

Coffee Rust

Hemileia vastatrix

Prevention

Even if rust is not visible, this does not mean that spores are not present. **DO NOT SMUGGLE** coffee plants, seeds, leaves or cherry to Hawaii. Discard or bag and immediately wash all clothing and footwear before and upon returning from a trip to coffee producing farms outside of Hawaii.

Description

Coffee rust (*Hemileia vastatrix* Berkley & Broome), the most economically important coffee disease in the world, was first discovered on cultivated coffee in Sri Lanka in 1869. Within 10 years, production was completely destroyed. This disease has since spread to Southeast Asia, Africa, the Western hemisphere, South and Central American countries and many other main coffee growing regions, devastating farms along the way. Hawaii is one of the last remaining coffee growing regions in the world, where coffee rust does not exist.

Biology

For coffee rust infection to be successful, spores of this fungus require the presence of water (rain, heavy dew, overhead irrigation, etc.) to germinate. Spores germinate in 2-4 hours and within 24-48 hours, the infection process is complete. Inoculation, infection, and colonization are highly dependent on plant susceptibility, high relative humidity, moisture, and a temperature range of 59°F to 82°F. Loss of moisture after germination inhibits the infection process. As a result, disease outbreaks typically occur during the rainy season.

Symptoms

The first observable symptoms are chlorotic, yellow-orange rust spots, approximately 2-3 mm in diameter (fig. 1), appearing on the upper surface of leaves. On the underside of the leaves, these rust spots correspond with blotches of infectious spores (fig.2) or urediniospores, resembling a patch of yellow to dark orange colored powder. These young lesions steadily increase in size with the center of the lesion turning necrotic (fig. 3) and brown. Early spotting tends to occur around the margins or tips of leaves where dew and raindrops collect, creating the ideal environment for spore germination. Lower leaves are typically the first to show signs of rust, with the infection eventually progressing up the tree. Occasionally, coffee rust can be seen infecting young stems and berries.

Damage

The major effect of coffee rust is defoliation. Infected leaves drop prematurely, greatly reducing the plant's photosynthetic capacity (fig. 4). Vegetative and berry growth are reduced and is correlated with the intensity of rust in the current year. Long term effects of rust can have a stronger impact by causing dieback (fig. 5), which effectively reduces the number of productive nodes on branches. This can have a significant impact on the following year's yield with some researchers estimating losses between 30% and 80%.

Cultural Management

One of the key factors to any pest management is good sanitation practices. Regular pruning and training of the coffee tree helps to prevent over-cropping and maintain a healthy field. These practices help to improve air circulation and also to open up the canopy to allow proper spray coverage. Good weed control is an important factor as it keeps competition for vital nutrients low, thereby reducing the susceptibility to rust.

If you suspect an infestation of the coffee rust, please call your local Cooperative Extension Service Office:

Kona: 808-322-4892

Hilo: 808-981-5199

Maui: 808-244-3242

Molokai: 808-567-6929

Oahu: 808-622-4185

Kauai: 808-274-3471

References

- Arneson, P.A. 2011. "Coffee rust". *The Plant Health Instructor*. DOI: 10.1094/PHI-I-2000-0718-02. <http://www.apsnet.org/edcenter/intropp/lessons/fungi/Basidiomycetes/Pages/CoffeeRust.aspx>
- Ferreira, S. A. and R.A. Boley. 1991. "Hemileia vastatrix". *Crop Knowledge Master*. http://www.extento.hawaii.edu/kbase/crop/Type/h_vasta.htm.
- Kushalappa, A. C. and A. B. Eskes. 1989a. Coffee rust: epidemiology, resistance, and managemnet. CRC Press, Florida. 345 pp.
- Kushalappa, A. C. & A. B. Eskes. 1989b. Advances in coffee rust research. *Ann. Rev. Phytopathol.* 27:503-31.
- Nutman, F. J. & F. M Roberts. 1963. Studies on the biology of *Hemilea vastatrix*. *Trans. Brit. Myc. Soc.* 46:27-48.
- Schieber, E. and G.A. Zentmyer. 1984. Coffee rust in the Western Hemisphere. *Plant Dis.* 68:89-93.



Figure 1. Coffee rust symptoms on the upper surface of the leaf.



Figure 2. Coffee rust lesion viewed from lower leaf surface.



Figure 3. Center of lesions become necrotic.



Figure 4. The infected leaves drop prematurely, leaving long expanses of twig devoid of leaves.



Figure 5. Severe defoliation by coffee rust can kill trees.

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