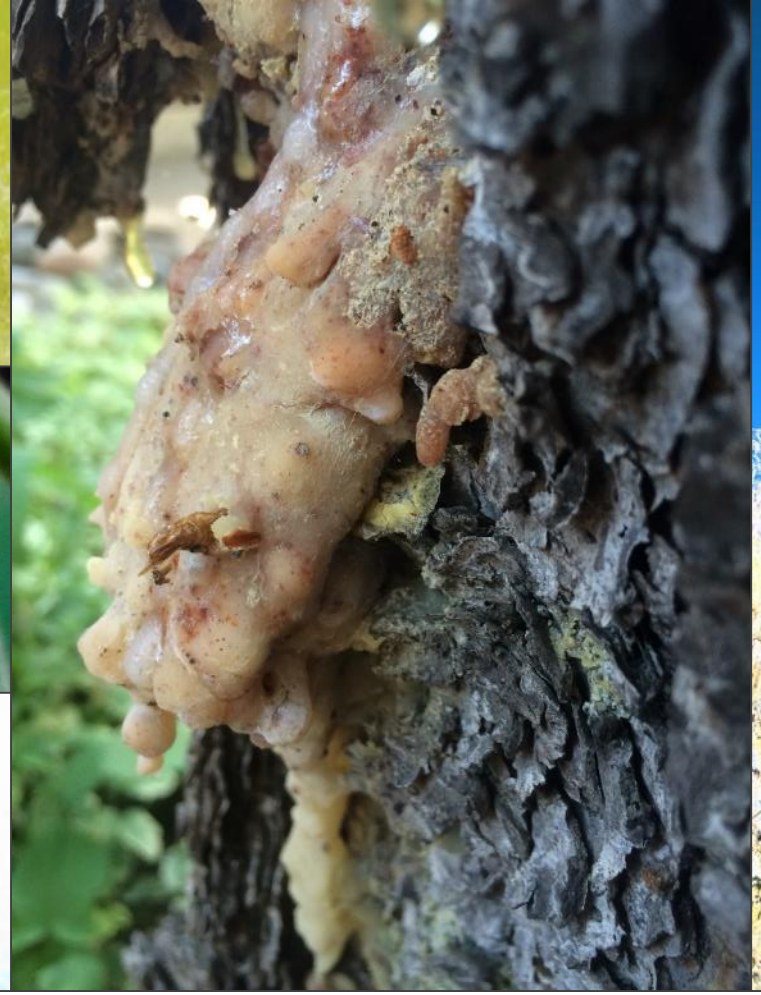



Utah's Insect Pests of Concern: Fruit, Tree Borers, and Nuisance

Diane Alston, Entomologist, Utah State University

Utah State University

Pesticide Education Workshop
December 2015

Utah Pests Online Resources

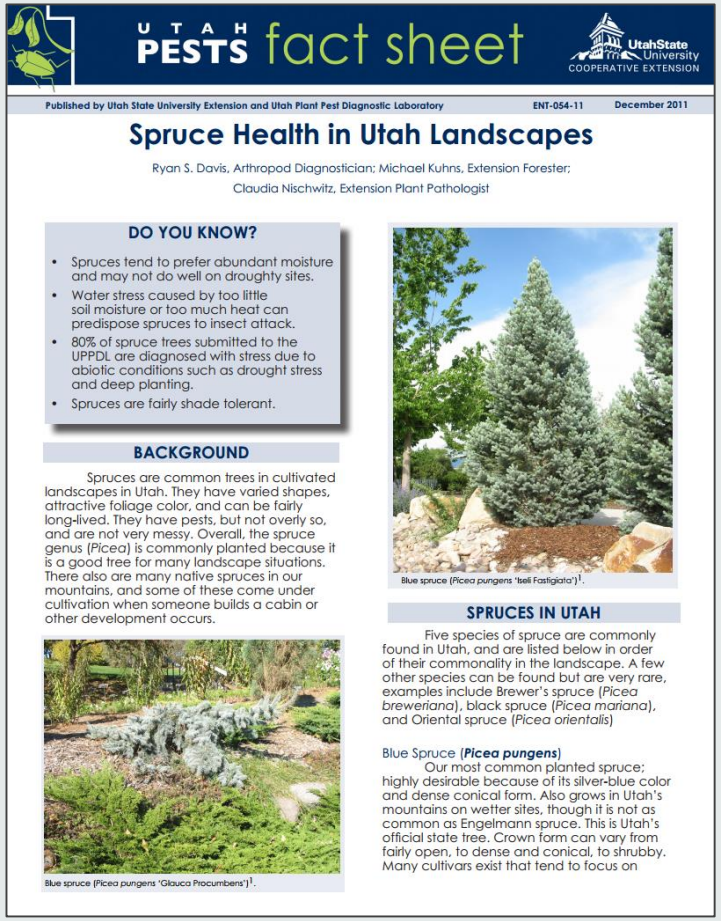
Integrated Pest Management (IPM)

- Sustainable
  - Economics, Environment, and Society
- Integrate Strategies
  - Cultural (plant & site management)
  - Mechanical (barriers, disruption, traps)
  - Biological (natural enemies)
  - Chemical (conventional, organic & bio-pesticides)
- Monitor pest numbers/injury
  - Treat only when needed

Utah Pests Online Resources

www.utahpests.usu.edu

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

UtahState 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* 'Glauca Procumbens')[1].

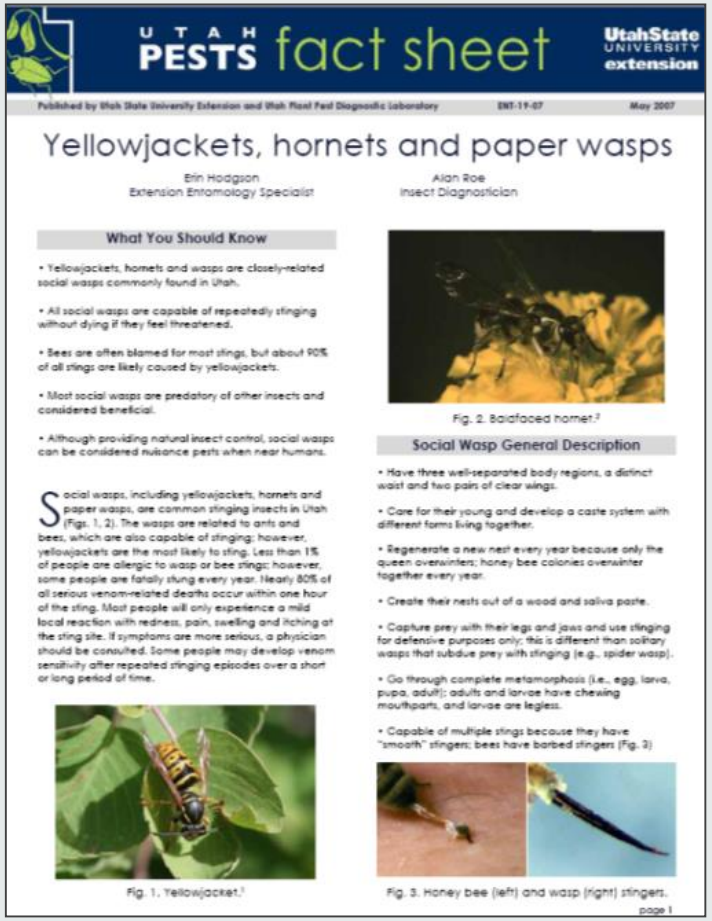
Blue spruce (*Picea pungens* 'Iseli Fastigiata')[1].

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



UTAH PESTS fact sheet

UtahState University extension

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

Yellowjackets, hornets and paper wasps

Erin Hodgson, 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 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.[1]

Fig. 2. Baldfaced hornet.[2]

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. 3)

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

page 1

UTAH PESTS fact sheet

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

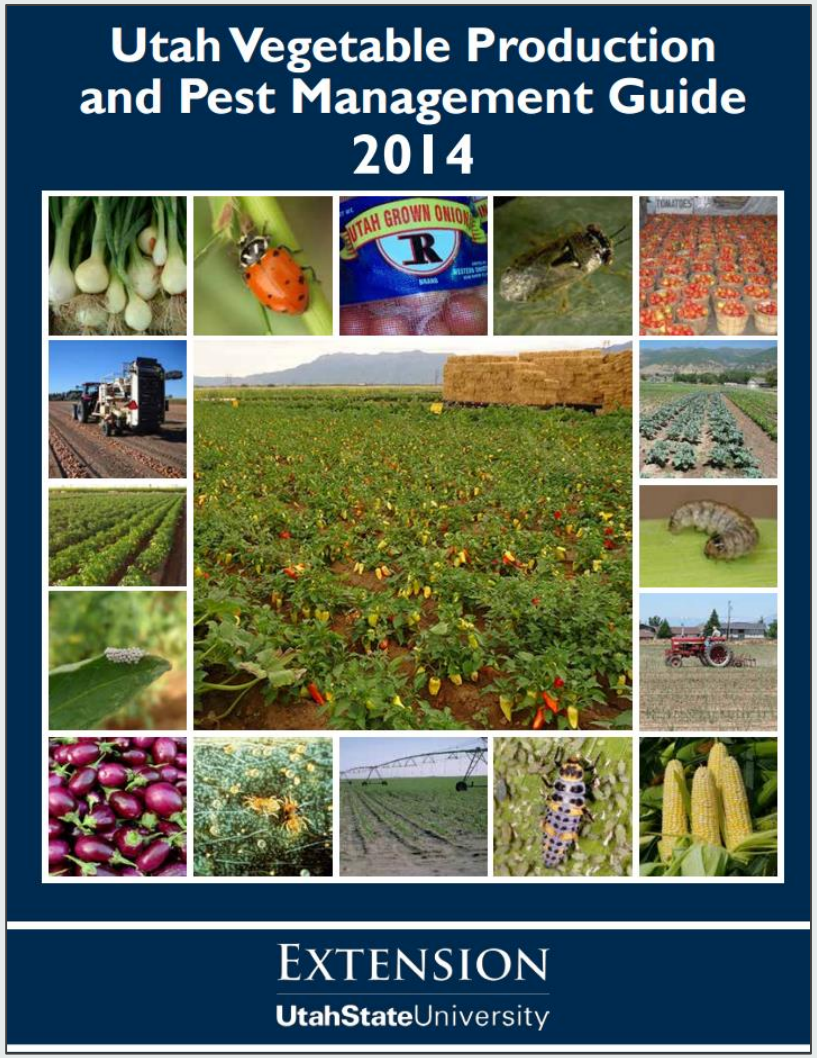
Actual adult length

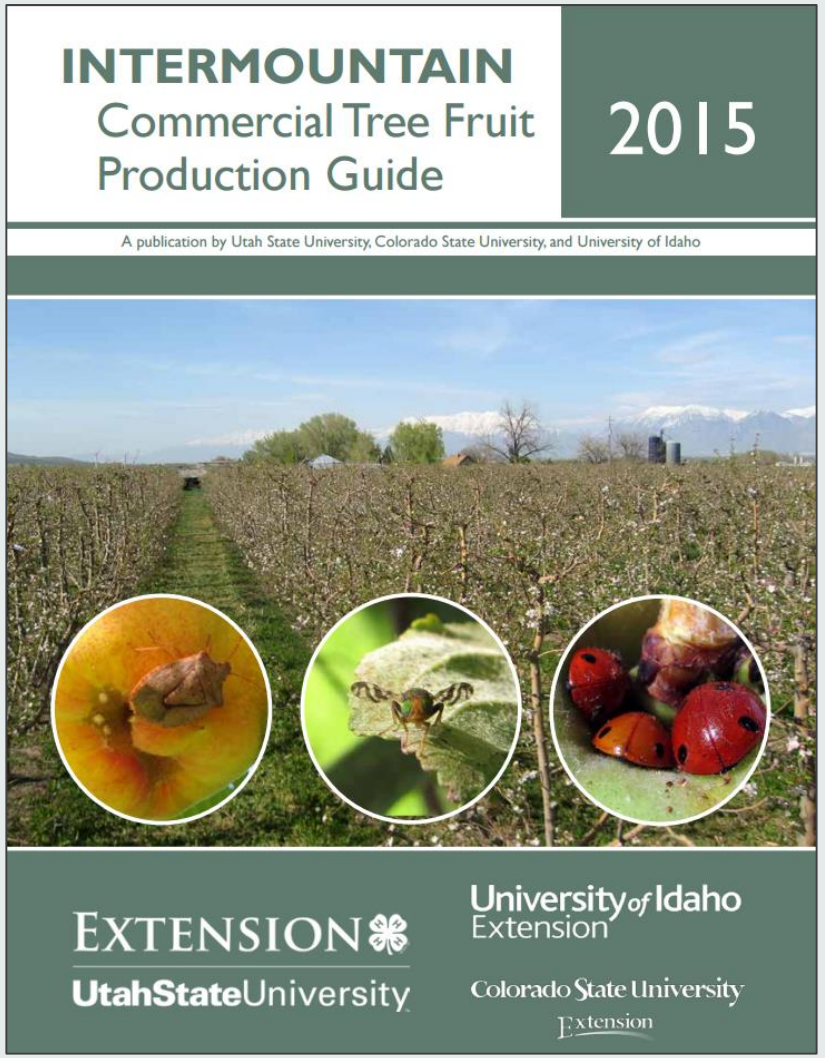
Figure 1. Adult chinch bug.

