



Cacao and Tropical Fruit Pest Management

Eli Isele, Assistant Extension Agent

Alyssa Cho, Assistant Researcher

Hilo, HI



COOPERATIVE EXTENSION

UNIVERSITY OF HAWAII AT MĀNOA
COLLEGE OF TROPICAL AGRICULTURE AND HUMAN RESOURCES



COOPERATIVE EXTENSION

UNIVERSITY OF HAWAII AT MĀNOA
COLLEGE OF TROPICAL AGRICULTURE AND HUMAN RESOURCES



Chinese Rose Beetle



Black Pod Rot



Aphids, mealybugs, thrips



Chinese Rose Beetle *Adoretus sinicus*

- First reported in Hawaii in 1891
- Adults feed at night on leaves of plants
- Serious pest of young cacao





Photo Credit: Colin Hart



Photo Credit: Colin Hart



Black Pod Rot (*Phytophthora palmivora*)

Symptoms:

- Brown spots on fruits
- Spread of infection on fruits
- Infection in beans
- Cankers

Spread:

- Infected materials
- Rain/water
- Soil



Photo Credit: Scot Nelson



Management of Black Pod Rot

- Site selection
- Quarantine
- Resistance
- Removal
- Spacing/pruning
- Mulch
- Fungicides



Photo Credit: Colin Hart



NOT HERE...YET

Frosty Pod Rot

- Americas (Ecuador)

Witches' Broom

- Americas (Brazil)

Vascular Streak

- Indonesia

Cocoa Swollen Shoot
Virus

- West Africa
- Transmitted by mealybugs



Anthracnose (*Colletotrichum gloesporioides*)

- Fungal pathogen
- Spreads through water
- Survives on plant material and alternate hosts
 - Mango, avocado, papaya, coffee, banana



Anthracnose Management- General

- Cultivar selection
- Site selection
- Field sanitation
- Good harvesting and post-harvest practices
- Fungicides



Mango Anthracnose



Mango Anthracnose

Symptoms:

- Leaves, twigs, flower clusters, and fruits
- Brown/black spots
- Kill flowers
- Symptoms can develop on fruit after ripening

Spread:

- Rain, irrigation (water)



Management of Mango Anthracnose

- Sanitation
- Cultural practices: pruning, spacing, intercropping, bagging
- Site and cultivar selection
- Fungicide sprays



Table 2. Mango cultivar reaction to anthracnose (after Nishijima 1993).

Country	Resistant	Moderate	Susceptible	Very susceptible
Australia	'Carrie' 'Caraboa Florigon' 'Tommy Atkins' 'Saigon'	'Kensington Pride'		'Willard' 'Neelum' 'Manaranijan'
Philippines	'Palmer' 'Siam' 'Velei-Colomban' 'Joe Welch'	'Fernandin' 'Arumanis' 'Edward' 'Gedong' 'Tjenkir'	'Carrie' 'Peter Passand'	'Ah Ping', 'Julie' 'Zill', 'Willard' 'Cherakuruasa' 'Hingurakgoda' 'Kensington' 'Otts', 'Pope'
Hawai'i	'Paris', 'Fairchild' 'Rapoza'	'Haden'	'Exel'	'Pirie'
Florida	'Zill'	'Haden'	'Irwin', 'Sensation' 'Kent', 'Keitt' 'Tommy Atkins'	

Nelson, 2008



Avocado Anthracnose

Symptoms:

- Primarily post-harvest
- Dark lesions
- Rapidly expand after ripening

Spread:

- Rain splash from twigs/leaves to fruits



Photo Credit: Scot Nelson



Management of Avocado Anthracnose

- Overall anthracnose management (site & cultivar selection, sanitation, cultural practices)
- Minimize damage to fruits: harvesting, fruit fly control
- Chill fruits after harvest to reduce lesion development
- Market fruits before soft
- Consume within 1 day of softening



Papaya Anthracnose

Symptoms:

- Small spots --> large sunken (water soaked) spots on the fruits

Spread:

- Rainfall
- High RH and warm temperatures



Photo Credit: Scot Nelson



Management of Papaya Anthracnose

- Overall anthracnose management
- Post-harvest:
 - Hot water dip
 - Post-harvest fungicide application
- Preventative field fungicide applications



Papaya Ringspot Virus

Symptoms:

- Mottled leaves
- Ring spots on fruits
- Reduced production
- Streaking on stems

Spread:

- Aphids



Photo Credit: Scot Nelson



Photo Credit: Scot Nelson



Management: PRV

- Use of GMO papaya varieties that have resistance
- Use of GMO borders
- Similar to BBTV
 - Control aphids
 - Rogue infected plants
 - This is not an effective approach



Banana Bunchy Top Virus



Photo Credit: Scot Nelson



DON'T BUNCH

STOP THE SPREAD OF THE
BANANA BUNCHY TOP VIRUS
(BBTV)

Information extracted from
CTAHR Publication PD-12
'Banana Bunchy Top Virus'

BBTV Common Symptoms



Banana Aphids



'Bunchy'
Leaf Sheaths



Morse code
Streaking



BBTV Symptoms
Banana Flower



Hooking



Morse code
Close up

Control Measures

Homeowners:

- 1) Kill aphids in leaf petioles with soapy water or a registered insecticidal soap. Leave undisturbed for a day.
- 2) Remove the entire mat of bananas through incineration, chopping, burial, or composting (generating internal heat of 140°F). Do not move plant material until completely dry.
- 3) Utilize clean media.
- 4) Contact your local extension service or the HDOA for more information.

Photo credit: D. Ogata, P. Hamasaki & HDOA, S. Nelson, J. Sugano



Mango Pests



ORIENTAL FRUIT FLY



MANGO SEED WEEVIL



Lychee Erinoose Mite (*Aceria litchii* (Keiffer))

- Typically on new growth
- Bottom of leaves: felt like erineum (fuzzy, rust colored)
 - Small blisters on leaves
 - Curling
- Mature trees = not an issue
- Management:
 - Sanitation pruning (remove from field/prune)
 - Sulfur sprays



Photo Credit: Scot Nelson



Questions?

