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DEVELOPMENT OF A METHOD FOR EVALUATING THE YIELD GOAL APPROACH

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ABSTRACT

Yield goals have been used to determine N recommendations in South Dakota, North Dakota, and western Minnesota. However, some states, such as Wisconsin and Iowa have eliminated yield goals from N recommendations because of poor correlation between yield and economically optimum N rates. The objective of this study was to determine the feasibility of switching from a yield goal approach to a non-yield goal approach in South Dakota. Field experiments were conducted in Aurora, South Dakota between 2002 and 2003. Treatments were natural rainfall and natural rainfall + irrigation and four N rates (0, 60, 120, 180 kg N /ha). Plant samples were analyzed for ^{13}C discrimination (Δ) and total N. Research results showed that; (i) adding N rates increased yield and Δ ; (ii) applying supplemental irrigation increased yield and decreased Δ ; (iii) yields were not influenced by an interaction between water and nitrogen; and (iv) $\delta^{15}\text{N}$ values increased with irrigation and decreased with increasing N. These results suggest that nitrogen and water stress had independent impact on yield, and irrigation increased N mineralization. These findings partially support the hypothesis that fertilizer rates should be independent of yield goal. Research needs to be conducted to determine the long term impact of changing the recommendation approach on soil N levels.