Department of Agriculture
STATE OF HAWAII

NEW PEST ADVISORY

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Coffee Leaf Rust

Hemileia vastatrix Berkley & Broome 1869

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INTRODUCTION

Coffee leaf rust (CLR) caused by the fungus *Hemileia vastatrix* is the most destructive and economically important disease of coffee (*Coffea* sp.) in the world. Infections result in loss of leaves and in severe cases may cause twig dieback and tree death. Long term impacts of the disease often result in a major decrease in yield. The disease was first found on coffee in Africa in 1861, but later reported infecting cultivated coffee in Sri Lanka in 1867 where it ruined coffee production within 10 years. Since then, CLR has been reported from all major coffee-producing countries.

FIRST REPORT

On October 20, 2020, Andrea Kawabata, a University of Hawai'i, College of Tropical Agriculture and Human Resources (UH-CTAHR) extension agent, referred a Ha'ikū farmer with suspicious orange spots on their coffee leaves to Hawai'i Department of Agriculture (HDOA) personnel on Maui. The leaves were tentatively identified as showing CLR symptoms. Samples were submitted to researchers at UH-CTAHR and the National Mycologists at USDA's National Identification Services (NIS) in Beltsville, MD. By October 28th, researchers and identifiers at both agencies confirmed that the coffee was infected with the rust fungus *Hemileia vastatrix*. This confirmation represents a new record for the state of Hawai'i and the United States.

Fig. 1. Coffee leaves showing mild CLR symptoms (Photo: Andrea Kawabata).

Fig. 2. Coffee leaves showing moderate to severe symptoms (Photo: Andrea Kawabata).

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Fig. 3. Close-up of upper coffee leaf surface with irregularly shaped, yellowish and brown spots.

Fig. 4. Lower surface of coffee leaves infected with CLR showing irregularly shaped, powdery, yellow to orange powdery spots (on a paper towel).

SIGNS & SYMPTOMS

Symptoms of CLR may vary depending on environmental factors and plant susceptibility. The most observable symptom of CLR are irregular shaped, yellowish spots on upper leaf surfaces (Fig. 1-3, & 6-7). Below these leaf spots (on the lower leaf surface), there may be yellow to orange powdery lesions (spores) (Fig. 4 & 5). As the spots on either side of the leaf grow, they may coalesce forming large irregular shapes or lesions (Fig. 1-4, & 6). The centers of the CLR spots or lesions will eventually dry up and turn brown (Fig. 2-4, & 6).

Spots can form anywhere, but mostly begin at the leaf edges or tips where water collects. The first lesions usually appear on the lowermost leaves and infection slowly progresses upward in the tree. Trees may prematurely drop infected leaves resulting in long, bare branches.

Fig. 5. Close-up of yellow orange powder (spores) on lower leaf surface.

BIOLOGY

CLR spores require water (rain, heavy dew, overhead irrigation, etc.) to germinate and infect a plant. Spores germinate in 2-4 hours under optimum conditions. Infection of the leaf where the spore landed may be complete within 24–48 hours of continuous free moisture. Characteristic lesions will appear in 4-6 weeks. Spores can be spread easily through environmental factors (wind, rain, etc.) and by contact with objects, animals, or people.

DISTRIBUTION

Before this report, CLR was found in all major coffee growing regions of the world except Hawai'i. Statewide rapid response surveys for CLR were conducted immediately following the Ha'ikū farm confirmation on Maui. To date, CLR has been confirmed on Maui and Hawai'i Islands.

HOSTS

Around the world CLR is reported infecting several species of coffee. Additionally, it has been reported on *Gardenia* spp., but only from South Africa (Farr & Rossman). In Hawai'i, CLR has only been found infecting coffee species.

MANAGEMENT

Maintaining healthy plants and good sanitation practices are key factors in the management of CLR. Removing weeds that may compete for nutrients or stress coffee trees will also contribute to maintaining tree health. This and pruning allows for better coverage of infected plants if a fungicide is applied. It is important to remove feral coffee near managed coffee to prevent reservoirs of CLR. Before applying fungicides check with your local extension agent for recommended practices and refer to Spraying to Suppress Coffee Leaf Rust (*Hemileia vastatrix*) in Hawai'i published by the University of Hawai'i, Cooperative Extension.

ACKNOWLEDGMENTS

Mach Fukada for tentatively identifying the disease and collecting and submitting samples. Dr. Michael Melzer (UH-CTAHR) for his assistance with his tentative molecular confirmation of the disease and review of this advisory. We are grateful to Dr. John McKemy (USDA-NIS) for his final confirmation of the disease identity. Dr. Lisa Keith (USDA-ARS-PBARC) for assisting in the confirmation of Hawai'i Island samples and providing technical guidance.

Fig. 6. Feral coffee seedlings infected with CLR, displaying irregularly shaped yellowish spots next to a CLR infected coffee leaf.

