Organic Growing Workshop:

10 Common Garden Insect Pests & How to Control Them Organically

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UTAH PESTS

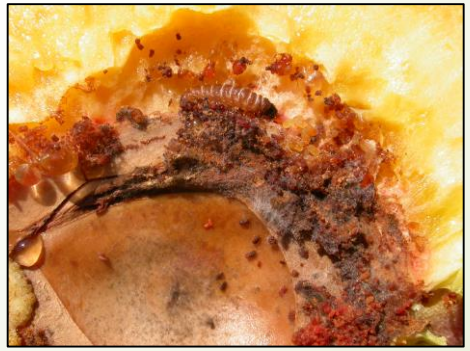
EXTENSION

UtahStateUniversity

Common Tree Fruit Insect Pests

codling moth, cherry fruit fly, peach twig borer, and aphids



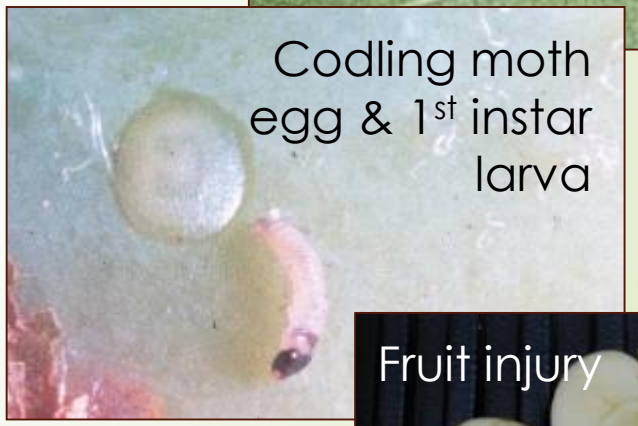



Codling Moth

- Internal "fruit worm" in apple & pear
- Overwinters as a caterpillar within a cocoon under tree bark
- Spring: adult moth emerges beginning at ~ apple bloom time
- Eggs laid on fruit & leaves
- 1st instar larva bores into fruit
  w/in 24 hr of hatching
- Challenging insect to control with non-chemical tools


Cocoon under bark

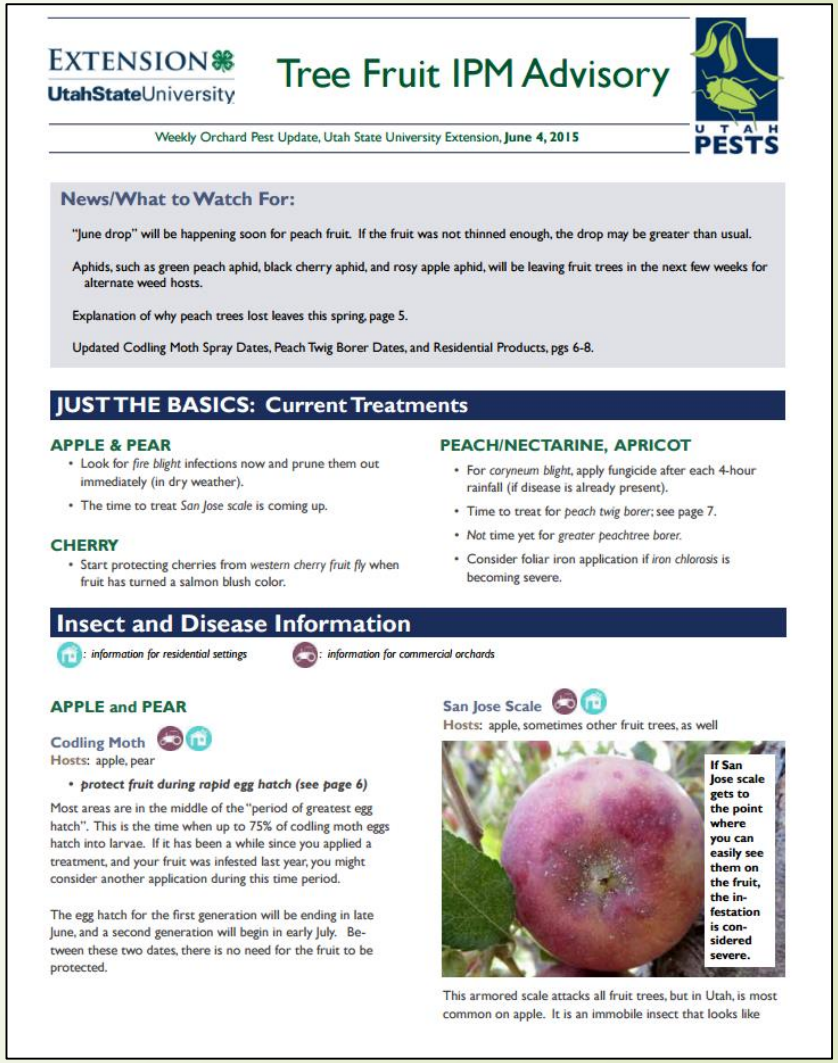

Adult moth


Codling moth egg & 1st instar larva


Fruit injury

Codling Moth Chemical Control

- Target eggs & newly hatched larvae
- Timing based on moth trap catch & degree-days in your area
- Tree Fruit IPM Advisory – provides the proper timing
- Organic insecticides:
  - horticultural mineral oil (1-1.5%)
    - target egg hatch
    - mix with CydX
  - codling moth virus (CydX; 7 d)
  - spinosad (Entrust; 7 d)



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Tree Fruit IPM Advisory

UTAH PESTS

Weekly Orchard Pest Update, Utah State University Extension, **June 4, 2015**

News/What to Watch For:

"June drop" will be happening soon for peach fruit. If the fruit was not thinned enough, the drop may be greater than usual.

Aphids, such as green peach aphid, black cherry aphid, and rosy apple aphid, will be leaving fruit trees in the next few weeks for alternate weed hosts.

Explanation of why peach trees lost leaves this spring, page 5.

Updated Codling Moth Spray Dates, Peach Twig Borer Dates, and Residential Products, pgs 6-8.

JUST THE BASICS: Current Treatments

APPLE & PEAR

- Look for *fire blight* infections now and prune them out immediately (in dry weather).
- The time to treat *San Jose scale* is coming up.

CHERRY

- Start protecting cherries from *western cherry fruit fly* when fruit has turned a salmon blush color.

PEACH/NECTARINE, APRICOT

- For *coryneum blight*, apply fungicide after each 4-hour rainfall (if disease is already present).
- Time to treat for *peach twig borer*; see page 7.
- *Not* time yet for *greater peachtree borer.*
- Consider foliar iron application if *iron chlorosis* is becoming severe.

Insect and Disease Information

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

APPLE and PEAR

Codling Moth

Hosts: apple, pear

- ***protect fruit during rapid egg hatch (see page 6)***

Most areas are in the middle of the "period of greatest egg hatch". This is the time when up to 75% of codling moth eggs hatch into larvae. If it has been a while since you applied a treatment, and your fruit was infested last year, you might consider another application during this time period.

The egg hatch for the first generation will be ending in late June, and a second generation will begin in early July. Between these two dates, there is no need for the fruit to be protected.

