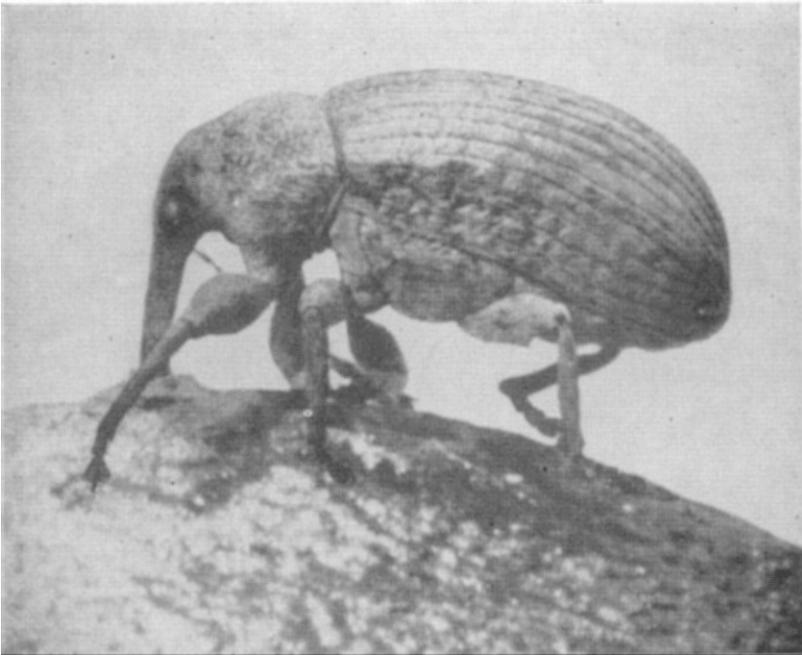


Cotton Insect Control

Cir. No. 430



Adult Boll Weevil in Feeding Position.

EXTENSION SERVICE, OKLAHOMA A. AND M. COLLEGE
Shawnee Brown, Director
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TABLE OF CONTENTS

Boll Weevil Control.....	4
Cotton Aphids or Plant Lice.....	7
Grasshoppers	7
Bollworm	9
Cotton Flea Hopper.....	10
Cotton Leafworm.....	10
Miscellaneous Cotton Insects.....	11
Dusting Machinery	12

Note: Cover page figure and Figs. No. 5, 10, 12, 13 and 14 by courtesy of U. S. Department of Entomology and Plant Quarantine. Figs. No. 1, 2, 4, 6, 8 and 11 by courtesy of Sherwin Williams and Fig. No. 7 by courtesy of G. A. Bieberdorf, Assistant Professor of Entomology, Oklahoma A. and M. College.

* A 10 percent Sabadilla dust is very effective against stink bugs.

COTTON INSECT CONTROL

by

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Extension Entomologist

Each year cotton insects take a heavy toll from the cotton farmer. It has been estimated that insects reduce the cotton yield by 15 percent over the entire cotton growing area of the United States.

During some years in Southeastern Oklahoma the damage to the cotton crop may run as high as 65 percent and some farmers have lost their entire crop where no insect control was used. Many times the difference between insect control and no control means the difference between a profit and a complete loss of the cotton crop. Cotton growers, merchants, bankers, cotton ginners, cottonseed crushers and others interested directly, or indirectly, in increased cotton production should realize the importance of having on hand adequate supplies for insect control. It is often too late to secure materials after an outbreak has occurred.

Cotton farmers can do much on their own farms to increase the per acre yield and profits from growing cotton. Seven steps that lead to balanced production, lower cost, better cotton and higher profits are:

1. Fit cotton into balanced farming.
2. Take care of your soil.
3. Get together on the best local variety.
4. Make your labor count.
- *5. CONTROL INSECTS AND DISEASES.
6. Pick and gin for high grade.
7. Sell for grade and staple value.

