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Foliar Pathogens in Guam: *Colletotrichum*

Disease: Anthracnose

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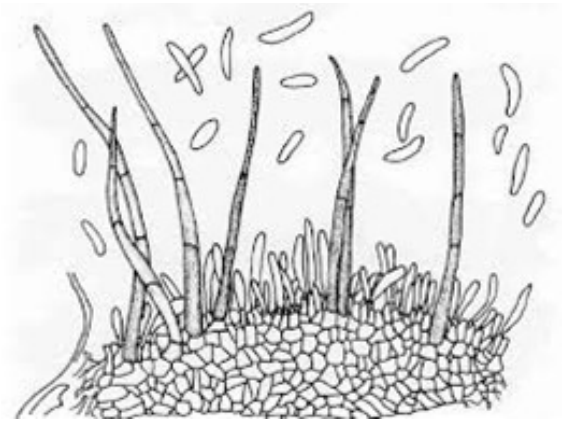

Figure 1. *Colletotrichum lagenarium*, the anthracnose fungus
Source: https://ipm.illinois.edu/diseases/rpds/920.pdf

Introduction

Anthracnose is a term used to loosely describe a group of related fungal diseases that typically cause dark lesions with salmon colored to white mucilaginous masses of spores on foliage, stems, or fruits. The spores are borne in an open fruiting body known as an acervulus— with and without setae (bristle-like, pointed, thick-walled modified hyphae). Only a few species are responsible for most of the anthracnose diseases. They are found in nature mostly in their conidial stage. The names of the most common anthracnose fungal species include *Discula, Gloeosporium, Marssoniella, Sphaceloma, Glomerella* and ***Colletotrichum***. Worldwide and on Guam, *Colletotrichum* spp. are the most frequently reported. Through molecular testing, two *Colletotrichum* species complexes have been identified on Guam: *C. orbiculare* and *C. gloeosporioides.*

Hosts

Foliar symptoms caused by *Colletotrichum* were mentioned on 53 hosts in the Index of Plant Diseases in Guam. It commonly occurs on many of Guam's crops and ornamental plants but only as a severe foliar pathogen on cucumber, papaya, and mango. Other Guam hosts include breadfruit, avocado, banana, eggplant, yam, pepper, watermelon, and tomato. Common ornamental hosts include plumeria, bougainvillea, dracaena, and croton. In 2017, Guam's cucumber anthracnose pathogen was identified as *Colletotrichum orbiculare* strain CBS 570.97+LARS73. In the Diseases of Cultivated Crops in the Pacific Island Countries, anthracnose was listed on kiwi fruit, kauri, sugar apple (sweetsop), anthurium, celery, aranda orchid, sweet pepper, papaya, watermelon, coffee, melon, greater yam, lupin, mango, cassava, bitter melon, passionfruit, avocado, french bean, guava, sugarcane, and vanda and vanilla orchids.

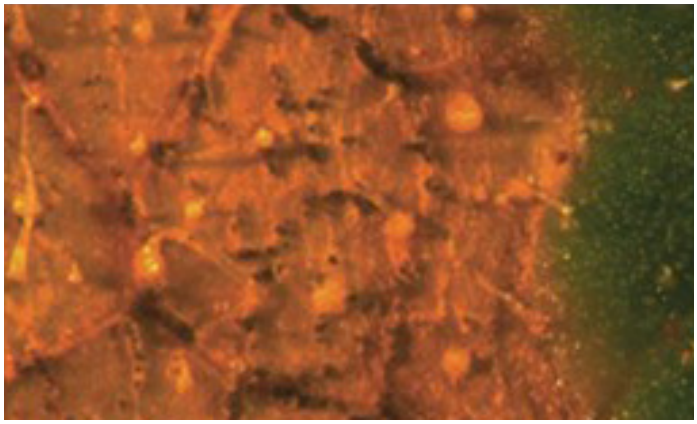

Figure 2. Fruiting bodies of *C. orbiculare*, the cucumber anthracnose
Photos: R.L. Schlub

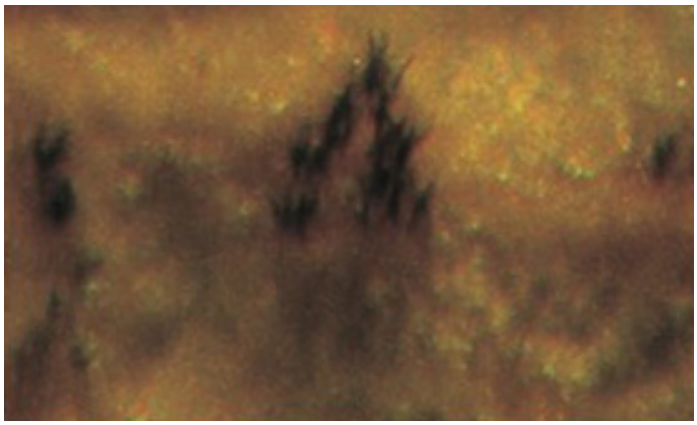

Figure 3. Darkly pigmented, hair like setae of *C. orbiculare* emerging from spore mass, seen on cucumber
Photos: R.L. Schlub

