October 3, 2017




Insects

Number of Insect Species

World

- 1 million species of insects have been described
- Maybe 30 million species in total

Micronesia

- “Only” about 10,000 species of insects in Micronesia
- About 45% of these are endemic (evolved here)

Number of Insect Species Collected on Guam (Gressitt 1954)

Insect Order	Common Names	Species Collected
Coleoptera	beetles	260
Lepidoptera	butterflies; moths	240
Diptera	flies	230
Hymenoptera	wasps; bees	150
Hemiptera	true bugs	99
Homoptera	aphids; psyllids; scales; whiteflies; mealy bugs	95
Thysanoptera	thrips	25
Orthoptera	grasshoppers; crickets; roaches	24
Psocoptera	booklice	18
Mallophaga	bird lice	12
Odonata	dragonflies; damselflies	11
Neuroptera	lacewings; antlions	6
Apterygota	silverfish	6
Isoptera	termites	4
Dermaptera	earwigs	4
Anoplura	sucking lice	3
Siphonaptera	fleas	3
Trichoptera	caddisflies	1
TOTAL		**1191**

Are all insects pests?

- Globally there are about 3,500 species of insect pests (0.35% of total species)
- In Micronesia there are about 400 species of insect pests (4% of total species)
- Many non-pest insects are actually beneficial: bees pollinate crops, insect predators and parasites control populations of pest insects and weeds, and many species provide ecosystem services by helping to recycle dead plants and animals

Number of new records of insect pest species in Guam between 1945 and 1990 (Schreiner 1991).

Order	New Records
Homoptera	12 (48%)
Coleoptera	5
Lepidoptera	3
Orthoptera	1
Thysanoptera	1
Diptera	1
Hymenoptera	1
Acari	1

Invasive Insects on Guam since WWII

Banana leaf roller	*Erionota thrax*	1957
Philippine lady beetle	*Epilachna philippinensis*	1948
Citrus swallowtail	*Papilio polytus*	1945
Bean pod borer	*Ophiomyia phaseoli*	1951
Cucumber beetle	*Aulacophora similis*	1951
Leaf miner	*Liriomyza sativae*	1960
Mosquito	*Anopheles subpictus*	1950
Chinese rose beetle	*Adoretus sinicus*	1951
Sweetpotato bug	*Physomerus grossipes*	1964
Flame tree looper	*Pericyma cruegeri*	1971
Flat beetle	*Brontispa palauensis*	1973
Mud wasp	*Delta pyriforme*	1972
Flower beetle	*Protaetia orientalis*	1972
Soursop beetle	*Kallitaxilia crini*	1970
Bagworm	*Brachycittarus griseus*	1976
Scarab beetle	*Popillia lewisi*	1985

New Island Records for Guam 2004

Coleoptera

Midway emerald beetle, *Protaetia pryeri* (Scarabaeidae)

Calamansi weevil, possibly *Myllocerus* sp. (Curculionidae)

Scarab beetle, *Popillia* sp. nr. *taiwana* (Scarabaeidae)

Homoptera

Cycad scale, *Aulacaspis yasumatsui* (Diaspididae)

False oleander scale, *Pseudaulacaspis cockerelli* (Diaspididae)

Cardin's whitefly, *Metaleurodes cardini* (Aleyrodidae)

Coconut mealybug, *Nipaecoccus nipae* (Pseudococcidae)

Greenhouse ensign coccid, *Orthezia insignis* (Orthezidae)

Coconut mealybug, *Nipaecoccus nipae*

Greenhouse ensign coccid, *Orthezia insignis*

Aphids

18 different species on Guam

Aphids


Spiraling White Fly


Spiraling white
fly on guava
leaves


Citrus
Swallow Tail


Caveman
Horace Tan


Caterpillar

Corn Borer

Corn Borer damage

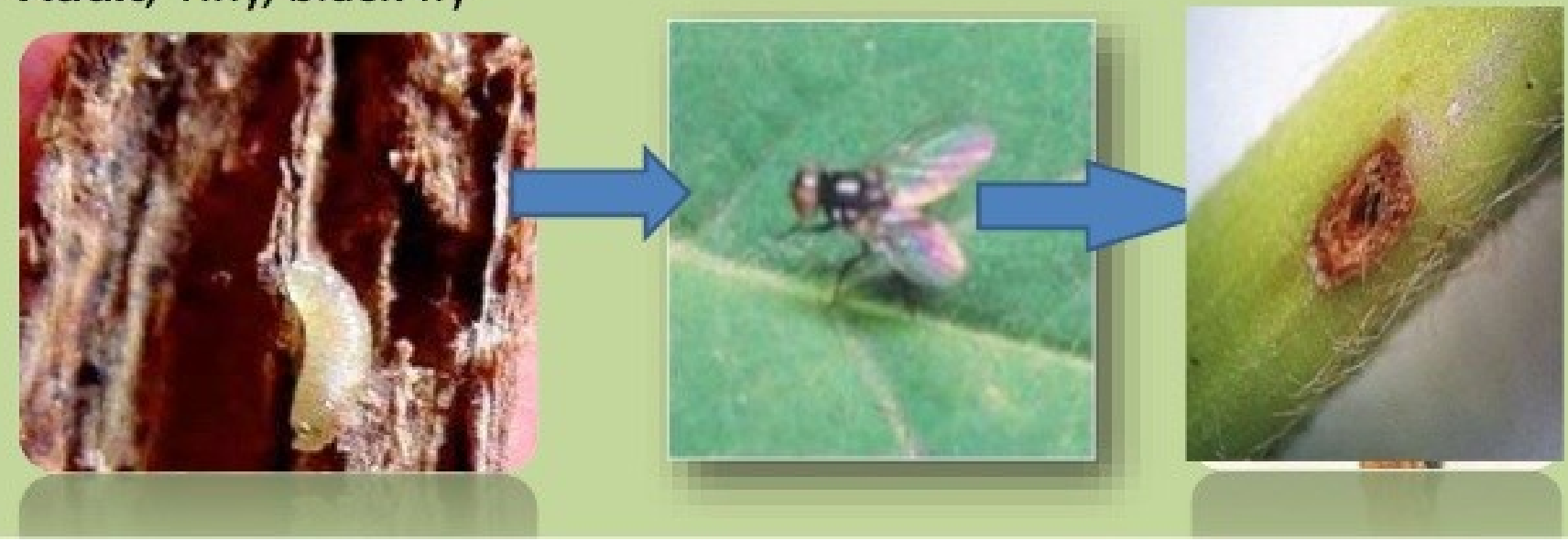
9. Stem fly: *Ophiomyia phaseoli*

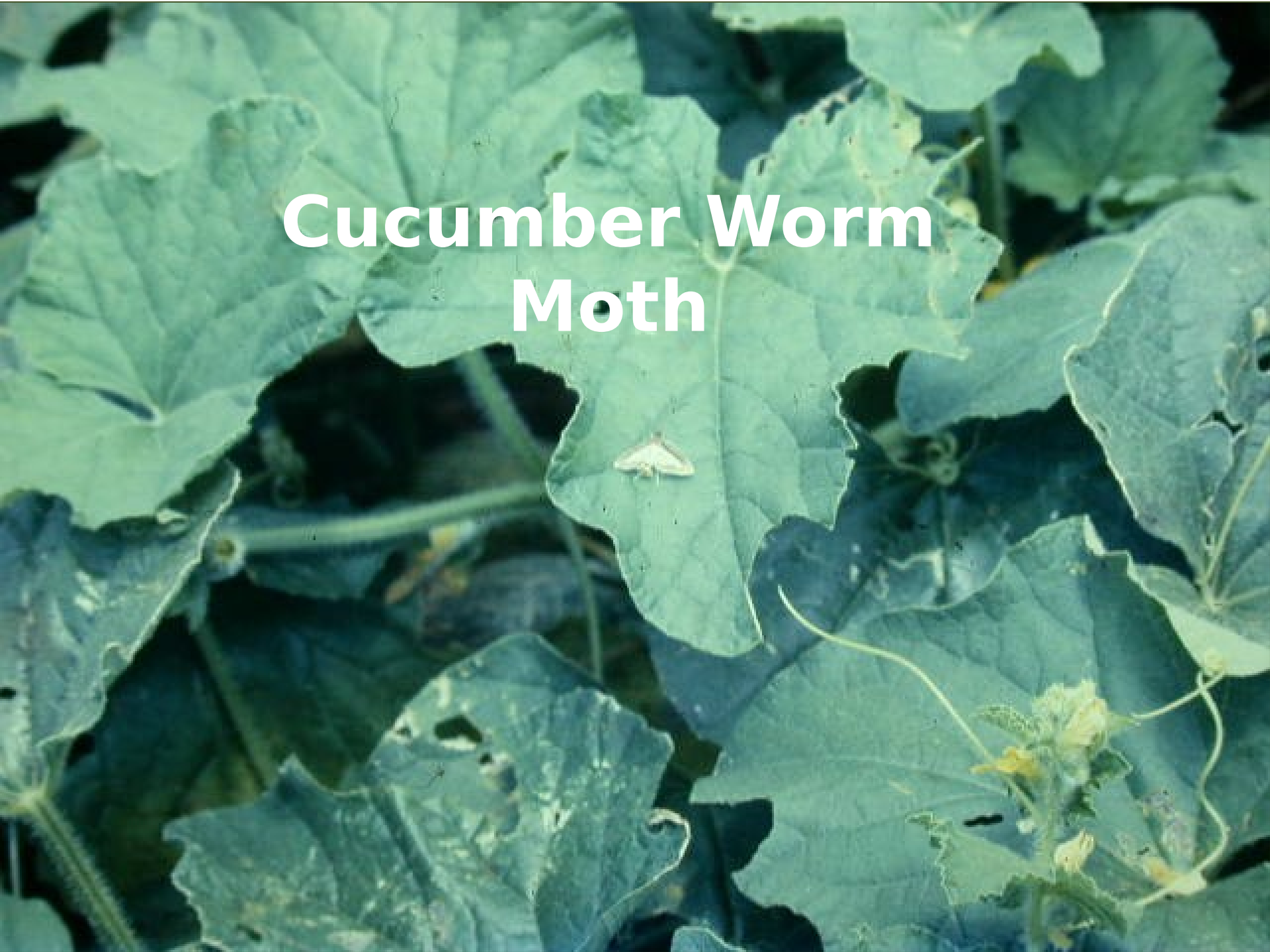
Symptoms of damage:

- Drooping of the tender leaves and seedling wilt
- Yellowing of young plants.
- Stem become swollen and start ribbing where maggot and pupae are present

Identification of the pest:

- **Maggot,** Small yellow coloured.
- **Adult**, Tiny, black fly




Cucumber Worm
Moth

Banana leaf roller damage

Pupa


Photo by Gopakumar V. R.

Mango flower

Looper

Cucumber Beetle

Philippine Lady Beetle


Eggs

Larvae

Banana Weevil damage

Banana weevil
Cosmopolites sordidus

Weevil damage to banana


Leafminer damage on beans


Mite


Mite Damage

Mite damage to

Chinese rose Beetles

- 250 plants from a wide variety of ornamental and cultivated crops are attacked

Sweet potato bug


Red
Bande
d
Thrips


Fruit Piercing Moth
Eudocima fullonia

Pacific Fruit-Piercing Moth (*Otheris fullonia*)

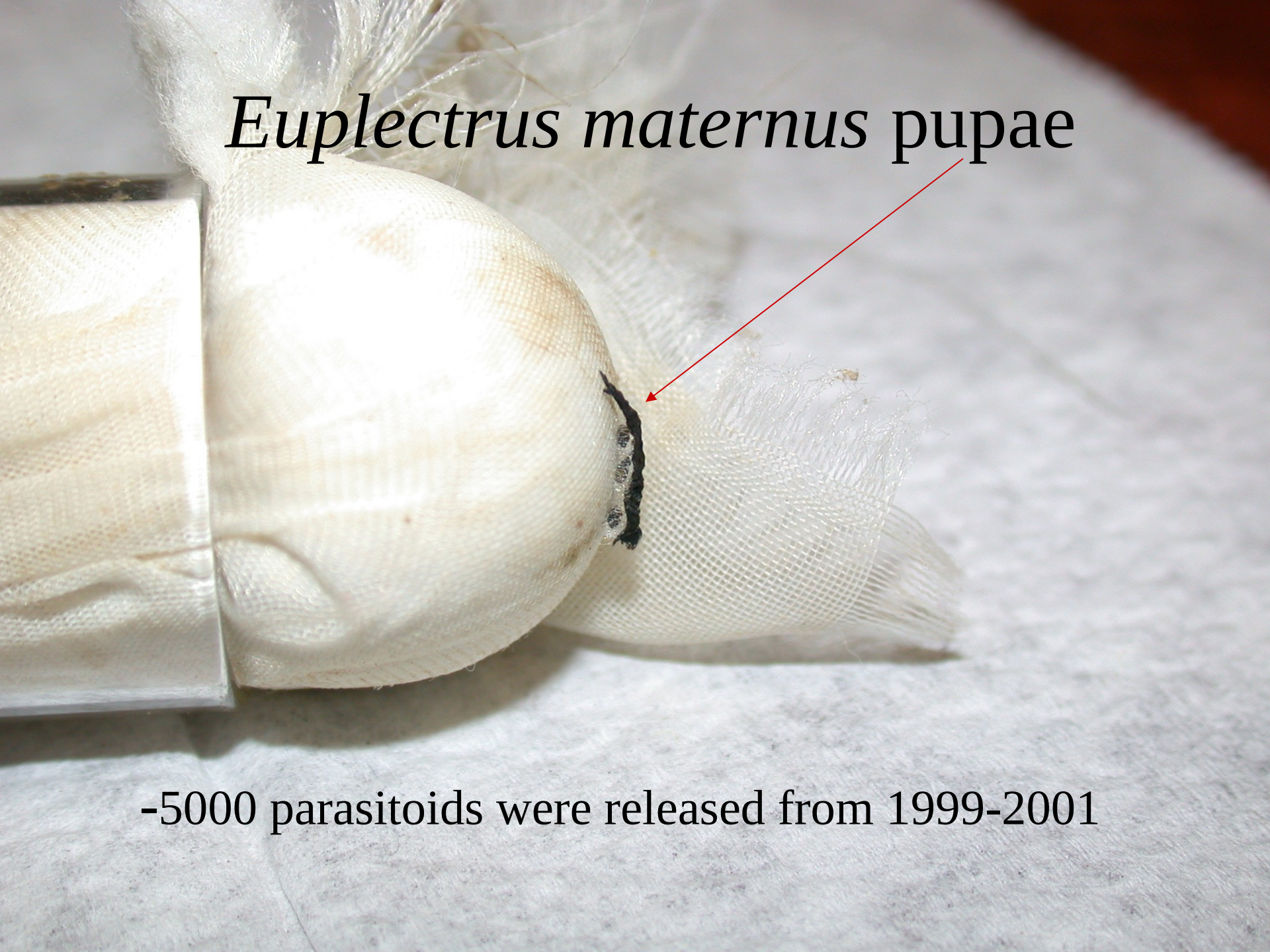
Adult

- West Africa to French Polynesia

Proboscis (of fruit piercing moth)


Euplectrus maternus larva on
E. Fullonia 2nd instar
-Ectoparasitoid
-Brought from India in 1998
-1st,2nd,and 3rd instar larvae

