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Sweetpotato Weevil

R. A. Roberts

The sweetpotato weevil occurs in parts of Alabama, Florida, Georgia, Louisiana, Mississippi, South Carolina, and Texas. Very likely it is of Asiatic origin. Our first record of it in this country was in 1875 in Louisiana.

The adult weevil is about one-fourth inch long and resembles a large ant. The head, snout, and wing covers are a dark, metallic blue. The prothorax and legs are reddish orange. The adult has well-developed wings and is capable of limited flight. The small eggs are yellowish white. The larvae are white, legless grubs about three-eighths inch long. The pupa is white and somewhat smaller.

The adult places its eggs in small cavities, which it punctures in the stem of the plant near the ground or directly into the sweetpotato. The eggs hatch in about a week. Then the grubs feed in the vine or potato for 2 or 3 weeks. The pupa is formed within the vine or stem or within the potato and this stage lasts a week or longer, after which the adult emerges. The adult may live for several months. The time required for the development of all the stages varies according to the season or the conditions under which potatoes are stored. In a year six to eight generations may be produced.

The adult weevils damage sweetpotato plants by feeding on leaves, vines, and roots and by pitting the potatoes with feeding and egg-deposition cavities. The larvae, which feed in both the vines and the potatoes, do the most injury. Men of the Louisiana State University and the State Extension Service estimated the loss to the commercial crop of sweetpotatoes in Louisiana in 1946 to be nearly 3 million dollars.

In 1950 this loss was reduced to 250 thousand dollars. Growers of sweetpotato plants in Georgia in 1945 had losses of about 1 million dollars. Eradication measures have prevented subsequent severe losses to these plant growers. The weevils even in light infestations can cause great damage because they can impart a bitter taste to the sweetpotato after only slight feeding and thus destroy much of its value.

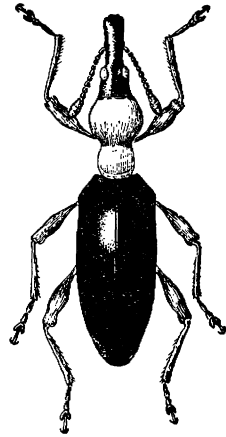
CONTROL OR ERADICATION depends on strict adherence to the recommended procedures and constant care by the grower to prevent reinfestation. The principle of control is to deny the weevil the host plants in which to feed. Strict sanitary, cultural, and storage practices are required. The use of insecticides to destroy and prevent weevil populations helps.

In areas of noncommercial sweetpotato production where weevil infestations are light and where nonplanting zones can be established, the weevil can be eradicated if it is deprived of its food for about a year. If weevils are found on a property no sweetpotatoes should be bedded, grown, or stored within a zone extending $\frac{1}{2}$ to 1 mile from the point of infestation. The procedure has resulted in eradication of the weevil when practiced on a single farm or on a community basis.

When a nonplanting zone is established, all remaining sweetpotatoes in the zone should be disposed of by February 1 (or earlier, if possible) by dehydration, feeding to livestock, or burning. The place where the potatoes were stored should be thoroughly cleaned and the debris burned. Thereupon the storages should be dusted with a 10 percent DDT dust at the rate of 1 pound to each 1,600 square feet of surface area. A spray may be used, consisting of 8 pounds of 50 percent DDT wettable powder to 100 gallons of water, applied 1.5 gallons to each 1,000 square feet. The treatment will eliminate any remaining weevils.

Potatoes still in the ground when the

infestation is found should be removed from the premises at harvesttime and disposed of in such a way as to prevent infestation of other properties. None should be stored within the restricted



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zone. Before the potatoes are plowed out, vines should be cut off at the surface of the ground and burned when dry. All potato roots, crowns, small sweetpotatoes, and scraps in the field should be destroyed by cultivation and by grazing livestock on the field after harvest. The old potato field should be plowed at least twice during the winter in order to expose any roots or potatoes missed. No volunteer sweetpotato plants should be permitted in the field or elsewhere on the property. These may be grubbed out or destroyed with a weed killer.

After the end of the 1-year nonplanting period, potatoes may be grown again. In the new plantings in zones that have been out of production, it is important that weevil-free planting stock be used.

In areas generally infested with weevils and in places where the extent of commercial potato production does not warrant the establishment of nonplanting zones, effective control can be had by following recommended control, cultural, and sanitary practices.

Planting stock of either plant slips or seed potatoes should be obtained from sources certified as weevil-free or from known weevil-free areas. If seed is selected locally at harvesttime in generally infested areas, however, the potatoes should be treated thoroughly with 10 percent DDT dust applied at the rate of 1 pound to 6 to 8 bushels of seed. The treatment will prevent the establishment of infestation within the seed and kill any already existing weevils if they emerge from the potatoes.

Sweetpotato parts and scraps should be removed from the field after harvest. Storage banks or houses should be cleaned and sprayed with DDT as soon as potatoes are removed. Fields previously planted to sweetpotatoes should be plowed at least twice during the winter and all volunteer sweetpotato plants destroyed.

