

Evaluation of Nitrogen Rate and Sulfur Topdress in Wheat

Andy Kleinschmidt, Extension Agriculture and Natural Resources Agent

Gary Prill, Extension Associate, Farm Focus/ Research Coordinator

Objectives

To evaluate the yield response of wheat to two different nitrogen topdress rates and the addition of sulfur in a spring topdress application. Farmers typically apply 90 to 100 pounds of nitrogen in a topdress application in the spring and often don't use previous nitrogen credits. This study will try to determine if a lower rate of topdress will provide the same yields, and if the addition of sulfur will help with nitrogen utilization.

Background

Cooperator:	Marsh Foundation/ Farm Focus	Fertilizer:	broadcast 320 lb/A 9-25-19 at planting; variable variable topdress (see Methods)
County:	Van Wert	Herbicide	1 pt/A MCPA April 17
Nearest Town:	Van Wert	Insecticide:	none applied
Soil Type:	Hoytville silty clay loam	Variety:	Wellman 9910
Drainage:	Tile	Row Width:	7.5 inch
Previous Crop:	Soybeans	Planting Rate:	166 lb/A
Tillage:	No-till	Planting Date:	October 30, 2001
Soil Test (2002):		Harvest Date:	July 8, 2002 (Rep. 1 and 2) July 9, 2002 (Rep. 3)
Rep. 1 and 2	pH 6.2, P 33 ppm, K 137 ppm		
Rep. 3	pH 6.5, P 85 ppm, K 249 ppm		

Methods

This study was set up with two different nitrogen topdress rates with and without sulfur for a total of four treatments. The treatments are 75 lb/ A nitrogen, 75 lb/ A nitrogen with 9.4 lb/ A sulfur, 100 lb/ A nitrogen, and 100 lb/ A nitrogen with 12.5 lb/ A sulfur. The straight nitrogen treatments were applied using 28-0-0 liquid fertilizer, and the treatments with sulfur were applied using 24-0-0-3 liquid fertilizer. There are three replications of each treatment set up in a complete randomized block design. Two replications are in one field and the third replication is in a second field adjacent to the first field with similar soil type and fertility. The study was planted using a John Deere 750 no-till drill. Plot size is 75 feet wide by 900 feet minimum length.

Harvest populations (July 8) were estimated by counting the number of wheat heads in a one-foot section at 10 different locations in each individual plot. The average of the number of heads counted per one foot was converted to heads per square foot. The center 56 feet of each plot was harvested with a John Deere 6620 combine. Each harvested plot was weighed by a calibrated weigh wagon, and moisture was determined using a Dickey John calibrated moisture meter. Yields reported in this study have been adjusted to 13.5% moisture standard.

Results

Table 1. Harvest Population, Moisture, and Yield.^a

Treatment	Harvest Population (heads/ft²)	Harvest Moisture (%)	Yield (bu/A)
100 lb./A nitrogen + 12.5 lb./A sulfur	64.0 a	12.7	83.2 a
100 lb./A nitrogen	55.0 b	12.7	79.4 ab
75 lb./A nitrogen + 9.4 lb./A sulfur	58.0 b	12.8	75.8 bc
75 lb./A nitrogen	54.3 b	12.9	71.7 c
LSD (0.05)	5.1	NS	4.1
F-test	9.1	<1	17

Summary

Results from this one-year study indicate that the addition of 25 lb/ A nitrogen significantly increased yields when independently comparing the two nitrogen rates with sulfur and the two nitrogen rates without sulfur. It has been suggested that sulfur added to the nitrogen application increases the efficiency of nitrogen. Although the addition of sulfur may have possibly helped with nitrogen utilization, the addition of sulfur at equivalent nitrogen rates did not significantly improve yields in this study.

According to the *Tri-State Fertilizer Recommendation for Corn, Soybeans, Wheat, and Alfalfa* (Extension Bulletin E-2567, Rep. August 1996), no accurate soil test exists for sulfur at this time. The decision to apply sulfur should be based on the following criteria and observations — low organic matter, sandy soils, and visual symptoms such as a yellow color in the presence of adequate nitrogen. A plant analysis is the best diagnostic tool for confirming sulfur availability.

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For additional information, contact: Andy Kleinschmidt or Gary Prill
The Ohio State University
kleinschmidt.5@osu.edu or prill.1@osu.edu