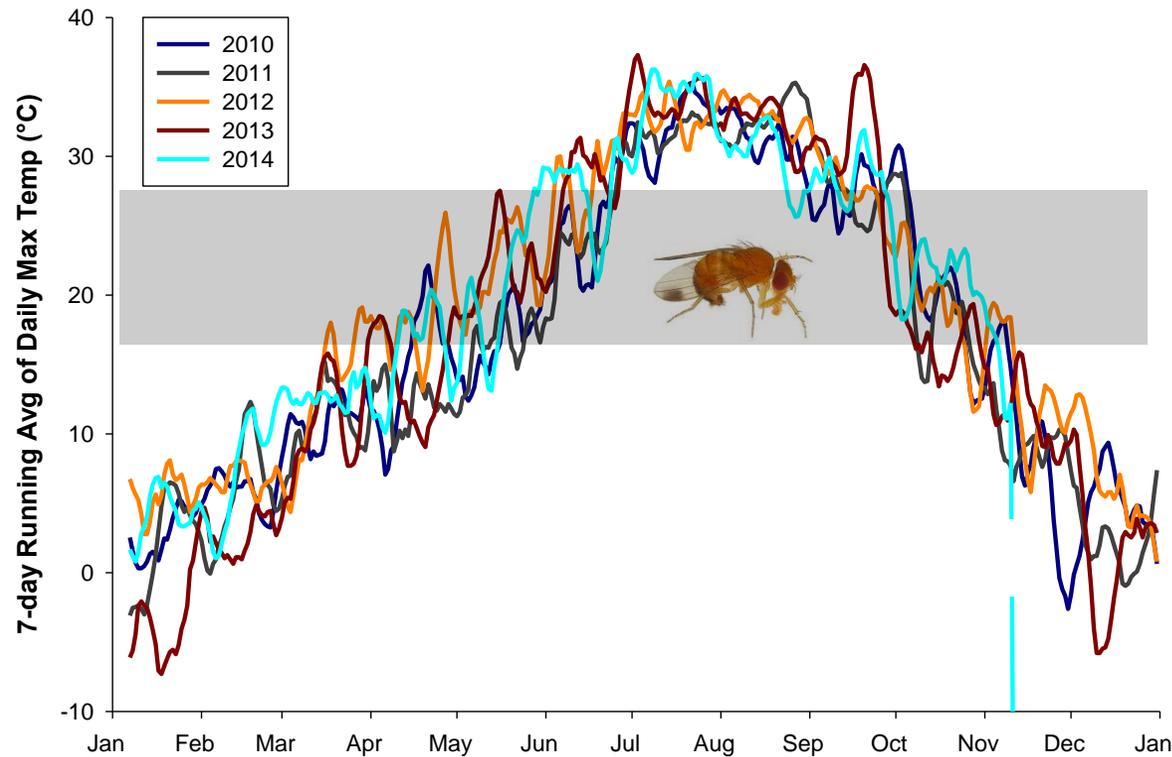
ALL YEARS		
Year	Total # of SWD	Date of 1 <sup>st</sup> trap capture
2010	73	Aug 18
2011	61	Sep 8
2012	16	Sep 17
2013	23	Sep 25
2014	3586*	June 2 / August 12

