

Diseases of Maize

Fungal diseases	
Brown spot	<i>Physoderma zae-maydis</i>
Black kernel rot	<i>Lasiodiplodia theobromae</i> / <i>Botryodiplodia theobromae</i>
Cercospora leaf spot	<i>Cercospora zae-maydis</i>
Diplodia ear rot	<i>Diplodia maydis</i>
Gray leaf spot	<i>Cercospora sorghi</i>
Eyespot	<i>Aureobasidium zae</i>
Late wilt	<i>Cephalosporium maydis</i>
Leaf spot/ blight	<i>Bipolaris turcica</i>
Common Smut	<i>Ustilago maydis</i>
Common Rust	<i>Puccinia sorghi</i>
Bacterial diseases	
Bacterial stalk and top rot	<i>Erwinia carotovora</i> subsp. <i>carotovora</i>
Bacterial leaf blight and stalk rot	<i>Pseudomonas avenae</i> subsp. <i>avenae</i>
Nemic diseases	
Root-knot	<i>Meloidogyne spp.</i>
Viral diseases	
Maize chlorotic mottle	<i>Maize chlorotic mottle virus</i> (MCMV)
Maize dwarf mosaic	<i>Maize dwarf mosaic virus</i> (MDMV)

Common Smut

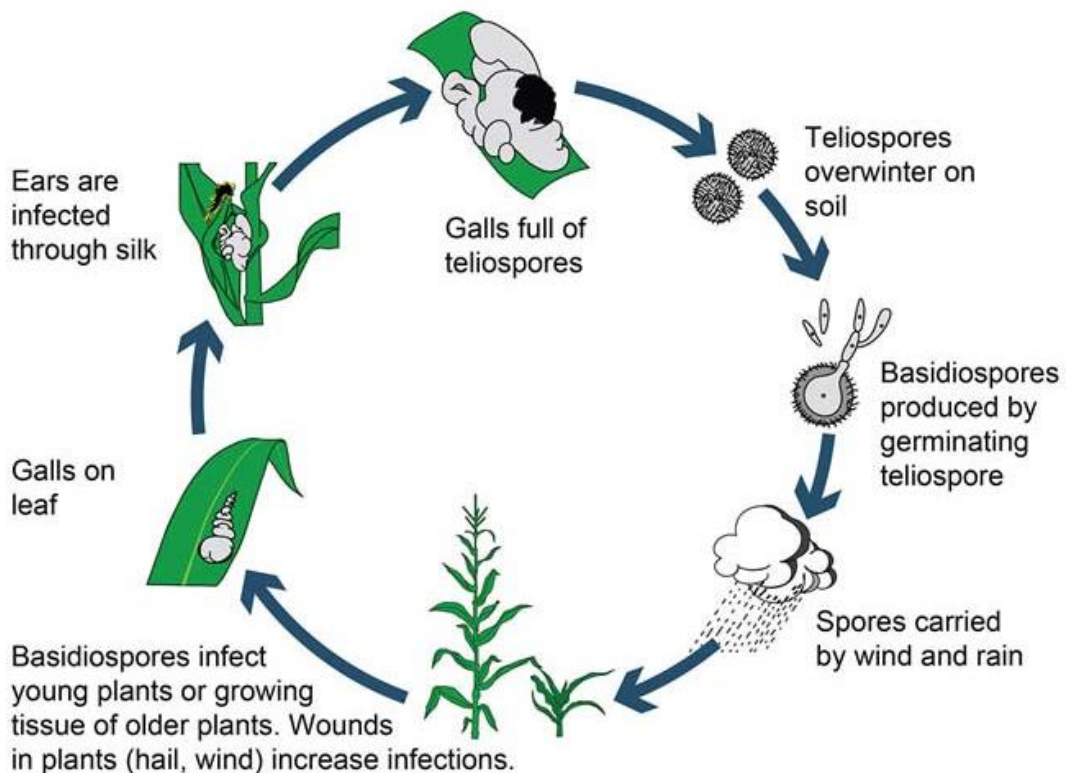
Causal organism: *Ustilago maydis*

Symptoms

Common corn smut/ maize smut is easily recognized and is probably the best known disease on maize. All actively growing or embryonic maize tissue is susceptible. Galls are commonly found on the tassels, husks, ears and kernels, stalks, leaves, axillary buds and rarely, on the aerial roots. As the smut galls enlarge, they are covered by a glistening, greenish to silvery-white membrane. Later, the inner tissue darkens as a result of spore formation. Mature galls may reach 6 inches (15 centimeters) in diameter and are filled with millions of microscopic, dark, olive brown to black, greasy to powdery spores—except for the small, hard, pea-sized galls that form on the leaves. The spores (teliospores, sometimes called chlamydospores) are released when the whitish outer membrane of the gall ruptures at maturity.



Disease Cycle



Common smut spores that overwinter (teliospores) are very resistant to freezing and drying, and may survive in the soil or crop debris for several years. Under good growing conditions the teliospores germinate and new spores (basidiospores) are carried by the wind or splashed by water to young, developing tissues of maize plants. These spores germinate and penetrate through wounds or silks into the plant.

