



BACTERIAL SPOT OF CUCURBITS

Bacterial spot (bacterial leaf spot), caused by the bacterium *Xanthomonas cucurbitae* (Syn.: *Xanthomonas campestris* pv. *cucurbitae*), has become one of the most important diseases of cucurbits, especially pumpkin and winter squash crops. This disease was first reported as bacterial leaf spot on Hubbard squash in New York in 1926. Subsequently, the disease was reported from other cucurbit growing areas in Asia, Australia, Europe, and North America on cucumber, pumpkin, squash, and watermelon. *Xanthomonas cucurbitae* infects cucumber, gourds, pumpkin, and summer winter squash. The pathogen infects leaves and fruit during the growing season. Outbreaks of bacterial spot in Illinois, however, have been observed only on pumpkin and winter squash. Yield losses caused by bacterial spot exceed 50% in the fields in moist conditions.

Symptoms

Symptoms on leaves appear as small (1-2 mm) and dark lesions, with indefinite yellow margin (Figure 1, C). The lesions may coalesce to form larger necrotic areas, usually on leaf margins (Figure 1, D). In Illinois, different lesions have been characterized on leaves, which vary in color and size (Figure 1, A-C).

The most readily identifiable symptoms occur on fruit. The appearance and size of fruit lesions can vary, depending on rind

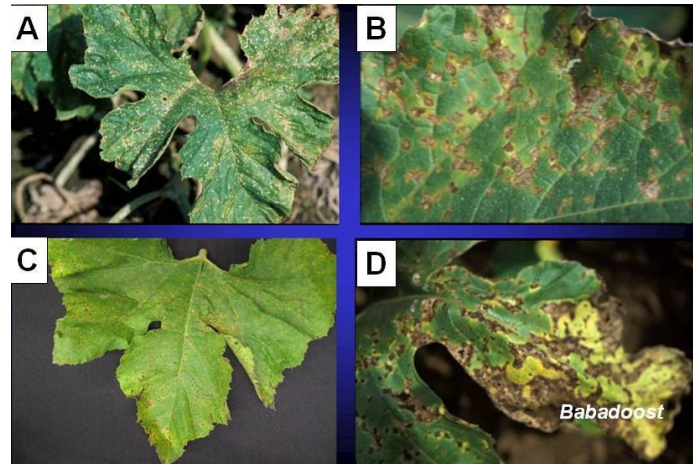


Figure 1. Pumpkin leaves infected with *Xanthomonas cucurbitae*. A, a leaf with translucent lesions; B, a leaf with angular spots; C, a leaf with dark lesions with yellow margins; D, a severely infected old leaf.



Figure 2. An infected pumpkin fruit with *Xanthomonas cucurbitae*.

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maturity and the presence of moisture. Initial lesions are small, slightly sunken, circular spots, 1/16 to 1/4 inch in diameter, with a beige center and a dark-brown halo (Figures 2-4). Later the cuticle and epidermis crack, and the lesions enlarge, reaching up to 1/2 inch in diameter (Figure 3, C). The large lesions may have scab-like appearance and give rise to tan, raised blisters. On mature fruit, saprophytic fungi often colonize the dead, tan tissue at the center of the lesion (Figure 4, C). Penetration of the bacteria into the flesh can lead to significant fruit rot in the field (Figure 4, D) or later in storage.

Disease Cycle

The bacterium has been reported to be a seed-borne pathogen. Also, the bacteria can survive in association with infested crop residue. The disease appears during the summer months when temperatures are high, and most commonly after heavy rain, dew, or overhead irrigation. Fruit infection occurs through natural opening or wound in young, rapidly expanding fruit prior to the development of thick, waxy cuticle. The bacteria are splash-spread in the field. Spread of the bacteria within fields can be very rapid. Long distance dispersal of the pathogen is believed to be by contaminated seed.



Figure 3. Infected winter squash fruit with *Xanthomonas cucurbitae*.

Control

The most effective method for control of bacterial spot is planting pathogen-free seed. Rotation with noncucurbit crops is effective in management of the disease. Application of copper compounds during early formation and expansion of fruit may result in substantial fewer symptomatic pumpkins. Copper spray, however, is ineffective once an epidemic is underway.

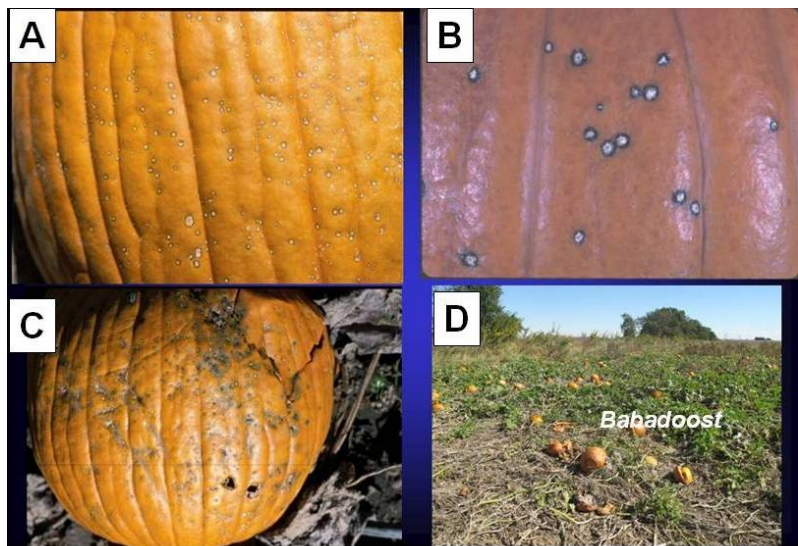


Figure 4. Pumpkin fruit infected with *Xanthomonas cucurbitae*. A, a fruit with small lesions; B, a fruit with most common lesions; C, an infected, collapsing fruit; D, rotting fruit in a commercial field.