UH-CTAHR Coffee Research and Extension Update 2021-2022

Andrea Kawabata

Extension Agent for Coffee and Orchard Crops

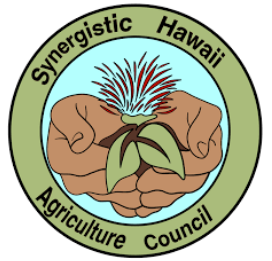
May 20, 2022

Hawaii Coffee Association Conference

Outline:

1. Coffee and CLR survey
2. CLR pesticide research trials
3. Coffee tissue culture
4. CBB repellent and biocontrol
5. Inflation and coffee
6. Coffee efforts on Kauai
7. Catimor/Mokka hybrids
8. CLR-resistant plant propagation

Funding and collaborations



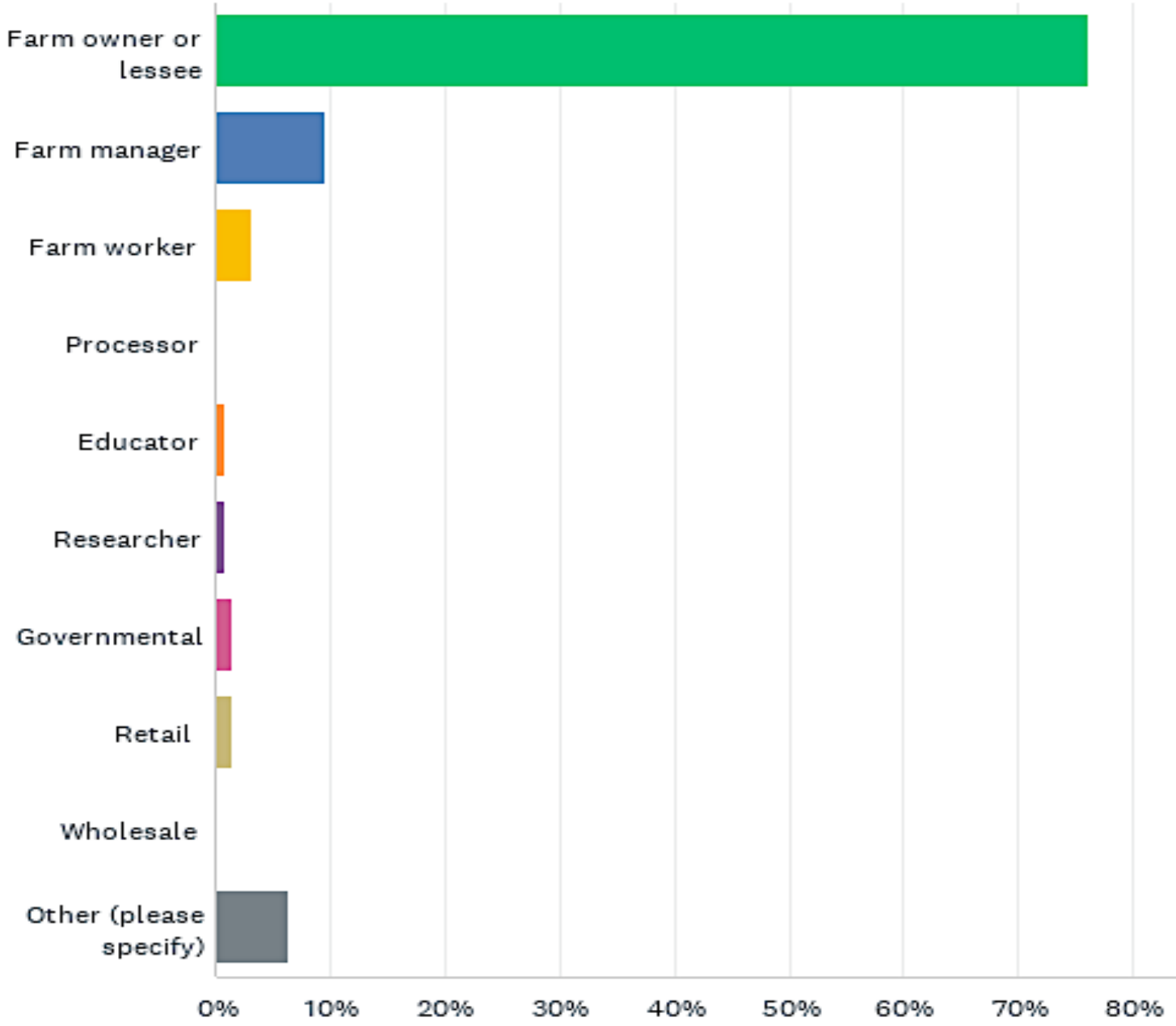
United Kau Farmers Cooperative

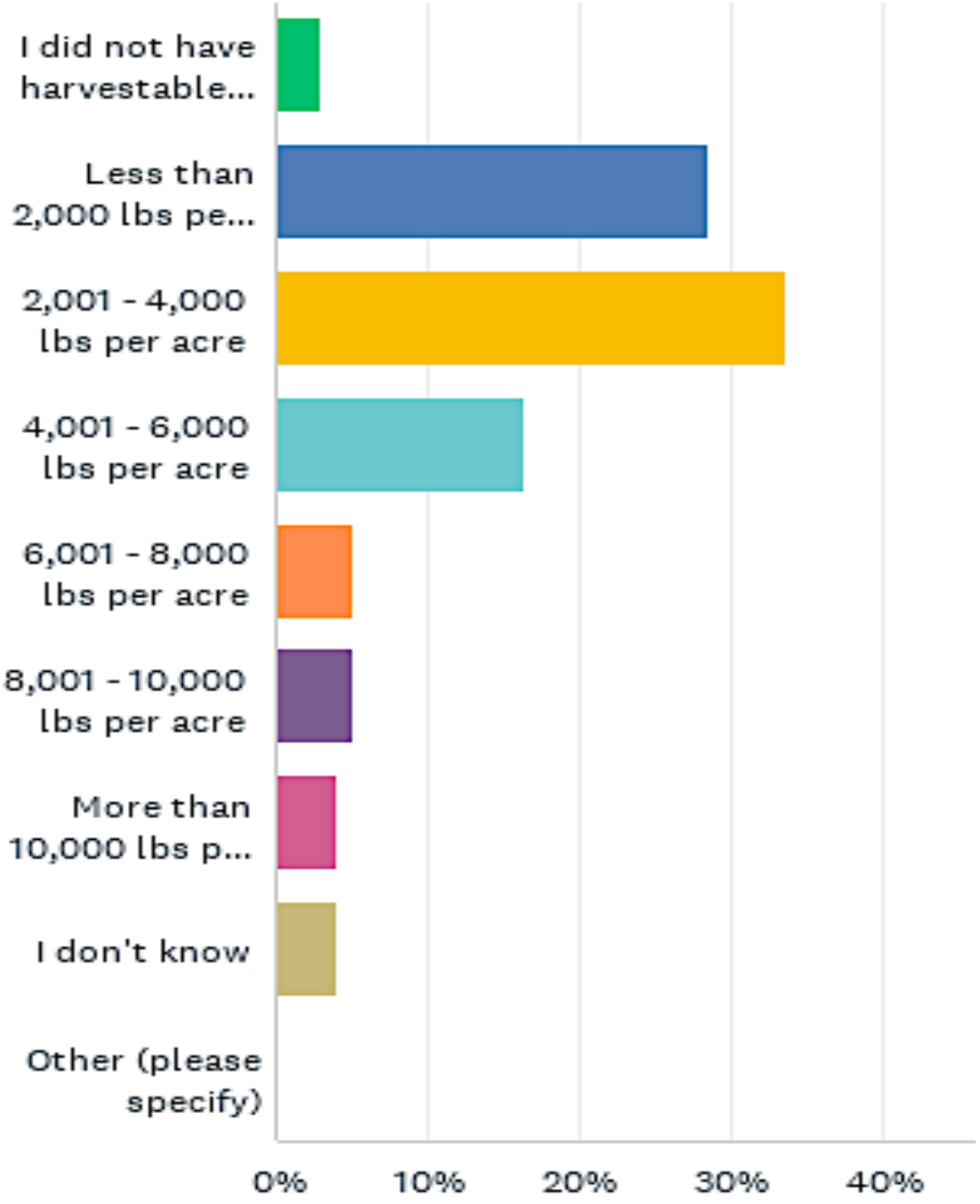
Hawaii's Coffee Industry

Our Many Volunteers

2021/2022 Coffee industry & CLR survey

- 128 responses
  - 91% Big Island
  - 9% Maui, Oahu, Kauai
  - 62% <5 acres
  - 14% certified organic; <1.0A
  - Estate and cherry sales
- Translated to Spanish





In the previous (2020-2021) coffee season, what was the estimated harvested, ripe cherry yield per acre for the farm(s)?

48% - decreased a little to a lot compared to the past 3-5 years.




