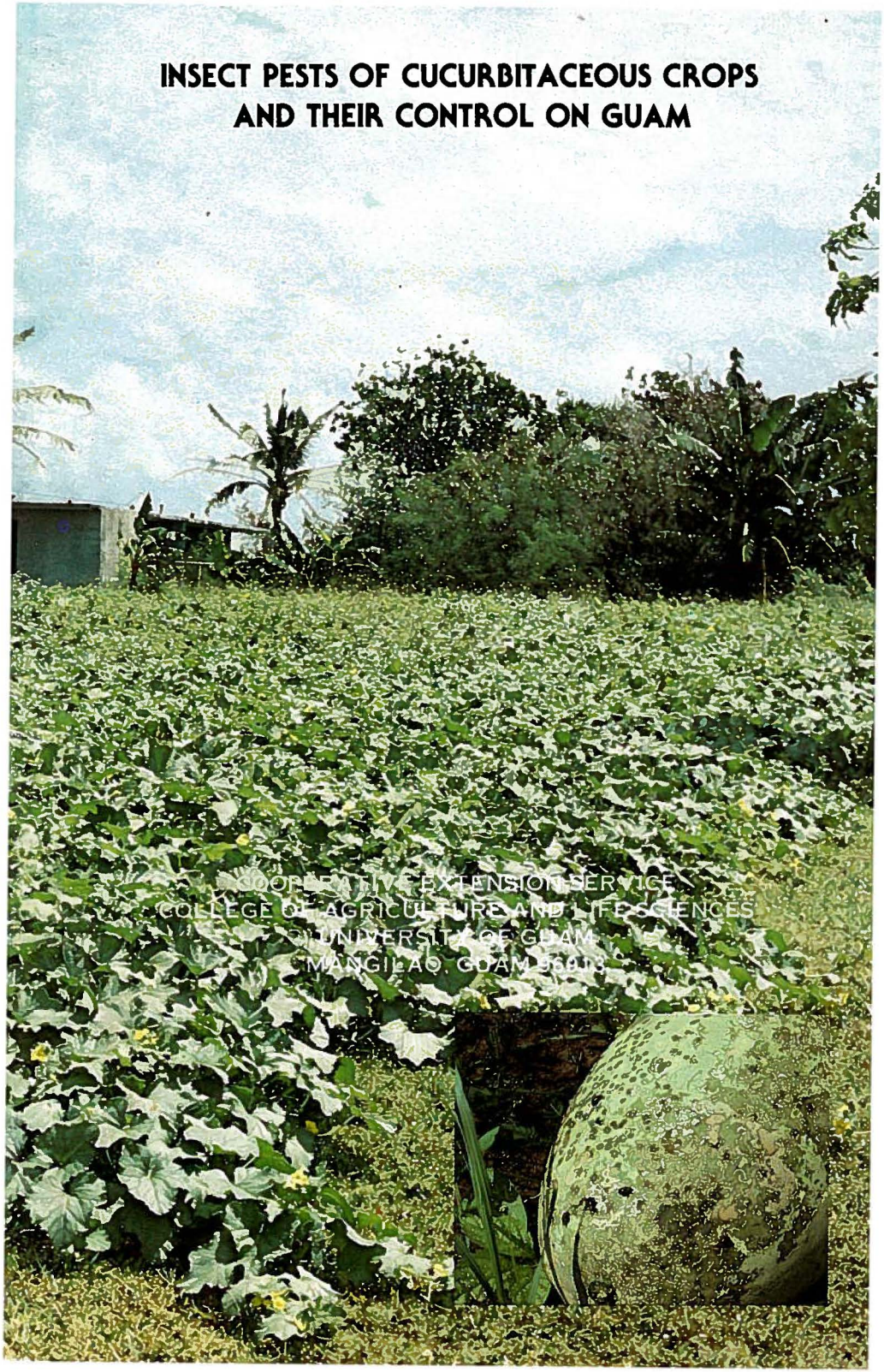
INSECT PESTS OF CUCURBITACEOUS CROPS AND THEIR CONTROL ON GUAM



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INSECT PESTS OF CUCURBITACEOUS CROPS AND THEIR CONTROL ON GUAM [1]

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Cucurbits are the most common group of vegetable crops on Guam. They include all melons, squashes, gourds, pumpkins, etc. Cucurbits, in general, are infested by a specific group of insect pests. Most of the pests of this group on Guam are Asiatic in origin.

