

Insect/Disease Information

VEGETABLES

Corn Earworm



Corn earworm trap catches in the Layton area have been low so far this summer, which is good news. Corn earworm moths typically don't survive the winter in northern Utah, and are blown up from southern regions during the summer. If your corn was planted early and formed silks in June, you have probably avoided injury by corn earworm.

Where present, corn earworm eggs have been hatching for a few weeks now in northern Utah. Adults only lay eggs on fresh silk, and larvae must be controlled before they enter the ear. If you see less than 1 inch of fresh silk that has been eaten, eggs are newly hatched, and larvae can possibly be controlled with Bt (*Bacillus thuringiensis*) sprayed on the silk and top of the ear. Eggs will continue to be laid on silks until they turn brown.

Treatment: Treatments are only effective while silks are still fresh. 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), Bt (variety), or carbaryl (Sevin)

Alternative options:

Spray silk (or use 5 drops from 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. Do not get oil on the husk or foliage.

Hand-pick caterpillars out from the ears. Pull the husks back, remove the larva, and then use a twist-tie to secure the sheath back to its original position. Remember: once the silks are brown, they are not as attractive to egg-laying, so this only needs to be done once.

Onion Thrips



Onion thrips is the most destructive insect pest on onions in Utah. They thrive in hot dry weather, and populations in monitored fields have increased significantly the past few weeks to about 100/plant in some locations. This number well exceeds the spray threshold levels (30+ thrips/plant).

Thrips feeding causes white to silvery streaks on the foliage and may lead to plant withering, and reduced bulb size due to loss of plant vigor. Thrips can also vector viruses such as the iris yellow spot virus. We are surveying for this virus and will report on results later.

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Scout for onion thrips by opening the leaves of the plant and look in the neck at the newest leaves and quickly count the thrips before they hide. To conserve the use of the few effective materials we have for onion thrips control, be certain not to spray until thresholds have been reached or exceeded.

Treatment: azadirachtin (Azatin, Neemix), spinosad (Success, Entrust, Green Light), spinetoram (Radiant), insecticidal soap, kaolin clay (Surround), carbamate (Lannate), permethrin (Ambush, Pounce)

Earwigs

Earwigs feed at night on a variety of vegetable plants, including leafy vegetables, corn, peppers, herbs, and more. Earwigs prefer moist environments, and irrigated vegetable gardens are a perfect setting for this insect. Wet springs for the past few years have also helped earwigs to multiply. Their populations will not start declining until mid September.

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

Treatment Options:

- do not over water or grow plants too tightly together
- remove earwig hiding spots in the garden, such as old debris, heavy mulch, and weeds,
- cultivate the soil
- place earthworm castings around the base of plants to repel earwigs
- apply diatomaceous earth around the base of plants or in plant crevices (use gloves)
- Earwigs do not travel far, so trapping earwigs regularly (over time) can reduce the population:
 - Lay traps of rolled cardboard or newspaper 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. Adding wheat bran inside the trap improves effectiveness.
 - Place small tuna or cat food cans filled with oil (fish oil or bacon grease or vegetable oil) just below the soil line near plants; replace regularly
- insecticides: carbaryl, spinosad, Sluggo Plus Bait (iron phosphate plus spinosad); If control close to harvest is warranted, products with insecticidal soap or pyrethrin have a PHI of 12-24 hours.

Squash Bug



Adult squash eggs have been hatching for the last few weeks and will continue through early September. It is very important to know the squash bug activity in your garden or field so you know what you are up against. Look on the undersides of leaves at V's of leaf veins or the bright orange eggs. Eggs hatch into nymphs about 2 weeks after being laid and the nymphs are the easiest to treat. Nymphs will often feed in clusters on the undersides of leaves and sometimes on the developing fruit. As they get older (just a few days), 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 (carbaryl can cause phytotoxicity (plant damage) when applied in hot weather)

Tomato Russet Mite

Tomato russet mite is a tiny mite that feeds on the undersides of leaves. It is not visible to the naked eye, so therefore the damage might be misdiagnosed as a disease. The lowest leaves will show symptoms first, and in heavy populations, the entire plant will be affected.

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Feeding causes leaves to turn yellow, curl upwards, dry out and drop. The stems and leaves also appear bronzed and the leaves will feel greasy. Injury resembles nutritional deficiencies, plant disease or water stress.