What are your main FIELD challenges, and how serious are these problems?

- Pests and diseases
- Tree decline and/or tree death
- Issues related to farm labor

CLR results

Activity	< 5% CLR Infection & Severity	> 26% CLR Infection & Severity
Field sanitation – destroy infected materials	More likely	Less likely
Field sanitation – decrease overstory shade and surrounding plants	Less likely	More likely
Submit soil and/or leaf tissue samples	More likely	Less likely
Increase or modify fertilization program	More likely	Less likely
Spray an approved fungicide	More likely	Less likely; 20% did not spray any fungicides on their farm
Active farm participation & awareness	Remains the same to increased	Decreased to remains the same
Managing CLR at a level that keeps your operation profitable?	Yes; I don't know	No; I don't know

What coffee-related scientific research do you want to see conducted?

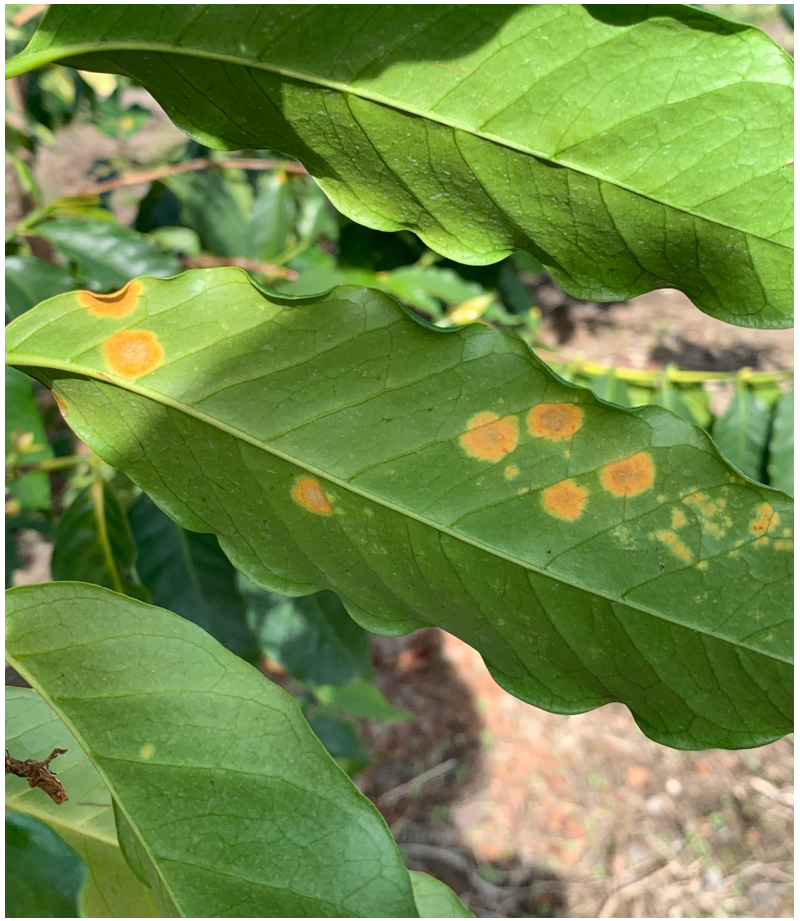
IR-4 Pesticide Registration Program Update

