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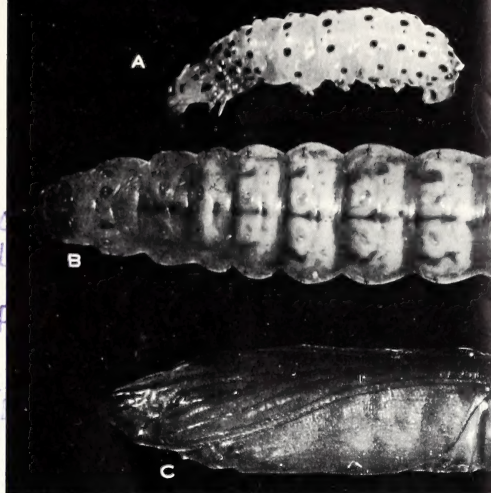
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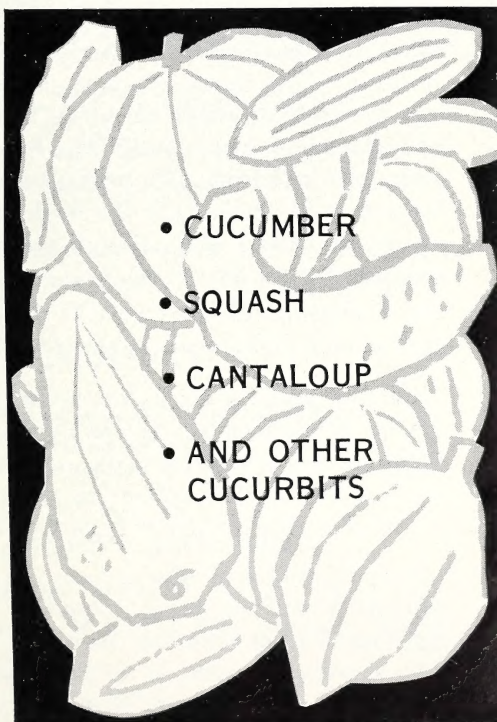
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CURRENT SERIAL
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THE PICKLEWORM

HOW TO CONTROL IT ON



LEAFLET NO. 455

U.S. DEPARTMENT OF AGRICULTURE



Immature stages of the pickleworm:
A, Young larva; B, full-grown larva;
C, pupa.

TC-7345

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The insect known as the pickleworm¹ gets its name from the fact that it feeds on cucumbers, although it feeds on all cucurbit plants. It attacks only the growing plants and fruits.

The pickleworm causes serious damage to cucumber, summer squash, and cantaloup in all the South Atlantic and Gulf States and occasionally causes damage as far west as Oklahoma and Nebraska, and as far north as Iowa and Connecticut. Unless effective control measures are used, profitable production of these crops usually is impossible when the insect becomes abundant. The insect sometimes attacks other cucurbit crops, including winter squash, pumpkin, watermelon, and gourd, and several wild cucurbit plants.

DEVELOPMENT

Adults of the pickleworm are moths. Their bodies and wings, viewed from above, are yellowish brown and have a purple sheen. The wingspread is about 1¼ inches. At the tip of the abdomen the moths have a brushlike appendage, which they wave while resting.

The female moths lay eggs at night, singly and in clusters, among the hairs on flower and leaf buds, tender leaves, and stalks or vines, and on young fruits. The

¹ *Diaphania nitidalis*.

eggs are irregular in shape, yellowish white, and not easily seen. They hatch in about 3 days.

The newly hatched larvae (pickleworms) are yellowish white. Numerous dark spots soon appear on them; these disappear before the larvae are full grown.

In 10 to 28 days the larvae are full grown. At this time they are about $\frac{3}{4}$ inch long, and have yellowish-green bodies and brown heads.

A full-grown larva leaves the part of the plant where it has fed, attaches itself to a leaf on the plant or to a leaf or other object on the ground under the plant and spins a thin web around its body before transforming to a pupa.

The pupae are $\frac{1}{2}$ to $\frac{3}{4}$ inch long. At first they are greenish white; later, a shiny reddish brown.

The pupal stage lasts 6 to 31 days except in cold weather when it may last as long as 70 days.

