

# Control of SOIL INSECTS *and* LEAFHOPPERS ATTACKING SWEETPOTATOES

W. G. EDEN, L. L. HYCHE, and J. A. GRIFFIN  
Department of Zoology-Entomology

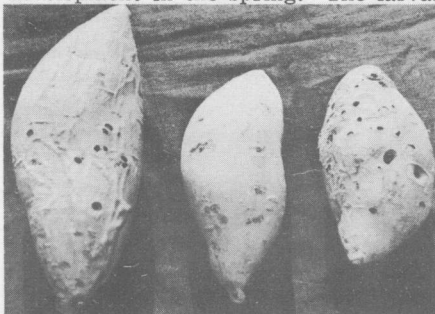
**A**LABAMA FARMERS have harvested approximately 18,000 acres of sweetpotatoes annually for the past 5 years. Average value of the crop has been about 3½ million dollars per year. With proper use of present information on insect control, yields can be increased and the quality of sweetpotatoes greatly improved. Experiments on control of insects of sweetpotatoes have been conducted for the past 5 years at the Chilton Area Horticulture and North Alabama Horticulture substations at Clanton and Cullman, and at the Horticulture Field, Ashford. Recommendations given in this leaflet are based on results from these experiments.

## SOIL INSECTS

Wireworms are the most important soil insects of sweetpotatoes in Alabama; however, others, such as larvae of certain flea beetles, cause some damage to the underground parts of sweetpotatoes. These immature insects inflict serious injury to sweetpotatoes by feeding on the roots. Although wireworms rarely, if ever, cause complete crop failure, the punctures made by their feeding (see photo) mar the appearance of the sweetpotatoes and lower their market value. Also, the punctures afford excellent entrances for such diseases as soil and

storage rots. These rots may result in heavy losses of stored sweetpotatoes.

**Life history.** Wireworms are immature forms of click beetles or skipjacks. One of the more common species found in Alabama is the Gulf wireworm, *Conoderus amplicollis* (Gyll.). The life cycle of this insect is completed in 1 year. Adult beetles are approximately 3/8-inch long and 1/8-inch wide, dark brown, and velvety. Female beetles deposit their eggs on or near the surface of the soil during May and June. The eggs hatch in 8 to 10 days, and the young larvae begin feeding immediately. The larvae (wireworms) attain most of their growth during the first 8 or 10 weeks of life and are almost fully grown by the end of November. They grow very little during the winter, and complete their development in the spring. The larval



Sweetpotatoes damaged by wireworms.

**AGRICULTURAL EXPERIMENT STATION  
of the ALABAMA POLYTECHNIC INSTITUTE**

E. V. Smith, Director

Auburn, Alabama

period is approximately 10 months. Mature larvae are about 3/4-inch long and nearly 1/8-inch wide. They have hard, shiny, yellowish-brown bodies and dark brown or black heads. Pupation occurs in earthen cells in the top layer of the soil during April, May, and June; length of the pupal period is approximately 8 to 10 days. Adult beetles emerge in May and June with a small percentage emerging in July.

**Control.** Results of experiments conducted since 1951 show that wireworms can be controlled by introducing insecticides into the soil. Of several insecticides tested, aldrin, dieldrin, and heptachlor have consistently been the most effective. These materials should be applied prior to planting at the rate of 2 pounds of technical insecticide per acre. Effective control may be obtained by applying in the row as insecticide-fertilizer mixtures, or they may be applied separately. The insecticides may also be applied broadcast as sprays, granules, or insecticide-fertilizer mixtures. Dusts may be used, but some of the material will be lost by drift. Broadcast applications should be disked into the soil prior to planting. Mixing insecticides with the transplant water has not given as effective control as the other methods.

Aldrin, dieldrin, and heptachlor are available as emulsifiable liquids, granules, and dusts. Granular formulations are easier to use, and there is no loss from drift. They are gaining in popularity for both insecticide-fertilizer mixtures and for broadcast application.

## LEAFHOPPERS

There are several insects that cause economic damage by feeding on the foliage of sweetpotatoes, but leafhoppers are probably the most important. There are many different kinds of leafhoppers; the most important ones on sweetpotatoes belong to the genus *Empoasca*.

**Life history.** Leafhoppers overwinter

in various stages, depending on the species. Some go through the winter in the egg stage in stems of various plants. A large number of species winter in the form of full-grown insects, taking shelter in and around the crops on which they feed; a few pass the winter in the partly developed or nymphal stage. Adult females usually lay their eggs in stems, buds, or leaves of their food plants. The eggs hatch into wingless but very active nymphs that feed by sucking the sap. They sometimes inject a substance that is distinctly poisonous to plant tissue, and that kills the areas around their feeding punctures. They shed their skins several times while developing from nymphs to adults, but they do not pass through a pupal or resting stage. Leafhopper adults vary in size from 1/20- to 1/4-inch long, and rarely reach 1/2 inch in length. The adults have wings but use their legs to a large extent in jumping from one part of a plant to another. They are good jumpers or hoppers as their common name implies. The general outline of their bodies is long and slender, and they vary greatly in color.

**Control.** Results of experiments show that, when leafhoppers become numerous in sweetpotato fields, it is highly profitable to use insecticides to control them. This is particularly true if other factors indicate a good yield of sweetpotatoes. An example of how increased yields can result from proper use of insecticides is given in the table.

**Results of Controlling Leafhoppers on Sweetpotatoes, North Alabama Horticulture Substation, 1955**

Treatment*	Yield per acre
	Bushels
Untreated check	422
DDT, 5 per cent	539
TDE, 5 per cent	510
Methoxychlor, 5 per cent	516
Toxaphene, 20 per cent	514

\*Dusts were applied at the rate of 30 pounds per acre on August 15, 24, and 31, and September 10 and 20.

All of the insecticidal dusts used resulted in substantial yield increases. On the basis of this and other similar experiments, all of these insecticides are recommended.

Applications of insecticides should be started when leafhoppers become numerous. A good rule is to begin treatments when flights of leafhoppers are obvious as you walk through the field. Treatments should be made at 7- to 10-day intervals as long as large numbers of leafhoppers are evident. These insecticides are also effective on many other insects, such as hornworms, tortoise beetles, and other leaf feeders.

## RECOMMENDATIONS

1. Good control of soil insects can be obtained by using 2 pounds per acre of aldrin, dieldrin, or heptachlor. The insecticides may be applied to the soil in mixtures with fertilizer or broad-

cast and disked in before the sweetpotatoes are transplanted.

2. Mixing insecticides with the transplant water has not given as effective control as other methods.

3. Leafhoppers can be effectively controlled with 30 pounds per acre of 5 per cent dusts of DDT, TDE, or methoxychlor, or 20 per cent toxaphene.

4. Applications of these insecticides should be made at 7- to 10-day intervals when leafhoppers are numerous.

5. These insecticides will also control other insects, such as hornworms and tortoise beetles.

## ACKNOWLEDGEMENT

The authors acknowledge the cooperation and assistance of C. C. Carlton and T. S. Morrow, superintendents of the Chilton Area and North Alabama Horticulture substations at Clanton and Cullman, respectively, and R. L. Livingston, in charge of the Horticulture Field at Ashford.

