



## BACTERIAL WILT OF CUCUMBER AND MUSKMELON

Bacterial wilt, caused by the bacterium *Erwinia tracheiphila*, is a common and destructive disease of cucurbits. The disease is most common on cucumber and muskmelon (cantaloupe), but less damaging to squashes and pumpkins. Watermelons are apparently not affected by it. Losses from bacterial wilt vary from the premature death of occasional plants to as high as 75 percent of a crop.

### Symptoms

Expression of the disease symptoms varies with different crop species. On cucumber and melon, bacterial wilt first appears on leaves as dull green patches that rapidly increase in size. Within a day or two the wilting symptoms spread to leaves up and down the runner (Figure 1). In a short time these and later affected leaves on the runner turn brown, wither, and die. The bacteria spread from the infected runner to the main stem and then to other runners. The entire plant soon wilts, shrivels, and dies. Less susceptible plants, such as squashes and pumpkins, may show a dwarfing of the vines, sometimes accompanied by excessive blossoming and branching.



Figure 1. Bacterial wilt on cucumber vine.

If a severely affected stem is cut across at the base and squeezed, a creamy white bacterial ooze may exude from the cut vascular tissue. After a minute or two the droplets will adhere to a finger or knife blade and may be slowly pulled out into delicate, shiny threads about 1/4 inch long. This test is helpful in diagnosis of the disease. The test works well for cucumber, but poorly for muskmelons. Bacterial wilt is easily confused with other causes of wilting, including *Fusarium* or *Verticillium* wilts, root or stem rots, gummy stem blight, nematode damage, an excess or deficiency of moisture, damage by root or stem feeding insects, or an excess of fertilizer.



Figure 2. Bacterial wilt on muskmelon.

For further information on Vegetable Diseases, contact Dr. Mohammad Babadoost, Extension Specialist in Fruit and Vegetable Diseases, Department of Crop Sciences, University of Illinois, Urbana-Champaign.

## Disease Cycle

The bacteria overwinter in the digestive tracts of hibernating, adult striped and spotted cucumber beetles (Figure 3). In the spring the bacteria are introduced into the leaves of cucurbits by the beetles as they feed. The bacteria enter cucurbit tissue only through wounds, such as those produced by beetle feeding. When the beetles are absent, bacterial wilt does not occur. The pathogen is not seed-transmitted and does not survive in soil.

Weather conditions have an indirect effect on the disease, in that environmental conditions which favor the overwintering, feeding, and reproduction of the cucumber beetles subsequently affect the prevalence of bacterial wilt. A good winter snow cover followed by warm temperatures in March and April can be expected to increase the number of overwintering beetles and therefore increase the early incidence of bacterial wilt.

When a beetle feeds on a diseased leaf, its mouth parts become contaminated. The wilt bacteria are then introduced into the next several plants on which the beetle feeds. Beetles remain infectious for at least three weeks. Infection of cucurbit plants occur **only** when sufficient water from dew, rain, or irrigation is present to allow the bacteria to penetrate the inner leaf tissue via feeding wounds. Wilting may be visible in several days, and the entire plant is invaded in 12 to 15 days. Field symptoms are usually apparent approximately one month after the beetles appear.

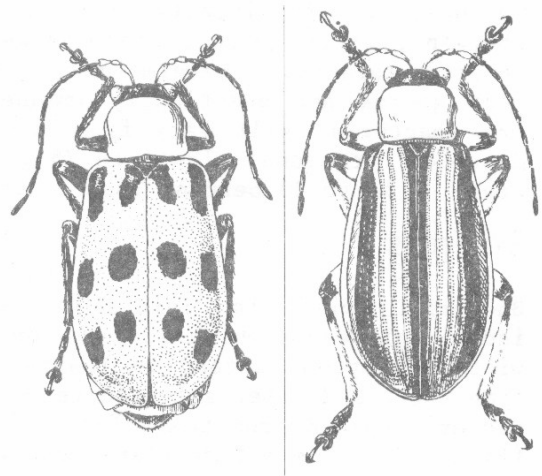


Figure 3. Cucumber beetles. Left, spotted; right, striped (USDA photo).

Bacterial wilt develops when daily temperatures **average** between 46° and 72°F (7 to 22°C) with an optimum of 52° to 60°F (11 to 15°C). The bacterium grows best at temperatures of 77° to 86°F (25 to 30°C), and under conditions of high relative humidity. Bacterial isolates differ in their virulence on each species of cucurbit. Some isolates that are highly virulent on cucumbers are also quite virulent on squashes while others that are less virulent on cucumbers usually are not virulent on squashes. However, distinct cucumber and squash strains of the bacterium may exist.

## Control

1. Provide season-long control of spotted and striped cucumber beetles and other insects, such as grasshoppers and squash bugs, with insecticides. **Start applications as the plants start to crack the soil**, before the leaves appear, even if no beetles are evident. Frequent applications are necessary, especially in the seedling stage, to keep the foliage free of beetle-feeding wounds. Applications may be needed at 4 to 5 day intervals. **Repeat after rains**, especially if beetles are present. Early-season sprays or dusts are the most important step in controlling bacterial wilt. Make treatment in late afternoon or evening to avoid damage to bees. The use of a systemic, soil-applied insecticide will provide moderate control for 5 to 6 weeks. Supplemental foliar insecticide treatments, however, will be necessary. For current insect-control recommendations, read University of Illinois Extension Circular 1354, Illinois Homeowners' Guide to Pest Management (revised annually).

2. Plants in the home garden can be protected against insects by starting them under Hotkaps and then enclosing them in cheesecloth tents for several weeks until blossoms appear. Apply a recommended insecticide frequently after removing the covering. Follow suggestions of University of Illinois Extension Entomologists and your nearest Extension adviser.
3. In small plantings, pull the wilted plants at the first sign of disease and destroy them after first spraying thoroughly or dusting with a suggested insecticide.
4. Where feasible, grow adapted, partially resistant cucumber varieties. For information on currently recommended varieties, read the Illinois Homeowners' Guide to Pest Management, Circular 1354, which is revised annually and available at the Information Technology and Communication Services at the University of Illinois.