

Foliar Pathogens in Guam: *Corynespora*

Diseases: Target Spot, Bull's Eye, Leaf Blight

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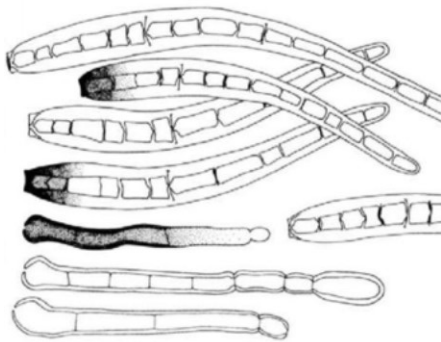


Figure 1. Conidia and conidiophores of *C. cassiicola*
 Source: https://www.researchgate.net/figure/Corynespora-cassiicola-A-Conidiophores-B-Conidia-Bar-20-m-hyaline-subhyaline-to_fig4_267772957

Introduction

TARGET SPOT, or bull's eye, is the name given to a leaf lesion which has concentric rings of necrotic tissue. There are several fungi that produce these spots, the most common being species of *Corynespora* and *Alternaria*. Target leaf spot caused by *Corynespora cassiicola*, also called *Corynespora* blight, is a widely reported disease of over 530 plant species in 53 families in the world's tropical and subtropical regions. Besides being a pathogen and producing symptoms, *C. cassiicola* may also grow inside living tissue as an endophyte without producing symptoms. In addition, *C. cassiicola* can grow and reproduce on dead tissue as a saprophyte. While *C. cassiicola* is reported to have a wide host range, specific isolates may infect only one or a few hosts.

Hosts

In the Index of Plant Diseases in Guam, *Corynespora* was listed on 41 different hosts, all of which exhibited foliar symptoms. Of these, it is most severe on cucumber, papaya, and tomato. Other hosts on Guam include banana, guava, melon, pumpkin, edible soybean, pepper, and common weeds such as beggarticks, morning glory, browne's blechum, and siam weed. In the Diseases of Cultivated

Crops in Pacific Island Countries it was listed on papaya and cucumber.

Morphology of *Corynespora cassiicola*

Samples often do not reveal conidiophores or spores until placed in a moisture chamber for 1 to 4 days. Spores (conidia) of *C. cassiicola* are large (9-22 μm wide), appear multicellular (4-20), cylindrical and straight in shape, pale to darkly pigmented, and variable in length (40-220 μm) (Fig. 1, Fig. 2B). Lengths up to 800 μm may be reached under moisture chamber conditions (Fig. 2A). The conidia are generally borne singly but may occur in short chains of 2-6 on the tip of a conidiophore. A highly distinctive feature of a *C. cassiicola* conidium is its hilum or attachment scar, which forms where the conidia attaches to the conidiophore (Fig. 1, Fig. 2B). The conidiophores vary, ranging from flexible to straight, pale to mid-brown, 110-850 μm in length with a thickness of 4-11 μm . They are smooth and multicellular, with multiple cylindrical proliferations at their tip (Fig. 2C). Conidiophores are often abundant (scattered across infected tissue) and form individually and not in tight clusters.

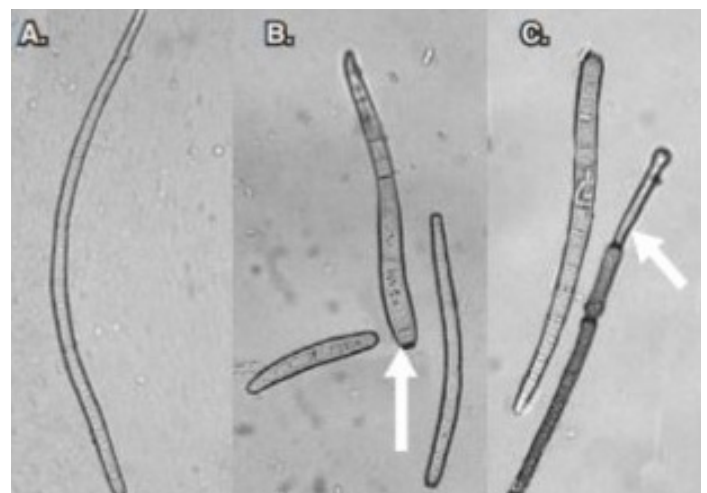


Figure 2. Conidia of *Corynespora* spp. vary in length and shape [A] [B], and are pseudoseptate with distinct hilum [B]. Conidiophores are multicellular with multiple cylindrical proliferations at their tips [C]
 Photo: R.L. Schlub

