

Corn disorders: Smut and rust

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Common smut is caused by the fungus *Ustilago maydis* and is the most widespread disease of sweet corn, occurring everywhere that corn is grown. Losses from smut range from trace amounts up to about 15%. Sweet corn appears to be more susceptible than field corn. The number, size, and location of the galls on the plant affect the amount of yield reduction. Galls are produced when the fungus stimulates the corn cells to increase in size and number.

Common rust, caused by the fungus *Puccinia sorghi*, has been around since the early 19th century and is present wherever corn is grown. Rust first reached epidemic proportions in the United States in the 1950s. Since then plant breeders have selected for rust resistance in field and sweet corn. Today, resistant varieties are the primary means of disease prevention.

Symptoms and effects

Smut The symptoms of corn smut are usually conspicuous and easily recognized. Most infections occur when plants are 1–3 feet tall and rapidly growing. All above-ground parts of the plant are susceptible. When galls first appear, they are covered with a glistening, greenish to silvery-white tissue. The interiors darken as the galls mature, eventually rupturing to release masses of powdery, dark olive-brown to black spores. Galls on ears may grow to 6 inches in diameter, although on leaves and tassels they seldom develop beyond the size of a pea. Leaf galls become hard and dry at maturity and contain few spores. Galls on leaves do not rupture at maturity. Seedlings are rarely infected, but when they are, they're killed quickly. Plants with galls on the lower part of the stalk may be barren or produce several small ears.

Rust Rust pustules are characterized by elongated, cinnamon lesions located on both the upper and lower leaf surfaces, husks and tassels. Mature pustules rupture to expose the spores which are responsible for secondary infection. As the season progresses and overwintering spores are produced, the pustules turn black.

Disease cycle

Smut Spores from the corn smut galls overwinter in the soil. They are easily moved from one area to another by rain, farm machinery, insects, and dust storms. Spores germinate in moist air at temperatures



The unmistakable bloated galls of corn smut.

of 50°–95°F to produce tiny structures that are wind blown or carried in water. The greatest incidence of infection occurs when the plants are in the rapidly growing leaf-whorl stage. Although wounds are not necessary for infection to occur, an increased incidence of infection may occur as a result of plant injury within 2 weeks of tasseling. Free water is necessary



Elongated rust pustules appear on corn leaves, husks, and tassels.

for infection to occur, but is no longer needed once the plant has been infected.

Rust The pathogen that causes rust requires two hosts to complete its life cycle—corn and common yellow woodsorrel (*Oxalis* sp.), a plant that grows much farther south. For corn grown in the Midwest to be infected, spores must be carried from the Gulf of Mexico each year on wind currents. Tracking the northward progression of rust spores is useful in determining when the disease potential is likely to increase. Sweet corn plants already infected by the maize dwarf mosaic virus are more susceptible to rust infection.

Control

Smut Crop rotation and destruction of galls before they rupture will reduce the buildup of spores in the field. Because spores are disseminated by the wind, crop rotation will never be completely effective in preventing this disease.

Avoid mechanical injury to plants during cultivation. Maintain balanced soil fertility and avoid excessive nitrogen or manure. Late applications of 2,4-D with crop oil, which is prohibited on the label, may lead to a higher-than-normal incidence of smut galls.

Later-maturing varieties tend to have less infection than early varieties. Consult Extension recommendations for locally adapted cultivars.

Rust Resistance provides the primary line of defense against rust infections in sweet corn. There are numerous rust-resistant sweet corn varieties and new ones are released every year. For current recommendations of resistant varieties, consult Extension recommendations.



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