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Research Methods

Abstract

Our present world population of 7.4 billion people depends on the availability and use of nitrogen (N). Nitrogen fertilizer is widely used in global cereal production, with the three main cereals being maize, rice, and wheat. Nitrogen Use Efficiency (NUE) is 33% for cereal production in the world, meaning 67% is lost to the environment or sequestered in organic fractions. Present challenges are centered on improving global NUE through the utilization of mid-season sensor based-N management strategies. This emerging field encumbers estimates of final grain yield utilizing estimated mid-season biomass, projected growth rates for the growing-environment and season in question, which ultimately leads to tailored fertilizer N rates. This approach delivers overnight increases in NUE through customized fertilization rates for each unique set of growing conditions. The objective of my thesis study is to determine the optimum preplant fertilizer nitrogen (N) rate for maize (Zea mays L.) and sorghum (Sorghum bicolor) in a dryland production environment. Delayed or reduced applications of N are ideal so long as final grain yield is not sacrificed. This approach has the potential to increase NUE and provide a positive economic return to producers.