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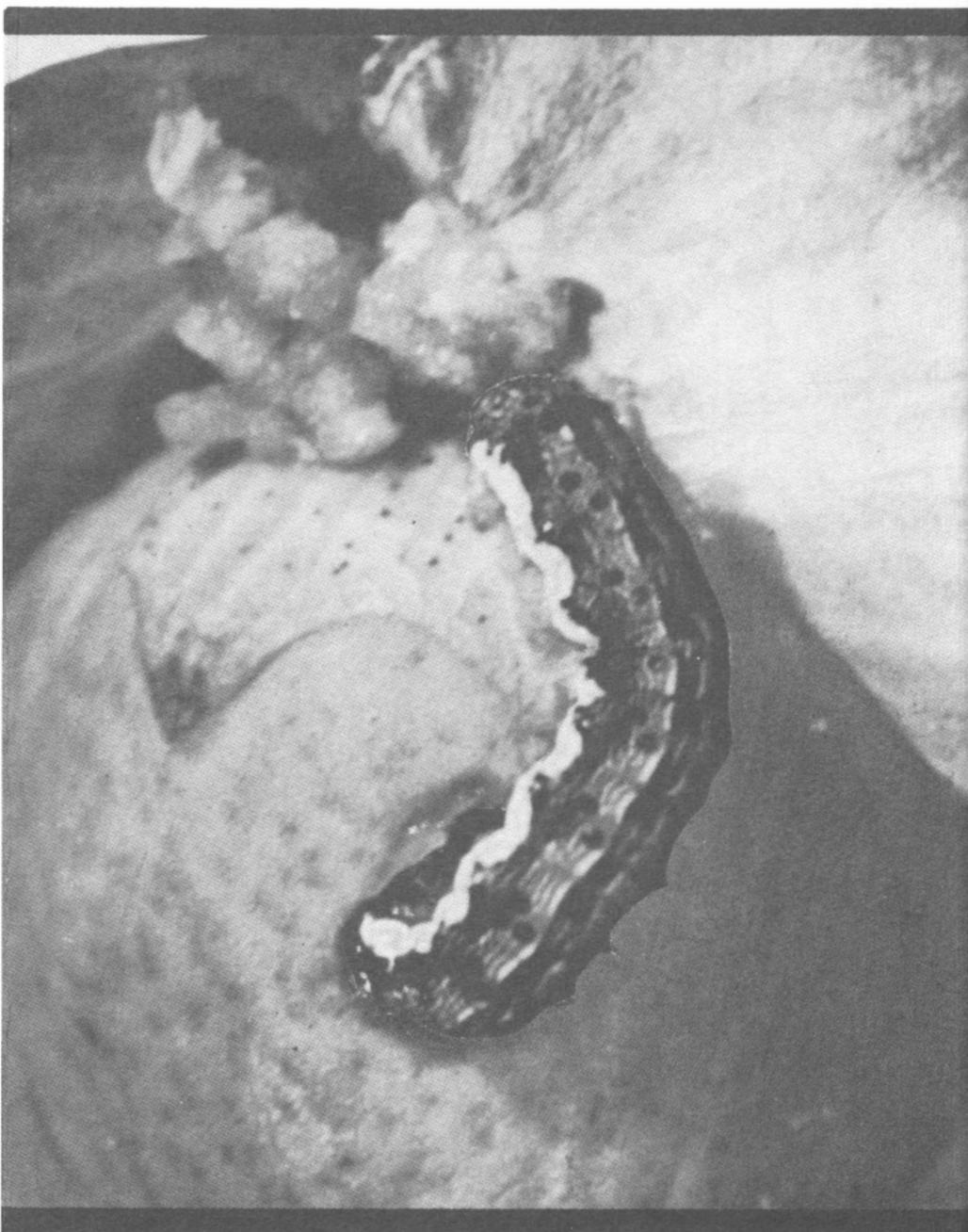
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Revised

**GUIDE FOR CONTROLLING
Cotton Insects
IN THE HIGH PLAINS AND
TRANS-PECOS AREAS
OF TEXAS**



THE AGRICULTURAL AND MECHANICAL
COLLEGE OF TEXAS
TEXAS AGRICULTURAL EXTENSION SERVICE
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THIS GUIDE is a supplement to the state-wide guide, L-218, *Texas Guide for Controlling Cotton Insects*, and is primarily for use in the *Texas High Plains* and *Trans-Pecos* areas. Growing conditions of cotton and cultural practices in these areas are distinctly different from many other parts of the State. The boll weevil is not known to occur and climatic conditions, rainfall, soil type and farming practices differ considerably. If boll weevils occur in your area use L-218.