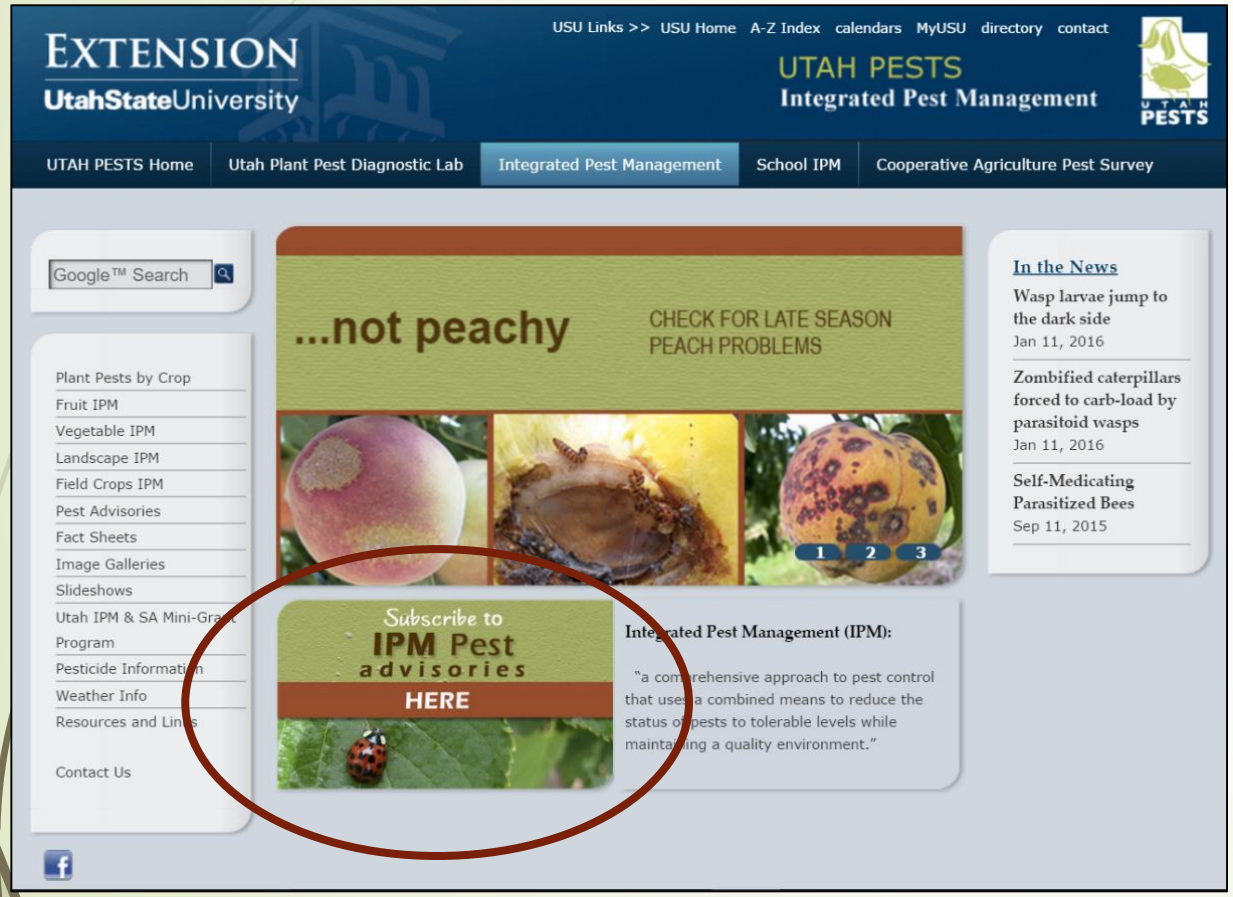
San Jose Scale

Hosts: apple, sometimes other fruit trees, as well

If San Jose scale gets to the point where you can easily see them on the fruit, the infestation is considered severe.

This armored scale attacks all fruit trees, but in Utah, is most common on apple. It is an immobile insect that looks like

Tree Fruit IPM Advisory



Please check this table at each advisory as the information may change as the dates get closer. The forecasts use the average temperature for each site. Fruit should remain protected through each generation according to interval provided on your pesticide label. Many more locations can be viewed on the Utah Climate Center TRAPs website (select location; select codling moth).

Codling Moth, First Generation

In the table, choose either Option A or B when starting your codling moth sprays.

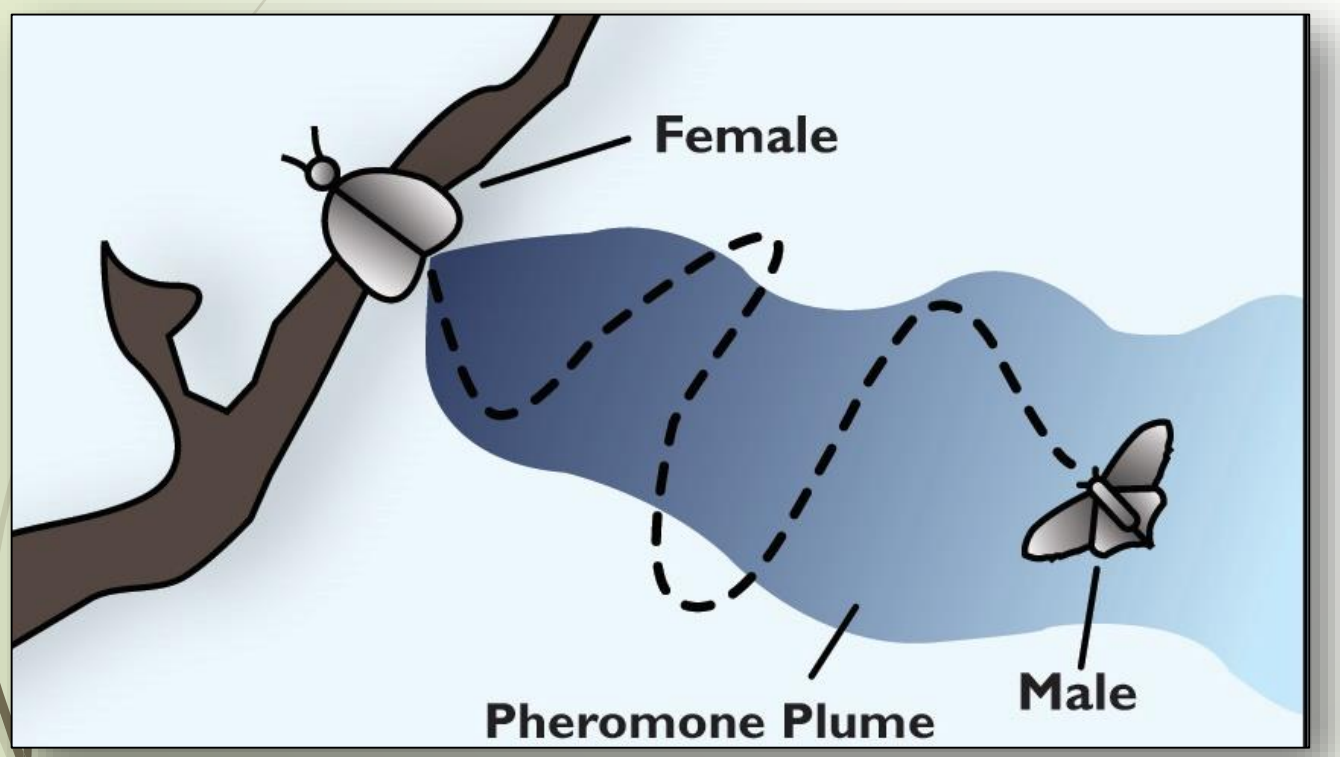
Option A is what most people will do. Apply insecticide at the recommended date, and repeat. ***Option B*** is an alternative that may help to reduce sprays. Liberally apply horticultural oil (1%) on the first date, and then apply your regular insecticide on the later date. The oil kills eggs that have been laid on fruit up to that point.

The "period of greatest egg hatch" is the time when 75% of all eggs for the first generation will hatch. Use this information to time your treatment applications.

		Option A	Option B		Period of Greatest Egg Hatch
County	Location	Apply first spray	Apply oil	Apply first spray	
Box Elder	Perry	passed	passed	May 27	May 27 - June 17
	Tremonton	May 21	May 19	June 2	June 1 - 20
Cache	Logan Airport	May 31	May 29	June 11	June 10 - unknown
	River Heights	May 29	May 27	June 10	June 9 - unknown
Carbon	Price Airport	May 28	May 26	June 7	June 6 - unknown
Davis	Kaysville	passed	passed	May 27	May 26 - June 14
Grand	Moab	passed	passed	passed	through June 1
Iron	Cedar City Airport	May 27	May 25	June 6	June 5 - unknown
Salt Lake	Benches/Cooler sites	passed	passed	May 29	May 29 - June 13
	Most areas	passed	passed	May 24	May 23 - June 9
Sevier	Monroe	passed	passed	May 26	May 25 - June 16
Tooele	Erda Airport	passed	passed	May 27	May 26 - June 15
	Grantsville	passed	passed	May 25	May 24 - June 13
Uintah	Vernal Airport	May 31	May 29	June 10	June 9 - unknown
Utah	Alpine	May 20	passed	June 2	June 1 - 20
	American Fork	passed	passed	May 28	May 27 - June 15
	Genola (CHF)	passed	passed	May 21	May 23 - June 14
	Lincoln Point	passed	passed	May 30	June 1 - 19
	Orem (Lindon)	passed	passed	May 27	May 27 - June 12
	Payson	passed	passed	May 27	May 26 - June 14
	Provo Airport	passed	passed	May 27	May 27 - June 14
	Provo Canyon	May 25	May 27	June 4	June 5 - 20
	Santaquin (South Ridge)	passed	passed	May 31	May 31 - June 20

