

## Insect/Disease Information

### VEGETABLES

#### Potato Verticillium Wilt



Cornell University Dept of Plant Pathology

Sometimes called early dying, verticillium wilt of potatoes is a minor disease that can occur where potatoes are not rotated out. It is caused by a soil borne fungus that survives in the soil on debris and old rootlets for many years. Tomatoes are also susceptible.

Infected plants will start showing symptoms at this time of year or in the next few weeks. Usually the lowest leaves or one side of the plant will start wilting because the fungus (which clogs the water-conducting vessels), may only occur in a portion of the roots. Leaves turn yellow and then brown on the edges, or entire leaves die. The wilting eventually progresses to the upper leaves or to the entire plant.

You can detect verticillium wilt by cutting the plant off at the soil line and looking at a longitudinal section of the cut end. There will be a light tan discoloration of the vascular tissue that occurs inside the stem, running just below and just above ground level. Infected potato tubers may also show tan or blackened discoloration, occurring in rings, especially near the stem end. Infected tubers are safe to eat.

**Treatment:** The first step is to get a positive diagnosis at the Utah Plant Pest Diagnostic Lab. Other diseases or even drought stress can cause similar symptoms. Infested plants will need to be removed and the remaining plants should be kept healthy with optimal watering. At the end of the season, remove all plant and root material out of the infested area. The next growing season, rotate the area out of susceptible hosts (potato, tomato, pepper) for at least 3 seasons to resistant hosts such as legumes.

#### Powdery Mildew on Melons



Powdery mildew is just showing up on melons, squash, and other crucifers. This disease can spread quickly because of its prolific spore production. Surface water is not necessary for spread, and plants can become infected at humidity levels as low as 50%. To stay on top of powdery mildew at your farm or garden, scout for lesions weekly by looking at the oldest leaves of at least 10% of the plants. Powdery mildew of melons infects the bottom of leaves first, and then infections move to the upper leaf surface.

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To prevent spread, fungicides should be applied when the mildew is first noticed, as most fungicides will not cure existing infections. Heavy infections will minimize yields due to lack of photosynthetic leaf surface.

### Treatment:

*commercial growers:* Sulfur is used as a protectant, and has no systemic activity, so it should be applied with good coverage. If the powdery mildew has already spread throughout much of the crop, use a systemic such as Quintec (group 13), Pristine (group 7+11), Flint (group 11), Quadris (group 11), Cabrio (group 11), Rally (group 3), Procure (group 3), or Inspire Super (group 3). (We mention the groups name so that you rotate fungicides among groups to prevent resistance.) Spray every 7-10 days.

*residential growers:* sulfur or chlorothalonil

## Corn Earworm



It is time to start thinking about corn earworm, especially if you have sweet corn that is beginning to tassel up AND you had problems in past years.

The corn earworm is a moth that is not able to survive winters in northern Utah. Most moths are blown up from southern regions during the summer so that by the time corn has started to silk in the northern region, moths are ready for egg-laying. If your corn was planted early and formed silks in June, you have probably avoided injury by corn earworm.

Adults lay eggs on the silk, so corn treatment should begin at the tasseling stage, 2-3 days before silking. Eggs will continue to be laid on silks until they turn brown. Feeding on the silks reduces pollination, and feeding on the kernels results in unmarketable corn.

To know for sure whether or not you need to treat (or when to start), you can monitor for the presence of corn earworm

with pheromone traps called heliothis traps. Traps are made of fabric and tied to poles above the corn. A lure attracts moths to the trap. If the trap is not catching moths, you will not need to treat. Once the trap starts catching 10 moths/night (and silks are present), it is time to start treating.

Another, more intensive monitoring method is to check for direct damage. Look at corn kernels for larval feeding by pulling back the sheath and looking for frass (excrement) at the tips of the ears, or examine silks for feeding.

**Treatment:** Start 2-3 days before silking, and repeat applications based on insecticide residual until silks turn brown.