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

Guides


Utah Vegetable Production and Pest Management Guide 2014
EXTENSION
UtahStateUniversity


INTERMOUNTAIN
Commercial Tree Fruit Production Guide
2015
A publication by Utah State University, Colorado State University, and University of Idaho
EXTENSION
UtahStateUniversity
University of Idaho Extension
Colorado State University Extension


INVASIVE INSECT
FIELD GUIDE for
UTAH
2014
EXTENSION
UtahStateUniversity
Lori R. Spears & Ricardo A. Ramirez


Common Pests of Schools & Structures in Utah
EXTENSION
UtahStateUniversity
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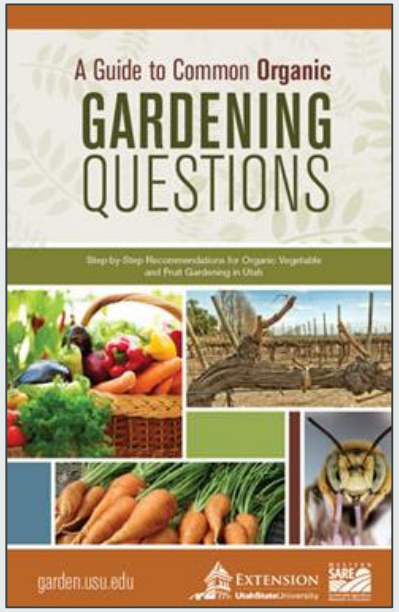
NIFA

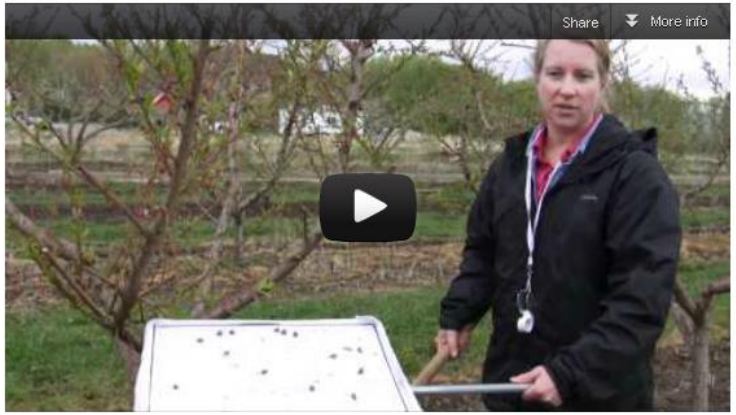

A Guide to Common Organic
GARDENING
QUESTIONS
garden.usu.edu
EXTENSION

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.

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.

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.

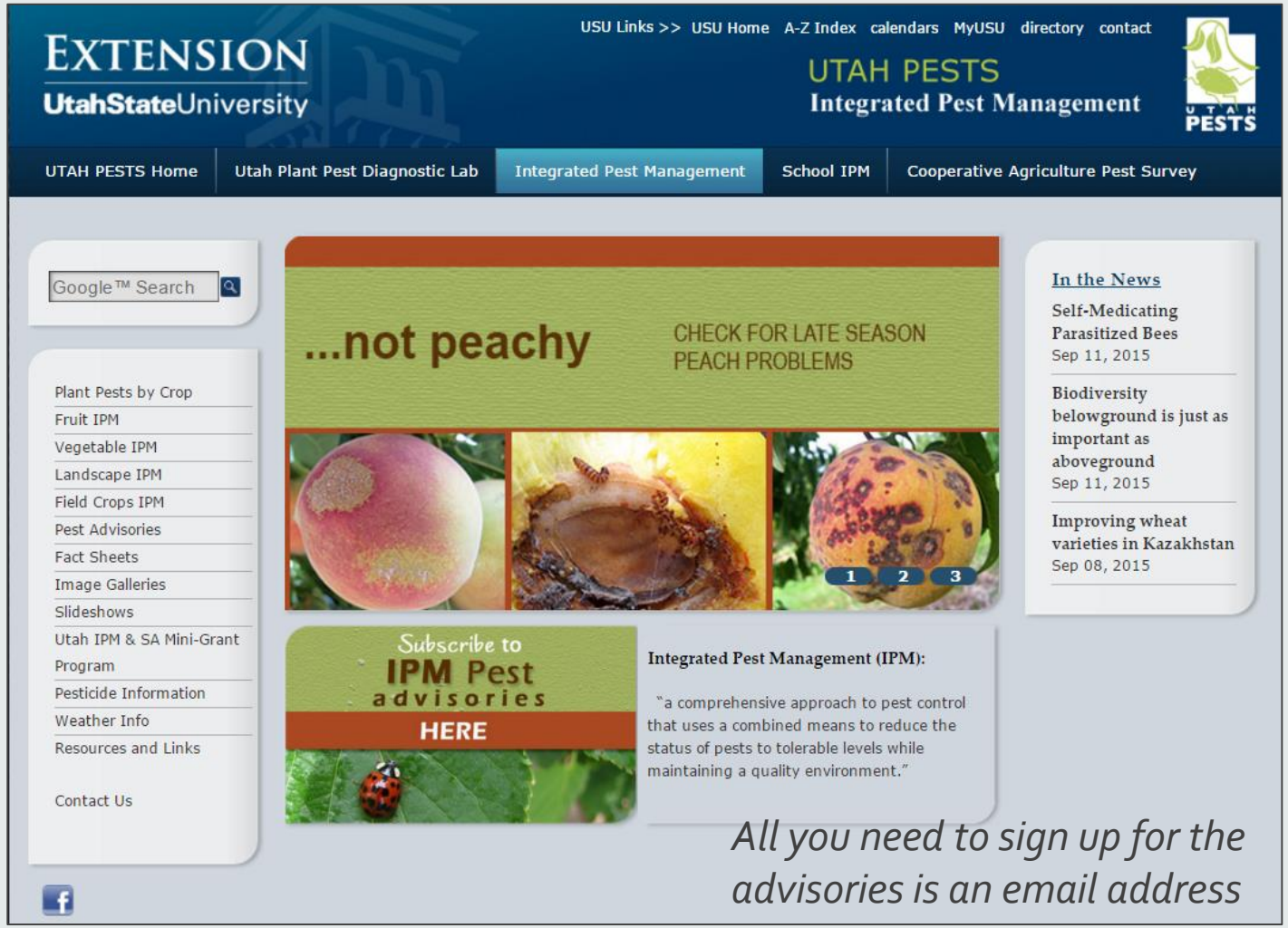


Tips for avoiding bed bugs while traveling.
Entomologist Ryan Davis discusses safe travel techniques to avoid falling prey to bed bugs, and how to minimize the chances of bringing bed bugs back to the home.

IPM Advisories:

ornamentals, turf, fruits, vegetables

www.utahpests.usu.edu/ipm



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

Free subscription

Timely info on pest activity

- -insects
- -mites
- -diseases
- -nutrient deficiencies
- -environmental stress

Lots of images!

IPM recommendations

Effective pesticides

IPM Advisories (2015 Examples)

EXTENSION
UtahStateUniversity

Landscape IPM Advisory

UTAH PESTS

Weekly Pest Update for Woody Ornamentals, Utah State University Extension, **April 29, 2015**

What's In Bloom

(Salt Lake City area)

Blackhaw viburnum: first bloom
Crabapple: end bloom
Lilac: bloom - end bloom
Redbud: end bloom
Redtwig dogwood: first bloom
Japanese flowering cherry: bloom
Kwanzan cherry: full to end bloom
Quince: end bloom
Serviceberry: full bloom

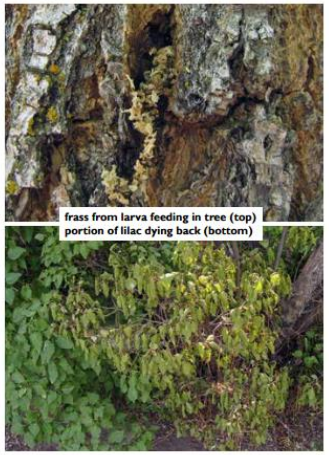
Insect/Disease Information

DECIDUOUS TREES

Lilac-Ash Borer

Hosts: lilac and ash; occasionally privet and mountain-ash

- ***treat susceptible trunks now until mid-July***



frass from larva feeding in tree (top)
portion of lilac dying back (bottom)

Lilac-ash borer adults have just started to emerge and females are laying eggs on the bark of ash trees and lilac. Green and white ash (*Fraxinus*) are the most susceptible. Sometimes, mountain-ash (*Sorbus*) and privet are attacked.

Lilac-ash borer does not directly kill trees, but repeated infestations can cause branch dieback and can leave trees susceptible to breakage in storms. Infested trees will have round exit holes on the bark, sawdust-like frass near the holes or at the base of the tree, and rough, swollen, cracked bark, mostly near branch crotches.

This insect overwinters as a larva inside the host plant and pupates in spring, emerging as an adult moth, usually in early to mid May. Emergence and egg-laying continues for about 6 to 8 weeks.

Treatment:

Healthy plants are able to withstand minor infestations, while stressed plants are more susceptible to attack and failure, so give trees optimal water and fertilizer, and prune properly.

Insecticides target the adults. Small trees can be treated by the home gardener, but in order to get thorough coverage on large trees, treatments should be made by a licensed pesticide applicator.

Residential options: Hi-Yield Permethrin, Spectracide Triazicide (lambda-cyhalothrin)

Commercial options: Acelepryn (chlorantraniliprole), permethrin (Astro, Covert, Waylay), or Onyx (bifenthrin)

UtahState UNIVERSITY extension

Turfgrass IPM Advisory

UTAH PESTS

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

Turfgrass Management

At this time of year, your thoughts may be turning to the potential effects of winter conditions on your turf. "Winterkill" is the general term describing turf loss that may occur as a result of winter conditions. This issue will discuss the actual causes of winterkill and how they may be prevented.

News/What to Watch For

During winter, most turfgrass diseases and insects are relatively inactive. However, one disease complex, the snow molds, may be at work despite recent low temperatures.

Focus on: Winterkill

When turfgrasses die over the winter months, it may generally be described as "winterkill" (Figs. 1 and 2). The term covers a multitude of actual causes of turfgrass death in the winter, which may include snow mold, low temperatures, ice sheets, dessication and crown hydration.

Crown Hydration

Crown hydration is of most concern during the warmer days of late winter or early spring when there is the potential for a day or two of warm daytime temperatures followed by a hard freeze. Turfgrass plants may start to take up water as temperatures warm and then re-freeze rapidly. As a result, ice crystals may form in the crown of the plant, rupturing cells and causing death.

Of the commonly-used cool-season turfgrass species, annual bluegrass and creeping bentgrass are most susceptible to crown hydration problems, though annual bluegrass is the more susceptible of the two because it emerges from dormancy earlier.

Dessication

During the winter when turfgrass plants are dormant or semi-dormant, drying of the leaves or plants (dessication) may cause death. Dessication is typically only a factor on elevated or extremely exposed or windy sites, and areas where surface runoff is rapid.

Figure 1. Winterkill symptoms in turfgrass.

EXTENSION
UtahStateUniversity

Tree Fruit IPM Advisory

UTAH PESTS

Orchard Pest Update, Utah State University Extension, **October 5, 2015**

JUST THE BASICS: Current Treatments

GENERAL

- Clean up fallen fruit to reduce pest pressure for next year.
- Mow tall weeds around trees/install barrier or wire to reduce rodent problems and deer rubbing.
- Make sure all new plantings get white tree paint or tree wrap (base of tree to scaffold limbs) from December through early April, to prevent sun scald.
- Give trees a good watering before the ground freezes.
- Do not do any pruning now; wait until winter (apples) or early spring (peaches).

APPLE & PEAR

- Apply lime-sulfur when the first leaves start turning color to control *blister mites*.
- To reduce *codling moth* for next year, remove bins and debris from the orchard after harvest and remove fruit on the ground or left on the tree.

PEACH/NECTARINE

- Prevent new *coryneum blight* (shothole) infections this fall by applying copper to trees when 50% of leaves have fallen.

Insect and Disease Information

: *information for residential settings* : *information for commercial orchards*

APPLE & PEAR

Blister Mites

Hosts: apple, pear

Blister mites cause early fall color change and leaf drop (shown here on apple).