The life cycle from egg to adult normally is completed in 22 to 53 days.

Several overlapping generations of the pickleworm occur each year in the South. There may be only a partial one in the northern limit of the range of the insect.

The pickleworm apparently is able to survive the winter only in semitropical areas where living host plants do so. In other areas the first brood of larvae usually is small and causes little damage to cultivated crops. The insect then gradually increases in abundance until frost kills its host plants. Summer and fall plantings usually are the ones that receive most injury.

Pickleworms feed throughout the winter on cultivated and native host plants in extreme southern Florida and extreme southern Texas. The species gradually spreads northward during the spring and summer of each year. This spread results from flights of the moths and occasionally from shipment of infested squash or other hosts. Larvae have been found in central Florida in March, in southern Georgia in April, in coastal South Carolina in May, in coastal North Carolina in June, in eastern Virginia in August, and in Maryland in September. Similar northward spread evidently occurs from other

Certain insects may be mistaken for the pickleworm when found on cucurbit crops. These are the melonworm, which feeds chiefly on foliage; the squash vine borer, which usually confines its feeding to stalks near the soil surface; and the corn earworm, which usually is found only in the flowers.



A

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Pickleworm adults: A, Male; B, female.

areas in the South where the insect overwinters. Larvae usually are present on cultivated hosts in destructive numbers during the last of March and in April in the lower Rio Grande Valley in Texas. Damage by the insect has occurred in Missouri during late July and in August.

DAMAGE

Young pickleworms feed at first at the surface of the parts of the plant where they hatch. The surfaces of flower buds, terminal buds, and young fruits are favorite locations. The larvae continue feeding by tunneling into flowers, buds, stalks, vines, and fruits. Flowers may be destroyed. Injury to small fruits may destroy them or cause them to become deformed as they grow. Larger fruits may be made unfit for food, and entire plants injured or killed. Plant disease organisms often gain entrance through the tunnels made by pickleworms.

CONTROL

Cultural practices aid in preventing pickleworm damage, but they cannot be relied on for control of the insect. Application of insecticide is the chief means of control.

CULTURAL PRACTICES

Early planting is of value in areas where the insect does not appear until late spring or summer. Ask your county agricultural agent about best time for planting.

In semitropical areas in southern Florida and southern Texas it may be helpful to destroy, if feasible, native host plants such as wild or creeping cucumber and Okeechobee gourd.

Fall and winter cleanup measures and use of a trap crop do not appear to be of value.



C. Pickleworms in squash flower. • **D, Cucumbers deformed by pickleworm feeding.** (About one-half natural size.) • **E. Pickleworm on cucumber.**

CONTROL WITH INSECTICIDE

Lindane and carbaryl (Sevin) are the insecticides recommended for controlling the pickleworm. Lindane usually is most effective.

They may be applied as dusts or sprays. Dusts are ready to use when purchased. A spray is prepared by mixing a wettable powder with water. Lindane is also available in an emulsifiable concentrate for mixing with water.

NOTE.—Lindane spray prepared from emulsifiable concentrate is not recommended for cantaloup; it may cause undesirable flavor. Use of lindane in any form on cantaloup, cucumber, and winter squash may have a slight effect on flavor. Do not use lindane in fields to be planted later to potatoes or other root crops.

Some injury to the foliage of cucurbit plants may occur if several days of rain or high humidity follow the use of carbaryl.

Each dust or spray application should provide either 4 ounces of actual lindane or 1 pound of actual carbaryl per acre. For example, apply 25 pounds of either a 1-percent lindane dust or a 4-percent carbaryl dust per acre. Do not exceed these dosages.



D

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result of pickleworm
infested cucumber.



E

Forms of the insecticides that are commonly available for preparing sprays are listed below; opposite each is shown the amount that should be mixed with water in order to prepare a spray of the desired strength. (If you buy a product in which the percentage of insecticide differs from the one indicated here, use proportionately more or less of it.)