Dr. Zhiqang Cheng, Julie Coughlin, and James Kam

Fungicides for Coffee Leaf Rust

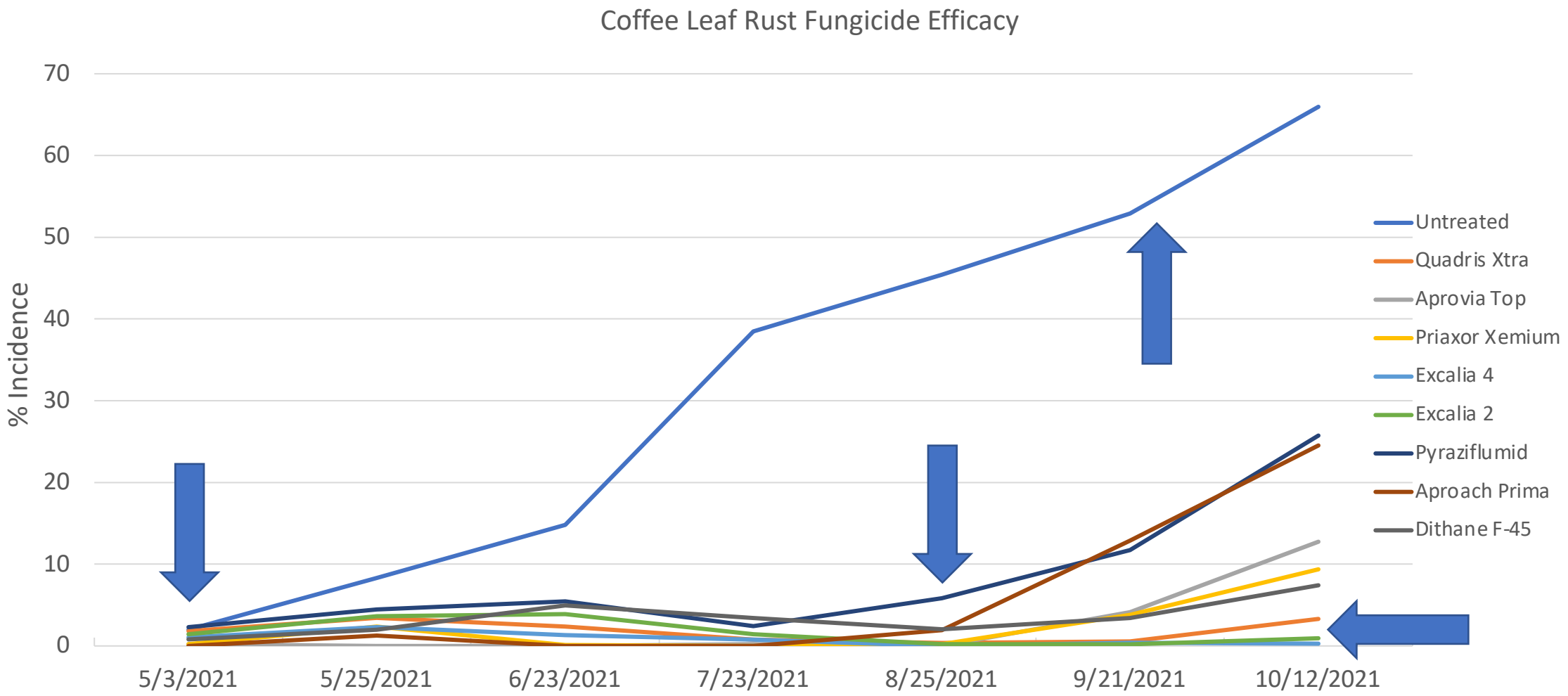
Fungicide Products Tested in 2021:

• Quadris Xtra®	*Syngenta*
• Aprovia® Top	*Syngenta*
• Priaxor® Xemium®	*BASF*
• Aproach® Prima	*Corteva*
• Dithane® F-45	*Corteva*
• Pyraziflumid 20SC	*Nichino America*
• Excalia™	*Valent*



The IR-4 Project

Results


Coffee Leaf Rust Fungicide Efficacy
% Incidence
70
60
50
40
30
20
10
0
5/3/2021
5/25/2021
6/23/2021
7/23/2021
8/25/2021
9/21/2021
10/12/2021
Untreated
Quadris Xtra
Aprovia Top
Priaxor Xemium
Excalia 4
Excalia 2
Pyraziflumid
Aproach Prima
Dithane F-45

2022 IR-4 Coffee Trials

Coffee Leaf Rust Fungicide Trial 2022

- Pyraziflumid 20SC — *Nichino America*
- Excalia™ — *Valent*
- Alto 100 SL — *Syngenta*
- Abound — *Syngenta*

Other 2022 Coffee Trials

- Anthracnose fungicide screening trial
- GF-3206 herbicide screening trial

Thank You !

www.ir4project.org

www.wrir4.org

The IR-4 Project

SCRI CLR Field Trial Project

Dr. Zhiqiang Cheng, UH Manoa

- Kona Hills (concurrent with UH's IR-4 CLR trial, but different treatments).
- The trees were recently stumped (Feb. 2022).
- When new shoots grow, contact fungicide will be applied to protect the tree during first growth.
- After shoots are big enough, the trial will begin (est. late June or early July 2022).

Field trial plot area

End of Feb. 2022

End of April 2022

Systemic fungicide and biological control products being tested

- Azoxystrobin - Organic Systemic, interrupts electron transport chains
- Benzovindiflupyr + Azoxystrobin - Systemic
- Picoxystrobin - Systemic, inhibits mitochondrial respiration
- Myclobutanil - Systemic, inhibits fungal membrane production
- *Pseudomonas chlororaphis* strain AFS009 - Bacterial biocontrol
- Untreated control

Data Collection

Observing three trees per treatment and six branches per tree.

- Number of infected leaves per branch
- Number of lesions per leaf
- Percentage of leaf surface that is infected

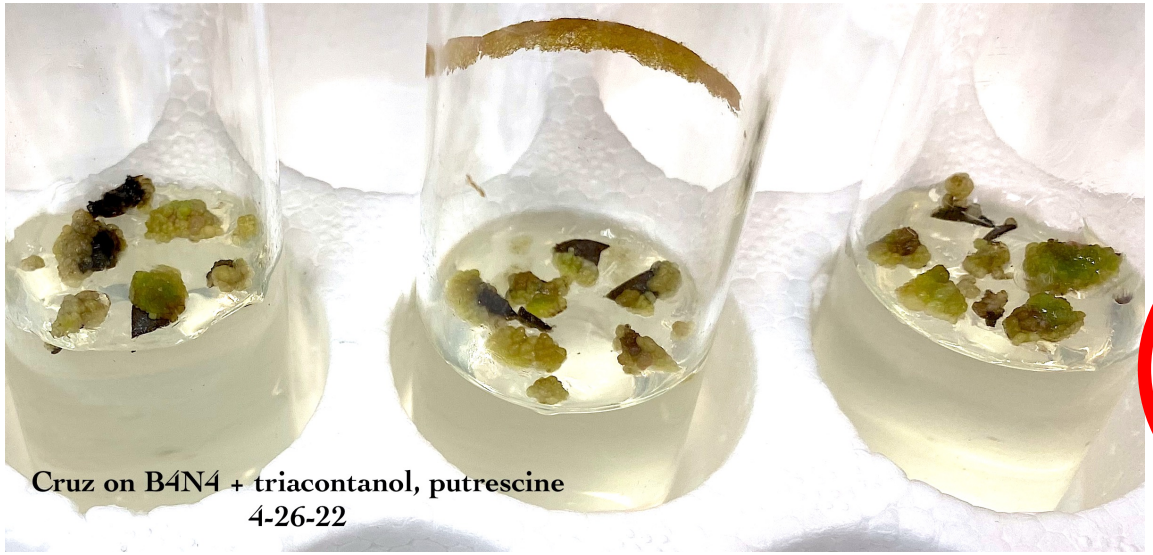
5 leaves will be chosen at random excluding selected branches from the whole tree and evaluated for incidence and severity.

- Phytotoxicity from the fungicides will be monitored.

