Stalk rots are common in the Midwest and are in every field to some extent. Identifying the specific type of stalk rot is easier during early stages of development, but becomes more difficult late in the season when multiple stalk rots become established in the same plant. Regardless of which stalk rot pathogen causes the primary infection, the end result is the same: yield loss due to lodging or premature plant death.

1. **Lodging** – Plants infected with stalk rot pathogens are susceptible to lodging which can cause high amounts of harvest loss. Leaving plants to field dry increases the risk of severe stalk lodging. Fields with a large amount of stalk rot should be harvested as soon as possible.

2. **Premature Plant Death** – The amount of yield loss from premature plant death depends on when the plants die in relation to the stage of kernel development. Premature plant death prior to the dough stage causes severe yield loss due to kernel abortion and small shrunken kernels. During dent stage, premature death can cause yield losses up to 40%. Potential yield loss drops to 12% if death occurs at the half milk-line of kernel development. Yield loss past the dent stage is primarily due to reduction in kernel size and weight.

As with any disease, potential severity of stalk rots depend on the amount of inoculum present, a susceptible host, and environmental conditions that favor disease establishment. For stalk rots, inoculum occurs naturally in the soil and on plant residue for a large number of pathogen species. Stalk rot inoculum is highest in reduced tillage, corn following corn environments. Corn hybrids vary in susceptibility to certain types of stalk rot pathogens, but no hybrid is resistant to all stalk rot species. Weather largely influences which stalk rots are highest risk each year.

Many stalk rots enter the plant through wounded stalks or through the roots. Stalk rot pathogens move into the roots and up through the stalk if root health is compromised by excessive heat, extended dry weather, prolonged saturated conditions, root disease pathogens, or insect damage. Stalk rots are often apparent in the crown of the plant before moving up into the vascular tissue in the stalk. A brown, rotting crown is a precursor to premature plant death caused by stalk rots. Plants with healthy leaf, root, and stalk tissue are adept at holding off impending stalk rots.

Anything that interferes with plant health, and subsequent photosynthesis during grain fill, will cause the plant to cannibalize stalk tissue to meet needs of the developing ear. Cannibalization makes the plants more susceptible to stalk rot establishment.

**Common Stalk Rots**

**Fusarium Stalk Rot**

Fusarium stalk rot is common this year and is caused by a number of Fusarium species. Fusarium stalk rot inoculum can remain dormant for many years and infect corn on rotated acres. It can be identified early by inspecting the crown of the plant. Brown, rotting crowns of Fusarium infected plants will soon die prematurely due to clogging of the vascular tissue in the stalk. Plants that have died prematurely will have a wilted or frosted appearance from the ground to the tassel but are intact, while neighboring plants are still healthy and green. Stalks infected by Fusarium will have a typical straw-colored appearance and can have white growth around the lower stalk nodes. The inner stalk tissue will have a shredded appearance typical of most stalk rots, and can have a pink coloration similar to, but not as intense as, Gibberella.

**Gibberella Stalk Rot**

Gibberella stalk rot is caused by Gibberella zeae which over-winters in crop residue and soil. It can also cause ear rot disease in corn. Infection occurs through roots, stalks, and leaves. Warm, wet conditions favor disease development. This disease causes pinkish-red discoloration inside the stalk. Another characteristic that can help identify Gibberella are small black specks on the stalk surface that can easily be scratched off. These specks are reproductive structures known as peritheceae and can be used to distinguish Gibberella from Fusarium.
Anthracnose Stalk Rot

Anthracnose stalk rot is an aggressive pathogen that can be evident before plant death. The leaf phase symptoms are highly variable in size and shape and also vary among hybrids, making diagnosis difficult. Presence of the leaf phase doesn't always correlate to the stalk rot being a serious problem. High relative humidity, warm temperatures, and extended periods of cloudy weather favor disease development. Plants become infected soon after pollination, but symptoms aren’t immediately apparent. Symptoms of the stalk phase include shiny black lesions on the stalk's outer rind that can't be rubbed off with your fingernail. Internal stalk tissue, or pith, becomes discolored, turning gray to brown and shredded. Continued disease development causes weakened stalks with lodging as a result. Plants infected with Anthracnose can have top die back, giving the plants a dead appearance at the top of the plant and at the bottom of the plant with a green zone in the middle. The disease eventually causes the entire plant to die, with a later symptom being dead plants with tops going out.

Diplodia Stalk Rot

Diplodia stalk rot can cause both stalk and ear rot diseases of corn, and is caused by Diplodia maydis. It over-winters in crop residue and infects the roots, crown, and lower stalk of corn particularly where insect damage is present. Infections on the husks and silks will cause ear and kernel rots. This disease can be identified by tiny dark brown/black reproductive structures called pycnidia, which are embedded in husks, the rind of stalks, or on kernel surfaces. These structures feel rough like sandpaper and are not easily rubbed off.

Physoderma Stalk Rot

Physoderma stalk rot isn't common but has been identified in fields this year. It's caused by the fungus Physoderma maydis, which is the same pathogen that causes Physoderma brown spot on leaves. Appearance of Physoderma on leaves isn’t indicative of subsequent stalk rot. Physoderma infection requires free water, and is therefore favored by wet weather. Symptoms include dark brown to black lesions encircling the stalk near the base which greatly weakens the stalk. Internal symptoms include dark coloration, and often a hollowing out of the stalk tissue at the base of the plant.

Conclusion

Stalk rots are becoming more apparent in this year’s crop. Fields at high risk include those with large kernel set at pollination followed by dry conditions after pollination, fields showing N deficiency, root lodged fields, fields with leaf disease, and fields that were saturated. Inspect fields for stalk rots by pinching stalks six inches above the soil, splitting stalks and looking for shredded, discolored, internal tissue or by scouting for premature dead plants. If stalk rot symptoms are found, harvest timing should be adjusted to avoid severe losses due to lodging.

Links for further information on these or other stalk rots:
http://ianrpubs.unl.edu/live/ec1898/build/ec1898.pdf
https://www.extension.iastate.edu/NR/rdonlyres/69E27900-6822-4DB8-85FB-1BCD1F7AB7FD/0/IPM50.pdf
http://www.extension.iastate.edu/CropNews/2013/0920robertsonmuellersalaau-rojas.htm

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