

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

New Island Records for Guam

2004

Coleoptera

Midway emerald beetle, *Protaetia pryeri* (Scarabaeidae)

Calamansi weevil, possibly *Myloccerus* 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



winged
aphid





Spiraling White Fly



**Spiraling white
fly on guava
leaves**



Citrus Swallow Tail





Horace Tan

Caveman



Caterpillar

Corn Borer



Corn Borer damage



9. Stem fly: *Ophiomyia phaseoli*

Symptoms of damage:

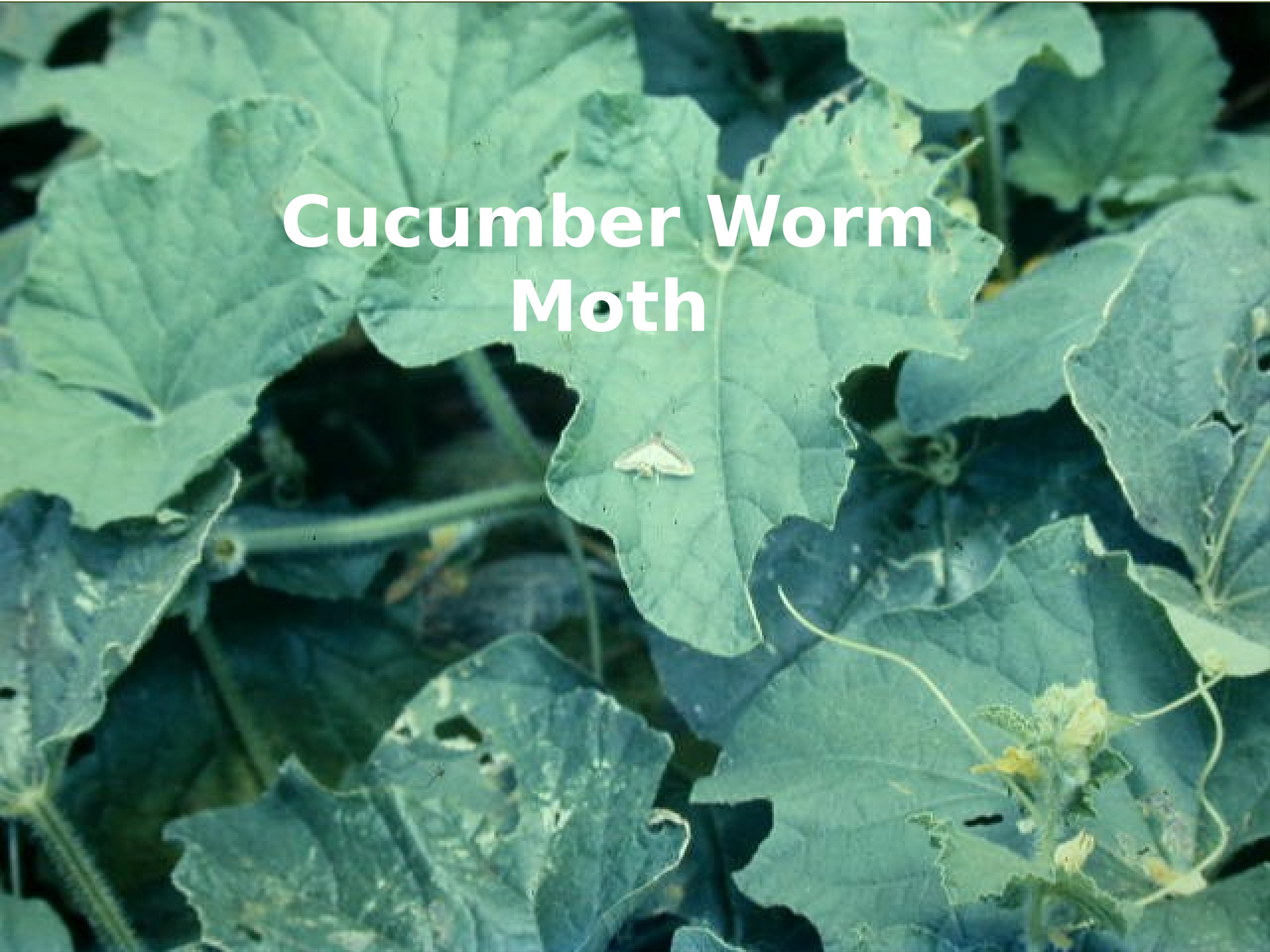
- Drooping of the tender leaves and seedling wilt
- Yellowing of young plants.
- Stem become swollen and start ribbing where maggot and pupae are present

Identification of the pest:

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



Cucumber Worm Moth





Banana leaf roller damage



Pupa







Mango flower



Looper



Cucumber Beetle









**Philippine Lady
Beetle**

Egg s



Larvae



Banana Weevil damage



Banana weevil

Cosmopolites sordidus

Weevil damage to banana



Leafminer damage on beans





Mite





Mite Damage





Mite damage to







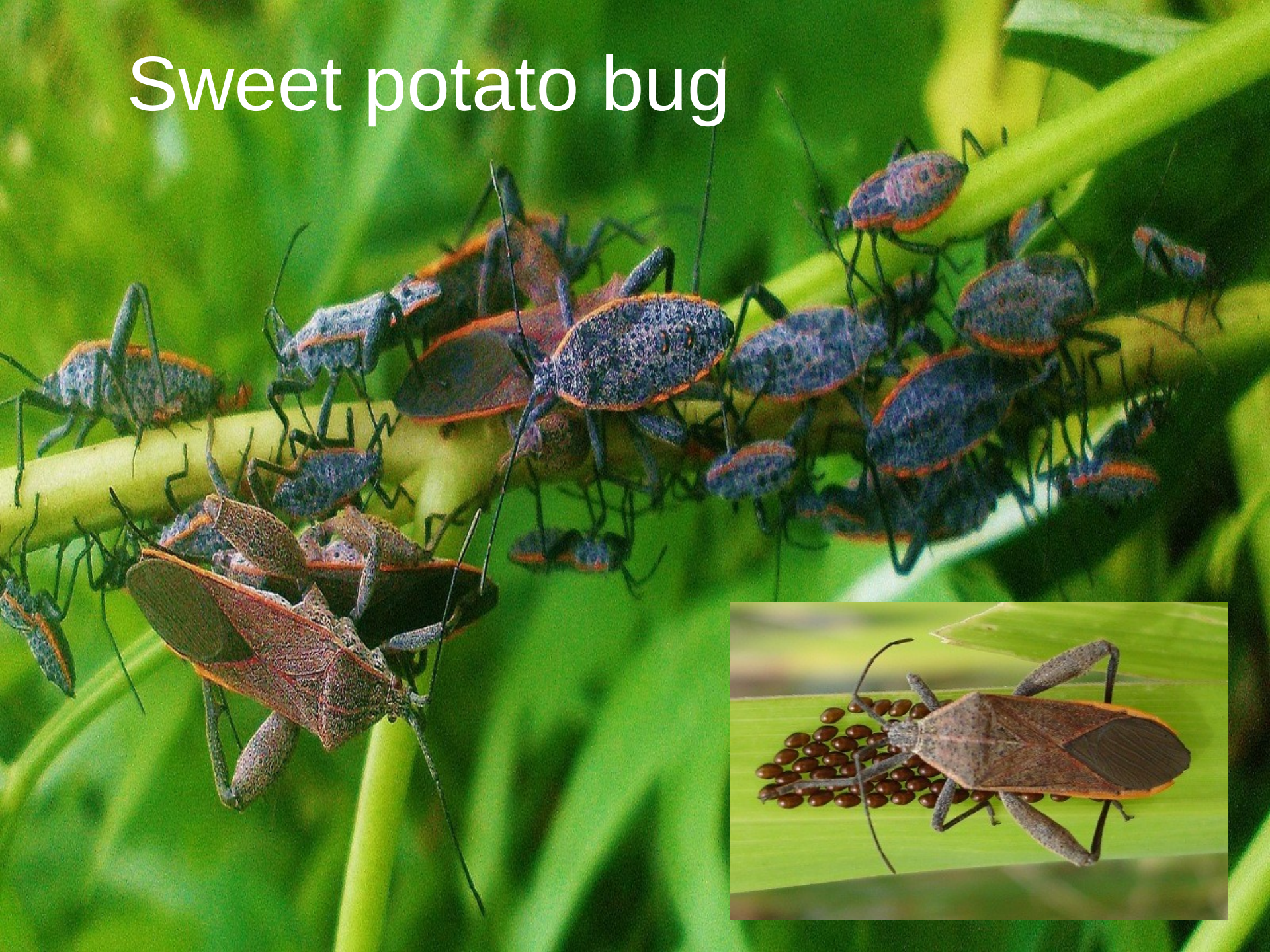
Chinese rose Beetles

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





Sweet potato bug



A microscopic photograph showing several Red Banded Thrips (Frankliniella tritici) on a plant surface. The thrips are small, elongated insects with a yellowish body and a distinct red band across the middle of their abdomen. They are surrounded by plant debris and other small insects. A semi-transparent grey box on the left contains the text 'Red Banded Thrips' in bold black font.