This bulletin is intended for farmers to recognize the pest species and take up the appropriate control methods in consultaion with Agricultural Extension Agents from the Cooperative Extension Service.

Information on description of these pests, their biology, and natural enemies is included primarily for better decision-making in an integrated pest management approach.

1. AES Technical Report No. 6
2. Agricultural Experiment Station
3. Cooperative Extension Service

Fig. 1a Cucumber beetle feeding on watermelon

Fig. 1b Cucumber beetle feeding on cucumber leaf

Cucumber Beetle: *Aulacophora foveicollis* (Lucas)

Family: Chrysomelidae Order: Coleoptera
Description: The adult is an orange-colored, active beetle about 8 mm long and 3 mm wide. It feeds on the leaves, flowers, and fruits of cucumber, watermelon, squash, gourd, pumpkin, etc. (Fig. 1a,b)

The female beetle lays eggs singly or in small groups. Eggs are pale yellow in color. The number of eggs laid by a female ranges from 100 to 300. Eggs are laid on the surface of the soil near the base of the host plants. Eggs hatch about a week after laying. The grubs are yellowish in color with a brown head. Grubs tunnel into the roots of cucurbitaceous plants (Fig. 2). This grub stage lasts for about a month. Pupation takes place in the soil about 2 to 3 cm below the surface. The pupal stage lasts for about 2 weeks.

Control: Insecticides (such as Sevin) should be applied immediately after noticing the beetles in the field. Any delay in controlling the adult beetles will result in the beetles laying eggs and the grubs entering the roots of the plants. It is much more difficult to control the grubs inside the roots, than the adults on the surface of the leaves.

Fig. 2 Cucumber beetle grub tunneling into the cucumber roots

Melon fly: *Dacus cucurbitae* Coquillett

Family: Tephritidae Order: Diptera

Description: The adult fly is a little larger than a housefly, yellowish in color with smoky wings. The posterior end of the female is conical in shape. This pointed end is used for piercing the outer skin of its host fruits and for laying eggs.

The adult female lays eggs in groups inside the fruit. Each female is capable of laying over 100 eggs. Eggs hatch two to three days after laying. Maggots tunnel into fruit and feed on the pulp (Fig. 3). Fully grown maggots wriggle out of the fruit and drop on the surface of the soil. Later, they burrow themselves about 2 to 5 cm below the surface and undergo pupation. Pupae are barrel-shaped, yellow in color in the beginning, and turn brown before emergence. The pupal stage lasts for about a week.

Fig. 3 Melon fly maggot feeding on fruit pulp

In addition to fruits belonging to the family on Cucurbitacene, this fly has been known to attack beans, tomato, cowpeas, guava, papaya, oranges, mango, and green pepper.

Control:

A. Chemical: Spraying the crop with approved insecticides will reduce the infestation.

B. Sanitation: Collection and destruction of the affected fruits.

C. Cultural: Plowing the field after harvest of the crop to expose the pupae for parasites and predators, as well as other physical factors, helps in reducing the population of this pest. Raising crops like corn in-between or around the cucurbitaceous crop and spraying it with insecticides when the cucurbitaceous crop is in the fruiting stage will kill the adult females that hide under the lower surface of corn leaves during hot periods of the day.

D. Resistant Crops: Growing varieties that are resistant to this pest.

E. Biological Control: A pupal parasite, *Opius fletcheri,* is quite common on Guam.

F. Other methods: Melon fly has been eradicated in Rota and Saipan by releasing sterile males after reducing the wild male population by dispersing baits with protein hydrolysate and Dibrom.

Fig. 4 Melon aphid on watermelon leaf

Melon aphid: *Aphis gossypii* Glover

Family: Aphididae Order: Homoptera

Description: It is a small insect about 2 mm in size with sucking mouthparts. It is mostly dark green in color and sometimes pale yellow. It usually occurs in colonies on plants because of its ability to lay young ones directly (Fig. 4). Females reach maturity in 4 to 6 days and lay up to 100 young ones at a rate of 5 to 10 per day.

