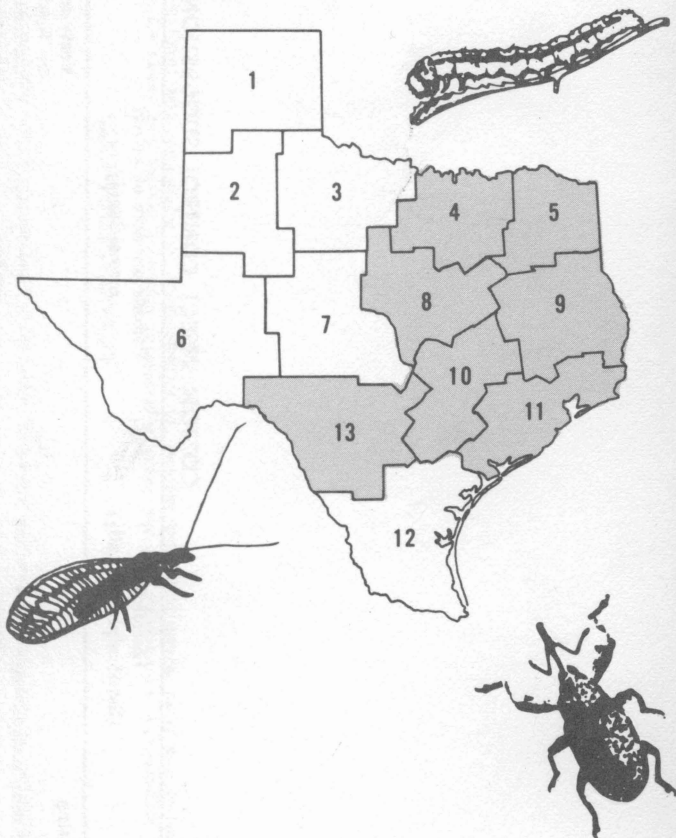


SUGGESTIONS for controlling Cotton Insects

in North Texas, Blacklands
and Gulf Coast Counties
of Texas



TEXAS A&M UNIVERSITY
TEXAS AGRICULTURAL EXTENSION SERVICE
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SUGGESTIONS in this publication are based on results of continuing research conducted throughout the state by the Texas Agricultural Experiment Station and the Agricultural Research Service, U.S. Department of Agriculture. Research results for some of the minor cotton pests from other cotton-producing states have been evaluated carefully and utilized in developing these suggestions. A committee of state and federal research personnel and Extension specialists meets annually to review research results and to develop the safest, most profitable suggestions for Texas producers.

Use of insecticides should be restricted to actual need, based on field inspections.

At least 12 insect and mite species attacking Texas cotton show some 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. 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. Use chemicals only if economic populations of injurious insects develop. If chemicals are applied, they must effectively cover plants to achieve control.

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

INSECT CONTROL PROGRAM

When insecticide applications are necessary to prevent economic damage, base applications on pest infestation as determined by field inspection. Each grower should be able to determine insect population levels and assess potential damage as influenced by crop maturity and conditions.

Early Season Pests

Thrips are sometimes pests during the early season. They normally cause heaviest damage from plant emergence until early squaring begins. Heavy infestations may reduce stands, stunt plants, reduce fruiting and thus delay maturity. Thrips numbers, damage and population buildups vary from season to season and area to area.

The *cotton fleahopper*, which usually damages small squares, occupies a key position in a cotton insect management program. Base chemical applications not only on fleahopper numbers but also upon fruiting rate and excessive small square loss. In early season, cotton may sustain heavy square loss without reducing yields but maturity may be delayed. Carefully evaluate the decisions to apply the first application, because insecticide applications made after the first square appears may create conditions favorable for bollworm-tobacco budworm outbreaks because of destruction of beneficial insects.

Late Season Pests

Bollworms, tobacco budworms, pink bollworms and boll weevils are the principal insects involved in the late season control program. Apply insecticide treatments when infestation counts and crop damage indicate the need. Once insecticidal applications begin, inspect fields frequently and repeat applications until the pest population has been reduced below economic levels. Control of late season insects is designed to insure continued fruiting and protect fruit previously set.

Cotton grown under irrigation or on high-yielding land is subject to insect damage later in the season than cotton on dryland acreage. Production practices, such as late irrigation and excessive nitrogen rates which prolong plant growth, may necessitate continued insect control measures. These practices also greatly favor an increase in the number of injurious insects which may overwinter, thereby increasing the potential for insect damage the following season.

Insecticides may be required at application intervals of not more than 5 days for effective control of the boll weevil, bollworm, tobacco budworm and pink bollworm.

