

Foliar Pathogens in Guam: *Ascochyta*

Diseases: Gummy Stem Blight, Leaf Spot

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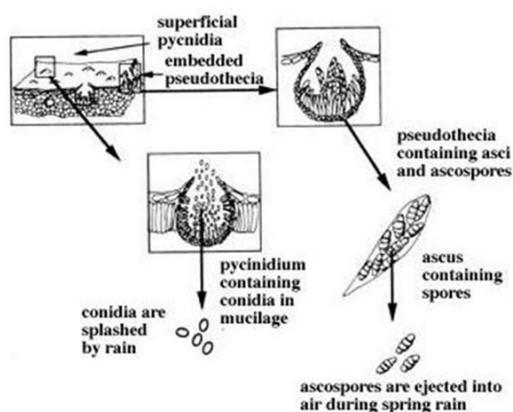


Figure 1. Flow chart of pycnidia and conidia; and pseudothecia, asci, and ascospores of *Ascochyta* spp.

Source: http://www.microfarms.com/technical/greenhousecd/greenhouse/pests/diseases/ascochyta_blight.htm

Introduction

Ascochyta, *Didymella*, and *Stagonosporopsis* encompass the main genera within the family *Didymellaceae*. These fungi produce conidia (asexual spores) within a pycnidia (fungal fruiting structure). The conidia are generally 2-celled whereas the closely related genera of *Phyllosticta* and *Phoma* are generally one-celled. *Didymella* refers to the fact that the fungus produces ascospores with an ascus. **GUMMY STEM BLIGHT** is caused by the fungus *Stagonosporopsis cucurbitacearum*, *S. citrulli*, and *S. caricae* (syn. *Aschochyta cucumis* and *Didymella bryoniae*). It is an important disease of melons and watermelon on Guam. The name “gummy stem blight” is derived from the fact that it causes a blight on the leaves (rapid killing of the leaves) and stem lesions that may form a gummy exudate.

Hosts

In the Index of Plant Diseases on Guam, hosts of gummy stem blight included cucumber, melon, summer squash, and watermelon. Watermelon and melon being the most commonly reported. In the Diseases of Cultivated Crops

in Pacific Island Countries, *Ascochyta* leaf spot was mentioned on bean and bittermelon and gummy stem blight was mentioned on watermelon and cucumber.

Morphology of *Stagonosporopsis cucurbitacearum*

Conidia (asexual spores) are produced in a pycnidia (Fig. 1, 2, & 3). Superficial pycnidia are tan to brown and 120-180 μm in diameter (Fig. 2, Fig. 3). They may be irregular in shape, separated, or in small groups; usually with a single pore-like opening (ostiole). Conidia are hyaline, cylindrical with rounded ends, one or two celled, 3-5 x 6-10 μm (Fig. 1, Fig. 4), and may contain oil-like drops. Conidiophores are usually absent.

Ascospores (sexual spores) are occasionally produced on Guam and appear in club-shaped asci (sacks). These asci are produced in a pseudothecia (Fig. 1). Pseudothecia are brown to black, 125-210 μm in diameter, and are typically embedded within the host surface, eventually becoming erumpent (Fig. 1, Fig. 7). Within the pseudothecia, cylindrical and bitunicate asci (10-15 x 60-90 μm) produce eight ascospores per ascus. The ascospores are 13-18 x 4-6 μm , hyaline, two celled with a constriction at the septum, and rounded on the ends (Fig. 1).

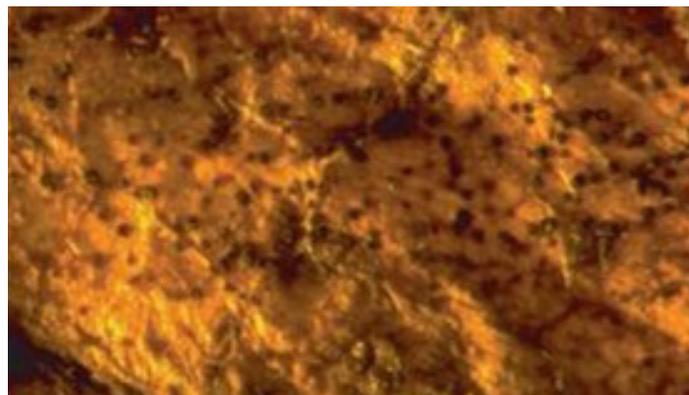


Figure 2. Example of fruiting bodies (pycnidia or pseudothecia) produced by *Ascochyta* spp.