This aphid is widespread all over the tropics and warm, temperate areas. Light infestation of young plants will result in stunting. Production of honeydew by the aphids usually result in development of sooty mold all over the leaf surface of host plants.

In addition to Cucurbitaceous plants, this insect is known to infest cotton, eggplant, okra, pepper, citrus, hibiscus, and many other ornamental plants.

The major economic importance of this aphid is its ability to transmit over 50 virus diseases, including cucumber mosaic disease, papaya mosaic disease, and papaya ringspot virus disease.

Green peach aphid : *Myzus persicae* (Sulz)

Description: This is also a small insect, yellowish green in color that occurs in colonies. It is distributed all over the world, including both tropic and temperate regions.

Heavy infestations of this insect may cause weakening of young plants and dropping of young, infested leaves. It is known to transmit over 150 plant virus diseases, and is considered as one of the serious enemies of farmers. Some of the diseases transmitted are cucumber mosaic, bean common mosaic, bean yellow mosaic, soybean mosaic, cabbage black ringspot, corn mosaic, and many others.

In the tropics, this aphid also multiplies by laying young ones directly without fertilization.

Control of Aphids:

A. Chemical: Using chemicals, such as Malathion, will result in control of aphids.

B. Biological: Lady beetle larvae and adults and syrphid fly maggots (Fig. 5) feed on aphids. A small wasp parasite also attacks aphids on Guam.

Fig. 5 Lady beetle larva and sytphid fly maggot feeding on aphids

Fig. 6 Leaf miner adults on cucumber seedling

Leaf miner: *Liriomyza* sp.

Family: Agromyzidae Order: Diptera
Description: It is a small reddish brown fly (Fig. 6). The female fly inserts its ovipositor inside the leaf surface and lays eggs singly. The maggot is small, yellow in color, and somewhat conical in shape. It tunnels in the lamina of the leaf in a zigzag fashion (Fig. 7). The fully grown maggot gets out of the tunnel and falls on the surface of the soil. It then buries itself further about 10cm deep in the soil and pupates.

Control:

A. Chemical: Use of pesticides, such as Diazinon or Cygon, at the recommended dosages will provide a satisfactory control of this pest.
B. Biological: A complex of small wasp *(hymenopterous)* parasites are known to occur on Guam.

Fig. 7 Leaf miner tunneling into a cucumber leaf

Melon leaf caterpillar: *Diaphania indica* (Saunder)

Family: Pyralidae Order: Lepidoptera
Description: The adult moth has white wings with a black band along the anterior margin and the distal margins of both fore and hin wings (Fig. 8). It is a small moth of about 3 cm, when wings are spread (Fig. 9).

Eggs are laid singly on the leaves. Eggs hatch in 4 to 6 days. The caterpillars are green in color with white longitudinal stripes. They feed on the lower surface of the leaves and often bind them together with silken threads. The caterpillar stage lasts for about 2 weeks. In severe cases of infestation, the crop may be severely defoliated. Pupation takes place in a cocoon spun in the leaves and the pupal stage lasts for about a week.

It is primarily a pest of cucurbitaceous plants.

Control: Spraying with chemicals, such as Sevin, should be done when the pest is noticed in the field.

Fig. 8 Melon leaf caterpillar on the under side of a cucumber leaf

Fig. 9 Adult of melon leaf caterpillar

Corn earworm: *Heliothis armigera* (Hb.)

Family: Noctuidae Order: Lepidoptera

Description: The adult moth is brown in color with black markings and is about 4 cm in width with wings stretched. This moth is active during the night and hides under leaves, debris, and other dark places during the daytime. Eggs are spherical in shape and yellowish in color, and are laid singly on the leaves or buds. Each female is capable of laying over one thousand eggs. Eggs hatch in 2 to 3 days.