Blister mites and other eriophyid mites can be treated now, and no later than just before leaf drop. They are more of an aesthetic problem, and do not harm the health of the tree. In fact, they serve as a food source for early emerging predatory mites in the spring. In turn, the predatory mites will take care of the harmful spider mites that are active during summer.

Blister mite spots on pear turn black by mid to late season.

If treatment is desired, options include:

- 1.5-2% oil, thoroughly covering the bottoms of the leaves
- Sevin (carbaryl), alone or with 1% oil
- lime-sulfur (only at this time of year, you can mix with oil, but not on drought-stressed trees)

Blister mites belong to a group of mites called eriophyid mites (air-ee-oh-FYE-id). They are so small that they are invisible to the naked eye, but their feeding can cause visible symptoms.

continued on next page

Pest Diagnostics

Utah Plant Pest Diagnostic Lab

www.utahpests.usu.edu/uppdl

Sample Submission

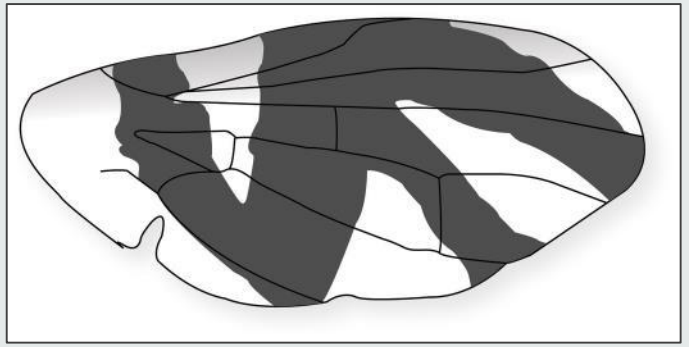
Fruit Fly Pests

Tephritid Fruit Flies

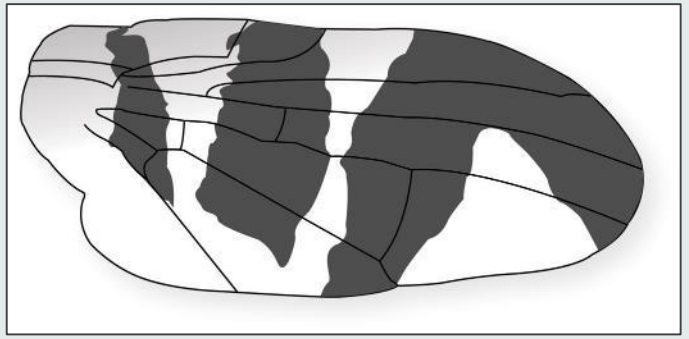


- 'True' fruit flies (~1/4 inch long)
  - 3 primary pest species in Utah
- Females have a sharp ovipositor to lay eggs under the skin of fruits & husks
  - Susceptible when "soft enough", e.g., blushed cherry
- Characteristic banding pattern on wings
  - Differentiate species
- Maggots tunnel in fruit
  - Legless, cylindrical body (~1/4 inch long when full grown)
  - Tapered head, 2 dark mouth hooks

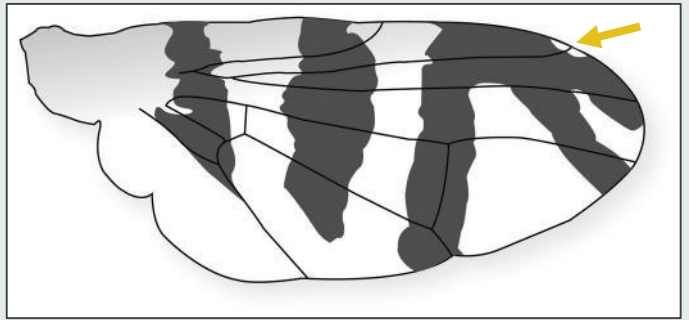
Apple Maggot: "F"
Quarantine Pest



Walnut Huskfly:
"Inverted V"



Cherry Fruit Fly:
"Funky F &
Small Window"



Apple Maggot in Utah – 2013-15

- **Home yard plum fruits**
- **River hawthorn nearby**
- **No insecticide applications**
- **Utah State Quarantine Pest**

AM larva inside plum fruit

Apple maggot adult fly on domestic plum fruit, Salt Lake City

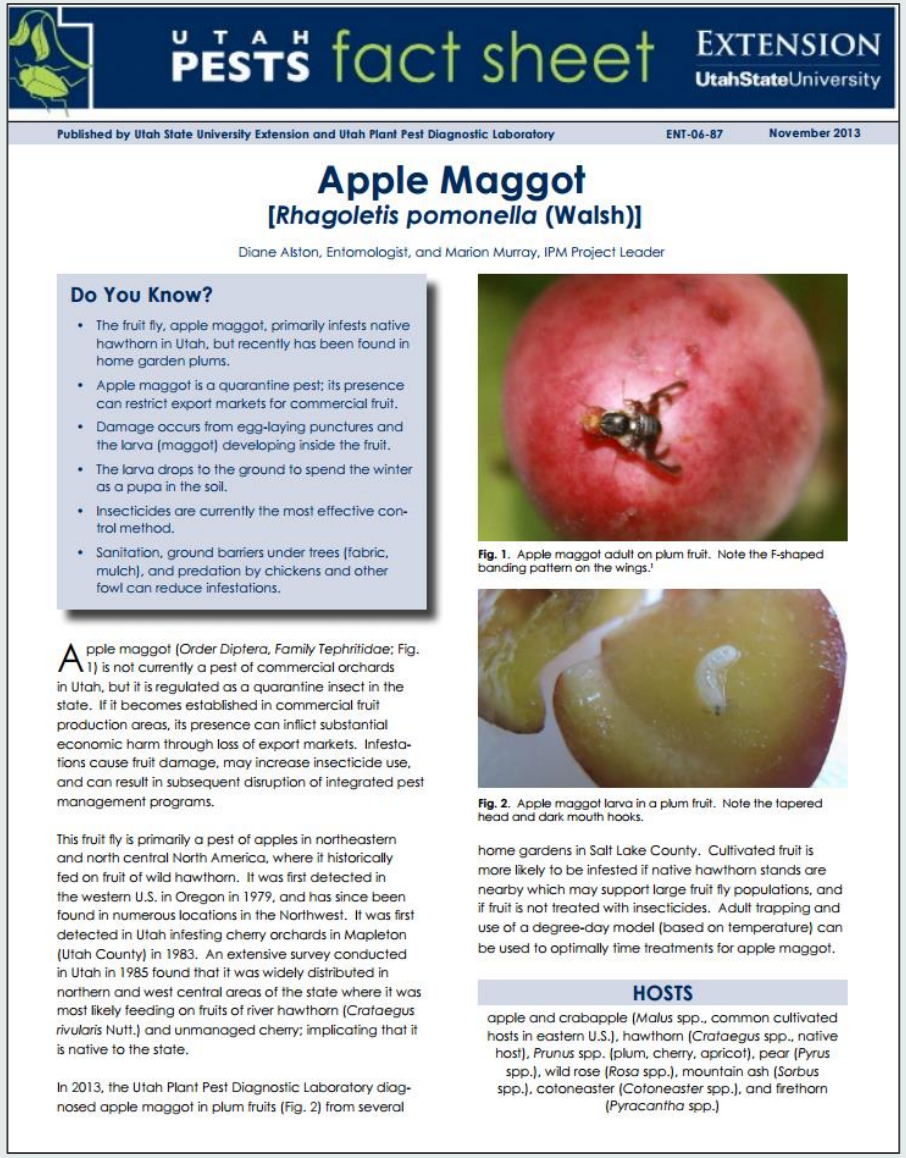
"F"-shaped wing pattern

Breakdown of plum flesh from AM feeding

Fact Sheet

www.utahpests.usu.edu

- Educate home gardeners
  - Master Gardener Program
  - IPM Tree Fruit Advisory
  - Online resources
  - County Extension Offices
- Prevent establishment of AM in commercial orchards
  - Sanitation
    - Remove fruit post-harvest
    - Remove nearby hawthorn stands
    - Remove abandoned orchards



UTAH PESTS fact sheet EXTENSION UtahStateUniversity

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Apple Maggot
[*Rhagoletis pomonella* (Walsh)]

Diane Alston, Entomologist, and Marion Murray, IPM Project Leader

Do You Know?

- The fruit fly, apple maggot, primarily infests native hawthorn in Utah, but recently has been found in home garden plums.
- Apple maggot is a quarantine pest; its presence can restrict export markets for commercial fruit.
- Damage occurs from egg-laying punctures and the larva (maggot) developing inside the fruit.
- The larva drops to the ground to spend the winter as a pupa in the soil.
- Insecticides are currently the most effective control method.
- Sanitation, ground barriers under trees (fabric, mulch), and predation by chickens and other fowl can reduce infestations.

Apple maggot (*Order Diptera, Family Tephritidae*; Fig. 1) is not currently a pest of commercial orchards in Utah, but it is regulated as a quarantine insect in the state. If it becomes established in commercial fruit production areas, its presence can inflict substantial economic harm through loss of export markets. Infestations cause fruit damage, may increase insecticide use, and can result in subsequent disruption of integrated pest management programs.

This fruit fly is primarily a pest of apples in northeastern and north central North America, where it historically fed on fruit of wild hawthorn. It was first detected in the western U.S. in Oregon in 1979, and has since been found in numerous locations in the Northwest. It was first detected in Utah infesting cherry orchards in Mapleton (Utah County) in 1983. An extensive survey conducted in Utah in 1985 found that it was widely distributed in northern and west central areas of the state where it was most likely feeding on fruits of river hawthorn (*Crataegus rivularis* Nutt.) and unmanaged cherry; implicating that it is native to the state.

In 2013, the Utah Plant Pest Diagnostic Laboratory diagnosed apple maggot in plum fruits (Fig. 2) from several

Fig. 1. Apple maggot adult on plum fruit. Note the F-shaped banding pattern on the wings.[1]

Fig. 2. Apple maggot larva in a plum fruit. Note the tapered head and dark mouth hooks.

home gardens in Salt Lake County. Cultivated fruit is more likely to be infested if native hawthorn stands are nearby which may support large fruit fly populations, and if fruit is not treated with insecticides. Adult trapping and use of a degree-day model (based on temperature) can be used to optimally time treatments for apple maggot.

HOSTS

apple and crabapple (*Malus* spp., common cultivated hosts in eastern U.S.), hawthorn (*Crataegus* spp., native host), *Prunus* spp. (plum, cherry, apricot), pear (*Pyrus* spp.), wild rose (*Rosa* spp.), mountain ash (*Sorbus* spp.), cotoneaster (*Cotoneaster* spp.), and firethorn (*Pyracantha* spp.)

Tree Fruit Insects

Western Cherry Fruit Fly

UTAH PESTS fact sheet

UtahState University COOPERATIVE EXTENSION

Published by Utah State University Extension and Utah Plant Pest Diagnostic Laboratory ENT-102-06 June 2010

Western Cherry Fruit Fly (*Rhagoletis indifferens*)

Diane Alston, Entomologist • Marion Murray, IPM Project Leader

Do You Know?

- Western cherry fruit fly is the primary insect pest of sweet and tart cherries in Utah.
- Damage occurs from the larva developing inside fruit.
- Females lay eggs under the skin of fruit, so target adult flies for control.
- Insecticides are currently the most effective control method.
- Attract-and-kill (bait plus insecticide) can be effective for control in commercial and home cherry trees.
- Use of ground barriers (mulch, fabrics) can reduce pupation and fly emergence.
- Post-harvest sanitation can reduce populations.

Figure 1. Adult fly caught on trap.

Figure 2. Larvae feeding inside a cherry fruit.[1]

Figure 3. Damaged cherries with larval exit holes.

Figure 4. Cherry fruits are not susceptible to attack until they have a blush of salmon color.[1]

The western cherry fruit fly (Order Diptera, Family Tephritidae) is the most important pest of sweet and tart cherries in Utah. Once the skin of fruits becomes soft enough to penetrate, adult females (Fig. 1) insert eggs with their ovipositor, and larvae develop inside the fruits (Fig. 2). The result is "wormy" fruit that is unmarketable. It is difficult to determine whether a fruit is infested until the larva exits through a hole that it chews (Fig. 3) or the fruit is cut open to reveal the larva inside. For processed cherries, detection of one larva by the processor can result in rejection of the entire crop from that orchard and/or farm. Therefore, the best management strategy is to prevent fruit infestation.

Adult flies will migrate only short distances (< 40 m) if host fruit is available. This causes infestations to be spotty in a region; however, once established in an orchard, the western cherry fruit fly can spread rapidly and require annual control. Protective insecticide sprays are currently the major tactic for preventing infestation. An "attract-and-kill" technology where adult flies are enticed to feed on a sticky bait droplet containing an ultra low concentration of insecticide, has proven effective in Utah orchards.

