

Insect/Disease Information

VEGETABLES

Root Rot (Phytophthora) on a variety of Vegetables



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Phytophthora is a root rot caused by a fungus-like organism that is present in almost all soils. It can cause disease when a susceptible host is growing in water-logged or saturated soils. The pathogen can survive in the soil for several years in a resting state, and all that is needed is about 24 hours of free water for infection to occur. Growers using flood irrigation in clay soils may find instances of root rot in the lower parts of the field.

Most vegetables are susceptible, and cucurbits, solanaceous crops, and beans are very susceptible. Symptoms include sudden wilting of the entire plant, and collapse of the stem at the soil line. Usually the plant tissue turns a darker color.

Infected plants should be removed immediately, as well as 1-2 adjacent plants (even if they look healthy). Remove as many roots as possible. The upper soil can also be removed to reduce the amount of inoculum. Phytophthora can survive on plant debris for up to 5 years.

Here are some ways to combat this disease:

- Maintain water drainage and sanitation. Cultivate your gardens or fields to encourage drainage as sun-exposed soil develops a hard, almost impermeable crust.

- Do not add rotten fruit or plants to your compost.
- Clean soil and debris off equipment that is borrowed, or that is moved from one field to the next. This will prevent the spread of infected soil.
- Rotate susceptible plants with more resistant crops such as sweet corn.

Treatment options: Mefenoxam (Ridomil Gold, Ultra Flourish), metalaxyl (Metastar) applied as a broadcast prior to planting, or in a band over the row after transplanting. If necessary, make two additional applications at 30-day intervals.

Bacterial spot on Pepper and Tomato



Cornell Extension, Community Horticulture



Bacterial spot, caused by *Xanthomonas vesicatoria*, is not very common in Utah unless we have a wet spring such as in 2010. Bacteria may overwinter in infected debris in the soil, or on seeds. Once an infection occurs, bacteria are further spread from plant to plant by splashing water. Fruits on the plants are also susceptible to spotting. Spots on leaves first appear as water-soaked lesions, then turn brown with a yellow halo.

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To prevent spread, do not use overhead irrigation, and take care when pruning and tying tomato plants if the disease is present on any of the plants.

Treatment: Fixed coppers (Champ, Cuprofix, NuCop, Kocide, Kop-R-Spray) at 5-10 day intervals during wet weather. Sonata is a biological control that works as a bacterial antagonist.

Two-spotted Spider Mite

Although the weather has been cool and wet (not ideal for spider mites), mites will begin activity as soon as temperatures increase. Growers using row covers that increase heat may find spider mite activity earlier. If you have had problems with mites in the past, check plants weekly once the weather warms to above 80. Look at the leaves closest to the soil first, on the undersides of leaves. Waiting to manage this pest until it is widespread makes control more difficult.

Treatment: Acramite, Agri-Mek, Kelthane, Oberon, Envidor, Zeal (best when used early in mite life cycle), insecticidal soap^H, horticultural oil^H

^Hhomeowner use

Colorado Potato Beetles



Whitney Cranshaw, CSU, bugwood.org

Adults have emerged from their protective overwintering sites, and have laid masses of eggs on the undersides of potato, tomato, and (more rarely) eggplant. Each female can lay up to 500 eggs. A second generation will be active in about a month. Monitor the crop to determine if a treatment is necessary. If you find more than 1 adult beetle per plant or more than 4 larvae per plant, apply an insecticide.