BENEFICIAL INSECTS

Natural beneficial insect populations in many instances effectively control cotton pests such as the bollworm, tobacco budworm, cotton aphid and spider mites. Most insecticides are highly injurious to populations of beneficial insects. For this reason, make frequent field inspections before insecticides are applied to determine if economically damaging levels of injurious insects are present. While natural populations of beneficial insects frequently provide effective biological control, practical methods have not been devised for releasing beneficial insects.

PINK BOLLWORM

See Texas Agricultural Extension Service leaflet L-219, *Ways to Fight the Pink Bollworm in Texas*.

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. Pay particular attention to the destruction of green or cracked bolls and other plant debris left at the end of rows following stripper harvest. Do not allow stubble regrowth or development of volunteer seedlings.

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 pound methyl parathion or 0.25 pound azinphosmethyl (Guthion) to arsenic acid or phosphate type defoliants has proved effective in reducing potential overwintering boll weevil populations. *Do not add methyl parathion or azinphosmethyl to chlorate-type defoliants* (See L-145, *Cotton Defoliation Guide for Texas*, for a list of chlorate-type defoliants). *Growers and applicators are cautioned to use combinations of phosphate-type defoliants (Folex and Def) and phosphate insecticides with extreme care.* These combinations may pose a much greater toxicity hazard than either of the compounds used alone.

GENERAL INFORMATION

In the late season program, dusts and sprays are equally effective when applied properly. If showers occur within 24 hours following an application, fields should be checked to determine the need for repeating the applications. Increase dosages to the maximum recommended when infestations are heavy.

For detailed information on using sprays and spray machinery, see L-486, *Insecticidal Spraying of Field Crops with Ground Machinery* and L-764, *Pesticide Application Ground Equipment Calibration Guide*.

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

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

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
Carbophenothion (Trithion)	4.0	2.0	1.0	0.5
Demeton	2.0	1.0	0.5	0.25
Dicrotophos (Bidrin)	8.0	4.0	2.0	1.0
Dimethoate	2.67	1.33	0.67	0.33
Ethion	4.0	2.0	1.0	0.5
Methyl parathion	4.0	2.0	1.0	0.5
Monocrotophos (Azodrin)	5.0	2.5	1.25	0.625
Parathion	2.0	1.0	0.5	0.25
Toxaphene	6.0	3.0	1.5	0.75
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.

COTTON INSECT CONTROL SUGGESTIONS

Insects	Insecticide (listed alphabetically)	Pounds per acre of actual insecticide(s)	Remarks
Application at planting time for control of:			Early season spray programs based on actual need as determined by field inspection are preferred. Systemic insecticides can be used as alternatives to foliar applications. Granular-in-furrow applications provide control for 4 to 6 weeks following planting. Systemic seed treatment at recommended rates provides control for about 3 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 deeply, etc. Injury is generally more pronounced on light, sandy soils and increases when higher application rates are used. Exercise care in using systemic insecticides with pre-emergence herbicides.
	<i>Granules-in-furrow</i>		
Thrips	A. Disulfoton (Di-Syston)	0.5-1.0	
Aphids	B. Phorate (Thimet)	0.5-1.0	
Spider mites			
Leaf miners	<i>Pre-treated seed</i>	Pounds per 100 lbs. seed	
	A. Disulfoton	0.5	
	B. Phorate	0.5	
Cutworms	A. Toxaphene+methyl parathion ^{1,2}	2.0+1.0	
	<i>Baits</i>		
	A. Carbaryl (Sevin) (5% bait) ⁵	1.5 (30 lb. bait/acre)	May cause damage during seedling stage. Keep fields as weed-free as possible 3 weeks before planting to minimize cutworm problems. Plow under cover crops at least 3 weeks before planting. Insecticide sprays or baits are recommended for application over the drill.
	B. Trichlorfon (Dylox) (5% bait) ⁷	1.5 (30 lb. bait/acre)	
(See below for control of beet armyworm and yellow-striped armyworm.)			
Garden webworm	A. Methyl parathion ²	0.25-0.5	Generally a problem on seedling to six-leaf stage. Apply treatment as needed.
Thrips	A. Azinphosmethyl (Guthion) ³	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. Base applications on four-leaf or older cotton on the extent of plant damage. Silvering of the lower leaf surface is commonly observed, followed by wilted, deformed and bronzed or blackened leaves.
	B. Carbaryl (Sevin) ⁵	0.5	
	C. Dicrotophos (Bidrin) ⁴	0.05-0.1	
	D. Dimethoate ⁶	0.1	
	E. Toxaphene ¹	0.75-1.0	
Cotton fleahopper	A. Carbaryl (Sevin) ⁵	0.5-1.0	Base all treatments on damage (excessive loss of squares) as well as numbers of fleahoppers; for example, during the first 3 weeks of squaring, 25 to 50 cotton fleahoppers (nymphs and adults) per 100 terminals may cause damage. As plants increase in size and fruit load, larger populations may be tolerated without serious damage. Use insecticides only when few or no squares are being "set" by the plants, due to fleahopper attack. Insecticides applied early in the blooming period may result in outbreaks of bollworm and tobacco budworm due to the destruction of beneficial insects. <i>Use recommended higher application rates only when infestations are severe.</i>
	B. Dicrotophos (Bidrin) ⁴	0.05-0.1	
	C. Dimethoate ⁶	0.1	
	D. Trichlorfon (Dylox) ⁷	0.25-0.5	