There is one generation per year; however, adults can emerge from the soil over a period of 3 months or more. Cherry fruits are susceptible to infestation from when they first ripen to a salmon-blush color (Fig. 4) until they become too soft or fall from the tree.

HOSTS

Sweet, tart, and wild species of cherries

LIFE HISTORY

Pupa – Overwintering Stage

- **Size**: about 3/16 inch (5 mm) long
- **Color**: light to dark brown and shaped like a large grain of wheat
- **Where**: overwinters in the soil of the orchard floor, 1 - 4 inches (2.5 - 10 cm) deep
- Rate of pupal development and adult emergence affected by soil temperature and moisture

Adult – Monitoring Stage

- **Size**: about 1/5 inch (5 mm) long
- **Color**: black body with white bands on abdomen (posterior body region); wings are transparent with a distinctive pattern of dark bands (Figs. 1 and 7)

control treatments begin based on timing information described above, maintain protection of fruit through harvest. Reapply insecticides based on the protection interval stated on the label. It is best to rotate the type of insecticide applied between applications to reduce development of resistance and negative effects on beneficial insects and mites. For example, insecticides such as carbaryl, malathion, and the synthetic pyrethroids are especially toxic to predatory mites.

*Recommended Insecticides**

For home and commercial orchards:

- spinosad (GF-120, Success®, Entrust®) – reapply every 7 days
- carbaryl (Sevin®) – reapply every 7 days
- malathion (Malathion®) – best when used just before harvest as it lasts approximately 3 days
- esfenvalerate (Asana®, Ortho®)
- permethrin (Ambush®, Pounce®, Ortho®)

For commercial orchards only:

- imidacloprid (Provado) – reapply every 14 days
- azinphosmethyl (Guthion®) – reapply every 14 days (scheduled for phase-out by 2012 by the U.S. Environmental Protection Agency)
- phosmet (Imidan) – reapply every 14 days; do not use on sweet cherry
- diazinon (Diazinon) – reapply every 10-14 days
- synthetic pyrethroids – reapply every 7-10 days
  - cyfluthrin (Baythroid®)
  - lambda-cyhalothrin (Warrior®)

*All brand names are registered trademarks. Examples of brands may not be all-inclusive, but are meant to provide examples of insecticides registered on cherry trees in Utah. The availability of insecticides is changing rapidly. Always check the label for registered uses, application and safety information, and protection and pre-harvest intervals.

[a] Restricted use products that require an applicator license.

[b] Insecticide products that may be available for use on home fruit trees.

It is critical to keep an adequate number of bait-insecticide droplets available to kill adults soon after they emerge and before they mate and/or females lay eggs. Currently it is only sold in larger volumes; larger than is practical for most home orchards.

Figure 9. Application of GF-120 attract-and-kill product with a 4-wheeler-mounted sprayer.[1]

Cultural Controls

Ground Cover and Mulches

Ground covers and mulches around the base of trees can prevent larvae from burrowing into the soil to complete development into the pupal stage. Successful vegetation covers include grasses and other plants with extensive, dense root systems (e.g., clover) that physically impede fruit fly larvae. Landscape fabric can prevent larval burrowing and emergence of adults from pupae in the soil (Fig. 10). Mulches of other dense materials may also interfere with their life cycle.

Sanitation

Maintaining a "clean" orchard wherein the fruit fly population is kept at low levels from one year to the next is important because high populations are more difficult to control, even with insecticides. In years when the crop is not harvested or not all fruit is removed from trees, fruit fly populations can increase and cause greater pest pressure the following year. Therefore, it is important to remove dropped fruit from the orchard floor as it may contain larvae. In addition, remove any nearby abandoned or wild cherry trees to prevent them from serving as unmanaged hosts that contribute to the local fruit fly population.

Biological Control

There are some natural enemies that will attack fruit fly life stages, such as parasitic wasps that lay eggs on larvae within fruit, but control has not been shown to be significant. Birds and rodents take a larger toll on fruit fly larvae, but they generally also consume the fruit and so

Figure 10. Landscape fabric under the trees can prevent larvae from burrowing into the soil to pupate.

are not considered beneficial. Chicken and other fowl have been shown to eat fruit fly larvae and pupae in the soil and may provide some benefit.

Walnut Husk Fly

- Active in late July to October
- Hosts: Black/Japanese/English walnut & peach/nectarine/apricot

Maggots tunnel in husk

Nutshell staining
Difficult to remove husks
Shriveled kernels

<u>Tunnel in peach flesh</u>
Late-maturing peaches at greatest risk

New Fact Sheet: Walnut Husk Fly

UTAH PESTS fact sheet EXTENSION UtahStateUniversity

Published by Utah State University Extension and Utah Plant Pest Diagnostic Laboratory ENT-173-14 January 2015

Walnut Husk Fly
[*Rhagoletis completa* (Cresson)]

Diane Alston, Entomologist - Marion Murray, IPM Project Leader - James Barnhill, Weber County Agriculture Agent

Do You Know?

- Walnut husk fly infests black and English walnuts, and late-maturing apricot and peach fruits when infested walnuts are nearby.
- Damage is caused by egg-laying punctures and larvae developing inside husks and fruits.
- Infested walnut husks can be difficult to remove; early-season infestations cause shriveled kernels.
- Non-chemical options include sanitation, ground barriers, tolerant cultivars, and predation by chickens and other fowl.
- Reduced-risk insecticides and attractant baits can provide effective control.

Walnut husk fly (Order Diptera, Family Tephritidae; Fig. 1) is the most common insect pest of walnuts in Utah. Husk fly larvae (maggots) tunnel in walnut husks, causing them to soften and decay, and stain the shell (Fig. 2). Damaged husks are difficult to remove. If husk fly infestation occurs early in kernel development, nuts may shrivel, darken, become moldy, and drop from the tree (Fig. 3). For commercial producers, discolored shells result in reduced quality for in-shell sales, and nut loss lowers profits. For home gardeners, difficult removal of softened husks is the primary problem. The husk fly also infests ripe apricot and peach fruits, usually only when infested walnuts are nearby. The larvae chew tunnels in fruits causing reduced quality and decay of the flesh (Fig. 4).

Fig. 1. Walnut husk fly adult on walnut husk. Note the inverted V-shaped banding pattern on the wing tips.

Fig. 2. Walnut husk fly larvae feeding in walnut husk. Decayed husks are difficult to remove and cause nut-shell staining.

Fig. 3. Shriveled walnut kernel caused by husk fly injury occurring in July to early August.

Fig. 4. Walnut husk fly larva tunneling in ripe apricot fruit.

To prevent development of insecticide resistance, rotate the class of insecticide (see mode of action classifications for insecticides below). Select insecticides that are safer for beneficial insects and mites to reduce the likelihood of flaring spider mites and other secondary pests. For example, insecticides such as carbaryl, malathion, and the synthetic pyrethroids (e.g., gamma-cyhalothrin, cyfluthrin) are toxic to predatory mites.

No insecticides are currently registered for soil application for control of walnut husk fly.

Table 1. Degree day (DD) model for walnut husk fly (Kasana and AliNiazee 1997).

DD since March 1 (°F)	Event	Recommendation	Typical calendar date (northern Utah)
1600		Set out traps	Mid- to late June
1900	First emergence of flies expected	Check traps daily	Late June to early July
2220	First mature females expected	If using spinosad or GF-120, apply now and repeat every 7 days	Early to mid-July
2480	Beginning of egg-laying	If using other insecticides, apply now and repeat according to label	Mid-July
2700	First egg hatch		Late July
3150	50% adult emergence	Continue checking traps for adults; if numbers decline, reduce or discontinue applications	Early August
3460	First larval exit		Mid-August

Home Use Insecticides

Bait Spray: a food bait mixed with insecticide attracts adult husk flies to more readily ingest the insecticide. Apply bait sprays as large, evenly spaced droplets. An advantage of bait sprays is that complete coverage of the tree is not necessary as the flies are attracted to the droplets.

- 4 to 6 Tbsp molasses per gallon of water plus spinosad concentrate; MOA = 5; residual = 7-14 days (Pickel 2014)

Table 2. Examples of **HOME USE** insecticides registered in Utah that are effective for control of walnut husk fly.

Brand Name	Active Ingredient	Mode of Action*	Residual (days)
Malathion	malathion	1	7
Sevin	carbaryl	1	7-14
Fertilome Triple Action, Pyganic°	pyrethrin	3	3-5
Spectracide Triazide	gamma-cyhalothrin	3	14
Ortho Flower, Fruit and Vegetable	acetamiprid	4	10-14
Bonide Captain Jack's, Fertilome Spinosad Lawn and Garden Insect Spray, Gardens Alive Bull's-Eye Bioinsecticide, Green Light Lawn and Garden Spray with Spinosad, Monterey Garden Insect Spray	spinosad	5	5-7
Surround°	kaolin clay	physical	3-5; repels adults; a suppressant only

Drosophilid Fruit Fly
Spotted Wing Drosophila (*Drosophila suzukii*)

- Native to southeast Asia
- Established in Hawaii in 1980s
- Found in California in 2008
- First detected in Utah in 2010
- Threat to marketable fruit

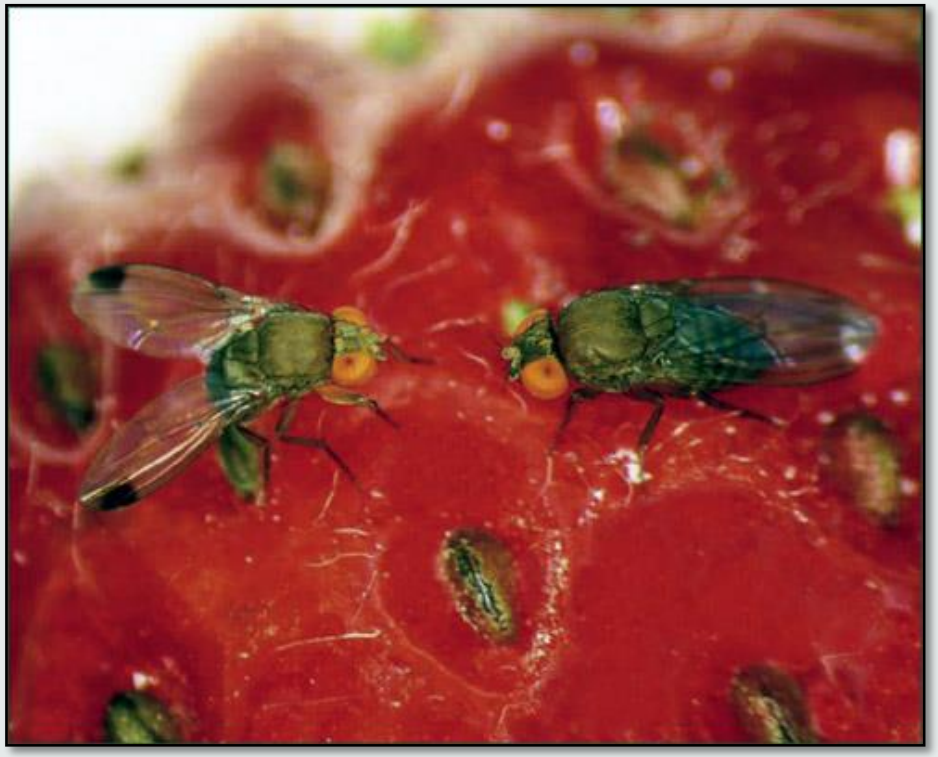
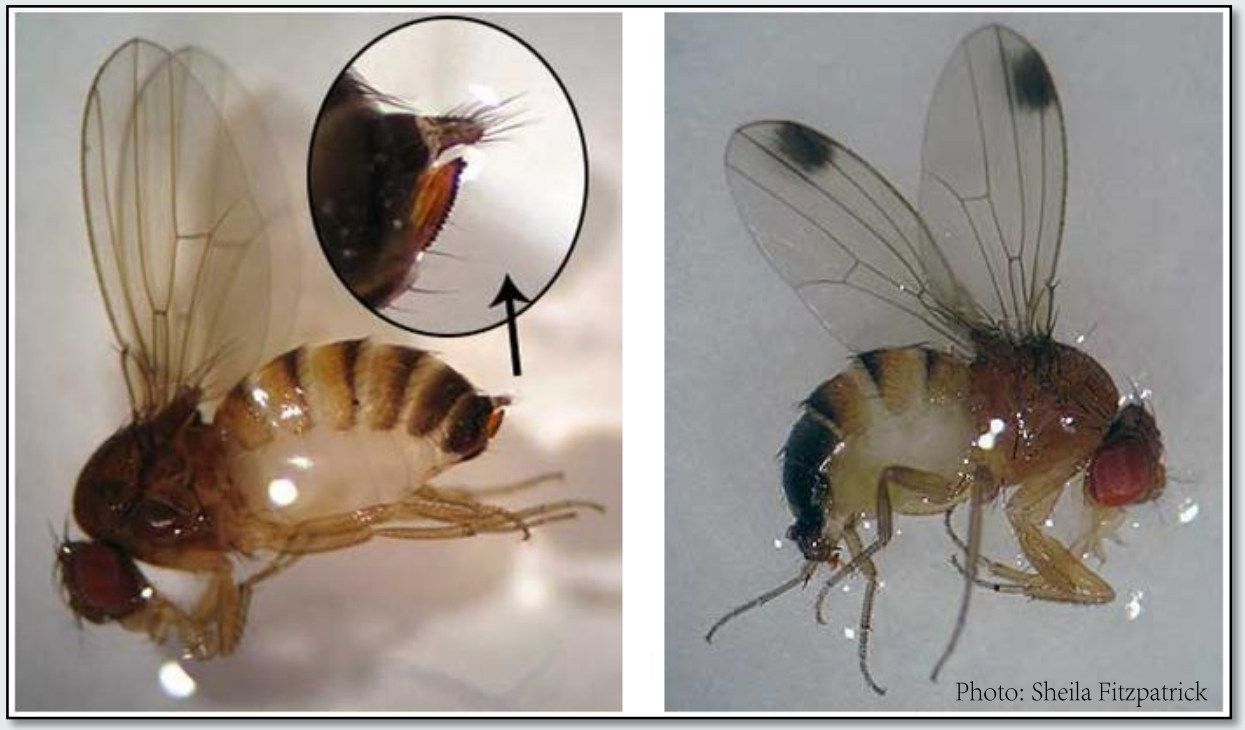