***INSECT CONTROL OFTEN DOES MORE TO INCREASE YIELDS AND LOWER PRODUCTION COSTS THAN ANYTHING ELSE THE FARMER CAN DO.**

Note: Cover Page — Adult Boll Weevil in Feeding Position.

Most of the injury to cotton in Oklahoma is caused by four insects: The boll weevil, grasshopper, bollworm and cotton leafworm.



Fig. 1—Adult Weevil Attacking Square.

This feeding method makes it much more difficult to control than the leafworm which feeds only on foliage.

BOLL WEEVIL CONTROL

Early Seasonal Treatment

The over-wintering boll weevils feed first on the small tender leaves on or near the top of the plant. Early in the season, before squares are large enough for weevils to puncture, examine the plants for boll weevils. If weevils

are found at the rate of 25 or more, per acre, presquare poisoning may be used as a preliminary measure.

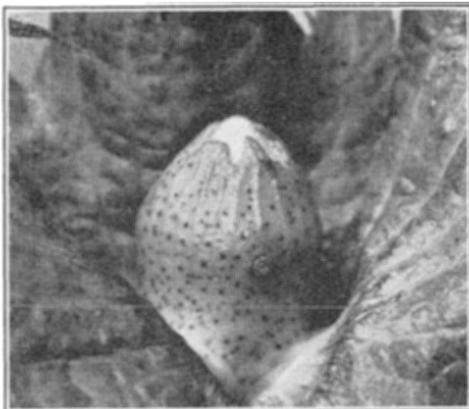


Fig. 2—Egg Puncture in a Square. Note the raised wart-like area where the egg was inserted.

Control

When 25 or more weevils are found, per acre, dust with calcium arsenate at the rate of 3 to 4 pounds per acre. Adjust the dusting machine nozzles close to and above the plants in order to apply the dust directly into the tops of the plants where most of the weevils are feeding. Dust every 5 or 6 days until 2 or 3 early applications have been made. By that time large squares or blooms will be present and treatments should be stopped until square examinations show that the weevils are abundant enough to require dusting.

The boll weevil is the most important and does perhaps as much damage on the average as the other three combined. The boll weevil is also one of the most difficult insects to control even though it gets its food by chewing portions of the tender foliage early in the year. Later it feeds on the squares and bolls. The boll weevil's mouthparts are located at the end of the snout. Much of the adult boll weevil's feeding is done inside the squares or bolls after feeding punctures are made.



Fig. 3—Power Take-Off Duster. Note nozzle over each row.

Dusting After Fruiting Begins

(1) After cotton begins to fruit, examine the plants once a week or oftener for weevil-punctured squares. To determine the percentage of weevil-injured squares, walk diagonally across the field and pick a total of 100 squares, equally from top, middle and lower limbs. Select squares large enough for weevils to puncture (half grown or larger). The number of squares found punctured in 100 squares examined is the percentage of square infestation. In large fields the counts should be made in several places to determine which parts of the field should be dusted.

(2) Begin dusting with calcium arsenate when 10 to 25 percent of the squares are punctured. On light soils, where the cotton does not grow rank and where it matures early, dusting should begin when 10 to 15 percent of the squares are punctured. It has been found that it does not pay to poison boll weevils on soil that will not produce at least one-half bale of cotton, per acre, in normal seasons. On fertile soils, where cotton continues growing and fruiting until late in the season, it is safe and often more profitable, to wait until 20 to 25 percent of the squares are punctured, before dusting.

(3) Dust with 5 to 7 pounds of calcium arsenate, per acre, every 4 or 5 days until the weevils are brought under control or

a crop of bolls is mature. On exceedingly large cotton where weevil infestation is high, the dosage should be increased to 8 or 10 pounds per acre.

(4) Repeat the application if the dust is washed off by rain within 24 hours. Three to 5 applications that remain on the plants will usually control the weevils and result in the setting of a crop. From 1 to 3 later dustings are sometimes needed to protect bolls from weevil damage.