Red Banded Thrips



Fruit Piercing Moth
Eudocima fullonia

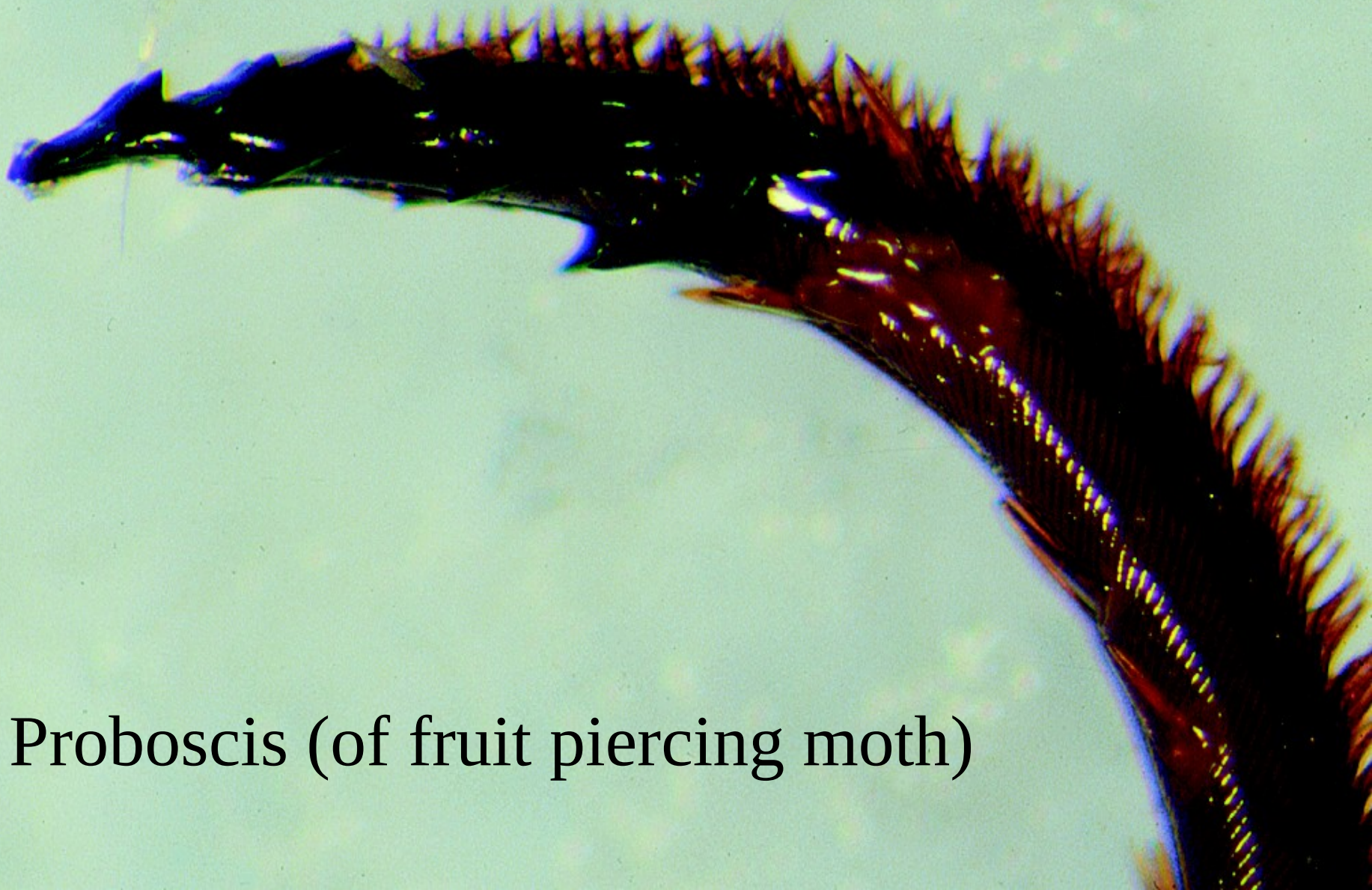


Pacific Fruit-Piercing Moth (*Otheris fullonia*)

Adult



- West Africa to French Polynesia



Proboscis (of fruit piercing moth)





