

Sweet Potato & Irish Potato Insects

Wireworms

Several kinds of wireworms feed on sweet potatoes as well as Irish potatoes. The southern potato wireworm (*Conoderus falli*) is injurious in the southeastern United States. Adults (click beetles) are dark brown, about ¼ inch long and are found near the soil surface under leaves and trash in sweet potato plantings. Adults do not feed on potato plants.



Tobacco wireworm adult (click beetle)
Natasha Wright, Florida Department of Agriculture and Consumer Services, www.insectimages.org

Eggs are laid in the soil from late spring to early fall. They hatch in five days during midsummer, but may take several weeks during cool weather in the spring or fall.

Potatoes are injured by larvae (immature forms). The larvae are white, cream or yellowish-orange with reddish-brown heads and tails. They are smooth, shiny and relatively hard-bodied. When fully grown they are ½ to ¾ inch long. The larvae change to pupae (immature nonfeeding stage where larva changes to an adult) in earthen cells in the ground. One to two generations of this wireworm occur each year.

Injury by wireworm larvae usually consists of fairly small irregularly shaped holes. If growth cracks or

other breaks in the skin are present, holes may be concentrated in these, otherwise the holes are scattered at random over the surface of the root. The original holes are usually less than a quarter of an inch deep but may be considerably deepened by later growth of the root. A good indicator of wireworms is new feeding holes with ragged edges, usually containing chewed root fiber.

Wireworms usually attack potatoes late in the season. Consequently, they produce less "healed-hole" injury (early season injury that has been healed over).

The tobacco wireworm (*Conoderus vespertinus*) also damages potatoes. Adults are similar in size and shape to those of the southern potato wireworm, except for areas of light and dark brown. The immature stages are also very similar.



Tobacco wireworm larvae
R.J. Reynolds Tobacco Company Slide Set, R.J. Reynolds Tobacco Company, www.insectimages.org

Only one generation of the tobacco wireworm occurs each year. The eggs, which are laid during the summer, hatch into larvae in one to three weeks. Pupation takes place during the late spring and

summer of the following year. Most overwintered larvae have pupated before sweet potato roots begin to enlarge; therefore, injury is probably caused by larvae from eggs laid during the current year.

Home gardeners can use various measures to control wireworms. Trap wireworms in pieces of potato scattered around the garden, rotate crops and plow or cultivate infested soil in late summer or in autumn to kill or expose various insect stages to predators. Cultivation in the Spring, well in advance of planting can help reduce wireworm populations. The sweet potato varieties Nugget and All Gold possess some resistance.

Cucumber Beetles

Larvae of both the banded cucumber beetle (*Diabrotica balteata*) and the spotted cucumber beetle (*Diabrotica undecimpunctata howardi*) feed on the roots of the sweet potatoes.



Banded cucumber beetle
Clemson University - USDA Cooperative Extension Slide Series, www.insectimages.org

Injury to sweet potatoes by these beetles is identical. Eggs, larvae and pupae of the two species are also identical.

Cucumber beetle larvae eat small, round holes through the skin of sweet potato roots and form irregularly shaped enlarged cavities just under the skin. The larvae seldom tunnel into the roots, as do elongate flea beetle or striped flea beetle larvae. Feeding scars are usually in groups rather than scattered randomly over the root. Original holes are

usually shallow but may be deepened by later growth of the root. In contrast to wireworms, cucumber beetles often attack sweet potatoes early in the season. This results in much healed-hole injury.



Spotted cucumber beetle
J.P. Michaud, Kansas State University, www.insectimages.org

Handpicking to remove the beetles is time-consuming but effective. In addition, several predators and parasites are enemies of cucumber beetles. Eliminate weeds in and around the garden.

Flea Beetles

Both the elongate flea beetle (*Systema elongata*) and the palestriped flea beetle (*Systema blanda*) feed on sweet potatoes. The habits and life histories of the two species are similar, and the immature stages look alike.



Palestriped flea beetle
Whitney Cranshaw, Colorado State University, www.insectimages.org

These insects have a wide range of hosts, including many weeds. Adults move into sweet potato fields

during the spring and summer and lay creamy yellow eggs in the soil. These hatch into white larvae, which are soft bodied, and about $\frac{3}{8}$ inch long when fully grown. They have brown heads and a fleshy pointed tubercle (small knob-like protuberance) on the tail end. The larvae mature in 20 to 30 days, and then curl up in a cell made in the soil and transform into pupae. Adults emerge in about one week. At least two generations occur per year in the south.