The caterpillars vary in color from green to brown. These caterpillars prefer to feed on young shoots, buds, flowers, and young fruits (Fig. 10). Sometimes they tunnel into tender stems. The caterpillar stage lasts for about 2 weeks. Fully grown larva drops into the ground and pupation takes place in the soil. The pupal stage lasts for about a week. It is a polyphagous (feed on many plants) pest and has a host range of over 200 plants.

Control:

A. Chemical: Spraying with registered chemicals, such as Sevin and commercial preparations of the polyhedral virus, will control this pest.

B. Biological: An ecto and an endoparasite have been recorded on the caterpillars of this pest. Muddauber wasps pick up the mature caterpillars from the field. A predaceous pentatomid bug also feeds on this caterpillar.

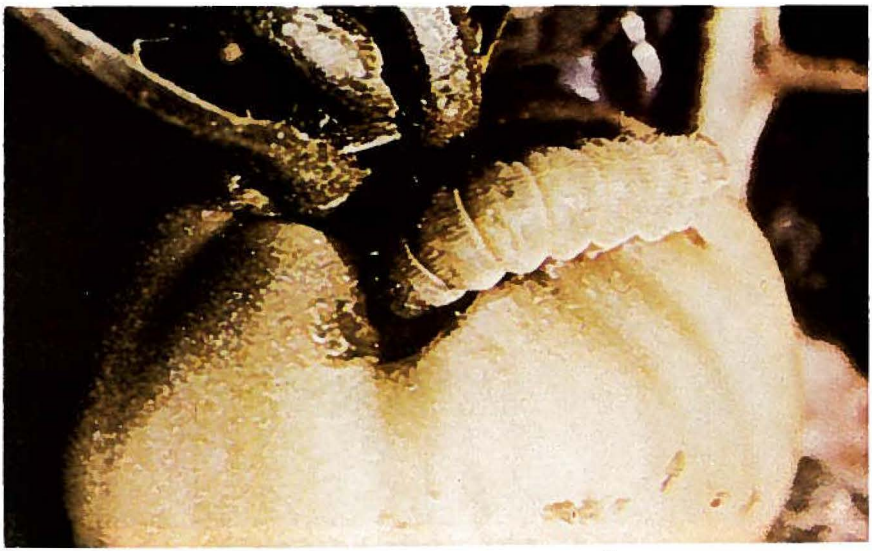

Fig. 10 Corn earworm caterpillar

Fig. 11 Cutworm caterpillar

Common cutworm: *Spodoptera litura* (F.)

Family: Noctuidae Order: Lepidoptera
Description: It is also a polyphagous (feeds on many plants) pest with many host plants. Adults are active during the nighttime and the wings are dark brown in color with white bands.

The adult female lays eggs in groups of 100 or more, and is capable of laying close to 2,000 eggs.

Caterpillars are pale green in the beginning and become brown as they mature (Fig. 11). It is primarily a leaf feeder; however, it may cause severe damage to seedlings in some seasons by cutting them at ground level.

Pupation takes place in the soil within an earthen cocoon.

Control:

A. Chemical: Spraying with pesticides, such as Sevin, Dibrom, etc., will control this pest.

B. Biological: An egg parasite, *Telenomus* sp., is very effective in reducing the population of this pest on Guam. An ecto and an endo larval parasite are also known to occur. In some seasons, a microsporidian and virus diseases reduce the population of this pest.

Fig. 12 Garden looper caterpillar

Garden looper: *Chrysodeixis chalcites* (Esper)

Family: Noctuidae Order: Lepidoptera
Description: It is primarily a leaf feeder. The female moth lays eggs singly on the leaves. Because of the absence of two pairs of legs in its abdomen, the caterpillar moves with a loop in its middle. The caterpillar is green in color (Fig. 12). A fully grown caterpillar is about 4 cm long. Pupation takes place among the leaves within a silken cocoon.

Control: Spraying any one of the approved pesticides will provide an effective control of this pest.

Flea hopper: *Halticus tibialis* Reuter

Family: Miridae Order: Hemiptera
Description: It is a small, shiny, black bug (Fig. 13). The young ones and adults look alike, except the adults have wings. The hind legs of this bug are well developed to aid in jumping. It has sucking type of mouthparts and leaves markings of white spots in the place of its feeding. It is a very active insect and, in some seasons, its population builds up quite heavily. Heavy infestations on young seedlings may cause stunting of growth.

