MANAGING STALK ROT ROTS

FACTORS LEADING TO STALK ROT ROTS

Symptoms of crown rot were observed throughout fields across SE MN in 2014. Many plants were stunted and yellowed even with relatively mild crown decay. However, some plants did not display any above ground symptoms (Picture 1). Stressful growing conditions combined with crown decay can create more susceptible platform for late season stalk rots.

Stresses such as: wet soils, cold temperatures, soil compaction, fertility problems or herbicide injury; along with the current weather pattern, a wet spring followed by an extended dry period, may amplify the effects of these problems. Injury to roots, stalks or leaves by diseases, insects, nematodes, hail or equipment also can increase the incidence of stalk rot by providing avenues of entry and overlaying multiple stresses.

High yields are frequently associated with stalk rot problems. Plants can over commit to yield when environments are ideal through the pollination period and stress occurs later in the season. In a stressful environment, the large number of kernels places a high demand on the plant for sugars. If photosynthesis is reduced because of stress, the kernels draw stored photosynthates from stalk tissue and deprive the roots of adequate nutrients. Once the kernels begin taking sugars from storage areas (cannibalization), it cannot be reversed. Cases where high nitrogen levels combined with low levels of potassium may increase the development rate of stalk rots. However, balancing the proper rate of nitrogen with adequate rates of potassium and phosphorus will decrease the potential for stalk rot in any yield environment.

HOW DOES STALK ROT DEVELOP?

Corn produces sugar by means of photosynthesis. Sugar, the energy source of all cells, moves to growing points in the stalk and roots during vegetative growth. After pollination, priority for sugar shifts to developing kernels. Approximately 80% of the sugar demand for grain fill is met by photosynthesis, while the remaining 20% comes from storage in the stalk. After pollination, some of the sugars from the stalk are used for cell maintenance throughout the plant. If stress reduces photosynthetic capabilities, more sugars are taken from the stalk to meet grain fill demand. If insufficient sugar is produced, stalks and roots will eventually be weakened, allowing stalk rot organisms to invade earlier and breakdown or plug up tissue.
SCOUTING FOR STALK ROT

TWO DIFFERENT METHODS CAN BE USED TO SCOUT OUT STALK ROT S:

1) PUSH TEST: Randomly select 20 plants from five different areas of the corn field (100 plants total). Push the top portion of the plant, and note whether the plant lodged or had the stalk strength to remain standing.

2) PINCH OR SQUEEZE TEST: Is an assessment of the lower stalk. Again, randomly select 20 plants from five different areas of the corn field (100 plants total). Remove the lower leaves and pinch or squeeze the stalk above the brace roots. If the stalk is easily squeezed, with moderate pressure, it is rotting on the inside. Record the number of rotted stalks.

Regardless of which method is used, if 10 to 15 percent of the plants are lodged, stalk rot is prevalent in the field. If this condition occurs, early harvesting should be considered to prevent losses as the corn stalks will have less time to rot, and subsequently lodge in the field. Extra grain drying costs may be incurred, although those costs could be covered by better harvest efficiency.

COMMON STALK ROT IDENTIFICATION

DIPLODIA STALK ROT: Symptoms of diplodia stalk rot generally do not occur until several weeks after silking. The lower internodes will become brown to straw colored, spongy and easily crushed. The piths will begin to disenigrate and turn tan or brown. Most often, the vascular bundles will remain intact. A white fungal growth may be present on the stalk during humid weather. The key diagnostic feature of diplodia stalk rot are small black specks called pycnidia found in clusters around the base of the lower nodes. Pycnidia are subepidermal fungal spore producing structures of diploidia that cannot be scraped from the stalk rind.
ANTHRACNOSE STALK ROT: Anthracnose may occur as a late season foliar disease, a top kill, a stalk rot or a combination of all of these. However, most hybrids are not affected until after tasseling and not usually not until shortly before normal senescence. The stalk rot form of anthracnose appears as a narrow, vertical to oval, water-soaked lesions on the rind tissues. These lesions will turn dark brown to black later into the season and they will extend through the rind into the pith tissue. **These black blotches are the diagnostic characteristic to identifying anthracnose stalk rot.**

GIBBERELLA STALK ROT: Gibberella is one of the most common stalk rots throughout the midwestern cornbelt. One of the most common characteristics of gibberella is the pink to reddish dicoloration found within the disintegrated pith tissue of an infected stalk. **However, the diagnostic feature is the presence of small round black specks called perithecia that are formed on the surface of the rind and frequently clustered near the nodes.** Unlike the pycnidia in diplodia, perithecia can be scraped of the surface of the rind.
CHARCOAL STALK ROT: Charcoal stalk rot is found primarily in the southern part of the midwest corn belt where there are extended periods of drought and high temperature stress. Among highly disintegrated pith tissues, the unique characteristic of charcoal rot is small black specks found within the vascular bundles once the stalk is split. These small specks are called sclerotia and can live in the soil for several years.

FUSARIUM STALK ROT: Fusarium stalk rot is the most difficult of all stalk rots to diagnose. The color of the infected pith can be tan to white-pink to salmon easily confusing it with Gibberella. Fusarium will be more severe when there are stress factors during the growing season. **There are no diagnostic indicators for the fusarium shredding of pith tissues.**
MANAGEMENT OF STALK ROTs

For this year about all we can do now is to identify problem fields and schedule them for early harvest, but what about next year? While it is impossible to control all the various stress factors that can predispose the corn crop to stalk rot issues, growers can hedge against many of them by incorporating a number of sound risk management practices into their production plans. These include:

- **GENETIC DIVERSIFICATION:** Environmental conditions vary from year to year. By planting corn hybrids of different genetic background, the grower can better manage risks from a wide range of environmental issues.
- **HYBRID/GENETIC POSITIONING:** Understanding the diversities (soil types, drainage, fertility, insect pressures, weed pressures, disease pressures, etc.) within fields can aid in positioning hybrids based on their genetic background. Thus optimizing their performance and minimizing potential risks.
- **PROPER PLANT POPULATION:** Planting population should vary with hybrid, soil type and even somewhat with planting date and nitrogen fertility level. Planting too thick of stand when planting certain flex ear “Southern” genetics can result in poor stalk quality. On the other hand, “Northern” and “Eastern” genetic type hybrids generally maintain stalk integrity well and must be planted at higher plant populations to obtain optimum yields.
- **INSECTICIDE USAGE:** Insects injure the corn and open a pathway for stalk rot organisms to enter the plant. By controlling various soil as well as foliar insect pests, the risk of stalk rot can be reduced. If there were significant secondary insect issues (wireworm, white grub, maggot, etc.) within a field or area, consider using a rootworm insecticide.
- **PROPER FERTILIZATION:** A thorough understanding of the crop nutrient status is essential for optimum corn growth and development. Obtaining representative current soil tests of fields is a good place to start. While all plant nutrients are important, stalk rot issues often occur where potassium and/or nitrogen are limiting.
- **EFFECTIVE WEED CONTROL:** Weeds compete for space, water, nutrients and light and must be controlled to prevent added stress to the corn crop. A thorough knowledge of the weed pressures within the field is needed to aid in herbicide selection. All herbicides should be applied in a timely manner to obtain maximum effectiveness and minimal crop stress.

Sources:


