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# ANTHRACHNOSE DISEASE IN MELON (*Cucumis melo* L.)

*By:*

**I Made Sudarma* and Dewa Ngurah Suprapta***

*Lecturer Staff of Agroecotechnology Study Program, Faculty of Agriculture, Udayana University, Jalan PB. Sudirman Denpasar,

Email: madesudarma@unud.ac.id.

## Abstract:

Anthracnose (*Colletotrichum obiculare*) of melons is a fungal disease caused by *Colletotrichum* species. It appears as sunken black lesions on the fruit and spots on the leaves and stems. Symptoms include yellow spots that turn brown and brittle on the leaves, dark, elongated lesions on the stems, and sunken circular spots on the fruit that can produce pink or orange spore masses in wet conditions. The disease is spread by wind, rain, and infected seeds or plant debris and thrives in warm, humid weather.

## *Keywords:*

*Anthracnose, Colletotrichum obiculare, symptoms, lesions, and weather.*

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### Introduction

Anthracnose *(Colletotrichum obiculare*) is a common watermelon leaf disease in Oklahoma. The disease affects all aboveground plant parts, including leaves, stems, and fruit. Fruit lesions are particularly damaging, progressing from small, easily missed spots on the fruit at harvest to rotting melons that leak during shipping [1].

Anthracnose is a common disease of watermelon, especially in humid climates with frequent rainfall during the growing season. Cucumbers, honeydew melons, and bottle gourds are also highly susceptible to anthracnose, while melons, chayote, and pumpkin are less susceptible. 1,2 Anthracnose fungi infect leaves, stems, and fruit, causing substantial losses in

watermelon production. Yield losses in untreated research fields in South Carolina averaged 46% in the 1980s and early 1990s. The severity of anthracnose in commercial watermelon fields in the southeastern US has increased over the past several years, likely due to reduced use of QoI fungicides (strobilurins) for disease control [2].

Anthracnose damage to melon fruit, leaves, and stems is caused by a fungus. Initial symptoms on leaves are spots with pale yellow rings. These spots then turn brown, brittle, and dry. Diseased spots on fruit are round and sunken with a yellowish tinge. Infected stems show dark brown spots that turn gray in later stages. One common symptom observed are the spots containing pink powder during the rainy season (Nam, 2012) [3].

Anthracnose is a fungal disease that affects corn, cucumbers, beans, peppers, squash, and tomatoes. The disease can spread rapidly in warm (28 degrees Celsius) and wet weather, especially if air circulation is poor. Fortunately for California gardeners, the disease does not thrive in hot, dry summers (Langston, 2025) [4].

The disease initially appears as small, circular spots of varying colours (angular in watermelon) on older leaves, though it eventually spreads to younger leaves, stems, pods, and fruit. The spots enlarge and coalesce, becoming darker until the leaves fall off and the plant defoliates (or curls its stems) and dies. Sunken, round, water-soaked spots appear on the fruit [4].

## Disease Symptoms

The spots on the leaves first appear as small, circular to angular brown spots (Figure 1A). The spots on the leaves enlarge, coalesce, and crack. Elongated, light brown lesions also appear on the stems and petioles (Figure 1A). The entire vine can die from combined leaf and stem infection. Fruit spots are circular and typically ¼ to ½ inch in diameter (Figure 1B). The fruit spots crack and become sunken, and decay extends into the flesh of the fruit [1].

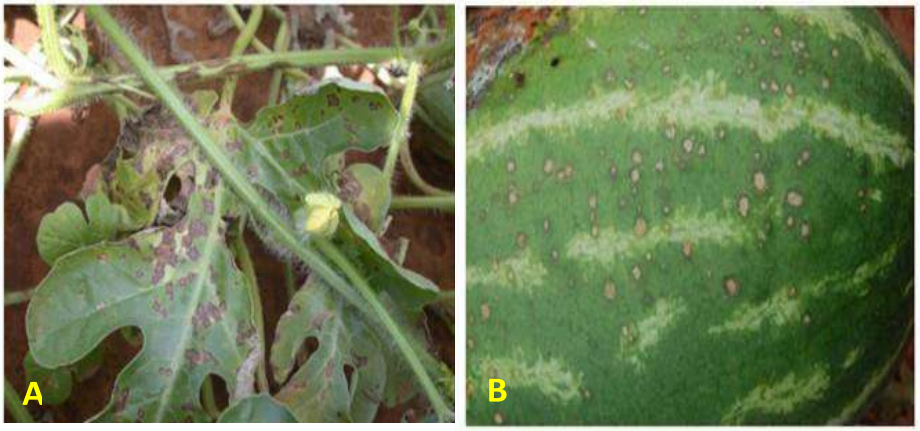


*Figure 1.* Symptoms of anthracnose leaf spots and stem lesions on melon (A), and (B) Symptoms of anthracnose fruit spots [1]

