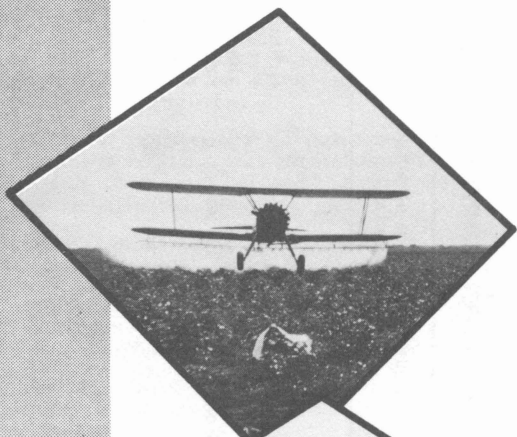


# *Texas Guide*

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## *for controlling* **Cotton Insects**



**R**ECOMMENDATIONS in this guide are based on results of continuing research conducted throughout the state by the Texas Agricultural Experiment Station and the Entomology Research Division, U. S. Department of Agriculture. In developing control recommendations for some of the minor cotton pests, research results from other cotton producing states have been evaluated carefully. A committee of state and federal research personnel and Extension specialists meets annually to review research results and to develop the most recent, safest and most profitable recommendations for Texas producers.

The development of resistance to insecticides, deposit of pesticide residues in soil or on neighboring crops and destruction of beneficial insect parasites and predators dictate that the use of insecticides should be restricted to actual need, based on field inspections.

At least ten insect and mite species attacking Texas cotton show some degree of resistance to once effective chemicals. Evidence indicates that the more extensively a material is used, the more rapidly resistance develops.

Fruits, vegetables and animal feed can be contaminated by insecticidal drift. Continued excessive use of persistent insecticides results in soil residues, which jeopardize the use of these fields for growing certain vegetable or root crops.

Natural populations of parasites and predators are important in cotton insect control and should be protected. Chemicals should not be used unless economic populations of injurious insects develop.

Wise chemical use is paramount to profitable cotton production in most areas of Texas, but a sound insect control program also makes maximum use of natural and cultural controls. Immediate results and long-range consequences require careful consideration in developing profitable, effective insect control programs.

Cotton insects can be controlled economically by applying recommended insecticides at the correct time. (See recommendations.) Insecticides must cover the plant for effective control. Plants, however, usually are not protected when insects attack new growth or when chemicals are washed off.

For information on identification, life history and nature of damage of major cotton insects, see B-933, *Cotton Insects*.

## **INSECT CONTROL PROGRAM**

To achieve effective insect control and maximum profits, base insect control applications on infestation as determined by field inspection. Every grower should be able to determine insect population levels, to time insecticide applications on the basis of insect numbers and/or damage and to recognize the damage caused by different cotton insects.

### **Early Season Control**

Thrips and fleahoppers are commonly the major pests during the early season. Control of these pests helps insure early fruiting and maturity. Insecticide selection

# TEXAS GUIDE FOR CONTROLLING COTTON INSECTS

and rate will be influenced by pest species to be controlled, pest population level and impact on beneficial insects.

**Thrips** normally cause heaviest damage from plant emergence until early squaring begins. Heavy infestations cause delayed plant maturity, stunting and reduced stands. Thrips numbers, damage and population buildups vary from season to season.

**Fleahoppers** damage small squares but do not cause larger squares or bolls to shed. Fleahopper control should be based on infestation counts and excessive loss of small squares. Insecticide applications after the one-third grown square stage may create conditions favorable for a bollworm buildup. However, if fleahoppers are preventing normal square set, it may be necessary to continue treatment.

## Late Season Control

Bollworms, tobacco budworms, pink bollworms and boll weevils are the principal insects involved in the late season control program. Control of late season insects is designed to insure continued fruiting and protect fruit previously set.

Apply insecticide treatments when infestation counts indicate the need. Cotton grown under irrigation or on high-yielding land usually requires protection longer than cotton on dryland acreage.

