



# vegetable INSECT CONTROL



extension service



OKLAHOMA A&M COLLEGE

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# VEGETABLE INSECT CONTROL

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All vegetable crops are likely to be injured by one or more kinds of insects. Insects injure plants by feeding on them. Insects can be killed by swallowing poisons or by coming into contact with them.

One group of insects feed by biting off and chewing portions of the plant much as a horse eats. This is called the chewing type. Chewing insects are controlled by placing poison on the plant or in bait that they will eat or by contact insecticides. Stomach poisons include the arsenicals such as lead arsenate, calcium arsenate and Paris green, the flourines such as cryoliet and sodium fluosilicate, and some of the newer organic chemicals such as DDT, lindane and chlordane.

Other insects feed by piercing the plant tissue with sharp needle-like mouthparts and sucking the juice much like drinking soda pop through a straw. Contact poisons such as nicotine sulfate, rotenone, DDT and lindane must be used against these pests. These insects can be killed by being hit with the poison at time of application, or by later coming in contact with deposits remaining on the plant surfaces. This allows for longer periods of time between applications of the poison.

From the above it may be noted that certain insecticides act both as stomach poisons and as contact insecticides. DDT and lindane are in this class.

Stomach poisons such as arsenate of lead, and residual insecticides such as DDT, **should not be applied to those parts of vegetables that are to be eaten within three weeks of harvest, unless it is possible to remove the deposit by washing or stripping off the outer leaves as in cabbage.**

## Directions for Mixing

BAITS  
DUSTS  
SPRAYS

### BAIT—Poison Bran Mash

Coarse Bran	1 pound (½ gallon)
Water	2-3 cups
Sodium Fluosilicate or Paris green	2 tablespoons

Mix bran and sodium fluosilicate or Paris green together dry. Pour water over the dry mixture and mix until a moist crumbly mash is made. Each flake should be moist. When spread on the infested area, each flake should fall separately. Test for moisture: Squeeze a handful of the bait and a drop of water will form between the fingers. If water runs or drips from the bait it is too wet.

Spread thinly but thoroughly around each plant in late afternoon.

## DUSTS—3 percent Nicotine Dust

Nicotine sulphate (40% nicotine)	4 teaspoons	1 pound (pint)
Hydrated lime	1 pint	12 pounds

To mix a small quantity of dust use a quart, one-half gallon, or gallon can or jar with an air-tight lid. Put a pint of hydrated lime in the can with 5 or 6 smooth stones the size of a walnut. Then add 4 teaspoons of nicotine sulphate. Close the can and shake until well mixed. Sift the contents through an ordinary screen wire to remove lumps and stones.

**Caution:** Do not breathe nicotine fumes. If liquid nicotine is spilled on the skin, wash it off with water at once.

## Rotenone Dust

For general use, a dust containing between 0.75 and 1 percent rotenone gives good control. A formula by weight and dry volume is as follows:

0.75 percent Rotenone Dust	Volume	Weight
Derris or cube with 5% rotenone.....	1 part	1 pound
Dusting sulfur, talc or flour.....	2½ parts	5 pounds

DO NOT use lime with rotenone.

To make a small amount of dust, place one pint of 5 percent rotenone powder and 2½ pints of diluent (sulfur, talc, or flour) in a tight one-half gallon jar or can and shake until a uniform mixture is obtained.

## Cryolite Dust

Cryolite dust should contain from 25 percent to 50 percent cryolite. Talc or flour are suitable fillers and can be used for diluting cryolite that has a higher percentage than is required.

**NOTE:** Dust will mix easier if the mixing can is no more than two-thirds full.

## SPRAYS

### Dilution Table

Insecticide	100 gallons	10 gallons	1 gallon	1 quart
Cryolite.....	4 pounds	14½T (5½ oz.)	4½ t.	1 t.
DDT (50% W).....	2 pounds	3.2 oz.	2 T	1½ t.
Lead arsenate.....	2 pounds	10T (3.2 oz.)	3 t.	¾ t.
	3 pounds	15T (4.7 oz.)	4½ t.	1 t.
Nicotine sulphate.....	1 pint	3T	1 t.	¼ t.