*commercial growers:* permethrin (Pounce, Ambush), esfenvalerate (Asana), bifenthrin (Capture, Brigade), carbaryl (Sevin), spinosad (Success, Entrust)

*residential growers:* permethrin (Bayer Advanced Dust, Bonide Eight Dust), spinosad (Green Light, Monterey), or carbaryl (Sevin)

Alternative option: Spray silk (or use eyedropper) with petroleum oil (or corn or soybean oil) with or without Bt (*Bacillus thuringiensis*) at a rate of 1 part Bt to 20 parts oil. Apply mixture 2-4 days after silk is fully grown and pollination is almost complete (when the silk tips have begun to wilt and turn brown). Oil applied earlier will interfere with pollination, and oil applied later may result in more feeding damage. Only one application is necessary.

## European Earwig



Earwigs are becoming quite a problem for Utah vegetable growers, which is unusual because this is a moisture-loving insect. The vegetable garden, however, is one of the most moist parts of outdoor environments, with lots of succulent plant tissue to feed on and many places to hide. Wet springs for

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the past few years have also helped earwigs to multiply. We are entering the period where their populations are starting to peak, with a decline toward mid September.

One thing to keep in mind is that earwigs are omnivorous, and important predators of many other soft-bodied insect pests.

### Treatment:

- Do not over water or plant too tightly
- Remove earwig hiding spots in the garden, such as old debris, mulch, and weeds, and cultivate the soil.
- Trap earwigs:
  - Lay traps of rolled cardboard on the ground at the base of plants. Clean out or replace traps daily (each morning). If reusing, dump earwigs in a bowl of soapy water. Rolled damp newspaper or sections of hose also work. Adding wheat bran inside the trap improves effectiveness.
  - Place small tuna or cat food cans filled with oil (fish oil or bacon grease+vegetable oil) just below the soil line near plants; replace regularly
- Insecticides: carbaryl, spinosad, Sluggo Plus Bait (iron phosphate plus spinosad)

## Squash Bug



Adult squash bugs have been actively feeding on squash stems, mating, and laying eggs. We have detected eggs on the undersides of leaves and they will be hatching soon (if not already in your area). Egg-laying will continue through mid-August.

It is very important to monitor for eggs (look on the undersides of leaves at V's of leaf veins) because when they hatch (2 weeks), the nymphs are very easy to treat. Nymphs will often feed in clusters on the undersides of leaves and sometimes on the developing fruit. As they get older, they disperse and are more difficult to treat. They feed by sucking plant juices, causing yellow speckling and browning.

In areas of heavy feeding, wilting and death of leaves or plants can occur. This is sometimes referred to as "sudden wilt." Adult squash bugs feed on the vines and stems, puncturing the xylem cells, and preventing water transport up to the leaves. Wilting can occur on individual leaves, a section of a plant, or an entire plant.

**Treatment:** While plants are in bloom, spray only in early morning or evening to avoid harming pollinators.

*commercial growers:* acetamiprid (Assail), esfenvalerate (Asana), permethrin (Ambush, Pounce), bifenthrin (Tundra), carbaryl, lambda-cyhalothrin (Warrior)

*residential growers:* neem oil (Concern, Ferti-Lome), permethrin (Ace Dust, Bayer Advanced Dust, Bonide Eight), kaolin clay (Surround), carbaryl

## Colorado Potato Beetle



The second generation of Colorado potato beetles has been active for a few weeks now, the larvae feeding on potato, tomato, pepper, eggplant, and some weeds. Moderate plant defoliation, less than about 15%, has no impact on yield. But sometimes potato beetle populations are high enough to defoliate plants, resulting in premature death and reduced yield.

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*commercial growers:* abamectin (Agri-Mek), azadirachtin (Azatin, etc.), spinetoram (Radiant), Vydate

*residential growers:* One of the best options for high populations is to vacuum them with a shop or hand vac, or use hand picking (squish or drop in soapy water); neem oil, pyrethrins

**Cabbage Caterpillars**

Damage from cabbage looper and imported cabbageworm is occurring in many areas of northern Utah. We also have isolated populations of diamondback moth feeding on crucifers. Damage and feeding will continue until frost.

The caterpillar of the imported cabbageworm (a butterfly) is green and velvety, and sluggish in movement. They may occur on the upper or lower leaf surface. There are 3-4 generations per year.



Diamondback moth caterpillars are small, light green, highly segmented, and pointy in shape. When disturbed, they wiggle vigorously and may drop off the plant on a string of silk. More than likely, they come to the northern Utah region by migrating from southern locations. Adults can be monitored with a pheromone trap.