*Insecticides and forms
in which they may
be purchased*

*Amount to apply per acre
in 20 to 100 gallons of
water*

Lindane:

25-percent wettable powder..... 1 pound
or

20-percent emulsifiable concentrate..... 1 pint

Carbaryl:

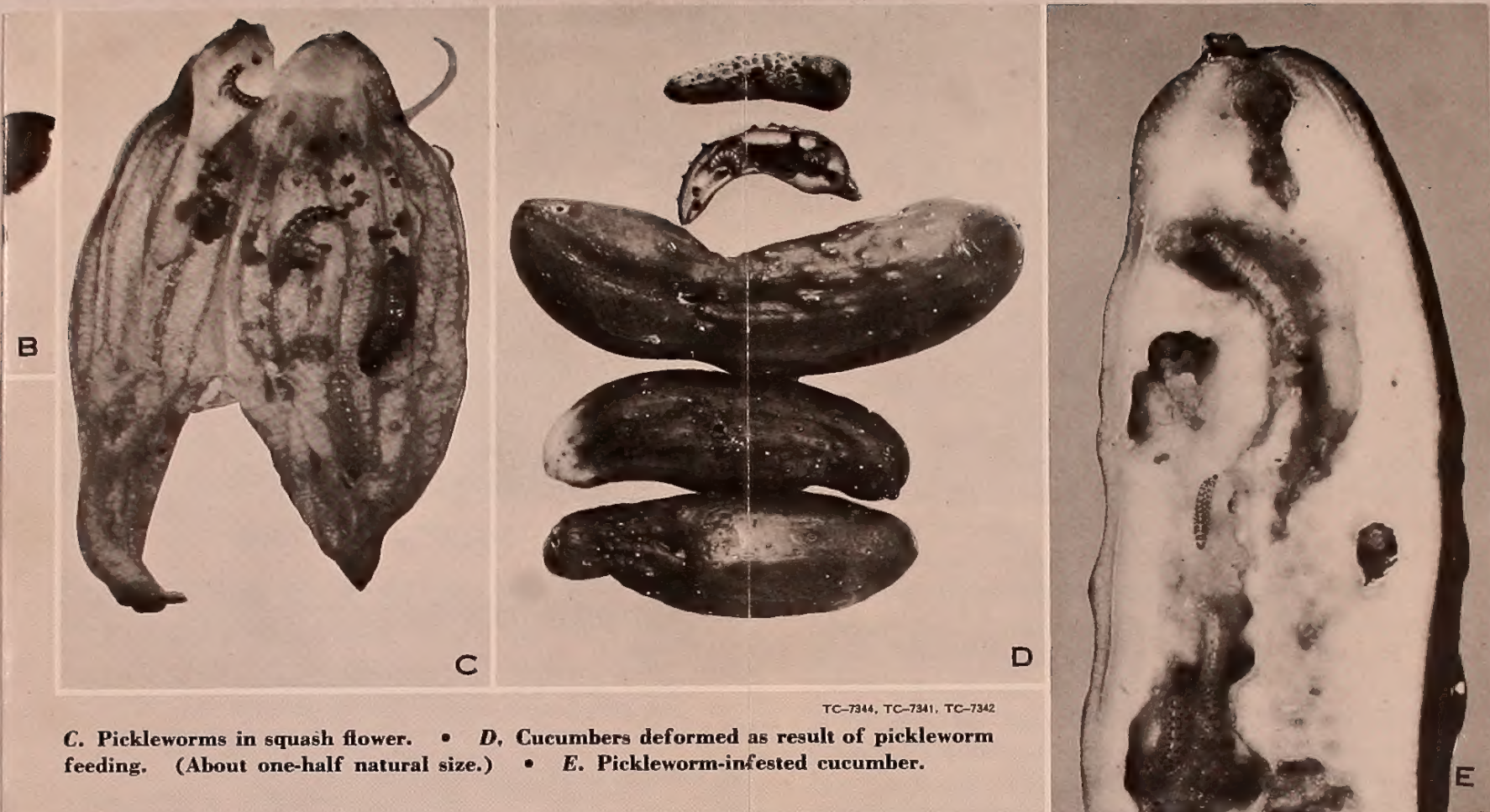
50-percent wettable powder..... 2 pounds

80-percent wettable powder..... 1 pound, 3 ounces

4 lbs./gal. suspension concentrate..... 1 quart

The fungicides zineb and maneb are toxic to young pickleworms. If you apply one of these to your cucurbit crop for disease control, you may apply either lindane or carbaryl in the same dust or spray. On cucumber plantings, if you do this and make applications every 5 days, you may reduce the amount of insecticide applied per acre by one-half.