Treatment: Cover the tops and bottoms of leaves, and spray when temps are below 85F. wettable sulfur (Grants) (+ spreader-sticker); horticultural oil; abamectin (Agri-mek)

Wilt Diseases



Verticillium wilt of potato

Tomatoes and potatoes can sometimes be affected by soil-borne pathogens such as verticillium or fusarium. These are two different fungi that harm plants in different ways, but the symptoms are similar. Leaves turn yellow and dry, often without wilting. Symptoms appear on oldest leaves first, and later

move to younger leaves. Leaves turn yellow and then brown on the edges, or entire leaves die. In other cases, shoot tips or the entire plant may wilt slightly during the day and recover at night. As leaves are lost, the remaining leaves will curl upward but remain alive.



Verticillium wilt of zucchini

Fungi that cause verticillium and fusarium live in the soil on tiny debris particles where they can persist many years. Fusarium kills the roots and phloem, and verticillium clogs the water-conducting vessels (xylem). Eggplants, peppers, and many cucurbits can also be affected.

If you suspect verticillium wilt, cut 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. There are no fungicides for verticillium or fusarium; the best option is to remove infested plants and keep the remaining plants healthy with optimal watering. At the end of the season, remove all plant and root material out of the infested area. Rotate to resistant crops for at least 3 seasons, then, use resistant cultivars. Fusarium is worse in overly wet soil, so be sure to only water when necessary.

Early Blight of Tomato

We've had a few reports of tomatoes with leaf spotting and yellowing foliage. There are a number of causes for symptoms like these, and one is a fungal disease called early blight, caused by the fungus *Alternaria solani*. Older leaves will be

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most affected, with circular spots containing concentric rings like a target. Usually spots will have a yellow halo. Fruit lesions occur at the stem end and are brownish black.



It overwinters on old plant debris and can be a problem where tomatoes and/or potatoes are planted in the same location in successive years.

Warm, rainy conditions are optimal for infection, as is using overhead irrigation. Monitor plants for these distinctive lesions and apply a fungicide as a preventive (to protect the uninfected foliage) as necessary. This fall, till or remove all plant residue in infested fields and next season, rotate out of tomatoes and potatoes for 3-4 seasons.

Treatment: Spray fungicide every 7-14 days until wet weather dissipates; fixed copper (Bordeaux, NuCop, Cuprofix, Kocide), maneb, chlorothalonil, trifloxystrobin (Flint)

Leaf Spot Diseases



Cercospora leaf spot of eggplant

Cercospora and *alternaria* leaf spots are common fungal-caused leaf spots on eggplant. Neither species affects the fruit. They overwinter on plant debris in the soil, and usually affect the older, lowest leaves first. If leaves are kept dry infections

will not spread, but with multiple overhead waterings, the disease can become severe, causing loss of foliage and a reduction in yield.



Bacterial leaf spot of tomato

Pseudomonas is a bacterium that causes leaf spots on pepper, tomato, cucumber, and other vegetables. It is active during warm, wet weather.

Treatment: To prevent leaf spots in successive seasons, remove all plant debris after harvest, make sure seeds or new transplants are disease-free, and rotate crops. Fungicides should not be necessary on light infections. Severe cases may warrant regular preventive sprays of a fungicide (C-O-C-S, Kocide, Champ, Maneb).

BERRY CROPS

Raspberry Crown Borer



If you are noticing entire canes wilting in your raspberry field, or canes with scorched or curled leaves, it is possibly damage from the raspberry crown borer. Larvae are actively feeding in the roots and crowns now, 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.

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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.

Treatment: Early fall is the best time for treatment because at that time, larvae leave the crowns and move to the roots for the winter. Drench roots once with a product containing bifenthrin in early fall. At least two years of diligent treatment is necessary in an infested patch or field.

Treatment options:

- *Insecticides* against beet leafhopper are *not an option* because of the wide movement of the insect and the difficulty in determining when the leafhoppers are present.
- Growers in areas that face continual virus infections should *plant varieties labeled as resistant*. Trials in southern Utah showed that the resistant labeled varieties Rowpac, Roza, Salad Master, and Colombian fared well.
- *Plant at a higher than normal density* to lower the probability that every plant will be infected, allowing some plants to survive without decimating the entire field.
- Using *remay* (a white mesh fabric) over plants will prevent beet leafhopper feeding.

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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