**INSECTICIDES SHOULD BE APPLIED AT INTERVALS OF NOT MORE THAN 5 DAYS FOR EFFECTIVE CONTROL OF THE BOLL WEEVIL, BOLLWORM AND PINK BOLLWORM.**

## PINK BOLLWORM

Begin pink bollworm counts after cotton has been blooming for at least 5 days. Select five representative locations in the field, step off 300 feet of row, and count the number of rosetted blooms. Add the total number of rosetted blooms from these five locations and multiply by 10 to obtain the number of worms per acre. When approximately 350 or more worms per acre are found, begin treatment immediately.

In Pima cotton, a natural condition exists causing many blooms to appear rosetted. Therefore, examine each rosetted bloom to determine whether rosetting resulted from the presence of a pink bollworm larva.

After the first bolls form, bloom inspections are no longer the most reliable means of determining pink bollworm population levels. Begin boll inspections as soon as the first bolls are 3 weeks old. Continue inspection weekly. Walk diagonally across the field and collect at least 100 bolls (two-thirds grown or larger). Crack the bolls and examine the inside of the hull for tunnels made by small worms. Where tunneling is not found, check lint and seed for evidence of feeding or presence of worms. This is particularly important in determining infestation counts in Pima cotton.

Start treatment when 10 to 15 percent of the bolls are infested. Continue treatment until 70 percent are

open. Because of yields, cultural practices and economics involved in producing Acala and Pima cottons, begin insecticide applications when 5 to 10 percent of the bolls are infested and continue until the top bolls are mature.

## EARLY STALK DESTRUCTION AND FARM CLEANUP

Early harvest, stalk destruction and plowing under debris immediately after harvest reduce boll weevil, pink bollworm, bollworm and tobacco budworm populations. These practices force the boll weevil into starvation before time to enter winter quarters, prevent late-season buildup of weevils, pink bollworms, bollworms and tobacco budworms and reduce the number surviving the winter. The addition of 0.5 lb. methyl parathion or 0.25 lb. azinphosmethyl (Guthion) to arsenic acid or phosphate-type defoliant has proved effective in reducing potential overwintering boll weevil populations. *Do not add methyl parathion or azinphosmethyl to chlorate-type defoliant and/or desiccants. See L-219, Ways to Fight the Pink Bollworm in Texas.*

## BENEFICIAL INSECTS

Natural populations of beneficial insects help control cotton pests, such as the bollworm, cotton aphid and spider mite. However, never rely entirely on beneficial insects for control. Examine fields frequently to determine insecticide need. The introduction or release of Trichogramma wasps or convergent lady beetles has not proved effective in controlling damaging bollworm populations.

### CONVERSION TABLE

Pounds of Actual Insecticide in  
Different Quantities of Spray Concentrate\*

Insecticide	Gal.	2 Qt.	1 Qt.	1 Pt.
Azinphosmethyl (Guthion)	2.0	1.0	0.5	0.25
Azodrin	5.0	2.5	1.25	0.625
Bidrin	8.0	4.0	2.0	1.0
Carbophenothion (Trithion)	4.0	2.0	1.0	0.5
Demeton	2.0	1.0	0.5	0.25
Dieldrin	1.5	0.75	0.375	0.187
Ethion	4.0	2.0	1.0	0.5
Methyl parathion	4.0	2.0	1.0	0.5
Parathion	2.0	1.0	0.5	0.25
Toxaphene	6.0	3.0	1.5	0.75
Strobane	2.0	1.0	0.5	0.25
Pounds Actual Carbaryl (Sevin) or Trichlorfon (Dylox) Per Acre				
	3.0	2.0	1.0	0.5
	0.25			

Pounds of carbaryl (Sevin) or  
trichlorfon (Dylox) 80% wettable  
or soluble powder required 3.75 2.5 1.25 0.625 0.312

\*Certain formulations may differ in the amount of actual insecticide per gallon. Refer to the manufacturer's label for specific concentration, and adjust spray mixtures accordingly.

## GENERAL INFORMATION

In the late season program, dusts and sprays are equally effective when properly applied. If showers occur, repeat the application as soon as possible if the insecticide is washed off within 24 hours, except when aphicides are used. Increase dosages to the maximum when infestations are heavy, and apply insecticides at 5-day intervals or less.

