TOBACCO INSECTS

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FOR TOBACCO INSECT CONTROL DIRECTIONS—

This publication does not give control measures. For up-to-date directions on tobacco insect control, get a copy of the current miscellaneous publication, "Tobacco Insect Control," from your county agent or by sending a request to the Bulletin Office, Agricultural Experiment Station Building, University of Kentucky, Lexington.

Tobacco Insects

By H. H. Jewett

The tobacco plant may be attacked by insects from the early seedling stage until harvest. Thus it is necessary to provide some measure of protection for the plants in beds until they are pulled and, later, when they are transplanted and growing in the field. Control of the insects is mainly achieved by application of insecticides, but certain farm practices are often helpful. Frequent inspection of plants in the bed and field is necessary to detect which insects are present and to learn the extent of their damage.

The number of insects that attack the tobacco plant is not large, but some of them are capable of doing a great deal of damage. Sometimes the insects are referred to as either plant-bed insects or field insects, but several are destructive in both bed and field. This publication contains illustrations and descriptive matter on insects attacking tobacco.

KEY TO INSECTS INJURIOUS TO TOBACCO PLANTS

Insects Injuring Plants in the Bed

1. Immature insects damaging plants by burrowing into and disturbing the soil.

(a) Large white grub burrowing into and working up the soil. The grub crawls on its back.

Green June Beetle Grub (page 10)

(b) Small worm-like whitish maggot that damages germinating seed in patches in the bed by loosening and pulverizing the soil, which interferes with the rooting of the seedlings.

Midge Maggot (page 15)

(c) Tough, leathery, gray maggots, about 1 inch long, tunneling and working the soil near the surface.

Crane Fly Moggot (pages 15, 16)

the length of the body. They bore into the buds of plants that have made considerable growth, and when the buds expand the leaves have a ragged appearance. The worms also eat seed heads.

Corn Earworm (false bud worm) (pages 21, 22)

(d) Worms similar in shape and size to 8c (above), but the color of nearly mature worms is green with lighter stripes running the length of the body. Only an occasional worm found in central Kentucky. Plants injured as 8c above.

Tobacco Bud Worm (page 23)

(e) Large green worms with prominent horn-like appendages at the rear end of their bodies. These worms, when maturing, eat large holes or extensive areas of the leaves, sometimes leaving only the mid-rib.

Hornworm (pages 29, 30, 31)

INSECTS IN THE BEDS AND FIELDS

The insects most commonly found in plant beds in Kentucky include tobacco flea beetles, cutworms, green peach aphids, green June beetle grubs, springtails, crane fly maggots, and maggots of midges. Slugs are present nearly every year, and millipeds sometimes do considerable damage. Slugs and millipeds, however, are not insects.

Some of the insects that infest beds also attack plants in the field. Among these are the tobacco flea beetle, several kinds of cutworms, and the green peach aphid. In addition, several other insects attack tobacco and some, when numerous, may be very destructive. The more important ones are wireworms, budworms, hornworms, grasshoppers, and sod webworms.

Measures for Protecting Plants in Beds

A great deal of damage to plants in the bed may be prevented when measures are taken to kill insects in the soil and prevent other insects from entering the bed. These measures include: (1) burning the bed, (2) steaming, (3) fumigation with methyl bromide, and (4) enclosing the bed with a frame covered with tobacco cotton. The first three measures kill grass and weed

seed and many of the insects in the soil. Methyl bromide fumigation is more effective than either burning or steaming. A well-covered board frame around a bed will keep most insects from entering the bed.

The degree of control of white grubs and other soil insects accomplished by burning, steaming, or fumigation is affected by the mechanical condition of the soil and its moisture content and temperature. Also important, are the kind of wood used in burning beds, the pressure of steam in the boiler, and the length of time of exposure.

Burning

To kill insects and weed seeds near the surface requires the burning of fairly large wood for at least 30 minutes, even when the soil has been thoroughly prepared and is dry enough for good tillage. The heat should penetrate the soil to at least 3 to 4 inches. Burning may kill all white grubs and other insects to a depth of 6 inches, but generally to a depth of only about 4 inches.