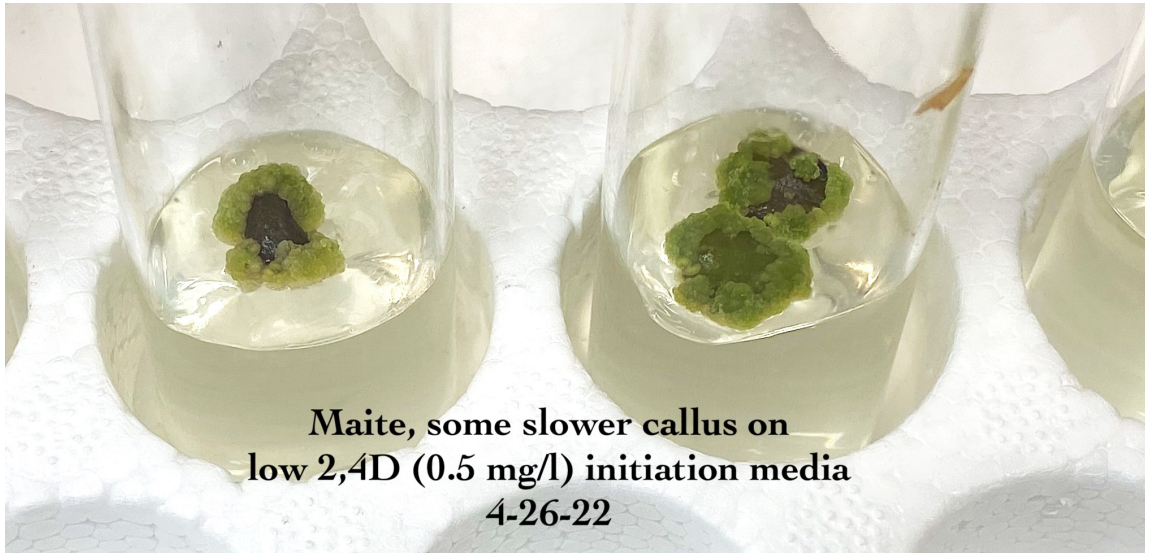
SCRI CLR tissue culture of coffee

Goal 1	Goal 2	Goal 3
Establishing embryo culture in preparation for large scale micropropagation	Set-up of bioreactor facility	Plant production and acclimatization

Dr. Michael Shintaku
UH-CTAHR
Hawaii County Administrator



Cruz on B4N4 + triacontanol, putrescine
4-26-22



Maite, some slower callus on
low 2,4D (0.5 mg/l) initiation media
4-26-22

https://www.frontiersin.org/articles/10.3389/fpls.2018.01630/full

CBB repellent and biocontrol

Dr. Mark G. Wright

Plant and Environmental Protection Sciences

Espinoza et al. 2009

Verbenone as a CBB repellant

- A pine beetle repellant pheromone labeled for tree protection
- We have run trials with the ISCA Tech SPLAT delivery system
- Preliminary trials showed potential to reduce CBB infestation by 50%

Chris Fettig

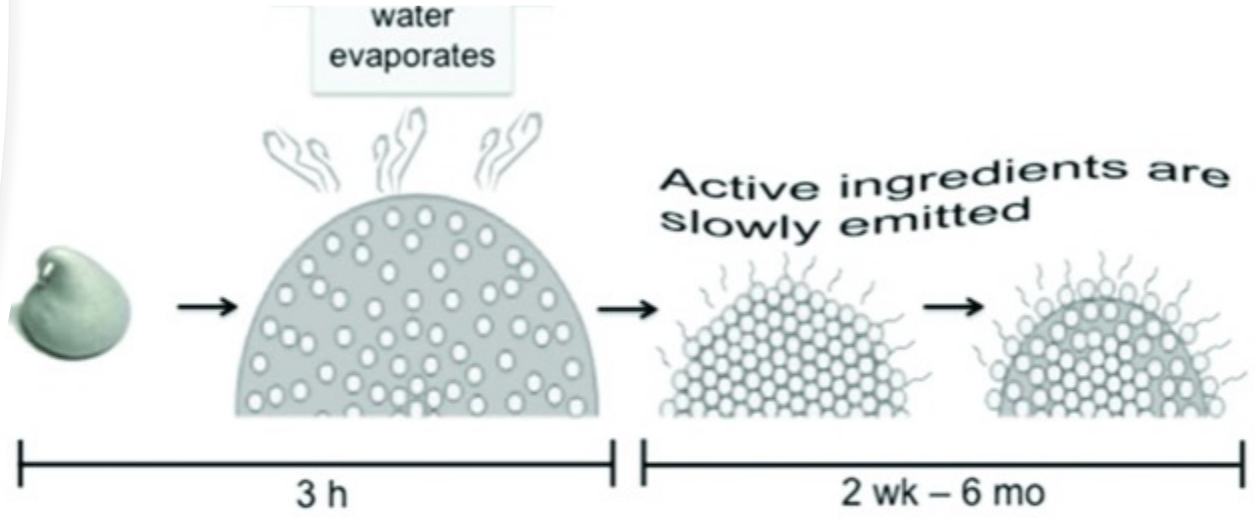


Figure 2. Following application, the SPLAT® emulsion dries and becomes rainfast within 3 hours, then releases active ingredients at a controlled rate for 2 weeks to 6 months.

2022 work

- Have been issued HDOA Experimental Use Permit for verbenone (SPLAT VERB) registration trials
- Trials will be started as soon as coffee beans on Oahu are susceptible (late flowering!)
- Expect registration by the end of 2022 season.

Hypothenemus hampei
The Coffee Berry Borer

Andrew J. Johnson

http://www.ambrosiasymbiosis.org/wp-content/uploads/2016/08/Identification_of_CBB_from_similar_beetles_v0p1_.pdf

CBB biocontrol: *Phymastichus coffea* LaSalle (Eulophidae)

With Dr. Peter Follett, USDA-ARS

- Originally from Africa; introduced broadly in Latin America
- Parasite of adult beetle; Small (♀ 1mm), long life cycle, short adult longevity; 2 eggs per host.
- Have demonstrated high degree of host specificity – does not attack native species.
- Applications for release in HI under review at USDA-APHIS and HDOA; hopeful for positive response by Fall 2022

