

**Guide for
controlling insects
on vegetable crops
in Texas**

L-255



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TEXAS AGRICULTURAL EXTENSION SERVICE
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Guide for Controlling Insects on Vegetable Crops in Texas — 1956

WITH FEW EXCEPTIONS, vegetable insect control is a preventive program. Control measures should be initiated before insects appear in damaging numbers. Dusts and sprays in most instances are equally effective.

Methods of Application

Dusts • Insecticides and fungicides are generally compatible and may be applied simultaneously. Dusts should be applied at the rate of 15 to 20 pounds per acre. Dusts should be applied when the air is calm. Tractor dusters should have adequate fan capacity to give good coverage. Airplanes may be used to distribute dusts when the air is calm using a swath width no wider than the wingspread of the plane. A thorough coverage is necessary to control such pests as aphids and spider mites on low growing leafy crops. Hand dusters, especially the rotary type, are best adapted for treating home gardens and small fields.

Sprays for Insect Control • Low-volume sprays have been successful in controlling insects. Unless otherwise specified the emulsifiable concentrate should be used at the recommended rate in from 5 to 15 gallons of water per acre. Tractor sprayers should have 2 or 3 nozzles per row and should be operated at approximately 60 pounds pressure. Airplane sprays may be used with good results on most vegetables.

Garden Sprayers for Insects • The conventional 3 or 5-gallon knapsack sprayer with agitator and constant pressure is useful in garden insect control. Spray the plant thoroughly so that both leaf surfaces will be covered. The following dilution chart may be used to convert the amounts in the table to quantities suitable for home garden use. It is based on an application rate of 100 gallons per acre. Either emulsions or wettable powders may be used. **Phosphorus compounds (Parathion or TEPP)** are not recommended for use in hand sprayers.

Dilution Chart for Hand Sprayers

Insecticide	% Emulsion concentrate	Tbsp. per gal. of water	% Wettable powder	Tbsp. per gal. of water
Aldrin	25	1/2	25	2
BHC	10	1	10	1
Chlordane	75	1/2	40	4
DDT	25	2	50	2
Heptachlor	25	1	25	2
Lindane	25	1	25	1
Malathion	50	1/2	25	2
Methoxychlor	25	2	50	2
TDE	25	2	50	2
Toxaphene	60	2	40	4

Cautions

All insecticides are poisons and should be handled according to instructions on labels. **Special precautions should be taken in handling TEPP and parathion.** Do not breathe dust or mist or enter drift; wear Bureau of Mines approved respirators; have shirt sleeves rolled down; change clothes and bathe immediately after finishing work.

Small amounts of many of the organic insecticides may be found on plants for as long as 30 days after applications. The residues of these insecticides are usually too small to give effective insect control 7 days after treatment, but they present a health hazard to the consumer. The Pure Food and Drug Administration has designated the amount of organic insecticidal residue allowed on edible crops. Based on present research data, the following table shows the recommended time which should elapse between the last application and harvest.

Insecticide	Days that should elapse between last application and harvest
DDT	30 (DDT may be used in DUST FORMULATIONS and applied to TOMATOES in normal dosages within 5 DAYS of harvest)
Toxaphene	30 (Safe to use DUST on blackeye peas within 10 days of harvest; also on snap beans if beans are washed before shipping.) (Safe to use DUST on tomatoes within 7 days of harvest.)
Aldrin	30
Dieldrin	30
Heptachlor	30 (Safe to use DUST on blackeye peas within 10 days of harvest; also on snap beans if beans are washed before shipping.)
BHC	30
Lindane	30
Chlordane	30
TDE	30 (TDE may be used in DUST FORMULATIONS and applied to TOMATOES in normal dosages within 5 DAYS of harvest)
Methoxychlor (emulsion concentrate)	30 (Methoxychlor may be applied as a DUST or wettable powder spray to food crops within 7 DAYS of harvest. Wash produce thoroughly before eating or selling)
Parathion	21
Malathion	10
TEPP	3
Nicotine	3
Pyrethrin	1
Piperonyl butoxide	1
Rotenone	1
Sabadilla	1
Cryolite	21

The spray and dust schedules in this guide, if followed as directed, should not result in excessive residues of insecticides on the harvested crop.

The specific use of insecticides and interval between last application and harvest may change before this guide is reprinted. The latest available information on insecticide tolerances and uses will be distributed to county agents in the "Entomology Notes."

Home Garden Mixtures

General purpose dusts or sprays containing several insecticides which will control both chewing and sucking insects are available for the home garden.

Corn Earworm Control

Good control of corn earworms has been obtained utilizing formulations of DDT and white mineral oil with a Saybolt viscosity of 65 to 90 seconds. Mixtures containing these two materials must be constantly agitated during treatment. Proper timing of the applications is of the utmost importance. Ears may be treated individually or high clearance sprayers may be used for large scale applications.

Treatment of Individual Ears

- (1) Spray treatment—Make 3 applications of the following mixture at 2-day intervals beginning when the first ears start silking: 3 qt. 25% DDT emulsion plus 2 1/2 gal. mineral oil in 25 gal. water. Spray approximately 1/2 teaspoonful directly on the silks and corn spikes, using a pressure of 35 to 60 lb. Fair control may be obtained with 2 sprays applied 3 days apart.
- (2) Sponge treatment—Make 1 application after most of the silks are bending down and before they start to dry up. Apply a mixture of 1 lb. technical DDT and 25 gal. mineral oil (.2 lb. DDT in 5 gal. oil) with a synthetic sponge. Press the sponge against the silk until approximately 1/4 teaspoonful of the mixture runs into the silk. Injury may result if the treatment is made too early or if too much of the mixture is applied.

- (3) Brush treatment—Make 4 applications at 1 day intervals, by pressing a 1 inch stipple brush, dipped in a 5% DDT dust, into the silks. Begin treatment when the first ears start silking.

Large-scale Treatment

High clearance sprayers, applying 35 gal. of spray mixture per acre at a pressure of 100 to 150 lb., may be used to spray the following formulation: 3 gal. 25% DDT emulsion plus 7½ gal. mineral oil diluted with water to 100 gal. Four nozzles should be directed at each row. Treat 3 times at 2-day intervals beginning when the first ears begin silking.

The efficiency of earworm control treatments can be increased by planting earworm resistant varieties, utilizing such sweet corn hybrids as Calumet.

Control of Insect Pests in Planting Seed

Peas and other seed to be stored and used for planting may be treated, immediately after threshing, with lindane, methoxychlor or DDT to protect them from stored grain pests. Do not consume or feed any seed treated with these materials. One ounce of 3% DDT, methoxychlor or one-half ounce of 1% lindane per bushel of seed is effective. No damage to seed viability has been observed as a result of treatment with either compound at recommended dosages. (See Extension Service publication L-217.)

The recommendations in this leaflet are based upon results of experiments conducted by the Texas Agricultural Experiment Station, Texas A. & M. College System and other research agencies.