Alternative treatments to insecticides include:

- crop rotation, ideally as far away from last year's planting as possible
- planting one or two extra rows as "trap crops" that are treated at planting time with a systemic such as imidacloprid (Admire)

- use organic mulches to impede beetle travel
- plant late, after beetles have emerged and dispersed

Treatment: spinosad (Conserve, Entrust, Success, Bonide^H, FertiLome^H, Monterey^H), pyrethrin (Ace Flower and Vegetable Insect Spray^H), imidacloprid (Admire), carbaryl (Sevin^H, Bayer Advanced^H), abamectin (AgriMek), acetamiprid (Assail, Ortho Max Flower, Fruit, and Vegetable Insect Killer^H), indoxacarb (Avaunt)

^Halso for homeowner use

Imported Cabbageworm

Imported cabbageworm is becoming active in many areas of northern Utah. The adult is a common butterfly that lays small, yellow, oblong, eggs on the upper leaf surface of crucifers. They hatch in about 4 days. Caterpillars are different from cabbage looper larvae in that they have a velvety fuzz on their bodies and are more sluggish in motion. They can be found mostly on the tops of the leaves for about 2 weeks, and then they pupate. You may find their green pupae attached to leaves or other objects in the garden. There can be as many as 5 generations each summer.

Scout plantings weekly by checking at least 5 consecutive plants each in 10 random locations throughout the field (or all plants in backyard plantings). Examine the innermost leaves first where eggs are often laid. A treatment is necessary if caterpillars are found at least 10% of the planting. On mature plantings, (in broccoli, cauliflower and cabbage) infestations up to 20% may be tolerated. For leafy greens such as collards and kale, 10% plants infested is the threshold throughout.

Treatment: Bt^H and spinosad^H both provide excellent control. Carbaryl^H can also be used.

^Halso for homeowner use

BERRY CROPS

Raspberry Horntail

Raspberries are in various stages of development in northern Utah; some varieties blooming, some still reaching maturity. The raspberry horntail, a particularly troubling pest of many growers, is actively laying eggs now.

The adult—a wasp (*Hartigia cressoni*)—is rarely seen. The male is black, and the female is black with yellow markings. Adults emerge from winter pupation within raspberry canes, and lay eggs on canes by inserting eggs just under the epidermis. Larvae then feed inside the cane. Wilting of the tips may not be evident until extensive feeding has already occurred. This wilting may recover at night, but later in the season, the top terminal usually dies back. In late summer, the larvae move down the cane, and remain in the pith for the winter.

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Raspberry and blackberry are both susceptible, but in USU surveys of fields in Utah, borers have been mostly found in raspberries. Fields can tolerate low populations, however if left untreated, populations can build and cause quite a bit of damage and frustration.

Because the adult lays her eggs under the epidermis, this insect is difficult to control with insecticides. Growers should monitor plants throughout the season for terminal wilting and prune and destroy the infested plant material. When pruning, be sure that you get the white larva inside the stem. It may be farther down the stem than you think. To get a feel for where the larvae are feeding, slice a few cut stems vertically to locate the larva. Where there is no borer, the pith will be creamy-white. A pith with loose brown material will indicate borer activity (either above or below the cut).

Treatment: Carbaryl (Sevin) may reduce the adult egg-laying population, and should be applied now, and again 2 weeks later; if plants are in bloom, do not spray, or limit spraying to evening hours only to protect pollinators.

Rose Stem Girdler



Another serious pest of raspberries is the rose stem girdler (*Agilus aurichalceus*). The adult is a shiny, bronze colored beetle and is related to other flatheaded borers such as the bronze birch borer. Adults are pupating now inside canes of raspberry, currant, gooseberry, and shrub roses, and will be emerging in the next week or so to lay eggs.

Females lay eggs near the base of the canes, and the larvae hatch and tunnel into the cane tissue. The insect at first forms random, spiraling galleries on the inner bark of canes, and then moves into the center where it tunnels up or down the cane. Canes may have swellings at the feeding sites, and infested canes may break at weak areas later in the season.

The best treatment option is to remove and destroy infested canes late in the season and over the winter. There are a few insecticides that can be used to kill the eggs and newly hatched larvae, but use caution when spraying flowering plants: treat at dawn or dusk only to avoid harming pollinators, or ideally, do not spray plants in bloom.

Treatment: Malathion^H, rotenone + pyrethrin (Pyrellin EC^H, Bonide Liquid Pyrethrin Spray^H; this option is softest on bees), Diazinon. Treat every 7 days starting in late June, and continue for the next 3 weeks.

^Halso for homeowner use

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