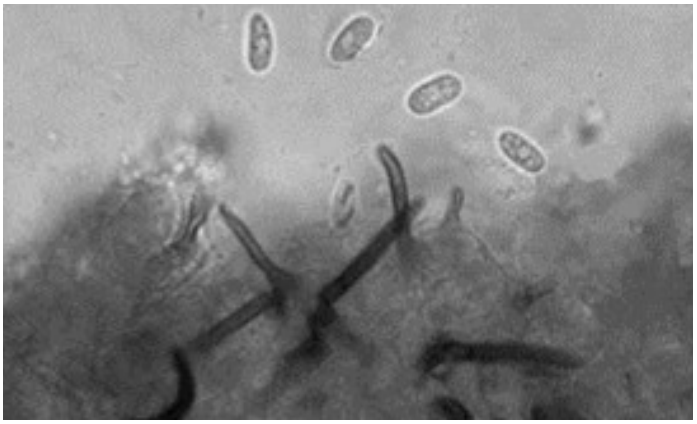

Figure 4. Conidia and seta attributed to *C. orbiculare* on cucumber
Photos: R.L. Schlub

Figure 5. Anthracnose on cucumber, caused by *C. orbiculare*
Source: https://edis.ifas.ufl.edu/pdffiles/PP/PP26600.pdf

Morphology of *Colletotrichum orbiculare*

All aboveground parts of cucumber, melon and watermelon are susceptible to infection. Spores of *C. orbicular*e are produced within an acervulus (saucer-shaped fruiting body) (Fig. 1). The acervulus starts out sub-epidermal then erupts through the surface of the host tissue at maturity. Conidia are formed at the end of conidiophores which are about the length of the spores and are not easily seen, even using a microscope. The fruiting structures, especially on older infections, will be accompanied by a crown of small black bristles (setae) (Fig. 3). Setae appear dark and are 3 to 4 times the length of the conidia, which are unicellular, transparent, short, and oblong (4-6 X 13-19 µm) (Fig. 4). Setae may arise from an acervulus or stroma (hyphae matrix). Key to positive diagnosis of *C. orbiculare* is presence of setae.

Visibility of*Colletotrichum orbiculare*

- **With the unaided eye:** leaf lesions usually appear as small spots near veins, roughly circular but with irregular margins, and light brown in color (Fig 5 & 7). They continue to enlarge, easily reaching 1 cm. The center of lesions may dry, crack and drop out, creating a shot-hole appearance. (Fig. 6).
- **With a 14X coddington hand lens:** dark brown to black dots of the fungus are visible within the brown lesions and often along veins (Fig. 2).
- **With a dissecting microscope:** black stromata bearing crowns of setae (bristle-like hyphae) are visible (Fig. 3). Individual spores cannot be seen but en masse appear as a salmon colored dot within the crowns.
- **With a compound microscope**: conidia and seta are easily found and seen in detail (Fig. 4); whereas, conidiophores are usually obscured by background tissue.

Figure 6. Shot-hole leaves caused by an anthracnose infection on cucumber, caused by *C. orbiculare*
Source: https://plant-pest-advisory.rutgers.edu/wp-content/uploads/2015/07/Anthracnose.jpg

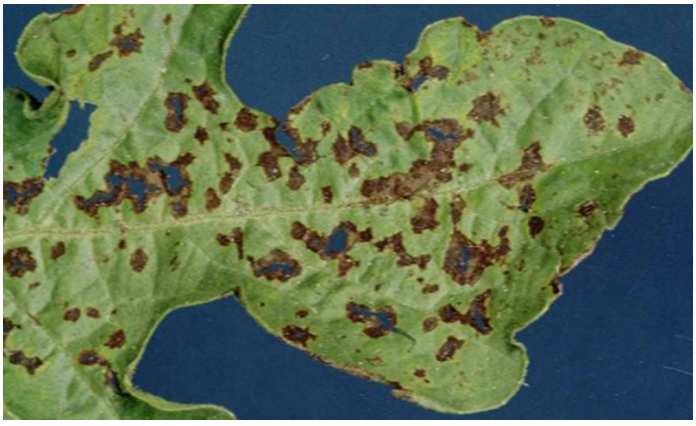

Figure 7. Anthracnose on watermelon, caused by *C. orbiculare*
Source: https://apps.lucidcentral.org/pppw_v10/text/web_full/etities/

Figure 8. Anthracnose on mango, caused by *C. gloeosporioides.*
Source: https://www.ctahr.hawaii.edu/oc/freepubs/pdf/pd-48.pdf

Disease Development

Cucumber anthracnose spreads easily within a single plant and to adjacent plants. The disease is most severe during the rainy season when 100% of a crop may become infected. Infections usually begin on the lowest (and oldest) leaves and migrate upward, with the youngest leaves rarely affected. Infections commonly occur along veins resulting in spots being more angular than circular. Infection spots enlarge under moisture chamber conditions.

Foliar Symptoms

On cucumber, areas of infection start out as yellow or water-soaked spots that soon become tan to brown (Fig. 5). The dry centers of the lesions may tear out or shatter leaving ragged or shot-hole leaves (Fig. 6). On watermelon, leaf spots are black (Fig. 7). On mango, leaf lesions begin on immature leaves as tiny brown to black specks which develop chlorotic halos (Fig. 8). The spots later enlarge and combine to form sizable necrotic areas which can distort the leaf (Fig. 8).

For further information

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Acknowledgments

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