C



TC-7344, TC-7341, TC-7342

C. Pickleworms in squash flower. • **D. Cucumbers deformed as result of pickleworm feeding.** (About one-half natural size.) • **E. Pickleworm-infested cucumber.**

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EFFECTIVENESS

LINDANE provides effective control of the pickleworm. It also controls cucumber beetles, the melon aphid, and the melonworm. It is of some value against the squash vine borer.

CARBARYL, when properly applied, gives satisfactory protection against the pickleworm, the melonworm, cucumber beetles, the squash bug, and the squash vine borer.

WHEN TO APPLY

Pickleworms usually do not appear in appreciable numbers in a cucurbit planting until the earliest flowers open. Examine the terminal buds and blossoms frequently. If you find pickleworms, apply an insecticide at once. Repeat the application every 7 days as long as the insect is present, which is usually to the end of the harvest period.

In areas where experience has shown that the pickleworm is likely to be present every year on late summer and fall plantings of cucumber, squash, and cantaloup, routine applications of the insecticide should begin each year shortly before the earliest flowers open.

To obtain satisfactory control of the pickleworm, you must kill the young larvae before they tunnel into the terminal buds, flowers, vines, stalks, or fruits. Early and frequent insecticide applications are necessary. It is especially important that the plants be protected during their fruiting period.

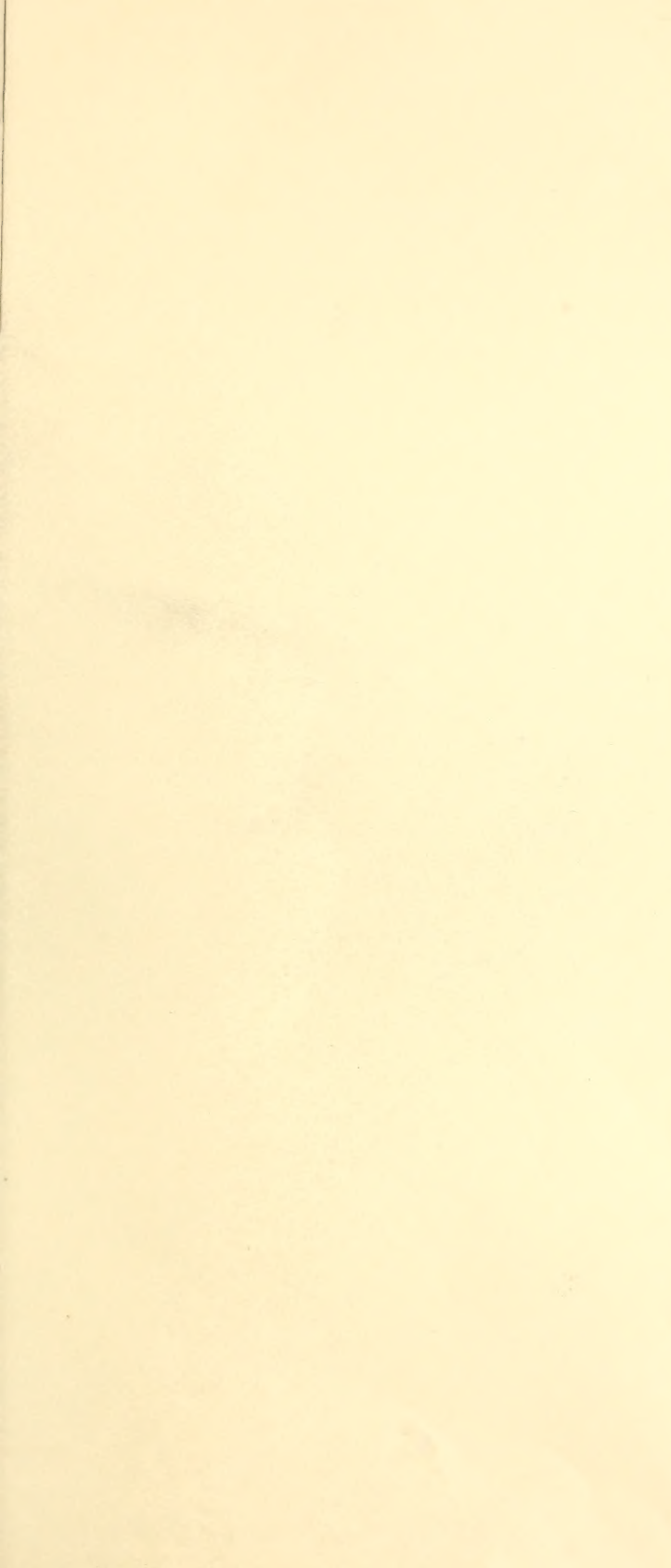
If possible, apply dusts when the air is calm or the wind velocity is no more than 3 miles an hour, and when the plants are moist. Don't dust when the wind velocity is more than 5 miles an hour. Don't spray when the wind velocity is high enough to prevent thorough coverage of the plants. Low-gallonage mist sprays are the ones most likely to be adversely affected by wind.

