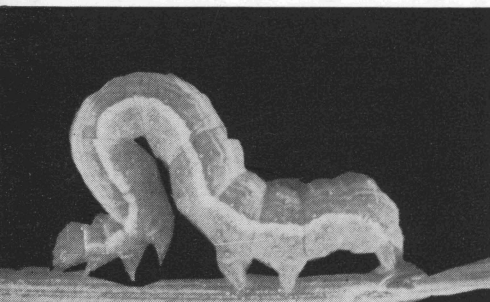
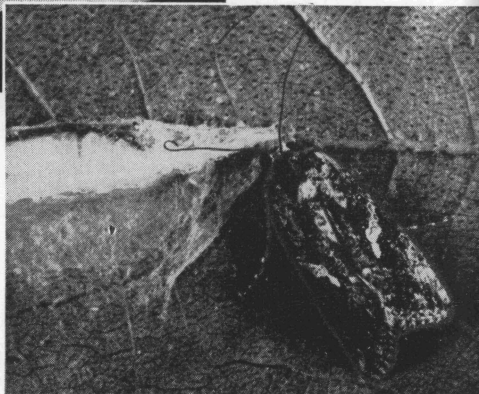


**Texas Guide
for Controlling**

Cotton Insects



Cabbage Looper
Larva



Cabbage Looper Adult

TEXAS AGRICULTURAL EXTENSION SERVICE
J. E. Hutchison, Director, College Station, Texas

Texas Guide for Controlling Cotton Insects — 1958

COTTON INSECTS can be controlled economically by the use of the proper poisons at the correct time (See Table). **Poisons must cover the plants to kill insects.** Plants usually are not protected from insect attack on new growth or if poisons are washed off.

Substantial profits have been made, even when a large number of poison applications was necessary for maximum yields, by controlling damaging infestations of boll weevils and bollworms on cotton growing on fertile soils. On upland soils where insect infestations do not last long, fewer applications may be needed. The control program for 1958 includes three phases:

1. **EARLY SEASON CONTROL** (insures early fruiting and maturity)
2. **LATE SEASON CONTROL** (based upon infestation)
3. **EARLY STALK DESTRUCTION AND FARM CLEANUP**

The grower must carry out an adequate control program to obtain greatest benefits.

Early Stalk Destruction and Farm Cleanup

Early harvest and immediate stalk destruction before the first frost reduce boll weevil and pink bollworm populations. These practices force the boll weevil into starvation before time to enter winter quarters, prevent late season buildup of weevils and pink bollworms and reduce the numbers that survive the winter. See L-219 **Ways to Fight the Pink Bollworm in Texas** for more details.

Pink Bollworm

Crop losses from heavy pink bollworm infestations can be reduced by the proper use of insecticides as recommended in this Guide.

WHEN TO APPLY INSECTICIDES

1. **Bloom Inspection:** After the cotton has been blooming for at least 5 days, inspect a representative number of blooms per field for those rosetted or infested (blooms with the petals webbed together at the tips). Check for number of worms per acre computed as follows: at 5 representative locations in the field, step off 100 steps down the row (300 ft.); then count the number of rosetted blooms. The total number of worms infesting the rosetted blooms from these 5 locations (1,500 ft.) multiplied by 10 will give the approximate number of worms per acre. When 500 or more worms are found per acre, begin treatment immediately.

2. **Boll Inspection:** All fields should be checked regularly, starting when first bolls are 2 weeks old. Walk diagonally across the field and collect at random 100 bolls ($\frac{1}{2}$ grown or larger). Examine each boll as follows: crack the boll in the same way you would a hard nut and remove each lock; examine the inner carpal lining for the characteristic tunnels made by small worms. The number of bolls found infested represents the percentage infestation. Start treatment when 10 to 15 percent of the bolls are infested and continue until 70 percent of the bolls are open; then force the remaining bolls open with a recommended preharvest chemical (See L-145, **Cotton Defoliation Guide for Texas**); harvest and destroy standing stalks.

Seed Treatment with Systemic Insecticides

Results of research show that 4 to 6 weeks' protection from planting date has been obtained against thrips, aphids, spider mites and leaf miners with Thimet* when applied to planting seed. Overdosing with this material may retard early growth. One pound of the active ingredient plus an equal amount of carbon per bushel of seed planted per acre appears to be a relatively safe dosage. Extreme care must be exercised in planting treated seed because of the toxicity of the compound to man. Under weather conditions unfavorable for germination this treatment may reduce the stand of cotton.