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

Dust or Spray Program

Insect	Dusts	Sprays (lb. actual toxicant per acre)	Remarks
BEANS, SNAP AND LIMA			
1. Aphids	1. 1% parathion or 1% lindane or	1. .25 lb. lindane or parathion or .5 lb.	Apply when insects first appear at 5 to 7-day intervals. Cover plants thoroughly. Four percent malathion dust or .5 lb. malathion as a spray may be used to control leafhoppers.
2. Flea beetles, leaf hoppers	4% malathion or 3% nicotine or .1% pyrethrin or 1% rotenone	malathion or 1 pt. 20% TEPP or 1 pt. nicotine sulfate (40% nicotine)	
3. Thrips	2. 5% DDT	2. 1 to 1½ lb. DDT	
4. Cabbage loopers	3. 20% toxaphene or 2½% aldrin or	3. 2 lb. toxaphene or .5 lb. aldrin or	
5. Corn earworms	4% malathion or 2½% heptachlor	.5 lb. heptachlor or .5 lb. malathion	
	4. 20% toxaphene or 5% DDT plus 3% malathion or 1% rotenone or 40% cryolite or .9% piperonyl butoxide plus .06% pyrethrin	4. 3 lb. toxaphene or 1 lb. DDT plus .6 lb. malathion	
	5. 5% DDT	5. 1 lb. DDT	
BEETS			
1. Beet webworms and leaf beetles	1. 5% DDT	1. 1 to 1½ lb. DDT	Apply when insects first appear and repeat as needed.
CABBAGE, BROCCOLI, CAULIFLOWER, TURNIPS AND MUSTARD			
1. Aphids	1. 4% malathion or 3% nicotine or 1% lindane or 1% parathion or .1% pyrethrin or 1% rotenone	1. .5 lb. malathion or 1 pt. nicotine sulphate (40% nicotine) or 1 pt. 20% TEPP or .25 lb. parathion or lindane	Apply when insects first appear at 5 to 7-day intervals. Cover plants thoroughly.
2. Flea beetles, vegetable weevils, thrips	2. 20% toxaphene or 5% DDT	2. 2 lb. toxaphene or 1 lb. DDT	
3. Harlequin cabbage bugs	3. 2% parathion or 20% toxaphene or 20% sabadilla	3. .25 lb. parathion or 2 to 3 lb. toxaphene	
4. Cabbage worms (looper, imported, etc.)	4. 20% toxaphene or 5% DDT plus 3% malathion or 40% cryolite or 1% rotenone or .9% piperonyl butoxide plus .06% pyrethrin	4. 2 to 3 lb. toxaphene or 1 lb. DDT plus .6 lb. malathion	
CANTALOUPEs, CUCUMBERS, WATERMELONS, OTHER CUCURBITS			
1. Cucumber beetles	1. 5% methoxychlor or 1% rotenone or 2.5% aldrin or 40% cryolite or .1% pyrethrin	1. 1 lb. methoxychlor or .5 lb. aldrin	<i>(Do not use sulphur, DDT, toxaphene, BHC or chlordane on cucurbits)</i> Aldrin may cause burning of young plants. Apply when insects first appear and repeat as needed. Cover plants thoroughly. Thrips usually damage seedling plants.
2. Squash bugs	2. 3% lindane or 2% parathion or 20% sabadilla	2. .5 to .75 lb. lindane or .25 lb. parathion	
3. Melonworms	3. 5% methoxychlor or 1% parathion or 1% rotenone or 40% cryolite	3. 1 lb. methoxychlor or .25 lb. parathion	
4. Aphids	4. 4% malathion or 1% lindane or 3% nicotine or 1% parathion	4. .25 lb. lindane or parathion or 1 pt. 20% TEPP or .5 lb. malathion or 1 pt. nicotine sulphate (40% nicotine)	
5. Thrips	5. 1% lindane or 1% parathion or 4% malathion or 1% rotenone	5. .25 lb. lindane or parathion or .5 lb. malathion	
6. Spider mites	6. 1% parathion or 4% malathion	6. .25 lb. parathion or .5 lb. malathion or 1 pt. 20% TEPP	
CARROTS			
1. Flea beetles, leafhoppers, vegetable weevils, webworms	1. 5% DDT or 20% toxaphene	1. 1 to 1½ lb. DDT or 2 to 3 lb. toxaphene	
EGGPLANTS			
1. Flea beetles, Colorado potato beetles, cucumber beetles	1. 5% DDT or 20% toxaphene	1. 1 to 1½ lb. DDT or 2 to 3 lb. toxaphene	Apply as needed.
2. Hornworms	2. See tomatoes	2. See tomatoes	
3. Spider mites	3. 1% parathion or 4% malathion	3. .25 lb. parathion or .5 lb. malathion or 1 pt. 20% TEPP	
LETTUCE			
1. Aphids	1. 4% malathion or 1% parathion or .1% pyrethrin or 3% nicotine	1. .5 lb. malathion or .25 lb. parathion or 1 pt. 20% TEPP or 1 pt. nicotine sulphate (40% nicotine)	Apply when insects first appear and repeat as needed.
2. Cabbage loopers, flea beetles, plant bugs	2. 5% DDT plus 3% malathion or 20% toxaphene or 1% rotenone or .9% piperonyl butoxide plus .06% pyrethrin	2. 1 lb. DDT plus .6 lb. malathion or 2 to 3 lb. toxaphene	
3. Corn earworms	3. 10% DDT	3. 1 to 1½ lb. DDT	
4. Cucumber beetles, vegetable weevils	4. 10% DDT or 20% toxaphene	4. 1 to 1½ lb. DDT or 2 to 3 lb. toxaphene	

