

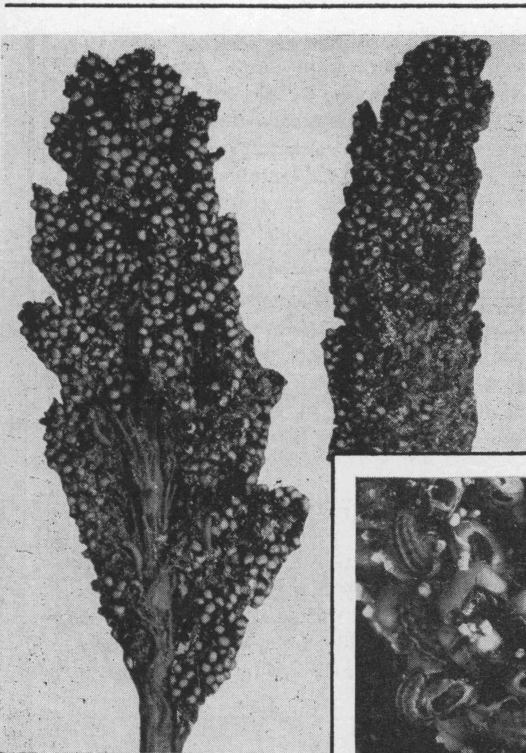
# GUIDE

*for CONTROLLING*

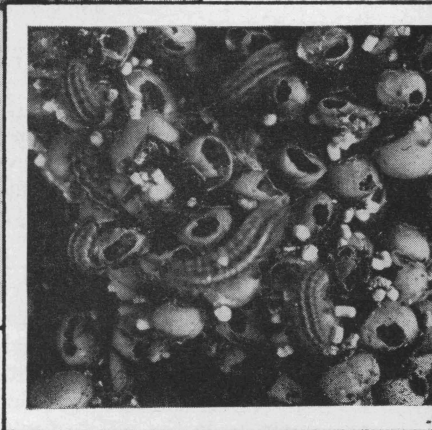
## INSECTS ON CORN, SORGHUM, SMALL GRAINS and GRASSES

*in TEXAS*

### 1956



**SORGHUM WEBWORM**



TEXAS AGRICULTURAL EXTENSION SERVICE  
G. G. Gibson, Director, College Station, Texas

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Corn, sorghum and small grains are important feed crops in Texas. Small grains are planted for grazing and grain production. All of the crops are subject to insect attack throughout the growing period and many insects attack the grain while in storage. Some of the insects are difficult to control, but most can be controlled effectively by using the best-known treatments.

## **FIELD PESTS**

### **Southern Corn Rootworm**

The southern corn rootworm is the immature stage of the spotted cucumber beetle. The rootworms attack the roots and lower parts of stalks of seedling plants, causing a loss in stand. The injury usually is more severe in corn following legumes or sod.

### **Wireworms**

Several species of wireworms and false wireworms cause injury to corn, sorghum and small grains. The wireworms are immature stages of click beetles while the false wireworms are the immature stages of darkling beetles. They damage the young sprouts that have just emerged, the kernel or the tender shoots just below the soil surface. At least 1 year is required for wireworms to complete the life cycle from eggs to adults.

### **Seed Corn Maggots**

Seed corn maggots attack the sprouting seeds of beans, peas, corn and potato seed pieces. The adults resemble small house flies. Larvae are white, legless maggots. Flies generally are attracted to soil high in organic matter and lay their eggs in the soil on or near the food plants.

### **White Grubs**

White grubs are immature stages of May beetles. The grubs feed on the roots of corn, sorghum and small grains. If they occur in sufficient numbers, stands may be lost. These pests are usually more damaging to grain crops following legumes or sod. Insecticides such as aldrin, dieldrin, heptachlor and chlordane, applied either as a dust or spray to the soil, greatly reduce the number of white grubs.

### **Cutworms**

Several species of cutworms are injurious to young grain plants in different ways: (1) by cutting off the young plants just above or slightly below the surface of the soil (2) by climbing the plants and feeding and (3) by remaining in the soil to feed on the roots. Most species of cutworms pass the winter in the larval stage. They feed on crops planted in the spring and continue to feed and grow until summer. After pupating, the moths emerge and deposit eggs in various crops. Some species

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have two generations a year, while others have only one. The species of the group that remains in the soil feeding on the roots cannot be controlled with surface application of insecticides.