Euplectrus maternus pupae

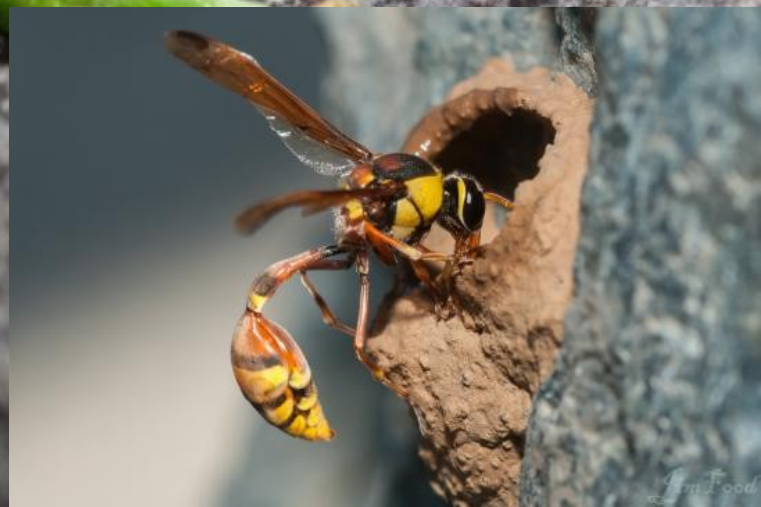


-5000 parasitoids were released from 1999-2001

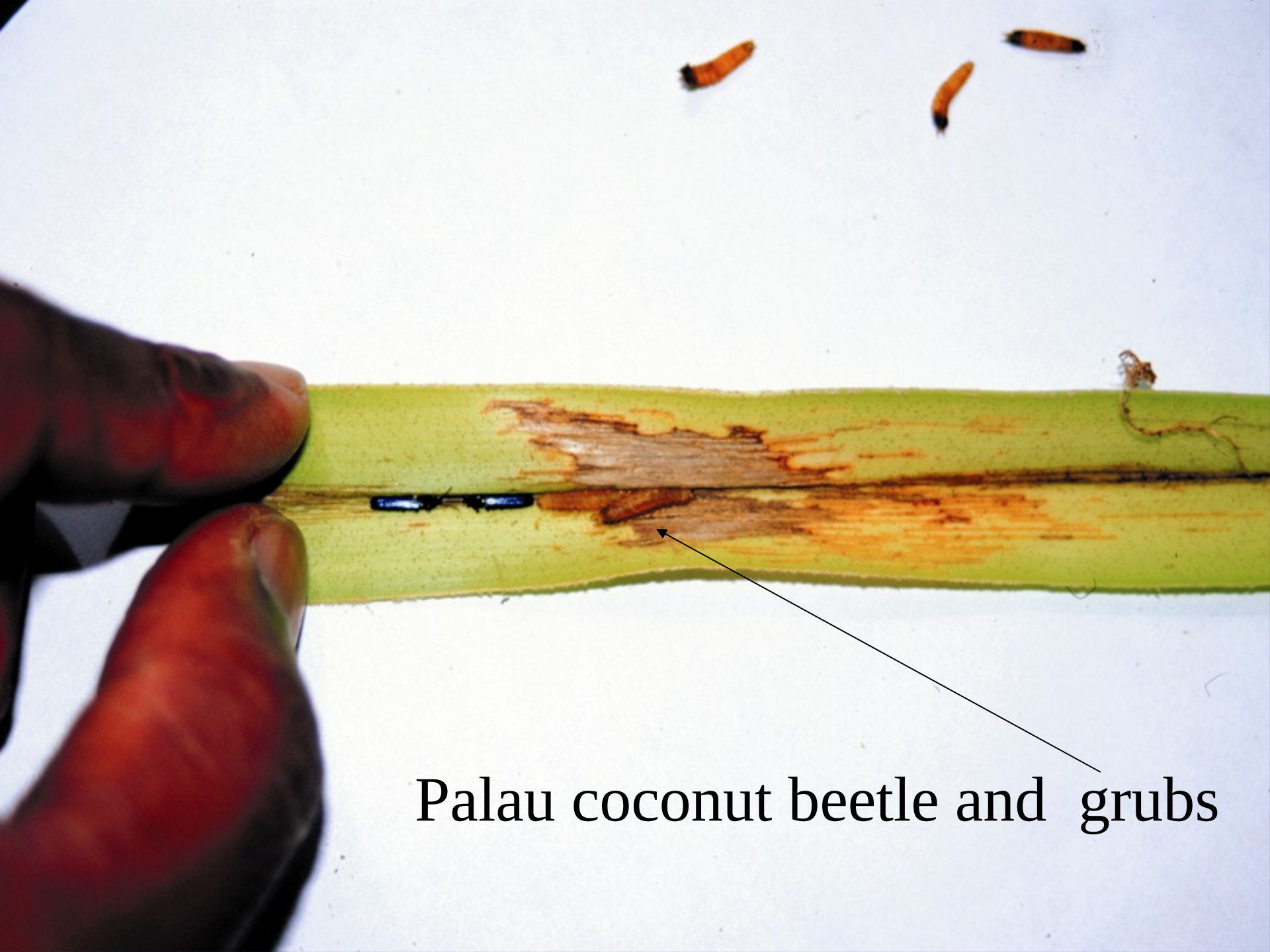
Erythrina gall wasp *Quadrastichus erythrinae*