Steaming

Applying steam at a boiler pressure of 100-125 pounds to well-prepared and fairly dry soil for 25 minutes has been known to kill insects to a depth of 10 inches.

Methyl bromide fumigation

To be effective, methyl bromide fumigation must be applied to thoroughly pulverized soil that is fairly moist. The soil temperature should be 50° F or warmer. Cover the bed with a gas-proof covering and seal the edges with soil; then release 1 pound of methyl bromide gas to 100 square feet into shallow pans or troughs, using a specially designed applicator. The cover should be removed after 24 to 48 hours. Methyl bromide gas is poisonous and will kill a good percentage of all insects to the depth of the plow line.

Cover for bed

A frame of boards, 6 inches wide, covered with a good grade of tobacco cotton is an effective means of preventing re-infestation of a bed by insects and other pests. The boards are set on edge around the bed and held in place by pegs. All joints at the ends of the boards must be tight and the soil packed firmly

beetles that emerge from hibernation in the spring and by the broods of adults that develop during the summer. The adults appear in 23 to 45 days after the eggs are laid, and three broods may develop during the season.

Injury

The beetles attack the plants in the beds and eat small circular areas from the leaves, leaving small round holes. When numerous, the beetles may destroy practically all plants in a bed. In central Kentucky, they are generally less destructive than in the western part of the state (Fig. 4).

Control

There should be little need for insecticides to control the tobacco flea beetle in beds that have been protected by a cloth-covered board frame, but when little or no protection has been provided some insecticide may be needed.

The tobacco flea beetle sometimes injures newly transplanted plants so severely that the plants die or make little growth. Generally the entire field of tobacco is not injured severely, but areas up to one-half acre or larger may be completely ruined. The tobacco grower should not neglect to check newly trans-