Pheromones for Moth Monitoring

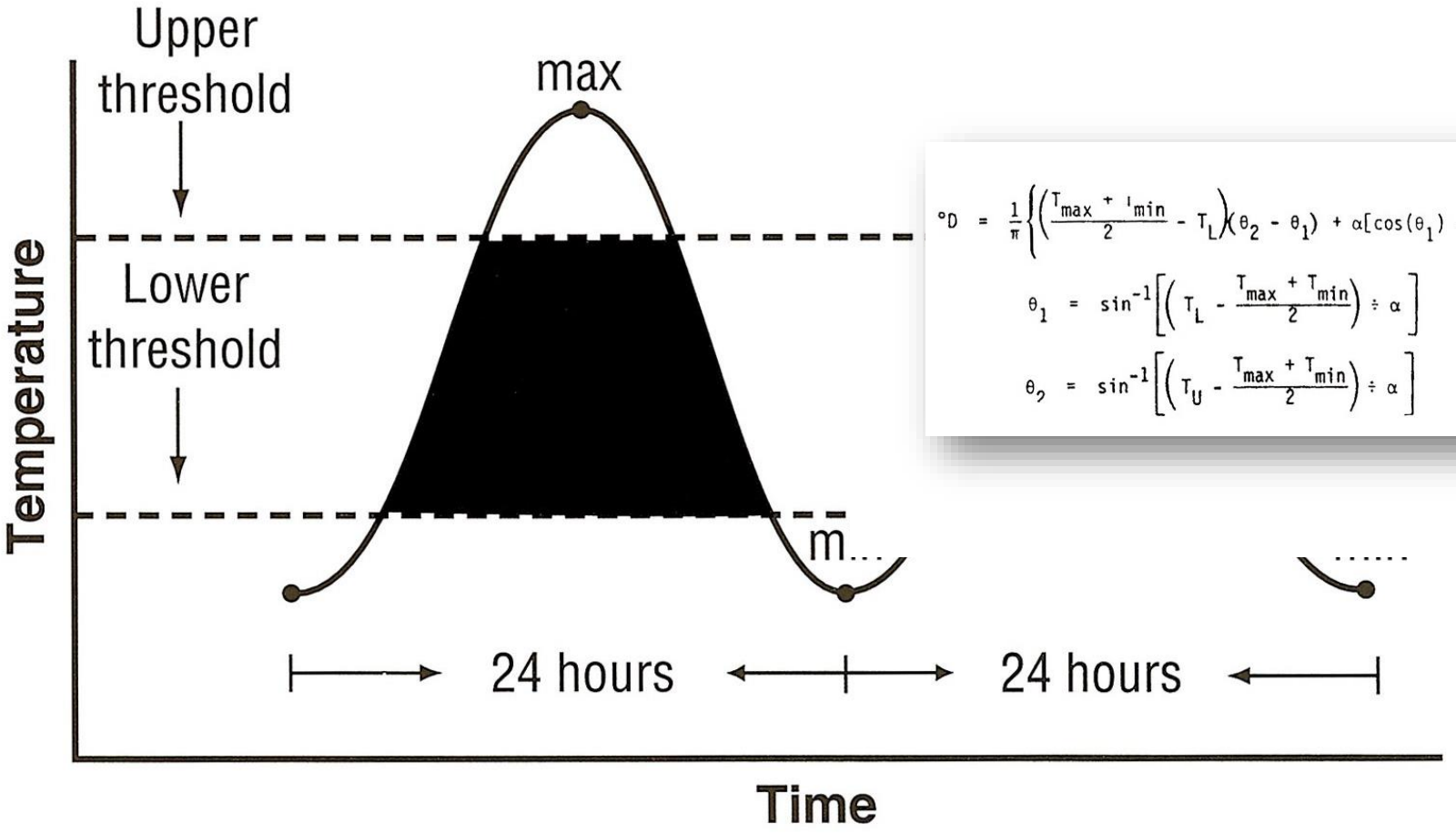
Communication within a species: sex attractant



Pheromone traps are only for monitoring
They are not a control tool
Attract only male moths

Pest detection and evaluation – Degree Days

Degree days are a measurement of heat units over time



$$^{\circ}D = \frac{1}{\pi}\left\{\left(\frac{T_{max} + T_{min}}{2} - T_L\right)(\theta_2 - \theta_1) + \alpha[\cos(\theta_1) - \cos(\theta_2)] + (T_U - T_L)\left(\frac{\pi}{2} - \theta_2\right)\right\}$$

$$\theta_1 = \sin^{-1}\left[\left(T_L - \frac{T_{max} + T_{min}}{2}\right) \div \alpha\right]$$

$$\theta_2 = \sin^{-1}\left[\left(T_U - \frac{T_{max} + T_{min}}{2}\right) \div \alpha\right]$$

Codling Moth Fact Sheet

UTAH PESTS fact sheet
UtahState University COOPERATIVE EXTENSION
Published by Utah State University Extension and Utah Plant Pest Diagnostic Laboratory ENT-13-06 June 2010

Codling Moth (*Cydia pomonella*)

Diane Alston, Entomologist • Marion Murray, IPM Project Leader • Michael Reding, Former IPM Project Leader

Do You Know?

- Codling moth is the major pest of apple and pear in Utah.
- Damaging stage: larva tunnels into fruit
- Monitoring stage: adult moth
- Use of pheromone traps and the degree-day model (based on daily temperatures) are critical for determining optimal treatment timings.
- Insecticides and pheromone-based mating disruption are currently the main management tactics.
- Insecticides are targeted at newly hatched larvae and/or eggs.
- Mating disruption devices need to be applied immediately before or at biofix (first moth activity) to prevent or adequately delay moth mating.
- Biological control is minimally effective because larvae are protected inside fruit.
- Insect development and spray timing information are available on the USU Extension Integrated Pest Management (IPM) Tree Fruit Pest Advisories Web page (www.utahpests.usu.edu/ipm/htm/advisories/treefruit) or from your county USU Extension office.

Fig. 1. Codling moth adult

Fig. 2. Codling moth larva

Codling moth (Order Lepidoptera, Family Tortricidae) is the most serious pest of apple and pear worldwide (Fig. 1). In most commercial fruit producing regions and home yards in Utah, fruit must be protected to harvest a crop. Insecticides are the main control tactic. There are new insecticides available, many of which are less toxic to humans and beneficial insects and mites than earlier insecticides. For commercial orchards with more than 10 acres of contiguous apple and pear plantings, pheromone-based mating disruption can greatly reduce codling moth populations to allow reduced insecticide use. Effective biological control has not been possible because fruit is attacked by newly hatched larvae, which are protected from natural enemies once inside the fruit (Fig. 2). Sanitation methods can help reduce codling moth densities within an orchard, but alone cannot provide satisfactory control.

In Utah, there are two to three generations of codling moth each year (Fig. 3). In northern Utah, there are typically two full generations and a partial third generation. In southern Utah, most or all of a third generation will occur. First generation moths begin to emerge about bloom time and peak in June in northern Utah. Second generation moths begin emerging in late June to early July and peak in late July to early August. Third generation moths are active from about mid August to mid September before declining day length induces the end of activity for the year.

HOSTS

apple, pear, crabapple, English walnut, quince, hawthorn, apricot, plum, peach, cherry

- Plan to use the same type of trap and lure from year to year so that you can compare results.

Degree-day Model

The Degree-day Method

- The development of codling moth, like all insects, can be predicted based on accumulated heat over time, called degree days (DD). Use of the codling moth phenology model based on DD will help to more accurately time insecticide applications and reduce the number of applications to a minimum.
- Codling moth development occurs between the lower and upper temperature thresholds of 50° F and 88° F.
- Starting March 1 in northern Utah or January 1 in southern Utah, begin accumulating DD for an individual location by:
  - collecting representative daily maximum and minimum air temperatures and using the DD look-up table (Table 2), or
  - obtaining the information provided by the online degree-day calculator at Utah Climate center TRAPs website (http://climate.usurf.usu.edu/pest.php) or from your county Extension office.
- Place pheromone traps in orchards when 100 DD have accumulated (first pink of Red Delicious). The first moths are expected by 150 - 200 DD (full bloom of Red Delicious).
- Once biofix (first consistent moth catch) has occurred, accumulated DD are reset to zero (Table 1).

Timing Sprays

- If mating disruption (MD, see page 6) is used in an orchard, dispensers should be hung immediately before or at biofix to prevent mating and egg-laying (get a biofix at a nerby non-MD location). Supplemental insecticide treatments are usually necessary even when MD is used. The first cover spray is often the most important to apply as this timing should suppress the first generation, and thus, the following generations.
- Depending on the type of insecticide used, the first cover spray should be applied as follows:

DD after biofix	Timing/Target	Examples
50 - 75	pre-egg-laying	Rimon
100 - 200	early egg-laying	Horticultural oil, Esteem, Intrepid
220 - 250	first egg hatch (emergence of larvae)	Altacor, Assail, Asana, Calypso, Carbaryl, Codling Moth Granulosis Virus, Delegate, Diazanon, Guthion, Imidan, Proclaim

Table 1. Major events in a codling moth management program, based on accumulated degree days

Degree Days	% Adults Emerged	% Egg Hatch	Management Event
100 *	0	0	• Place traps in orchards
150 - 200	First moths expected	0	• Check traps every 1-2 days until biofix is determined
First Generation			
0 (biofix)†	First consistent catch	0	• Reset degree days to 0
50 - 75	5 - 9	0	• First eggs are laid • Apply insecticides that need to be present before egg-laying
100 - 200	15 - 40	0	• Early egg-laying period • Apply insecticides that target early egg-laying period
220 - 250	45 - 50	1-3	• Beginning of egg hatch • Apply insecticides that target newly hatched larvae
340 - 640	67 - 98	12 - 80	• Critical period for control, high rate of egg hatch • Important to keep fruit protected during this period
920	100	99	• End of egg hatch for 1st generation
Second Generation			
1000 - 1050	5 - 8	0	• First eggs of 2nd generation are laid • Apply insecticides to target early egg-laying
1100	13	1	• Beginning of egg hatch • Apply insecticides that target newly hatched larvae
1320 - 1720	46 - 93	11 - 71	• Critical period for control, high rate of egg hatch
2100	100	99	• End of egg hatch for 2nd generation
Third Generation			
2160	1	15	• Beginning of egg hatch • Keep fruit protected through September 15 • Check pre-harvest interval of material used to ensure that final spray is not too near harvest.