Boll Weevil Resistance to Insecticides

Boll weevils resistant to chlorinated hydrocarbons continued to appear in small localized areas of Robertson and Brazos Counties during 1957. Growers should be on the alert for such populations during 1958 and when reasonable proof of resistance has been obtained, a change of insecticide is recommended. Calcium arsenate and several phosphorus insecticides have proved effective for control of resistant weevils; however, unless resistance has been established, use chlorinated hydrocarbons because the phosphorus compounds in general are more hazardous to the applicator. The following dusts at the rate of 10 to 15 pounds per acre are recommended for resistant weevils: calcium arsenate; 2% Guthion*-10% DDT; 5% methyl parathion-10% DDT; or 10% malathion-10% DDT. If sprays are preferred, use 1 pint Guthion* (1.6 lb. per gal.) or 1 to $1\frac{1}{2}$ quarts methyl parathion (2 lb. per gal.) or 1 to $1\frac{1}{2}$ quarts malathion (5 lb. per gal.) with 2 to 3 quarts DDT (2 lb. per gal.) for boll weevil and bollworm control. In case of severe boll weevil infestations, methyl parathion and malathion should be applied at 3 to 4-day intervals.

General Information

In the late season program, dusts and sprays are equally effective when properly applied. Repeat the application as soon as possible if the poison is washed off within 24 hours, except where demeton and other aphicides are used.

Dusts should be applied when the air is calm or nearly so. Dew on plants is not necessary. Dust nozzles

*Trade name

on ground machines should be placed 4 to 6 inches above the plants.

Spray applications may be made during wind velocities up to 12 miles per hour. Apply spray when leaves are dry. Poison "run-off" may occur if leaves are wet. For early season treatment with ground equipment, one or two cone-type nozzles per row, placed 6 to 9 inches above the tops of plants, are sufficient. Nozzle spacings of 20 inches on the boom are adequate for late season control. Sprays should be applied at approximately 60 pounds pressure and at 2 to 8 gallons per acre. As a safety measure, mount spray booms on the rear of the tractor.

Ground machines and airplanes are equally effective for applying poisons. For best results with airplanes, flag the swaths so that they overlap. Increase dosages recommended in this Guide at least 50 percent when an airplane is used in making early season applications. Sprays should be applied at 2 to $2\frac{1}{2}$ gallons per acre except in West Texas; increase the amount to 3 to 4 gallons per acre for this area.

Some poisons are destructive to honeybees. A determined effort should be made to prevent their destruction since bees help pollinate many agricultural crops.

Beneficial insects may aid in controlling cotton pests such as the bollworm, cotton aphid and spider mite. Growers should never rely entirely on beneficial insects to control cotton insects, but should examine their fields frequently to determine the need for insecticides.

A supplemental guide for the Lower Rio Grande Valley is available.

CAUTION: ALL INSECTICIDES ARE POISONS AND PRECAUTIONS GIVEN ON THE LABELS SHOULD BE FOLLOWED STRICTLY. SPECIAL PRECAUTIONS SHOULD BE TAKEN IN HANDLING PARATHION, METHYL PARATHION, DEMETON, GUTHION AND THIMET TO AVOID PROLONGED CONTACT WITH THE SKIN OR BREATHING THE VAPORS OR DRIFT FROM EITHER SPRAY OR DUST.

The recommendations in this Guide are based upon results of experiments conducted by the Texas Agricultural Experiment Station, Texas A. & M. College System and Entomology Research Division, United States Department of Agriculture.

