

## 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.

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## 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 found statewide.

## HOSTS

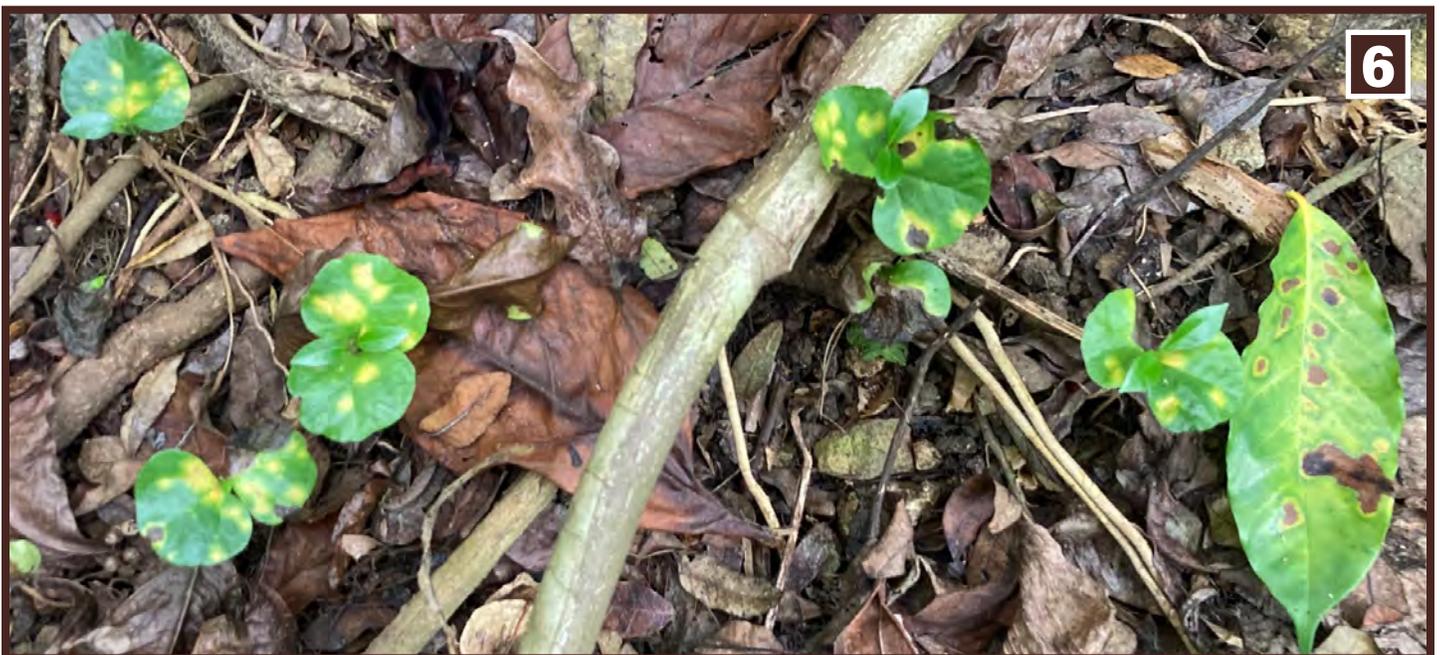
Around the world CLR is reported infecting several species of coffee. Additionally, it has been reported on *Gardenia* spp., but only from South Africa (Farr & Rossman). In Hawai'i, CLR has only been found infecting coffee species.

## 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

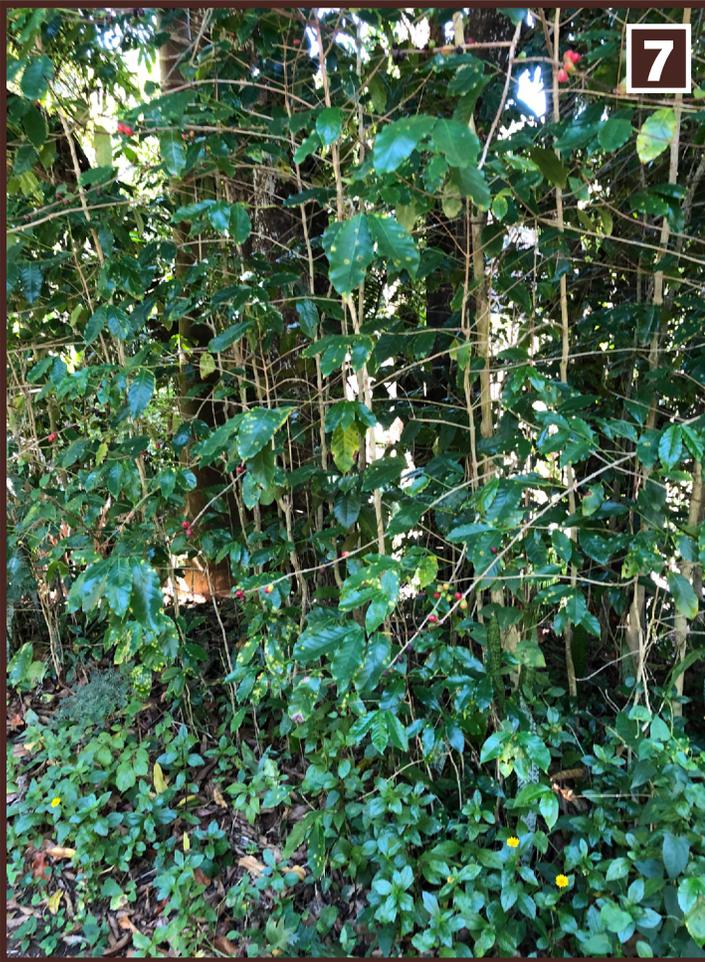
Mach Fukada (HDOA) for tentatively identifying the disease and collecting and submitting samples. Dr. Michael Melzer (UH-CTAHR) for his assistance with his tentative molecular confirmation of the disease and review of this advisory. We are grateful to Dr. John McKemy (USDA-NIS) for his final confirmation 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.

If you need assistance with management, then please contact Andrea Kawabata at [andreak@hawaii.edu](mailto:andreak@hawaii.edu), 808-322-4892, or 415-604-1511 (text only).

## FOR MORE INFORMATION

[Field guide to Coffee Leaf Rust \(\*Hemileia vastatrix\*\)](#) – Hawai'i Department of Agriculture

[Spraying to Suppress Coffee Leaf Rust \(\*Hemileia vastatrix\*\) in Hawai'i](#) – University of Hawai'i, 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/>