**NOTE:** All measures of teaspoon or tablespoon are level full, not heaping.

**Abbreviations:** t—teaspoonful; T—tablespoonful

Spreaders and stickers will increase the efficiency of the spray. Sweet-skim milk or sweet milk, two gallons to 100 gallons of spray or a half cup per gallon ordinary bread flour, two pounds per 100

gallons, 3 t. per gallon; 1 t. per gallon, are the safest and cheapest spreaders. Make a paste of the flour and dilute before adding it to the spray. It is better to dilute the spreader in the spray tank before adding the insecticide. Soap is also a good material to add to nicotine sprays to increase its wetting qualities. Use one cubic inch cake of soap or two tablespoons soap flakes in each gallon of spray.

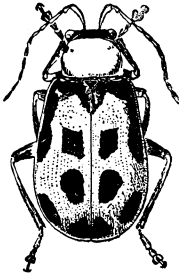
### Rate of Application

For one application for 100 feet of row use:

1. Two to four ounces of dust.
2. Two to four quarts of spray.

## VEGETABLE INSECT CONTROL GUIDE

### BEANS



Bean Leaf Beetle is reddish to yellow, about 1/5 inch long with a black head and black spots. The beetle above is about 5 times natural size.

#### Bean Leaf Beetle — Kind of Injury:

Adults eat holes in leaves; larvae eats roots.

#### Control:

- (1) Dust with cryolite when injury is noticeable.
- (2) For a spray use 4½ level teaspoons cryolite to one gallon of water.
- (3) Dust containing 1 percent rotenone is also effective.
- (4) A 5 percent DDT dust or spray containing 1 tablespoon of 50 percent powder in 1 gallon of water. This material is also effective in controlling thrips.

Do not use arsenicals on beans.

### CABBAGE

#### Cutworm — Kind of Injury:

Young plants cut off near ground.

#### Control:

- (1) Scatter poisoned bran mash in late afternoon on infested soil.
  - (2) Carefully examine soil near damaged plants: locate and destroy worms.
  - (3) Place paper collars around stem of plant at transplanting time.
- \*It is better to poison cutworms before planting the crop.

#### Aphids — Kind of Injury:

Plants stunted and yellowed, leaves curled, honey-dew present.

#### Control:

- (1) Before setting, dip cabbage plants in solution of two teaspoons 40% nicotine sulphate, 1 cubic inch soap, or two tablespoons soap flakes, to one gallon of warm water.

◀ A collar of cardboard will keep cutworms away from plants.



- (2) Spray plants so as to hit aphids with preceding solution.
- (3) Dust plants with 3% nicotine dust. Use nicotine only when temperature is 70° F., or above.
- (4) Dust with 1% rotenone.
- (5) Dust with 1% lindane.

**Harlequin Bug** — Kind of Injury:

Plant withers and turns brown as if burned.

**Control:**

- (1) Dust with 5% DDT dust or spray using 2 table-  
spoons of 50% powder per gallon of water.
- (2) Dust with 0.7 - 1.0% rotenone.
- (3) Dust with 1% lindane.

Harlequin bugs are brilliantly colored red and black about ½ inch long, flat and shield shaped. The one here is about 3 times natural size.

**Cabbage Looper** — Kind of Injury:

Holes eaten in leaves, leaves shredded, heads tunnelled.

**Control:**

- (1) Dust with 5% DDT dust or spray using two  
tablespoons of 50% DDT powder or 25% emul-  
sion per gallon of water.
- (2) Dust with 0.7 to 1% rotenone.

**CAUTION:** Remove outside leaves from head be-  
fore using if cryolite, DDT, lindane, lead arse-  
nate or calcium arsenate is used.