Fig. 13 Flea hopper

Control: Spraying with one of the common pesticides will control this pest.

Black scale: *Saissatia* sp.

Family: Coccidae Order: Homoptera
Description: It is a polyphagous pest (feed on many plants) with many host plants. The females are dark brown and are attached to the twigs. Each female is capable of laying over 2,000 eggs. The nymphs are capable of moving and usually migrate to tender portions of the plant. Adult males have wings and females are sessile and have no wings.

It becomes a pest in unattended crop fields. Because of the production of honeydew by this insect, sooty mold develops on the leaves and stems and, also, ants attend them to feed on the honeydew.

Control:

A. Chemical: Adult females are covered with a wax layer and are hard to control. Nymphs are susceptible to insecticide sprays.
B. Biological: There are some wasp parasites of this pest on Guam.

Fig. 14 Leaf-footed bug

Leaf-footed bug: *Leptoglossus australis* (F.)

Family: Coreidae Order: Hemiptera
Description: This bug is a polyphagous pest(feeds on many plants), however, it is a minor pest of cucurbits. The adult is a large, dark brown bug. Because of the leaf-like expansions in its hind legs, it is called the 'leaf-footed bug'. (Fig. 14).

It lays eggs in patches on the stems and usually the adult female guards the eggs. Both nymphs and adults suck the sap of host plants.

Control: Easily controllable with the common insecticides.

Tumid spider mite: *Tetranychus tumidus* Banks

Family: Tetranychidae Order: Acarina
Description: It is a common pest of vegetable and fruit crops on Guam. In the early stages of infestation, this mite is found on the under surface of leaves. However, clusters of dull, white spots appear on the upper surface due to the feeding injury by them. The adults are reddish and young ones are yellowish in color. Eggs are white in color and spherical in shape.

Adult mites spin a silken web in the areas of infestation. In hea-

vy infestations, the mites will cover the entire plant including leaves, stems, buds, flowers, and fruits, and cause heavy crop damage.

Control:

A. Chemical: Using approved miticides, satisfactory results could be achieved.

B. Biological: Some predaceous mites of indigenous origin, as well as the introduced *(Phytoseiulus* sp.,)are active in feeding on this pest in Guam.

Broad mite: *Polyphagotarsonemus latus* (Banks)

Family: Tarsonemidae Order: Acarina

Description: It is also a polyphagous pest. During some seasons, it becomes very serious. This mite is very small and almost requires a microscope to observe it (Fig. 15). Infestations primarily occur in the tender parts of the plant. Affected leaves normally curl up and, in severe infestations, cause bud and flower to drop. Even the fruits that survive will have a corky surface (Fig. 16).

Some of the cucumber varaieties are very sensitive to this pest.

Control:

A. Chemical: Use of approved miticides will result in effective control.

B. Biological: An introduced predatory mite, *Metaseilus* sp., and also some of the indigenous predatory mites, are effective on this pest.

Fig. 15 Broad mites on a tender cucumber

Fig. 16 Broad mite damage expressed on mature cucumber fruit

Ants: *Solonapsis germinata* (Jerdon)

Family: Formicidae Order: Hymenoptera
Description: Ants live in colonies. In some of the infested fields, these red ants feed on the seed sown, as well as girdle the young seedlings.

Control: Application of Diazinon granules will reduce the severity of this pest.

Calabasa plume moth: *Sphenarches caffer* Zeller

Family: Pterophoridae Order: Lepidoptera
Description: The adult is a small moth with fringed wings and is light gray in color. Small, green eggs are laid individually on the leaves. The caterpillar is small and green with small, spiny hairs on it. It feeds mostly on the leaves, but sometimes on on flower buds and fruits. The caterpillar pupates on the leaves and does not form a cocoon.

Even though it is a minor pest of cucurbits, it is mostly found on the calabasa or bottle gourd.

Control: The economic damage caused by this pest is of very minor importance and, in severe cases of infestation, it could be controlled with any one of the common insecticides approved for cucurbitaceous crops.

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