

THE EFFECT OF NITROGEN RATE ON WHEAT YIELD

TRIAL OVERVIEW

- As farmers push grain yields higher, are there differences in how wheat varieties respond to increased nitrogen rates?
- Do wheat yields plateau or continue to increase at higher nitrogen rates?

RESEARCH OBJECTIVE

- This study evaluated the yield response of winter wheat varieties to differing nitrogen rates in order to optimize best management practices for dryland production systems.

Location	Soil	Previous Crop	Tillage Type	Planting Date	Harvest Date	Potential Yield/Acre	Planting Rate/Acre
Gothenburg, NE	Hord silt loam	Soybean	Vertical tillage	10/11/2016	07/15/2017	90 bu/acre	1.4M

SITE NOTES:

- Five wheat varieties from three maturity groups were used in this study: WB4462 (early-medium maturity), WB4458 (early-medium maturity), WB4721 (medium maturity), WB4303 (medium maturity), and WB-Grainfield (medium-late maturity).
- This study was conducted on a dryland field, planted into vertically-tilled soybean residue.
- Nitrogen (N) rates were 0, 60, 90, 120, and 150 lbs/acre of N, which was applied in the spring as 32-0-0 with stream bars.
- The study was designed as a randomized split plot with four replications, with N rate as the whole plot and variety as the subplots.
- Weeds were controlled uniformly throughout the season and no insecticides or fungicides were needed.
- Soil test results: pH – 6.6, organic matter – 4%, residual N – 37 lbs/acre, residual P – 40 ppm.
- Yield was the only factor measured at harvest.

UNDERSTANDING THE RESULTS

Month	Gothenburg, NE	
	2016-17 total	Average
	Inches	
September	0.61	1.55
October	2.69*	1.41
November	0.55	0.89
December	0.38	0.45
January	0.7	0.45
February	0.43	0.51
March	2.7	1.41
April	1.5	2.26
May	2.53	3.71
June	0.75	3.67
July	1.52	3.23
Total	14.36	19.54

Table 1. Accumulated moisture at Gothenburg. *Two inches of irrigation water was applied on October 21, 2016 to ensure good stand establishment.

- Wheat varieties responded differently to N rates. The highest yield was observed in four of the five varieties at 120 lbs/acre of N while the highest yield for WB4458 was at 150 lbs/acre of N (Figure 1).
- The lowest yields across all varieties was at the 0 lbs/acre of N treatment, which was between 18 to 30% below the highest yield observed for each variety.

WHAT DOES THIS MEAN FOR YOUR FARM?

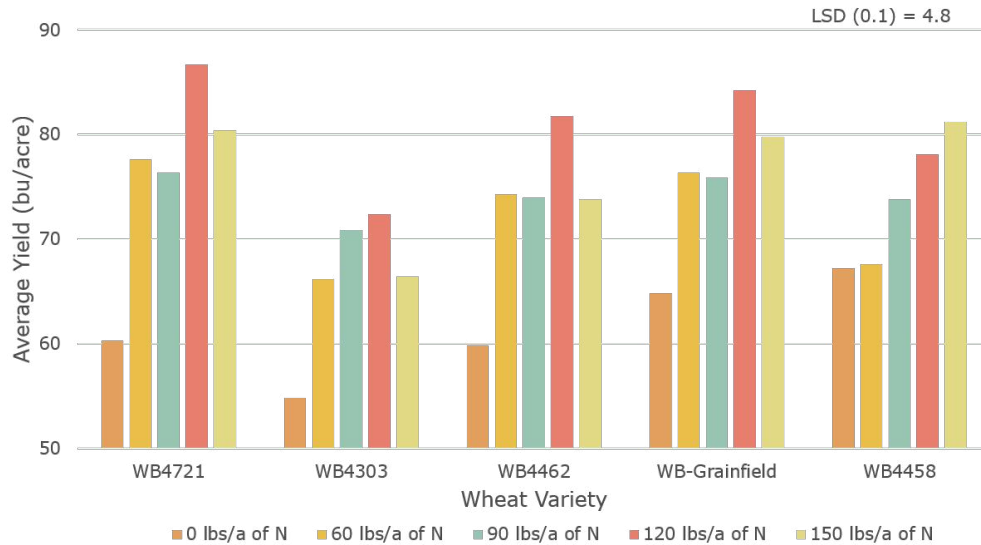


Figure 1. Wheat yields by nitrogen rate

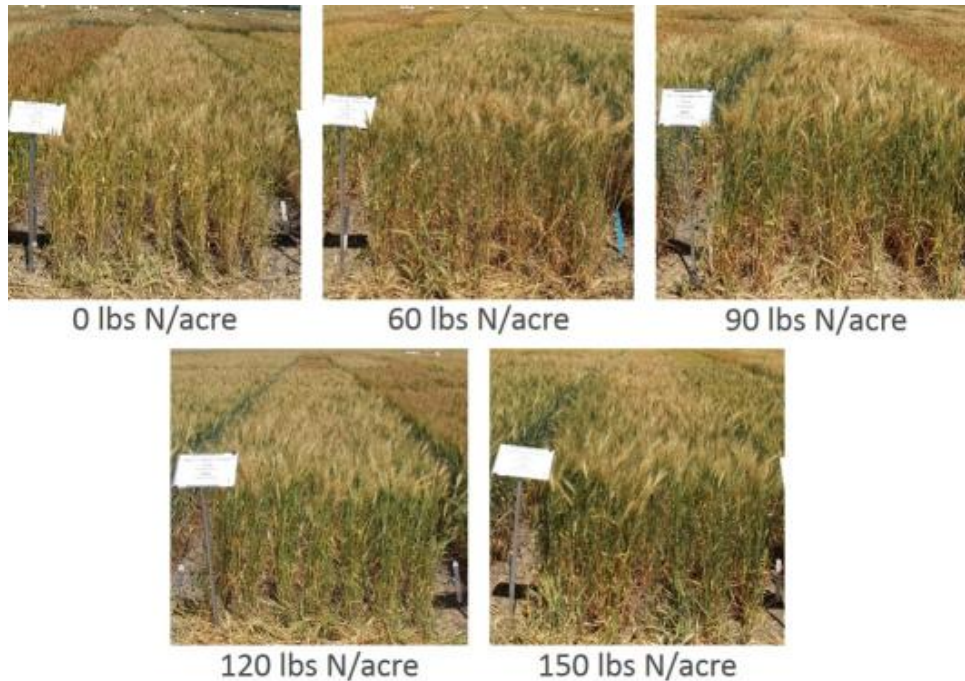


Figure 2. Plant growth at the various nitrogen rates in WB-Grainfield

- The results from this study were not conclusive to understand if wheat varieties respond differently to increased rates of nitrogen. Further research will be completed during the 2017-2018 season.
- Excessive foliage was observed in the 150 lbs/acre of N treatment, which likely caused more water to be used earlier in the growing season, thus decreasing yield. Split applications of N could potentially reduce excessive vegetative growth.

LEGAL STATEMENT

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