*Begin accumulating degree days after daily temperatures begin to exceed 50°F, typically on January 1 for southern Utah or March 1 for northern Utah.

† Biofix is when at least two moths are caught on consecutive nights

Mechanical Control: Sanitation

- Pick up dropped fruit
  - "June drop"
    - green apples
  - July-August
    - don't wait too long or larvae will have already exited fruit

Mechanical Control: Bands & Bags

"Mass trap" larvae in corrugated cardboard bands on tree trunks

Pupate inside silken cocoons on trunks

Late June to Mid-September

Fruit bags to exclude codling moth eggs

Place bags over 3/4" diameter fruit

Western Cherry Fruit Fly

- Larvae feed inside sweet & tart cherries; female flies lay eggs in ripening fruit; fruit doesn't become soft enough for egg-laying until it turns salmon colored
- Chemical control:
  - spinosad (Entrust; 7 d)
  - GF-120 NF (spinosad + bait; 7 d)
  - pyrethrin (Pyganic; 3-5 d)
- Mechanical control: Landscape fabric or barrier under tree canopy
  - pupate in soil under trees
- Predation by fowl: chickens, guinea hens, ducks, geese, turkeys

Western Cherry Fruit Fly Fact Sheet

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.

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

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 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.

Peach Twig Borer

- Over winter as young larvae on limbs within cocoons
- From bloom to petal fall, brown caterpillars tunnel into new shoots
- 2nd & 3rd generation caterpillars enter fruit, usually at the stem end
- Chemical Control:
  - Delayed Dormant Spray (Bud break)
    - horticultural oil (2%) OR
  - Bloom sprays: 2 Bt sprays(Dipel, Thuricide, Javelin) at early & full to late bloom
- Fruit Protection (Tree Fruit IPM Advisory):
  - spinosad (Entrust) or pyrethrin (Pyganic)

Common Tree Fruit Aphids in Utah

- Apple
  - Rosy Apple Aphid
  - Green Apple Aphid
  - Woolly Apple Aphid
- Cherry
  - Black Cherry Aphid
- Peach
  - Green Peach Aphid
- Plum
  - Mealy Plum Aphid
  - Leaf Curl Plum Aphid

How to identify aphids:

-green, black, pink, purple
-small, soft pear-shaped bodies
-slow moving
-pair of "tailpipes" – cornicles exude defensive fluid
-adults with & without wings

Aphids

- Aphids have “tailpipes”
- Non-winged & winged adults
- Suck fluids from leaves & stems; curl leaves; produce sticky honeydew; black sooty mold growth
- Protect young trees, older trees can tolerate more aphid feeding
- Chemical Control:
  - horticultural oil at green tip stage
  - In-season: insecticidal soap, horticultural oil, azadirachtin (neem)
- Biological control:
  - lady beetles, lacewings, syrphid flies, parasitic wasps

Rosy Apple Aphid

Green Apple Aphid

Woolly Apple Aphid

Woolly Apple Aphid

- Can be a severe pest of apple
- Mid- & late-season pest
- Forms galls on roots & twigs
  - reduced tree vigor
  - stunted roots & trees
- Contaminate stem bowl of fruit

Root galls

Aphids covered in white woolly wax

Twig galls disrupt transport of nutrients & water

Aphid Biological Control

Convergent Lady Beetle

Syrphid or Hover Fly

Brown Lacewing

Green Lacewing

Woolly Apple Aphid Biological Control

Aphid mummies

Aphelinus mali
parasitoid wasp of WAA

Aphid Predators:

ladybeetles
lacewings
syrphid flies

Alyssum planted to attract
Syrphid flies to nectar & pollen

Aphid & Spider Mite Mechanical Control

Stiff spray of water every 2-3 days until aphid or mite numbers decline

Best if initiated before leaves are tightly curled (aphids) or extensive webbing & leaf injury occurs (mites)

Common Raspberry Insect Pests

earwigs, grasshoppers, and caneborers

European Earwig

Female European earwig (straight cerci)

Nocturnal – feed on fruits & leaves with chewing mouthparts

European Earwig Traps

Earwig Management – Before Berries are Ripe

- Insecticidal soap + pyrethrin (Pyganic) or neem
  - reapply every 3-5 days
  - suppressive
  - combine with trapping & habitat management
- OR spinosad (Entrust)
- Predation by fowl
  - chicken, turkey, duck

Dense & moist ground covers, such as birdsfoot trefoil, can provide attractive daytime refuge for earwigs

Wheat straw & paper mulch are less attractive

Earwigs prefer dense, moist refuge

Grasshoppers on Berries

Strip the foliage
Some eat fruit: e.g., Differential grasshopper, *Melanoplus differentialis*

Late summer to early fall
Hot, dry conditions

Grasshopper Management

- Floating row cover fabric
- Cultivate around plants in fall and/or spring to disrupt overwintering eggs in soil
- Predation by fowl
- Insecticides
  - pyrethrin or neem
  - *Nosema locustae* bait
    - treat a larger area around farm/garden
    - target nymphs (young) before adult numbers build up


UTAH PESTS fact sheet

Community-Wide Grasshopper Control

Marion Murray, IPM Project Leader

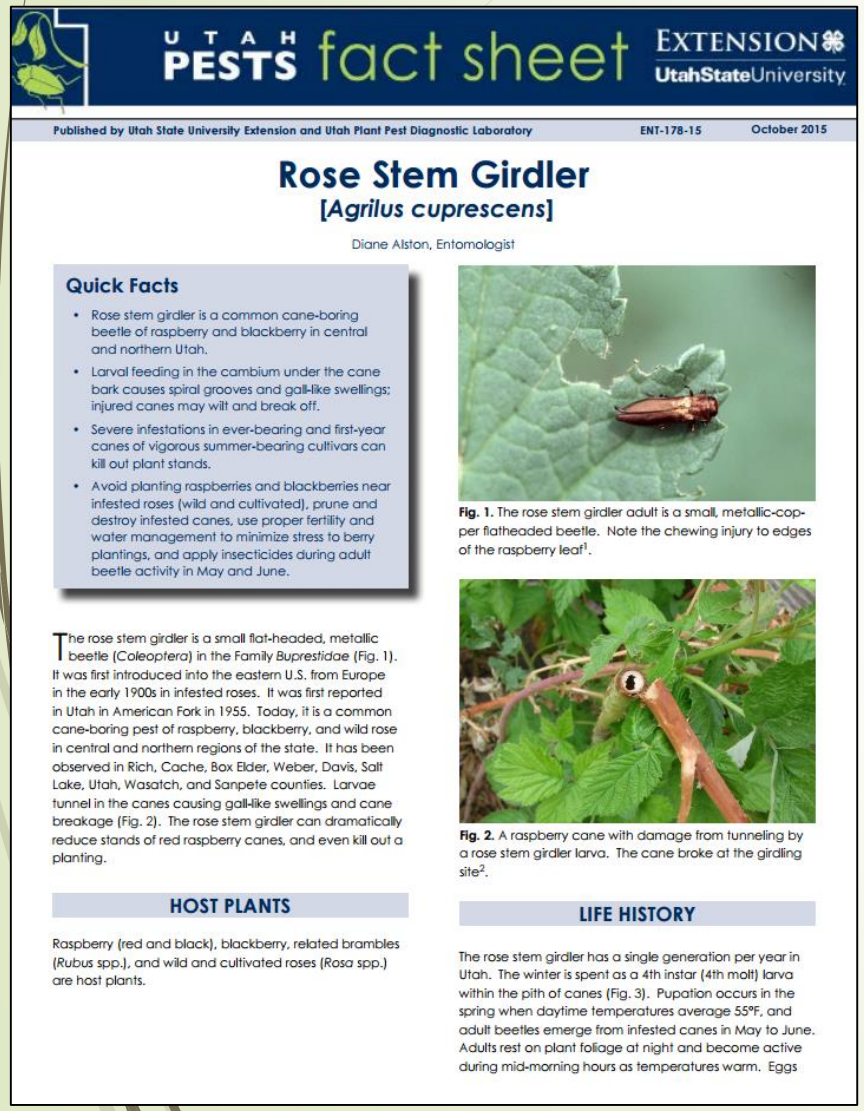
HOW TO IDENTIFY NYMPHS

Community-Wide Grasshopper Control Fact Sheet

utahpests.usu.edu Fact sheets

Raspberry Cane Borers

Fact Sheets: Insects – Small Fruit



UTAH PESTS fact sheet — EXTENSION UtahStateUniversity

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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.

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.

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].