For detailed information on the use of sprays and spray machinery, see L-486, *Insecticidal Spraying of Field Crops with Ground Machinery*.

Apply dusts when the air is calm. Dew is not necessary at time of dust applications. Dust and wettable powders are washed off by light showers more easily than sprays. Place dust nozzles on ground machines 4 to 6 inches above plants.

Ground machines and airplanes are equally effective for insecticide application. For best results with airplanes, it is essential to flag swaths so that they overlap.

## CAUTION

All insecticides are poisonous. Follow carefully all precautions on the label. Take special precautions when handling azinphosmethyl (Guthion), Azodrin, Bidrin, demeton, disulfoton (Di-Syston), methyl parathion, parathion and phorate (Thimet). Avoid skin contact. Do not breathe the vapors or drift from sprays or dusts.

Fields should not be entered for 48 hours following the application of methyl parathion at rates used for bollworm and tobacco budworm control.

Prevent drift from contaminating neighboring crops.

Most insecticides are destructive to honeybees. Since bees help pollinate many agricultural crops, every effort should be made to prevent their destruction.

For additional information, contact your county agent or write the Extension entomologist, Texas A&M University, College Station, Texas 77843.

COTTON INSECT CONTROL PROGRAM

Insects	Insecticides (Listed alphabetically)	Pounds per acre of actual insecticide(s) <sup>1</sup>	Remarks
Application at planting time for control of:			
Thrips	Granules-in-furrow		Granular in-furrow applications provide control for 4 to 6 weeks following planting. Systemic seed treatment provides control for 3 to 5 weeks following planting. Phorate and disulfoton may retard plant emergence and result in stand reduction when used under conditions unfavorable for rapid germination and plant emergence, such as cool, wet weather, planting too deep, etc. Injury is generally more pronounced on light, sandy soils and is increased when higher rates of application are used. Exercise care in using systemic insecticides with pre-emergence herbicides.
Aphids	A. Disulfoton (Di-Syston)	0.5-1.0	
Spider mites	B. Phorate (Thimet)	0.5-1.0	
Leaf miners	Pre-treated seed	Pounds per 100 lb. seed	
	A. Disulfoton	0.5	
	B. Phorate	0.5-1.5	
Cutworms	A. Strobane-DDT (2-1 mixture) <sup>2,4,11</sup>	2.0-3.0	Examine seedling cotton for these pests. Apply treatment as needed.
Garden webworms	B. Toxaphene-DDT (2-1 mixture) <sup>2,11</sup>	2.0-3.0	
(See below for control of beet armyworm and yellow striped armyworms.)			
Thrips	A. Azinphosmethyl (Guthion) <sup>3</sup>	0.125	Inspect cotton as soon as it emerges to a stand. If thrips are present and leaf buds between the cotyledons are affected, treat at once. Make second application 7 days later if infestation persists. Applications on four-leaf or older cotton should be based on the extent of plant damage. Silvering of the lower leaf surface is commonly observed, followed by wilted, deformed and bronzed or blackened leaves. If thrip control proves difficult, substitute methyl parathion at 0.25 lb. per acre for DDT.
	B. Bidrin <sup>2,8</sup>	0.1	
	C. Carbaryl (Sevin) <sup>5</sup>	0.5	
	D. Strobane-DDT (2-1 mixture) <sup>2,4,11</sup>	1.0	
	E. Toxaphene-DDT (2-1 mixture) <sup>2,11</sup>	1.0	