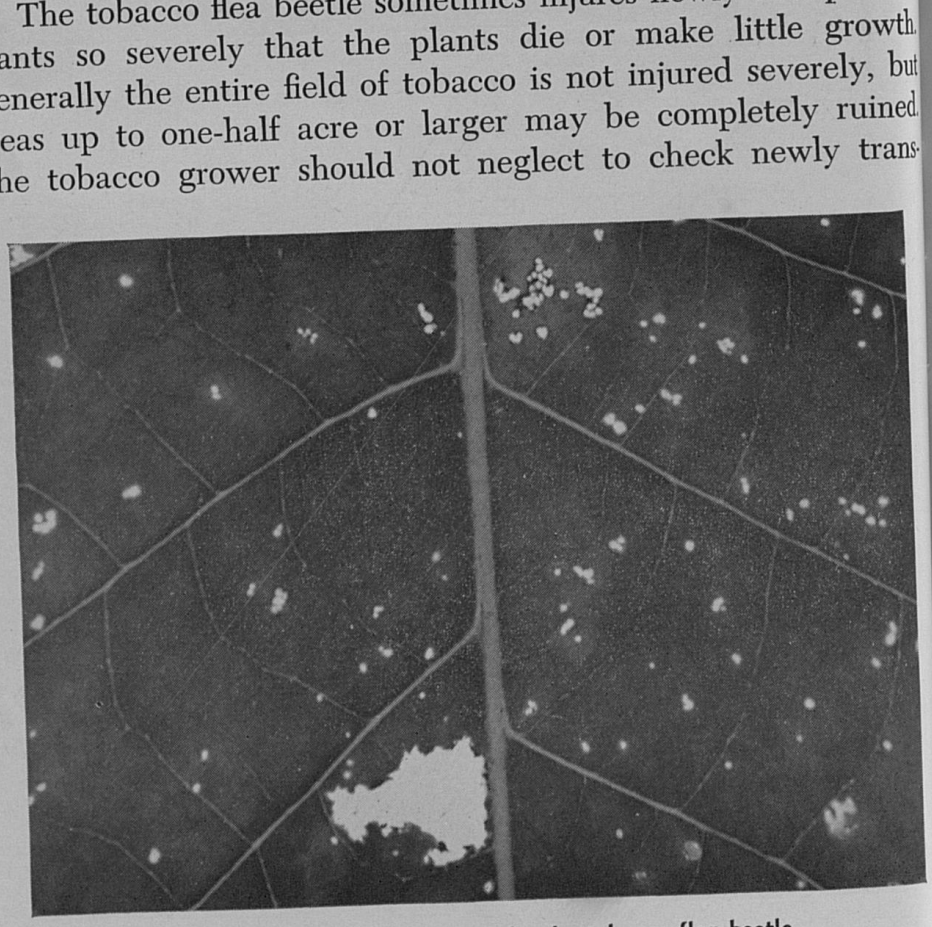

Fig. 4.— A leaf showing injury by the tobacco flea beetle.

planted plants for possible flea beetle injury. It is seldom necessary to apply control measures for flea beetles when the plants have made considerable growth.

Green Peach Aphid

The green peach aphid, *Myzus persicae (Sulzer)*, has been known in the United States for many years and has been found on a wide range of plants, including some deciduous fruits, vegetables, flowering plants, and ornamental shrubs (Fig. 5). In 1946, moderate infestations on tobacco by this aphid developed in several states, but the reason for the sudden attack on tobacco is not clear. This aphid now does considerable damage to tobacco in several counties in Kentucky.

Tobacco plants in beds infested by this aphid are not injured greatly, but infested plants when transplanted in the field cause many colonies of the aphid to become established and a general infestation to occur.

The aphid injures plants (1) by sucking the juices of plants and (2) by depositing honeydew excretions upon the leaves. The extraction of juices from the leaves causes thin light-weight leaves, and the honeydew and the resulting mold that develops upon it cause the leaf to cure a dark off-color, of poor quality.

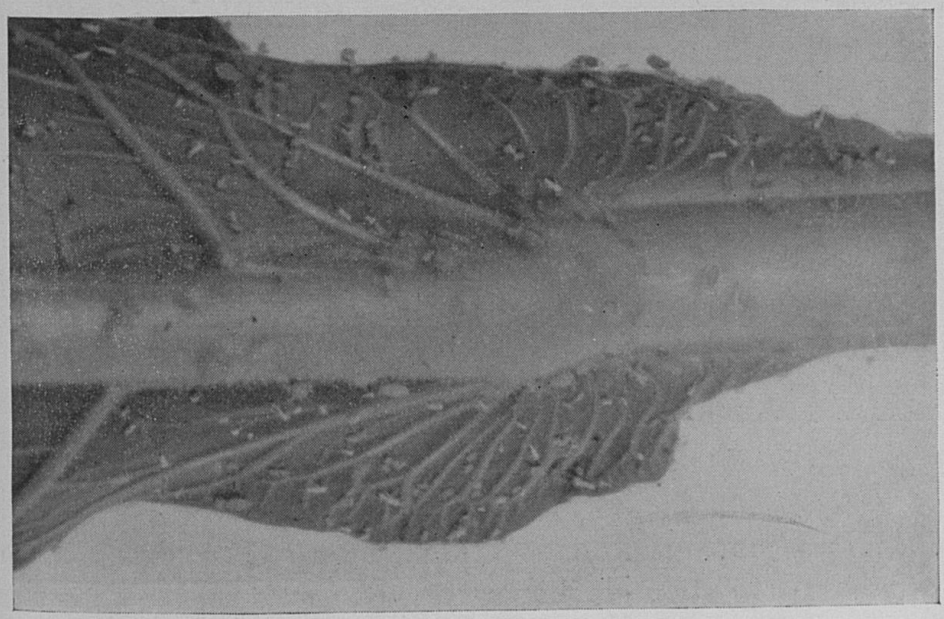

Fig. 5.— Green peach aphid on a tobacco leaf.