LIFE HISTORY

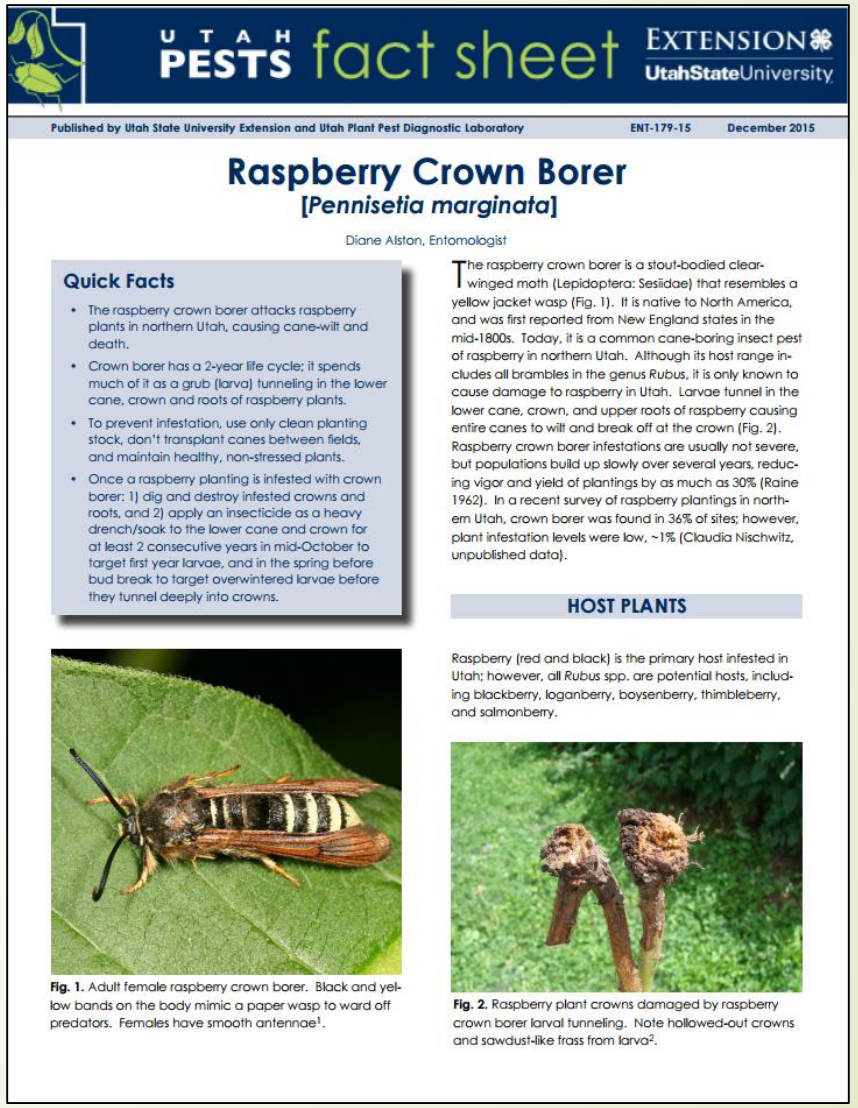
The rose stem girdler has a single generation per year in Utah. The winter is spent as a 4th instar (4th molt) larva within the pith of canes (Fig. 3). Pupation occurs in the spring when daytime temperatures average 55°F, and adult beetles emerge from infested canes in May to June. Adults rest on plant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

Canes break at girdling site

Remove nearby wild roses

Prune out infested canes

Insecticide applications to target adult flight (May & June)



UTAH PESTS fact sheet — EXTENSION UtahStateUniversity

Published by Utah State University Extension and Utah Plant Pest Diagnostic Laboratory — ENT-179-15 — December 2015

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.

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. 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].

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

Entire canes wilt

Clear-wing moth: 2-yr life cycle

Use clean stock

Dig out infested crowns

Entomopathogenic nematodes (July)

Insecticides applied as crown drench (October) for 2-consecutive yrs

Raspberry Cane Borers

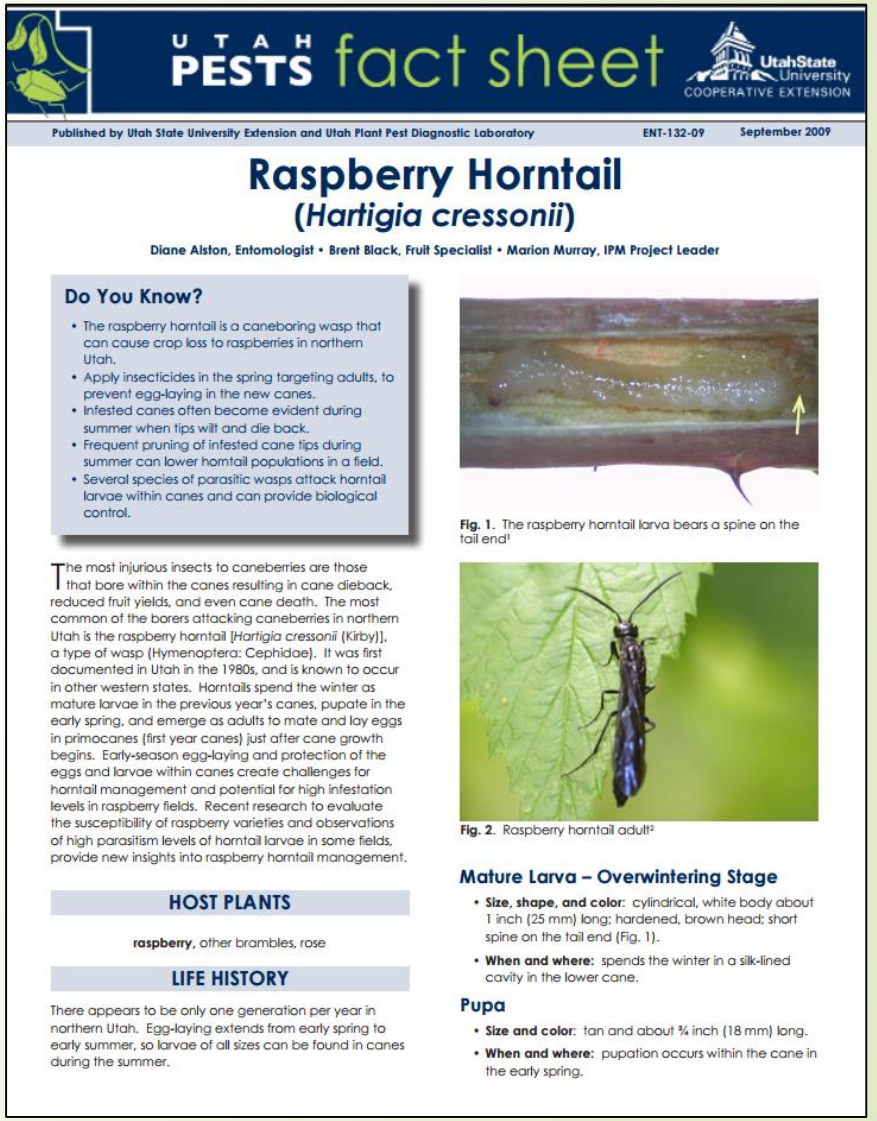
Raspberry Horntail

Prune out canes with hole in pith (by early May)

Prune out tips of infested canes (June – July)

Select less susceptible cultivars

Natural biological control from several parasitic wasps



UTAH PESTS fact sheet

UtahState University COOPERATIVE EXTENSION

Published by Utah State University Extension and Utah Plant Pest Diagnostic Laboratory ENT-132-09 September 2009

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.

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.

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

Fig. 2. Raspberry horntail adult[2]

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.

Common Vegetable Insect Pests

squash bug, flea beetles, and cabbage worms

Squash Bugs

- Difficult insect to control
  - prone to insecticide resistance
- In Utah, primarily a pest of squash & pumpkin
- Plant injury:
  - leaf necrosis, scarred fruits, rapid plant wilt
- Use preventive & mechanical controls first
- Treatment threshold: 1 egg cluster per plant

Females lay bronze-colored egg clusters near leaf veins

Nymphs have gray bodies with dark legs & antennae

Squash Bug Damage

‘Sudden Wilt’ from heavy feeding that severs xylem vessels

Feeding on fruit rinds causes scars and sunken areas

Squash Bug IPM

- Maintain healthy plants
- Field sanitation
  - destroy crop debris immediately after harvest
  - Remove wood piles & other debris near garden/field where adults seek winter shelter
- Resistant varieties
  - resistant: 'Butternut', 'Royal Acorn'
  - mod resistant: 'Sweet Cheese', 'Green Striped Cushaw'
- Floating row covers (before bloom)
- Hand-pick adults & nymphs, and squish eggs
  - sticky tape method
- Kaolin clay (Surround)
  - cover undersides of leaves and stems
  - Every 1-2 wk during peak activity

Exclude squash bugs with floating row cover when plants are young

Remove eggs & nymphs with sticky tape; cover lower plant with kaolin clay

Utah Pests Fact Sheet

Insects – Vegetable link

UTAH PESTS fact sheet

UtahState UNIVERSITY extension

Published by Utah State University Extension and Utah Plant Pest Diagnostic Laboratory ENT-120-08 August 2008

Squash Bug
(*Anasa tristis*)

Diane G. Alston, Entomologist • James V. Barnhill, Weber County Agriculture Agent

What You Should Know

- In Utah, the squash bug is primarily a pest of squash and pumpkin.
- Plant injury includes leaf necrosis, scarred fruits, and rapid plant wilt.
- Squash bugs are prone to develop resistance to insecticides and adults are difficult to kill.
- Best management is achieved by suppressing squash bugs when eggs or nymphs are first detected.
- Preventive cultural and mechanical controls should be the first line of defense.
- One egg cluster per plant is the treatment threshold.

