

Corn Stalk Rots

By Laura Sweets

Any factors which stress corn during the growing season may contribute to an increase in stalk rots that season. And this has certainly been a season of stresses for corn in Missouri with late planting due to wet soil conditions, flooding, cool temperatures, moisture stress, heavy rains, some foliage diseases, etc. Therefore, it would be wise to scout fields for corn stalk rots and to harvest fields with stalk rot problems as quickly as possible.

A number of different fungi and bacteria cause stalk rots of corn. Although many of these pathogens cause distinctive symptoms, there are also general symptoms which are common to all stalk rot diseases. Early symptoms, which occur a few weeks after pollination, usually start with premature dying of bottom leaves. Eventually, the entire plant may die and appear light green to gray. Diseased stalks usually begin losing firmness during August. The cells in the interior of the stalk are dissolved, resulting in a loss of stalk firmness and strength. Stalks may then lodge, particularly if harvest is delayed or wind storms occur.

Fusarium stalk rot and Gibberella stalk rot can be difficult to distinguish in the field. Both can cause a pink to reddish discoloration of diseased stalk tissue. Tufts of white mycelium may be evident at the nodes of diseased stalks. When stalks are split open the pith is usually shredded and discolored.

Anthracnose stalk rot, caused by the fungus *Colletotrichum graminicola*, may be most evident at the nodes. Initially lesions are tan to reddish-brown but they become shiny black later in the season. These shiny black lesions may begin at a node and extend out from that node. The lesions may merge to discolor much of the lower stalk tissue. Internal pith tissues may also be discolored and may disintegrate as disease progresses.

Diplodia stalk rot may begin as a brown to tan discoloration of the lower internodes. Stalks become spongy. The pith disintegrates leaving only the vascular bundles. Mats of white fungal growth of *Diplodia maydis* may be evident on affected tissues. Diplodia also produces fruiting bodies which may be seen as small black specks embedded in the white fungal mat.

Charcoal rot may begin as a root rot and move into the lower internodes of the stalks. Pith tissues will be shredded and plants may break at the crown. The charcoal rot fungus, *Macrophomina phaseolina*, produces very small survival structures called microsclerotia which may be visible as very small, black flecks just beneath the stalk surface or on the vascular strands remaining in the interior of the shredded stalks. Charcoal rot is usually more severe under hot, dry conditions, so this corn stalk rot is not likely to be widespread this season.

Stalk rots are caused by several different fungi and bacteria which are part of the complex of microorganisms that decompose dead plant material in the soil. They survive

from one growing season to the next in soil, in infested corn residues or on seed. Stalk rot pathogens enter the corn plant in a variety of ways. The spores may be blown into the base of the leaf sheath where they may germinate and grow into the stalk. Spores may enter directly into a plant through wounds made by corn borers, hail or mechanical injury. When fungi are present in soil or infested residue as either spores or mycelium, they may infect the root system causing root rot early in the growing season and later grow up into the stalk causing stalk rot.

Stalk rot becomes a problem when plants are stressed during the grain filling stage of development. Water shortage, extended periods of cloudy weather, hail damage, corn borer infestation, low potassium in relation to nitrogen, leaf diseases and other stresses that occur in August and September may be associated with an increase in stalk rot.

Losses from stalk rots vary from season to season and from region to region. Yield losses of 10 to 20% may occur on susceptible hybrids. Losses greater than 50% have been reported in localized areas. Losses may be direct losses due to poor filling of the ears or lightweight and poorly finished ears or indirect through harvest losses because of stalk breakage or lodging. Harvest losses may be reduced if fields are scouted 40-60 days after pollination to check for symptoms of stalk rot. Stalk rot can be detected by either pinching stalks or pushing on stalks. If more than 10-15 percent of the stalks are rotted, the field should be harvested as soon as possible.

Management of stalk rots of corn should include the following:

- Select hybrids with good stalk strength and lodging characteristics.
- Plant at recommended plant populations for that hybrid.
- Follow proper fertility practices.
- Avoid or minimize stress to corn (especially during pollination and grain fill).
- Harvest in a timely manner.