

Best Management Practices for Colorado Corn

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Corn Diseases

Management and identification

Corn diseases caused by fungi, bacteria, viruses, nematodes and mycoplasmas in Colorado are minimized by good management decisions made prior to the growing season.

Good weed control, fertility and irrigation practices throughout the growing season, coupled with prompt harvest of corn damaged by wind, hail or insects, can help minimize yield losses associated with the common corn diseases in Colorado.

Seedling blights

Damping-off and other seedling blights generally are caused by soil dwelling fungi such as *Pythium*, *Fusarium*, *Diplodia*, *Rhizoctonia* and others. These fungi may cause seed to rot before germination or the seed may germinate and the seedling becomes infected.

Damping-off is favored by cool, wet soil and is often first seen in low-lying or poorly drained areas in the field. Heavy plant residue on the soil surface favors damping-off by keeping soils cooler and wetter. Delayed emergence caused by compaction, crusting or planting too deep can also predispose seedlings to infection.

Damping-off is generally controlled by the seed treatments provided with seed corn. Avoid deep planting on wet soils cooler than 50°F to minimize occurrence of the disease

Nematodes

Nematodes are microscopic worms that live in the soil. Several species of nematodes are known to damage corn, but they are not considered a significant, widespread problem in Colorado. Symptoms may occur at any time and generally appear as stunted plant growth, uneven stands, chlorosis, small or poorly filled ears. Often, these symptoms will appear as patches in the field where nematode numbers are highest. Corn roots dug in these areas often appear stunted, malformed and may have discolored lesions.

Nematode damage is often most severe on stressed corn plants. Corn growing with adequate moisture and fertilizer nutrients is better able to compensate for nematode feeding by producing more roots. Nematicides are labeled for use in Colorado, but not generally recommended. In some cases, it may be necessary to rotate heavily infested fields to crops other than corn.

Disease management practices

- Select hybrids with resistance to diseases common in your area.
- Plant high quality seed treated with a seed fungicide.
- Avoid planting too early into cold, wet soils.
- Avoid higher than recommended plant populations for the hybrid selected.
- Deep rip fields to reduce soil compaction.
- Rotate fields regularly to crops other than corn.
- Apply N,P,K and micronutrient fertilizers according to soil test recommendations.
- Control grassy weeds in and around corn fields to destroy host sites.



Damping-off damage to corn stands.

Photo W.M. Brown

Chemical control guidelines can be found in the High Plains IPM Guide - CSU Cooperative Extension Bulletin 564A or on the website www.highplainsipm.org.

Corn Diseases



Goss's wilt

Top right photo R.L. Croissant

Bottom left photo H.F. Schwartz



Goss's wilt

Goss's wilt (*Clavibacter michiganese* subsp. *nebraskaense*) is a bacterial disease aggravated by growing susceptible hybrids, continuous cropping and reduced tillage. It overwinters in previously infected corn residue. The bacterium survives in irrigation water and can be spread by splashing water. Goss's wilt is more prevalent in Nebraska than in Colorado, but is occasionally seen in the eastern part of the state.

Corn leaves may be infected at any growth stage and symptoms appear as long gray green to black lesions. As lesions age, they gradually fade to tan. Plants may wilt as if under drought stress. Premature death may occur, limiting yield by up to 50%. Genetic resistance is available in hybrids. Growers may reduce incidence by rotation and tillage.



High Plains disease

Photo W.M. Brown

High Plains disease

High Plains disease is a newly discovered virus disease of corn, small grains and several grasses in Colorado. It is transmitted by the wheat curl mite (*Aceria tosciella* Keifer). Symptoms vary, but include stunting, yellowing and a mosaic pattern on leaves. Many corn hybrids are resistant to the disease. Susceptible hybrids planted in the vicinity of infested wheat fields or winter annual grasses can be severely impacted by the virus, with infections at earlier corn growth stages being more serious. Corn that emerges well before infected host plants dry down usually escapes serious damage. Controlling winter annual grasses near susceptible corn plantings, at least two weeks before emergence, is the most effective cultural control for High Plains disease.

