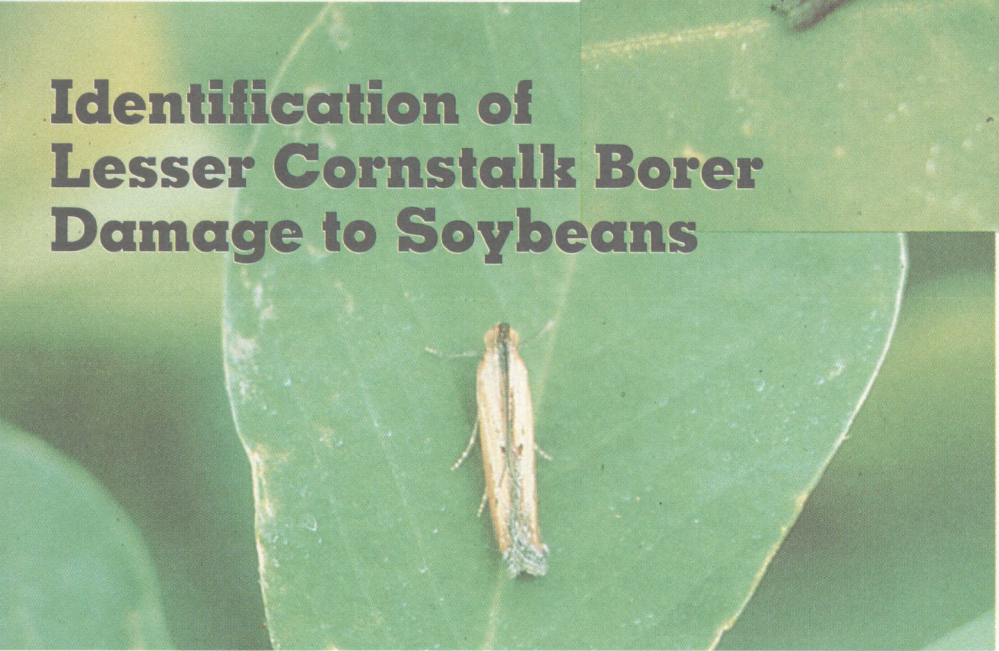




Identification of Lesser Cornstalk Borer Damage to Soybeans



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INTRODUCTION

THE lesser cornstalk borer, *Elasmopalpus lignosellus* (Zeller) (Lepidoptera: Pyralidae), is an insect pest of soybeans and other crops in the Southeastern United States. Severe outbreaks, such as the one in 1980, have shown that this pest can be a serious economic threat to crops and management programs are needed. Population outbreaks do not occur every year or in all parts of the State, but are most likely to occur during hot and dry weather in plants that are grown on sandy, well drained soils. A population outbreak in 1986 in the Wiregrass region of Alabama presented an opportunity for detailed

Cover Fig. Adult male (bottom) and adult female (top) lesser cornstalk borer.

observations of lesser cornstalk borer habits and their damage to soybeans.

DESCRIPTION OF THE STUDY

Certified Centennial soybean seeds were planted in 36-inch rows in a Dothan sandy loam soil at the Wiregrass Substation, Headland, Alabama. Soybeans were planted into wheat stubble on June 9, 1986, using strip til-

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lage with an in-row subsoiler. Lesser cornstalk borer populations were monitored weekly by sampling 200 plants and by examining each for insects and damage. Presence of lesser cornstalk borer was verified by locating larvae actively living within stems or within silken tubes attached to the plants. Larvae also were found to be associated with plant roots near the soil line. Stages of insect development and characteristic symptoms of plant damage by lesser cornstalk borer were documented.

RESULTS AND OBSERVATIONS

Identification of the Insect

Adult lesser cornstalk borers are small moths, approximately 12 mm (1 inch = 25 mm) in length, that are linear-shaped when resting on vegetation. These moths are active primarily at night and in the twilight hours and can be easily flushed from daytime under-canopy resting spots. A number of moths seen flying by a grower walking crop rows can alert him to possible infestations. Adult males, cover figure (bottom), are tan with a dark grey stripe down the center of the back, while females, cover figure (top), are more uniformly dark grey. The first generation in soybeans can occur at seedling emergence; thereafter, infestations can occur anytime during the season.

Adult female lesser cornstalk borers deposit small (0.6 mm diameter), greenish-yellow eggs which turn pinkish-white on plant stems near the soil line. Newly hatched larvae are pink and approximately 2 mm long. Mature larvae, figure 1, are bluish-green with dark transverse bands and reach a length of approximately 16 mm. As larvae develop they construct a series of silken tubes, figure 2, covered with soil particles which they attach to feeding sites at the bases of plant stems. Tubes are used as a refuge during periods when larvae are not actively feeding. Larval development can vary from 16 days during hot and dry periods to 40 days when temperatures are cooler. When mature, larvae transform into small greenish-yellow pupae (usually in the silken tube) in the soil near the base of infested plants. Pupae darken to brown as they age.