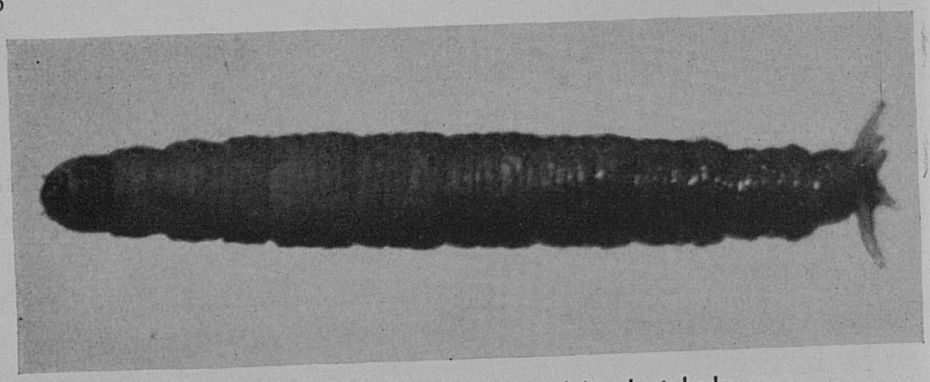

Fig. 9.—Crane fly maggot found in plant beds.

have been reported in plant beds in other states. The general color of the larva is grayish brown, and the body is cigar-shaped, about 1/8 inch in diameter and 4/5 inch long. Some appendages are arranged radially on the ventral surface of the last segment. The larvae are often called leather jackets and live over winter partly grown. The flies have very long, slender legs, with the bodies being approximately 3/5 inch long. They resemble very large mosquitoes (Fig. 9).

Injury

The larvae live mostly on humus in the soil but have been reported injuring lespedeza in Kentucky. In tobacco plant beds, the larvae loosen the soil at the surface, and in dry weather especially the very young plants do not become well-established in the soil and, consequently, many die. Also it is likely that the larvae cut out portions of the leaves and stems.

Cutworms

Tobacco in beds and fields is often injured by cutworms, of which approximately 2 dozen species have been reported as injuring tobacco. Cutworms are much more likely to be destructive to tobacco that follows crops that have occupied the land for several seasons, such as forage crops. Some adults, however, will lay their eggs on cultivated land.

Cutworms do their feeding late in the evening and at night, and hide during the day. A worm or two in a plant bed may destroy a considerable number of plants. They feed on the portion of the plants near the surface of the soil, consume portions of the leaves, and cut off stems; sometimes they climb the plants and feed on the leaves and buds, and cut off leaves.

Life history

Cutworms are the larval stage of moths often called "candle flies." The full-grown worms are from 1½ to 2 inches long, have rounded bodies, and are moderately stout. They are soft, and the different species vary from gray to brown, marked with dark lines or spots on the back.

The moths lay many eggs from which the young worms hatch and, after completing their growth, enter the ground to pupate; later the adults appear.

Some species of cutworms live over winter as larvae, others as pupae. Some produce three or four broods of worms a year; others require a year to complete development. The variegated cutworm, *Peridroma margaritosa* (Haworth), a common and destructive species, very likely lives over winter in the pupal stage (Figs. 10 and 11). It appears early in the spring as an adult,

Fig. 10.— Moth of the variegated cutworm.

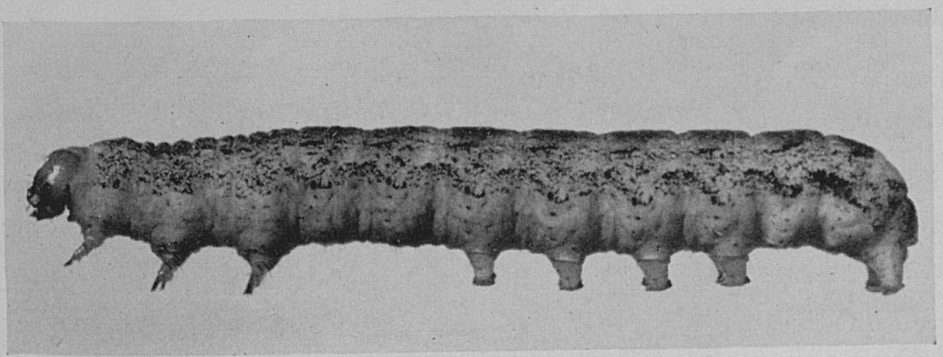

Fig. 11.— Variegated cutworm.

