

## Bacterial Wilt of Cucurbits

### *Erwinia tracheiphila*

**Hosts:** Cucumber (*Cucumis sativus*); cantaloupe (*Cucumis melo* var. *cantalupensis*); watermelon (*Citrullus lanatus*); some varieties of squash and pumpkin (*Cucurbita moschata* and *Cucurbita maxima*); and pumpkin, squash, and zucchini (*Cucurbita pepo*).

**Disease common name:** Bacterial wilt.

**Pathogen:** *Erwinia tracheiphila*.

### Disease Cycle

**Inoculum:** Cucumber beetles, overwintering plants that harbor the pathogen, and possibly asymptomatic weed hosts provide sources of inoculum.

**Transmission:** In early spring, inoculum is spread by the striped cucumber beetle, *Acalymma vittata*, and the spotted cucumber beetle, *Diabrotica undecimpunctata*. They feed on overwintering plants that harbor the pathogen, and then they contaminate other cucurbit plants as they feed. The beetles cause injuries when feeding on leaves and depositing contaminated feces on the wounds. Other plant-feeding insects, such as grasshoppers, may also transmit the bacteria through wounds.

**Infection:** Infection takes place when a film of water is present that enables the pathogen to reach a wound, invade, and then move into the xylem vessels. From there it spreads systemically throughout the plant. Growth of the bacteria affects the plant vascular system. Infected stems provide less than one-fifth of the normal water flow, indicating that extensive plugging of the vessels may be the primary cause of wilting. Wilt symptoms appear 6–7 days after infection and the plant is usually wilted by the fifteenth day.

**Symptoms and signs:** Symptoms vary considerably depending upon the plant species and cultivar. Cucumbers, squash (Fig. 1), and melons (Figs. 2–4) are highly susceptible. Diseased runners (Fig. 2) first appear dark green and then become necrotic as the wilt becomes irreversible. With summer squash (Fig. 1) and pumpkin, a distinct necrosis and chlorosis develops around leaf margins before the entire plant collapses and dies. Young pumpkin plants usually lose vigor and die within 2 weeks, whereas summer squash maintains a healthy appearance and continues to grow weeks after the first wilt symptoms appear. Frequently, positive diagnosis can be made by cutting an infected stem, followed by touching the ends for a moment and then slowly pulling them apart. The presence of stringy bacterial ooze between the two cut ends is a positive indication of the presence of the pathogen.

**Survival:** The mechanism of overwintering remains uncertain, but survival in asymptomatic plants is a good possibility. The pathogen does not survive in soil and does not live long in dried plant material.

### Disease Management

Bacterial wilt of cucurbits is managed mostly by controlling cucumber beetles with insecticides. However, recommended insecticides are often toxic to pollinators and should not be applied during pollination, if possible. Applications of pesticides, if they must be used, should be made in the evening after bee activity ceases. There are some disease-resistant cucumber cultivars but none in melons.

## References

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Bradbury, J. F. 1986. *Guide to Plant Pathogenic Bacteria*. CAB International, Slough, U.K.

Zitter, T. A., Hopkins, D. L., and Thomas, C. E., eds. 1996. *Compendium of Cucurbit Diseases*. American Phytopathological Society, St. Paul, MN.



Figure 1. Severely wilted squash plants with chlorosis and necrosis of leaves. (Courtesy B. Jacobsen/M. Shurtleff)



Figure 2. Severely infected muskmelon plants with dying runners. (Courtesy B. Jacobsen/M. Shurtleff)



Figure 3. Severely diseased muskmelon plants. (Courtesy M. Shurtleff)



Figure 4. Severe disease of cantaloupe from bacterial wilt (left), less on the right. (Courtesy L. Claflin)