

CONTROL of WIREWORMS ATTACKING SWEET POTATOES

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Wireworms are one of the most important groups of under ground insect pests of sweet potatoes in Alabama. These immature insects inflict serious injury to the sweet potatoes by feeding on the marketable roots. Although wireworms rarely, if ever, cause complete crop failure, the punctures made by their feeding mar the appearance of the potatoes and lower their market value. Also, the punctures afford excellent entrances for secondary infections, such as soil and storage rots. These rots may result in tremendous losses of stored potatoes.

LIFE HISTORY

Wireworms are the immature forms of the common click-beetle or skip-jack. The species found most frequently in Alabama potato fields is the Gulf wireworm, *Conoderus amplipollis* (Gyll). The life cycle of this insect is completed in one year. The adult beetles are approximately 3/8 inch long and 1/8 inch wide, dark brown and velvety. Adult females deposit their eggs on or near the surface of the soil during May and June. The eggs hatch in 8 to 10 days, depending on temperature. The young larvae begin feeding immediately and attain most of their growth during the first 8 to 10 weeks of their life. By the end of November, the larvae are almost fully grown, and very little growth occurs during the winter months, December to February. The duration

of the larval 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 an earthen cell in the top layers of the soil during April, May, and June; the 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. The life history of this insect was determined by Cockerham and Deen¹ during the period from 1929 to 1932.

CONTROL with INSECTICIDES

Experiments conducted in 1951 and 1952 at Ashford, Auburn, Clanton, and Cullman have shown that wireworms can be controlled by introducing insecticidal compounds into the soil in row treatments approximately 2 weeks prior to setting the potato slips. Nine insecticides were tested at various rates. They were chlordane, lindane, heptachlor, aldrin, dieldrin, parathion, toxaphene, benzene hexachloride, and ethylene dibromide.

Five of the nine compounds tested gave good wireworm control. These were lindane, heptachlor, aldrin, dieldrin, and benzene hexa-

¹Cockerham, K. L. and O. T. Deen. "Notes on Life History, Habits, and distribution of *Heteroderes laurentii* (Guerin)". Jour. of Econ. Entom. 29 (2): 288-296. 1936.

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chloride² at the rate of 2 pounds technical per acre. Chlordane at 2 to 8 pounds per acre and toxaphene at 10 pounds gave varying degrees of control, ranging from good in some tests to no control in others. Parathion at 2 pounds technical per acre and ethylene dibromide at 8.2 gallons technical³ per acre gave no practical control in these experiments.

If correctly formulated fertilizer-insecticide mixtures are not available, the following formula may be used to calculate the correct amount of insecticide per acre:

$$\frac{\text{Pounds technical insecticide needed per acre}}{\text{Percentage of insecticide in dust formulation}} = \text{Pounds of dust needed per acre}$$

For example, when 2 pounds of aldrin is to be used per acre, and the concentration of the dust is 2.5

per cent, then $\frac{2}{.025} = 80$ pounds of dust needed per acre.

The insecticide may be mixed with the fertilizer and applied to the open furrow in one operation, or it may be applied separately.

CULTURAL CONTROL

Cultural methods may be used to control wireworms if conditions exist whereby these methods may be employed. Early spring plowing to expose the pupae has given some control. The plowing exposes the pupae to the sun and wind and they are killed by drying out. If this method is employed, the field should be plowed only one time. Excessive plowing pulverizes the soil and covers the pupae after they have been exposed.

Where an abundant water supply is available and the lay of the land

²Rates of benzene hexachloride are expressed as pounds of gamma isomer.

³Twenty gallons of a 40 per cent commercial formulation.

is suitable, flooding may be used to control wireworms. The land should be flooded and left under water for several days after the atmospheric temperature has reached 70°F.

EFFECT of INSECTICIDES on FLAVOR of SWEET POTATOES

Taste tests have shown that no off flavors were imparted to sweet potatoes by any of the insecticides used in these experiments. However, it is known that benzene hexachloride in the soil will cause off flavor in Irish potatoes and perhaps other crops. Benzene hexachloride is not recommended for wireworm control on sweet potatoes because of the danger of imparting off flavors to subsequent crops grown in the same soil.

SUMMARY

1. Wireworms are an important pest of sweet potatoes in Alabama. Their feeding punctures lower the market value of the potatoes and also provide excellent entrances for secondary infections, such as soil and storage rots.

2. Good control of wireworms can be obtained with 2 pounds per acre of aldrin, dieldrin, lindane, heptachlor, or gamma isomer of benzene hexachloride applied with the fertilizer in row treatments.

3. Chlordane at 8 pounds per acre and toxaphene at 10 pounds per acre gave good control in some tests and no control in other tests. Parathion at 2 pounds per acre and ethylene dibromide at 8.2 gallons per acre did not give satisfactory control in these experiments.

4. Taste tests conducted in 1951 and 1952 revealed no off flavors of the sweet potatoes due to the insecticidal treatments.

5. Benzene hexachloride is not recommended for wireworm control on sweet potatoes. Residues may contaminate certain crops following the sweet potatoes.