## Armyworms

Several species of armyworms cause injury to grain crops. The moths usually lay their eggs in masses or clusters and large numbers of worms hatch. When the food supply becomes exhausted where they hatched, they move in "armies" to adjacent fields. Some species feed only at night, causing damage before they are discovered by the grower. Other species feed continuously and do not hide during the day. Several generations may occur each year. Parasites tend to prevent outbreaks of armyworms when favorable weather conditions exist. However, cool, wet springs prevent parasite development and the worms may increase to damaging numbers.

## Cornstalk Borers

Three common species of stalk borers attack corn in Texas.

The southern cornstalk borer and the southwestern cornstalk borer are grayish-white and marked with brown spots. Corn plants infested with stalk borers are twisted and stunted, often with an enlargement at the surface of the ground. The winter is passed as larvae in the lower part of the stalks just above the roots. A thorough clean-up of refuse and corn stubble, is the most effective control.

The lesser cornstalk borer is a bluish-green striped caterpillar that first feeds on the leaves or roots of young corn, later burrowing into the stalk. Here, too, a thorough clean-up of refuse and corn stubble is the most effective control measure.

## Corn Earworm

The corn earworm is considered the most damaging pest of corn. The moths deposit their eggs on fresh silks and the larvae feed on silks and kernels at the tips of ears. No practical control for this pest in field corn is known. For the control in sweet corn, see L-255. Some of the strains with long husks have proved somewhat resistant to earworm damage.

The corn earworm also attacks sorghum. Chemicals recommended for the control of sorghum webworms are recommended for this pest on sorghum. To control corn earworms in the bud of young sorghum, place the sprayer or duster nozzle directly over the tops of the plants.

## Chinch Bugs

Chinch bugs feed on corn, sorghum, small grains and wild grasses. The adults hibernate during the winter in clump-forming native grasses. In the spring they migrate

to adjacent grain fields where they suck sap from the plants and lay their eggs on the lower leaves and near exposed roots. When small grains are cut, the bugs either crawl or fly to nearby corn or sorghums. In Texas the chinch bugs usually transfer to these crops on the wing; thus barriers may not be practicable. Insecticides for the control of chinch bugs are given in the Table.

## Flea Beetles

Several species of flea beetles attack corn, sorghum and small grains. Flea beetles usually pass the winter in the adult stage. The adults become active in the spring and lay their eggs on the leaves or in the ground near the base of the plants. The damage to plants is caused by the adults feeding on the leaves and transmitting diseases. In most cases flea beetles do not develop in sufficient numbers to warrant chemical control. Cleaning fields of weeds will aid in the control.

## Sorghum Webworms

The sorghum webworm attacks the heads of grain sorghum. The sluggish caterpillars are somewhat flattened, clothed with spines and hairs and the bodies are greenish with four brown or red longitudinal stripes on the upper part.

## Sorghum Midge

Sorghum grains sometimes are severely damaged by the grayish maggots of the sorghum midge. This pest extracts plant juices from the developing seeds causing them to blast. Early planting can reduce damage by this pest.

## Mites

The winter grain mite may cause serious damage to oats, wheat and barley. Mite infestations in grain are considerably worse on land planted to grain in previous years. Crop rotation tends to reduce the damage. The mites are quite small, ranging from 1/32 to 1/16 inch in length. The adult has four pairs of legs which are reddish-orange and the body is dark brown with a bluish cast. This pest feeds during the night and may be found during the day around the base of plants under clods. The mites, retarded during hot, dry periods, do the greatest damage during winter and early spring. They cause the tips of the leaves to turn brown and the plants become stunted. Infested fields appear silvery.

The brown wheat mite often develops to injurious numbers on wheat. This mite resembles the winter grain mite except it is smaller and lighter brown. This species thrives in cool spring weather. When this pest becomes abundant, it causes the leaves to turn brown and the plants may die. The brown wheat mite also may be controlled by proper rotation and irrigation.

## Greenbugs

Greenbugs develop under certain conditions to large numbers and may cause serious losses. They attack wheat and other small grains. Fields infested usually show small deadened areas during the winter when these plant lice suck sap from the plants. Later, greenbugs in these spots increase and migrate throughout the entire field. In some cases, entire fields of grain are killed. However, greenbug outbreaks usually occur where the wheat or small grains suffer from deficient moisture in mild winters and cool springs. The greenbug reproduces rapidly at temperatures between 55 degrees and 65 degrees F. Their natural enemies, however, reproduce very slowly when the temperatures are below 65 degrees F. Thus, in cool weather the greenbug may increase to enormous numbers while its natural enemies can increase very slowly.

