



# Wireworm Control in Sweet Potato

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## Introduction

Farmers are concerned about insect damage to sweet potato roots in commercial potato fields. Many farmers growing sweet potatoes for the first time don't use insecticides, and insect damage occurs long before harvest.

Unfortunately, not much can be done at harvest time to rectify damage which has already occurred, especially with a late October harvest. As the soil temperature drops, so does the activity of root-feeding insects.

Insect injury consists of irregularly-shaped gouges, usually less than one-fourth inch deep, on the surface of the potato. The depth and the length of the scar increase as the roots enlarge, thereby giving the impression of a greater depth and continuous feeding.

Damage of this type can be caused by larvae of May beetles (*Cyclocephala* species) or June beetles (*Cotinis nitida*), generally called white or green grubs, or wireworms (*Conoderus*). Grub larvae are white or cream colored with light tan heads. Grubs also feed on sweet potato roots with broad, shallow gouges; however, grub larvae do not penetrate as deeply as wireworms.

Experiencing heavy pressure from insect grubs and wireworms during harvest is not uncommon, especially in September in south Arkansas and northern Mississippi. Insecticide protection from Lorsban and Diazinon, applied during planting (May-June), has degraded and is no longer effective.

Before harvest, the soil is not cold enough to hold down larval feeding activity and to keep populations in check.

The best remedy for this dilemma is to follow recommended soil treatment programs and avoid fields with a history of wireworm or grub activity.

## Life Cycle

Wireworms are the immature or larval forms of click beetles (family *Elaeteridae*). The larval stage lives in the soil and feeds on the potato roots. Adult beetles overwinter in the soil and emerge from mid-April to early June. After mating, female beetles burrow into the soil and lay their eggs. The eggs hatch in three to four weeks. The adults do not feed on the plants but are found near the soil surface under leaves and trash.

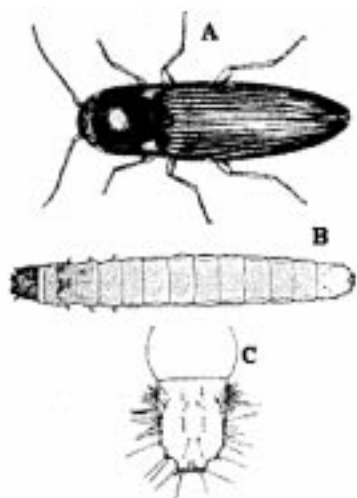


Wireworm/grub damage to sweet potatoes.

Most common wireworm species have larval stages that last about 30 days. Some can live for three to four years in the soil. Each year, the larval wireworms and grubs (white, yellowish or cream colored larvae with much darker reddish-brown heads and tails) migrate deeper into the soil to overwinter, then move towards the surface to feed in the spring.

Southern potato wireworm, the one common in southeast Arkansas, has a complete life cycle which may last more than a year in dry weather. During the last year of development, the larvae pupate in the soil, develop into adults and remain there until spring.

## Wireworm Life Stages



Southern potato wireworm. A. Adult, B. Larva, C. Tip of larval abdomen.

## Recommended Wireworm Population Per Acre Before Treatment

Wireworm population is estimated from soil sampling in the field. Soil sampling helps determine the type of treatment needed for effective and economical control. Sampling can be done at any time of the year, but the recommended time is prior to planting in the spring when the soil temperature at a depth of

six inches is 55°F or more. Equipment needed to sample a field includes a posthole digger or shovel, a bucket for collecting the soil samples and a soil lifting device or a scooper.

Refer to the chart below. Look across the Acres in Field row to the number of acres to be planted. Look down that column to find the number of samples required to get a valid estimate of the wireworm population. Take random scattered samples from throughout the field to a depth of at least 18 inches (46 cm). Refer to the Cooperative Extension Service pesticide recommendations for suggested treatment, based on the number of wireworms found.

## Control Method

Repeated sampling may be required to ensure effective treatment. If no wireworms are found in the required number of samples, then double the number of samples. This ensures that the wireworm population is too low to warrant treatment. If treatment calls for both broadcast and sidedress, use two different insecticides. Some insecticides, including Diazinon, remain in the soil for only a short time period. Use the recommended rate after April 15 and a higher rate before April 15. Seek detailed information from your county Extension office.

## Broadcast Treatment

Before planting, broadcast either granular or an emulsifiable formulation evenly on the soil surface and incorporate into the soil immediately by disking or other suitable means. Over the years Lorsban, Dyfonate, Mocap and Diazinon have been used for wireworm control. Contact your county Extension agent for recommended rates and approved insecticides.

## At-planting Sidedress Treatment

Apply granular formulation in narrow bands (shanked) spaced 3 to 4 inches (7 to 10 cm) on both sides of the row and then level.

Acres in Field	10	20	30	40	80	120	160
Number of Samples	30	43	52	60	85	104	120
Number* of wireworms: when using sidedress or furrow** treatment.	0-1	0-1	0-2	0-2	0-3	0-4	0-5
Number of wireworms: for broadcast treatment	2-6	2-8	3-10	3-13	4-17	5-21	6-24
Number of wireworms: for broadcast and fumigation	7-10	9-14	11-17	13-20	18-28	22-34	25-40
Number of wireworms: when using sidedress and fumigation	11-14	15-19	18-24	21-28	29-39	35-48	41-56
Number of wireworms indicating use of an alternative crop (rotation)	15	20	25	29	40	49	57

\* Number of wireworms indicated is the total number of wireworms found in the required number of samples.

\*\* Furrow treatment can be used in place of plant sidedress.

## Furrow Treatment

A granular formulation of Dyfosate or any of the recommended insecticides may be applied in the furrow at planting time at the same rate as the sidedress treatment.

## Post-emergence Sidedress Treatment

If five or more larvae are found per 100 hills examined in sweet potato fields that were not treated before or at planting time, apply recommended insecticides at two (2) pounds active ingredient per acre as a sidedress treatment in narrow bands spaced 3 to 4 inches on both sides.

## Fumigation Treatment

Generally, fumigation controls wireworms, grubs, nematodes, weeds and certain soil-borne diseases. But, because of the high cost of fumigation, we advise using a combination of broadcast and sidedress treatments rather than fumigants, if only insect control is needed.

When used, apply fumigants 8 to 9 inches deep into the finely pulverized soil with a chisel, sweep or blade applicator when the soil temperature is 45°F to 80°F. Use only as overall or broadcast treatment. A commonly used fumigant among sweet potato growers is Telone II at a rate of 15 gallons per acre. However, see your local county Extension agent for the latest and most effective insecticides and rates.

## General Precautions

Maintaining a vigorous cultural program includes the following:

- Use certified seed potatoes for slip production, and spray seed beds with approved insecticides.
- Broadcast granular insecticides over the foliage when the roots begin to form and adult beetles are abundant.
- Avoid fields not recently planted to row crops and practice good crop rotation program.
- Effective weed control will reduce high population pressure of wireworms.
- Cut slips 1 inch above soil line, and do not pull slips for transplant.
- Destroy bedding areas after slips are pulled.
- After harvest, especially in fields planted to winter crops, plow during the fall, exposing whatever is left in the field to frost and freezing temperatures.
- Clean storage areas in the spring after selecting seed potatoes. Sweep the area and destroy sweepings and old sweet potatoes by feeding to livestock or by burning.
- Use soil baits of untreated corn or wheat to check for the presence of wireworm larvae. Place the bait 6 inches in the soil at approximately six locations in the field in early spring. Check for larvae presence and numbers three weeks later.

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