Larvae eat small holes through the skin of sweet potatoes and make enlarged cavities and short tunnels just under the skin. Except for these tunnels, injury is very similar to that of cucumber beetle larvae, which seldom tunnel into the roots. At harvest time, early season injury usually appears as shallow, healed scars which tend to be long and irregularly shaped.

Flea beetles often migrate in from weedy areas, so keep weeds controlled near the garden. Plant flea beetle tolerant sweet potato varieties, such as Centennial and Jewel.

Sweet Potato Flea Beetle

Sweet potato leaves are often damaged by sweet potato flea beetles (*Chaetocnema confinis*); however, most damage to the plant occurs from larvae feeding on the roots.

Adult beetles are black, about 1/16-inch long and usually hop away when disturbed. They are easily recognized by the tendency to eat narrow grooves in the upper surface of sweet potato leaves.

Larvae make small winding tunnels just under the skin of sweet potato roots. These tunnels are nearly invisible at first but soon darken and can be seen through skin. As roots grow, the skin over the tunnels splits away, leaving shallow scars on the surface. Sweet potato varieties differ widely in their susceptibility to economic injury by this insect. This injury is only cosmetic, but may impact the marketability of the potatoes.

Controlling weeds along borders of garden and plowing under crop debris destroys overwintering and egg laying sites. Plant resistant varieties, such as Jewel and Centennial.

Grubs

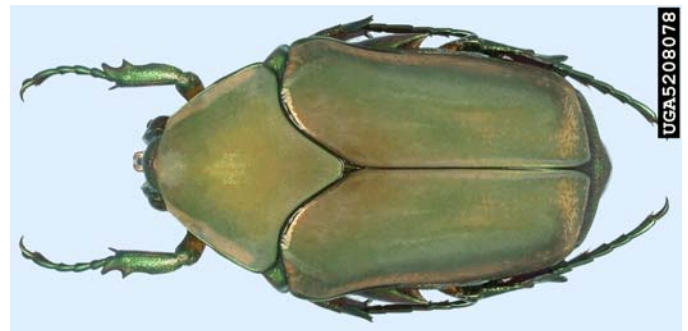
Grub injury to sweet potatoes occurs in most areas where the crop is grown. There are many species of

grubs and several of them feed on sweet potatoes. Grubs are the larvae of May beetles (*Cyclocephala species*) or green June beetles (*Cotinis nitida*).



Green June beetle larva
Clemson University - USDA Cooperative Extension Slide Series, www.insectimages.org

Adults of the various grubs vary in size and color, but all are robust beetles.



Green June beetle adult
Natasha Wright, Florida Department of Agriculture and Consumer Services, www.insectimages.org

Eggs are laid in the soil during the spring and summer and soon hatch into fleshy larvae that are typically C-shaped. They are usually white or cream with light-tan and grayish areas on the tail. Larvae pass the winter in the soil and change into pupae the following spring.

Grubs carve broad shallow areas in sweet potato roots. Since grubs feed upside down in the soil, horizontal roots are injured mostly on the underside.

Cultivate garden soil well in advance of planting, and hand collect grubs during raking and leveling of soil.

Sweet Potato Weevil

The sweet potato weevil (*Cylas formicarius elegantulus*) is a serious pest of sweet potatoes but occurs only in certain parts of South Carolina, mostly in the coastal counties.



Sweet potato weevil adult
Division of Plant Industry Archive, Florida Department of
Agriculture and Consumer Services, www.insectimages.org

Adult sweet potato weevils are ant-like beetles about $\frac{1}{4}$ inch long. The head and wing covers are metallic dark blue and the thorax (chest region) and legs are bright orange red. Adult weevils feed on the exposed part of the sweet potato plant but prefer the roots. Feeding scars on the roots consist of tiny shallow holes usually in patches.

Eggs are laid in specially prepared cavities in the vines or roots. Egg cavities are similar to the feeding punctures but may be distinguished by a mucus covering secreted by the female. Eggs hatch in about a week during warm weather. Larvae are white to ivory with light brown heads. When fully grown in two or three weeks, they are about $\frac{3}{8}$ -inch long. Pupae are found in the vines or roots. In a week or longer they change into adult weevils. As many as six or eight generations may be produced in a year.

Injury to sweet potatoes by weevil larvae can be recognized by tunnels that start just beneath the skin and become larger as they extend inward. Adult exit holes are about the size of a match.

When cultivating, throw soil around the base of the vines to prevent adult weevils from reaching the sweet potatoes underground. Destroy all crop debris and culls at the end of the season, as well as

volunteer sweet potato plants and morning glories (an alternate host plant) to eliminate breeding sites for weevils. Use crop rotation and plant tolerant sweet potato varieties, such as Centennial. Use of deep-rooted varieties, such as Porto Rico may help reduce damage.