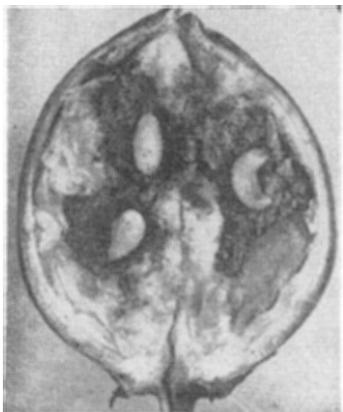


Fig. 4—Grown Boll Badly Damaged by Developing Weevils.

(5) Dusting with calcium arsenate alone may be done at any time of the day or night *when the air is calm*. It is more important to dust when the air is calm or nearly so than when the plants are wet with dew.

(6) Low winter temperatures and hot, dry summers help control the boll weevil. Watch for a rapid increase of weevils during rainy spells in the growing season. The largest gains and most profitable returns from dusting are obtained in years when weevils are most abundant. Dusting pays better in wet than in dry seasons.

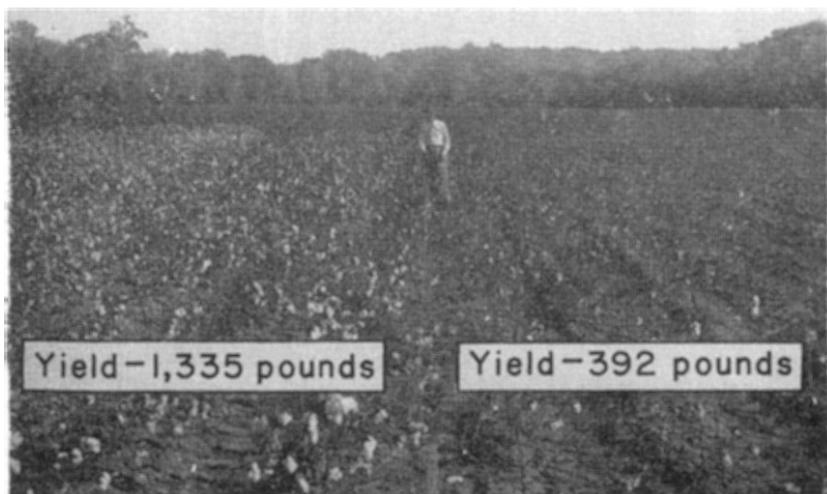


Fig. 5—Treated and Untreated Field for Boll Weevil Control.

COTTON APHIDS OR PLANT LICE

When several applications of calcium arsenate are made for control of the boll weevil damaging infestations of aphids (plant lice) may follow. During some years aphids are present in damaging numbers when no calcium arsenate has been used. The aphids suck the plant juices from the leaves, buds, etc., and excrete honey dew, a sticky substance and a medium for sooty mold, which lowers the grade by discoloration and weakening the fiber. Aphids stunt young plants and curl the leaves. On older plants the aphids cause cotton leaves to lose their color and fall off and reduce the yield of cotton.

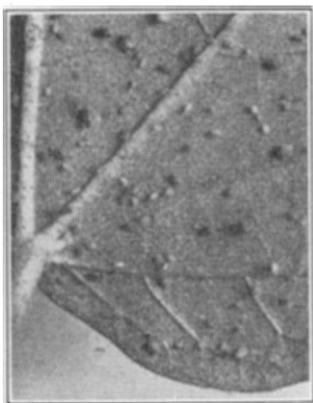


Fig. 6—Aphids on Cotton Leaf.

Control

The addition of nicotine to calcium arsenate, 2 percent in alternate applications or 1 percent in every application, is effective in preventing aphid damage. Under present conditions 2 percent of actual nicotine in alternate applications is preferred. Usually, one or two applications will control aphids.

