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Managing Watermelon Anthracnose in Virginia

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Introduction

Anthracnose, caused by the fungus *Colletotrichum orbiculare*, is one of the most important diseases of watermelon in Virginia (Figure 1). The disease reduces yield and fruit quality by causing lesions on leaves, vines, and fruit, and may continue to develop after harvest, resulting in postharvest losses. Anthracnose symptoms can resemble other diseases, and more than one pathogen species may be involved. In Virginia, the most common strain ("race 2") of the pathogen is not effectively controlled by currently available resistant cultivars, making accurate diagnosis and an integrated program of preventative fungicides and cultural practices essential.

The information and management recommendations provided here are specific to watermelon anthracnose and may not apply to other cucurbit crops.

Causal Agent

Anthracnose is caused primarily by the fungal pathogen *Colletotrichum orbiculare*. This pathogen has a narrow host range and infects only watermelon and other cucurbit crops such as cantaloupe, cucumber, pumpkin, and squash. Multiple races (strains) of *C. orbiculare* occur, but race 2 predominates in many Mid-Atlantic production systems, limiting the usefulness of currently available host resistance. More recently, *Colletotrichum sojae*, a species historically associated with soybean, has also been identified as a cause of watermelon anthracnose in Virginia, indicating that more than one pathogen species may be involved in affected fields.

Figure 1. Anthracnose outbreak in watermelon.

Symptoms

Anthracnose often first appears in localized "hot spots" within a field and spreads outward during warm, wet weather (Figure 2). Symptoms may first be observed on leaves, petioles, or vines. Leaf lesions begin as small, angular yellow to light brown spots that enlarge, darken, and may develop a characteristic "shot-hole" appearance as dead tissue falls away (Figure 3). These symptoms can resemble those of gummy stem blight, but gummy stem blight lesions typically develop concentric rings or a "target spot" pattern that is absent in anthracnose (Figure 4). On petioles and vines, anthracnose causes narrow, shallow, sunken tan lesions that are spindle-shaped and do not completely encircle the affected tissue (Figure 5). Fruit develops dark or sunken lesions that enlarge over time and may eventually rot. Under dry conditions, lesions become corky, cracked, and scabby, whereas under humid conditions, they remain sunken and may produce salmon-pink spore masses (Figure 6). Fruit may

continue to deteriorate after harvest during storage, shipping, and marketing.

Figure 2. Localized anthracnose “hot spots” within a field, which then spread outward during warm, wet weather.

Figure 3. Anthracnose symptoms on leaves are angular lesions, and as they age, the dead tissue may fall out, leaving a characteristic “shot-hole” appearance.

Figure 4. Leaf symptoms caused by anthracnose (left) and gummy stem blight (right).

Figure 5. On petioles and vines, anthracnose produces narrow, shallow, sunken tan lesions that are elongated and spindle-shaped, widest in the middle, and tapering toward both ends.

Figure 6. Under dry conditions, fruit lesions often become corky, cracked, and scabby (top), while under humid conditions they are sunken and produce salmon-pink spore masses (bottom).

Disease Development

Anthracnose survives between seasons on infested seed, crop residue, and volunteer host plants. During warm, wet weather, the fungus produces spores that are spread over short distances by splashing rain or overhead irrigation, rather than by the air as in many other plant diseases. Spores may also be moved on equipment, workers, and field activities when foliage is wet. Disease development is favored by warm temperatures of 75–85°F and extended periods of leaf wetness. Fruit infections commonly occur when spores are splashed onto developing fruit or when fruit comes into contact with infested vines or residue.

Management

Host Resistance

Host resistance is an important management tool for many diseases but currently provides limited benefit for watermelon anthracnose in Virginia. Multiple races (strains) of *C. orbiculare* occur, and resistance in watermelon is race-specific. Current evidence indicates that race 2 predominates in Virginia. Unfortunately, commercially available watermelon cultivars provide little to no effective resistance to race 2. In Virginia field trials, popular seedless cultivars were highly susceptible under local production conditions. As a result, cultivars advertised as resistant to anthracnose may still develop severe disease if that resistance is effective only against race 1 or other races. Growers should read seed catalog descriptions carefully (see Reading Resistance Claims in Seed Catalogs).

Cultural Practices

Cultural practices can help reduce anthracnose pressure. Rotate out of watermelon and other cucurbit crops, such as cantaloupe, cucumber, pumpkin, and squash, for at least 2–3 years to reduce the pathogen's survival in crop residue. In Virginia, growers should use caution when rotating watermelon with soybean because *Colletotrichum sojae*, a pathogen historically associated with soybean anthracnose, has recently been identified as a cause of watermelon anthracnose. Although its importance in rotation is unknown, avoiding close rotation between soybean and watermelon may be prudent. Use certified, disease-free seed and transplants whenever possible. Because anthracnose spreads by splashing water, reduce leaf wetness by avoiding overhead irrigation or irrigating early in the day. Minimize movement through wet fields and clean equipment between fields to avoid spreading the pathogen.

Reading Resistance Claims in Seed Catalogs

Seed catalogs may advertise watermelon cultivars as “anthracnose resistant,” but this resistance is usually effective only against specific races (strains) of the pathogen. In the fine print, catalogs may indicate resistance to anthracnose race 1, race 3, or simply “anthracnose” without specifying the race.

Because more than one race of *Colletotrichum orbiculare* exists, it is important to read these resistance claims carefully. Current evidence suggests that race 2 predominates in many Mid-Atlantic production systems, including Virginia. As a result, cultivars advertised as resistant only to race 1 are unlikely to perform well under Virginia conditions.

Fungicide Programs

Fungicides are essential for managing watermelon anthracnose because currently available cultivars provide little effective resistance. Applications should begin at vine run, before symptoms develop, to protect foliage and fruit. A 7-day spray schedule is recommended during periods favorable for disease.

Multisite fungicides containing chlorothalonil or mancozeb have been particularly effective and should form the backbone of a fungicide program. Chlorothalonil may cause rind burn when applied after fruit are present, so use caution and follow label directions closely. Several systemic fungicides may also be effective, but because product performance can change over time, consult the current Mid-Atlantic Commercial Vegetable Production Recommendations for updated recommendations and fungicide rotations.

Funding: USDA National Institute of Food and Agriculture Specialty Crop Research Initiative Grant/Award Number: 2023-51181-41156.

2025 SPES-809NP