Photo: Bev Gerdeman

SWD slides from Dr. Lori Spears, USU CAPS Coordinator

Identification of SWD



Female Male

SWD Not SWD

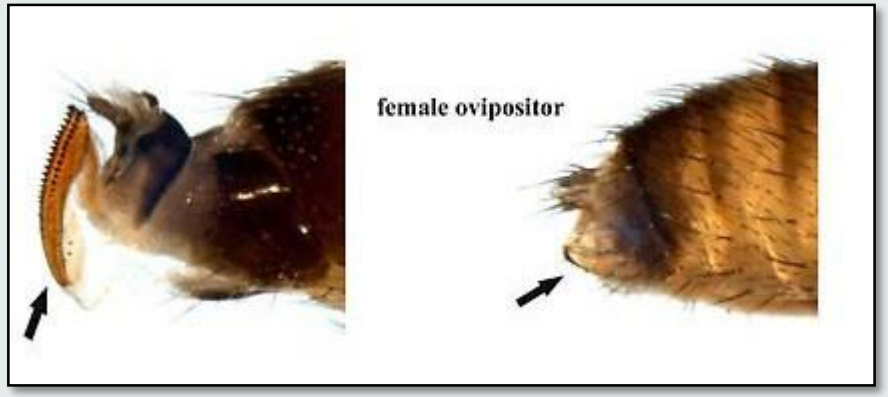


Photo: Martin Hauser

SWD Crop Damage

Oviposition scars

Small hair-like filaments

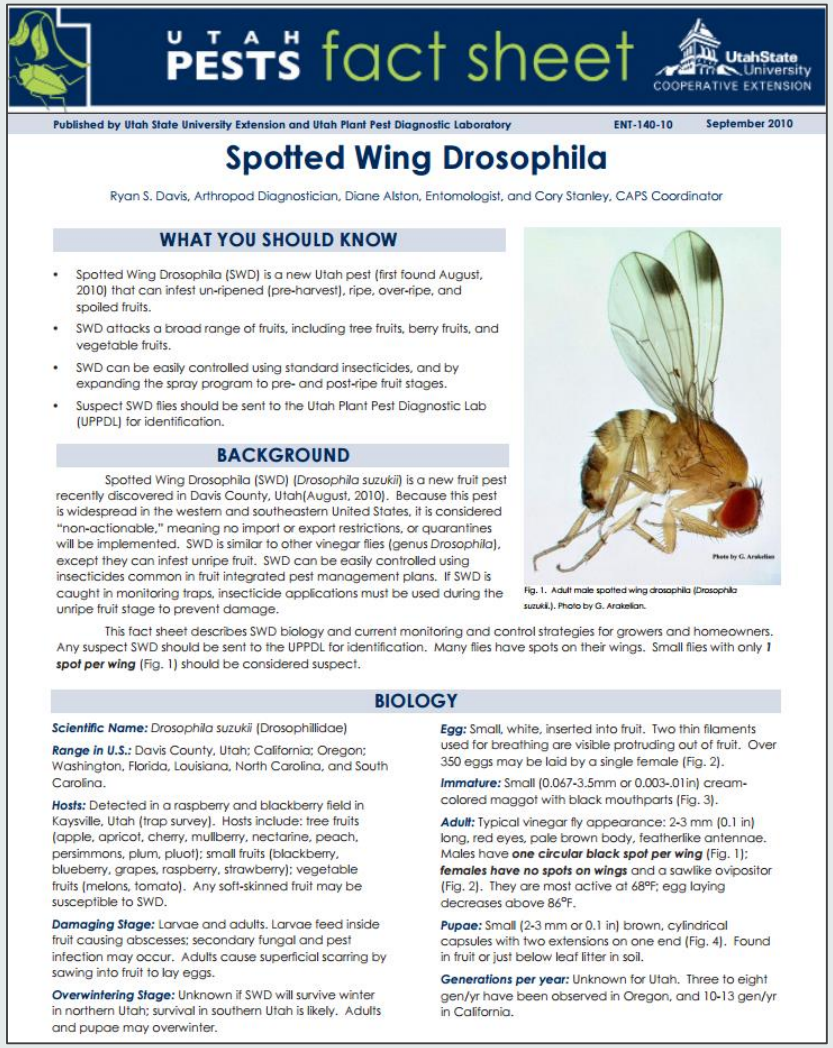
Secondary infections

Softened or collapsed fruit

Small larvae or pupae

In 2014 and 2015 , SWD was trapped in many locations in northern Utah; abundant in August – November; adults trapped in late-season fruits; no fruit injury detected

Fact Sheets: Spotted Wing Drosophila



UTAH PESTS fact sheet

UtahState University COOPERATIVE EXTENSION

Published by Utah State University Extension and Utah Plant Pest Diagnostic Laboratory ENT-140-10 September 2010

Spotted Wing Drosophila

Ryan S. Davis, Arthropod Diagnostician, Diane Alston, Entomologist, and Cory Stanley, CAPS Coordinator

WHAT YOU SHOULD KNOW

- Spotted Wing Drosophila (SWD) is a new Utah pest (first found August, 2010) that can infest un-ripened (pre-harvest), ripe, over-ripe, and spoiled fruits.
- SWD attacks a broad range of fruits, including tree fruits, berry fruits, and vegetable fruits.
- SWD can be easily controlled using standard insecticides, and by expanding the spray program to pre- and post-ripe fruit stages.
- Suspect SWD flies should be sent to the Utah Plant Pest Diagnostic Lab (UPPDL) for identification.

BACKGROUND

Spotted Wing Drosophila (SWD) (*Drosophila suzukii*) is a new fruit pest recently discovered in Davis County, Utah(August, 2010). Because this pest is widespread in the western and southeastern United States, it is considered "non-actionable," meaning no import or export restrictions, or quarantines will be implemented. SWD is similar to other vinegar flies (genus *Drosophila*), except they can infest unripe fruit. SWD can be easily controlled using insecticides common in fruit integrated pest management plans. If SWD is caught in monitoring traps, insecticide applications must be used during the unripe fruit stage to prevent damage.

Fig. 1. Adult male spotted wing drosophila (*Drosophila suzukii*). Photo by G. Arakelian.

This fact sheet describes SWD biology and current monitoring and control strategies for growers and homeowners. Any suspect SWD should be sent to the UPPDL for identification. Many flies have spots on their wings. Small flies with only ***1 spot per wing*** (Fig. 1) should be considered suspect.

BIOLOGY

Scientific Name: *Drosophila suzukii* (Drosophillidae)

Range in U.S.: Davis County, Utah; California; Oregon; Washington, Florida, Louisiana, North Carolina, and South Carolina.

Hosts: Detected in a raspberry and blackberry field in Kaysville, Utah (trap survey). Hosts include: tree fruits (apple, apricot, cherry, mullberry, nectarine, peach, persimmons, plum, pluot); small fruits (blackberry, blueberry, grapes, raspberry, strawberry); vegetable fruits (melons, tomato). Any soft-skinned fruit may be susceptible to SWD.

Damaging Stage: Larvae and adults. Larvae feed inside fruit causing abscesses; secondary fungal and pest infection may occur. Adults cause superficial scarring by sawing into fruit to lay eggs.

Overwintering Stage: Unknown if SWD will survive winter in northern Utah; survival in southern Utah is likely. Adults and pupae may overwinter.

Egg: Small, white, inserted into fruit. Two thin filaments used for breathing are visible protruding out of fruit. Over 350 eggs may be laid by a single female (Fig. 2).

Immature: Small (0.067-3.5mm or 0.003-.01in) cream-colored maggot with black mouthparts (Fig. 3).

Adult: Typical vinegar fly appearance: 2-3 mm (0.1 in) long, red eyes, pale brown body, featherlike antennae. Males have ***one circular black spot per wing*** (Fig. 1); ***females have no spots on wings*** and a sawlike ovipositor (Fig. 2). They are most active at 68°F; egg laying decreases above 86°F.

Pupae: Small (2-3 mm or 0.1 in) brown, cylindrical capsules with two extensions on one end (Fig. 4). Found in fruit or just below leaf litter in soil.

Generations per year: Unknown for Utah. Three to eight gen/yr have been observed in Oregon, and 10-13 gen/yr in California.

Video Fact Sheet: Trapping and Identifying SWD

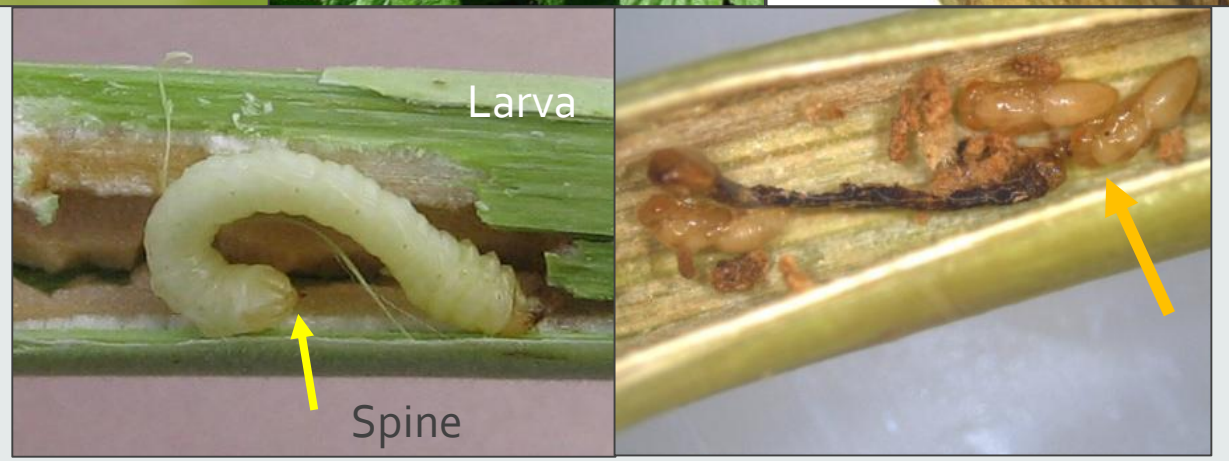
Trapping and Identifying Spotted Wing Drosophila

Spotted wing drosophila is a new pest to Utah; larvae (maggots) feed on the flesh of a wide variety of fruits. Entomologist Cory Stanley discusses how to make your own trap and how to identify adults.

Raspberry Cane Borers

Raspberry Horntail, *Hartigia cressonii*

- Major cane-boring pest in Utah
- Wasp (Hymenoptera)
  - Stem sawfly (Cephidae)
  - Attacks first-year primocanes
  - Intermountain West & CA
- Infested canes
  - Lower yield
  - Lower vigor
  - Lower winter survival



Natural parasitoid wasps kill RHT larvae

Raspberry Horntail IPM

- Select cultivars with more resistance
  - Fall-bearing are less susceptible than summer-bearing cultivars
- Prune out infested canes before adults emerge (by May)
  - Remove fall-bearing canes at ground level
  - Remove floricane-fruiting canes with a horntail tunnel in pith
- If warranted, apply insecticide beginning in May to prevent egg-laying; repeat based on protection interval of product (emergence: 500-1800 DD)
  - Carbamate: carbaryl (Sevin)
  - Pyrethroids: bifenthrin (Brigade, Capture), esfenvalerate (Asana), fenpropathrin (Danitol), zeta-cypermethrin (Mustang Max), pyrethrin
  - Organophosphates: diazinon (Diazinon, RUP), malathion (Malathion)
  - Don't spray when bees are active! Follow all product label protections for pollinators
- Frequent pruning of infested cane tips during summer can lower the horntail population in a field
- Conserve parasitoid wasps by avoiding unnecessary insecticide applications

Raspberry Cane Borer Fact Sheets

UTAH PESTS fact sheet — UtahState University COOPERATIVE EXTENSION

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Raspberry Horntail
(*Hartigia cressonii*)

Diane Alston, Entomologist • Brent Black, Fruit Specialist • Marion Murray, IPM Project Leader

Do You Know?