Cotton fleahoppers	A. Bidrin <sup>2,8</sup>	0.1-0.25	Begin treatment when 15 to 35 cotton fleahoppers (nymphs and adults) are found per 100 terminals. As plants increase in size and fruit load, larger populations may be tolerated without serious damage. Base later treatments on fleahopper numbers and on damage as indicated by excessive loss of small squares. Apply sprays at 7-day intervals. Repeat application of trichlorfon at 3 to 5-day intervals as needed.
	B. Carbaryl (Sevin) <sup>5</sup>	0.5-1.0	
	C. Strobane-DDT (2-1 mixture) <sup>2,4,11</sup>	1.0-1.5	
	D. Toxaphene-DDT (2-1 mixture) <sup>2,11</sup>	1.0-1.5	
	E. Trichlorfon (Dylox) <sup>10</sup>	0.25-0.5	
Overwintered boll weevils	A. Azinphosmethyl (Guthion) <sup>3</sup> (EC or ULV)	0.25	Where weevils are found, apply just before first squares are one-third grown to prevent egg laying. If more weevils emerge from hibernation sites, additional treatment may be necessary. These insecticides also control thrips and cotton fleahoppers.
	B. Carbaryl (Sevin) <sup>5</sup>	1.25-1.5	
	C. Malathion (ULV only)	12-16 fluid oz.	
	D. Methyl parathion <sup>6,9</sup>	0.25-0.5	
	E. Strobane + methyl parathion <sup>2,4,6,9,11</sup>	1.0 + 0.25	
	F. Toxaphene + methyl parathion <sup>2,6,9,11</sup>	1.0 + 0.25	
Cotton aphids	A. Bidrin <sup>2,8</sup>	0.125-0.25	In early season, apply insecticides as needed. In late season, begin treatment when honeydew appears.
	B. Demeton (Systox) <sup>2,7</sup>	0.125-0.25	
	C. Methyl parathion <sup>6,9</sup>	0.25-0.375	
	D. Parathion <sup>6</sup>	0.25-0.375	
Apply dusts at same rate of actual insecticide per acre as recommended below for sprays.			
Bollworms	A. Azodrin <sup>2,7</sup>	0.8-1.0	FIELD INSPECTION—Method A: 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 four to five young worms are found per 100 terminals or 5% of the squares and small bolls have been injured by small bollworms. Method B: Make a whole plant examination (terminals, squares, flowers or bolls) of all plants on 10 feet of row in five locations in the field. When larval counts average more than 1.5 larvae per 10 feet of row begin treatment. Apply insecticides at 5-day intervals or less. Check fields closely 2 to 3 days following each application for effective control. Where control has not been obtained, repeat application immediately.
Tobacco budworms	B. Carbaryl (Sevin) + methyl parathion <sup>5,6,9</sup>	2.0 + 0.5 to 3.0 + 0.75	
	C. Methyl parathion <sup>6,9</sup>	1.25-2.0	
	D. Strobane + methyl parathion <sup>2,4,6,9,11</sup>	2.0 + 1.0 to 3.0 + 1.5	
	E. Toxaphene + methyl parathion <sup>2,6,9,11</sup>	2.0 + 1.0 to 3.0 + 1.5	
Under most conditions, avoid treating cotton for early infestations of budworms until time of flowering. Where resistant tobacco budworms are encountered it may be necessary to shorten treatment interval to 3 days and increase dosage of methyl parathion to 2 lb./acre.			
Boll weevils	A. Azinphosmethyl (Guthion) <sup>3</sup> (EC or ULV)	0.25	FIELD INSPECTION—Examine cotton weekly. Examine 100 squares, at least one-third grown, at random, taking a few squares at several representative places in the field. If 15 to 25% or more have weevil punctures, begin treatment. Apply insecticides at 5-day intervals. Under extremely heavy build-ups, it may be necessary to shorten the interval to 3 days.
	B. Carbaryl (Sevin) <sup>5</sup>	1.6-2.4	
	C. Malathion (ULV only)	12-16 fluid oz.	
	D. Methyl parathion <sup>6,9</sup>	0.375-1.0	
	E. Strobane + methyl parathion <sup>2,4,6,9,11</sup>	1.0 + 0.25 to 2.0 + 0.5	
	F. Toxaphene + methyl parathion <sup>2,6,9,11</sup>	1.0 + 0.25 to 2.0 + 0.5	
Beet armyworms	A. Methyl parathion <sup>6,9</sup>	1.0-1.5	Examine cotton for presence of these pests. Apply treatment as needed. Insecticides are most effective if applied when worms are small.
