



## STEWART'S LEAF BLIGHT OF DENT CORN

Stewart's leaf blight, or Stewart's bacterial wilt of corn, is caused by the bacterium *Erwinia stewartii*. This bacterium causes a similar but more serious disease of sweet corn. Wilt symptoms seldom develop on dent corn, even under conditions that are ideal for disease development. Seedlings of very susceptible hybrids may wither and die. Stewart's leaf blight is found each year on dent corn in localized areas of Illinois, especially in the southern third to southern half of the state. Infection that is severe enough to cause yield reduction occurs most often in south-central Illinois, when susceptible hybrids are grown. Severely blighted plants almost always show a marked increase in stalk rot. The severity of Stewart's leaf blight is increased by high temperatures.



Figure 1. Stewart's leaf blight on dent corn leaves.

### SYMPTOMS

Stewart's leaf blight is characterized by short-to-long, irregular leaf streaks (Figure 1). The first infections generally appear after tasseling. Initially, the streaks are pale green to yellow; later, the tissues die and change to a tan or straw color. Individual streaks may extend along the length of the leaf with irregular wavy margins that tend to follow the leaf veins. Several streaks may merge, causing the entire leaf to wither and dry. If leaves die prematurely, yields are reduced and the weakened plants become more susceptible to stalk rot. Examination of the streaks, especially when the leaf is held up to the light, will show feeding marks made by the corn flea beetle (Figure 5). The marks appear as fine scratches that are white, irregular, and usually at a right angle to the streak. Infected plants may produce bleached and dead tassels. Brown to black cavities may form in the stalk pith of severely infected plants near the soil line (Figure 4). Some bacteria may spread into the kernel of extremely susceptible hybrids. Seed transmission is at a very low rate even in the most susceptible hybrids.

### DISEASE CYCLE (Figure 2)

The bacterium overwinters almost exclusively within the body of the adult corn flea beetle (*Chaetocnema pulicaria*) (Figure 3). Adult beetles begin to feed on corn seedlings in late spring to early summer. The beetles spread the bacterium to corn plants through their feeding wounds. Flea beetles continue to spread the causal organism throughout the growing season by feeding on infected plants, then flying and feeding

on healthy ones. In areas where Stewart's leaf blight or bacterial wilt was severe during the previous growing season, an average of 20 percent of the beetles coming out of hibernation in the spring are contaminated with the bacterium. The flea beetles may be carried by air currents for 20 miles or more. Flea beetles feeding on diseased corn plants become contaminated and carry the bacterium to healthy plants. As the season progresses, new broods of corn flea beetles become infected, greatly increasing the number of contaminated beetles. The beetles carry and transmit the bacterium as long as they live.

Other host plants for the Stewart's leaf blight bacterium include eastern gamagrass (*Tripsacum dactyloides*) and teosinte (*Zea mays* subsp. *mexicana*). The importance of these hosts in the disease cycle is unknown.

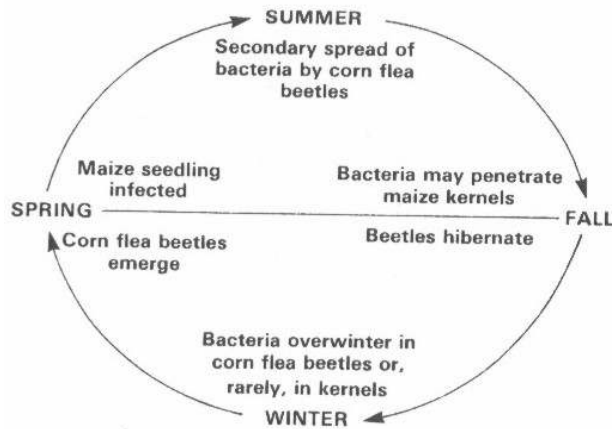


Figure 2. Disease cycle of the Stewart's leaf blight bacterium.

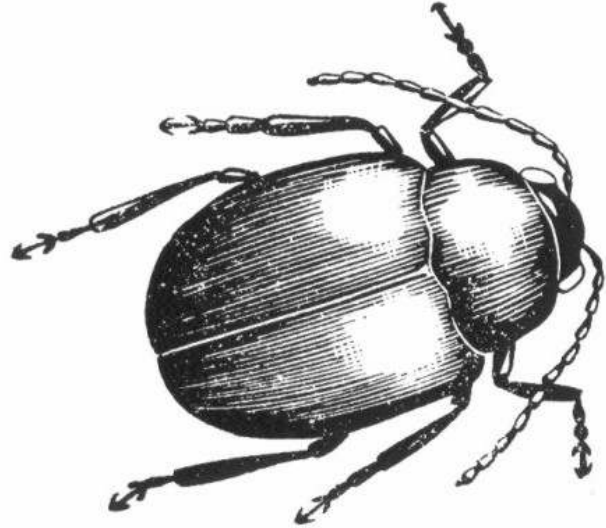


Figure 3. An adult corn flea beetle. The actual length of the insect is 1/16th of an inch.