Cotton insects can be controlled economically by the use of the proper insecticides at the correct time (Refer to table). *Poisons must cover the plants to kill insects.* Timely, effective applications of insecticides to control damaging insect infestations should result in substantial profits to the cotton producer although numerous applications may be required. Cotton growing under dryland conditions generally has lighter insect infestations and injurious infestations usually do not last as long as in irrigated cotton. Consequently, fewer insecticide applications are needed.

INSECT CONTROL PROGRAM

The cotton insect control program for the areas includes two major phases with the following objectives:

1. Early Season Control (insures early fruiting and maturity).
2. Late Season Control (insures continued fruiting and protects fruit).

The grower must carry out an adequate control program to obtain greatest benefits. Cotton fields should be examined closely throughout the growing season to determine when to apply insecticides.

EARLY SEASON CONTROL PROGRAM

Research in these areas shows that substantial savings can be realized by basing early season control on infestation counts. The early season control program in most years will be conducted primarily to control thrips and fleahoppers. Regular and thorough insect checks by the grower are necessary to obtain good insect control. If the cotton producer knows the insect situation in his field, he can determine when he needs to apply insecticides. Every grower should know how to make insect counts, when to apply insecticides based on insect population numbers and how to recognize the damage by different cotton insects.

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The grower who follows an early season control program based on infestation numbers uses insecticides only when needed.

EARLY SEASON PESTS

Thrips

Heavy infestations of thrips on young cotton may delay plant maturity for a few days to a few weeks. Thrips normally cause heaviest damage from the time of plant emergence until early squaring. Serious damage may continue for longer periods. The first sign of thrips damage on newly emerged cotton is wilted, wrinkled, blackened leaves and terminal growth. The number of thrips and time of occurrence varies from season to season.

Fleahoppers

Fleahoppers usually begin damaging cotton as soon as fruiting starts and continue throughout the season. Control measures should be based on infestation counts and the apparent loss of small, terminal forms as cotton fruiting progresses. The first forms should be protected to allow the cotton to produce early fruit.

Fleahoppers damage only the small squares and do not cause the shedding of the larger squares or bolls. After plants have set more fruit than the cotton is capable of maturing, under a given set of growing conditions, it is not advisable to continue fleahopper control because additional forms ordinarily will be shed by the cotton plant. Protection of small forms later in the season, which do not have enough time to mature before frost, is a waste of insecticide. The above conditions vary, depending on the age of the plant, time of first freeze and factors which determine the potential yield.

All cotton should be checked carefully before applying insecticides to determine the degree of infestation. The presence of aphids, spider mites or other insect pests may influence the selection of the insecticide. (For additional information on cotton insects, see Extension publication B-933, *Cotton Insects*.)

LATE SEASON CONTROL PROGRAM

The late season control program, like the early season control program, is based on infestation count. The principal insects involved are the bollworm and the cabbage looper. Other cotton insects which may occur are fleahoppers, lygus bugs, cotton leafworms, aphids, spider mites and stink bugs. Begin control

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PROBLEM

measures when bollworms and cabbage loopers are small.

Bollworms

The bollworm is a common pest of cotton as well as many other crops. The history of this area shows that the bollworm causes more damage to cotton than any other insect.

Eggs generally are laid on the tender growth of the terminal areas of the plant. The eggs hatch in about 3 days and the small worms begin working their way down the cotton plants, feeding on the squares and bolls.

Insecticide applications should be made when the bollworms are small.

Inspect fields weekly from mid to late season. Examine the terminal growth of the plants for eggs, small worms or damage. If no eggs or worms are found in the terminal, examine closely the squares, blooms and bolls on the remainder of the plant for presence of eggs or worms. Infestations often begin on the bottom fruit and are easily overlooked until considerable damage has been done.

Cabbage Looper

In recent years the cabbage looper has become an important cotton pest, especially in West Texas. This insect is principally a leaf feeder. The damage resulting from cabbage looper infestations is characterized by the "buckshot" holes in the leaves. Heavy infestations may defoliate the plants.

