

Impact of Top-Dressing Nitrogen Fertilizer at Boot Stage on Spring Wheat Performance

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Objective Determine the response of spring wheat to a top-dress application of nitrogen fertilizer at the boot stage of the wheat crop. Supplemental nitrogen fertilizer applications are often made to spring wheat as a means to either enhance grain protein or to increase grain yields. Supplemental applications at the boot stage may be more effective in enhancing grain protein content than grain yield. A grain yield response may be expected if nitrogen availability was suspected to be deficient relative to the yield potential being anticipated based on the prevailing environmental conditions.

Materials and Methods

- An application of urea nitrogen fertilizer was top dressed to the spring wheat on June 21 when the crop was at Feekes 9.0, boot stage. A total of 109 lbs per acre of urea or 50 lbs per acre of actual nitrogen was applied. This application was made to a dry wheat canopy. Within one day the study was irrigated with 0.75 inches of water to wash in the nitrogen fertilizer. This study was planted on land that had a projected total of 140 lbs/acre of N based on 40 lbs soil test, 60 lbs N via NH₃ and 40 lbs N legume credit.

Results and Discussion

Application of an additional 50 lbs of nitrogen to wheat at the boot stage did not affect grain yield but did have a significant and positive influence on grain protein. The top-dressed nitrogen resulted in a nearly one-point increase in protein. The protein increase associated with nitrogen at the boot stage was consistent among the four spring wheat varieties evaluated. Additional nitrogen at the boot stage did not cause a significant grain yield response, although there appeared to be a trend for a slight yield reduction. This trend was consistent with each of the varieties tested.

Table 1. Influence of nitrogen fertilizer on grain yield and quality of wheat when nitrogen was top-dressed at the boot stage.

Management Factor	1000 KWT gram	Test Weight lb/bu	Grain Protein %	Grain Yield bu/ac
Untreated Check	28.5	58.6	13.8	53.0
Nitrogen at Boot	28.3	58.1	14.7	51.7
LSD 0.05	NS	0.3	0.17	NS
LSD 0.01	NS	0.4	0.23	NS
# Obs	16	16	16	16

Planting Date = May 1 ; Harvest Date = August 7 ; Previous Crop = Soybean

Table 2. Influence of top-dressed nitrogen at boot stage on performance of four spring wheat varieties.

Variety	Management Factor	1000 KWT gram	Test Weight lb/bu	Grain Protein %	Grain Yield bu/ac
Faller	Untreated Check	26.7	55.8	13.2	47.5
Faller	Nitrogen at Boot	26.8	55.6	14.0	46.8
Prosper	Untreated Check	28.6	56.6	13.2	47.1
Prosper	Nitrogen at Boot	27.7	56.1	14.0	45.1
Barlow	Untreated Check	28.7	59.6	14.1	57.8
Barlow	Nitrogen at Boot	28.9	58.8	15.2	56.0
Glenn	Untreated Check	30.1	62.3	14.7	59.7
Glenn	Nitrogen at Boot	29.7	62.0	15.5	58.6
MEAN		28.4	58.3	14.2	52.3
C.V. (%)		4.0	0.7	1.7	6.7
LSD 0.05		NS	NS	NS	NS
LSD 0.01		NS	NS	NS	NS
# Obs		4	4	4	4

Planting Date = May 1 ; Harvest Date = August 7 ; Previous Crop = Soybean