



Agronomic Spotlight

Red Root Rot in Corn

Plants infected with red root rot have reddish pink roots. Premature plant death leads to yield losses near 20 percent. Genetic resistance is hard to achieve in corn products, but crop rotation with a non-host crop (soybean) helps control the disease.

WHAT TO CONSIDER

Red root rot is caused by a complex of soil fungi, of which *Phoma terrestris* is the main pathogen. It is a late-season disease of corn. The disease was initially discovered in eastern United States and has spread to Colorado, Nebraska, Missouri, and Oregon. Red root rot has been reported to cause corn yield reductions of 15 to 20 percent in localized areas in Delaware, Maryland, and Virginia. Genetic resistance has been difficult to find and management options are limited. Red root rot symptoms typically appear just before senescence. Roots and basal stalk tissue (lower three internodes) infected with RRR have

a reddish pink discoloration. Roots become a deeper red color as the disease progresses. The reddish coloration can be confused with *Fusarium* or *Gibberella* stalk rots, but RRR has a darker red color. The root tips and roots may be shredded or frayed, similar to insect damage.² The root mass can be small, increasing the risk of severe lodging. Harvest may be difficult because the entire root ball can be pulled up as plants are harvested. The small root mass, compromised root system, and lodging contribute to yield loss.

YIELD IMPACT

In the late stages of ear filling, the disease can cause rapid, premature plant death. Foliar symptoms can occur over a four to five day interval and plant death of the most susceptible plants can occur within a week. Other above ground symptoms include a grayish green discoloration of leaves and stalks or a wilted appearance, which is also characteristic of other stalk rot diseases.

Red root rot can survive in the soil for many years across a wide range of soil types, soil temperatures, and soil pH. The optimal temperature range for disease infection is 70 to 80° F, around the time corn begins to senesce. There are reports that infection may occur as early as mid-

silking.¹ High plant populations, high fertility, and irrigation can be common characteristics in infected fields. Recently, research indicated early infection by *Pythium* species (and others) can cause root damage that promotes *Phoma terrestris* invasion in corn roots.

Phoma terrestris produces dark, thick-walled microsclerotia resting structures in roots of infected plants. Microsclerotia allow fungi to survive overwinter for many years and are the primary source of inoculum.¹

MANAGEMENT OPTIONS

Management options are limited. Crop rotation with a non-host such as soybean can provide some control.¹ Genetic resistance has been difficult to incorporate into corn products, although the rate of

disease development varies greatly between products. Research on inheritance of disease resistance indicates that it is a polygenic trait with additive gene action, which has complicated breeding efforts.¹ Environmental stress during the season may contribute to disease infection and severity.²



Figure 1. Red root rot infection of basal stalk tissue (crown).

Sources

¹ White, D.G. 1999. Compendium of Corn Diseases, 4th Edition. American Phytopathological Society Press.

² Sweets, L.E. and Wright, S. 2008. Corn diseases - Integrated Pest Management PM 1001. University of Missouri. 131014060650

Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible. ©2017 Monsanto Company. 131014060650 080917SEK