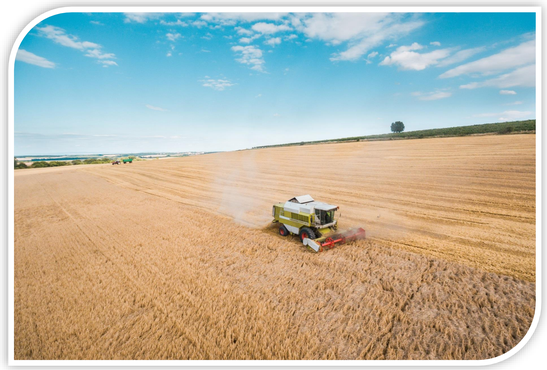
Soft Red Winter Wheat Response to Nitrogen Rate on an Ohio Lakebed Soil

Edwin Lentz, Extension Educator, The Ohio State University Extension Hancock County, Findlay, OH 45840



ABSTRACT

Producers rely on university research to apply the proper rate of nitrogen for optimal wheat yields and to reduce the risk of nutrient loss into the environment. Few nitrogen rate studies have been completed in recent years in the Eastern Corn Belt. The objective of this study was to determine the nitrogen rate for optimal yields for soft red winter wheat. AGI 217B, a medium-maturity variety, was established in the fall of 2019 on the OARDC Northwest Agricultural Research Station near Custar, Ohio. Seven nitrogen rate treatments were applied as urea-ammonium nitrate between greenup and early stem elongation (Feekes Growth Stage 6). Rates included in the study were 0, 40, 70, 90, 110, 130, and 150 pounds per acre. All treatments received 30 pounds of nitrogen per acre prior to planting. Experimental design was a completely randomized block replicated four times. Analysis was a simple ANOVA. Grain yield, test weight, and spike number were measured for each plot. Yields were 31.1, 45.7, 73.9, 84.3, 90.2, 88.2, and 85.8 bushels per acre for the 0, 40, 70, 90, 110, 130 and 150 nitrogen rates, respectively. All treatments were significantly better than the 0 check, $p<0.01$. Among the other treatments, significant differences were only between the lowest and highest nitrogen rates. Large amounts of nitrogen were lost because of the excessive spring rain; thus, an optimal spring nitrogen rate was difficult to establish for this given study.

INTRODUCTION

Current Ohio N rate recommendations for wheat were based on older studies that used public varieties. Producers question whether these recommendations for N are too low for maximum yield since most acres are planted to larger yielding private varieties.

OBJECTIVE

To determine N rates for optimum yields in soft red winter wheat

METHODS

- Medium maturity variety – AGI 217B
- Seeded at 1.8 million seeds/A in soybean stubble, no till
- Seeded within two weeks of fly-free date
- 10 x 74 foot plots, 11 center rows harvested
- 7.5-inch row spacing
- 30 lb/A N applied prior to planting
- Seven treatments of broadcast urea-ammonium nitrate (28-0-0) applied at Feekes GS 5 at 20 - 30 pound increments per acre from 40 to 150, plus a zero check.
- Experimental design randomized block replicated four times
- Statistical analysis – simple ANOVA

RESULTS

- Yields increased with increased N rate until 90 lb N rate
- Alll N rate treatments had larger test weights than the zero check
- Spike numbers were less below the 90 lb N rate

Means for grain yield, test weight, and spike number (heads) in response to N rate.

N Rate	Yield	Test Weight	Spikes
lb/A	bu/A	lb/bu	/ft row
150	85.8^{A}	57.4^{A}	47^{AB}
130	88.2^{A}	58.1^{A}	48^{AB}
110	90.3^{A}	57.2^{A}	49^{A}
90	84.3^{A}	57.5^{A}	45^{AB}
70	73.9^{B}	52.2^{A}	42^{B}
40	45.7^{C}	56.5^{A}	29^{C}
0	31.1^{D}	54.5^{B}	24^{C}
lsd 0.10	6.9	1.8	7
cv (%)	7.9	2.3	14

Means with different letters are significant; ($P \leq 0.10$)

CONCLUSIONS

- For this year, optimal N rate occurred at the 90 lb N rate.
- Test weight and spike number were affected at the low N rates

OUTREACH AND IMPACT

- Data has been presented at county and regional meetings to producers, consultants, and retailers.
- Data is one year of multiyear research to develop new N rate recommendations for Ohio wheat

Grain Yield for Spring N Rate