Flame tree looper

Mud wasp




Palau coconut beetle
Introduced to Guam - 1973


Palau coconut beetle and grubs

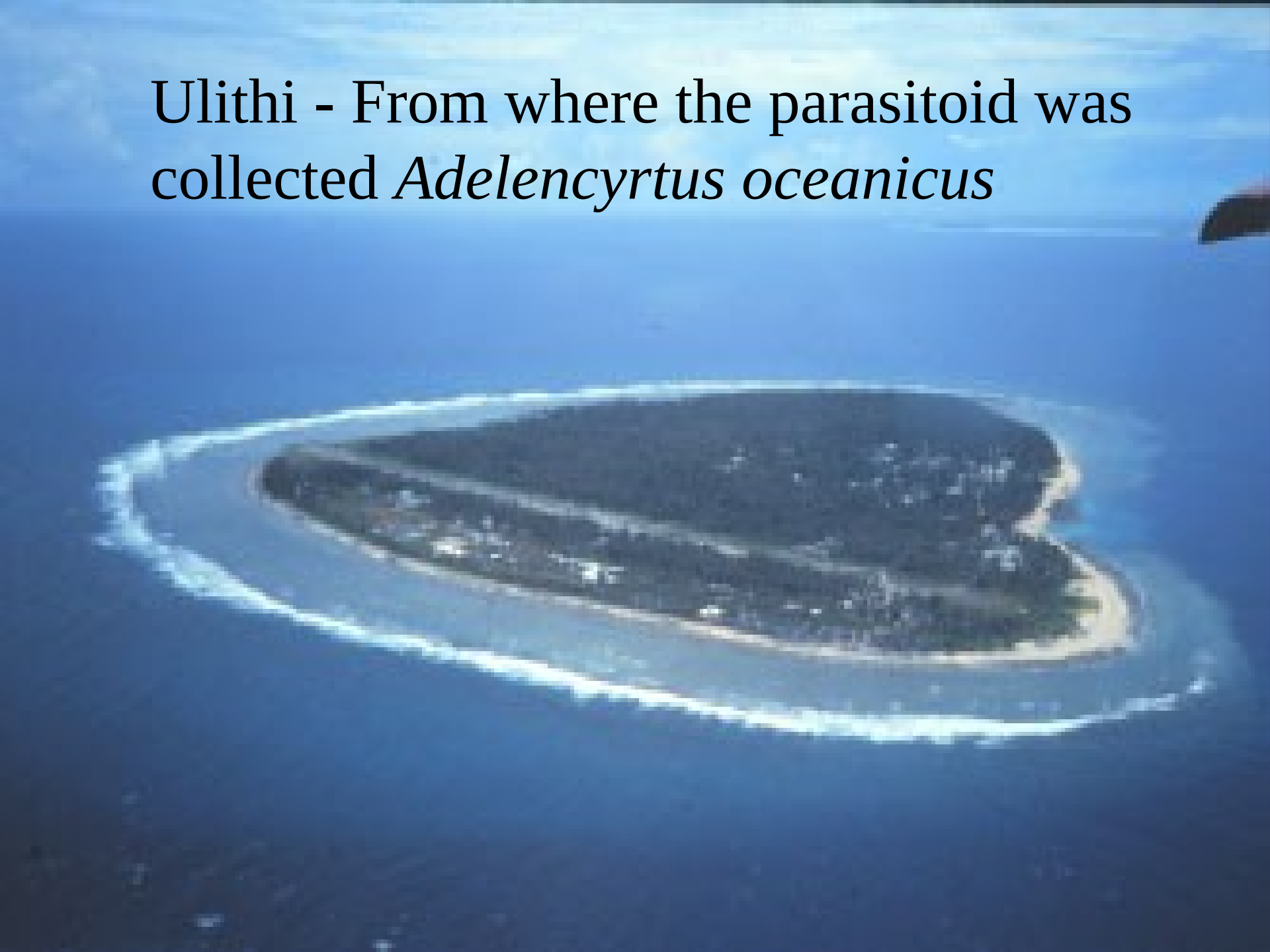

Leaf damage

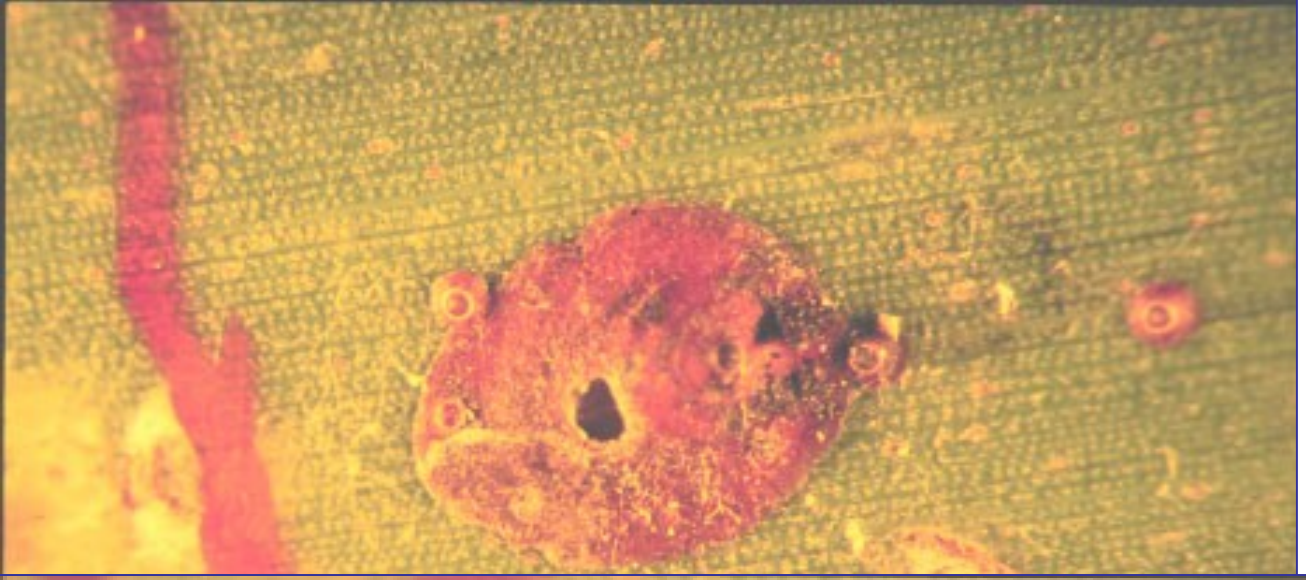

Release of the biocontrol agent *Tetrastichus brontispae* - 1974

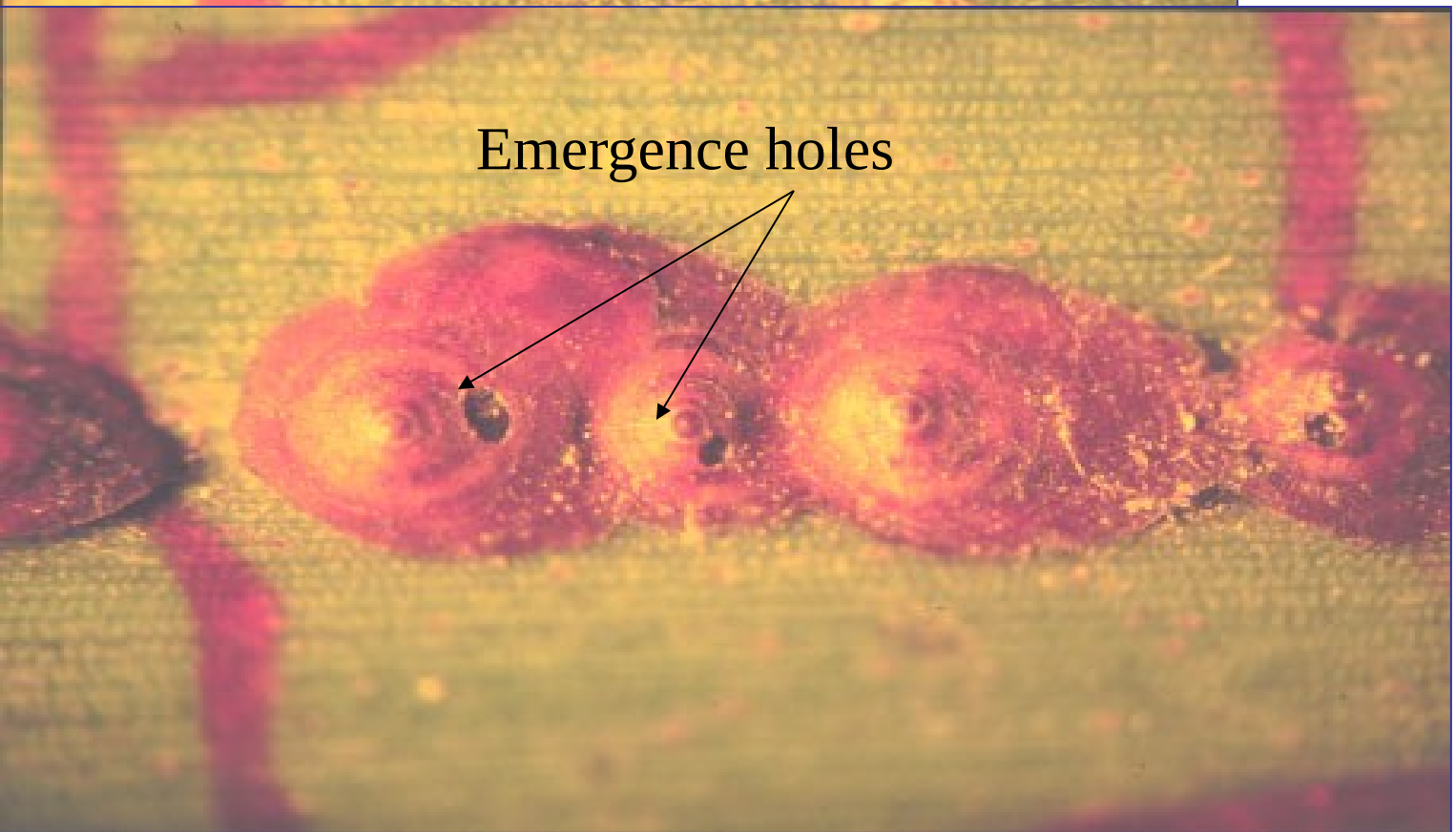
Scales

Red Coconut Scale damage *Furcaspis oceania*

Ulithi - From where the parasitoid was collected *Adelencyrtus oceanicus*