The leaves of cotton are the site of food manufacturing for the plant. Thus, when a considerable proportion of the leaf areas is destroyed, the capacity to produce cotton is reduced. Control measures should begin when the worms are small and before the plants are severely ragged.

Cabbage looper populations are susceptible to both bacterial and virus diseases. Control measures may not be needed if these diseases appear early.

Pink Bollworm

Extension publication L-219, *Ways to Fight the Pink Bollworm in Texas*.

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.

Three-Way Insecticidal Mixtures

Commercial mixtures of emulsifiable concentrates containing three insecticides are being marketed in the State. In most instances they will give control

of several pests. However, they are often formulated in such proportions that the needed dosage of one of the necessary insecticides is not sufficient to control a certain pest. For example, insufficient amounts of needed insecticides for bollworm control may be applied when such mixtures are used, resulting in poor control. Therefore, growers should know the contents of such mixtures and make sure that they are applying recommended dosages of the insecticides required to give control of the pests.

The actual amount of technical materials per gallon of emulsifiable concentrate may vary from those listed in the guide. In such cases, consult your county agent or extension entomologist for amounts to use.

General information

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

Apply dusts when the air is calm or nearly so. Dew on plants is not necessary. Dusts are more easily washed off by light showers than are sprays. Dust nozzles on ground machines should be placed 4 to 6 inches above the plants.

Spray applications may be made with wind velocities up to 10 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, use one or two cone-type nozzles per row, placed 10 to 15 inches above the tops of plants. 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 3 to 8 gallons per acre. As a safety measure, mount spray booms on the rear of the tractor.

Ground machines or airplanes are effective for applying poisons. For information on calibrating and adjusting spray machinery, see L-486, *Insecticidal Spraying of Field Crops with Ground Machinery*. For best results with airplanes, flag the swaths so they overlap. Airplanes should apply 3 to 4 gallons per acre of the necessary spray mixture.

EARLY SEASON CONTROL PROGRAM (Insecticides listed at random)

Increase Dosages Recommended in This Guide at Least 50 Percent When an Airplane Is Used to Make Early Season Applications

INSECTS	INSECTICIDES		AMOUNT OF SPRAY CONCENTRATE PER ACRE	REMARKS
	DUSTS	SPRAYS AND POUNDS OF TOXICANTS PER GAL.		
Cutworms and certain armyworms		A. Toxaphene-DDT ¹ (4 lb.-2 lb.) B. Toxaphene ¹ (6 lb.) C. Endrin ¹ (1.6 lb.) D. DDT ¹ (2 lb.)	1 1/3 to 2 qt. 1 1/3 to 2 qt. 1 1/2 to 2 pt. 1/2 to 1 gal.	Examine seedling cotton for presence of these pests. Apply treatment as needed.
Darkling beetles	Dusts are effective, but sprays are considered more practical and economical under early season conditions.	A. Heptachlor (2 lb.) B. Dieldrin (1.5 lb.)	1 qt. 1 qt.	Brown to black beetles which feed around base of seedlings. Damage resembles cutworm attack. Begin control when damage warrants it.
Thrips and Fleahoppers		A. Dieldrin (1.5 lb.) + DDT ¹ (2 lb.) B. Guthion ² (2 lb.) C. Strobane ^{1,3} -DDT (4 lb.-2 lb.) D. Sevin ⁴ (80% W.P.) E. Toxaphene-DDT (4 lb.-2 lb.) F. Heptachlor (2 lb.) + DDT ^{1,3} (2 lb.) G. Endrin (1.6 lb.) + DDT ¹ (2 lb.)	1 to 1 1/2 pt. + 1 qt. 1/2 to 1 pt. 1 1/2 pt. to 1 1/2 qt. .7 to 1.3 lb. 1 1/2 pt. to 1 1/2 qt. 1 to 1 1/2 pt. + 1 qt. 1 to 1 1/2 pt. + 1 qt.	Thrips — Begin control measures as soon as damage is apparent on seedling plants. Damage is characterized by wilted, deformed and blackened leaves. Silvering of the lower leaf surface also is common. Apply sprays at 7-day intervals. If difficulty is encountered in controlling thrips, substitute methyl parathion ⁵ (0.25 lb.) 1 pt. per acre for DDT. Fleahoppers — After cotton is old enough to produce squares, examine the main stem terminal buds (about 3-4 in. of top of plant) of 100 cotton plants at several representative points in the field. As cotton reaches the fruiting stage, apply control measures when 15-20 fleahoppers are found per 100 terminals. As plants increase in size and fruit load, larger populations may be tolerated without serious damage. Later treatments should be based both on numbers of fleahoppers and on damage as indicated by excessive loss of small squares. Apply sprays at 7-day intervals.
Cotton aphids	Dusts are effective, but sprays are considered more practical and economical under early season conditions.	A. Malathion (5 lb.) B. Methyl parathion (2 lb.) C. Parathion (2 lb.) D. Demeton (2 lb.)	1 to 1 1/2 pt. 1 to 1 1/2 pt. 1 to 1 1/2 pt. 1/2 to 1 pt.	In early season, apply insecticides as needed. In late season, begin treatment when honeydew appears. Demeton, parathion, malathion or methyl parathion may be combined with other sprays.