Damage

It is the larval stage that damages both soybean seedlings and mature plants. Larvae usually bore into the main stem at or just below the soil line. Several seedlings can be damaged by a single larva. Seedlings may be cut off at the soil line or extensive main stem tunneling may occur causing damaged seedlings to wilt in place. Plants in the later vegetative stages are damaged when larvae bore into the stems and tunnel upward, figure 3. In older plants, larvae make successive borings into the stem near the soil line, thereby riddling important nutrient conducting tissues, figure 4. This damage is significant because it reduces a plant's ability to withstand other stresses, such as drought and disease. Slight damage may cause varying degrees of stunting. Heavy damage causes plants to turn yellow, wilt, and die; dead plants may either remain standing in a characteristic brown teepee-shaped appearance, figure 5, or lodge, figure 6, due to pressure from wind or cultivation equipment.

There are several indicators of the potential for or presence of lesser cornstalk borer infestations in soybeans. First, most infestations are associated with extensive periods of hot and dry weather. Soybeans that are late-planted in June (i.e., double-cropped with wheat), when the weather is normally hot and dry, are more likely to be attacked. Plants in soils that dry out quickly, such as sandy soils, are also more susceptible to attack. Easily noticed symptoms of attack are wilted seedlings and yellowed, stunted, or lodged older plants. Lesser cornstalk borer infestations most often begin in several locations within a field (i.e., where areas of sandy soil occur). Other insects and certain diseases can cause similar symptoms in soybeans, but a survey can confirm the presence of lesser cornstalk borers. Examinations of several damaged living plants can be made by carefully uprooting plants and looking for characteristic bore holes and/or silken tubes near the base of plant stems. Also, splitting of several stems allows one to determine if tunneling by larvae has occurred.

Prevention of Damage

Adequate soil moisture is probably the best defense against lesser cornstalk borer. Management practices which optimize or conserve moisture (i.e., early planting, no-till cultivation, and irrigation) are helpful in areas prone to infestations. For example, season-long irrigation is cost prohibitive for most growers, but one or two waterings when plants are young and most susceptible to lesser cornstalk borer attack could reduce populations and be cost effective.

The use of insecticides is another control method. Chlorpyrifos (Lorsban®) at 0.5 to 2.0 pounds technical per acre is the only currently recommended granular insecticide for control of lesser cornstalk borer in soybeans. Best control results when this material is lightly incorporated at planting in narrow bands in the row. Cost can be minimized by limiting treatments to fields with previous infestation histories or those with predominantly sandy soils. If outbreaks occur in fields not treated at planting, early season applications can be considered. Currently there are no economic injury levels for lesser cornstalk borer in soybeans. However, agronomic studies indicate that a minimum of 4 to 6 undamaged plants per row-foot are needed for optimal yields. If existing larval populations threaten to reduce stands below that density, chlorpyrifos granules can be applied at recommended rates in narrow bands or broadcast. Lesser cornstalk borer larvae do crawl on the soil surface in and between crop rows and some efficacy can be obtained with sur-

face applications. Costs could be minimized if treatments were applied to 'hot spots' rather than over entire fields. It is important to apply post-plant treatments before extensive stem damage has occurred. Stem damage is permanent and although applications may reduce larval numbers, they may not enhance yields if many plants have already been damaged.

SUMMARY

The lesser cornstalk borer, an important insect pest of soybeans in Alabama, has population outbreaks primarily during hot and dry years. The larvae of this insect (2-16 mm in length) can be identified by their bluish-green, banded color pattern or by the presence of their silken tubes attached to plant stems. Larvae are most often found in stems, roots, or soil near the base of infested plants. Larvae make successive borings into the stems near the soil line, riddling important nutrient-conducting tissues. Heavily damaged plants turn yellow, wilt, and die; dead plants may remain standing in a teepee-shaped appearance, or lodge.

Agronomic studies indicate that 4 to 6 undamaged plants per row-foot are needed for optimal yields. If existing lesser cornstalk borer larval populations threaten to reduce stand density below this level, then control measures would be profitable. However, a knowledge of conditions favorable to the development of infestations can alert growers to potential problem situations and allow for more effective pre-season management strategies.



FIG. 1. Lesser cornstalk borer larva inside a soybean stem.



FIG. 4. Damage to an older soybean stem caused by lesser cornstalk borer larvae. Note the number of bore holes, and the enlarged stem diameter.



FIG. 2. Characteristic silken tube made by a lesser cornstalk borer larva.



FIG. 5. Brown and teepee-shaped dead plants caused by lesser cornstalk borer attack.



FIG. 3. Young soybean stem that has been tunneled into by a lesser cornstalk borer larva.



FIG. 6. Soybeans that have lodged because of lesser cornstalk borer damage to the main stem.

Information contained herein is available to all persons without regard to race, color, sex, or national origin.