Nitrogen Rate and Super N® Topdress in Wheat

Andy Kleinschmidt, AGNR Extension Educator- Van Wert County
Gary Prill, Extension Associate, Farm Focus/Research Coordinator

Objectives

The objective of this study is to evaluate the yield response of wheat to two different nitrogen topdress rates and the addition of Agrotain Super N® nitrogen loss inhibitor in a spring topdress application. Farmers typically apply 90-100 pounds of nitrogen in a topdress application in the spring, and often do not consider 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 Super N® nitrogen loss inhibitor will help prevent nitrogen loss resulting in improved yields.

Background

Cooperator:	Farm Focus, Inc.		planting; variable topdress
County:	Van Wert		(see Methods)
Soil Type:	Hoytville silty clay loam,	Herbicide:	.75 pt/A MCPA Amine
	Haskings loam	POST (April 15)	with 28% UAN topdress
Drainage:	Non-systematic Tile	Insecticide:	None applied
Previous Crop:	Soybeans	Variety:	Pioneer 25R47 bearded
Tillage:	No-till	Row Width:	7.5 inch
Soil Test (2002):	pH 6.5, P 39 ppm, K 125 ppm	Planting Rate:	125 lb/A
Fertilizer:	300 lb/A 10-20-20 blend	Planting Date:	October 7, 2003
	surface broadcast prior to	Harvest Date:	July 1, 2004

Methods

This study was designed as four treatments using two nitrogen topdress rates, 60 lb/A and 90 lb/A, plus the addition of Super N® nitrogen loss inhibitor, at a rate of 3.25 gallons/ton of 28% UAN fertilizer, to each nitrogen rate. Six replications of each treatment were set up in a randomized complete block design. The nitrogen source used for all treatments was 28% UAN. MCPA Amine herbicide was included in all topdress treatments for weed control in the plots. Applications of the two nitrogen only treatments were made first, and then Super N® was added to a known amount of 28% UAN for the treatments with Super N®. Topdress applications were broadcast on April 5 using a Demco field sprayer equipped with floodjet nozzles operated at variable application speeds to maintain pressures between 26-30 psi. The study was planted using a John Deere 750 no-till drill. Plot size was 28.75 feet wide by 1,000 feet long.

Harvest populations (July 1) were estimated by counting the number of wheat heads in a one foot section of row at 10 different locations in each individual plot. The average of the number of heads counted per one foot of row was converted to heads per square foot. Plots were harvested with a John Deere 6620 combine equipped with an AgLeader PF3000 yield monitor with GPS. Yields were calculated based on calibrated yield monitor wet grain weights and moistures. Yields reported in this study have been adjusted to a 13.5% moisture standard.

Results

Table 1. Harvest population, moisture and yield means[1]

Treatment	Harvest Population	Moisture	Yield
	(heads/ft^2)	(%)	(bu/A)
90 lb/A nitrogen	73.2 a	12.9 ab	101.6 a
90 lb/A nitrogen w/ Super N	73.5 a	13.0 a	99.1 a
60 lb/A nitrogen	61.8 b	12.7 b	94.2 b
60 lb/A nitrogen w/ Super N	65.1 b	12.8 ab	93.6 b
LSD (0.05)	6.6	0.2	3.0
F-test	7.1	6.0	15.2
CV(%)	7.9	1.0	2.5

[1]Means followed by the same letter in same column are not significantly different
NS = not significant

Summary

Results from this one-year study indicate that the additional 30 lb/A nitrogen significantly increased wheat yields. Based on in-season nitrogen pricing of $0.09/lb for 28% UAN, and $3.15/bushel wheat price at harvest, the additional 30 lb/A nitrogen required a 3 bu/A yield increase to cover the additional cost. With an average increase of 6.5 bu/A for the higher nitrogen rate, this provided a net increase of $11.00 per acre.

The results did not indicate a statistically significant yield increase from the addition of Super N® to either rate of nitrogen. According to the manufacturer, Super N® helps to improve nitrogen utilization by inhibiting volatilization and retarding denitrification. Volatilization of nitrogen can also be reduced by incorporation into the soil, which can happen through significant rainfall shortly after application. The first rainfall following topdress applications (April 5) occurred on April 12 (.22 inches). Rainfall amounts of 0.5 inches or more are generally considered adequate for incorporation of the UAN into the soil. Although this amount of rainfall was not received for an extended period of time after application, the dry soil conditions experienced in early April in 2004 would have tended to slow both volatilization and denitrification processes.

As always, it is best to use multiple sources and years of data when making a decision as to the optimum nitrogen topdress rate or the use of nitrogen additives. Results from a similar study conducted at Farm Focus in 2003 support this year's results in that there was a significant yield response from the additional 30 lb/A of nitrogen, but the addition of Super N did not provide a significant yield response.

Acknowledgement

The authors express appreciation to Steve Parrish, sales representative for Agrotain International, for supplying Super N® for this trial. Thanks also to Pioneer Hybrids for supplying the seed used for this trial.

For more information, contact:
Andy Kleinschmidt, or Gary Prill
OSU Extension- Van Wert County

1055 South Washington St., Van Wert, OH 45891
(419) 238-1214
kleinschmidt.5@osu.edu, or prill.1@osu.edu