Utah Pests In-Service:

Vegetable & Caneberry Insects of Concern

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Utah State University Annual Extension Pre-Conference

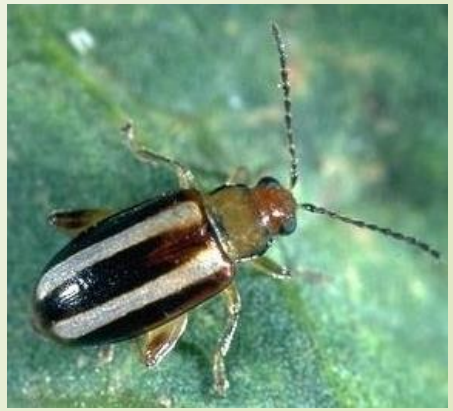
March 1, 2016

Flea Beetles in Vegetable Crops

- Leaf beetle family (Coleoptera: Chrysomelidae)
- Flea beetles are 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

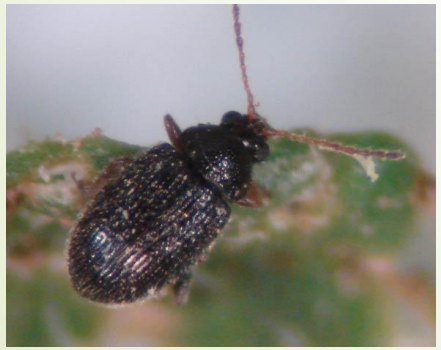
Western black flea beetle



Palestriped flea beetle

Plants Preferred by Flea Beetles

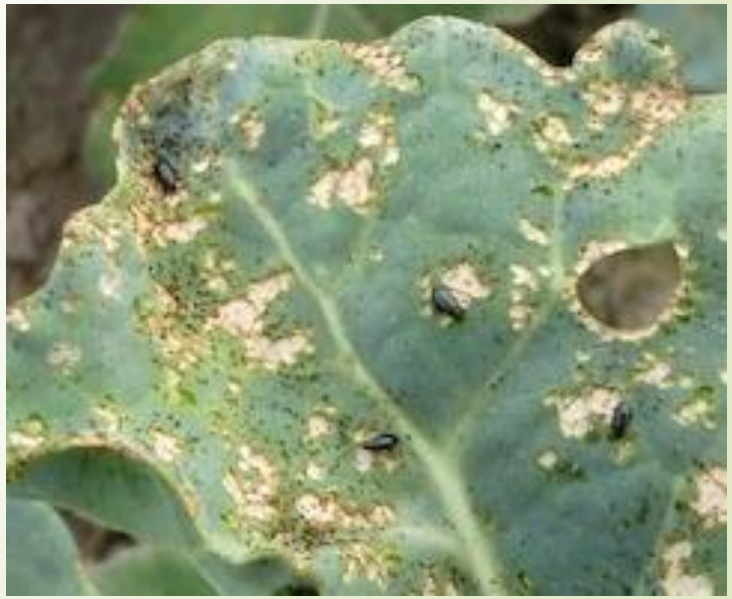
- Vegetables in the mustard family (Brassicaceae)
  - mustard greens, arugula, broccoli, kale, cabbage (Chinese), collards
- Vegetables in the tomato family (Solanaceae)
  - potato, tomato, eggplant, pepper
- Many weeds, especially mustards



Potato flea beetle

Tobacco flea beetle

Arugula leaf with adult flea beetle 'shot holes'