- The raspberry horntail is a caneboring wasp that can cause crop loss to raspberries in northern Utah.
- Apply insecticides in the spring targeting adults, to prevent egg-laying in the new canes.
- Infested canes often become evident during summer when tips wilt and die back.
- Frequent pruning of infested cane tips during summer can lower horntail populations in a field.
- Several species of parasitic wasps attack horntail larvae within canes and can provide biological control.

Fig. 1. The raspberry horntail larva bears a spine on the tail end[1]

Fig. 2. Raspberry horntail adult[2]

The most injurious insects to caneberries are those that bore within the canes resulting in cane dieback, reduced fruit yields, and even cane death. The most common of the borers attacking caneberries in northern Utah is the raspberry horntail [*Hartigia cressonii* (Kirby)], a type of wasp (Hymenoptera: Cephidae). It was first documented in Utah in the 1980s, and is known to occur in other western states. Horntails spend the winter as mature larvae in the previous year's canes, pupate in the early spring, and emerge as adults to mate and lay eggs in primocanes (first year canes) just after cane growth begins. Early-season egg-laying and protection of the eggs and larvae within canes create challenges for horntail management and potential for high infestation levels in raspberry fields. Recent research to evaluate the susceptibility of raspberry varieties and observations of high parasitism levels of horntail larvae in some fields, provide new insights into raspberry horntail management.

HOST PLANTS

raspberry, other brambles, rose

LIFE HISTORY

There appears to be only one generation per year in northern Utah. Egg-laying extends from early spring to early summer, so larvae of all sizes can be found in canes during the summer.

Mature Larva – Overwintering Stage

- **Size, shape, and color**: cylindrical, white body about 1 inch (25 mm) long; hardened, brown head; short spine on the tail end (Fig. 1).
- **When and where:** spends the winter in a silk-lined cavity in the lower cane.

Pupa

- **Size and color**: tan and about ¾ inch (18 mm) long.
- **When and where:** pupation occurs within the cane in the early spring.

UTAH PESTS fact sheet — EXTENSION UtahStateUniversity

Published by Utah State University Extension and Utah Plant Pest Diagnostic Laboratory ENT-178-15 October 2015

Rose Stem Girdler
[*Agrilus cuprescens*]

Diane Alston, Entomologist

Quick Facts

- Rose stem girdler is a common cane-boring beetle of raspberry and blackberry in central and northern Utah.
- Larval feeding in the cambium under the cane bark causes spiral grooves and gall-like swellings; injured canes may wilt and break off.
- Severe infestations in ever-bearing and first-year canes of vigorous summer-bearing cultivars can kill out plant stands.
- Avoid planting raspberries and blackberries near infested roses (wild and cultivated), prune and destroy infested canes, use proper fertility and water management to minimize stress to berry plantings, and apply insecticides during adult beetle activity in May and June.

Fig. 1. The rose stem girdler adult is a small, metallic-copper flatheaded beetle. Note the chewing injury to edges of the raspberry leaf[1].

Fig. 2. A raspberry cane with damage from tunneling by a rose stem girdler larva. The cane broke at the girdling site[2].

The rose stem girdler is a small flat-headed, metallic beetle (*Coleoptera*) in the Family *Buprestidae* (Fig. 1). It was first introduced into the eastern U.S. from Europe in the early 1900s in infested roses. It was first reported in Utah in American Fork in 1955. Today, it is a common cane-boring pest of raspberry, blackberry, and wild rose in central and northern regions of the state. It has been observed in Rich, Cache, Box Elder, Weber, Davis, Salt Lake, Utah, Wasatch, and Sanpete counties. Larvae tunnel in the canes causing gall-like swellings and cane breakage (Fig. 2). The rose stem girdler can dramatically reduce stands of red raspberry canes, and even kill out a planting.

HOST PLANTS

Raspberry (red and black), blackberry, related brambles (*Rubus* spp.), and wild and cultivated roses (*Rosa* spp.) are host plants.

LIFE HISTORY

The rose stem girdler has a single generation per year in Utah. The winter is spent as a 4th instar (4th molt) larva within the pith of canes (Fig. 3). Pupation occurs in the spring when daytime temperatures average 55°F, and adult beetles emerge from infested canes in May to June. Adults rest on plant foliage at night and become active during mid-morning hours as temperatures warm. Eggs

UTAH PESTS fact sheet — EXTENSION UtahStateUniversity

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Raspberry Crown Borer
[*Pennisetia marginata*]

Diane Alston, Entomologist

Quick Facts

- The raspberry crown borer attacks raspberry plants in northern Utah, causing cane-wilt and death.
- Crown borer has a 2-year life cycle; it spends much of it as a grub (larva) tunneling in the lower cane, crown and roots of raspberry plants.
- To prevent infestation, use only clean planting stock, don't transplant canes between fields, and maintain healthy, non-stressed plants.
- Once a raspberry planting is infested with crown borer: 1) dig and destroy infested crowns and roots, and 2) apply an insecticide as a heavy drench/soak to the lower cane and crown for at least 2 consecutive years in mid-October to target first year larvae, and in the spring before bud break to target overwintered larvae before they tunnel deeply into crowns.

Fig. 1. Adult female raspberry crown borer. Black and yellow bands on the body mimic a paper wasp to ward off predators. Females have smooth antennae[1].

The raspberry crown borer is a stout-bodied clear-winged moth (Lepidoptera: Sesiidae) that resembles a yellow jacket wasp (Fig. 1). It is native to North America, and was first reported from New England states in the mid-1800s. Today, it is a common cane-boring insect pest of raspberry in northern Utah. Although its host range includes all brambles in the genus *Rubus*, it is only known to cause damage to raspberry in Utah. Larvae tunnel in the lower cane, crown, and upper roots of raspberry causing entire canes to wilt and break off at the crown (Fig. 2). Raspberry crown borer infestations are usually not severe, but populations build up slowly over several years, reducing vigor and yield of plantings by as much as 30% (Raine 1962). In a recent survey of raspberry plantings in northern Utah, crown borer was found in 36% of sites; however, plant infestation levels were low, ~1% (Claudia Nischwitz, unpublished data).

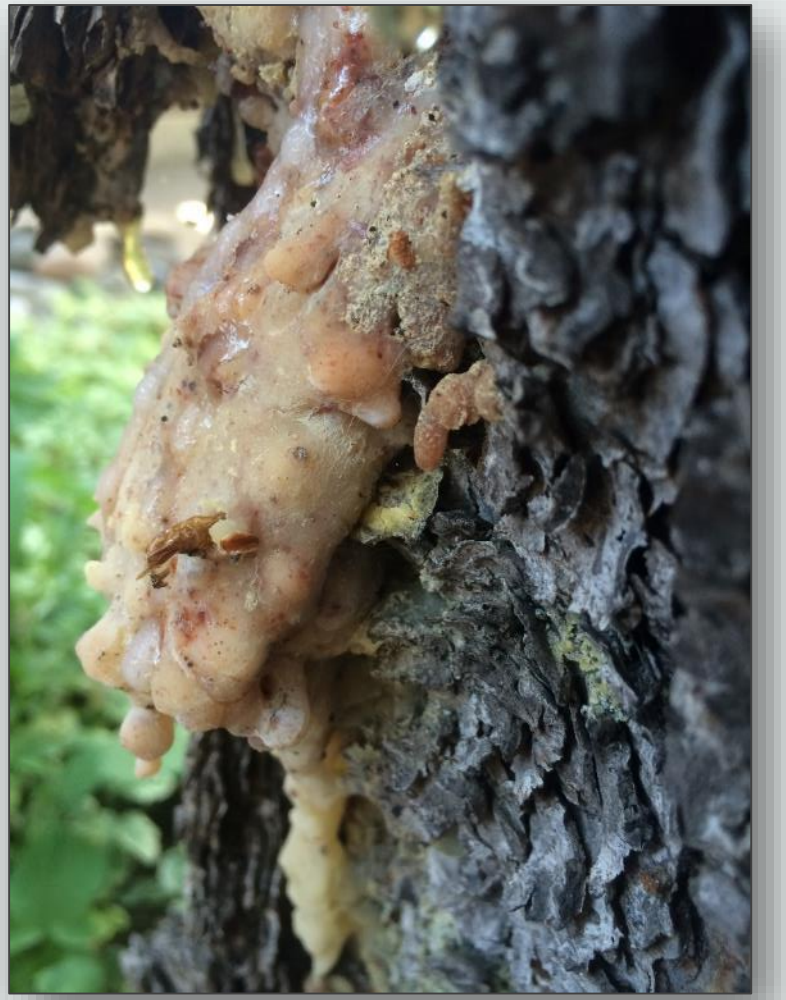
HOST PLANTS

Raspberry (red and black) is the primary host infested in Utah; however, all *Rubus* spp. are potential hosts, including blackberry, loganberry, boysenberry, thimbleberry, and salmonberry.

Fig. 2. Raspberry plant crowns damaged by raspberry crown borer larval tunneling. Note hollowed-out crowns and sawdust-like frass from larva[2].

Tree Borers

Pitch Borers



Sequoia-Douglas Fir Pitch Moth Complex

Synanthedon sequoia-novaroensis
(Clear-winged moth)

Hosts: Pines (Austrian, Scots, Ponderosa, Lodgepole, Pinyon), occasionally Douglas Fir and true firs

Attack weakened trees

Large, oozing masses of pitch caused by larvae feeding beneath the bark

Moths lay eggs in bark crevices near pitch masses

Larvae actively feed in late summer, can spend up to two years feeding on the resin

Boring larvae damage the tree's water conducting vessels

Pitch Borers

Douglas fir pitch moth (left) and sequoia pitch moth (right)

Management

Keep trees healthy, avoid stress, avoid summer pruning when moths lay eggs

Manually remove pitch masses, crush caterpillars, and allow wounds to heal

Preventive bark sprays
Late June through August for at least two years
bifenthrin, cyfluthrin, and carbaryl

Insecticides will not kill larvae under the bark, require several years to suppress

Bark Beetles

Conditions that Promote Bark Beetles

- Drought
- Trees on dry, sloping sites
  - Tree stress
  - Dry soils in spring and fall
    - Supplemental irrigation is absent or inadequate
- Longer, hotter growing seasons
  - More bark beetle generations
- Warmer winters
  - Higher overwinter survival, more generations
- Cyclic populations of bark beetles
  - Established populations in an area
  - Spread from foci / sources

Primary bark beetles in urban landscapes of Utah

- *Ips hunteri & I. pilifrons*
  - blue & Engelmann spruce
- *Ips pini*
  - ponderosa & lodgepole pine
- *Ips confusus*
  - pinyon & singleleaf pine
- Banded elm bark beetle
  - *Scolytus schevyrewi*
  - elm
- Shot hole borer
  - *Scolytus rugulosus*
  - apple, pear, cherry, hawthorn
- Black walnut twig beetle
  - *Pityophthorus juglandis*
  - black walnut

Ips have obvious spines on rear of outer wings

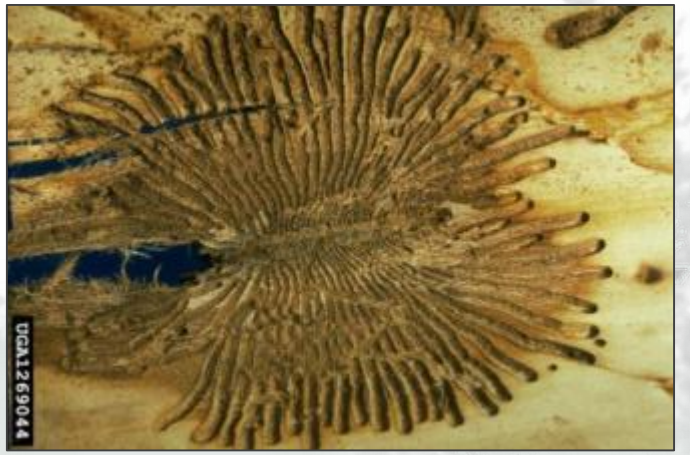
and a concave depression

Ips are tiny! 1/8 – 3/8 inch long

Distinguishing characteristics of bark beetles

Spruce Ips galleries: "octopus arms"

How do they feed and tunnel in trees?