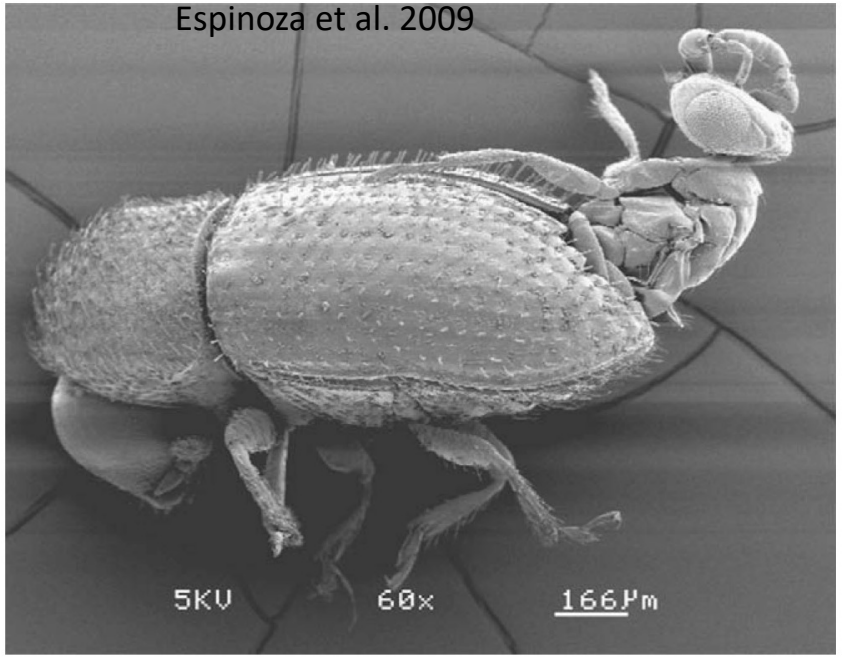


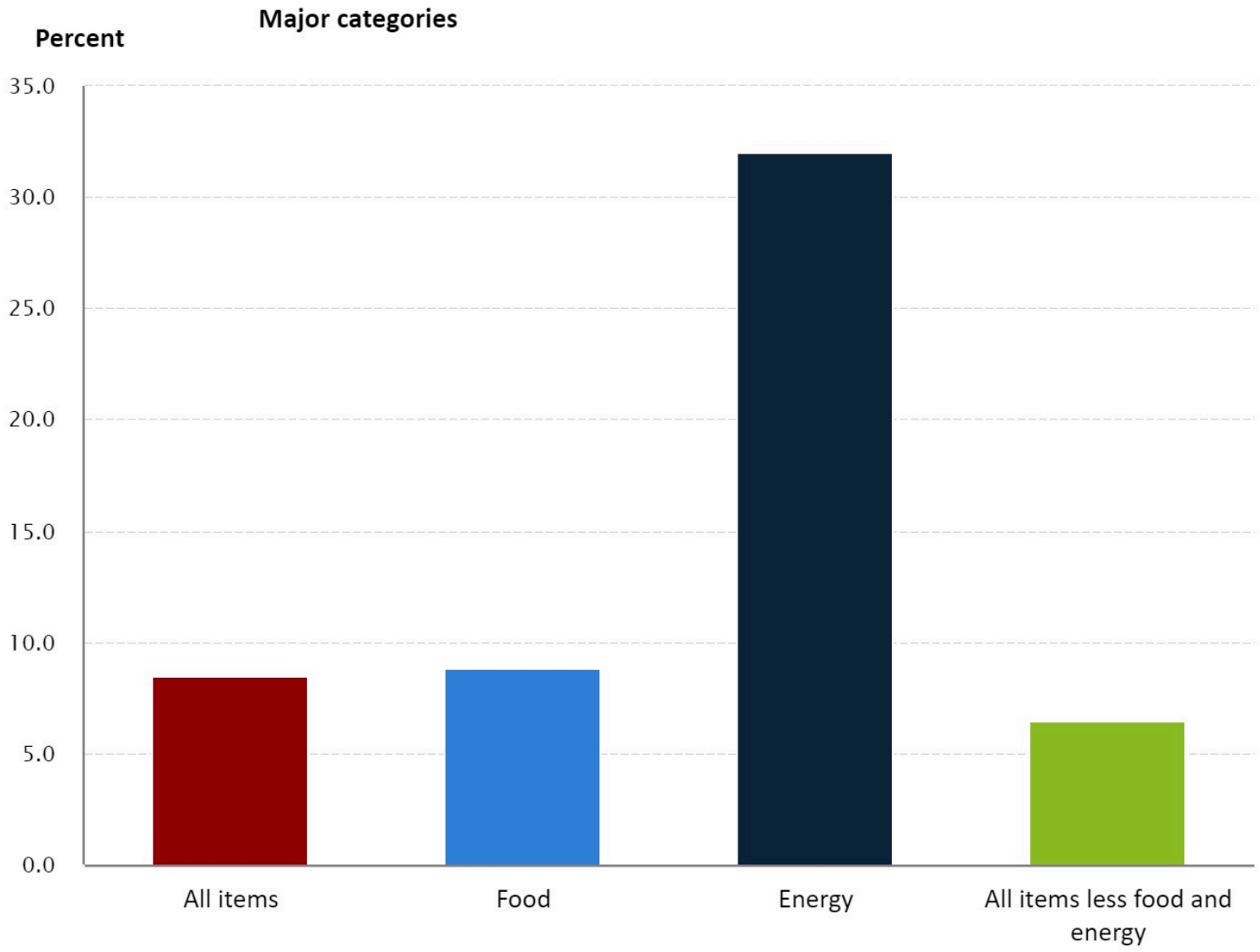
Fig. 5. An adult female of *Phymastichus coffea* emerging from a coffee berry borer.

Inflation in the U.S.

- Consumer purchasing power March 2022 inflation reached 8.5%
- Highest in 40+ years

