University of Minnesota Extension
www.extension.umn.edu
612-624-1222

Minnesota Crop News

Monday, May 16, 2016

Frost injury to corn seedlings unlikely to greatly impact yield

by Jeff Coulter, Extension Corn Specialist

Assessing frost injury

Air temperatures below or near freezing during the last couple of mornings in some regions of Minnesota have resulted in frost injury to corn. Symptoms of frost injury on corn are initially discolored water-soaked leaves, which later dry and turn brown. The growing point on corn seedlings is currently about 0.75 inches below the soil surface and remains below the soil until the five to six leaf-collar stage. Therefore, frost prior to the five to six leaf-collar stage typically does not kill corn unless prolonged cold temperatures freeze the upper part of the soil where the growing point is located.

Frost-damaged corn generally shows new leaf growth a few days after a frost if the growing point was not damaged. Therefore, assessment of damaged fields should be delayed until at least three days after a frost. Larger corn plants damaged by frost can resemble buggy whips as new vegetative growth tries to break free of dead tissue. Buggy-whipped plants generally recover, with a faster recovery rate for smaller plants and when warm and windy conditions occur after a frost.

To determine whether frost-damaged corn will survive, dig up plants and split stems to examine the growing point and the tissue directly above the growing point. Healthy growing points will be firm and white to yellow in color. If the growing point or tissue within 0.5 inches above the growing point is damaged, it will be water soaked and orange to brown and recovery is unlikely. Corn recovery is greatest when frost occurs before

the three leaf-collar stage or when only a limited amount of leaf area is damaged after the three leaf-collar stage.

Yield reductions due to frost

Yield loss due to early-season frost injury in corn is influenced by the reduction in plant population and the severity of plant damage. In Minnesota, reductions in corn grain yield of around 5, 12, and 24% are expected when the plant population is reduced to 28,000, 22,000, and 16,000 plants per acre, respectively. The severity of frost damage on surviving plants also should be assessed. Early-season frost injury tends to delay corn maturity by a few days in the fall.

Replanting considerations

Before replanting, consider the yield potential of the existing crop, replanting costs, and the yield potential of a replanted crop. Replant costs including time, fuel, seed costs, and penalties associated with hybrid selection if the best genetics are no longer available. In Minnesota, corn planted on May 20 to 25 yields about 87 to 95% of that planted in late April to early May. If replanting, consider the length of the remaining growing season and select hybrids of appropriate maturity. Growing degree days available for various planting dates in Minnesota and the relationship between this and hybrid selection is available at: Selecting Corn Hybrids for Grain Production.

Additional information on corn production from University of Minnesota Extension is available at: http://z.umn.edu/corn.

Related articles

Coulter, J. 2015. Agronomic responses of corn to planting date and plant density. http://www.extension.umn.edu/agriculture/corn/planting/corn-planting-date-and-plant-density/ (verified 16 May 2016). Univ. of Minnesota Extension, St. Paul.

Coulter, J. 2009. Optimum plant population for corn in Minnesota. http://www.extension.umn.edu/agriculture/corn/planting/optimum-plant-population-for-corn-in-minnesota/ (verified 16 May 2016). Univ. of Minnesota Extension, St. Paul.

Coulter, J., and R. Van Roekel. 2009. Selecting corn hybrids for grain production. http://www.extension.umn.edu/agriculture/corn/hybrid-