**CORN**

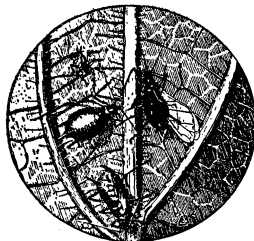
**Corn Earworm** — Kind of Injury:

Silks cut. Tip end of ears eaten.

**Control:**

When silks have wilted or about seventh day after silk appears:

- (1) Inject ¼ teaspoon of 125 to 135 viscosity medi-  
cinal mineral oil in the base of the silk channel  
with an oil can or medicine dropper (one-half  
dropperful to each ear).
- (2) Cut tip of ear at base of silk channel with sharp  
knife and destroy tips collected.



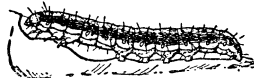
Aphids are small winged and wingless lice clustered thickly on leaves, usually are green in color. The above are 5 times natural size.



Cabbage looper is a green worm located on head or leaves of plant, the one above is a little less than natural size.

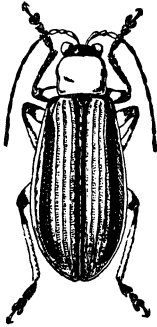


Cabbage worm, a little less than natural size.



Corn earworm, green or brownish worms ¼ to 1¼ inches long. The one above is a little less than natural size.

## CUCUMBERS, CANTALoupES, WATERMELONS



### Striped Cucumber Beetle — Kind of Injury:

Seedlings eaten just as they are pushing through the soil, girdled at base, leaves and blossoms eaten. Larvae feed on roots. Adults spread cucumber wilt.

**Control:** Treat promptly at first appearance of beetles with:

- (1) One percent lindane dust
- (2) Cryolite or cryolite-fixed copper dust.

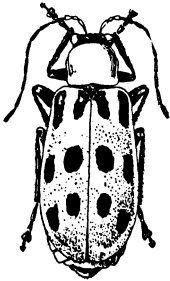
**DO NOT USE SULFUR**

◀ **Striped cucumber beetle, is small with black stripes down back separated by wider stripes of bright yellow. The one here is 6 times natural size.**

### Spotted Cucumber Beetle — Kind of Injury:

Same injury as caused by striped beetle.

**Control:** Same control as for striped beetle.



◀ **Spotted cucumber beetle is yellowish green, about 1/4 inch long with 12 black spots on back. This one is 5 times natural size.**

### Melon Aphids — Kind of Injury:

Leaves curled, tips stunted. Honeydew present.

**Control:**

Dust to hit aphids on underside of leaves when temperature is 70°F. or above, and the air is calm.

- (1) Three percent nicotine dust.
- (2) One percent lindane dust.

## ONIONS

### Onion thrips — Kind of Injury:

Whitish blotches appear on the leaves and the tips turn brown and die.

**Control:**

- (1) Treat with 5% DDT dust or a spray containing 2 tablespoons 50% powder per gallon of water.
- (2) Dust with 1% lindane dust.



◀ **Onion Thrip about 25 times natural size.**

## PEAS

### Pea Aphid — Kind of Injury:

Plants stunted with leaves and tips curled and distorted.

**Control:**

Watch young plants closely and treat promptly at first appearance of aphids.

- (1) Treat with 5% DDT dust or a spray containing 2 tablespoons 50% powder per gallon of water.
- (2) Dust with a 0.7 to 1% rotenone dust.

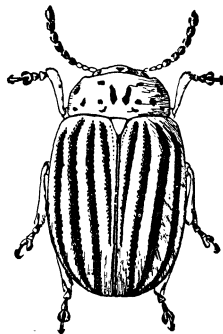
## POTATOES

**Colorado Potato Beetle** — Kind of Injury:  
Leaves eaten by adults and larvae.

**Control:**

- (1) Treat with 5% DDT dust or a spray containing either 2 tablespoons of 50% DDT powder or 2 tablespoons of 25% DDT emulsion to 1 gallon of water.
- (2) Spray using 3 tablespoons of lead arsenate or cryolite to one gallon of water.

