

ANGULAR LEAF SPOT OF CUCURBITS

Angular leaf spot, caused by the bacterium *Pseudomonas syringae* pv. *lachrymans*, is a widespread disease of cucurbits in the world. It is most serious in cucumbers and melons grown in warm and moist conditions. In Illinois, angular leaf spot has been observed on muskmelon and cantaloupe.

Symptoms

Angular leaf spot of cucurbits first appears as small, watersoaked lesions on leaves (Figure 1). The lesions usually expand until they are delimited by larger secondary veins in the leaves, which give the lesions an angular appearance (Figures 2 and 3).

Accompanying water-soaking at high relative humidities is a clear to milky exudates, which collects in tear (*lachrymans*, “tear” in Latin) on the lower surface of the lesions. The exudate dries to form a thin white crust on or adjacent to the lesion. On leaves, the lesions become dry, turn tan-brown, and may drop out (Figure 2). Lesions also develop in petioles, stems, and fruit, on which the white, crusty exudates can also be evident. On fruit, lesions appear as small, circular, watersoaked spots, 1-3 millimeters in diameter, often with a light-tan center. Fruit rot can penetrate deeply, causing an internal rot (Figure 4).



Figure 1. Angular leaf spot of cucumber.



Figure 2. Angular leaf spots on the upper surface of a cucumber leaf.

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Disease Cycle

The pathogen is seed-borne, and infestation occurs beneath the seed coat, so that upon germination the cotyledons are infected. It is carried from plant to plant by splashing rain, by insects, on the hands of pickers, and on farm machinery. Spread is enhanced when the foliage is wet from rain or dew. The bacterium enters stomata, hydathodes, and small wounds caused by abrasion. Wind-blown sandy soil containing infested debris is particularly effective in spreading the disease, as is irrigation water contaminated with the bacterium. The bacteria overwinter in infested crop residues and can live for up to two and a half years in dry leaves.



Figure 3. Angular leaf spots on the underside of a cucumber leaf.

The presence of free moisture on the foliage and fruit is essential for infection to occur. Infection and disease development are promoted by water-soaking of leaves which follows extended periods of rainfall, high relative humidity (95 percent or above), and a combination of warm, moist soil and cool nights followed by warm days. Two weeks of dry weather will stop disease development. High nitrogen levels result in more severe disease.

Disease Management

Primary control of angular leaf spot is with the use of pathogen-free seed. Treatment of cucurbit seed for 20 min with water at 122°F (50°C) containing tartaric acid or acidic cupric acetate reduces but does not entirely eliminate bacteria from the seed. Crop rotation with non-cucurbit crops for at least 2 years is effective in managing this disease. Cultivation of soil when it is dry is effective in reducing bacterial survival. Overhead irrigation, irrigation from surface drainage water near cucurbit fields, and working in the field when the foliage is wet should be avoided. Copper sprays as a foliar protectant can reduce disease development. Control of cucumber beetles and other insects would reduce disease occurrence. Harvest wounds should be minimized to reduce disease development after harvest; for example, cucumber fruit should be harvested by cutting rather than tearing the stems from the fruit. Some cucumber cultivars are resistant to angular leaf spot, but should be used with combination of other management practices. For the updated information on chemical control of angular leaf spot of cucurbits, refer to the Midwest Vegetable Production Guide for Commercial Growers.



Figure 4. Cucumber fruit infected with angular leaf spot pathogen. (Courtesy P. H. Williams)