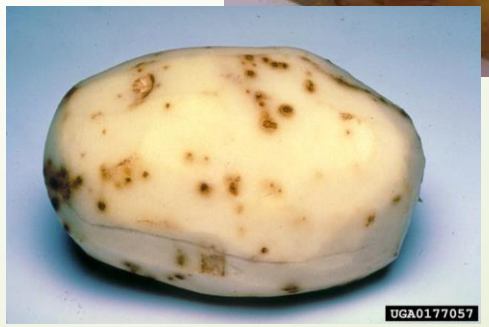


Flea beetle adults chew pits in waxy broccoli leaves

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

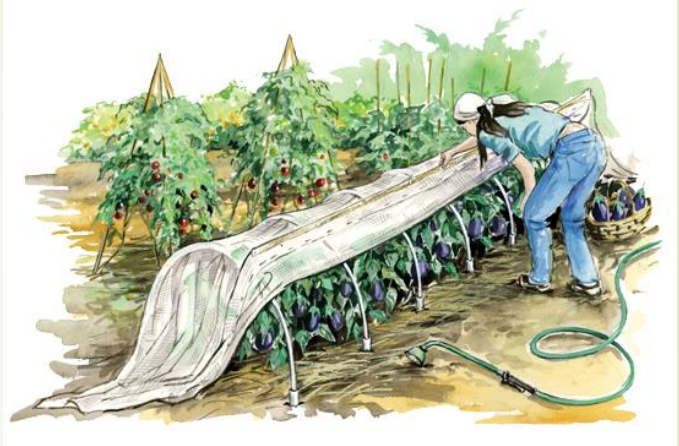
Flea beetle larva feeding on root



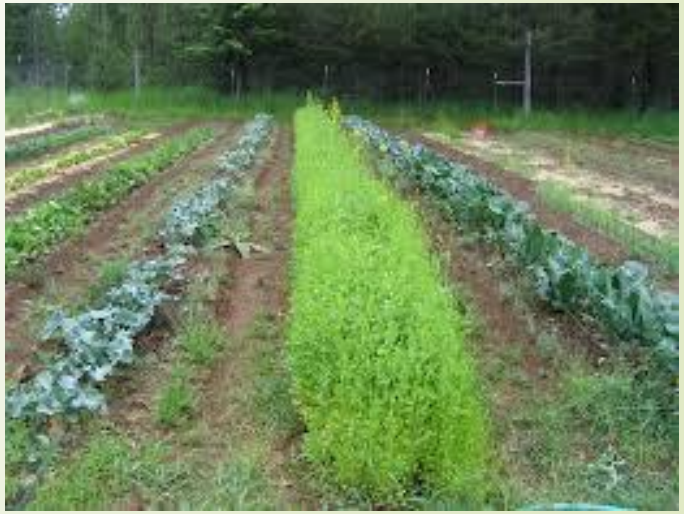
Flea beetle larval injury to potato tubers & carrots

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 not)
  - Chinese southern giant mustard, radish, daikon, pac choi, Pacific gold mustard
- Organic insecticides
  - pyrethrin (PyGanic), spinosad (Entrust), azadirachtin (Aza-Direct, Neem Oil)
- Conventional insecticides
  - bifenthrin (Aloft, Hi-Yield Bug Blaster), esfenvalerate (Asana), permethrin (Ambush, Hi-Yield 38 Plus), carbaryl (Sevin), spinosad (Success)
- To protect potato tubers & carrot roots (systemic)
  - dinotefuran (Venom), imidacloprid (Admire Pro)
  - 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)

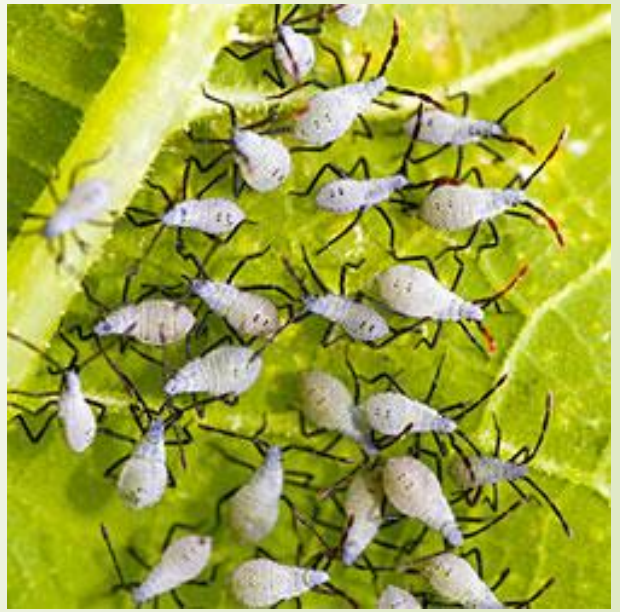
Pupa: Resting stage

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

Squash Bugs

- Leaf-footed bug family (Hemiptera: Coreidae)
- Transcontinental in distribution
- Difficult insect to control
  - prone to insecticide resistance
- In Utah, primarily a pest of squash & pumpkin
  - pumpkin, 'Hubbard', 'Turban' and yellow squash most severely damaged
- 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

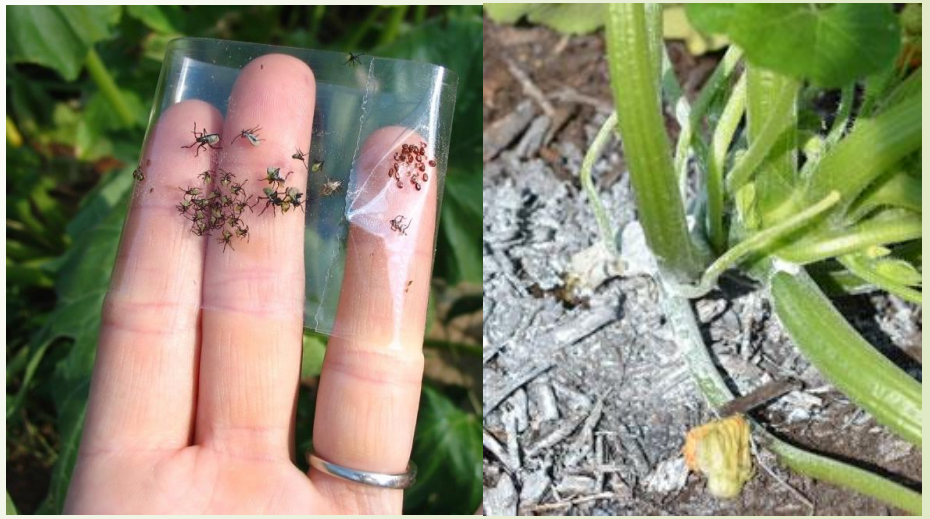
‘Sudden Wilt’ from heavy feeding that severs xylem vessels