Colorado Potato Beetle is yellow and black striped,  $\frac{3}{8}$  inch long. Larval stage — brick red with soft body. This one is 3 times natural size.



**Blister Beetles** — Kind of Injury:  
Leaves stripped from plants.

**Control:**

Dust beetles with:

- (1) 10% DDT dust.
- (2) Cryolite or sodium fluosilicate dust.



Blister Beetle is gray, black or striped,  $\frac{1}{2}$  to 1 inch long with a distinct neck. Also attacks tomatoes and egg plants. This blister beetle is twice the natural size.

## SQUASH AND PUMPKIN

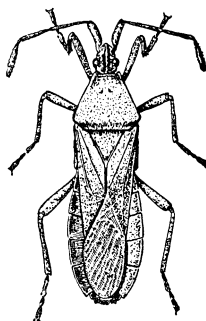
**Squash Bug** — Kind of Injury:

Sap sucked from plants, plants wilt and die.

**Control:**

- (1) Dust at 5 day intervals with 1% lindane dust to kill young and adults. Dust must hit bugs.
- (2) Hand pick eggs and adults early in season. Examine plants and kill bugs daily. For control of cucumber beetles see "Cucumbers."

Squash bug, twice natural size. Adults or "hard shells" are dark brown to ashy in color.  $\frac{3}{4}$  inch long; young are green and reddish in color, when older turn gray.



## TOMATOES

**Hornworm** — Kind of Injury:  
Leaves eaten.

**Control:**

- (1) Spray with lead arsenate or cryolite, 3 tablespoons to 1 gallon of water.
- (2) Dust with lead arsenate or cryolite.
- (3) Treat with 5% DDT dust or spray of 2 tablespoons 50% powder in 1 gallon of water.
- (4) Hand pick.



Hornworms, are large, green worms and are 3 to 4 inches long when full grown, with distinct horn.

**Fruit Worm** — Kind of Injury:  
Holes Bored in fruit.

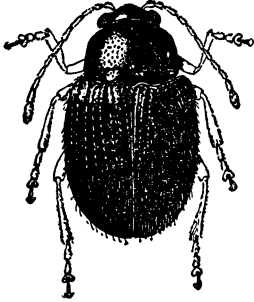
**Control:**

- (1) Treat with 5% DDT dust or a spray of 2 tablespoons of 50% powder in 1 gallon of water.
- (2) Spray with lead arsenate or cryolite 3 tablespoons to 1 gallon of water.

**TURNIP, BEET, TOMATO, POTATO, MUSTARD, CABBAGE, RADISH, EGG PLANT**

**Flea Beetle** — Kind of Injury:

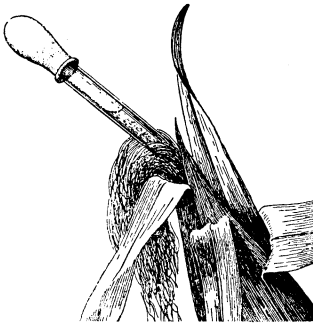
Small holes about size of bird shot eaten through leaves.



**Control:**

- (1) Treat with 5 percent DDT dust or spray containing 2 tablespoons 50% powder per gallon of water except on greens crops.
- (2) Dust greens crops with 0.7 to 1 percent rotenone dust.

◀ Flea Beetle is tiny and black and jumps like a flea when disturbed. This one is 15 times natural size.



An ordinary medicine dropped used to inject oil among corn silks for earworm control.

**ACKNOWLEDGEMENT**

Professor R. R. Walton, Assistant Entomologist, Oklahoma Agricultural Experiment Station, furnished valuable suggestions and information on the latest control recommendations for many of the insects listed in this circular.

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