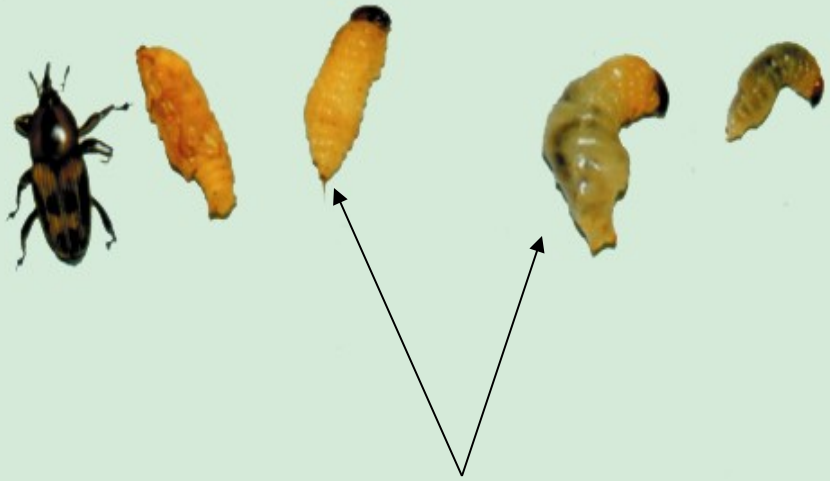




Red coconut scale with a parasitoid emergence hole

New Guinea sugarcane weevil & grubs *Rhabdoscelis obscurus*

New Guinea sugarcane weevil and grubs *Rhabdoscelis obscurus*



parasitoid Lixophaga sphenophori

Rhabdoscelus obscurus damage on Sago palm

Aceria guerronis, Coconut Mite A Possible Threat to Coconuts in the Pacific

First noticed in Mexico in 1965

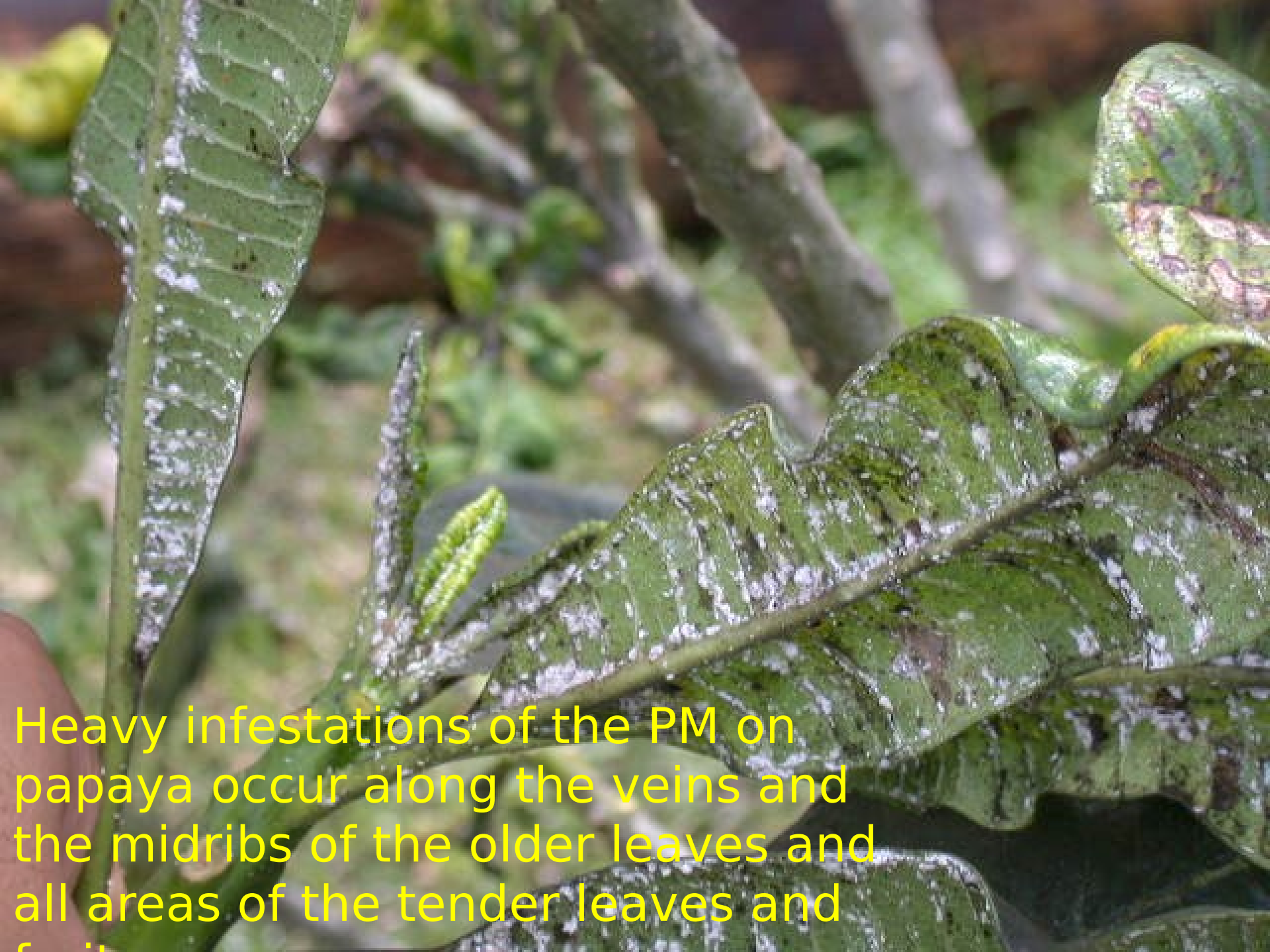
- Cameroon - 1967