Overwintered boll weevil	A. Azinphosmethyl (Guthion) ³ (EC or ULV)	0.25
	B. Carbaryl (Sevin) ⁵	1.25-1.5
	C. Malathion (ULV only) ⁸	12-16 fluid oz.
	D. Methyl parathion ²	0.25-0.5
	E. Toxaphene+methyl parathion ^{1,2}	1.0+0.25
Cotton aphid	A. Demeton (Systox) ⁹	0.125-0.25
	B. Dicrotophos (Bidrin) ⁴	0.1
	C. Methyl parathion ²	0.25-0.375
	D. Parathion ²	0.25-0.375

Where weevils are found, apply between pin-head size and first one-third grown squares to prevent egg laying. If more weevils emerge from hibernation sites, base additional treatment on economic damage levels shown under "boll weevils" below. These insecticides also control thrips and cotton fleahoppers.

Generally beneficial insects will effectively hold cotton aphid populations below damaging levels. Therefore, give careful consideration before beginning applications.

Apply dusts at same rate of actual insecticide per acre as recommended below for sprays.

Bollworm Tobacco budworm	A. Carbaryl (Sevin)+ methyl parathion ^{5,2}	2.0+0.5 to 3.0+0.75
	B. Methyl parathion ²	1.25-2.0
	C. Monocrotophos (Azodrin) ⁹	0.8-1.0
	D. Toxaphene+methyl parathion ^{1,2}	2.0+1.0 to 3.0+1.5

Under most conditions, avoid treating cotton for early budworm infestations until after blooms are observed in the field. Where moderately resistant tobacco budworms are noted, treatment interval may need shortening to 3 days and methyl parathion dosage increased to 2 pounds per acre. WHERE HIGH RESISTANCE LEVELS OCCUR, EFFECTIVE CHEMICAL CONTROLS ARE NOT AVAILABLE.

FIELD INSPECTION PRIOR TO INITIAL CHEMICAL APPLICATION: Check fields twice weekly (on a 3- to 4-day schedule). Examine 100 squares (one-half grown or larger) at random throughout the field for worm damage. *Before bloom*, begin treatment when 15 to 25 percent of the squares are worm damaged. *After bolls are present*, begin treatment when 8 to 10 percent of the squares are worm damaged.

FIELD INSPECTION AFTER INITIATION OF INSECTICIDE APPLICATIONS: Check fields closely 2 to 3 days following each application. Where control has not been obtained, repeat application immediately. Apply insecticide at intervals as determined by infestations.

Method A: Examine the terminal buds of 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 and 5 percent of the squares and small bolls have been injured by small bollworms.

Method B: Make a whole plant examination (terminals, squares, flowers and bolls) of all plants on 10 feet of row in at least five locations in the field. When counts average two or more larvae per 10 feet of row or exceed 10 in 50 feet of row, begin treatment.

Boll weevil	A. Azinphosmethyl (Guthion) ³ (EC or ULV)	0.25
	B. Carbaryl (Sevin) ⁵	1.6-2.4
	C. Malathion (ULV only) ⁸	12-16 fluid oz.
	D. Methyl parathion ²	0.375-1.0
	E. Toxaphene+ methyl parathion ^{1,2}	1.0+0.25 to 2.0+0.5

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 and from various portions of the plant. If 15 to 25 percent or more have weevil punctures, begin treatment. Apply insecticides at 5-day intervals. Under extremely heavy buildups, it may be necessary to shorten the interval to 3 days.

*Refer to overwintered boll weevil control section above before one-third grown square stage.

