



## Symptoms

Angular leaf spot (*Pseudomonas syringae* pv. *lachrymans*) will show up on cucurbit plants as small, water-soaked lesions on the leaves. These lesions will continue to expand until they are bound by leaf veins, giving them an angular appearance, often surrounded by a yellow halo (Figure 1). Angular leaf spot lesions may form a milky exudate on the underside of the lesion during humid conditions (Figure 2). As the disease develops, the lesions will turn brown and the centres will fall out, leaving small, angular, shot-holes and tattered



Figure 1. Angular leaf spot as it appears on the surface of a cucurbit leaf. Photo credit Dr. Paul Hildebrand.

leaves. Water-soaked lesions on infected stems and leaf petioles will exude a milky white bacteria-infested substance that will eventually dry to form a white crust.



Figure 2. Angular leaf spot as it appears on the underside of a cucurbit leaf. Note water-soaked lesions. Photo credit Dr. Paul Hildebrand.

## Effect on Crop

Angular leaf spot is mobile within the phloem, so an infection can spread systemically to the rest of the plant. Circular, tan lesions on the fruit surface (0.04 - 0.12 inches, 0.1 - 0.3 cm) can appear



and act as a site where secondary infection such as bacterial soft rot can occur. These secondary infections can further reduce marketability and storability. Lesions on young fruit may also cause a depression, resulting in deformed fruit. Systemic angular leaf spot infections can also cause water-soaked lesions in the interior flesh of squash which may not be recognizable until the squash is cut open (Figure 3).



Figure 3. Winter squash (var. Sweet Mama) showing internal damage due to systemic angular leaf spot infection.

## Biology

Angular leaf spot can be vectored by insects such as squash bug (see Perennia's [Squash Bug Fact Sheet](#)) and cucumber beetle, as well as through infected seed and soil containing infected residue. Seed-borne infections will usually show up shortly after plant emergence as irregular water-soaked lesions on the surface of the cotyledons. Bacteria can remain in soil for two to three years, and can show up at any time during the plant's lifecycle.

Angular leaf spot infection can become more virulent with extended periods of leaf wetness: optimal temperatures for disease development are between 24° and 27°C. Angular leaf spot lesions will ooze droplets of liquid teeming with bacteria from the undersides of the leaves in high humidity. Dry weather for more than two weeks will usually

stop the disease from developing. The bacteria enter the leaf through the stomata (breathing pores), hydathodes (water-excreting pores on the edge of the leaf), or small abrasions. The disease can spread throughout the field by rain splash, overhead irrigation, wind, insects, or during field operations (tillage, picking, etc.) It is best to avoid working in the field when the foliage is wet.

## Management

Poorly ventilated fields with cold, wet soils should be avoided. The best method to avoid seed-borne disease problems is to purchase treated seed that has been certified pathogen-free. Seed from infected fields should not be saved. There is variation in resistance among cultivars and seed catalogues should give further information. A good crop rotation which excludes planting of any cucurbits in an infected field for two to three years or more is advised. Infected crop residue should be incorporated after harvest to aid in plant residue decomposition. Avoiding over-fertilization with nitrogen will also help limit disease development. There are few bactericides on the market, and both chemical seed treatment and copper-based sprays have been shown to be largely ineffective in managing this disease.

*For more information, contact:*

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