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

EARLY SEASON CONTROL PROGRAM (Insecticides Listed at Random)				
INSECTS	INSECTICIDES		*AMOUNT OF SPRAY CONCENTRATE PER ACRE	REMARKS
	DUSTS	SPRAYS AND POUNDS OF TOXICANT PER GAL.		
Cutworms and certain armyworms	A. 10% DDT B. 20% toxaphene Apply dusts at 15 to 20 lb. per acre.	A. DDT (2 lb. per gal.) B. Toxaphene (6 lb. per gal.) C. Toxaphene-DDT (4 lb.—2 lb. per gal.)	½ to 1 gal. 1⅓ to 2 qt. 1⅓ to 2 qt.	Examine seedling cotton for presence of these pests. Apply treatment as needed.
Thrips and cotton flea-hoppers	A. 2½% dieldrin—40% sulfur B. 2½% aldrin—40% sulfur C. 2½% heptachlor—40% sulfur D. 2½% endrin—40% sulfur E. 10% toxaphene—40% sulfur	A. Dieldrin (1.5 lb. per gal.) B. Aldrin (2 lb. per gal.) C. Heptachlor (2 lb. per gal.) D. Endrin (1.6 lb. per gal.) E. Toxaphene (6 lb. per gal.)	½ to 1 pt. ½ to 1 pt. ½ to 1 pt. ½ to 1 pt. 1 to 1½ pt.	Begin treatment when cotton is in the 4-leaf stage or earlier if necessary. Two to 4 applications may be needed, but regardless of number, stop treatment at least 30 days before the bollworm usually appears, UNLESS FLEAHOPPER OR BOLL WEEVIL INFESTATIONS ARE EXTREMELY HEAVY. This period allows sufficient time for beneficial insects to build up as an aid to bollworm control. Use maximum dosage recommended if overwintered boll weevils are present. Sprays are more effective and economical than dusts for controlling insects on young cotton. One-half pint of malathion (5 lb. per gal.) or parathion (2 lb. per gal.) may be substituted for the second early season treatment to control thrips and the BROWN COTTON LEAFWORM.
Boll weevils, thrips and cotton flea-hoppers	A. 2½% dieldrin—40% sulfur B. 2½% aldrin—40% sulfur C. 2½% heptachlor—40% sulfur D. 2½% endrin—40% sulfur E. 20% toxaphene—40% sulfur	A. Dieldrin (1.5 lb. per gal.) B. Aldrin (2 lb. per gal.) C. Heptachlor (2 lb. per gal.) D. Endrin (1.6 lb. per gal.) E. Toxaphene (6 lb. per gal.)	½ to 1 pt. ½ to 1 pt. ½ to 1 pt. ½ to 1 pt. 1 pt. to 1 qt.	Apply dusts at 7 to 10 lb. per acre at 7-day intervals. Apply sprays at 7-day intervals.
Cotton aphids	A. 1% parathion B. 5% malathion C. 1% methyl parathion	A. Demeton (2 lb. per gal.) B. Parathion (2 lb. per gal.) C. Malathion (5 lb. per gal.) D. Methyl parathion (2 lb. per gal.)	½ pt. ½ pt. ½ to 1 pt. ½ pt.	Apply as needed. Apply dust at 10 to 15 lb. per acre when air is calm.