Photo: R.L. Schlub

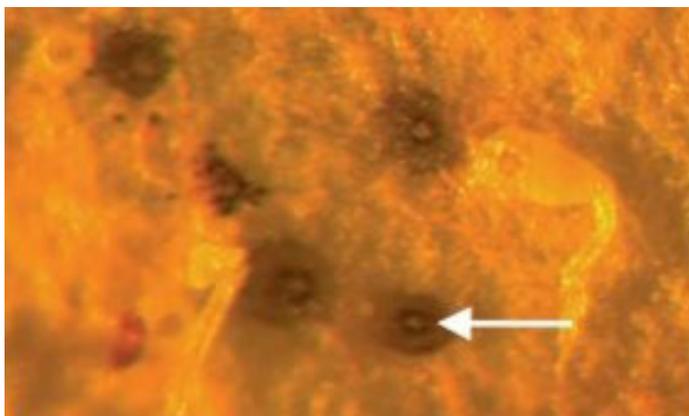


Figure 3. Pycnidia of *Ascochyta* spp. with ostiole (shown by arrow)
Photo: R.L. Schlub

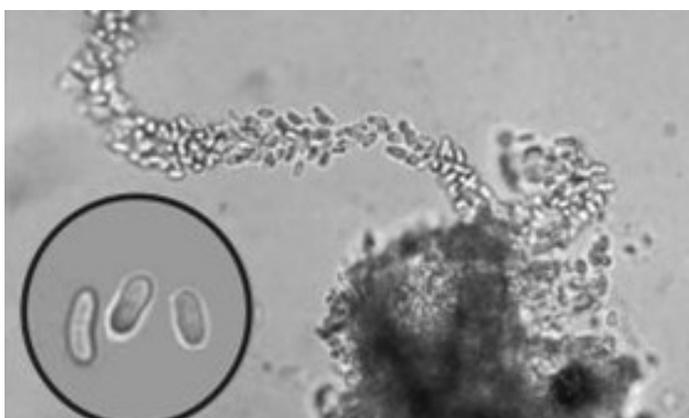


Figure 4. Conidia of *Ascochyta* spp. oozing from a pycnidium. Imbedded photo: close-up of conidia
Photo: R.L. Schlub

Visibility of *Stagonosporopsis cucurbitacearum*

- **With the unaided eye:** pycnidia and pseudothecia (if present) are barely visible (Fig. 6, Fig. 7).
- **With a 14X coddington hand lens:** pycnidia and pseudothecia (if present) are clearly visible (Fig. 2).
- **With a dissecting microscope:** pycnidia appear roughly spherical in shape with an opening at the top (ostiole) (Fig. 3). Pseudothecia (if present) are slightly larger than pycnidia and spherical.
- **With a compound microscope:** oval, one or two-celled conidia are seen being released from pycnidia (Fig. 4). Less commonly seen are ascospores, which form within club-shaped asci which are released with rupture of a pseudothecium.

Disease Development on Guam

Gummy stem blight symptoms affect all above-ground vegetative and reproductive parts of the cucurbits (cucumbers, gourds, melons, squashes, and pumpkins). On Guam, it commonly occurs in melon and watermelon fields and on occasion may lead to substantial losses. Optimal conditions include temperatures above 68° F, high day time humidity, and periods of moisture greater than 24 hrs. Spores of the gummy stem blight fungus are primarily dispersed by wind-driven rain. A film of moisture is necessary for spores to germinate and penetrate leaf tissue. Wounds caused by pruning, insects or field work can also serve as points of entry.



Figure 5. Black spots caused by gummy stem blight on watermelon
Photo: R.L. Schlub



Figure 6. Gummy stem blight infection on upper leaf surface of watermelon seedling. Pycnidia are barely visible in the center of the spot
Source: https://www.pestnet.org/fact_sheets/watermelon_gummy_stem_blight_007.htm



Figure 7. Pycnidia (left) and pseudothecia (right) of a gummy stem blight infection developed on the same piece of melon stem
Source: <http://vegetablemdonline.ppath.cornell.edu/PhotoPages/Cucurbit/Gummy/GSBfs2.htm>



Figure 8. Brown spots caused by gummy stem blight on melon
Photo: R.L. Schlub

Foliar Symptoms

Circular to triangular, 0.5 - 2 cm in diameter, brown (on melon– Fig. 8) to black (on watermelon– Fig. 5) spots appear on the leaves, often first at the margins. Spots enlarge rapidly until entire leaves are blighted, resulting in premature defoliation. This rapid leaf blight makes it difficult to find the fungus' fruiting bodies, but when seen, small pycnidia or pseudothecia appear as black specks in the centers of spots on the upper and lower leaf surfaces and stem cankers (Fig. 6, Fig. 7). Infected stems first develop water-soaked lesions, which later appear tan with a characteristic gummy exudate. This may girdle the plant, causing stunted growth or premature death.

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