Apply when the air is calm so the dust will stay down among the cotton plants. The temperature should be 70° F., or above, when using nicotine dust. Nicotine kills by coming in contact with the aphids.

GRASSHOPPERS

Most every year grasshoppers destroy some cotton in Oklahoma soon after it germinates or while the plants are small. About one year in five the damage may be severe and thousands of acres are destroyed. Oftentimes the damage occurs late in the planting season and it is not practical to replant the cotton. Most of the damage to cotton is caused by grasshoppers that spend the winter in the egg stage. The eggs are laid in the fall in clumps of grass on sunny slopes along roadways, turn-rows, ditch banks, etc. The eggs begin to hatch the latter part of April over most of the state. Extensive damage is caused to cotton by grasshoppers using grain fields and alfalfa fields as stepping stones from hatching areas to cotton fields. The young hoppers, if not poisoned, will move into the cotton field and begin feeding on the young plants. When the terminal bud is destroyed, the cotton plant dies. Some ragging of the leaves may occur late in the season but this damage is light unless there is an extremely heavy grasshopper infestation.

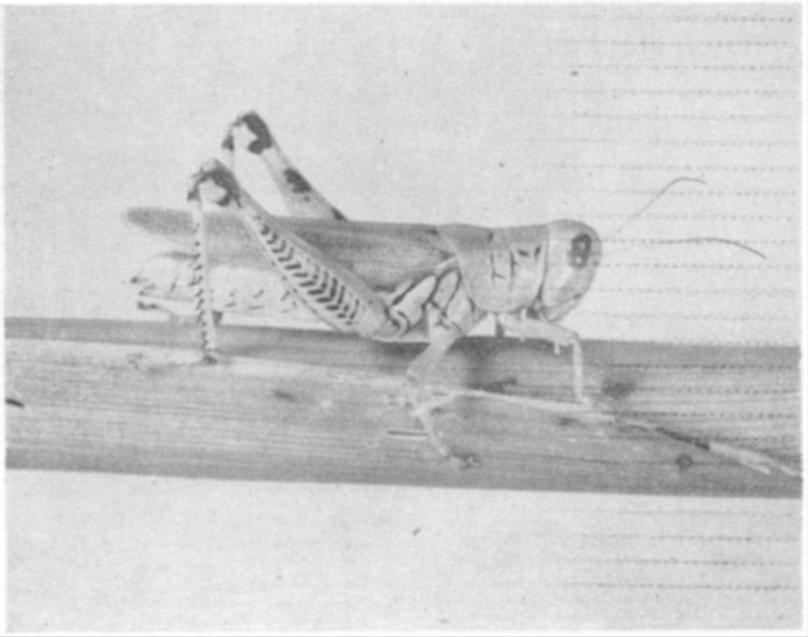


Fig. 7—Differential, or Yellow-legged Grasshopper Feeds Principally on Cotton, Corn and Alfalfa.

Control

(1) Deep fall and winter plowing of egg beds will destroy many of the hopper eggs and this practice should be followed whenever possible.

(2) Use poisoned bran mash when the hoppers are small and before they leave the hatching area. To make the poisoned bran mash use:

Bran—100 pounds (1 part by volume)

Sawdust or cottonseed hulls—(3 parts by volume)

Sodium fluosilicate—16 pounds

Water—20 to 30 gallons

Thoroughly mix dry ingredients before adding water. To the dry mixture add 20 to 30 gallons of water or a sufficient amount to moisten the bait. The proper moisture content of the bait can be determined by squeezing a handful of the mixture. On squeezing the bait formula a few drops of liquid should collect on the knuckles. When sodium fluosilicate is not available white arsenic or Paris green may be used at the rate of 5 pounds to each 100 pounds of dry bait mixture, or sodium arsenite—2 quarts.

Spread the bait broadcast, preferably early in the morning, over the area where the young hoppers are present at the rate of 20 pounds of the wet mixture per acre. Unless the little hoppers are poisoned before they scatter over the cotton fields, much damage will result. It is difficult to poison old hoppers once they get distributed over the cotton fields.