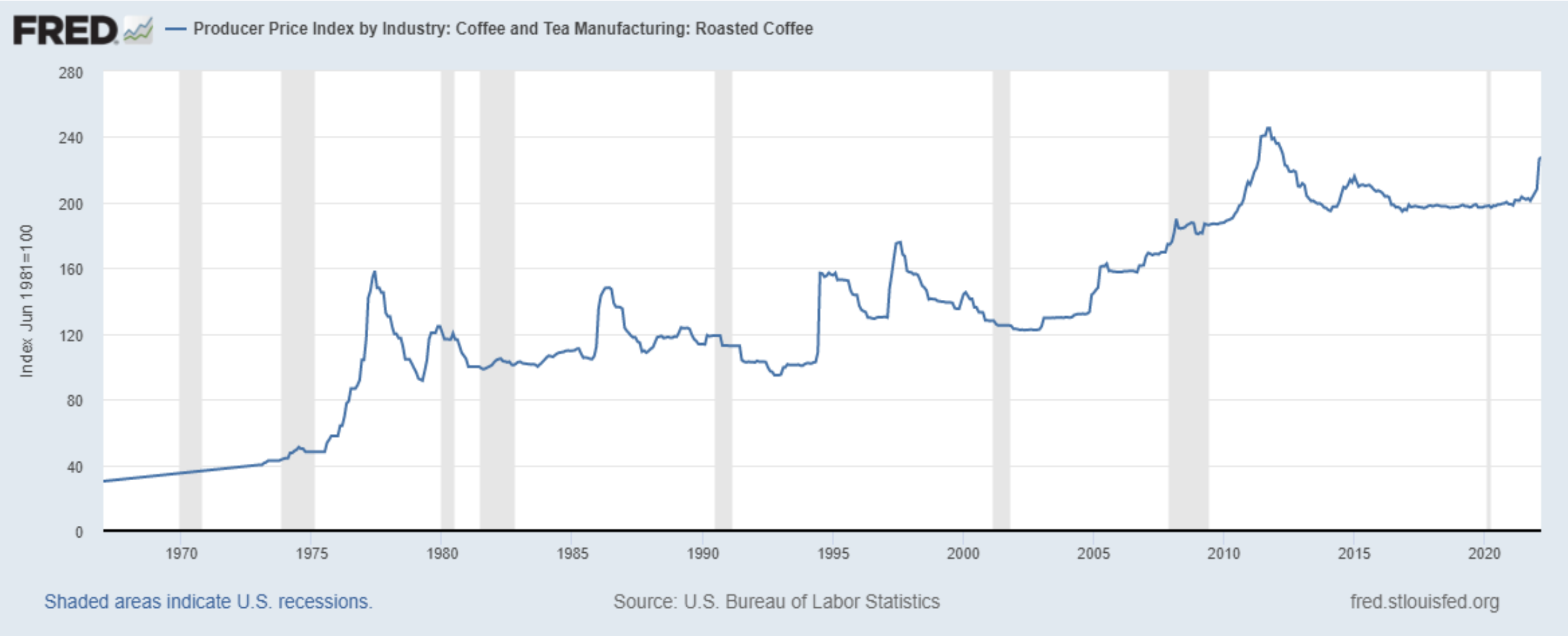
Shannon Sand
Assist. Extension Agent in Agricultural Finance

12-month percentage change, Consumer Price Index, selected categories, March 2022, not seasonally adjusted



Source: U.S. Bureau of Labor Statistics.

Inflation in the U.S. for Coffee March 2022 (PPI)



What does this mean for Hawaii coffee producers?

- Input prices are on the rise
- Important to look at budget, farm and business records
  - Compare your farm to benchmarks
  - Historical yields and current production
  - Input costs
  - Potential value-added (processing, use of coffee “waste”, etc.)

CTAHR CES (Kauai County Update 2021-22)

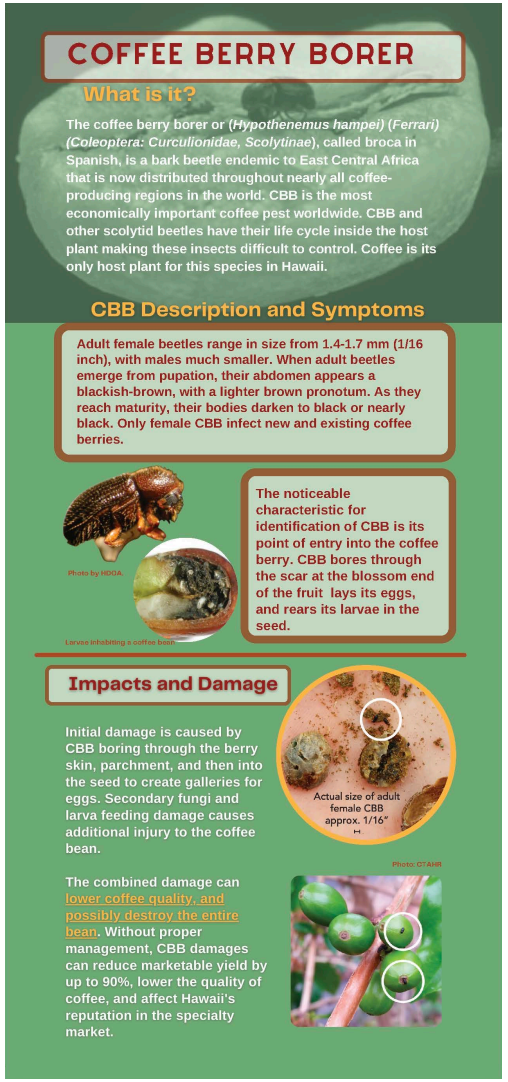
- Survey of CBB at the Moloa'a Bay Coffee Farm (with KISC, HDOA)
  - Coffee berries were visually inspected and CBB traps were deployed on the periphery of the farm.
  - CBB was detected with both methods, but visual inspection was easier and more rapid than trap detection.

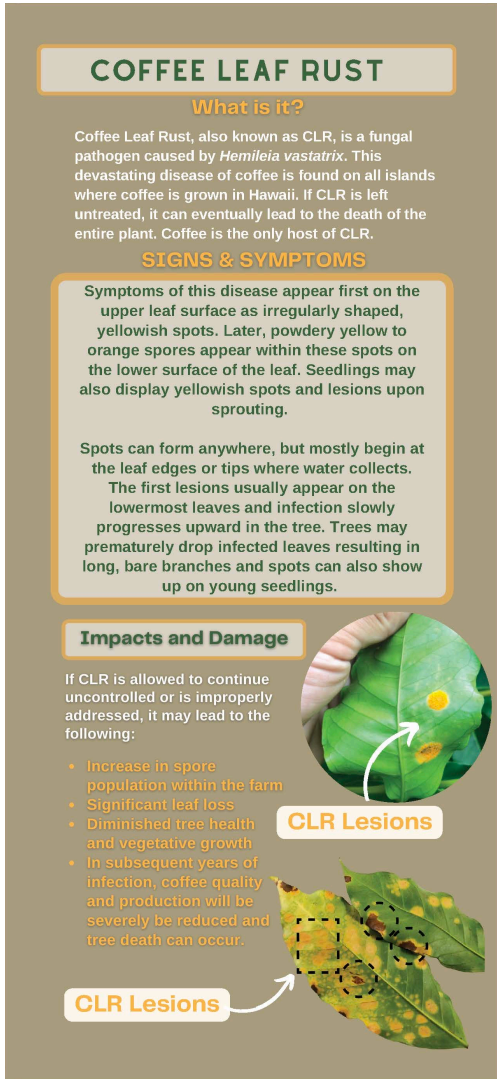
- Survey of coffee root-knot nematode (*Meloidogyne konaensis*) (with Dr. Koon-Hui Wang)
  - Coffee root-knot nematodes were not detected in the surveyed commercial coffee farms.

