

AGRONOMIC Spotlight



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Effect of Wet Weather Condition on Corn Standability

Wet conditions throughout the growing season may result in corn standability issues. In some cases, excessive soil moisture can limit corn root development, preventing the plants to properly anchor in the soil. These shallow root systems pose potential problems to the corn crop such as drought stress and nutrient deficiencies. This appears to be especially true in late-planted corn fields. Producers are also reporting uneven stands as a result of the wet conditions. These factors coupled with potential corn rootworm infestations raise concern over the potential for stalk and/or root lodging as the season progresses.

Shallow Root Systems and Lodging

Shallow root systems may develop due to excessive early-season moisture. Under moist conditions, brace root formation may not come quick enough to support the top growth of corn. In addition, the excessive moisture conditions can cause incomplete brace root development that leads to plant lodging.

Once pollination occurs the corn plant allocates more energy towards filling kernels and not expanding the root system. A poorly developed root system can result in stalk cannibalization and increase the risk of stalk rot infection which impacts stalk strength and late-season standability.

Corn can root lodge as early as the late vegetative stages and as late as harvest maturity. Corn products can vary in their susceptibility to root lodging with a higher probability for this to occur on hybrids that exhibit rapid growth. In addition, poor root development from cold soil conditions, poor seed placement at planting, soil compaction, herbicide injury and rootworm larvae feeding can contribute to root lodging. Mellow seedbeds and high nitrogen (N) levels can also contribute to the possibility of root lodging.

Recovery from Root Lodging

Depending on the severity of the root lodging, corn plants can typically recover by “goosenecking” back upright. The extent of the goosenecking is directly related to the corn growth stage when the root lodging



Figure 1. Root-lodged corn.

occurred. Waist-high corn could gooseneck up to 6 inches off center and shoulder high corn could gooseneck 12 inches or more. Goosenecked corn can make harvesting difficult.

Effect of Root Lodging on Yield

Simulated root lodging studies were conducted in 1985 and 1986 at The University of Wisconsin to evaluate the effect on corn yield. Overall, yields were reduced 3-4% when corn was lodged at the V10-V12 growth stages, 8-10% when lodged at the V13-V15 growth stages, and 12-24% when lodged at the V17-R1 growth stages. Yield loss is expected to be less if corn lodges after the R1 (silking) stage because VT/R1 are the most critical stages for loss to occur.

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Even though a lodged corn plant can gooseneck and again grow upright, negative impacts can still occur throughout the remaining growing season. Corn that has lodged early in the season may have reduced pollination due to delayed silking. Lodging may not only affect yield components, but also disrupt the entire plant orientation. Reorienting the crop canopy to better intercept light comes at a high energy cost to the plant.

Scouting for Root Lodging

Fields should be scouted to identify problems at an early stage. Fields with root lodging or goosenecking should be monitored throughout the remainder of the growing season. Depending on the severity of the root lodging, fields may need to be harvested early. Although high grain drying costs may be a concern when harvesting wet grain, this expense will likely be a better option compared to the loss of yield due to increased lodging later in the fall. Harvesting goosenecked corn can be a challenge as rows can be hard to follow and ears will be closer to the ground. Harvest speeds should be reduced to minimize losses.

Nutrient Deficiencies

Nitrogen(N) loss is a major concern when soils remain wet for long periods of time and corn forms shallow root systems. Denitrification and leaching can result in significant N loss in soil. Corn with N deficiency may appear light green in color and lower leaves may have yellow mid rib progressing towards yellowing of the entire leaves. Other nutrient deficiency symptoms may appear in corn with shallow roots.

Irrigating Shallow-rooted Corn

Irrigation management must be adapted for corn plants with shallow roots. A shallow root zone means there is less soil volume being accessed by the root system to supply the plants water needs; meaning irrigating will likely need to occur more frequently with less water applied each time in order to keep moisture in the active rooting zone and minimize pushing available N past the roots where the plant is unable to access it. Consider seeking irrigation management advice from a certified crop consultant or University irrigation specialist if you are dealing with fields where shallow roots are detected.

Understanding the cause for root lodging can provide valuable information and direction when making field management decisions. In areas where corn rootworm larvae feeding can be an additional problem to root lodging, soil insecticides, crop rotations or *Bt* hybrids resistant to rootworm feeding may be options for future use. Also corn hybrids vary in their susceptibility to lodging, producers plagued with root lodging issues should select a hybrid based on its root lodging rating.

Source: Carter, P.R. and K.D. Hudelson. 1988. Influence of simulated wind lodging on corn growth and grain yield. J. Prod. Agric. 1:295-299.

Corn stalk rots. Univ. of Illinois Extension. RPD No. 200. December 1995.

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Vagts, T. 2003. Reducing harvest losses in lodged corn fields. Iowa State University Extension. <http://www.extension.iastate.edu> (verified 7/16/10).

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.

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