LATE SEASON CONTROL PROGRAM (Insecticides Listed at Random)				
INSECTS	INSECTICIDES		*AMOUNT OF SPRAY CONCENTRATE PER ACRE	REMARKS
	DUSTS	SPRAYS AND POUNDS OF TOXICANT PER GAL.		
Boll weevils and bollworms	A. 3-5-40 mixture B. 2½% dieldrin—5% DDT—40% sulfur C. 2½% aldrin—5% DDT—40% sulfur D. 2½% heptachlor—5% DDT—40% sulfur E. Calcium arsenate F. Low-lime calcium arsenate + 1% parathion G. 2½% endrin—40% sulfur H. 20% toxaphene—40% sulfur Apply dusts at 10 to 15 lb. per acre at 5-day intervals. Increase dosages where heavy bollworm infestations occur.	A. Dieldrin (1.5 lb. per gal.) + DDT (2 lb. per gal.) B. Aldrin (2 lb. per gal.) + DDT (2 lb. per gal.) C. Heptachlor (2 lb. per gal.) + DDT (2 lb. per gal.) D. Endrin (1.6 lb. per gal.) E. 3-5 mixture (gamma BHC, .9 lb.-DDT, 1.5 lb. per gal.) F. Toxaphene-DDT (4 lb.—2 lb. per gal.) G. Toxaphene (6 lb. per gal.)	1¼ pt. to 1 qt. + 2 to 3 qt. 1 pt. to 1 qt. + 2 to 3 qt. 1 pt. to 1 qt. + 2 to 3 qt. 1¾ pt. to 1 qt. 1⅓ to 2 qt. 1⅓ to 2 qt.	Examine cotton weekly for boll weevils. Pull 100 squares, at least one-third grown, at random, removing a few squares at several representative places in the field. If 15 to 25% or more have weevil punctures, begin treatment. Two or more applications of insecticide are required to control boll weevils. DDT is included in these mixtures for bollworm control and may be omitted where bollworms are not a menace. Examine the terminal buds (upper 3 to 4 inches of the plant) of 100 cotton plants and 100 consecutive squares and bolls at each of several points in the field. Begin treatment when bollworm eggs and 4 or 5 young worms are found per 100 terminals or 5% of the small squares and bolls have been injured by small bollworms. Use of DDT alone for bollworm control greatly increases possibility of aphid infestations. Both calcium arsenate dusts and toxaphene spray may be used for boll weevil control, but they are less effective for bollworm control than other listed materials. During heavy weevil infestations, shorten interval to 4 days.
Bollworms	A. 2 or 3-10-40 mixture B. 2½% endrin—40% sulfur C. 2½% endrin—5% DDT—40% sulfur D. 10% DDT—40% sulfur E. 20% toxaphene—40% sulfur	A. Endrin (1.6 lb. per gal.) B. Endrin (1.6 lb. per gal.) + DDT (2 lb. per gal.) C. DDT (2 lb. per gal.) D. Toxaphene-DDT (4 lb.—2 lb. per gal.)	1 to 1¼ qt. 1¼ to 1¾ pt. + 1 pt. to 1 qt. 2 to 3 qt. 1⅓ to 2 qt.	Apply dusts at 10 to 15 lb. per acre at 5-day intervals. Apply sprays at 5-day intervals.
Cotton aphids	A. 1% parathion B. 5% malathion C. 1% methyl parathion	A. Demeton (2 lb. per gal.) B. Parathion (2 lb. per gal.) C. Malathion (5 lb. per gal.) D. Methyl parathion (2 lb. per gal.)	½ to 1 pt. ⅔ to 1 pt. 1 to 1½ pt. ⅔ to 1 pt.	Begin treatment when honeydew appears. Demeton, parathion, malathion or methyl parathion may be combined with other sprays. Apply dusts at 10 to 15 lb. per acre.
Spider mites	A. 1% parathion B. 3% aramite Apply dusts at 10 to 15 lb. per acre.	A. Demeton (2 lb. per gal.) B. Parathion (2 lb. per gal.) C. Aramite (2 lb. per gal.)	½ to 1 pt. ½ to 1 pt. 1⅓ to 2 pt.	Treat when leaves begin to turn yellow. Demeton or increased dosages of aramite and parathion are necessary to control the two-spotted mite. Two applications of aramite or parathion at 5-day intervals are needed. Demeton or aramite or parathion may be mixed with other sprays.
Cotton flea-hoppers, lygus and other plant bugs	A. 5% DDT—75% sulfur B. 10% toxaphene—40% sulfur Apply dusts at 10 to 15 lb. per acre at 7 to 10-day intervals.	A. DDT (2 lb. per gal.) B. Toxaphene-DDT (4 lb.—2 lb. per gal.) C. Toxaphene (6 lb. per gal.) Apply sprays at 7 to 10-day intervals.	1 to 1½ qt. 1 pt. to 1 qt. 1 pt. to 1 qt.	After cotton is old enough to produce squares, examine the main-stem terminal buds (about 3 or 4 inches of the top of plant) of 100 cotton plants at several representative points in the field. Begin treatment when 15 to 35 fleahoppers (nymphs and adults) are found per 100 terminals. In Northwest Texas begin treatment when lower infestations occur. When 8 to 10 lygus or other plant bugs are found per 100 squares or young bolls, begin treatment.
Leafworms	A. 1% parathion B. Calcium arsenate C. Low-lime calcium arsenate + 1% parathion D. 1% methyl parathion E. 20% toxaphene—40% sulfur F. 4% malathion	A. Parathion (2 lb. per gal.) B. Methyl Parathion (2 lb. per gal.) C. Toxaphene-DDT (4 lb.—2 lb. per gal.) D. Toxaphene (6 lb. per gal.) E. Malathion (5 lb. per gal.)	½ to 1 pt. ½ to 1 pt. 1 to 2 qt. 1 to 2 qt. ½ to 1 pt.	Apply dusts or sprays when cotton leafworms first appear and at 5-day intervals until control is obtained. Young worms are easier to kill than old worms. The BROWN COTTON LEAFWORM can be controlled effectively with parathion (2 lb. per gal.) ½ to 1 pt., malathion (5 lb. per gal.) ½ pt. or endrin (1.6 lb. per gal.) 1¾ pt. per acre. Apply dusts at 10 to 15 lb. per acre.
Cabbage looper	A. 2½% endrin—40% sulfur at 18 lb. per acre.	A. Endrin (1.6 lb. per gal.)	1 to 1¼ qt.	Regular applications of toxaphene-DDT or 2-10-40 for bollworms usually prevent heavy looper damage. Begin treatment when small worms first appear.
Grasshoppers	A. 2½% dieldrin—40% sulfur B. 2½% aldrin—40% sulfur C. 5% heptachlor—40% sulfur D. 20% toxaphene—40% sulfur	A. Dieldrin (1.5 lb. per gal.) B. Aldrin (2 lb. per gal.) C. Heptachlor (2 lb. per gal.) D. Toxaphene (6 lb. per gal.)	⅔ to 1⅓ pt. 1 to 2 pt. 1 to 2 pt. 1 to 2 qt.	Apply insecticide when damaging infestations appear. Baits are preferred for control of "jumbo" grasshoppers. (See your county agent for bait mixtures.) Apply dusts at 10 to 15 lb. per acre.

Pink bollworms—Use DDT dusts or sprays at 2 to 3 lb. per acre at 7-day intervals or 1¼ to 1½ lb. per acre at 4 to 5-day intervals when combined with other insecticides.

*pt. = pints — qt. = quarts — lb. = pounds