Smuts

There are two problem smuts that occur in Colorado corn. Common smut (*Ustilago zae*) damages all parts of the corn plant. This fungus is spread by the wind and spores infect the plant through wounds. Common smut overwinters in corn residue or soil and is often seen following hail or other injury. This disease is favored by excess N from fertilizer or manure. Some hybrids are less susceptible to common smut than others. Growers should avoid mechanical injury to corn during cultivation and maintain proper soil fertility levels to minimize impact.

The other smut that can be a problem in Colorado is head smut (*Sporisorium holci-sorghii*). It is commonly found to cause damage in tassels and ears. Different than common smut, head smut is systemic, infecting the plant through soil borne spores. Low soil moisture and soil temperatures between 70 to 82°F are optimum for infection, which cause stunting and ear abortion. Adequate soil N during early growth stages may limit susceptibility, but the disease is best managed by rotation and resistant hybrids.



Common smut



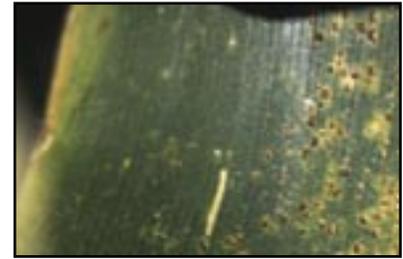
Head smut

Photo R.L. Croissant

Corn Diseases

Corn leaf rust

Corn leaf rust (*Puccinia sorghi*) is a fungus with symptoms that appear as flecks and develop into reddish-brown powdery pustules on upper and lower leaf surfaces. Most hybrids have some resistance to common rust, but the problem is seldom severe enough to warrant hybrid selection on this basis. Fungicides are available for use in years with economic levels of infection, but they must be applied early to be effective.



Corn leaf rust

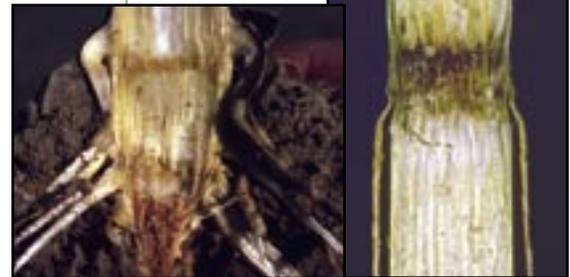
Photo R.L. Croissant

Stalk rots

Stalk rots of corn cause lodging and yield loss. They are caused by several fungal organisms. *Fusarium*, *Gibberella*, *Anthracnose*, *Diplodia*, *Macrophomina*, and *Pythium* and occasionally the bacterium, *Erwinia*. The occurrence of stalk rot is strongly affected by crop stress during grain filling.

Some resistance is available in corn hybrids, but in general, producers can minimize problems by avoiding stresses that predispose plants to disease. Avoiding stalk and root injury during cultivation, proper plant populations, adequate fertilizer and irrigation are helpful to minimize stalk rot severity.

Scout fields 40 to 60 days after pollination. If 10 to 15% of stalks split show signs of stalk rot, schedule the field for an earlier harvest



Fusarium stalk rot

Right photo W.M. Brown
Left photo R.L. Croissant

Fusarium stalk rot

Fusarium stalk rot is caused by the fungi (*Fusarium moniliforme* or *Fusarium subglutinans*). Corn can withstand some *Fusarium* stalk rot before yield loss. This stalk rot is influenced by hybrid and cultural processes.

Gibberella stalk rot

Gibberella stalk rot is caused by *Gibberella zeae* fungus. Control by rotation, hybrid selection and stress management.



Late plant pathologist Dr. Bill Brown worked on corn disease management in Colorado for 23 years. Bill also was instrumental in developing and promoting IPM practices.



Stalk rot damage

Photo H.F. Schwartz



Gibberella stalk rot

Photo W. M. Brown