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-picking adults & nymphs, and squishing eggs
  - sticky tape method
- Kaolin clay (Surround)
  - cover undersides of leaves and stems
  - Every 1-2 wk during peak activity
- Insecticides : same as flea beetles; see fact sheet

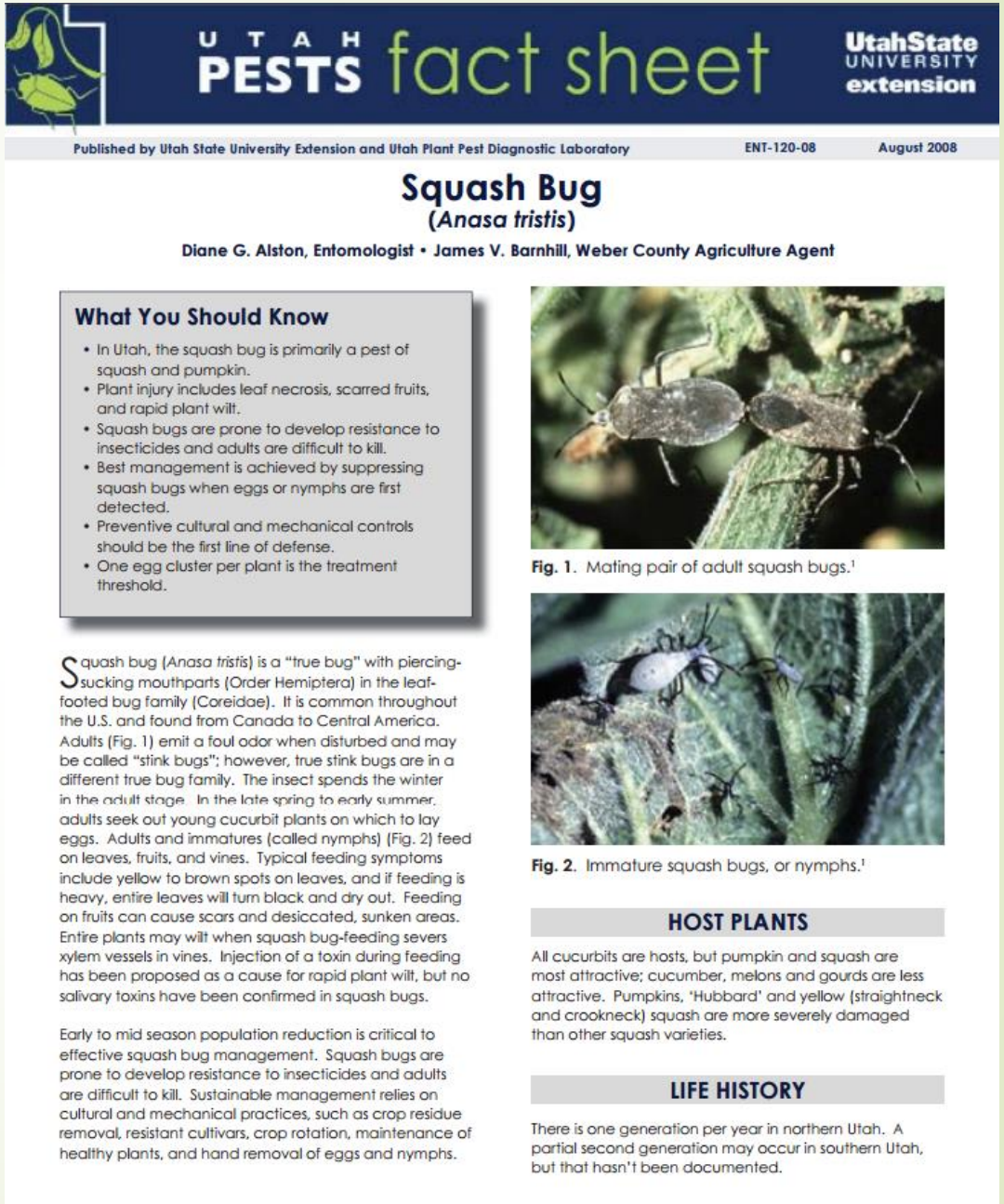
Exclude squash bugs with floating row cover when plants are young



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.

Raspberry Cane Borers
Fact Sheets: Insects – Small Fruit

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].

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.

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

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

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.

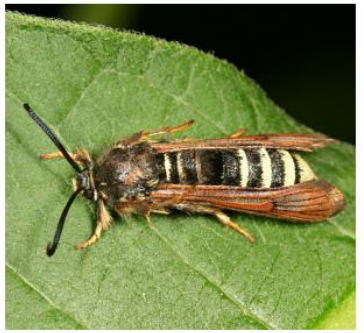


Fig. 1. Adult female raspberry crown borer. Black and yellow bands on the body mimic a paper wasp to ward off predators. Females have smooth antennae[1].

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].

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