## DISEASE FORECASTING

Low winter temperatures limit beetle survival. **For this reason, damage is unlikely when the mean temperature (fahrenheit) for the preceding December, January, and February is below 27°F.** Severe damage is likely if the mean is above 33°F, especially during two consecutive winters. Intermediate damage usually occurs if the average is between 27° and 33°F.

If the index* is	Early season wilt probably will be	Late-season leaf blight probably will be
Below 27°	Absent, or nearly so	A trace, at most
Between 27° and 28°	Absent to light	Light
Between 28° and 30°	Light	Light
Between 30° and 33°	Light	Moderate to severe
33° or more	Destructive	Severe

\*Mean temperatures (°F) for the preceding December, January, and February.

Because of low winter temperatures, flea beetles seldom survive in the northern half of Illinois. Those found in the late spring or summer have been carried by southerly winds. Prolonged periods of wet summer weather are unfavorable for beetle multiplication and feeding. Dry weather is favorable.

The causal bacterium may survive for several months in seed and corn stalk residue; however, the number of plants that become infected from such sources is considered insignificant. Sporadic outbreaks in Latin America, Europe, the USSR, and China are probably caused by planting infected seed.

The adults and larvae of the 12-spotted cucumber beetle (*Diabrotica undecimpunctata howardi*) and toothed flea beetle (*Chaetocnema denticulata*), and the larvae of the seed corn maggot (*Hylaemya cilicrura*), the northern corn rootworm (*D. Longicornis*), the western corn rootworm (*D. Virgifera*), wheat wireworm (*Agriotes mancus*), and white grub (*Phyllophaga* sp.) are suspected of carrying the wilt bacteria infrequently from one corn plant to another during the summer. Corn plants become infected at temperatures of 60° to 95°F (15° to 35°F). The bacteria multiply rapidly inside the plant and may plug the water-conducting vessels, producing typical symptoms of leaf streak and wilt. If conditions are favorable for infection, symptoms begin to appear in one or two weeks, but may not develop until the plant is nearly mature.

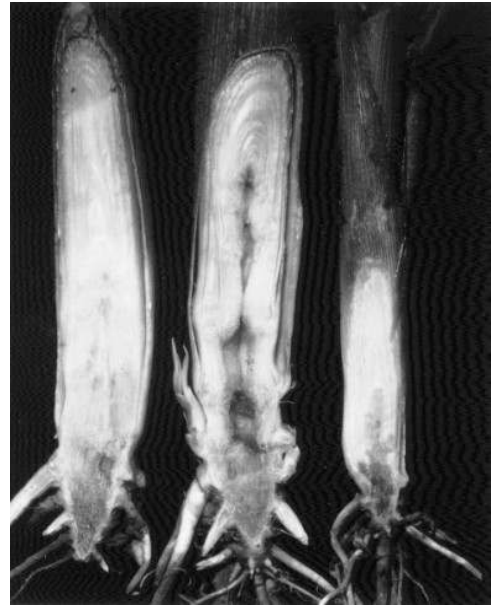


Figure 4. Dark cavities in stalk pith, caused by Stewart's leaf blight bacterium.

## CONTROL

1. Grow resistant, dent corn hybrids in the southern third or southern half of Illinois. Hybrids that are resistant to northern corn leaf blight also tend to be resistant to Stewart's leaf blight.
2. Maintain mineral nutrition, since that influences the susceptibility of corn hybrids to infection. High levels of ammonium nitrogen and phosphorus increase susceptibility whereas high levels of calcium and potassium tend to decrease susceptibility to infection.
3. Use a recommended insecticide in the furrow to control corn flea beetles. This is only suggested for sweet and pop corn. Use of an insecticide is not economically feasible and not recommended for dent corn. One to six sprays of a suggested insecticide, spaced three to five days apart, may be required to protect susceptible sweet corn cultivars. The first application should be made on the day **before** the corn emerges. Follow current recommendations of Extension Entomologists at the University of Illinois at Urbana-Champaign and your nearest Extension adviser.



Figure 5. Feeding scratches made by corn flea beetles (Dr. R.R. Bergquist).