Influence of Nitrogen (N) Fertilizer on the Uptake of 15N-Labeled Urea and Ammonium Sulfate by Soft Red Winter Wheat (Triricum aestivum L) in the Presence and Absence of Annual Bluegrass (Poa annua). (S04-griggs130547-Oral)

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Abstract:

In recent years there has been speculation that infestations of annual bluegrass (Poa annua) have led to reduced N uptake efficiency by winter wheat (Triticum aestivum L) because of either increased ammonia volatilization loss and/or uptake by the annual bluegrass. Our objectives in this study were to assess the mechanism by which the bluegrass was affecting uptake efficiency, and to determine the feasibility of using an N fertilizer that was less susceptible to ammonia volatilization. Wheat (Pioneer 2580) was sown in 1.6m (18cm row spacing) by 1.17m microplots with 50% of the plots bluegrass free and 50% infested with bluegrass. Urea and ammonium sulfate 15-N labeled (2 atom% 15-N) was applied at four rates (0, 89, 134, or 179 kg N/ha). At the 134 kg N/ha rate, ammonia volatilization loss was 12% and <1% in wheat plots and 2.7% and <1% in bluegrass plots for urea and ammonium sulfate respectively. Conversely, annual bluegrass accumulated 82 kg N/ha and 43% of the N fertilizer applied as urea, indicating annual bluegrass is an effective competitor with winter wheat for the fertilizer N. Second year data revealed that infested wheat had only slightly higher ammonia volatilization and wheat yields and dry matter accumulation was lower. This suggests that ammonia volatilization is a minor loss mechanism in winter wheat in the presence of bluegrass and N-uptake by the blue grass significantly reduces yields.

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