Coffee root-knot nematode survey team at Kauai Coffee

Dr. Roshan Manandhar, Asst. Extension Agent for Invasive Species Management

CTAHR CES (Kauai County Update 2021-22)

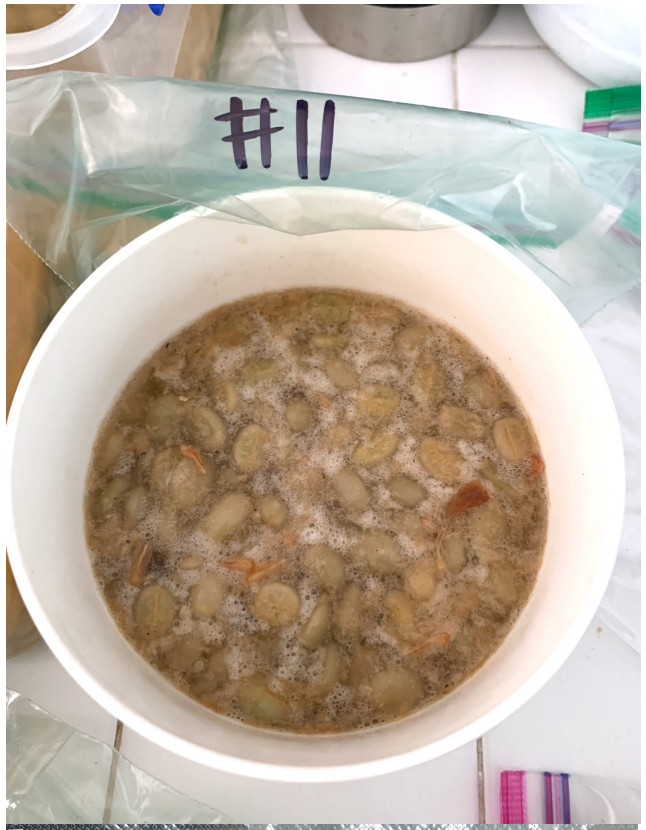




- Coordinate CBB &CLR response planning meetings (CTAHR, HDOA and KISC)
  - Monthly meeting for CBB & CLR status updates and rapid response planning - continuous
- CBB & CLR kit in preparation (by KISC)
  - Consists of rack cards, jeweler's loop, and CBB specimens
  - Aimed to educate backyard coffee growers and general public




Catimor/Mokka hybrid CLR resistance and quality project

Resistance and Harvest

- Kona Research Station
- 20 individual trees; 10 different selections
- Tree by tree data – first year
  - Hand harvested, weighed, pulped, fermented, sun dried, and vacuum-sealed

Cupping on 3/15/22

- Greenwell Farms
  - Tommy, Chai, Jennifer of GFI
  - Brittany, Madeline of Pacific Coffee Research
  - Tracie Matsumoto of USDA-PBARC
- Cupping of top 4 Catimor/Mokka hybrid selections plus Kona Typica
  - Overall yield, cherry quality, and size

Tree #	Assigned Genotype^	Appearance	Leaf Tip Color	Cherry Size*	Yield**	Ave Cupping Score***
4	MA2/Catimor hybrid	Dwarf/ Compact	Green	Medium	High	84.00
6	MA2/Catimor hybrid	Dwarf/ Compact	Green	Large	Medium	83.33
2	MA2/Catimor hybrid	Dwarf/ Compact	Green	Large	Medium	82.25
15	T.08667/Costa Rica 95	Dwarf/ Compact	Bronze	Large	High	81.58
Kona Typica		Tall	Light Bronze	Large	High	81.92

^ Determined by Dr. Dapeng Zhang, USDA-ARS research geneticist in Beltsville, Maryland

* In 2021, the average weight per berry of 1800 cherry from grafted typica trees - 2.04 grams

** 5x12 for 726 trees per acre; 10,000 lb cherry per acre

*** 80+ score for specialty coffee

#4: Dried orange, dark chocolate, caramel, red fruit, floral, red apple, citric and malic acid, juicy body.
Dried cherry, brown sugar, cacao, sweet spice, juicy body, lemon.
Sweet, caramel, spice, chocolate, bright acidity but thin body, juicy sensation.

2nd year of data

- Confirm CLR resistance and coffee quality
- Other trees should be considered
- Replicating top trees

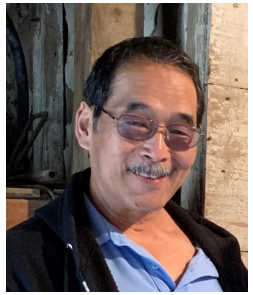



CLR-resistant clonal plant propagation

Trialing grafting methods for mother-plant replication

CLR & CBB videos and presentations

Kona Extension YouTube
https://www.youtube.com/channel/UC8pf1heM57lArMBpl8kkmOg



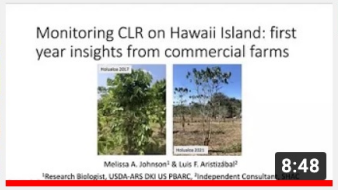
Dr. Stuart T. Nakamoto, Shannon, and Matt

Cafedak Coffee Biostimulant Workshop Presentation by...

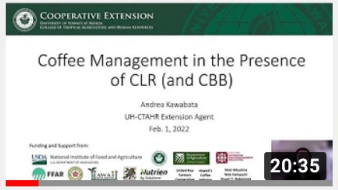
Priaxor Xemium and its Section 18 Requirements...

The Worker Protection Standard (WPS) for Pesticid...

Using Priaxor for CLR Management Presented by...



Monitoring CLR on Hawaii Island Presentation by Dr....



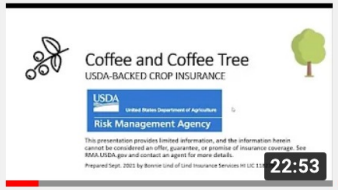
Coffee Management in the Presence of CLR (and CBB)...

HDOA's CBB and CLR Pesticide Subsidy Program...

Registration of Fungicides for Coffee Leaf Rust...

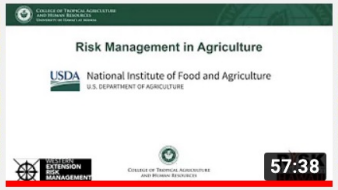
Coffee Crop Insurance Causes of Loss, Inspection...

Coffee Fruit and Coffee Tree Subsidies



Coffee Fruit and Coffee Tree Crop Insurance

Coffee Tree Pest and Disease Coverage and Tree...



Train the Trainer Webinar #1 - Overview of Risk...

Train the Trainer Webinar #2 - Whole Farm Insurance

Train the Trainer Webinar #3 - Crop Insurance

Train the Trainer Webinar #4 - USDA Farm Service Agency'...

Coffee Berry Borer Integrated Pest Management 101...