Elm bark beetle galleries: "radiating arms"

Adult Pinyon Ips hind end

Size, shape, and color & spine patterns on adults

Banded elm bark beetle adult

Ips: pioneers & mass attack

- Pioneer beetles – stressed trees
  - Bore in –convert sap chemicals to an aggregation pheromone
  - Signal others to join
- Attack trees in mass numbers
  - Overcome tree's natural defenses
    - pitch tubes
  - Adult flights synchronized
    - Spring – April (Wasatch Front)
    - Fall – late Sep to Oct
- Life cycle: 6-8 wk duration
  - Several generations within a tree at same time
  - Up to 5 generations/yr

Pitch tubes & boring dust on bark of pinyon pine

Fatal attraction

- Males bore in, release sex pheromone to attract female
  - Nuptial gallery – larval galleries
- Bark beetle galleries
  - Disrupt transport of nutrients & water
  - Girdles the tree
  - Many bark beetles carry a fungus that inhibits water transport
- New generation of adults emerge through "shotholes"

Ips adult exit holes

Key Ips management strategy: Prevent tree stress

- Avoid dry planting sites
  - slopes, south-facing
  - fast-draining soils, inadequate irrigation
  - Provide deep irrigation
    - 2-4 inches water/month for established trees
- Avoid over-crowded plantings
- Avoid compacted soils
  - construction sites
- Prevent mechanical injuries
- Remove Ips-infested trees (foci)
  - remove infested wood
  - properly dispose: chip & dry, remove bark, burn

Ips control: Insecticides

- Preventive application
  - when infested trees are in the neighborhood
- Save trees infested ≤ 30%
  - Loss of central leader will permanently distort tree shape
- Apply insecticide to entire bole & interior of lateral limbs
  - Spring (April) before beetle flight
  - Daily temps >50°F
  - Kill beetles when chew thru insecticide-soaked bark
  - Fall (late Sept – Oct)
- High pressure (≥ 250 psi), drenching spray to run-off, professional applicator & equipment
  - Thorough coverage!

Examples of effective insecticides

- Carbaryl (carbamate)
  - Carbaryl 4L, Sevin XLR
- Bifenthrin (pyrethroid)
  - Bifen XTS
  - Onyx
- Permethrin (pyrethroid)
  - Astro
  - Hi Yield 38 Plus[Homeowner]
- 1-2 applications per year
- To date, systemic insecticides have not shown good efficacy

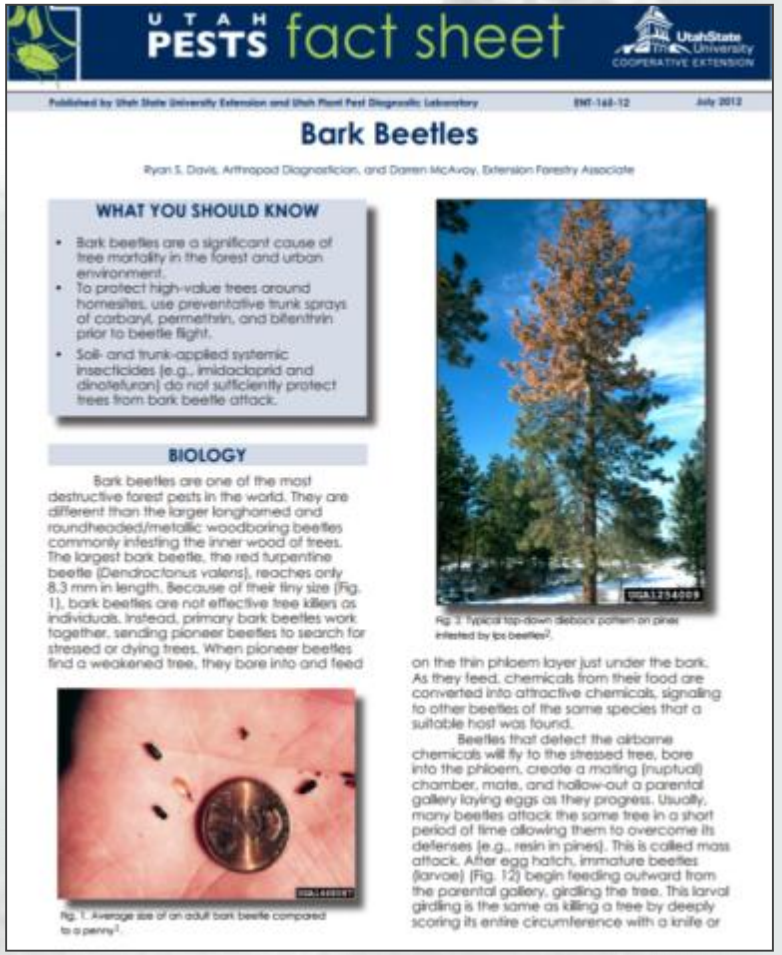
Sanitation: Treating infested wood

- Promptly remove wood from the landscape
  - ≥2-3 miles from host trees
- Check wood for live beetles
- Kill beetles within wood
  - Remove bark
  - Chip wood & spread to dry
  - Cover log pile with clear plastic
    - >130°F for a month (summer)
  - Burn wood

Ips pupa, larva, and adult within gallery tunnels

Cover infested logs with clear plastic to kill bark beetles with heat

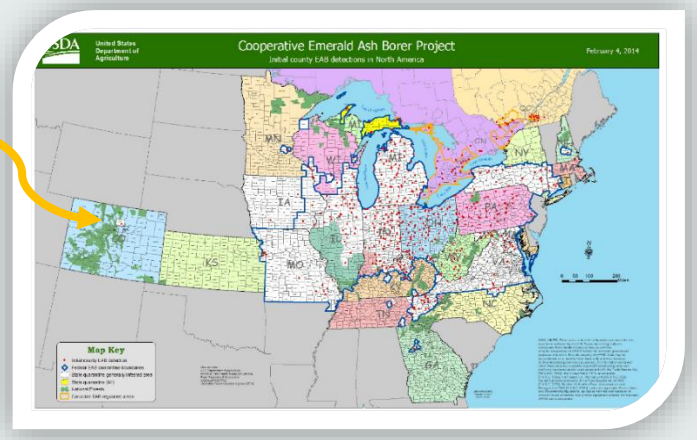
www.utahpests.usu.edu



High Alert for New Invasive: Emerald Ash Borer

Emerald Ash Borer: Invasive – not in Utah, yet…

Boulder, CO



Emerald Ash Borer is on our doorstep

- Native to Asia
- Flatheaded beetle (Buprestidae) (~1/2 inch)
- Larvae feed on inner bark disrupting water & nutrient transport
- First found in the U.S. in MI in 2002
- Killed nearly 60 million ash trees (~50 mill in southern Michigan)
- Attacks mature trees (olive family, Oleaceae)
  - Ash: all species of North American ash
  - White fringetree (*Chioanthus virginicus* L.)

Larva

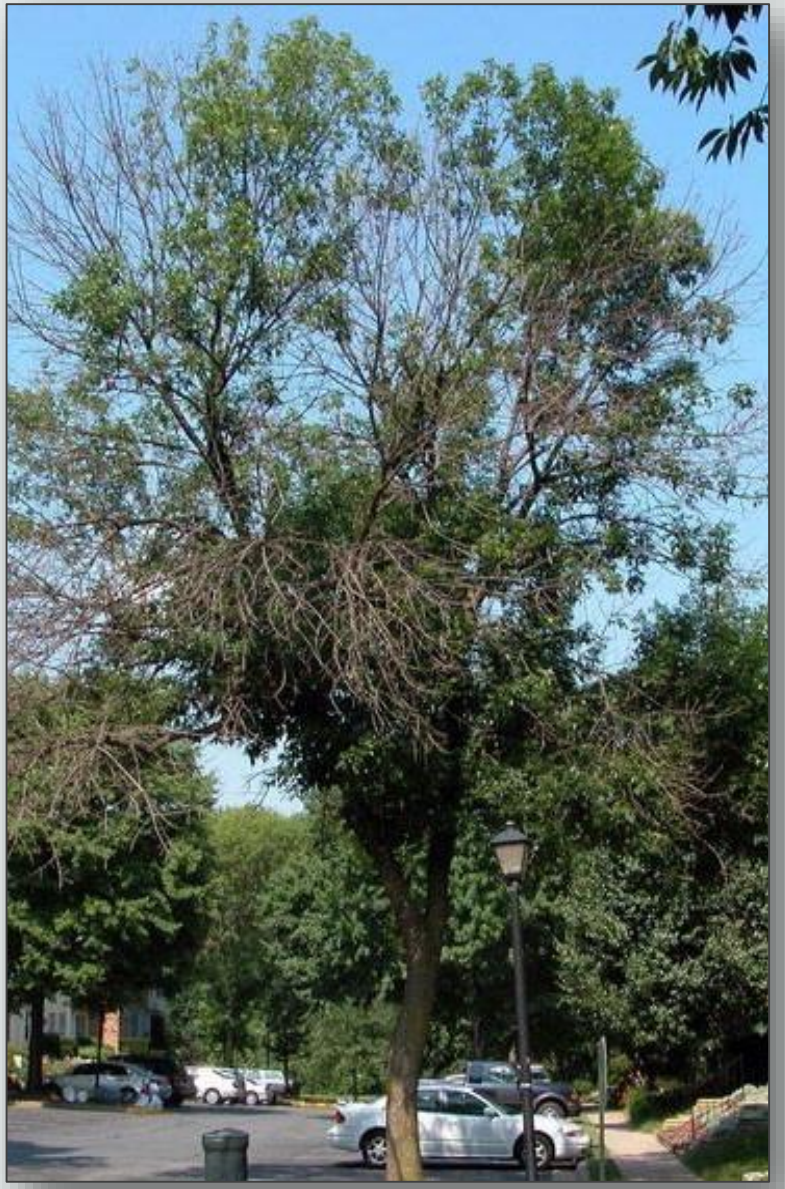
Look-Alikes:

Bronze Birch Borer

Honey Locust Borer

Larval Tunnels - Injury

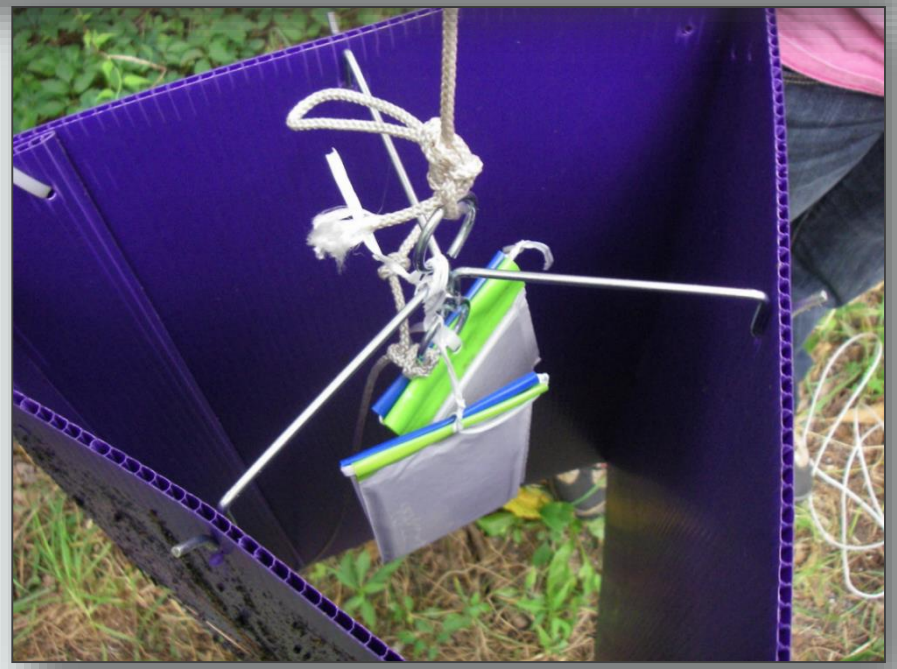
Monitoring: Tree Canopy Thinning



Monitoring: Exit Holes

D-shaped exit holes

Monitoring: Traps (Low Effectiveness)



Knowing When or Whether to Treat

- No threshold has been set
- When present, trees should be protected
  - within two miles of attacked tree
- Protective trunk, branch & foliage sprays
  - Pyrethroids: bifenthrin, cyfluthrin, permethrin
  - carbaryl
- Systemics – inject, drench, or bark spray
  - dinotefuran
  - imidacloprid

Management Practices: Prevention!!! and Sanitation

Don’t move infested wood!