LATE SEASON CONTROL PROGRAM (Insecticides listed at random)

INSECTS	INSECTICIDES		AMOUNT OF SPRAY CONCENTRATE	REMARKS
	DUSTS	SPRAYS AND POUNDS OF TOXICANTS PER GAL.		
Apply dusts at 10-15 lb. per acre unless otherwise indicated.				
Bollworms	A. 20% toxaphene-40% sulfur B. 10% Sevin-40% sulfur C. 10% DDT-40% sulfur D. 2 1/2% endrin-40% sulfur E. 20% Strobane-40% sulfur F. 2- or 3-10-40 mixture G. 2 1/2% endrin-5% DDT-40% sulfur	A. Strobane-DDT (4 lb.-2 lb.) B. Endrin (1.6 lb.) C. DDT (2 lb.) D. Endrin (1.6 lb.) + DDT (2 lb.) E. Toxaphene-DDT (4 lb.-2 lb.) F. Sevin (80% W.P.)	1 1/2 to 2 qt. 1 to 1 1/4 qt. 2 to 3 qt. 1 1/4 to 1 3/4 pt. + 1 pt. to 1 qt. 1 1/2 to 2 qt. 1.9 to 2.5 lb	HOW TO CHECK FOR BOLLWORMS — Examine the terminal buds (upper 3-4 in. 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. Make additional applications as needed.
Cotton aphids	Use sprays as recommended for early season control. 1% methyl parathion, 1% parathion or 4% malathion dust may be used.			
Spider mites	A. 1% parathion B. 2 1/2% methyl parathion	A. Trithion (4 lb.) B. Methyl parathion (2 lb.) C. Ethion (4 lb.) D. Parathion (2 lb.) E. Demeton (2 lb.)	3/4 to 1 1/2 pt. 1 to 1 1/2 pt. 3/4 to 1 1/2 pt. 1/2 to 1 pt. 1/2 to 1 pt.	Treat when leaves begin to turn yellow. Demeton, ethion or Trithion generally are more effective for controlling the two spotted mite. Two applications at 5-day intervals may be necessary with all materials except demeton.
Lygus and stink bugs	A. 3-10-40 mixture B. 10% DDT-75% sulfur C. 20% toxaphene-40% sulfur	A. Toxaphene-DDT (4 lb.-2 lb.) B. 3-5 mixture (gamma BHC .9 lb.-DDT 1.5 lb.) C. DDT (2 lb.)	1 to 2 qt. 1 1/3 to 2 qt. 1 1/2 to 2 qt.	When 8 to 10 bugs are found per 100 squares or young bolls, begin treatment. Apply dusts or sprays at 7 to 10-day intervals.
Leafworms	A. Calcium arsenate B. 2 1/2% DDT	A. Guthion (2 lb.)	1 to 1 1/3 pt.	Apply dusts or sprays when cotton leafworms first appear and