The invading fungus stimulates an increase in the number and size of affected plant cells, forming a gall. The smut mycelium grows between plant cells until just before the new teliospores are formed. The enlarged cells are then invaded, causing them to collapse and die.

Management of Common Smut

Maize growers worldwide, particularly in dry or cold growing areas have experienced presence of common smut in their fields. Yield losses caused by common smut are seldom above 5%. The impact of this fungus can be limited by practicing the following disease control approaches.

- Maintain well-balanced soil fertility, possibly based on soil tests. Excessive nitrogen available in soil, accompanied sometimes by low phosphorus level, increases the chance for smut infestation. Very dry weather conditions tend to aggravate this further.
- Avoid mechanical injuries to plants. Implements could cause small cuts and wounds to the leaves, stalks or roots, which then provide entry points for the fungus.
- Protect plants against insects. This is achievable in early stages of crop development through use of an insecticide seed treatment.
- Choose well-adapted hybrids for a particular growing environment.

Eyespot

Causal organism: *Aureobasidium zeae*

Symptoms

Eyespot presents as many circular to oval spots on the leaf which may coalesce to form large areas of dead tissue. Initially spots appear water-soaked eventually forming tan to cream colored centers surrounded by brownish purple margins with a narrow yellow halo. The haloed spots give the appearance of an “eyespot.”



Eyespot is favored by cool, wet weather. Spores are spread long distance by wind and locally by rain splashing from crop debris in soil onto host plants.

Management Strategies

This disease is rarely a target for foliar fungicides. Management strategies include the use of resistant hybrids. Disease management can also be aided by minimizing crop residue through clean plowing and implementing crop rotations in fields where disease has occurred.

Gray Leaf Spot

Causal organism: *Cercospora sorghi*

Symptoms

Symptoms of gray leaf spot are usually first noticed in the lower leaves. Initially, lesions of gray leaf spot begin as a small dot with a yellow halo. Lesions will elongate over time running parallel to the veins becoming pale brown to gray and rectangular in shape with blunt ends. These lesions can be described as having the appearance of a “matchstick.” Lesions may eventually coalesce killing the leaves. Leaves appear grayish in color due to the presence of fungal spores.



Gray leaf spot is favored by wet humid weather. Additionally, it is favored in situations with reduced tillage and continuous maize. Airborne spores are spread locally and regionally from maize debris.

Management Strategies

Management strategies for gray leaf spot include tillage, crop rotation and planting resistant hybrids.

Brown Spot

Causal organism: *Physoderma zae-maydis*

Symptoms: Initial lesions are tiny, round, and yellow spots. Later, lesions turn to a brown or reddish color and merge together to form irregular blotches. Lesions often occur in bands on leaves as well as on sheaths and stalks, but rarely occur on ear husks and tassels.



Conditions Favoring Disease:

- Infection usually occurs on leaf tissue within the whorl, where water has gathered
- High temperatures (72 - 86°F) and heavy rainfall

Disease Management:

- Infection may be reduced by tillage or destroying crop residue
- Using resistant variety

Common Rust

Causal organism: *Puccinia sorghi*

Symptoms: Pustules (A blister-like spore mass breaking through a plant epidermis) are oval to circular, and red to dark brown, common on both leaf surfaces. Rust spores (urediniospores) are cinnamon brown. Leaves as well as sheaths can be infected, and under severe conditions leaf chlorosis or death may occur. Urediniospores serve as the repeating stage of this fungus and are blown north to the maize belt in the early summer.

**Conditions Favoring Disease:**

- Cool temperatures (60 - 76°F), heavy dews, and high relative humidity (greater than 95%).
- Approximately, 6 hours of moisture is needed for germination and infection.
- Young leaves are most susceptible to infection

Disease Management:

- Use resistant maize hybrids
- Fungicides can be most beneficial if applied early and when there are few pustules on the leaves

Diplodia Ear rot

Causal organism: *Diplodia maydis*

Symptoms

- Husks appear either bleached or straw colored
- Infection most often begins at the base of the ear
- The ear may become bleached and brown, but may show no external symptoms
- Coarse, white or grayish brown fungal mycelium develops on the husk or kernels
- The ear may turn brown and become shrunken, rotten, and light
- Late in the season, black specks (fungal fruiting bodies) may be produced on ears

**Pathogen Involved**

- *Stenocarpella (Diplodia) maydis* (a fungus)
- This pathogen overwinters on infested maize debris from the previous year

Time of Occurrence

- This disease occurs after flowering

Conditions Favoring Disease

- Maize ears are most vulnerable for three weeks after silking
- Warm and wet weather conditions after silking
- Maize ears that have been damaged by insects or birds
- Conservation tillage
- Maize on maize rotation

Disease Management

- Maize hybrids differ in susceptibility, but resistant maize hybrids not reported
- Crop rotation
- Fall tillage of maize residue