Fig. 15.— Young tobacco plants showing wireworm injury to the stalks.

Seasonal history

Adults and larvae live over winter. The adult group is composed of the first-generation adults of the previous season and the spring-brood adults. The spring-brood adults are those that develop from the overwintering larvae. The overwintering larvae are composed of first- and second-generation larvae of the previous season. Adults may live for several months. From part of the eggs laid in early spring, a brood of adults may develop in about 75 days, but from the rest of the eggs, a year or slightly more may elapse between egg-laying and appearance of the adults. Larvae that live over winter are the ones that attack newly transplanted tobacco plants, but larvae may be found around the roots the entire growing season.

Select Plants Resistant to Injury

The different varieties of tobacco that are in use are all subject to attack by wireworms, and no one variety seems to be attacked to a greater extent than any other.

The types of plants selected for transplanting, however, differ in their ability to resist injury by wireworms. One should select

plants for setting (1) that have stems about the diameter of a lead pencil, (2) that have stems long enough so the bud will not be covered with soil when transplanted, (3) and which are well-hardened.

Corn Earworm

The corn earworm, *Heliothis armigera* (Hbn.), attacks tobacco in Kentucky and is sometimes called the false tobacco budworm (Fig. 16). The tobacco budworm, *Heliothis virescens* (F.), is seldom found attacking tobacco in Kentucky.

The corn earworm attacks tobacco plants in spring after the plants have made considerable growth and sometimes is destructive to the seed heads, late in the season. The worms eat or bore through the leaves when they are still in the bud, and as the leaves unfold the holes in the leaves become larger and the leaves ragged (Fig. 17). This worm generally does not injure extensive areas of tobacco and it frequently appears when the first hornworms are observed.

Life history

The worms vary greatly in color from light green to brown and the body is marked with light and dark stripes running lengthwise of the body (Fig. 18). The full-grown worms are about 1½ inches long. The moths have a wing expanse of nearly 1½ inches. The fore wings vary in color but generally are light grayish brown, marked with dark gray irregular lines often shaded

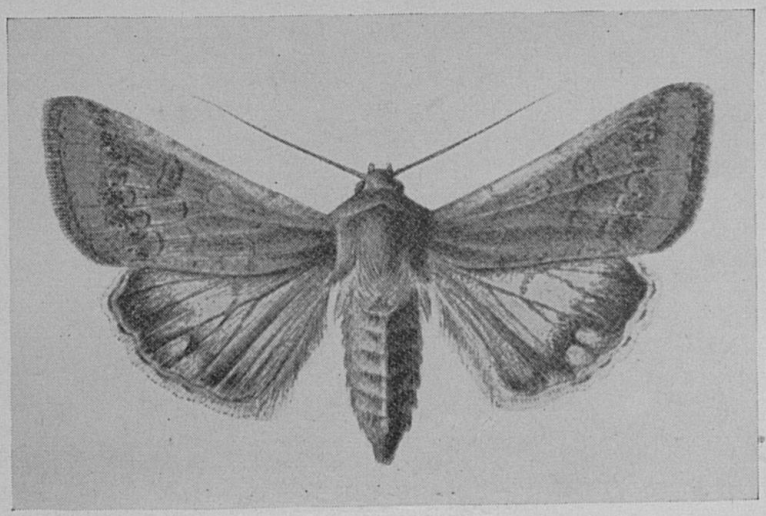

Fig. 16.— Moth of the corn earworm.