This fungus infects all aboveground plant tissues, including leaves, stems, stalks, and fruit. It is seed-transmitted, and symptoms in seedlings appear as dark brown lesions on the cotyledons. Although anthracnose symptoms can vary in appearance depending on the host, in general, leaf lesions begin as water-soaked areas that turn light to dark brown and appear circular or sometimes angular. In severe infections, lesions may coalesce, and affected leaf

areas appear mottled. Lesions on stems are elongated. Lesions on fruit can also have a slightly different appearance depending on the host but are generally mostly circular with a salmon-colored appearance due to the abundance of spores on the lesion surface [5].

**The pathogen**

Anthracnose is caused by the fungus *Colletotrichum orbiculare* (synonym: *C. lagenarium*). *Colletotrichum* species are widespread, causing significant disease in many crops worldwide. Most have a broad host range, such as *C. orbiculare*, which has been reported on other hosts, including many weeds [6]. In chayote, three races (1, 2, and 2B) of *C. orbiculare* exhibit host specificity and have been characterized based on a range of differential hosts, including watermelon and cucumber [7]. Race 1 is pathogenic on cucumber; isolates of race 2 are pathogenic on watermelon. Race 2B is intermediate, depending on the host (watermelon or cucumber). Other chayote varieties show variable responses to the three races. Recently, reports from other chayote production areas indicate that several *Colletotrichum* species cause anthracnose in chayote [8].

A synonym for *Colletotrichum lagenarium* is *C. orbiculare* (Berk. & Mont.) Arx. (some articles refer to this as the proper name and *C. lagenarium* as its synonym). *Gloeosporium lagenarium* is similar, though not identical, to *C. lagenarium*. The sexual or perfect stage (teleomorph) is *Glomerella lagenarium* (Figure 3).

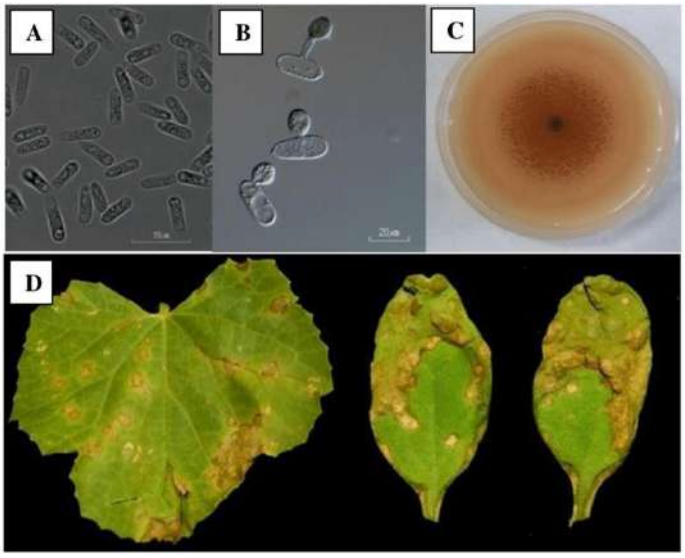


*Figure 3. Colletotrichum orbiculare*. A) conidia, B) appressorium, C) *C. orbiculare* on mung bean agar, and D) symptoms caused by the fungus on melon leaves and cotyledons five days post-inoculation [11]

## Taxonomy

*Colletotrichum orbiculare* belongs to the kingdom Fungi, phylum Ascomycota, class Sordariomycetes, order Glomerellales, family Glomerellaceae, genus *Colletotrichum* [12].

Earlier when the taxonomic classification of plant pathogenic fungi was based on plant disease specificity, *C. orbiculare* was named and identified multiple times by different researchers around the world [13]. Cucurbit and bean anthracnose were assumed to be caused by the same fungus, which was named *Colletotrichum lagenarium* [14]. This assumption was discarded in a comparative study of anthracnose fungi, in which bean anthracnose was named *Volutella citrulli*. Based on modern molecular tests, *C. orbiculare* is recognized as a species complex, with *C. lindemuthianum, C. malvarum, C. orbiculare,* and *C. trifolii* as distinct species [15]. Currently, the isolates causing watermelon anthracnose are classified as a subspecies in the *C. orbiculare* species group. Researchers still differ in classifying this pathogen [6].