Beet armyworm Yellow-striped armyworm	A. Methyl parathion ²	1.0-1.5
	B. Trichlorfon (Dylox) ⁷	2.0
Spider mites	A. Carbofenothion (Trithion) ¹⁰	0.375-0.75
	B. Demeton (Systox) ⁹	0.25
	C. Ethion ¹¹	0.375-0.75
	D. Methyl parathion ²	0.25-0.375
	E. Monocrotophos (Azodrin) ⁹	0.25-1.0
	F. Parathion ²	0.25

Examine cotton for presence of these pests. Apply treatment as needed. Insecticides are most effective if applied when worms are small.

Treat when mites begin to cause noticeable leaf damage. Two applications at 5-day intervals may be necessary with all materials except demeton. In certain locations some mite species 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.

Cotton leafworm	A. Azinphosmethyl (Guthion) ³	0.25	Apply dusts or sprays when cotton leafworms first appear and at 5-day intervals until under control. Young worms are easier to kill than old worms. The BROWN COTTON LEAFWORM can be controlled effectively with parathion at 0.125-0.25 lb. per acre or malathion at 0.35 lb. per acre.
	B. Carbaryl (Sevin) ⁵	1.0-1.25	
	C. Methyl parathion ²	0.125-0.25	
	D. Parathion ²	0.125-0.25	
Cabbage looper Soybean looper	A. Monocrotophos (Azodrin) ⁹	1.0	Cabbage looper infestations usually are reduced or eliminated by disease agents before excessive leaf damage occurs. If Azodrin is used, several applications may be necessary for effective control.
Grasshoppers	A. Carbaryl (Sevin) ⁵	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. Malathion (ULV only) ⁸	8 fluid oz.	
	C. Toxaphene ¹	1.5-3.0	

INSECTICIDE USE RESTRICTIONS*

¹TOXAPHENE—do not graze dairy animals or animals being finished for slaughter in fields treated late in the season.

²METHYL PARATHION and PARATHION—do not hand pick or harvest within 7 days of application. Workers entering fields within 24 hours after application should wear protective clothing. (At rates above 0.5 lb. per acre, do not enter fields within 48 hours after application).

³AZINPHOSMETHYL—do not apply EC within 1 day of picking or ULV within 2 days of handpicking. Cotton may be machine harvested any time after application of ULV. If late season applications are made, do not graze livestock on treated areas or feed gin waste.

⁴DICROTOPHOS—do not apply within 30 days of harvest. Do not graze livestock on treated fields or feed treated gin trash. Workers entering fields within 16 hours after treatment should be protected.

⁵CARBARYL—no time limitations. Problems may be encountered in spraying wettable powder with low-volume farm sprayers. Follow manufacturer's directions carefully.

⁶DIMETHOATE—do not apply within 14 days of harvest. Repeat applications should not be made at intervals closer than 14 days. Do not feed treated forage or graze livestock on treated fields.

⁷TRICHLORFON—do not apply within 7 days of picking. Do not graze livestock in treated fields within 14 days of application.

⁸MALATHION ULV—no time limitations.

⁹DEMETON and MONOCROTOPHOS—do not apply within 21 days of harvest. Do not graze dairy or meat animals on treated fields. Do not feed gin waste to livestock.

¹⁰CARBOPHENOTHION—do not graze dairy or meat animals in treated fields.

¹¹ETHION—do not apply after bolls open. Do not graze dairy or meat animals in treated fields. Workers entering fields within 24 hours following application should wear protective clothing.

*Source—Summary of Registered Agricultural Pesticide Chemical Uses—Environmental Protection Agency, Washington, D.C.

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CAUTION

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

Do not enter fields for 48 hours following methyl parathion application at rates used for bollworm and tobacco budworm control.

Do not graze livestock in cotton fields or feed gin trash treated with insecticides, except those with no label restrictions.

Prevent drift from contaminating neighboring crops.

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

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

POLICY FOR MAKING INSECT CONTROL SUGGESTIONS

Suggestions on use of pesticides made by the Texas Agricultural Extension Service and the Texas Agricultural Experiment Station are based upon:

- Effectiveness under Texas conditions
- Avoidance of residues in excess of allowable tolerances
- Avoidance of toxicity to desirable vegetation, animals and humans
- Avoidance of adverse side effects upon beneficial predators, parasites, honeybees, fish and other wildlife, plants, animals and humans.

Suggested pesticides must be registered and labeled for use by the Environmental Protection Agency and the Texas Department of Agriculture. The status of pesticide label clearances is subject to change, and may have changed since this publication was printed. County Extension agents and appropriate specialists are advised of changes as they occur.

The USER always is responsible for the effects of pesticide residues on his livestock and crops, as well as problems that could arise from drift or movement of the pesticide from his property to that of others. *Always read and follow carefully the instructions on the container label.*

For further information, contact your county Extension agent or:

Leader-Agricultural Chemicals, Texas A&M University (713) 845-1353

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