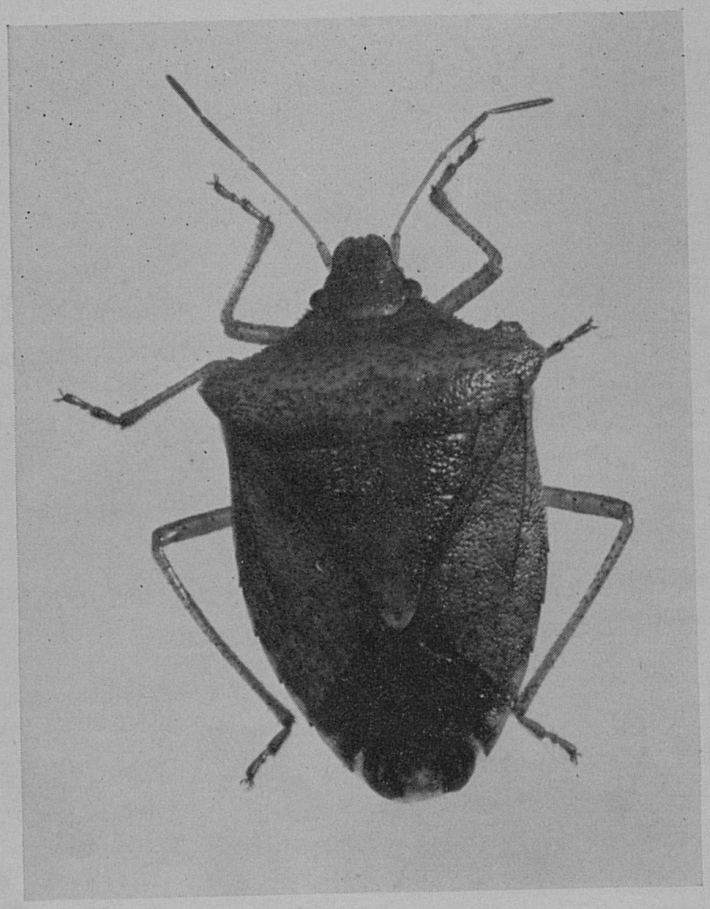

Fig. 19.—A stink bug that causes wilting of leaves.

Fig. 20.—Leaf showing wilting caused by a stink bug.

may attack several plants before completing its growth. The larvae are dark brown worms ranging from ¾ to 2 inches in length. All but the larger of the worms have a white stripe

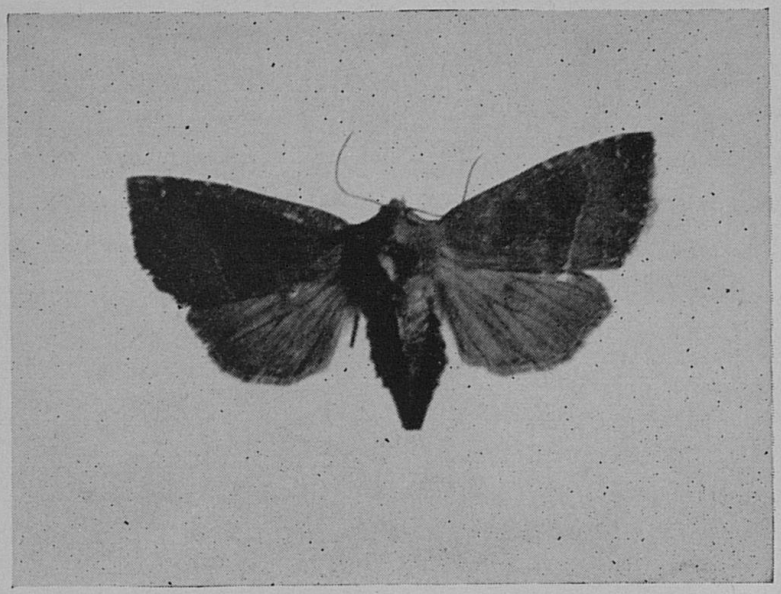

Fig. 21.— Moth of the common stalk borer.