## Corn Leaf Aphid

Corn, grain sorghums, barley, broom corn and related plants are often attacked by greenish or greenish-blue aphids. They are first found feeding in the whorl of the plants but under severe infestations the leaves may be covered entirely. When the aphids feed in the whorl of the plants, they are well protected from insecticidal treatments. Frequently beneficial insects prevent severe damage by these aphids. If insecticidal treatments are needed, apply 1/2 to 1 pint of parathion (2 pounds per gallon), 1 to 1 1/2 quarts BHC (1.2 pounds gamma per gallon) or 1 pint 20 percent TEPP per acre as a spray. Do not apply parathion within 21 days or BHC within 30 days of harvest.

## Grasshoppers

Find the locations where young grasshoppers are hatching. They may be found on roadsides, field margins, in idle lands, pastures or fields. Sprays or dusts recommended in the Table should be applied to the hatching grounds when the hatch is completed. Timely applications will destroy grasshoppers before they move into cultivated fields.

## Stink Bugs

Several species of stink bugs are injurious to rice and other grain crops. The rice stink bug is straw-colored, while another smaller species is slender and dull brown. Other species may attack grain crops. Both the young and adults feed on rice or other crops from the early milk to the late stage causing yield losses and poor grades.

## Rice Water Weevils

Rice plants may be injured by the adult rice water weevil feeding on the leaves and by the larvae feeding on the roots. The adults can be controlled with DDT applied to the young plants.

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## Insects That Attack Pastures

Pests such as armyworms, chinch bugs and grasshoppers often damage grasses. Controls for these pests are shown in the Table under other crops.

White grubs, cutworms and wireworms also may damage pastures. It is usually impractical to control soil pests on rangelands, but control measures sometimes are applied to improved pastures. White grubs may be controlled with aldrin at 0.1 pound or chlordane at 0.25 pound per 1,000 square feet of turf applied as a dust or spray. The other insects may be controlled with lower dosages.

## SEED TREATMENTS TO CONTROL CERTAIN SOIL INSECTS

Good control of southern corn rootworms, wireworms and seed corn maggots has been obtained with dieldrin, lindane or heptachlor used as seed treatments on several different crops. Dieldrin or lindane should be used at the rate of 1 ounce and heptachlor, at 1 to 1½ ounces of actual toxicant mixed with 100 pounds of seed corn. Use 2 ounces of actual dieldrin or lindane or 2 to 3 ounces of actual heptachlor mixed in 100 pounds of wheat, grain sorghums, rye, barley or oats. For example, if a 50 percent wettable powder of dieldrin is used, 2 ounces of this material would treat 100 pounds of seed corn or 4 ounces would treat 100 pounds of wheat, grain sorghums, rye, oats or barley.

Dieldrin, lindane or heptachlor may be applied to the seed whether or not they were treated previously or will be treated with a fungicide. Avoid an overdose of insecticide on the seed. Excessive amounts may retard the growth of young plants.

It is important to distribute the insecticide evenly so that each seed will be coated. Several suggested methods for treating the seed follow.

1. Use a concrete mixer for treating the seed.
2. A simple "treater" can be made out of a metal or wooden barrel by drilling an offsetting hole in each end through which a pipe, with a handle on one end, is inserted and anchored. This device can be mounted on two posts (stationary or portable) in such a manner that the barrel is suspended diagonally between the two posts. A trap door must be provided in the barrel for placing seeds and insecticide within. Sufficient distribution of the insecticide is obtained by turning the handle slowly.
3. A lard can might be used to treat small quantities of seed. Fasten the lard can lid securely to prevent it from coming off. The seed and insecticide are placed in the can together with several rocks about the size of a hen egg. After the lid is

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securely fastened, the can is rolled back and forth on the ground or floor to assure thorough mixing of the insecticide and seed.

When the seed are treated in a concrete mixer or homemade barrel-type mixer, sprinkle 1 pint of water on each 100 pounds of seed and mix to coat the seed with moisture. Then add the correct amount of insecticide to the seed and mix thoroughly.