1. Aphids 2. Stink bugs, plant bugs	1. 4% malathion or 1% parathion or 1% lindane or 3% nicotine or .1% pyrethrin or 1% rotenone 2. 10% DDT or 20% toxaphene	OKRA 1. .5 lb. malathion or .25 lb. parathion or lindane or 1 pt. nicotine sulphate (40% nicotine) or 1 pt. 20% TEPP 2. 1 to 1½ lb. DDT or 2 to 3 lb. toxaphene	Apply as needed.
1. Thrips	1. 1% BHC plus 5% DDT or 20% toxaphene or 2½% aldrin or 2½% heptachlor or 4% malathion	ONIONS 1. 2 lb. toxaphene or 1 lb. DDT or .5 lb. aldrin or .5 lb. heptachlor or .5 lb. malathion	Apply weekly beginning when 5 thrips are found per plant.
1. Aphids 2. Curculios 3. Stink bugs 4. Pea weevils	1. 3% lindane or 1% parathion or 4% malathion or 3% nicotine or .1% pyrethrin or 1% rotenone 2. 2½% aldrin or 20% toxaphene or 2½% heptachlor 3. 10% DDT or 20% toxaphene 4. See text	PEAS, BLACKEYE OR COWPEAS 1. 1 pt. 20% TEPP or .25 lb. lindane or parathion or .5 lb. malathion or 1 pt. nicotine sulphate (40% nicotine) 2. .25 lb. aldrin or heptachlor or 2 to 3 lb. toxaphene 3. 1 to 1½ lb. DDT or 2 to 3 lb. toxaphene 4. See text	Apply when needed. For curculio apply insecticides when pods are about 1 inch long. Repeat in 7 days. For pea weevils apply DDT when needed, but do not apply after pods form if to be used for snap peas.
1. Aphids 2. Thrips	1. 3% lindane or 1% parathion or 4% malathion or 3% nicotine or .1% pyrethrin or 1% rotenone 2. 5% DDT or 20% toxaphene or 2½% aldrin or 2½% heptachlor	PEAS, ENGLISH 1. 1 pt. 20% TEPP or .25 lb. lindane or parathion or .5 lb. malathion or 1 pt. nicotine sulphate (40% nicotine) 2. 1½ lb. toxaphene or 1 lb. DDT or .25 lb. aldrin or .25 lb. heptachlor	Apply when needed.
1. Cucumber beetles 2. Darkling beetles, flea beetles 3. Hornworms 4. Weevils, fruit- worms	1. 10% DDT or 20% toxaphene 2. 20% toxaphene or 2½% aldrin or 2½% heptachlor 3. See tomatoes 4. 2½% aldrin plus 5% DDT or 20% toxaphene or 2½% heptachlor plus 5% DDT	PEPPERS 1. 1 to 1½ lb. DDT or 2 to 3 lb. toxaphene 2. 2 lb. toxaphene or .5 lb. aldrin or heptachlor 3. See tomatoes 4. .25 lb. aldrin plus .5 lb. DDT or 2 to 3 lb. toxaphene or .25 lb. heptachlor plus .5 lb. DDT	Apply when needed. For weevil control, make first ap- plication at fruit setting. Treat 3 times at 7-day intervals.
1. Aphids 2. Colorado potato beetles, flea beetles, leaf- hoppers 3. Thrips 4. Blister beetles 5. Potato psyllid	1. 1% parathion or 3% nicotine or 4% malathion 2. 5% DDT or 20% toxaphene 3. 2½% aldrin or 20% toxaphene or 5% chlordane 4. 10% DDT 5. 5% DDT in sulphur	POTATOES, IRISH 1. .25 lb. parathion or .5 lb. malathion or 1 pt. nicotine sulphate (40% nicotine) or 1 pt. 20% TEPP 2. 1 to 1½ lb. DDT or 2 to 3 lb. toxaphene 3. .25 lb. aldrin or 1 to 2 lb. toxaphene or .5 to .75 lb. chlordane 4. 1 to 1½ lb. DDT 5. 1 to 1½ lb. DDT	Apply when needed and cover plants thoroughly.
1. Sweetpotato weevils 2. Tortoise beetles, garden webworms	1. See Extension publication L-202 2. 5% DDT	POTATOES, SWEET 1. See Extension publication L-202 2. 1 to 1½ lb. DDT per acre	Apply when needed.
1. Aphids 2. Worms, leaf- hoppers	1. 1% lindane or 4% malathion or 3% nicotine or .1% pyrethrin or 1% rotenone 2. 5% DDT or 20% toxaphene	RADISHES 1. .25 lb. lindane or .5 lb. malathion or 1 pt. nicotine sulphate (40% nicotine) or 1 pt. 20% TEPP 2. 1 to 1½ lb. DDT or 2 to 3 lb. toxaphene	Apply when needed.
1. Aphids 2. Flea beetles, worms	1. 1% lindane or 4% malathion or 3% nicotine or 1% parathion or .1% pyrethrin or 1% rotenone 2. 5% DDT or 20% toxaphene or 5% methoxychlor	SPINACH 1. .5 lb. malathion or 1 pt. nicotine sulphate (40% nicotine) or .25 lb. parathion or lindane or 1 pt. 20% TEPP 2. 1 to 1½ lb. DDT or methoxychlor or 2 to 3 lb. toxaphene	Apply when needed.
1. Budworms 2. Corn earworms 3. Flea beetles	1. Dusts are not effective 2. 5% DDT (See text) 3. 5% DDT	SWEET CORN 1. 1 to 1½ lb. DDT 2. 1 to 1½ lb. DDT (See text) 3. 1 lb. DDT per acre	Apply when needed.