2014	
County	Total # of SWD
Rich	204
Cache	2252
Box Elder	397
Weber	260
Davis	455
Utah	18
TOTAL	3586*

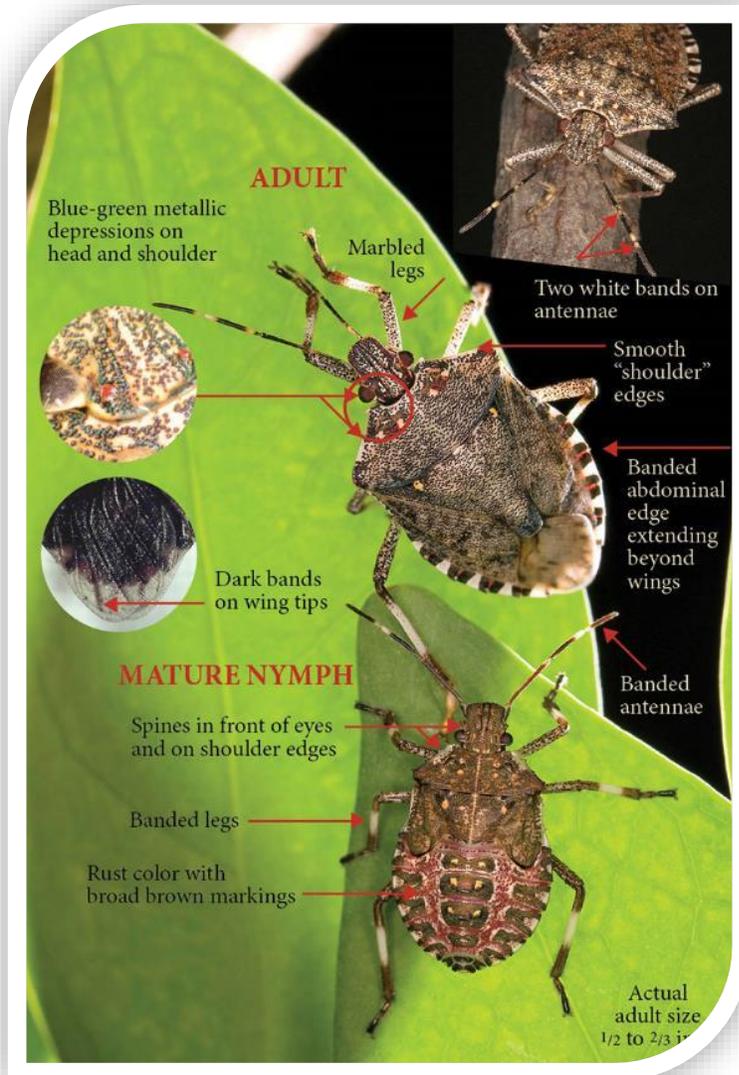
\* The Utah CAPS team will continue to monitor for SWD during the winter of 2014-2015

# Heat Tolerance of SWD

- *D. suzukii* is most active when temperatures are between 17-28°C (63-82°F). Male sterility is induced at 30°C (86°F).



# Brown Marmorated Stink Bug



Invades homes/buildings in the fall/winter – major nuisance pest  
Extremely broad host range: field crops, fruits, vegetables, fruiting  
ornamentals

Can cause substantial economic crop loss

Difficult to control with insecticides

Trapped in Salt Lake and Utah Cos. 2012-2014



Look alike:  
Rough stink bug  
(native to Utah)

# Brown Marmorated Stink Bug

- Native to eastern Asia
- First detected in the U.S. in Pennsylvania in late 1990s
- Feeds on a broad range of plants
  - crops, ornamentals
- Can be a major nuisance pest



# Velvet Longhorned Beetle



(former name: Chinese Longhorned Beetle)

Native: Asia & Eastern Europe

Adults lay eggs on bark, larvae tunnel into the wood to feed, potentially killing the tree

Trapped in multiple locations along the Wasatch Front (introduced on wood packing material)

Attacks orchard trees & wide range of forest and landscape trees: cherry, apple, cottonwood, willow, mulberry

Potentially a pest of live trees and dry wood (structures)