Cabbage looper (a moth) also can be blown from the warmer part of the state, although some pupae do survive in northern Utah. The caterpillar is shiny, light green, with wavy white or light yellow lines down the back and sides. They move more quickly than the cabbageworm in a characteristic "inchworm" motion. Adults can be monitored with a pheromone trap.



To determine how much damage you may have, scout plantings weekly by checking at least 10% of the field in random locations. Look on the undersides of leaves for eggs and larvae, especially on the innermost leaves. Treat when 10% of the plants have caterpillars. Once they get inside a cabbage head, they are difficult to treat.

**Treatment:**

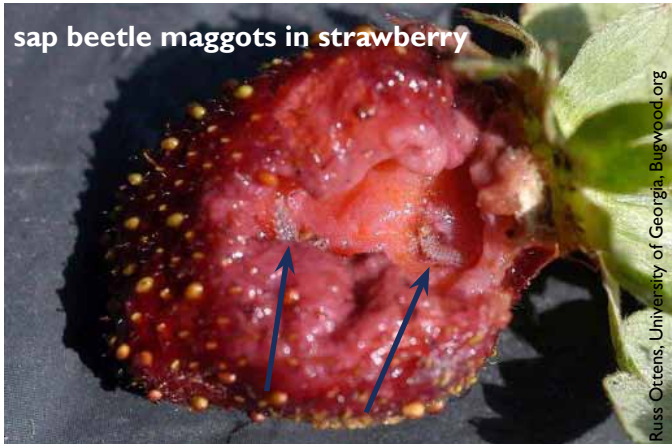
*commercial growers:* Bt (on young larvae, Xentari, Agree), indoxcarb (Avaunt), spinosad (Entrust, Success), spinetoram (Radiant), pyrethrin (Pyganic), tebufenozide (Confirm 2F), methoxyfenozide (Intrepid)

*residential growers:* neem oil, spinosad (Bonide, FertiLome, Monterey), pyrethrin (Ace Flower and Vegetable Insect Spray), carbaryl (Sevin, Bayer Advanced), acetamiprid (Ortho Max Flower, Fruit, and Vegetable Insect Killer)

**BERRY CROPS****Dusky Sap Beetle on Raspberries**

We recently had a report of adult sap beetles infesting ripening raspberries. Sap beetles are attracted to ripe fruit and infest raspberries in the field and after harvest. They also lay eggs on the fruit, leaving the fruit infested with maggots. They leave holes in the fruit.



**Insect/Disease Activity continued from previous page****Treatment:**

The best option is to manage the pest by regular harvesting of ripe fruit and removing damaged and diseased fruit regularly. If you are composting, bury your compost in the heap.

Baits can trap beetles by using apple cider vinegar or a mixture of yeast, sugar and water combined with a few drops of liquid detergent to drown the beetles.

**Raspberry crown borer**

If you are noticing entire canes wilting in your raspberry field, it is possibly damage from the raspberry crown borer. Larvae are actively feeding in the roots and crowns, and entire canes can be killed in response to the feeding. Often, the canes can be easily pulled out of the ground. You may see some tunneling in the lower part of the cane.

The crown borer is a clearwing moth, and the larvae live and bore into the crown and roots of blackberries, raspberries, loganberries, and wild brambles. The problem with this pest is that low levels of infestation can suddenly develop into a severe problem, so it is important to keep an eye on the health of your plants during the entire season.

The crown borer larvae actually spend two years feeding and developing in the plant, and the damage is most evident during the second year of larval activity. Early in their life cycle, they are feeding on the smaller roots, and as they get larger, they move to the crown. Pupation occurs in the crown in mid to late August.

Early fall is the best time for treatment because larvae will leave the crowns and move to the roots for the winter. At least two years of diligent treatment is necessary in an infested field.

**Treatment:** drench roots with bifenthrin in early fall

**Precautionary Statement:** Utah State University Extension and its employees are not responsible for the use, misuse, or damage caused by application or misapplication of products or information mentioned in this document. All pesticides are labeled with ingredients, instructions, and risks. The pesticide applicator is legally responsible for proper use. USU makes no endorsement of the products listed herein.

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Editor: Marion Murray, [marion.murray@usu.edu](mailto:marion.murray@usu.edu)

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