TOMATOES

(Do not use TEPP or BHC on tomatoes)

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| 1. Flea beetles,
Colorado potato
beetles, stink
bugs, blister
beetles | 1. 5% DDT | 1. 1 to 1½ lb. DDT | 1. Apply when insects first
appear. |
| 2. Thrips | 2. 20% toxaphene or 2½% aldrin or
2½% heptachlor | 2. .25 lb. aldrin or heptachlor or 2 to 3
lb. toxaphene | 2. Apply when thrips cause blos-
soms to fall. |
| 3. Darkling beetles | 3. See peppers | 3. See peppers | 4. Three applications at 7-day in-
tervals beginning at fruit set-
ting. Examine for worms and
eggs and continue treatment if
necessary. |
| 4. Fruitworms | 4. 5% TDE or DDT | 4. 1 to 1½ lb. TDE or DDT | 7. Mites cause bronzing of leaves,
stems and fruit. Repeat appli-
cations at 5 to 7-day intervals. |
| 5. Garden fleahoppers | 5. 5% chlordane or 2½% aldrin or 2½%
heptachlor | 5. .5 lb. chlordane or .25 lb. aldrin or
heptachlor | |
| 6. Hornworms | 6. 5% TDE or 5% DDT or 20% toxaphene | 6. 1 lb. TDE or DDT or 2 lb. toxaphene | |
| 7. Russet mites | 7. Sulphur or 5% DDT with 75%
sulphur or 4% malathion | 7. .25 lb. parathion or .5 lb. malathion | |
| 8. Vegetable weevils | 8. See cabbage | 8. See cabbage | |
| 9. Suck flies | 9. 5% DDT plus 40% sulphur or 2½%
heptachlor or 2½% aldrin | | |
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GENERAL

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| 1. Ants | 1. 5% chlordane or 2% dieldrin | 2. 1 to 1½ lb. DDT or 2 to 3 lb. toxaphene | 1. Apply to nests on surface of
the soil as needed. See Exten-
sion publication L-128 for con-
trol of leaf-cutting ants. |
| 2. Armyworms,
cutworms | 2. 5% DDT or 20% toxaphene | 3. 1 to 1½ lb. chlordane or 2 to 3 lb.
toxaphene or .25 lb. aldrin | 2. Apply when needed. Use 5%
methoxychlor dust on cucur-
bits. |
| 3. Grasshoppers,
crickets | 3. 10% chlordane or 20% toxaphene
or 2½% aldrin | 4. 2 to 3 lb. toxaphene or 1 to 1½ lb.
DDT or 1 to 1½ lb. chlordane | 3. Apply when grasshoppers and
crickets are young. |
| 4. False chinch
bugs | 4. 20% toxaphene or 5% DDT or 5%
chlordane | 7. .25 lb. parathion | |
| 5. Snails, slugs | 5. Poison baits | | |
| 6. Pillbugs, sowbugs | 6. 5% DDT or 5% chlordane or 2%
lindane or poison baits | | |
| 7. Leaf miners | 7. 2% parathion | | |
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