Over 250 adults were trapped in a sweet cherry orchard in Pleasant Grove in 2014

# Emerald Ash Borer: Invasive – not in Utah, yet...



**Emerald Ash Borer is on our doorstep**

Native to Asia

Flatheaded beetle

Larvae feed on inner bark disrupting water & nutrient transport

First found in the U.S. in MI in 2002

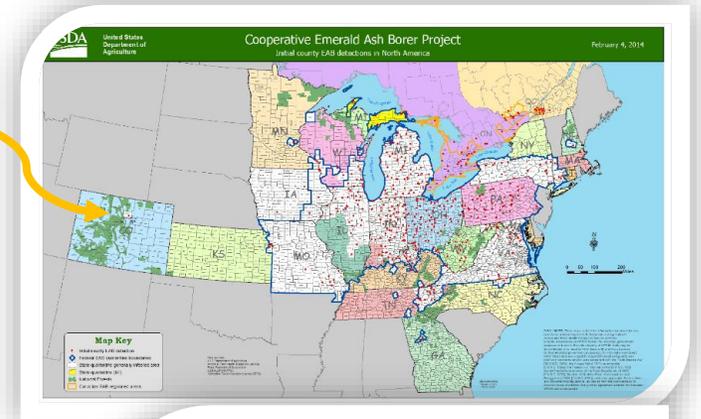
Killed millions of ash trees in SE MI alone

Attacks mature trees (olive family, Oleaceae)

- Ash: all species of North American ash
- White fringetree (*Chioanthus virginicus* L.)



Boulder, CO



# Invasive Insect Field Guide for Utah

[www.utahpests.usu.edu](http://www.utahpests.usu.edu): Cooperative Agricultural Pest Survey

EXTENSION UtahStateUniversity

UTAH PESTS

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

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

Google™ Search

Home  
Fact Sheets  
Video Fact Sheets  
Image Galleries  
Slideshows  
Utah Pests News  
Quarterly Newsletter  
Bees and Other Pollinators  
In the News  
Contact Us

Utah Plant Pest Diagnostic Lab  
Just \$7 gets your pest problem diagnosed or insect identified.

Integrated Pest Management  
Your source for fruit, vegetable, and landscape pest problems.

School Integrated Pest Management  
Teaching responsible pest management for a healthy learning environment.

Cooperative Agricultural Pest Survey  
CAPS protects Utah agriculture through statewide monitoring of invasive pests.

In the News  
Invasive Pests vs. Polar Vortex  
Nov 03, 2014  
Customs Agent in Buffalo Intercepts Invasive Tortricid Moth  
Oct 17, 2014  
New Leafhopper Species  
Oct 07, 2014

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!

Most Unwanted Invaders (in left navigation bar)

Invasive Insect Field Guide for Utah (link)

INVASIVE INSECT  
FIELD GUIDE for  
UTAH  
2014

EXTENSION UtahStateUniversity  
Lori R. Spears & Ricardo A. Ramirez

# USU Extension Pest Management Team: Utah Pests



Dr. Ricardo Ramirez  
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Arthropod Diagnostician  
Utah Plant Pest Diagnostic Lab



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Invasive Pest Survey



Dr. Diane Alston  
Entomologist  
IPM Coordinator

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



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 Utah State University" on the left, and "UTAH PESTS" on the right. Below this is a secondary navigation bar with links: "UTAH PESTS Home", "Utah Plant Pest Diagnostic Lab", "Integrated Pest Management", "School IPM", and "Cooperative Agricultural Pest Survey".

On the left side, there is a sidebar with a "Google™ Search" box and 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", and "Contact Us". A yellow arrow points to the "Slideshows" link.

The main content area features a large image of insects on a red fruit. Below this are four service tiles: "Utah Plant Pest Diagnostic Lab" (with a microscope icon), "Integrated Pest Management" (with a caterpillar icon), "School Integrated Pest Management" (with a book icon), and "Cooperative Agriculture Pest Survey" (with an envelope icon). Each tile includes a brief description of the service.

On the right side, there is an "In the News" section with three news items: "Invasive Pests vs. Polar Vortex" (Nov 03, 2014), "Customs Agent in Buffalo Intercepts Invasive Tortricid Moth" (Oct 17, 2014), and "New Leafhopper Species" (Oct 07, 2014). Below this is a paragraph of text describing the organization: "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 bottom of the page, the text "Pesticide Slideshows" is displayed in a large, italicized font.