- Columbia - 1971
- Cuba - 1972
- Ivory Coast - 1975
- Puerto Rico - 1977
- Dominican Republic - 1980
- Florida - 1984

In January 2002 our attention was drawn to the Mealybug infestation on papaya

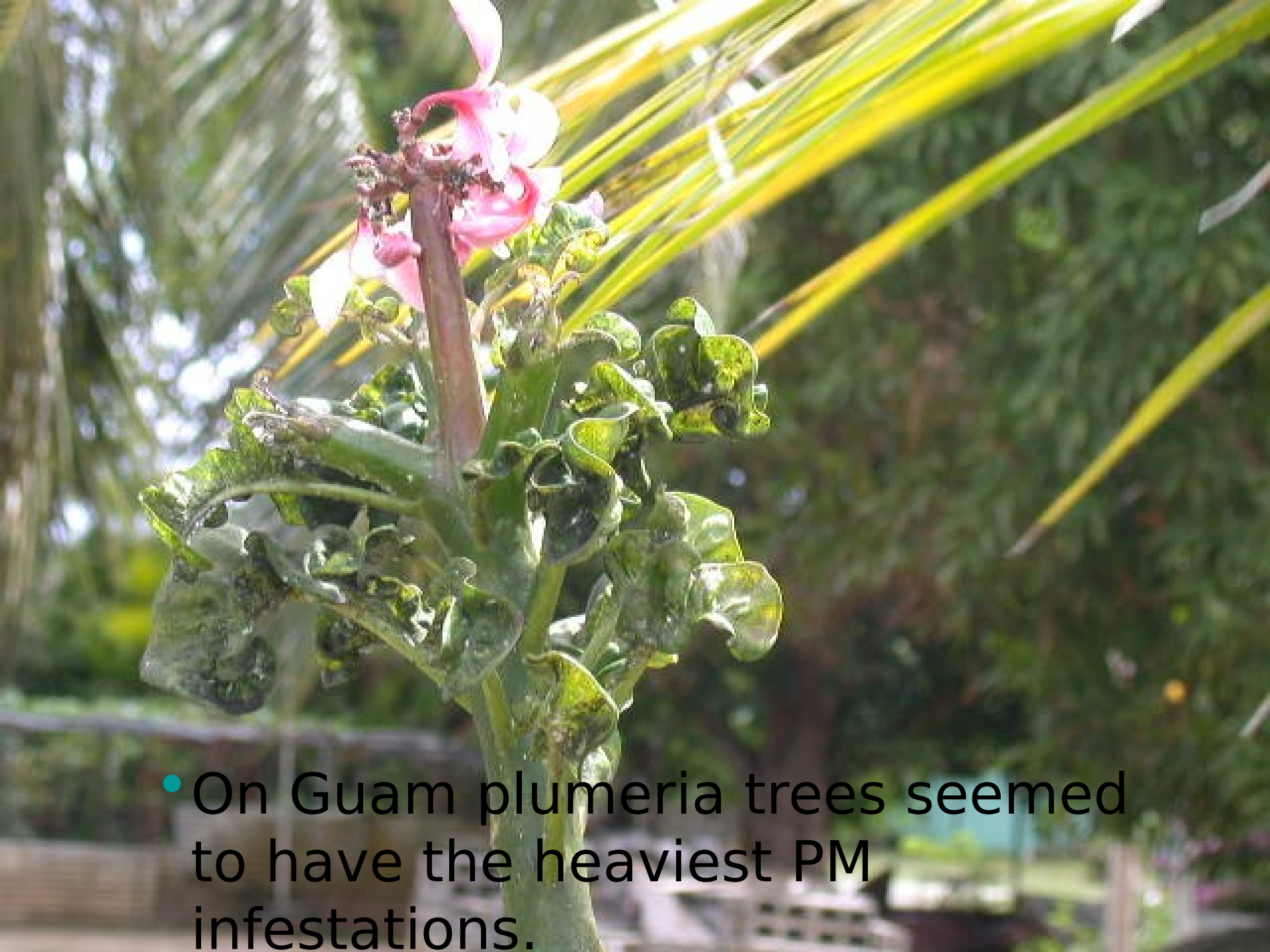
- Over 50 different species of plants are affected by this Mealybug.
  - The most noticeably affected plants on Guam are:

Papaya
Plumeria
Hibiscus


Severely affected older leaves turn yellow and dry up and fall.