**CAUTION: SEED TREATED WITH INSECTICIDES MUST NOT BE USED FOR FOOD OR FEED PURPOSES.**

## **APPLICATION OF INSECTICIDES**

Results of experiments indicate that sprays and dusts are equally effective in most areas when properly applied. Dust applications should be made when the air is calm or nearly so. When ground dusters are used, the nozzles should be about 6 to 8 inches above the tops of the plants.

Spray applications can be made when winds do not exceed 15 to 20 miles per hour. Spray when the plants are dry. Use No. 3 cone nozzles set 20 inches apart on the boom of a tractor sprayer. If the sprayer is operated at 60 pounds pressure per square inch and the tractor speed is about 4 miles per hour, the sprayer will deliver approximately 5 gallons of spray per acre. The nozzles should be from 6 to 9 inches above the tops of the plants to obtain adequate coverage. If young corn is to be sprayed for armyworm or cutworm control, only one nozzle per row is needed. The spray boom should be mounted on the rear of the tractor.

Both ground machines and airplanes are effective for applying poisons. For best results with airplanes, be sure to flag the swaths so that they will meet or overlap.

## **CAUTION**

**ALL INSECTICIDES ARE POISONOUS AND PRECAUTIONS ON THE LABELS SHOULD BE FOLLOWED STRICTLY. SPECIAL PRECAUTIONS SHOULD BE TAKEN IN HANDLING TEPP OR PARATHION TO AVOID PROLONGED CONTACT WITH THE SKIN OR BREATHING THE VAPORS OR DRIFT FROM EITHER SPRAYS OR DUSTS.**

The recommendations in this leaflet are based upon results of experiments conducted by the Texas Agricultural Experiment Station, Texas A. & M. College System and other research agencies.

For additional information contact your county agent or write the extension entomologist, College Station, Texas.