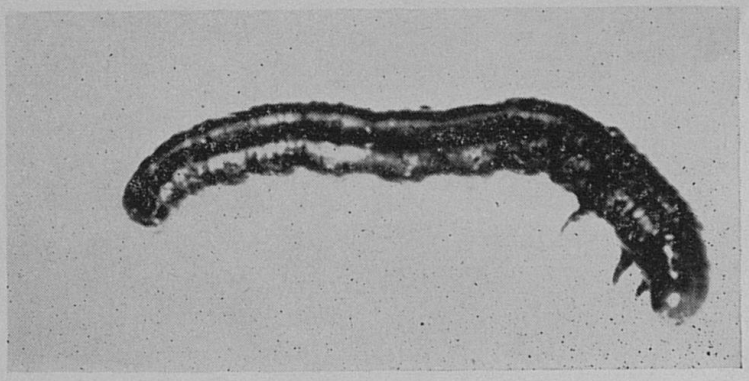

Fig. 22.— Larva of the common stalk borer.

down the back with broken white stripes on the sides. The mature worms are grayish colored (Fig. 21).

Life history

The insect hibernates in the egg stage, the eggs being laid in grasses and weeds. They hatch in early spring, and the worms feed or bore into the stems of various grasses and, later, bore into larger stalked plants where they complete their growth and pupate in July and August. The grayish-brown moths emerge

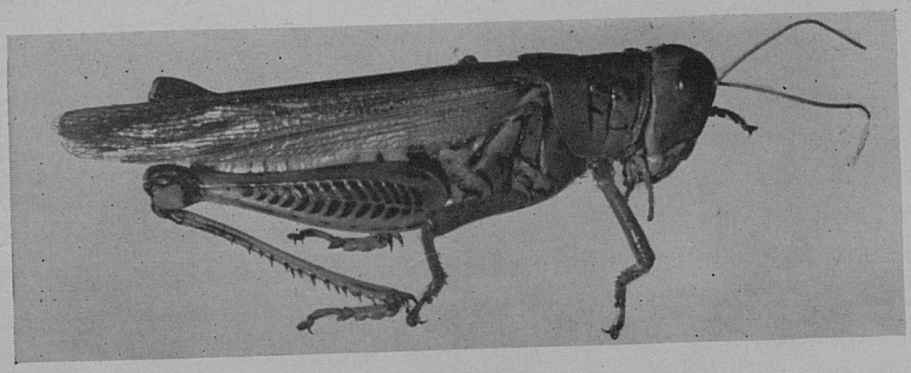

Fig. 25.— Two-striped grasshopper.

The two-striped grasshopper, *Melanoplus bivittatus* (Say), is dull olive brown to brownish fuscous above and pale yellow to dull greenish yellow beneath. A narrow yellow stripe extends back from the upper angle of each eye along the sides of the disk of the pronotum nearly to the tips of the wing covers. The females are large, having a body length as long as 1 1/5 inches. This hopper begins to reach maturity about June 15 and disappears in September (Fig. 25).

The differential grasshopper, *Melanoplus differentialis* (Thomas), is nearly uniform dark brownish green or olive green above, and bright to dull yellow beneath. This is a large and robust species, the females being larger than the males. The body length of the females may be as great as 1 4/5 inches. They reach maturity by mid-July and can be found till late fall (Fig. 26).

Tobacco Damaged by Adult Hoppers

Grasshoppers migrate into tobacco fields when they have developed wings, and they feed on the outside rows first and later move into the entire field. Practically all migration can be