BOLLWORM

Bollworms are also called corn earworms and tomato fruitworms. The bollworm moth prefers rapidly growing cotton on which to lay its eggs. Generally, the damage is late in the season and a cotton crop may be destroyed in a short time.

Examine the tips of the plants frequently for eggs when it is time for the bollworm to appear. The eggs are one-half the size of a pinhead and pearly white when laid, but change to a darker color before hatching.



Fig. 8—Young Bollworm Larva Attacking Square.

The small worms feed principally on the tender buds and leaves and outside of squares for several days after hatching and at this stage they can be controlled.

The large worms feed mostly on the inside of bolls and are difficult to control.

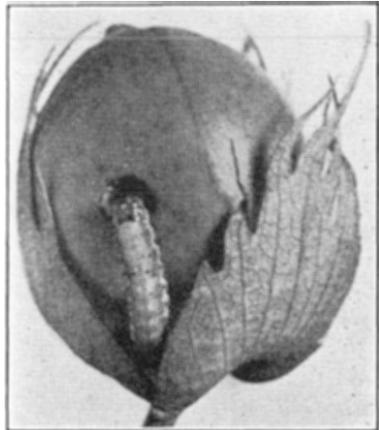


Fig. 9—Large Bollworm Attacking Boll.

Control

The following materials are recommended in order of their effectiveness:

1. Five percent DDT dust at the rate of 15 to 20 pounds per acre.
2. Basic copper arsenate-sulfur mixture at 12 to 15 pounds per acre.
3. Cryolite at 8 to 10 pounds per acre.
4. Calcium arsenate at 12 to 15 pounds per acre. DDT is more

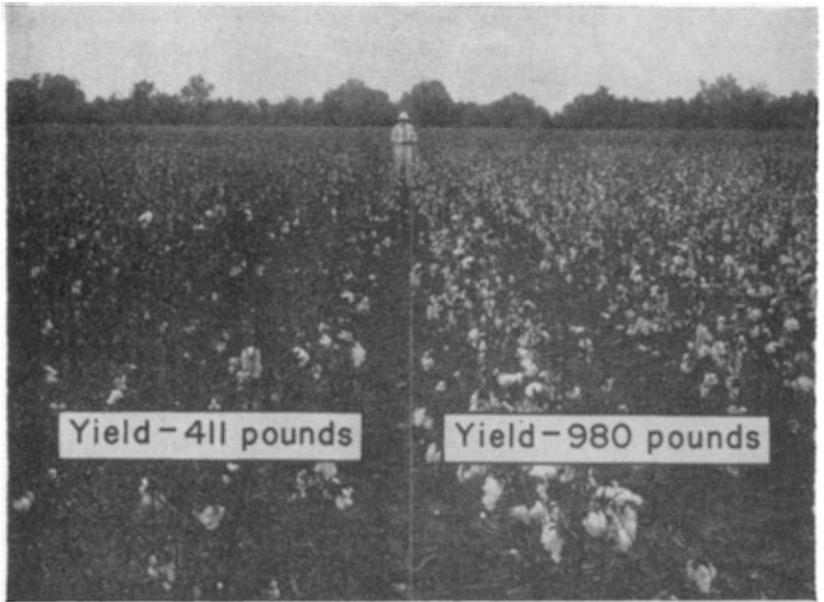


Fig. 10—Treated and Untreated Field for Bollworm Control.

toxic to the bollworm than any other material tested to date. However, the other materials give economical control when properly applied. Apply the dust at 5-day intervals immediately after the worms appear. Two or 3 applications may be necessary for control.

COTTON FLEA HOPPER

The cotton flea hopper causes damage in Oklahoma some years. However, the damage is not as severe as in Texas. The adult cotton flea hopper is about one-eighth inch in length, pale green in color and it feeds principally on the growing tips and very small squares of young cotton. The injured squares turn brown or black and are shed when quite small, often no larger than a pinhead.