Potato Leafhopper

The potato leafhopper (*Empoasca fabae*) is considered an important pest to Irish potatoes and is known to feed on nearly 200 other kinds of plants.



Potato leafhopper adult
Steve L. Brown, University of Georgia,
www.insectimages.org

Feeding by this leafhopper on potatoes causes curling, stunting and dwarfing, accompanied by a yellowing, browning or blighting of the foliage known as hopperburn or tipburn. The injection of saliva into the plant during feeding produces a physiological disturbance with disease-like manifestations. Symptoms are sometimes confused with drought stress.

The adult is pale green, somewhat wedge-shaped, about $\frac{1}{8}$ inch long, with small white spots on the head. Adults are very active, jumping or flying when disturbed. Females deposit slender white eggs within the stems and larger veins of the leaves. Hatching occurs in six to nine days during the summer, and the pale green nymphs (immature forms that closely resemble the adult insect) molt five times before they become fully-grown and transform to winged adults. The period from egg to adult is about three weeks during warm weather; several overlapping generations develop each season. The potato leafhopper has not been found overwintering north of the Gulf States where it

breeds throughout the year. Migration northward with the warm spring winds occurs annually.

Colorado Potato Beetle

Universally known among growers as the potato bug, the Colorado potato beetle (*Leptinotarsa decemlineata*) was long considered the most dangerous enemy of Irish potatoes. It is still capable of doing much damage and can be a serious pest of tomatoes or eggplants. The potato beetle is now found in most regions where potatoes are grown.



Colorado potato beetle adult
C. Trouvé, Service de la Protection des Végétaux,
www.insectimages.org

Adults are stout, oval, convex beetles, about $\frac{3}{8}$ inch long, with 10 black and yellow stripes running lengthwise along the wing covers. Overwintering beetles hibernate in the soil, emerging in the spring about the time that potatoes come through the ground. They lay orange-yellow eggs in groups of a dozen or more on the undersides of the leaves. Each female deposits approximately 500 eggs over a five-week period.



Colorado potato beetle eggs
Whitney Cranshaw, Colorado State University,
www.insectimages.org

Eggs hatch in a few days and the dark red larvae devour the foliage, becoming orange as maturity approaches. There are two rows of conspicuous black dots on the sides of their bodies. When mature, they leave the plant, enter the soil and pupate, emerging as adults several days later. The life cycle requires about a month, and there are one to three generations per year. Injury is due to actual consumption of foliage and stems by adults and larvae, however, potato plants can lose up to 30% of their foliage without a loss of yield.

Over the years, it has become resistant to most pesticides and is a major potato pest. A 3- to 5-inch layer of straw added just before the potatoes emerged can lead to higher yields. Soil temperatures will be cooler, soil moisture levels higher, and the populations of Colorado potato beetles will be lower in mulched gardens. Beetles can be controlled by one of the specialized *Bacillus thuriangiensis* strains: var. *San Diego* or var. *tenebrionis*, but this is primarily effective against small larvae. Apply *B.t.* when larvae are first seen. Hand picking beetles and larvae, and removing leaves with egg clusters both can reduce the population significantly.

Control of Potato Insects

Adult flea beetles, cucumber beetles, leafhoppers, and Colorado potato beetle can be controlled using carbaryl (Sevin). Colorado potato beetles can be controlled by rotenone (such as Hi-Yield Rotenone Dust or Bonide Rotenone-Pyrethrin) or by one of the specialized *Bacillus thuriangiensis* strains: var. *San Diego* or var. *tenebrionis*. Neem extract (such as Bonide Bon-Neem) may prevent the Colorado potato beetle larvae from developing normally. Colorado potato beetles and flea beetles on Irish potatoes only can be controlled by permethrin (such as Bonide Total Pest Control Concentrate Outdoor Formula, or Ortho Bug-B-Gon Multi-purpose Garden Dust, but wait seven days after spraying or dusting before harvest). Insecticides are not recommended for soil-inhabiting pests in the home garden.

Keep grass and weeds controlled, rotate where you plant root crops within the garden, and perform winter tilling to help keep soil pests in check.

Sources:

1. Cuthbert, F.P. *Insects Affecting Sweet Potatoes* (1967). Agriculture Handbook NO. 329.ARS, USDA
2. Davidson, R.H. and Williams F. Lyon, *Insect Pests of Farm, Garden, and Orchard, 8th Ed.*, John Wiley and Sons, New York, 1987.

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