## Factors influencing disease development

The anthracnose pathogen can overwinter in infested plant debris and wild cucurbit plants. The fungus can survive in plant debris for at least two years, and the pathogen can be transmitted through seeds. 1,2 Fungal spores are primarily spread by splashing water, including rain and overhead irrigation. However, spores can also be spread by wind and on workers' clothing and equipment, especially when foliage is wet from rain, irrigation, or dew. 1,2 Infection and disease development are favoured by warm temperatures, frequent rainfall, and humid conditions. Spore germination and fungal growth are optimal at temperatures between 72° and 80°F (22° and 27°C) and with relative humidity levels approaching 100% for 24 hours. Three races of *C. orbiculare* have been identified. Race 1 can infect cucumbers, cantaloupes, and some open-pollinated watermelon varieties. However, most commercial watermelon varieties have resistance to race 1. Race 2 can infect open-pollinated cucumbers, melons, bottle gourds, and all watermelon varieties. Race 2b is less common and less well characterized, but can infect some watermelon varieties. 1.6 Anthracnose in watermelon is most likely race 2 [2].

## Pathogen spread

- Contaminated seeds (the pathogen can be present in and on the seeds).
- Spores splashed by water from contaminated debris or infected wild chayote plants or chayote weeds growing from contaminated seeds.
- Spores, less commonly, are spread by wind.
- Workers touching spores on infected plant tissue with their hands or tools, then touching healthy plant tissue.
- Chayote weevils can pick up spores as they walk over lesions [10].

**Disease cycle**

The anthracnose fungus overwinters in diseased grapevine debris from the previous harvest. The pathogen can also be carried by pumpkin seeds. In spring, under wet conditions, the fungus releases airborne spores (conidia) that infect the grapevine and its foliage. The fungus relies on high humidity and temperatures, with an optimal temperature of 24°C (75°F). Conidia do not germinate below 40°F (4.4°C) or above 86°F (30°C) or if they are not provided with a water layer. Furthermore, the pathogen must have access to water to detach the conidia from their sticky coating on the fruiting body. The fruiting body is somewhat saucer-shaped and covered with microscopic stalks. These stalks produce conidia, which are clustered in sticky, flesh-coloured tendrils. As long as the tendrils remain dry, the conidia cannot be released, but heavy dew can dissolve the slime coating and then raindrops splash them several meters. Anthracnose usually forms mid-season after the plant canopy has formed. [10].

**Disease biology**

Anthracnose is favoured by extended periods of warm, rainy weather. The anthracnose fungus survives overwintering on infected debris from previous crops, on volunteer plants from diseased melon seeds left in the field, and can be transmitted through commercial seed. Spores produced on debris and volunteer plants are spread to the crop through rain splash, sprinkler irrigation, or surface runoff. Subsequently, disease flare-ups are caused by infection by spores produced in new lesions, which spread in the same manner [1].

**Disease management**

An integrated disease management program is recommended for anthracnose control. Whenever possible, use anthracnose-resistant varieties and disease-free seedlings. Plants should be monitored regularly for disease symptoms. At the end of the growing season, remove or combine plant debris and do not replant susceptible squash in the same field for at least one year. Susceptible squash and alternate hosts in and around the field and greenhouse should be removed. Avoid moving machinery or workers in the field when foliage is wet [5].

Preventing anthracnose is easier than treating it. Remove diseased plants promptly to minimize its spread. Keep plants off the ground with stakes or cages to allow for good air circulation. Anthracnose spores survive overwintering in weeds and plant debris, so clean beds in the fall and rotate crops. Spores are most often spread through water, when spore-containing soil is splashed onto plants by rain or irrigation. If necessary, you can reduce the spread by mulching around plants and using drip irrigation. Spores can also be spread by gardeners' hands, so avoid touching wet plants (especially after removing infected plants). Some plant varieties are resistant to anthracnose [4].

Anthracnose can be controlled through crop rotation, resistant varieties, and fungicide spraying. Some watermelon varieties or hybrids are classified as race 1, which is resistant to

anthracnose. Unfortunately, most race 1 isolates originate from cucumbers and melons, while race 2 is limited to watermelon. Consequently, resistant varieties can be severely affected by the disease, although to a lesser extent than non-resistant varieties. A fungicide spraying program consisting of preventive sprays at 7- to 14-day intervals beginning at anthesis and beginning of fruit set has been effective in controlling anthracnose [1].

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