The sites for seedbeds should be located on land that was not planted in potatoes the previous year. Fields to be planted in potatoes should be removed as far as possible from the seedbed and be located preferably on land which had not been planted to potatoes the previous season. Plants and tubers in the seedbed or mother rows should be destroyed as soon as sufficient plants have been produced.

The storage of sweetpotatoes in commercial kilns used to be a problem because of the spread of weevils from infested potatoes to noninfested potatoes in storage and the dispersal of large numbers of adult weevils at the end of the storage period from the kilns to adjacent planted fields. A new treatment for stored table-stock potatoes does much to solve the problem. Visibly infested potatoes are culled out and the potatoes to be stored are then dusted with 10 percent DDT dust. An inexpensive duster, operated on the principle of an air blower, is used that can treat a crate at a time at the rate of about 600 crates an hour. Only one-twentieth of a pound of dust is applied to a crate. The treatment will not destroy weevils already in the potatoes, but it will kill all adults upon emer-

gence and prevent any spread of the infestation. It is desirable also to dust or spray the kiln with DDT before the crated potatoes are stored.

SWEETPOTATO WEEVILS also develop in certain morningglories and related plants of the genus *Ipomoea*. The insect-host relationship is not entirely clear, but apparently the wild seaside and marsh morningglories are important as hosts. Certain of the cultivated morningglories may have to be considered in eradication projects that involve urban districts. The weevil breeds in the seaside morningglory (*Ipomoea littoralis*), but chemical weed killers will control the plant. Infestation of the marsh morningglory (*Ipomoea sagittata*) is rarer, but the species may harbor the weevil enough to permit reinfestation of potatoes grown following the termination of a nonplanting period in an eradication area. These two wild morningglories are found only in limited sections of the sweetpotato-growing areas, mostly in the coastal and tide-marsh margins. In controlling the plants with a herbicide, it is desirable that DDT be included in the spray. The DDT will kill any weevils present or those that might emerge from the plants before the action of the herbicide is complete.

THE SUCCESS OF A CAMPAIGN against the weevil depends largely on the cooperation of every grower, packer, and storage operator. Programs to inform all individuals of the aims of the campaign in areas of commercial potato production in Louisiana have helped greatly in getting full support. The keystone of the endeavor is a county or parish committee of growers, storage operators, dealers, representatives of civic and other organizations, and public officials. The committees sponsor meetings of growers and school groups to discuss the problem and methods. Exhibits and publicity material are presented by Extension Service specialists, county agents, and State and Federal agricultural workers.

FOR SOME YEARS the States infested by the weevil have maintained quarantines to prevent spread of the pest to weevil-free areas within the infested States as well as to noninfested States. The enforcement of the quarantines is primarily a responsibility and function of State plant quarantine officials but the Bureau of Entomology and Plant Quarantine aids in the enforcement as a means of assistance in the eradication and control work. The quarantines of infested States and noninfested States regulate the movement of sweetpotato plants and parts thereof (including vine cuttings, slips, and potatoes), other species of *Ipomoea*, and other plants that may be found to be hosts of the sweetpotato weevil.

Fumigation with methyl bromide or another approved treatment is required for the movement of table-stock potatoes from any of the infested areas to any of the States maintaining quarantines. The sweetpotato-producing States have additional regulations pertaining to the certification and movement of seed potatoes and plants.

From the beginning of the cooperative Federal-State eradication and control work, Federal inspectors have assisted the States in enforcing the nonplanting restrictions and in carrying out other control and eradication measures. Between 1937 and 1951, control and eradication work was done in 106 infested counties in 7 States. Of the 16,169 infested properties found in the counties, 12,327 were freed of weevils. In 1951, there remained 3,842 infested properties in 73 counties of the 7 States. No weevils were known to be present in the other 33 counties.

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The Pea Weevil

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The pea weevil depends entirely on edible and field peas for its existence. It occurs nearly everywhere peas are cultivated.

It is a pest in all pea-growing areas of the United States and Canada. It is especially abundant in places where peas are grown for the dry seeds. In some localities—the upper Snake River Valley of eastern Idaho and parts of Montana, among them—it is held in check by the long, cold winters. Heavy and long continued rains, such as occur in parts of the coastal areas of Oregon and Washington, also reduce winter survival.

Until 1920 or so the pea weevil was considered primarily a pest of dry or seed peas and, indeed, the main limiting factor in their production. In vain attempts to evade its ravages, the industry moved steadily westward from one growing area to another, until the now great pea-growing areas of the West—principally Idaho, Oregon, and Washington—were reached. When the production of green peas for processing was begun, the problem became even more acute because the weevily or “wormy” peas are unfit for human use.

To meet this challenge and to assist the new industry in controlling weevils so as to prevent the contamination of canned or processed products, the agricultural experiment stations of Oregon, Washington, and Idaho and the Department of Agriculture in 1930 began a cooperative research program to develop a solution.

The damage done by the pea weevil is due entirely to the feeding of the grubs or larvae within the growing seeds. Almost always a single larva completes its development in one seed,