Yellow striped armyworms	B. Trichlorfon (Dylox) <sup>10</sup>	2.0	
Spider mites	A. Azodrin <sup>2,7</sup>	0.25-1.0	Treat when leaves begin to turn yellow. Two applications at 5-day intervals may be necessary with all materials except demeton. In certain locations, some species of mites are highly resistant to miticides and are difficult to control with available materials. Use 0.6 to 1.0 lb. of Azodrin for control of resistant carmine mite.
	B. Carbophenothion (Trithion) <sup>2</sup>	0.375-0.75	
	C. Demeton (Systox) <sup>2,7</sup>	0.25	
	D. Ethion <sup>2,4</sup>	0.375-0.75	
	E. Methyl parathion <sup>6,9</sup>	0.25-0.375	
	F. Parathion <sup>6</sup>	0.25	
Lygus bugs	A. Carbaryl (Sevin) <sup>5</sup>	1.0-2.0	Begin treatment when an average of seven to 10 lygus are caught per 100 sweeps with a 15 to 16-inch net. Apply at 5 to 7-day intervals as long as required to reduce population.
	B. Methyl parathion <sup>6,9</sup>	0.5	
	C. Parathion <sup>6</sup>	0.5	
	D. Trichlorfon (Dylox) <sup>10</sup>	1.0-1.5	
Stink bugs	A. Carbaryl (Sevin) <sup>5</sup>	1.25-2.5	Begin treatment when average of two or more stink bugs are caught per 100 sweeps with a 15 to 16-inch net. Apply at 5 to 7-day intervals as long as required to reduce population.
	B. Methyl parathion <sup>6,9</sup>	0.5-1.0	
	C. Parathion <sup>6</sup>	0.5-1.0	
	D. Trichlorfon (Dylox) <sup>10</sup>	1.0-1.5	
Cotton leafworms	A. Azinphosmethyl (Guthion) <sup>3</sup>	0.25	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-0.125-0.25 lb. or malathion-0.35 lb.
	B. Carbaryl (Sevin) <sup>5</sup>	1.0-1.25	
	C. Methyl parathion <sup>6,9</sup>	0.125-0.25	
	D. Parathion <sup>6</sup>	0.125-0.25	
Cabbage loopers	A. Azodrin <sup>2,7</sup>	1.0	Natural control agents frequently prevent extensive leaf damage. Insecticides are most effective if applied when worms are small.
Spotted cabbage loopers			
Grasshoppers	A. Carbaryl (Sevin) <sup>5</sup>	1.5-2.0	Apply insecticides when damaging infestations appear. Baits are preferred for control of "jumbo" grasshoppers. (Ask your county agent about bait mixtures.)
	B. Dieldrin <sup>2</sup>	0.2	
	C. Toxaphene <sup>2</sup>	1.5-3.0	
Pink bollworms	A. Azinphosmethyl (Guthion) <sup>3</sup>	0.75	Apply insecticides at 5-day intervals. See text for additional information and procedures for making infestation counts for pink bollworms. Add methyl parathion where bollworm or budworm populations warrant.
	B. Carbaryl (Sevin) <sup>5</sup>	2.0-2.4	

<sup>1</sup>Dusts are effective, but sprays are considered more practical under early season conditions.

<sup>2</sup>Do not graze or feed treated plants, including gin waste, to dairy animals or animals being finished for slaughter.

<sup>3</sup>Do not apply within 1 day of picking. Do not apply ultra low volume application within 2 days of handpicking. Do not pasture fields or feed gin waste.

<sup>4</sup>Do not apply after bolls are open.

<sup>5</sup>Problems may be encountered in spraying wettable powder with low-volume farm sprayers. Follow manufacturer's directions carefully.

<sup>6</sup>Do not apply within 5 days of handpicking.

<sup>7</sup>Do not apply within 21 days of harvest.

<sup>8</sup>Do not apply within 10 days of harvest.

<sup>9</sup>Workers entering fields within 24 hours after application should wear protective clothing.

<sup>10</sup>Do not apply within 7 days of picking. Do not graze livestock in treated fields within 14 days after application.

<sup>11</sup>Do not feed gin waste to livestock.