Utah Pests In-Service:
Vegetable & Caneberry Insects of Concern

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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

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
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)
Flea Beetles on Vegetables
(Coleoptera: Chrysomelidae)

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 brassicas and cruciferous crops, and some root crops including potato tubers.
- Young vegetable seedlings are most sensitive to adult feeding injury, which often appears as small punctures and pitting in leaves and stems.
- 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.

HOSTS
Most species of flea beetles 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 cruciferous (potatoes, tomatoes, eggplant, peppers, etc.) families. In these crops, foliage injury from adults is common, and tunneling injury to potato tubers is of economic importance. Other hosts include older, current, evergreen, primrose, salvia, sunflower, snap, and a variety of weeds and grasses.

DESCRIPTION AND LIFE HISTORY
Adult: Overwintering and damaging stage
- Typically range from 1/16 to 1/4 inch (1.2 to 4.3 mm) long
- Hind legs are enlarged for jumping
- Range in color from brown, green, metallic-lime to black; may have stripe or spots
- Feed on foliage and can cause severe injury on some host plants (puncturing 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, warm-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
Utah Pests
Fact Sheet

Insects – Vegetable
link

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 squash 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 scorch and desiccated, sunken areas. Entire plants may wilt when squash bug feeding severity varies in vine. Infection of a town 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. Suitable 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.

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 considerably 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 has not been documented.
Raspberry Cane Borers
Fact Sheets: Insects – Small Fruit

Raspberry Crown Borer
(Pennesia marginata)

**Quick Facts**
- The raspberry crown borer attacks raspberry plants in northern Utah, causing crown and death.
- Crown borers have a 2-year life cycle. It spends much of its life as a larva tunneling in the lower canes, crown, and roots of raspberry plants.
- To prevent infection, use only clean, planting stock, don't transplant canes between fields, and maintain healthy, non-stressed plants.
- Once a raspberry plant is infected with crown borer, it lives and becomes infected crown and crown girdling. It can spread from the lower crown to the lower crown and crown girdling of 25 percent can be lost in the first year, and in the spring before budbloom to target crown infections before they tunnel deeply into crowns.

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

**LIFE HISTORY**
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**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**

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Raspberry Stem Girdler
(Agrius cuprescens)

**Quick Facts**
- The raspberry stem girdler is a common, currant-boring weevil of raspberry and blackberry in central and northern Utah.
- Larvae feeding in the cambium under the canes begin to place stems and girdles in the infested canes may wilt and die. 
- Severe infections in eye-boring and larvae canes, girdling of canes, and the growth of canes is reduced.
- Adult females deposit their eggs in the canes, and can cause damage to the crown and canes. 
- Entomopathogenic nematodes (July)
- Insecticides applied as crown drench (October) for 2-consecutive yrs

**Canes break at girdling site**

**Remove nearby wild roses**

**Prune out infested canes**

**Insecticide applications to target adult flight (May & June)**

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**Entire canes wilt**

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