How to Determine % Bean Damage in Ripe Cherry

Coffee Berry Borer IPM - Main Harvest

Coffee Berry Borer IPM - End of Season Strip-Pick

USC University of Southern California

Cooperative Extension
University of Hawai'i at Mānoa
College of Tropical Agriculture and Human Resources

ProBlad Verde Field Trial Webinar

Preliminary Data

Tuesday, May 24, 2022
Pre-recorded presentation at 3:00 PM HST
and live Q&A at 3:30 PM HST

Presented by:
Arianna Wood, M.A.
Master's in Environmental Studies, 2021;
University of Southern California (USC)

Acknowledging Advisors:

Monalisa Chatterjee, Ph.D.
Assistant Professor, USC
Environmental Studies Program

Andrea Kawabata
UH-CTAHR

Register at www.HawaiiCoffeeEd.com/problad to receive the Zoom link or call Matt at 808-322-0164 at least 2 days before the event.

ProBlad Verde is an organic, biofungicide product that was recently approved by the HDOA under a 24(c) Special Local Need Label. This pesticide can be incorporated into a new or existing coffee leaf rust spray rotation and be used to protect coffee leaves with its translaminar and contact kill properties.

During this presentation, Arianna Wood will share about her field trial with ProBlad Verde and Serenade ASO and will present preliminary information from this project.

www.HawaiiCoffeeEd.com/problad

MULTIPLE DATES

Talk Story with COFFEE BERRY BORER Researchers 2022

by Coffee Berry Borer Area-Wide Program
44 followers Follow

Free

Select A Date

These are free, informational meetings where people can gather virtually to share their knowledge on managing coffee pests and diseases.

Location
Online event

About this event

Thursday, **May 19**: no meeting - HCA Conference starts in Kona

Thursday, May 26: Melissa Johnson, Ph.D. "CLR monitoring on Hawaii Island"

Thursday, **June 2** Angelita Acebes-Doria Ph.D., "MyIPM Hawaii: Mobile App Fact Sheet and Management Guide for Pests in Hawaii"

The USDA-Agricultural Research Service and University of Hawaii-CTAHR invite you to participate in the Coffee Berry Borer (CBB) meetings on Zoom.

Talk Story at lunch time 12:00 noon – 1:00 PM Hawaii Time.

These are free, informational meetings where growers, researchers, and other agricultural professionals can share their knowledge on managing CBB, and coffee diseases, including coffee leaf rust (CLR).

https://bit.ly/3Ps20z0

Pesticide phytotoxicity burns (spots) on coffee fruit and leaves

Future trainings

- Coffee desuckering – June 4 @ Kona Research Station
- Coffee leaf rust and other pests
- Worker protection standard (WPS)
- Sprayer calibration and pesticide calculations
- Proper pesticide use
- Crop insurance
- Coffee grafting
- Coffee fertilization and nutrient management
- Soil health management
- Government programs for farms
- Grant writing for farmers
- Production and farm record keeping

www.HawaiiCoffeeEd.com

HOME | COFFEE LEAF RUST | BB MANAGEMENT | EVENTS AND ANNOUNCEMENTS | MORE... | LOG IN

- Coffee Leaf Rust Photos
- HDOA CLR Pest Alert ›
- Sanitation and Disinfestation Info
- Surveying, Sampling and Monitoring of CLR ›
- Spraying for CLR and Spray Product Info ›
  - Spraying for CLR - English
  - Pulverización para CLR - Español
  - Spraying for CLR - Tagalog
  - Spraying for CLR - Ilocano
  - Sprayer Calibration and Pesticide Calculations
  - Priaxor Xemium Info
  - ProBlad Verde Info
- Pruning for CLR and CBB
- Coffee Leaf Rust Poster ›
- CLR Trifold Brochure
- CLR Presentations and Meetings
- CLR Publications
- CLR/CBB Subsidy Program Info
- Bioworks BotaniGard and Mycotrol Compatibility Chart

Search

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Hemileia vastatrix)

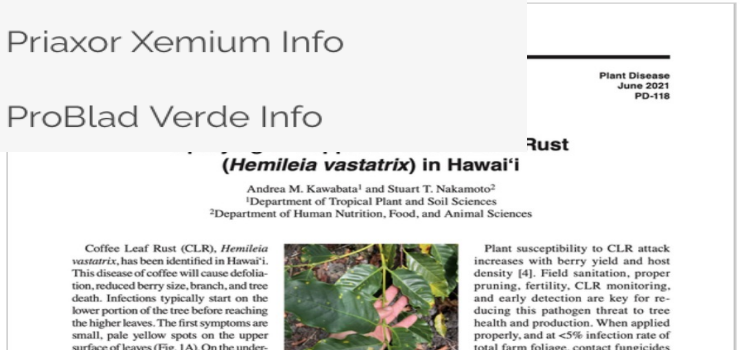
Confirmed Lanai, Kauai, Molokai and Hawaii Island.

Proper Pes nt Pesticide I e Diseases

Published 11/4/20;

The following publi thods of spraying to suppres on farms. The article includes:

- List of fungi Department on coffee gr
- Some sympt
- Why spray t
- Proper spra
- How to properly rotate the use of pesticide products



Plant Disease
June 2021
PD-118

Rust
(*Hemileia vastatrix*) in Hawai'i

Andrea M. Kawabata[1] and Stuart T. Nakamoto[2]
[1]Department of Tropical Plant and Soil Sciences
[2]Department of Human Nutrition, Food, and Animal Sciences

Coffee Leaf Rust (CLR), *Hemileia vastatrix*, has been identified in Hawai'i. This disease of coffee will cause defoliation, reduced berry size, branch, and tree death. Infections typically start on the lower portion of the tree before reaching the higher leaves. The first symptoms are small, pale yellow spots on the upper surface of leaves (Fig. 1A). On the under-

Plant susceptibility to CLR attack increases with berry yield and host density [4]. Field sanitation, proper pruning, fertility, CLR monitoring, and early detection are key for reducing this pathogen threat to tree health and production. When applied properly, and at <5% infection rate of total farm foliage, contact fungicides

Thank you!

Andrea Kawabata
andreak@hawaii.edu
808-322-4892
415-604-1511 (text)

Julie Coughlin
jcoughli@hawaii.edu
808-956-2003

Zhiqiang Cheng
cheng241@hawaii.edu
808-956-6906

Michael Shintaku
shintaku@hawaii.edu
808-969-8261

Mark Wright
markwrig@hawaii.edu
808-956-7670

Shannon Sand
srsand@hawaii.edu
808-969-8217

Roshan Manandhar
roshanm@hawaii.edu
808-274-3477

Stuart T. Nakamoto
snakamo@hawaii.edu
808-956-8125

Roseann Leiner
roseannl@hawaii.edu
808-969-8256

Jensen Uyeda
juyeda@hawaii.edu
808-622-4185

Rosemary Gutierrez-Coarite
gr6@hawaii.edu
808-244-3242 ext. 232