Extensive tests in southwest Oklahoma by the Oklahoma Experiment Station have failed to show any increase in the cotton yield as a result of dusting with sulfur and DDT for the control of this insect.

COTTON LEAFWORM

This is the easiest of all cotton insect pests to control. When the worms appear early, the crop may be cut short. Late occurrence decreases the yield and lowers the lint grade.



Fig. 11—Full Grown Cotton Leafworm.

Control

Dusting with calcium arsenate as for boll weevils or bollworms will keep the leafworms under control. Lead arsenate as a spray at the rate of 4 to 6 pounds in 50 gallons of water for about 3 acres is also satisfactory. If a quick kill of large worms is needed to prevent stripping, add 7 to 8 pounds of Paris green to each 100 pounds of lime. White arsenic mixed with lime is sometimes used by growers, but is not recommended, as it is liable to burn the plants. Cryolite is not so effective against leafworms as arsenical poisons. DDT will not control leafworms.

MISCELLANEOUS COTTON INSECTS

The tarnished plant bug, the rapid plant bug and stink bugs often injure cotton by causing the squares and small bolls to shed. The larger stink bugs may also cause the spotting of lint by puncturing the bolls. Where these insects are doing considerable damage, it has proved to be advisable in some states to

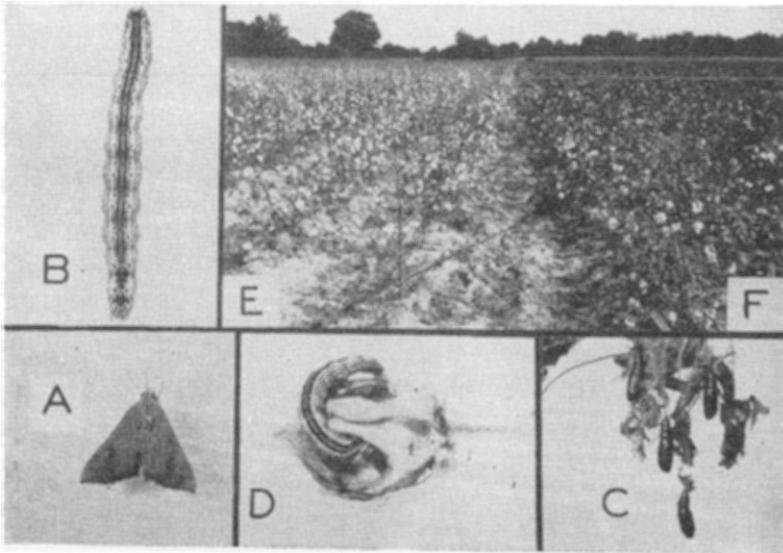


Fig. 12—Treated and Untreated Cotton Field for Cotton Leafworm.
A — leafworm miller, B — cotton leafworm, C — pupa, D — leafworm feeding on boll.
F—treated. E—untreated.

dust with a mixture composed of 5 percent DDT and at least 75 percent sulfur. This should be used at the rate of 10 to 15 pounds per acre for each application.*



Fig. 13—Hand Cotton Dusters in Operation.

DUSTING MACHINERY

In order to get good coverage of any insecticide used as a dust, a properly designed dusting machine must be used. They



Fig. 14—Five-row Horse Drawn Duster.

can be purchased in any size from the small hand rotary duster to the large eight-row power take-off, and even the airplane duster. When planning a dusting control program, a farmer should purchase a duster large enough to cover his acreage in 4 or 5 days with due allowance for bad weather and breakdowns. There must be a nozzle for each row and arranged so that the dust can be directed over the plants.

“Side delivery” or “broadcast” machines are not recommended. They waste dusts and do not give good control. For more detailed information, see your county agent.

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