

USE OF NITROGEN FERTILIZER SOURCES TO ENHANCE TOLERANCE AND RECOVERY OF NEW CORN HYBRIDS FROM EARLY SEASON SOIL WATERLOGGING

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Abstract

Corn (*Zea mays* L.) production losses due to temporarily flooded or saturated soils resulting from excessive precipitation are a persistent problem in Missouri and the Midwest Region of the United States. In 2011 alone, monetary losses for corn and soybean (*Glycine max*) production due to excessive flooding in the Midwest were calculated to be more than \$1.6 billion. Application of different sources of nitrogen (N) fertilizer may promote increased flood tolerance and recovery in interaction with different corn hybrids. The objectives of this study were to: 1) assess the interactive effects of different corn hybrids and pre- and post-waterlogging applications of different N fertilizer sources on corn yields; and 2) determine the effects of the treatments and excessive soil moisture conditions on plant available soil inorganic N during the growing season. A three-year field experiment having a randomized split-split-split plot design with three replications was established in 2013 at the Greenley Research Center in Northeast Missouri. Corn hybrids were pre-screened for flood tolerance in the greenhouse and two of the hybrids were selected and subjected at the V3 growth stage to seven days of soil waterlogging. Fertilizer treatments used were urea (NCU), urea plus a nitrification inhibitor (NCU+NI), and polymer coated urea (PCU) applied at a rate of 168 kg N ha⁻¹. A rescue N application of urea fertilizer plus urease inhibitor (NCU+UI) was also applied at the rate of 84 kg N ha⁻¹ to half of each plot after the waterlogging treatment. In the 2013 season, both hybrids under the seven day waterlogging treatment resulted in significantly lower grain yields than the non-waterlogged treatment. Significant increases in yield with pre-plant NCU, PCU and NCU+NI compared to the control were obtained with hybrids under waterlogged conditions. Results for the 2014 growing season will be included in this presentation.

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