Squash bug (*Anasa tristis*) is a "true bug" with piercing-sucking mouthparts (Order Hemiptera) in the leaf-footed bug family (Coreidae). It is common throughout the U.S. and found from Canada to Central America. Adults (Fig. 1) emit a foul odor when disturbed and may be called "stink bugs"; however, true stink bugs are in a different true bug family. The insect spends the winter in the adult stage. In the late spring to early summer, adults seek out young cucurbit plants on which to lay eggs. Adults and immatures (called nymphs) (Fig. 2) feed on leaves, fruits, and vines. Typical feeding symptoms include yellow to brown spots on leaves, and if feeding is heavy, entire leaves will turn black and dry out. Feeding on fruits can cause scars and desiccated, sunken areas. Entire plants may wilt when squash bug-feeding severs xylem vessels in vines. Injection of a toxin during feeding has been proposed as a cause for rapid plant wilt, but no salivary toxins have been confirmed in squash bugs.

Early to mid season population reduction is critical to effective squash bug management. Squash bugs are prone to develop resistance to insecticides and adults are difficult to kill. Sustainable management relies on cultural and mechanical practices, such as crop residue removal, resistant cultivars, crop rotation, maintenance of healthy plants, and hand removal of eggs and nymphs.

Fig. 1. Mating pair of adult squash bugs.[1]

Fig. 2. Immature squash bugs, or nymphs.[1]

HOST PLANTS

All cucurbits are hosts, but pumpkin and squash are most attractive; cucumber, melons and gourds are less attractive. Pumpkins, 'Hubbard' and yellow (straightneck and crookneck) squash are more severely damaged than other squash varieties.

LIFE HISTORY

There is one generation per year in northern Utah. A partial second generation may occur in southern Utah, but that hasn't been documented.

Flea Beetles in Vegetable Crops

- Small black & brown beetles that jump quickly when disturbed
  - enlarged hind legs for jumping
- Adults spend the winter in protected sites:
  - under soil clods & plant debris, under & on weeds
- In the spring, adults fly to attractive crop plants
- Adults feed on seedlings causing stunting & seedling death
- Adult feeding causes small round holes & pits in true leaves & cotyledons
  - young plants are most affected
  - injury to older plants can generally be tolerated

Feeding injury to bean seedlings; note cotyledon damage

Western black flea beetle

Palestriped flea beetle

Plants Preferred by Flea Beetles

- Vegetables in the mustard family (Brassicaceae)
  - mustard greens, arugula, broccoli, kale, cabbage (Chinese), collards
- Vegetables in the tomato family (Solanaceae)
  - potato, tomato, eggplant, pepper
- Many weeds, especially mustards

Potato flea beetle

Tobacco flea beetle

Arugula leaf with adult flea beetle 'shot holes'

Flea beetle adults chew pits in waxy broccoli leaves

Flea Beetle Larval Damage to Vegetable Crops

- Larvae are pale yellow to white with short legs and brown heads
- Chew on small roots & root hairs of host plants
- Larvae of some species feed on potato tubers & carrots
  - winding, shallow grooves on tuber surface
  - pimpled surface with small brown tunnels

Flea beetle larva feeding on root

Flea beetle larval injury to potato tubers & carrots

Vegetable IPM for Flea Beetles

- Remove weeds along field margins (especially mustards)
- Deeply disk plant residue in infested fields after harvest
- Good seedbed preparation to accelerate seedling growth
- Floating row covers to exclude adults
- Trap crops; plant 2-4 wk ahead of cash crop; treat trap crops with insecticides (or vacuum)
  - Chinese southern giant mustard, radish, daikon, pac choi, Pacific gold mustard
- Organic insecticides
  - pyrethrin (PyGanic), spinosad (Entrust), azadirachtin (Aza-Direct, Neem Oil)
- To protect potato tubers & carrot roots
  - diatomaceous earth (organic)

Row cover on eggplant

Mustard trap crop planted between broccoli rows

Utah Pests Fact Sheet

Insects – Vegetable link

UTAH PESTS fact sheet
EXTENSION
UtahStateUniversity

Published by Utah State University Extension and Utah Plant Pest Diagnostic Laboratory ENT-174-15 April 2015

Flea Beetles on Vegetables
(Coleoptera: Chrysomelidae)

Bonnie Bunn, IPM Vegetable Associate - Diane Alston, Entomologist - Marion Murray, IPM Project Leader

Do You Know?

- There are many species of flea beetles; most adults are small, darkly colored, sometimes shiny or metallic, and jump quickly when disturbed.
- Flea beetles attack foliage of brassica and solanaceous crops, and some root crops including potato tubers.
- Young vegetable seedlings are most sensitive to adult feeding injury, which often appears as small shotholes and pitting in leaves and cotyledons.
- Key management practices include early monitoring for injury and using row covers, trap crops, mulches, sanitation, and timely insecticide applications.

Flea beetles are common and problematic in Utah. They are present in late spring and early summer on many vegetable crops and ornamental plants. Adult flea beetles are small, shiny insects that have enlarged hind legs, allowing them to jump great distances when disturbed (Fig 1). They are strong fliers, moving into crops from neighboring fields and weedy borders.

Fig. 1. Flea beetles have enlarged femoral hind legs and jump when disturbed.

HOSTS

Most species of flea beetle attack only one plant group or closely related groups. Common agricultural and garden hosts include members of the brassica (mustard, broccoli, kale, cabbage, collards, etc.) and solanaceous (potatoes, tomatoes, eggplant, peppers, etc.) families. In these crops, foliage injury from adults is common, and larval injury to potato tubers is of economic importance. Other hosts include alder, currant, evening primrose, sedum, skunkbrush, sumac, willow, and a variety of weeds and grasses.

DESCRIPTION AND LIFE HISTORY

Adult: Overwintering and damaging stage

- Typically range from 1/15 to 1/6 inch (1.7 to 4.2 mm) long
- Hind legs are enlarged for jumping
- Range in color from brown, green, metallic-blue to black; may have stripes or spots
- Feed on foliage and can cause severe injury on some host plants (pitting and holes in leaves)

Egg: Laid in the soil at the base of host plants

- Elliptical in shape, 1/64 inch (0.4 mm) long
- White to yellowish-gray

Larva: Damaging stage, feeds on small roots

- Minute, worm-like
- White body with brown head (Fig. 2)
- Usually does not cause significant plant injury, except to potato tubers and possibly carrots (Fig. 2)

Pupa: Resting stage

- Occurs several inches deep in the soil (Fig. 3)

Cabbage Worms

- Caterpillars chew large holes in leaves; produce abundant frass (excrement)
- Bt (Dipel, Thuricide, Javelin), spinosad (Entrust)
- Row cover fabric – cover plants to prevent egg-laying

Floating row cover

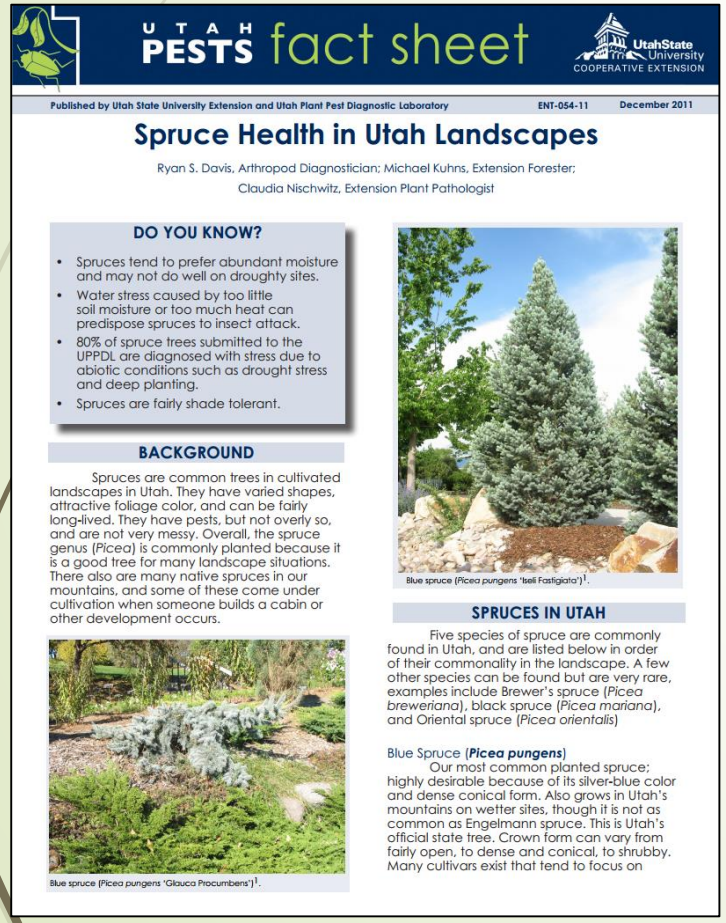
Cabbage butterfly (above)
Cabbage looper (middle)
Diamond back moth (below)

Utah Pests Online Resources

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].