Heavy infestations of the PM on
papaya occur along the veins and
the midribs of the older leaves and
all areas of the tender leaves and


• The tender leaves become crinkly, yellow and the terminal shoots become bunchy and distorted.

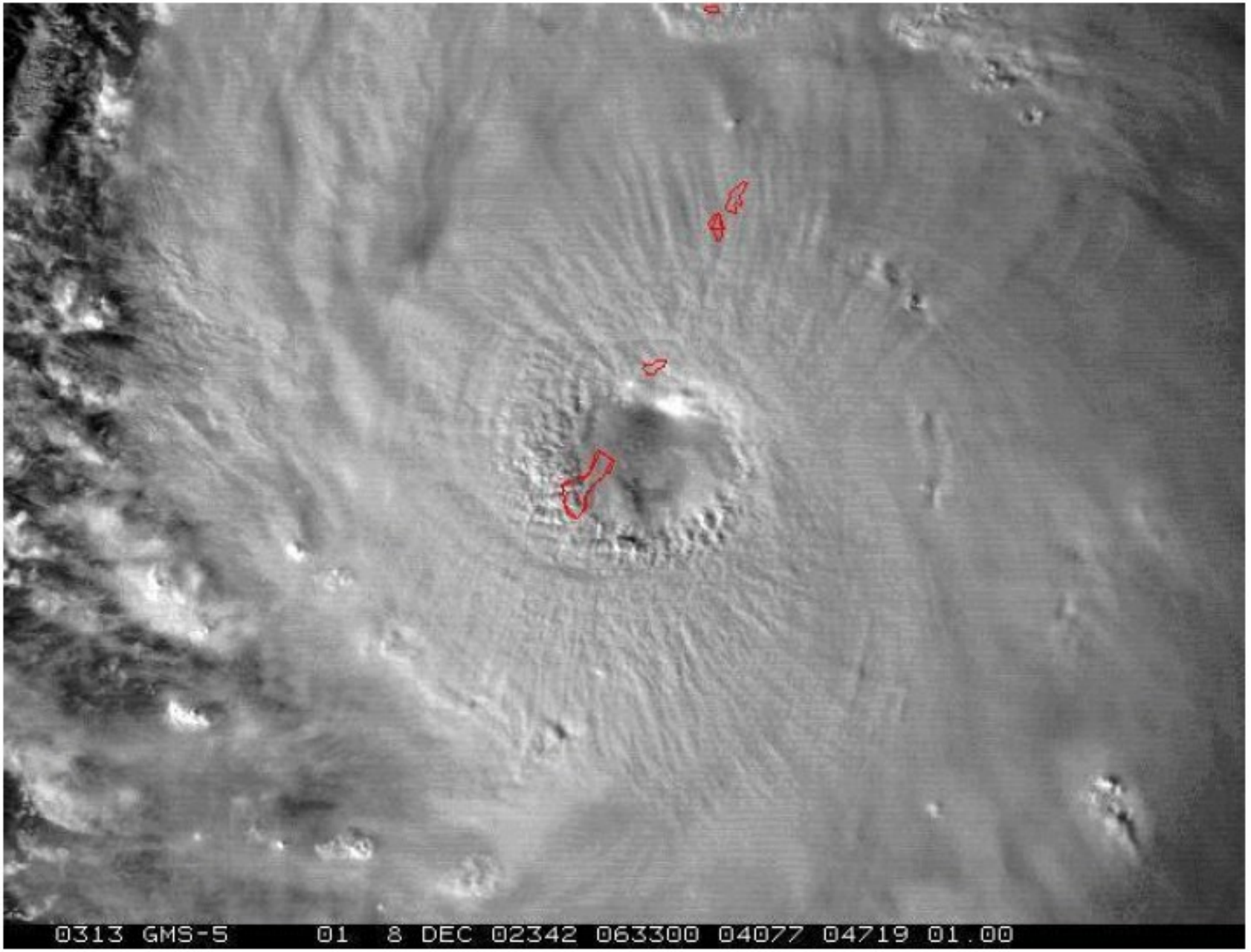


- On Guam plumeria trees seemed to have the heaviest PM infestations.

- Heavy mealybug populations produce large volume of honey dew, which causes black sooty mold that cover the infected fruits and vegetation on all

Release of Biocontrol

- Three species of parasitoids (*A. loecki*, *A. papayae* and *P. mexicana*) were shipped to Guam from Puerto Rico.
- They were released at different study sites around the island in June 27, 2002.
- Typhoon ‘Chataan’ on July 6, 2002



Visible satellite image of Pongsona as seen by the Japanese Geostationary Meteorological Satellite (GMS-5) at 4:30 p.m., December 8, 2002. The island of Rota is located just north of the eye. (Courtesy of the Wisconsin Co-operative Institute for Meteorological Satellite Studies)

Oriental fruit fly damage to mango

Maggots in the pulp

Oriental fruit fly was eradicated in the Marianas in the early 1970s using male annihilation technique.

Recently this fruit fly has established in Palau.


Accurate identification is the first step in an effective pest management program.
Know your crops


STOP

Pest Monitoring

- What kind of pest are present
- Are the numbers great enough to warrant control?
- When is the right time to begin control?
- Have the control efforts successfully reduced the number of pests?