Recent Invasive Nuisance Insect Pests

Elm Seed Bug

First confirmed detection in Utah: July, 2014
(Salt Lake and Cache Counties)

Native to Europe
Idaho in 2012
Oregon in 2013

Seed bug family: Lygaeidae
Feeds primarily on elm seeds, also other trees

Major nuisance pest
Enters buildings (like boxelder bug)
Emits a pungent odor from scent glands
(bitter almonds)

In Italy, apply insecticides to host trees when immature stage (nymph) is present (spring and early summer; May-June)

Use building exclusion techniques like for boxelder bug; vacuum congregations – warm soapy water

Elm Seed Bug Article: Utah Pests News, Fall 2014

UTAH PESTS News

Utah Plant Pest Diagnostic Laboratory and USU Extension — Vol.VIII, Fall 2014

What's Inside

News Highlights

WELCOME TO NEW VEGETABLE IPM ASSOCIATE

Bonnie Bunn recently joined the Utah Pests team to conduct outreach in vegetable integrated pest management. Bonnie is completing her M.S. in Biology at USU under Diane Alston. She has already made a great impact this summer by running the vegetable IPM advisories, monitoring and trapping for vegetable pests, and expanding our vegetable diagnostics image database. Bonnie will also develop fact sheets, expand our online content, and conduct presentations.

utahpests.usu.edu

First Report of Elm Seed Bug in Utah

In July 2014, the UPPDL received multiple submissions of a small, brown and black insect. We identified it, with confirmation from USDA APHIS, as elm seed bug (*Arocatus melanocephalus*), marking its first official appearance in the state. A native of Europe, the elm seed bug was first identified in the U.S. in Idaho in 2012 and then in Oregon in 2013. While the Utah sample submissions came from Salt Lake County, I also collected and identified this insect in Cache County around the same time. It is possible that the elm seed bug is already widely distributed along the Wasatch Front.

As a member of the family Lygaeidae, or the seed bugs, this insect feeds primarily on elm seeds, but can be found on other trees. In northern Italy, this insect has become a major nuisance pest, entering homes and buildings by the thousands, similar to the boxelder bug in Utah. Unlike boxelder bug, elm seed bugs can emit a pungent smell from scent glands, similar to bitter almonds.

The specifics of the elm seed bug life cycle in the U.S. are only generally understood. In northern Italy (Turin ~ 45°N and Modena ~ 44°N; Salt Lake City ~ 40°N), the insects overwinter as adults and begin to move from overwintering sites to host trees in March. Eggs are laid starting in early May on elm fruits (samara) and young nymphs emerge in mid-to-late May. The nymphs progress through 5 growth stages before becoming a winged adult. There can be many overlapping life stages present during the summer, but in Italy, the insects have one generation per year. Invasions of buildings have occurred anytime between late May and late September and were seen to coincide with peak summer temperatures.

Control of elm seed bug with insecticides may be difficult due to their mobile behavior. Italian entomologists report that city governments attempted control with etofenprox, pyrethrum, and rotenone, but only etofenprox showed efficacy. In Italy, insecticides are most effectively applied to host trees when immature stages are present, beginning in early May.

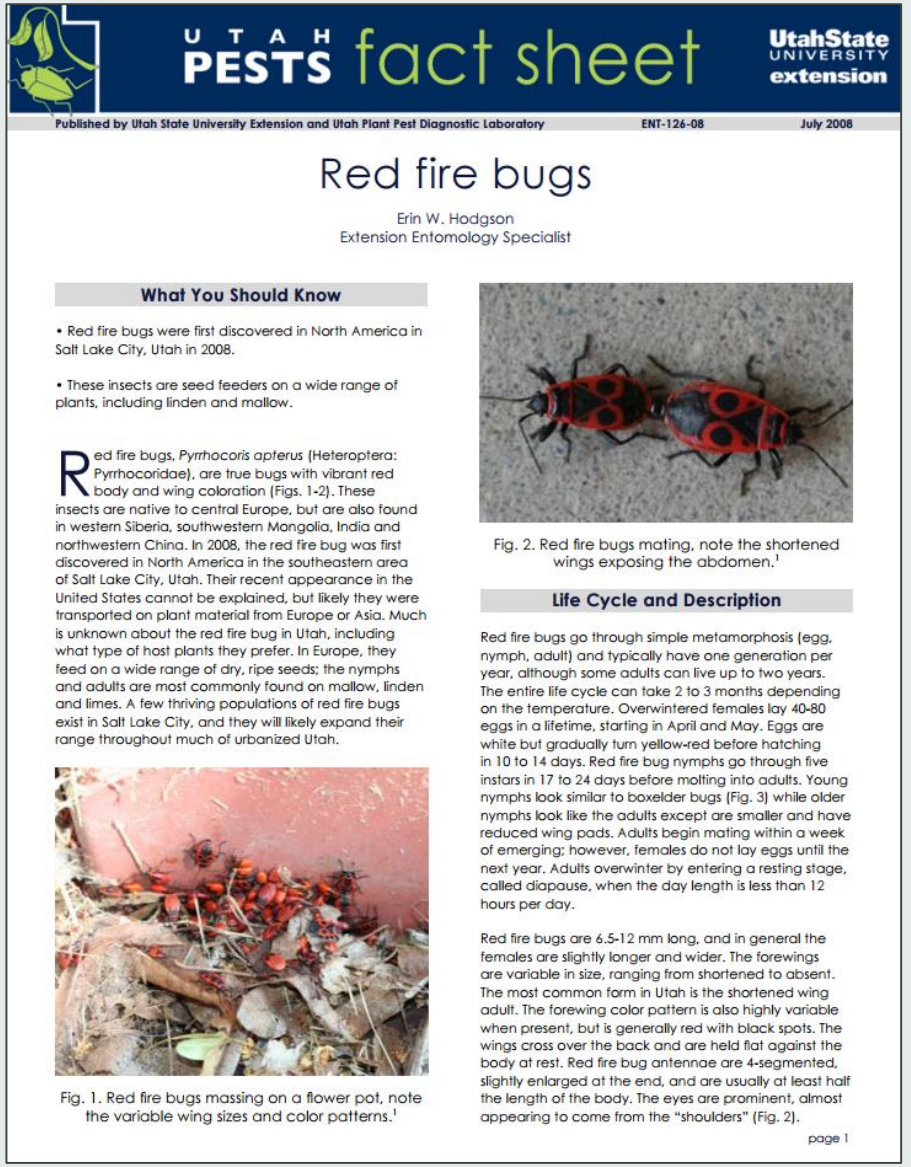
Unfortunately, adult emergence dates, egg laying, and egg hatch are not known in Utah. Proper spray timing for elm seed bug in Utah should be accurately timed to coincide with the presence of the nymph stages for greatest results. Adults may start appearing in March and their nymphs, in April and May.

Pest-proofing homes and buildings is the best tactic to deal with nuisance pests like the new elm seed bug, just as it is for the

continued on next page

Red Fire Bug

- First North America detection in Salt Lake City in 2008
  - Detected in Kaysville (Davis Co.) in 2014 and Pleasant Grove (Utah Co.) in 2015
- Native to Europe and Asia
- Seed feeders (Pyrrhocoridae): Malvaceae (cotton family)
  - linden, mallow (dry, ripe seeds)
- Seek shade on hot days
- Congregate on structures, plants and under leaf litter
- Manage like boxelder bug



UTAH PESTS fact sheet

UtahState UNIVERSITY extension

Published by Utah State University Extension and Utah Plant Pest Diagnostic Laboratory ENT-126-08 July 2008

Red fire bugs

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Extension Entomology Specialist

What You Should Know

- Red fire bugs were first discovered in North America in Salt Lake City, Utah in 2008.
- These insects are seed feeders on a wide range of plants, including linden and mallow.

Red fire bugs, *Pyrrhocoris apterus* (Heteroptera: Pyrrhocoridae), are true bugs with vibrant red body and wing coloration (Figs. 1-2). These insects are native to central Europe, but are also found in western Siberia, southwestern Mongolia, India and northwestern China. In 2008, the red fire bug was first discovered in North America in the southeastern area of Salt Lake City, Utah. Their recent appearance in the United States cannot be explained, but likely they were transported on plant material from Europe or Asia. Much is unknown about the red fire bug in Utah, including what type of host plants they prefer. In Europe, they feed on a wide range of dry, ripe seeds; the nymphs and adults are most commonly found on mallow, linden and limes. A few thriving populations of red fire bugs exist in Salt Lake City, and they will likely expand their range throughout much of urbanized Utah.

Fig. 1. Red fire bugs massing on a flower pot, note the variable wing sizes and color patterns.[1]

Fig. 2. Red fire bugs mating, note the shortened wings exposing the abdomen.[1]

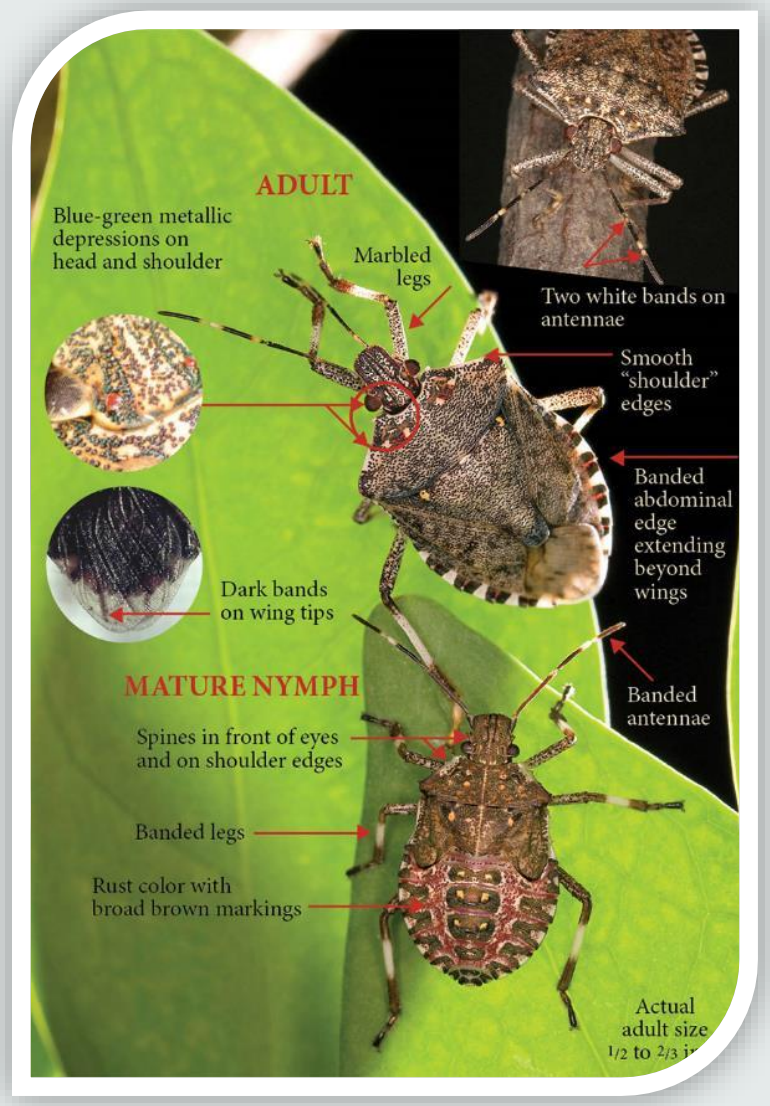
Life Cycle and Description

Red fire bugs go through simple metamorphosis (egg, nymph, adult) and typically have one generation per year, although some adults can live up to two years. The entire life cycle can take 2 to 3 months depending on the temperature. Overwintered females lay 40-80 eggs in a lifetime, starting in April and May. Eggs are white but gradually turn yellow-red before hatching in 10 to 14 days. Red fire bug nymphs go through five instars in 17 to 24 days before molting into adults. Young nymphs look similar to boxelder bugs (Fig. 3) while older nymphs look like the adults except are smaller and have reduced wing pads. Adults begin mating within a week of emerging; however, females do not lay eggs until the next year. Adults overwinter by entering a resting stage, called diapause, when the day length is less than 12 hours per day.

Red fire bugs are 6.5-12 mm long, and in general the females are slightly longer and wider. The forewings are variable in size, ranging from shortened to absent. The most common form in Utah is the shortened wing adult. The forewing color pattern is also highly variable when present, but is generally red with black spots. The wings cross over the back and are held flat against the body at rest. Red fire bug antennae are 4-segmented, slightly enlarged at the end, and are usually at least half the length of the body. The eyes are prominent, almost appearing to come from the "shoulders" (Fig. 2).

USU Horticultural Research Farm, Kaysville (Davis Co.)
Red Fire Bugs Congregating on Tart Cherry Tree Trunks

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. 2012-2015
Avenues, University of Utah, Eastern Bench

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
- A major nuisance pest

BMSB Crop Damage

Photo: Tracy Leskey

Photo: Doug Pfeiffer

Photo: Nik Wiman

Photo: Steve Jacobs

Find this slideshow and others at www.utahpests.usu.edu

for your attention…

Contact us