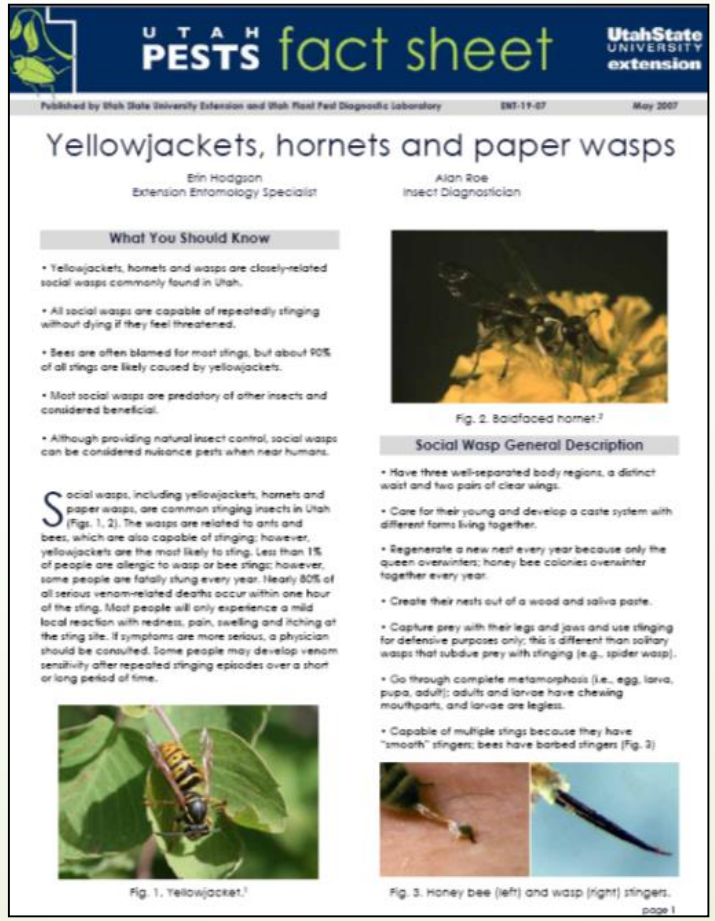
Blue spruce (*Picea pungens* 'Iseli Fastigiata')[1].

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 on 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]

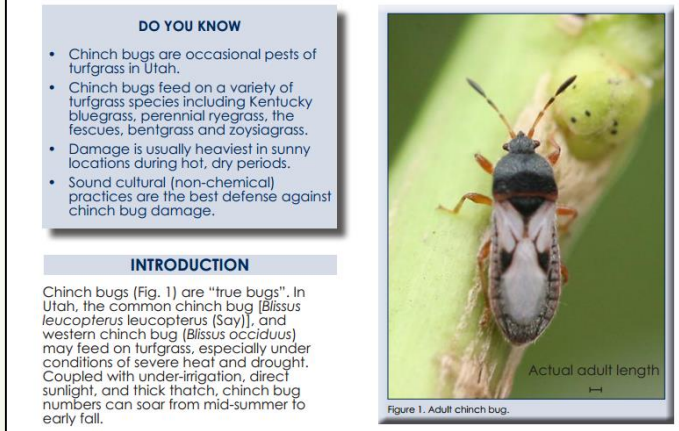
Fig. 2. Baldfaced hornet.[2]

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.

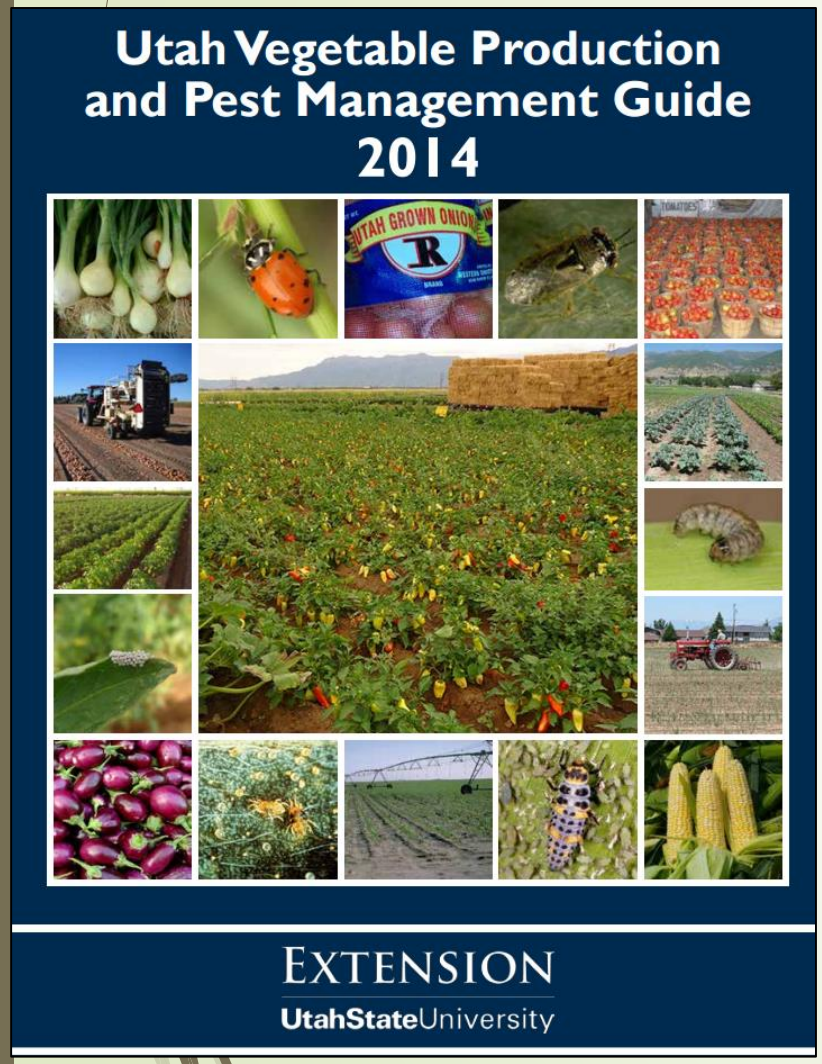
Adults of the first summer generation begin to appear in early to mid summer. Eggs of the second summer generation hatch approximately 1 month later and complete development in early to mid fall. Adults of this generation move to overwintering sites as temperatures cool in the fall.

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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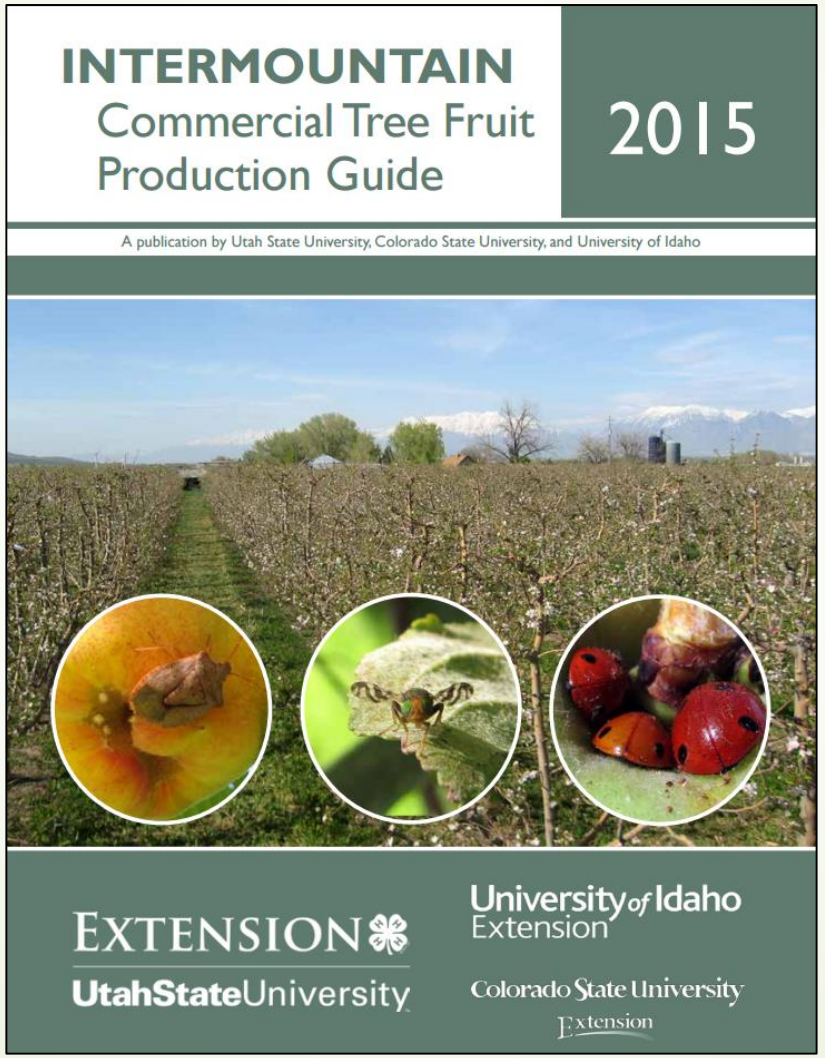
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Lori R. Spears & Ricardo A. Ramirez