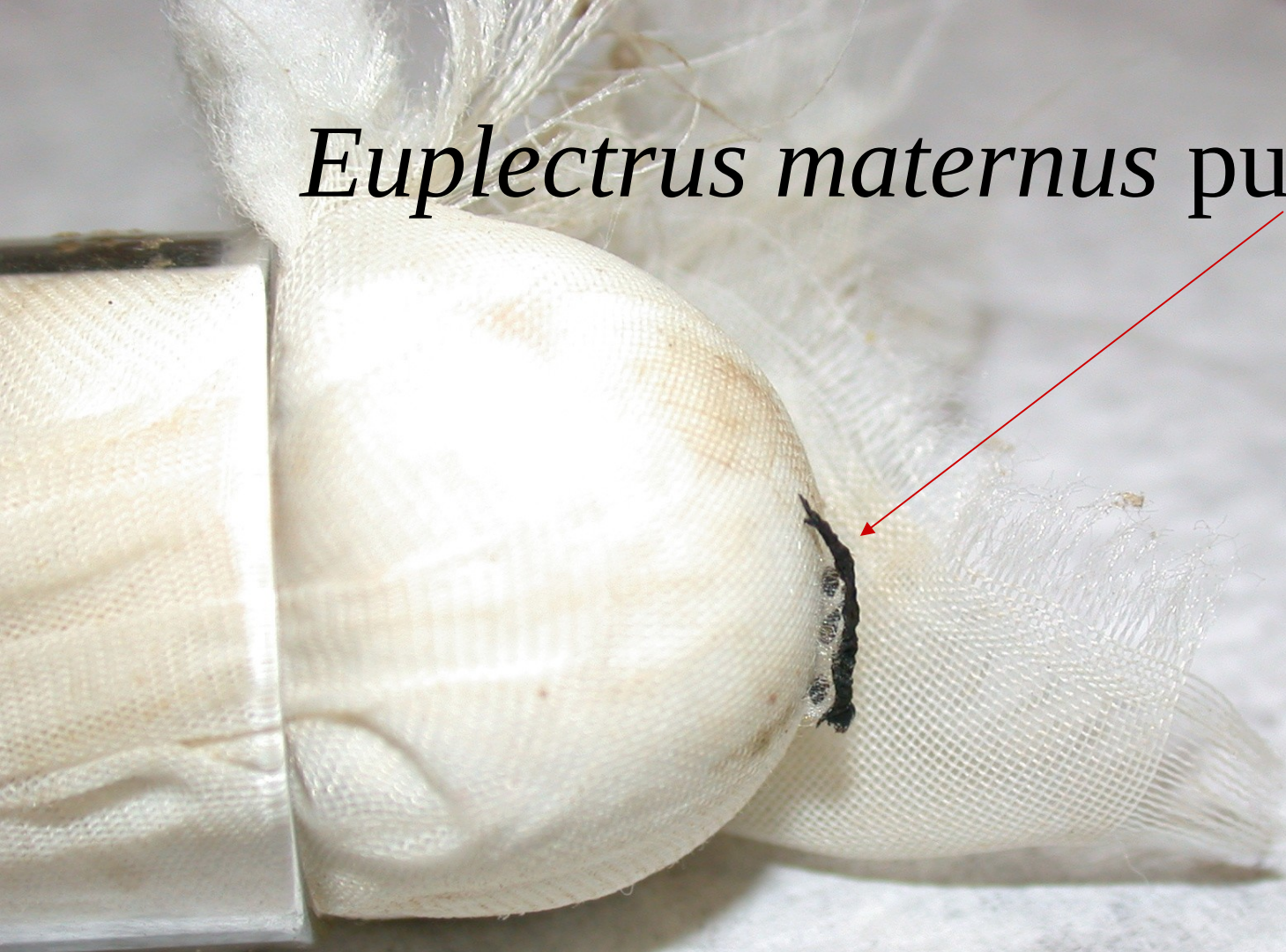


Euplectrus maternus larva on
E. Fullonia 2nd instar



- 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



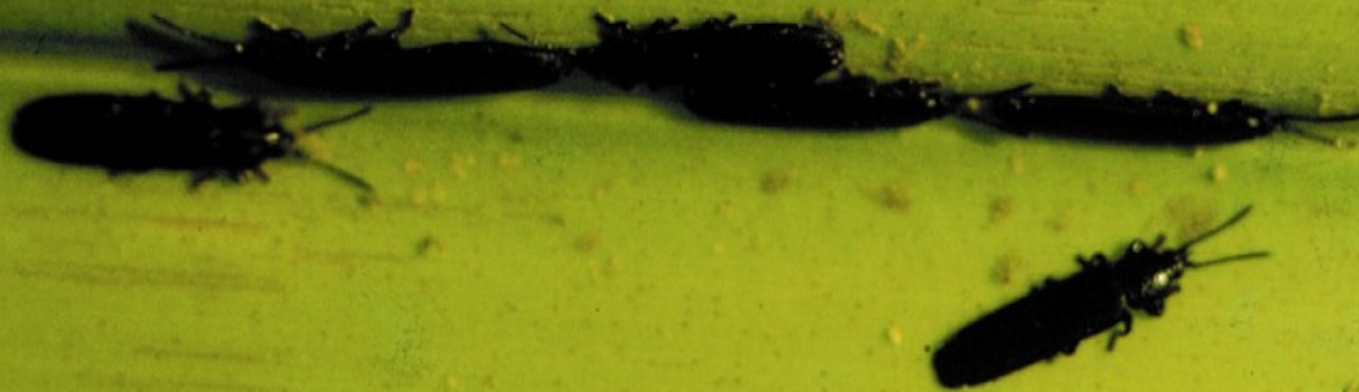
Flame tree looper

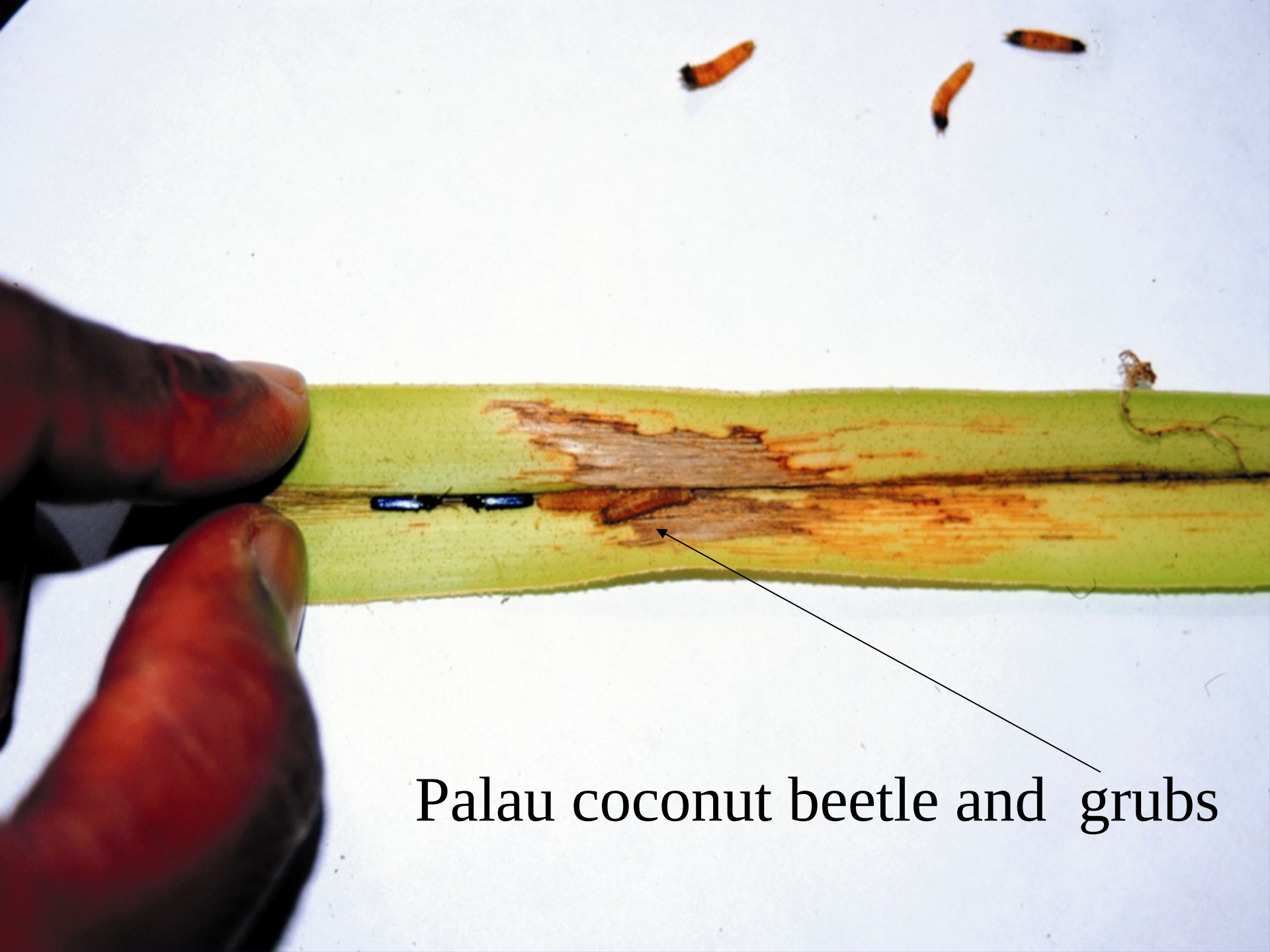


Mud wasp



Palau coconut beetle
Introduced to Guam - 1973





Palau coconut beetle and grubs



Leaf damage

A photograph showing a person from behind, wearing a blue long-sleeved shirt and light-colored pants, standing in a tropical environment with large palm trees. The person is reaching up towards the fronds of a palm tree. The background is bright and slightly overexposed, suggesting a sunny day. The text is overlaid on the right side of the image.