EQUIPMENT AND RATES OF APPLICATION

Apply dusts with ground equipment at the rate of 20 to 30 pounds per acre. With aircraft, use 30 to 35 pounds.

When spraying, use enough water to give thorough distribution of the insecticide throughout the foliage. The amount of water needed will depend on the equipment used. For most cucurbit crops, the approximate amounts of water needed are as follows:

<i>Equipment</i>	<i>Gallons of water per acre</i>
Low-gallonage ground sprayers.....	20
High-gallonage ground sprayers.....	75 to 100



The amount of water applied does not affect the amount of wettable powder or emulsifiable concentrate that should be used; follow the recommendations in the list on page 6.

Adjust the nozzles of dusters and sprayers so that the insecticide reaches all parts of the plants.

Drive slowly, preferably not faster than about 4 miles an hour, when dusting or using a low-gallonage sprayer. The air velocity at the nozzles of a duster, and the pressure at which a sprayer is operated, should be high enough to force the insecticide to all parts of the plants. However, the air velocity at the nozzles of a duster should not be so high as to blow the dust from the plants.

PRECAUTIONS

Insecticides used improperly may be injurious to man and animals. Use them only when needed and handle them with care. Follow the directions and heed all precautions on the labels.

Keep insecticides in closed, well-labeled containers in a dry place. Store them where they will not contaminate food or feed, and where children and animals cannot reach them.

When handling an insecticide, wear clean, dry clothing.

Avoid repeated or prolonged contact of insecticide with your skin.

Wear protective clothing and equipment if specified on the container label. Avoid prolonged inhalation of insecticide dusts or mists.

Avoid spilling insecticide concentrate on your skin, and keep it out of your eyes, nose, and mouth. If you spill any on your skin or clothing, remove contaminated clothing immediately and wash the skin thoroughly with soap and water. Launder the clothing before wearing it again.

After handling an insecticide, do not eat, drink, or smoke until you have washed your hands and face. Wash any exposed skin immediately after applying an insecticide.

Lindane can be absorbed directly through the skin in harmful quantities. Do not let it get on the skin, and keep it out of the eyes, nose, and mouth. If any is spilled, wash it off the skin and change clothing at once. Do not apply lindane or carbaryl to any crop within 24 hours before harvest.

Avoid applying insecticides to cucurbit plants during daylight hours when honey bees and wild bee pollinators are active in the field. These insects are necessary for good set of the fruit, and should be protected for other reasons. Do not apply insecticides if apiaries are near enough to be adversely affected; notify the beekeeper so that he can move the hives if necessary. Also avoid drift of insecticide to nearby wildlife habitats, crops, pasture grass, feed, or livestock.

To protect water resources, fish, and wildlife, do not contaminate lakes, streams, or ponds with insecticide. Do not clean spraying equipment or dump excess spray material near such water.

Dispose of empty insecticide containers at a sanitary land-fill dump, or crush and bury them at least 18 inches deep in a level, isolated place where they will not contaminate water supplies. If you have trash-collection service, wrap small containers in heavy layers of newspapers and place them in the trash can.

Washington, D.C.

Revised January 1961

Slightly Revised November 1966