Spider mites	A. 1% parathion B. 2½% methyl parathion	A. Trithion (2 lb.) B. Methyl parathion (2 lb.) C. Ethion (4 lb.) D. Parathion (2 lb.) E. Demeton (2 lb.)	¼ to 1½ pt. 1 to 1½ pt. ¾ to 1½ pt. ½ to 1 pt. ½ to 1 pt.	Treat when leaves begin to turn yellow. Demeton, ethion or Trithion generally are more effective for controlling the two spotted mite. Two applications at 5-day intervals may be necessary with all materials except demeton.
Lygus and stink bugs	A. 3-10-40 mixture B. 10% DDT-75% sulfur C. 20% toxaphene-40% sulfur	A. Toxaphene-DDT (4 lb.-2 lb.) B. 3-5 mixture (gamma BHC .9 lb.-DDT 1.5 lb.) C. DDT (2 lb.)	1 to 2 qt. 1½ to 2 qt. 1½ to 2 qt.	When 8 to 10 bugs are found per 100 squares or young bolls, begin treatment. Apply dusts or sprays at 7 to 10-day intervals.
Leafworms	A. Calcium arsenate B. 2½% Guthion C. 1% parathion D. 10% Sevin-40% sulfur E. 1% methyl parathion	A. Guthion (2 lb.) B. Parathion (2 lb.) C. Sevin (80% W.P.) D. Methyl parathion (2 lb.) E. Toxaphene-DDT (4 lb.-2 lb.)	1 to 1½ pt. ½ to 1 pt. 1.3 to 1.6 lb. ½ to 1 pt. 1 to 2 qt.	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.
Cabbage loopers	A. 2½% endrin-40% sulfur at 18 lb. per acre	A. Endrin (1.6 lb.)	1 to 1¼ qt.	Begin treatment when small worms first appear. Regular applications of toxaphene-DDT or 2- or 3-10-40 for bollworms usually prevent heavy looper damage. Cabbage loopers are susceptible to viral and bacterial diseases which, in many instances, will control the infestation and eliminate the need for insecticidal control.
Grasshoppers	A. 2½% heptachlor-40% sulfur B. 2½% dieldrin-40% sulfur C. 2½% aldrin-40% sulfur D. 20% toxaphene-40% sulfur	A. Dieldrin (1.5 lb.) B. Aldrin ¹ (2 lb.) C. Heptachlor (2 lb.) D. Toxaphene (6 lb.)	¾ to 1½ pt. 1 to 1½ 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.)
Pink bollworms	A. 2½% Guthion-10% DDT B. 10% DDT C. 10% Sevin-40% sulfur	A. Sevin (80% W.P.) B. DDT (2 lb.) C. Guthion (2 lb.) + DDT (2 lb.)	1.9 to 2.5 lb. 3 qt. to 1 gal. ¾ to 1½ pt. + 2 to 3 qt.	Apply DUSTS at 15 lb. per acre at 5-day intervals. Apply SPRAYS at 5-day intervals.

pt. = pints qt. = quarts gal. = gallons lb. = pounds W.P. = wettable powder

¹Do not feed treated forage or allow dairy or meat animals to graze in treated fields.

²Do not apply within 5 days of harvest at the ¼ lb. rate per acre or 21 days of harvest at a higher rate.

³Do not apply after bolls open.

⁴Problems may be encountered in spraying wettable powder with low-volume farm sprayers; follow manufacturer's directions carefully. Allow 7 days between last application and grazing treated fields.

⁵Do not apply within 5 days of hand picking.

TREATMENT WITH SYSTEMIC INSECTICIDES AT PLANTING TIME

Four to 6 weeks protection from planting date can be obtained from thrips, aphids, spider mites and leaf miners with phorate (Thimet) applied to the seed or placed in the furrow in granulated form at planting. One-fourth to ½ pound of the active ingredient per acre may be applied as a seed treatment or ½ to 1 pound per acre in the furrow. Seed may be treated at the rate of 1 to 1½ pounds per 100 pounds of seed to accommodate planting rate. One pound of actual Di-syston applied in granular form at time of planting is also effective. Overdosing with seed treatments may retard early growth especially under weather conditions unfavorable for emergence. Use extreme care in

handling treated seed or granules because they are toxic to man.

CAUTION

All insecticides are poisonous. Follow precautions on the labels strictly. Take special precautions in handling parathion, methyl parathion, Trithion, demeton, Di-syston, Guthion and phorate (Thimet) to avoid prolonged contact with the skin or breathing the vapors or drift from either spray or dust.

Be mindful of insecticidal drift that may contaminate neighboring vegetables or forage crops at the time cotton is sprayed or dusted. Plan crop locations in advance to eliminate this problem.