# CONTROL PROGRAM

## CORN

PESTS	Dusts	INSECTICIDES Sprays and Lb. of Toxicant per Gal.	AMOUNT OF SPRAY CONCENTRATE PER ACRE	REMARKS
Southern corn rootworms, wireworms and seed corn maggots	<ol style="list-style-type: none"> <li>1. 2½% dieldrin</li> <li>2. 2½% heptachlor</li> <li>3. 2½% aldrin</li> <li>4. 10% chlordane</li> <li>5. 3% BHC (gamma)</li> </ol>	<ol style="list-style-type: none"> <li>1. Heptachlor (2 lb. per gal.)</li> <li>2. Dieldrin (1.5 lb. per gal.)</li> <li>3. Chlordane (4 lb. or 8 lb. per gal.)</li> <li>4. BHC (1.2 lb. gamma per gal.)</li> <li>5. Aldrin (2 lb. per gal.)</li> </ol>	<ol style="list-style-type: none"> <li>1 pt.</li> <li>1 1/3 pt.</li> <li>1½ qt. or 1½ pt.</li> <li>1¾ pt.</li> <li>1 pt.</li> </ol>	Insecticides should be applied to the furrow immediately before or during the planting operation. Seed treatments have also proved effective in controlling these pests. (See text.) Apply 3% BHC at 8 lb.; 10% chlordane at 15 lb.; 2½% dieldrin, heptachlor or aldrin at 10 lb. per acre.
Cutworms and armyworms	<ol style="list-style-type: none"> <li>1. 20% toxaphene</li> <li>2. 10% DDT Apply dust at 10 to 15 lb. per acre</li> </ol>	<ol style="list-style-type: none"> <li>1. DDT (2 lb. per gal.)</li> <li>2. Toxaphene (6 lb. per gal.)</li> <li>3. Toxaphene-DDT (4 lb.-2 lb. per gal.)</li> </ol>	<ol style="list-style-type: none"> <li>½ to 1 gal.</li> <li>1 1/3 to 2 qt.</li> <li>1 1/3 to 2 qt.</li> </ol>	A thorough application should be made to the soil and young plants.
Chinch bugs	<ol style="list-style-type: none"> <li>1. 10% DDT</li> <li>2. 20% toxaphene</li> <li>3. 10% chlordane Apply dust at 10 to 15 lb. per acre</li> </ol>	<ol style="list-style-type: none"> <li>1. Toxaphene (6 lb. per gal.)</li> <li>2. Chlordane (4 lb. or 8 lb. per gal.)</li> <li>3. DDT (2 lb. per gal.)</li> </ol>	<ol style="list-style-type: none"> <li>1 1/3 to 2 qt.</li> <li>1 to 1½ qt. or 1 to 1½ pt.</li> <li>2 to 3 qt.</li> </ol>	These pests may be controlled by spot treatment when first found.
<b>GRAIN SORGHUMS</b>				
Sorghum webworms and corn earworms	<ol style="list-style-type: none"> <li>1. 10% DDT</li> <li>2. 20% toxaphene Apply dust at 10 to 15 lb. per acre.</li> </ol>	<ol style="list-style-type: none"> <li>1. Toxaphene-DDT (4 lb.-2 lb. per gal.)</li> <li>2. DDT (2 lb. per gal.)</li> </ol>	<ol style="list-style-type: none"> <li>1 1/3 to 2 qt.</li> <li>2 to 3 qt.</li> </ol>	Application should be made during the middle of the day when grain heads are open. Application should be made when seedheads are in full bloom. Do not apply within 30 days of harvest.
Aphids	(See text.)			
Wireworms	(See text for seed treatment.)			
<b>SMALL GRAINS (except rice)</b>				
Wireworms	(See text for seed treatment.)			
Cutworms and armyworms	(See Corn.)			
Greenbugs and mites	(Dust not recommended.)	<ol style="list-style-type: none"> <li>1. Parathion (2 lb. per gal.)</li> </ol>	<ol style="list-style-type: none"> <li>1 pt.</li> </ol>	Greenbugs are more effectively controlled when temperatures are above 50° F. Apply control measures for mites if stand is threatened and ample moisture is present. Do not allow livestock to graze grain within 21 days following treatment.
Chinch bugs	(See corn.)			
Flea beetles	(See corn.)			
Grasshoppers	<ol style="list-style-type: none"> <li>1. 20% toxaphene</li> <li>2. 2½% aldrin</li> <li>3. 10% chlordane</li> <li>4. 2½% dieldrin</li> <li>5. 2½% heptachlor Apply dust at 10 to 15 lb. per acre.</li> </ol>	<ol style="list-style-type: none"> <li>1. Aldrin (2 lb. per gal.)</li> <li>2. Heptachlor (2 lb. per gal.)</li> <li>3. Dieldrin (1.5 lb. per gal.)</li> <li>4. Toxaphene (6 lb. per gal.)</li> <li>5. Chlordane (4 lb. or 8 lb. per gal.)</li> </ol>	<ol style="list-style-type: none"> <li>½ to 1 pt.</li> <li>½ to 1 pt.</li> <li>1/3 to 2/3 pt.</li> <li>1 qt.</li> <li>1 qt. or 1 pt.</li> </ol>	If grasshoppers are migrating into a field, the dosages should be increased and in some cases doubled. Hatching grounds should be treated before the hoppers move into cultivated crops. Do not allow livestock to graze grains within 30 days after application.
<b>RICE</b>				
Stink bugs	<ol style="list-style-type: none"> <li>1. 20% toxaphene</li> <li>2. 10% DDT</li> <li>3. 2½% aldrin</li> <li>4. 2½% dieldrin</li> </ol>	<ol style="list-style-type: none"> <li>1. DDT (2 lb. per gal.)</li> <li>2. Toxaphene (6 lb. per gal.)</li> <li>3. Dieldrin (1.5 lb. per gal.)</li> <li>4. Aldrin (2 lb. per gal.)</li> </ol>	<ol style="list-style-type: none"> <li>2 to 3 qt.</li> <li>1 1/3 to 2 qt.</li> <li>1½ to 2 pt.</li> <li>1 to 2 pt.</li> </ol>	Apply insecticides when 15 or more stink bugs are found per 10 sweeps of a 15-inch diameter net. Do not apply within 30 days of harvest. Apply dust at 10 to 15 lb. per acre.
Water weevils	<ol style="list-style-type: none"> <li>1. 10% DDT at 10 to 15 lb. per acre</li> </ol>	<ol style="list-style-type: none"> <li>1. DDT (2 lb. per gal.)</li> </ol>	<ol style="list-style-type: none"> <li>2 to 3 qt.</li> </ol>	Rice plants may be injured by adult weevils feeding upon the leaves and larvae feeding upon the roots. Adults can be controlled with DDT applied to young plants. Do not apply insecticide within 30 days of harvest.
Other pests	(See small grains.)			