

Alternaria Leaf Spot of Cucurbits

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Cause and Symptoms

Alternaria leaf spot of cucurbits is caused by the fungus *Alternaria cucumerina*. Cantaloupes and watermelons are particularly susceptible in Florida, but squash, cucumbers, gherkins, balsam apple and other cucurbits are susceptible to some degree, probably with varietal differences within crop types. Plant vigor and fruit sugars are reduced if this disease is not controlled.

Alternaria leaf spots of cucurbits usually appear on the oldest leaves first (Fig. 1) and later spread to the newer leaves towards the tips of the vine. Leaf spots begin as bright to pale yellow or tan flecks, 1/50 to 1/16 inch (0.5 to 1.5 mm) in diameter on the upper leaf surface. These small spots may be surrounded by light green or yellow halos. Also at this early stage, these flecks may be surrounded by a greasy (water soaked) appearance due to cell wall breakdown within the leaf by the fungus (Figs. 2 and 3). In time, the spots enlarge to 3/8 to 3/4 inch (1 to 2 cm) in diameter (Figs. 2 and 4). The older spots are somewhat circular-to irregularly-lobed and are light brown-black in color. Older spots may or may not have concentric-rings. The darker bands or portions within a spot contain spores that are 1/115 to 1/195 of an inch long and these spores are dispersed by wind, primarily. Individual spots be-

come brittle or blister-like and will tear and appear ragged within the darkened tissue (Figs. 2 and 3). If Alternaria leaf spot becomes severe, leaf curling, defoliation (leaf loss), premature ripening, lower yields, lower fruit sugar and fruit deformity (especially on cucumber) are the ultimate results. Also, defoliation predisposes fruit to sunburn.

Alternaria leaf spot can occur on the same leaf as leaf lesions of gummy stem blight (see PP Fact Sheet No. 27) and be similar in appearance. Also, downy mildew (see PP Fact Sheet No. 2) and *Cercospora* leaf spots can occur simultaneously with Alternaria leaf spot, but these leaf diseases are usually distinguishable from Alternaria leaf spot. In cantaloupe, young Alternaria lesions can resemble downy mildew. If adequate control measures for these diseases are not initiated early in the season, the grower could have epidemics of all four diseases on the leaves simultaneously.

Fruit infection is not common but can occur if the leaf phase of Alternaria leaf spot is not controlled, especially on melons other than watermelon. Overripe and sunscalded fruit are most susceptible. Sunken spots up to 1 inch (2.5 cm) or slightly larger that have a green-black color are typical of the fruit rot stage in the field. Later, during storage or transit, these spots may enlarge to 2 inches (5 cm) or more in size. Internal decay of fruit is tough and dry but if the rotted area progresses, the fruit tissue becomes

moist and spongy. Some of the fruit rot attributed to *A. cucumerina* may be caused by another species, *A. tenuis*. Cladosporium fruit rot also has symptoms similar to Alternaria fruit rots.

Seedling blight caused by this fungus has been reported but is considered of minimal consequence at the present time in Florida, but it may be a problem in containerized transplants-grown in pasteurized soil.

Alternaria cucumerina can survive in or on crop debris, cucurbit weeds (balsam apple), volunteer cucurbits and seed. Leaf debris left on the soil surface or buried 6 to 9 inches (15 to 23 cm) deep is capable of regenerating spore production for at least 8 1/2 months. However, infected leaf debris on the soil surface would be a more likely source of spores because of its exposure to wind. Where cucurbit crops are planted in succession to achieve multiple harvesting dates, leaf spots upwind in the older plantings can serve as another source of spores for the younger plantings.

Wetting and drying is conducive for spore formation and spore release, respectively. Wind is a common method by which spores are dispersed but spore movement by rain splash and mechanical vectors probably occurs to some extent. If a spore lands on a cucurbit leaf and is wetted by water, it germinates and produces special structures by which the fungus penetrates the tissue. Spores are capable of germination, even if exposed to dry periods for as long as 8 months above freezing temperatures. Within 3 to 12 days after penetration of leaf tissue, leaf spots are capable of producing a new "crop" of spores. Variation in the incubation period is probably related to factors such as temperature, variety, and moisture conditions. Infection can occur from 41° to 95°F (5° to 35°C) with the optimum temperature for infection being 68°F (20°C). Disease will progress most rapidly as nighttime temperatures approach the optimum and will continue at a progressively slower rate as nighttime temperatures increas-

ingly depart from the optimum. A diurnal cycle from 68° to 90°F (20° to 32°C) is ideal for Alternaria leaf spot of cucurbits.

The length of time leaf wetness occurs influences the amount of penetration. Some penetration can be initiated with 2 to 8 hours of leaf wetness, but when leaves are wet for 10 to 24 hours, the number of penetrations is increased drastically. Rain frequency and length of dew periods are more influential than amounts of rain.

While Alternaria leaf spot of cucurbits is more likely to be a problem on older plants from flowering to harvest time, younger plants, including seedlings, can have leaf spots even in the cotyledons (seed leaves). The few leaf spots on these younger plants are the most likely source of inocula (spores) for a severe mid- to late-season epidemic. Older plants that are stressed from nutrient deficiency (especially nitrogen or "minor" elements), inadequate soil pH (6.0 to 6.5 is best), nematode damage, high yield potential or other factors could be more susceptible to Alternaria leaf spot.

Control

Effective control is dependent upon using a sequence of individual control measures, all of which are designed to reduce leaf spot early and thereby slow epidemic development.

Treat seed or use seed treated with a broad spectrum fungicide. This will reduce inocula originating with seed.

Destroy volunteer cucurbit crop plants and weeds that are capable of harboring spores of this disease.

Lime and fertilize the soil so that the crop is not in stress. Stressed plants, due to lack of nutrients or an imbalance in nutrients, are more susceptible. Also, inadequate foliage cover can result in sunburn of fruit which, in turn, is more

susceptible to *Alternaria* fruit rot.

Use crop rotation where cucurbit crops are not planted on the same land in successive years. This practice will reduce other diseases and nematodes as well.

Plant spring to early summer crops as early as possible to minimize exposure to disease-favorable weather that occurs with warmer nighttime temperatures and increased frequency of thunderstorms.

Begin and maintain a spray program with fungicides when nighttime temperatures exceed 60°F (15°C), especially when leaf wetness is lengthened by frequent rains, long dew periods, or overhead irrigation. Crops planted in the fall in North Florida may require spraying soon after emergence but a spring crop in

the same location may not have to be sprayed until shortly before the vines begin to “run”. Cucurbit crops planted during winter months in South Florida are prone to infection for most of the season except during prolonged cold periods. Spray intervals of 7 to 10 days are adequate with protectant fungicides but intervals may need to be shortened to 5 to 7 days during ideal weather conditions, especially as new plant growth becomes exposed. Your County Extension Office has publications, periodically updated, which list available fungicides for use on cucurbits and other crops.

Plow old crop debris below the soil surface as soon after harvest as possible to reduce available spore numbers for the next season. This tillage practice will contribute significantly to disease control.



Figure 1. *Alternaria* leaf spot in older watermelon leaves.



Figure 2. Variation of *Alternaria* leaf spots in watermelon leaves.



Figure 3. Alternaria leaf spot in cantaloupe leaves.



Figure 4. Zonate appearance of Alternaria leaf spot in watermelon leaf.