Visibility of *Corynespora cassiicola*

- **With the unaided eye:** concentric rings, if present, are visible within necrotic spots. On green leaves, a yellow halo often forms— extending outward from the dark margin of the spot (Fig. 5, 6, & 7).
- **With a 14X coddington hand lens:** pale gray or brown, hairy conidiophores are slightly visible (Fig. 3).
- **With a dissecting microscope:** conidiophores are easily seen. Iridescent appearing conidia are slightly visible (Fig. 4).
- **With a compound microscope:** conidia appear long and multi-cellular with a distinct hilum (Fig. 1, Fig. 2A, B). Conidiophore individual cells are visible with cylindrical proliferations at their tips (Fig. 2C)



Figure 3. Conidiophores with conidial chains, *C. cassiicola* on soybean
Source: https://www.gene.affrc.go.jp/databases-micro_images_detail_en.php?id=23918

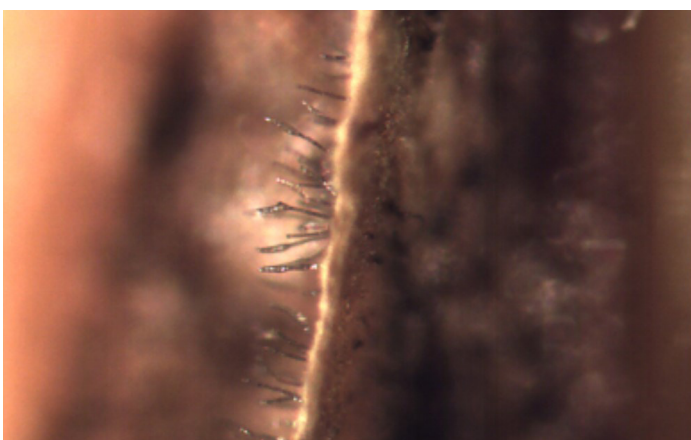


Figure 4. Conidiophores with conidial chains, *C. cassiicola* on papaya through 6X dissecting scope
Photo: B. Deloso

Disease Development on Guam

Though Guam’s year-round high humidity and high temperatures are favorable for target leaf spot development, disease outbreaks are sporadic. *C. cassiicola* spores are produced under long periods of near 100% humidity (16-44 hours) and are spread by blowing wind, with or without splashing rain. Infection occurs at temperatures of 25-35°C (77-95°F), favored by long periods of daylight. *C. cassiicola* can survive on infected plant materials for more than 2 years, so having good field sanitation practices— destroying dead tissue and old vines— is essential in fields where re-occurring disease outbreaks are common.

Foliar Symptoms

Identifying *C. cassiicola* as a causal agent is complicated by the fact that it can grow and sporulate profusely on a dead section of a leaf as a saprophyte, while leaf spots on the same leaf caused by a pathogenic strain of the fungus may produce little or no sporulation. In addition, the shape and size of the conidia that appear under moisture chamber conditions can differ significantly from what appears on a fresh field sample. Large amounts of foliar blighting and premature defoliation often begin deep in a plant’s canopy and/or on the lower leaves. Lesions are frequently surrounded by a yellowish green halo. Larger spots on leaves often develop concentric “ring” patterns, hence the name “target” leaf spot (Fig. 5). On cucumber, the first symptoms appear on older (lower) leaves as angular, water-soaked lesions that turn yellow (Fig. 6). On tomato, initial symptoms appear as small (pinpoint size), water-soaked lesions on leaves’ upper surfaces. In highly susceptible cultivars, the target spot lesions are sometimes so numerous that they are difficult to count (Fig. 7).



Figure 5. Target spot of soybean, caused by *C. cassiicola*
Source: <https://www.lsuagcenter.com/topics/crops/soybeans/diseases/atlas/fungal-foliar-diseases/target-spot>



Figure 6. Target spot of cucumber, caused by *C. cassiicola*
Source: http://www.pestnet.org/fact_sheets/cucumber_target_spot_189.htm



Figure 7. Target spot of tomato, caused by *C. cassiicola*
Source: http://www.pestnet.org/fact_sheets/tomato_target_spot_163.htm

For further information

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Published: 11 October 2022

Acknowledgments

This material is based upon work that is supported by the University of Guam and the National Institute of Food and Agriculture, U.S. Department of Agriculture, under award number 2019-38640-29880 through the Western Sustainable Agriculture Research and Education program under project number WPDP20-001. USDA is an equal opportunity employer and service provider. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture or the University of Guam. The factsheet was prepared by UOG Extension Specialist Robert L. Schlub, Ph.D. and UOG Extension Associates Julia Hudson and Elizabeth Hahn on 10/19/2022. Reviewed by Drs. Marin T. Brewer and Leilani G. Sumabat.

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