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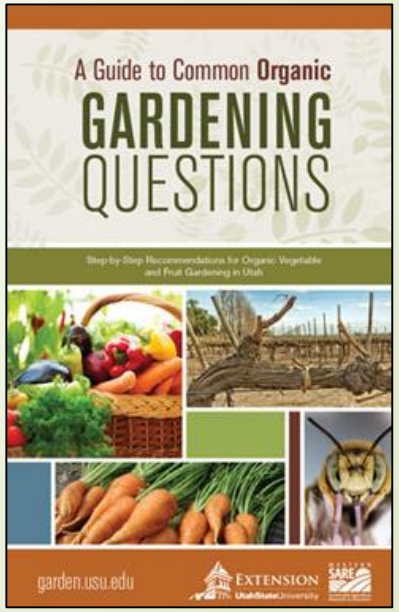
A Guide to Common Organic
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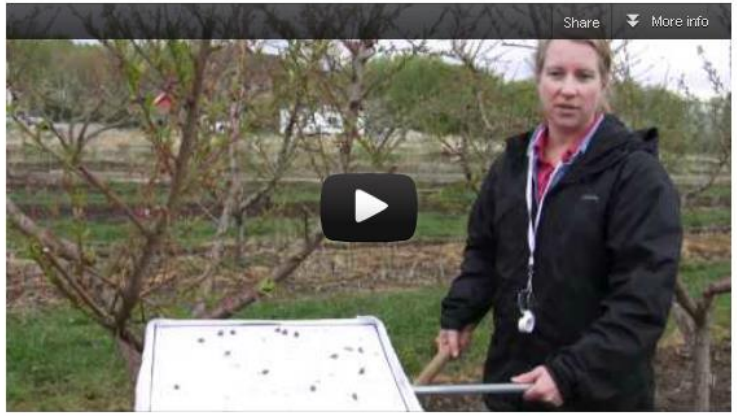
Video Fact Sheets

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.

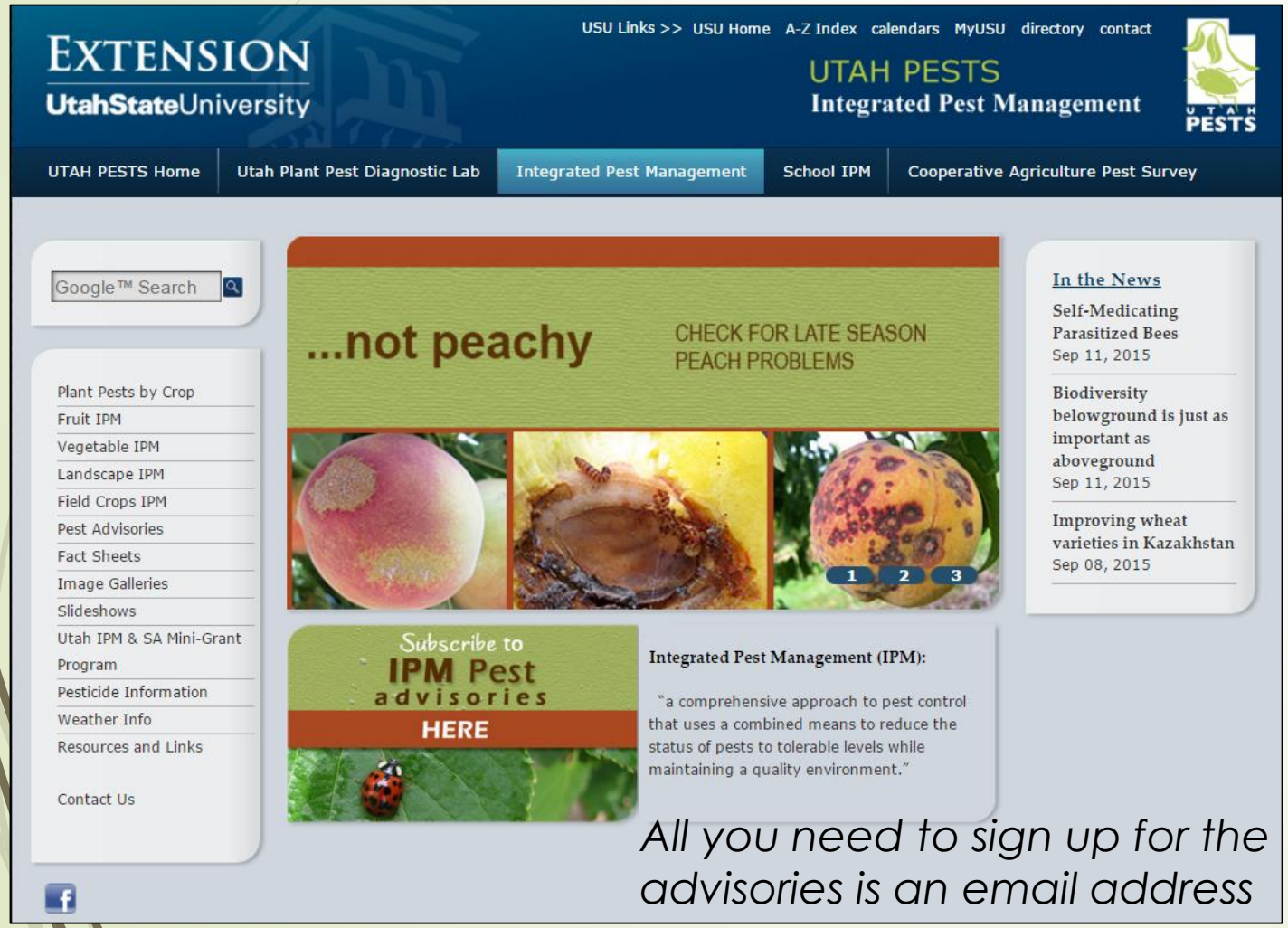


Tips for avoiding bed bugs while traveling.
Entomologist Ryan Davis discusses safe travel techniques to avoid falling prey to bed bugs, and how to minimize the chances of bringing bed bugs back to the home.

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
- -mechanical, cultural, biological

Effective pesticides
- -organic products

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

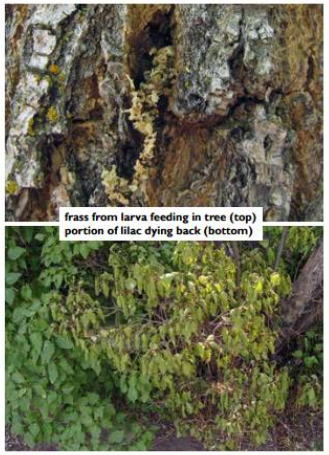
Insect/Disease Information

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

Utah Pests News

Quarterly newsletter on all things "insects and plant diseases" in Utah

UTAH PESTS News

Utah Plant Pest Diagnostic Laboratory and USU Extension — Vol. X, Winter 2016

What's Inside

News Highlights

NEW PUBLICATIONS

Raspberry Crown Borer

Rose Stem Girdler

utahpests.usu.edu

Utah Orchard Leafroller Survey

Leafrollers are a type of moth-caterpillar (Lepidoptera: Tortricidae) that may roll or tie leaves together to form a protective shelter, from which they feed on the leaves and fruits of plants. This group contains many economically important pests that attack fruits, vegetables, and ornamentals. The need for an orchard leafroller survey was prompted by an outbreak of leafroller caterpillars in Utah County tart cherry orchards just before harvest in July 2012.

We surveyed for five species that commonly occur in western U.S. orchards. The survey included five counties of northern Utah from late spring through early fall in 2014 (21 orchards) and 2015 (20 orchards). We used pheromone traps for moths, and feeding injury inspections and beating tray sampling for larvae. In 2014, 11 of the orchards received minimal management, such as limited insecticides, pruning, and irrigation. The remaining orchards were commercially managed.

Total Leafroller (LR) Trap Catches

The survey showed that OBLR is the most common leafroller species in Utah, followed by FTLR.

Our objectives were to determine the species of leafrollers present, types of orchards at greatest risk for infestation, leafroller phenology (timing of moth flight and caterpillar activity), and validate an existing temperature-based (degree-day) model that predicts timing of leafroller treatments.

Obliquebanded leafroller (OBLR) was the primary species caught in the pheromone traps, followed distantly by fruittree leafroller (FTLR), as shown in the graph above. We detected very few European leafroller (ELR) moths, and no omnivorous or pandemis leafrollers. In more limited surveys in 2012 and 2013, OBLR numbers were very high in 2012, the season of the larval outbreak in tart cherries. OBLR moth capture in 2015 increased over those in 2013 and 2014, and although several orchards had high trap captures, the overall catch in 20 orchards was not as high as the total catch in 2012 (6 orchards). Growers were notified when OBLR numbers were high, and populations will be monitored in 2016 to prevent another outbreak.

continued on next page

Pest Diagnostics

Utah Plant Pest Diagnostic Lab

www.utahpests.usu.edu/uppdl

Sample Submission

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

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