Release of the
biocontrol agent
Tetrastichus
brontispae - 1974



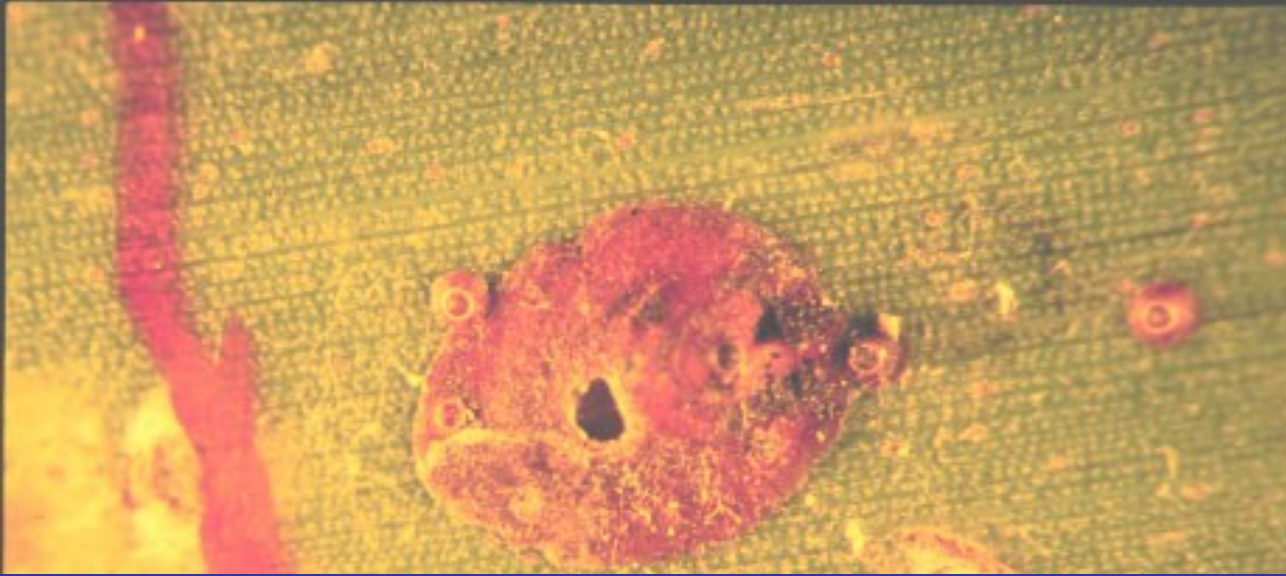
Scales

Red Coconut Scale
damage *Furcaspis*
oceanica

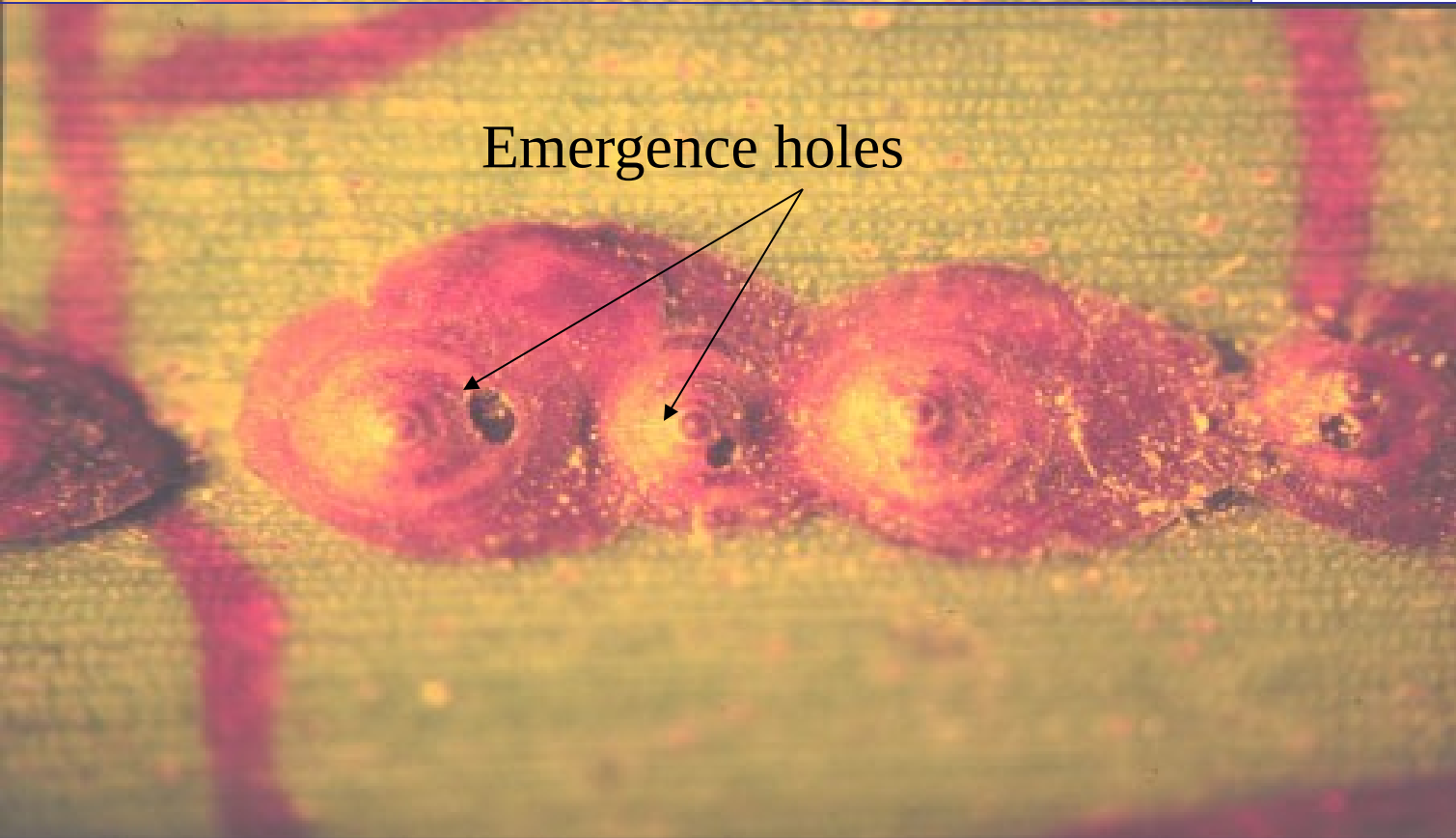


Ulithi - From where the parasitoid was
collected *Adelencyrtus oceanicus*





Red coconut
scale with a
parasitoid
emergence
hole



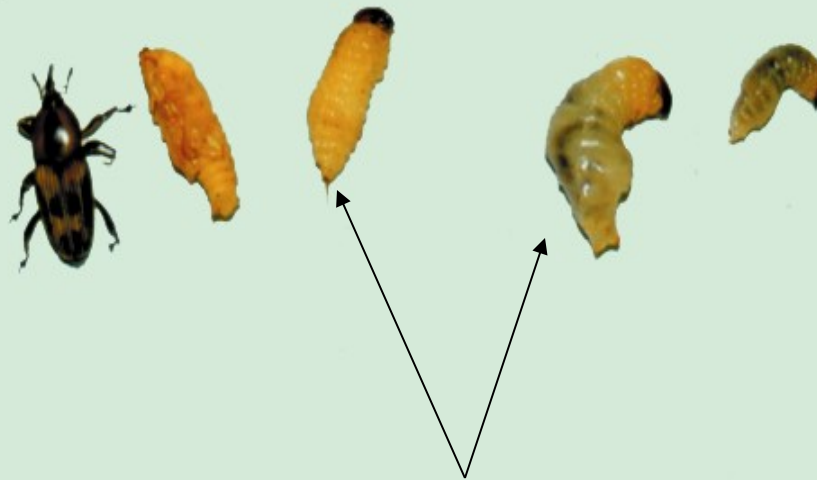
Emergence holes

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



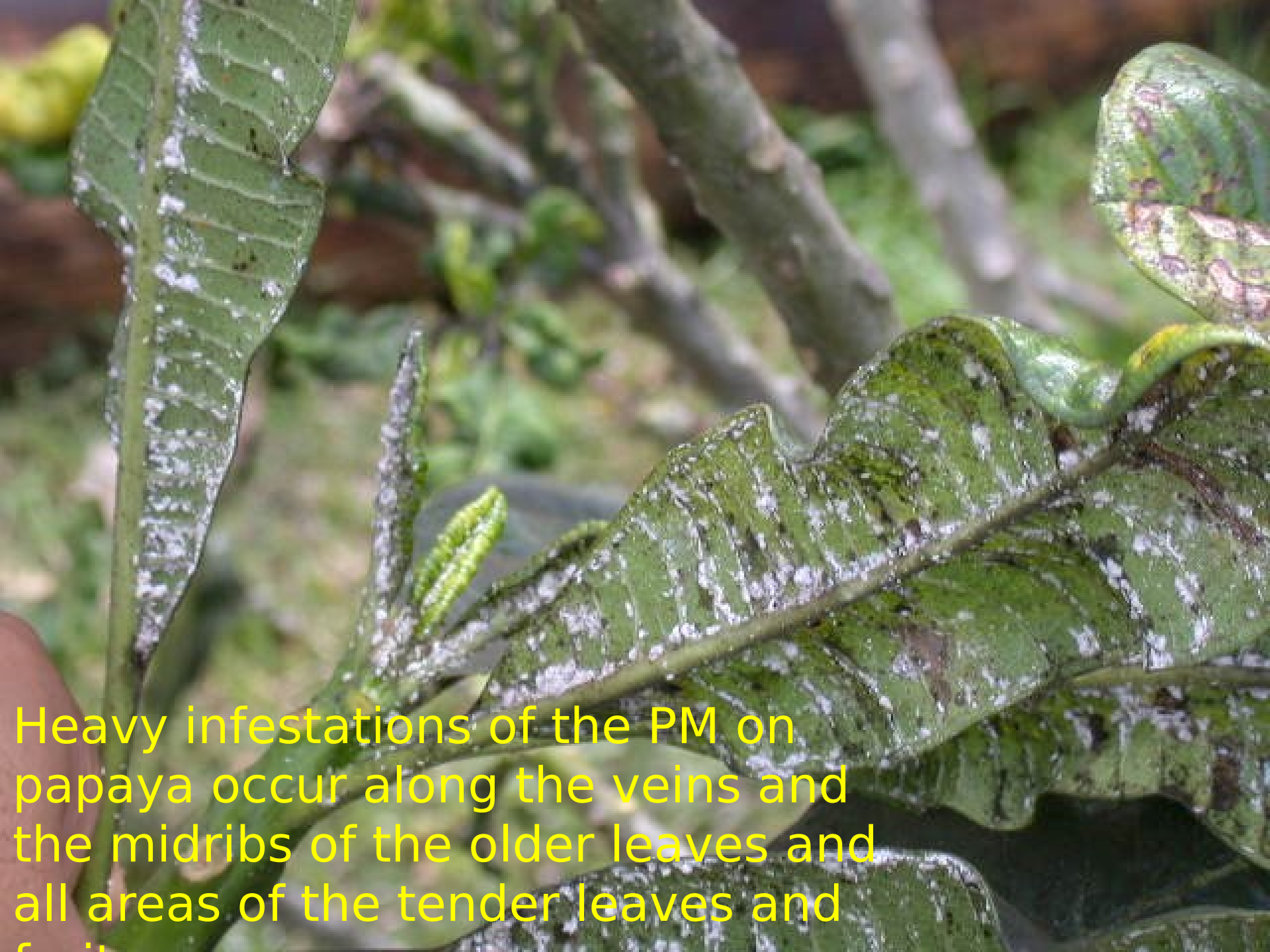
- Over 50 different species of plants are affected by this Mealybug.
- The most noticeably affected plants on Guam are:

Papaya
Plumeria
Hibiscus



A large, mature tree is the central focus of the image. Its branches are heavily laden with dead, yellowed leaves that are beginning to fall, creating a dense canopy of dry foliage. Some green leaves remain on the branches, particularly towards the top and right side. In the foreground, a red pickup truck is parked, partially obscured by the tree's branches. To the left, a portion of a dark-colored car is visible. In the background, a white building with a chain-link fence in front of it can be seen. The sky is clear and blue. The text "Severely affected older leaves turn yellow and dry up and fall." is overlaid in yellow on the right side of the tree.