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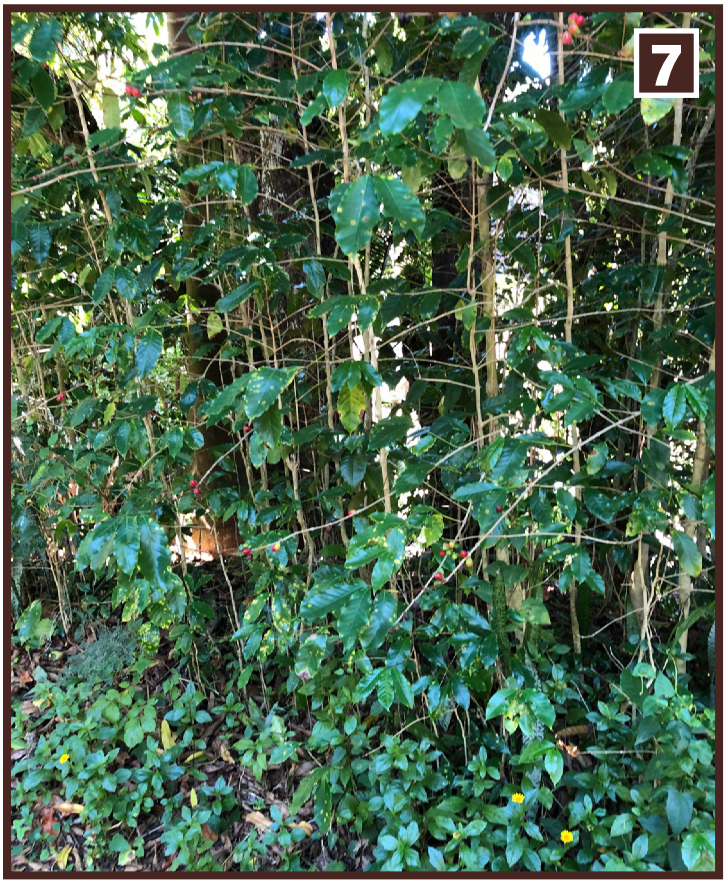

Fig. 7. Wild coffee tree infected with CLR, displaying yellowish spots and some bare branches.

Fig. 8. CLR infected wild coffee tree with long bare branches.

IF YOU SUSPECT A COFFEE LEAF RUST INFECTION

Do not touch or move the plant.

Oʻahu, Kauaʻi, Lānaʻi, Molokaʻi:
Please email us at HDOA.PPC@hawaii.gov with photos, the form at the end of this NPA, and the Subject: Suspect Coffee Leaf Rust or call (808)973-9525.

Hawaiʻi Island and Maui:
If you need assistance with management, then please contact Andrea Kawabata at andreak@hawaii.edu, 808-322-4898, or 415-604-1511 (text only).

FOR MORE INFORMATION

Field guide to Coffee Leaf Rust (*Hemileia vastatrix*) – Hawaiʻi Department of Agriculture
Spraying to Suppress Coffee Leaf Rust (*Hemileia vastatrix*) in Hawaiʻi – University of Hawaiʻi, Cooperative Extension
Coffee Leaf Rust Sanitation Protocol – USDA-ARS

REFERENCES

Farr, D.F., & Rossman, A.Y. Fungal Databases, U.S. National Fungus Collections, ARS, USDA. Retrieved November 13, 2020, from https://nt.ars-grin.gov/fungaldatabases/

DO NOT COLLECT SAMPLES OF INFECTED PLANTS TO PREVENT POTENTIAL SPREAD.

If you suspect coffee leaf rust

1. **First, do not touch or collect diseased plants.**
2. Do take clear photos.

   How to photograph coffee leaf rust:

   - Take photographs of whole plant (refer to Field Guide to Coffee leaf rust pages 3 and 4).
   - Take photographs of upper and lower surface of suspect leaves (refer to Field Guide to Coffee leaf rust pages 5-7).
3. Do not touch or collect diseased plants and flag or visibly mark the area where CLR was found. Let everyone (land owner, manager, workers, visitors, etc.) know to stay away. Do not move soil, plant materials, or supplies from the location.
4. Submit photos and Coffee Leaf Sampling Form to HDOA.PPC@HAWAII.GOV through e-mail with the Subject: **Suspect Coffee Leaf Rust**

   - We will be in contact on how to proceed.
   - Your information is confidential and will not be shared outside of Hawai'i Department of Agriculture.
5. Decontaminate at site if possible! If you have touched or contaminated your clothing, footwear, hat, etc. with the fungal pathogen or think you may have, shower immediately with soap and water and wash your clothing, footwear, hat, etc. in laundry detergent and hot water and dry with high heat. Once decontaminated, then it is safe to travel from your farm or location.

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Coffee leaf rust Sampling Form

Please complete this form as it applies and to the best of your ability. Include it with corresponding image(s). Submit only 1 form per farm/location/residence. Your information is confidential and will not be shared outside of the Hawai'i Department of Agriculture.

Contact Name:_____

Contact E-mail:_____

Contact Phone:_____

Date collected:_____

Farm name:_____

Address:_____

GPS Coordinates:_____

Location Type (Indicate or describe in Other):

Disease symptoms or signs (check all that apply):

Dropping of green leaves

Bare to nearly bare branches

Yellowish circular spots or lesions on leaves, which may or may not have brown centers

Clusters of orange to yellow-orange powder-like substance on the lower leaf surface below leaf spots on upper leaf surface

Number of plants affected:_____

Farm Nursery Residence Wild growing

Other:

This will be filled out by lab.

Received by:_____
Date received:_____
Final ID: _____
Identifier:_____
Date identified:_____

Action taken:

Notes:

DO NOT COLLECT SAMPLES OF INFECTED PLANTS TO PREVENT POTENTIAL SPREAD.