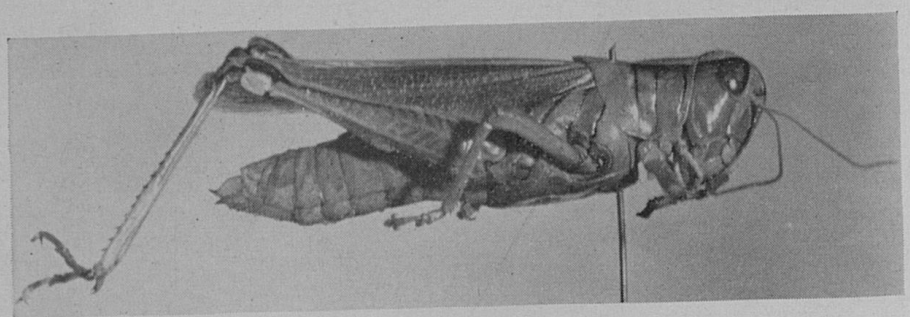

Fig. 26.— Differential grasshopper.

prevented if the farmer makes regular inspections in the fields and borders around his tobacco patch and applies an insecticide when the grasshoppers are immature.

Tobacco Hornworms

Hornworms may be found practically every year on tobacco plants in large enough numbers to make it necessary to apply insecticides. Two species of hornworms attack tobacco; the tomato hornworm, *Phlegethontius quinquemaculata* Haw., which is called the northern tobacco hornworm in the southern states and the southern tobacco hornworm, *Phlegethontius sexta* Joh. Each species is about equally destructive when present in comparable numbers. About 90 to 95 percent of the worms on tobacco in Kentucky are of the southern species.

Moths

The moth of the southern species is dark gray, the fore wings with a group of white irregular oblique whitish cross-bands. The abdomen is marked with six round, orange-yellow spots on each side (Fig. 27).

The moth of the northern species is light gray, and the hind wings are crossed with alternating black and whitish bands. The abdomen is marked with five orange-yellow spots on each side. The wing expanse of both species is about 4 inches (Fig. 28).

Worms

The body of the southern species is clothed with fine down. The general color is green with seven obliquely placed whitish

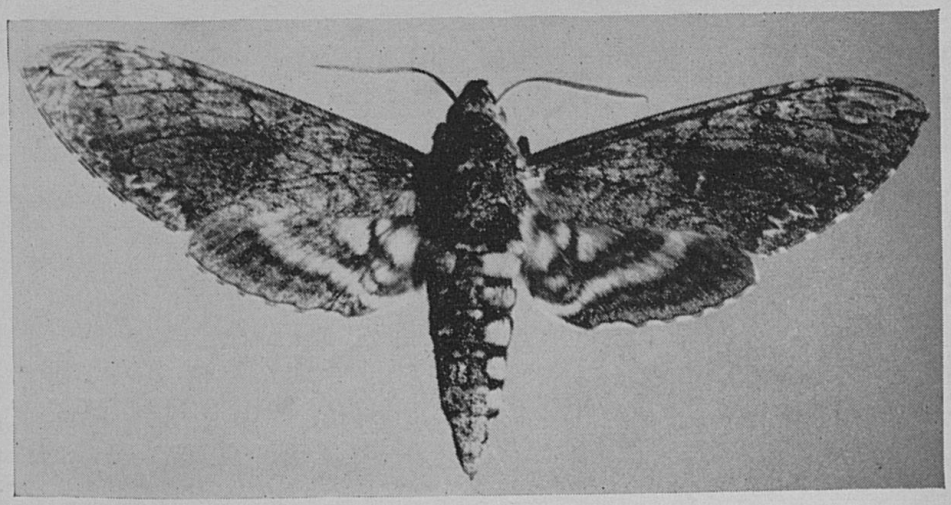

Fig. 27.— Moth of the southern tobacco hornworm.

an insecticide. Some farm practices help to reduce the worm population, but as a rule, an insecticide will have to be used before the tobacco is cut. One to four applications are necessary some years to protect the crop.

Farm practices

The practices generally useful are (1) hand-picking of worms where members of the family can do the work, (2) destroying the stubs of harvested plants to prevent the growth of suckers that furnish food in late season, (3) fall plowing to destroy pupae in the soil, but fall plowing should be done only in localities where this practice is good procedure.

Insect traps

No kind of insect trap is recommended for catching tobacco moths to reduce hornworm populations on tobacco.

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