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 fruit.



- The tender leaves become crinkly, yellow and the terminal shoots become bunched and distorted.



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



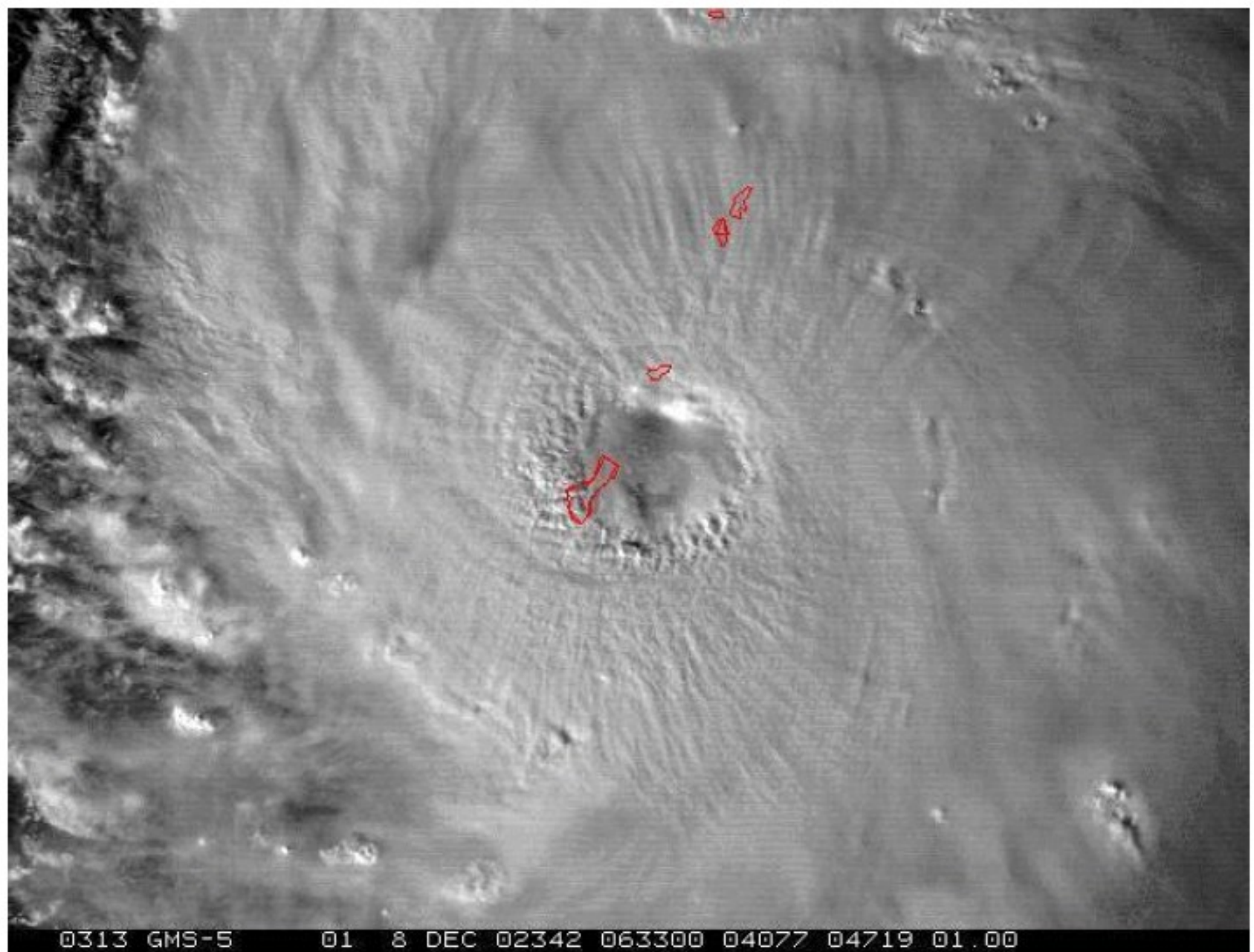




- Heavy mealybug populations produce large volume of honey dew, which causes black sooty mold that cover the infected fruits and vegetation on all

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.

A photograph of three people in a cornfield. On the left, the back of a person with long blonde hair wearing a grey t-shirt is visible. In the center, an older man with a white beard, wearing a white t-shirt, light-colored pants, and a tan bucket hat, is gesturing with his hands while talking. On the right, a younger man in a dark blue polo shirt and jeans is leaning over, examining the corn plants. The field is filled with green corn stalks. In the background, there is a line of trees and a cloudy sky.

**Accurate identification is the first step in an effective
pest management program.**

Know your crops

















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?

