

Supplemental Nitrogen on Soybeans

Andy Kleinschmidt, Agriculture and Natural Resources Extension Agent

Ed Lentz, Extension Northwest District Agronomist

Gary Prill, Farm Focus Research Coordinator

Objective

Evaluate the yield response of soybeans to supplemental nitrogen applied at the R4 (full pod) stage.

Background

Cooperator:	Vantage Career Center/ Farm Focus	Herbicide:	PRE: Roundup Ultra (1.5 pt/A) + AMS (3.4 lb/A)
County:	Van Wert		POST: Roundup Ultra (1.5 pt/A) + AMS (3.4 lb/A)
Nearest Town:	Van Wert	Variety:	Wellman W3127RR (treated)
Soil Type:	Hoytville	Planting Date:	May 17, 2000
Drainage:	Tile	Planting Rate:	200,000 seeds/A
Tillage:	No-till	Row Width:	7.5 inches
Soil Test:	pH 5.4, P 41 ppm, K 156 ppm	Harvest Date:	October 2, 2000

Methods

The experimental design was a randomized complete block with four replications of three treatments. Treatments included: (1) 83 lb. per acre actual nitrogen from urea plus Agrotain® (5 qt. per ton of urea), (2) one pass of application equipment without fertilizer, and (3) no fertilizer or equipment traffic. Nitrogen was applied during the R4 growth stage (full pod development prior to seed formation) on August 4, 2000, using a broadcast spreader on a tractor in a 15-foot swath. One pass was made for each treatment to produce a 15-foot-wide by 712-foot-long treatment area, with a 10-foot-wide border between treatments. All plots were planted using a John Deere 750 no-till drill.

Harvest populations were evaluated by counting the number of plants on each side of a tape for a distance of 17.5 feet at three different locations in the treatment plot. The average of the number of plants counted per 17.5 feet was converted to plants per acre. The center 14.5 feet of each plot were harvested and then weighed by a calibrated weigh wagon, and grain yield was determined at 13% moisture.

Results

Table 1. Soybean Yield and Harvest Population.

Treatment	Harvest Population (plants/A)	Yield (bu/A)
Nitrogen	123,200	56.2 a
Equipment traffic	128,100	58.9 a
No traffic	119,000	65.2 b
LSD (P =0.05)	NS	5
CV (< 15%=credible)	10.90%	3.70%

Results with the same letter are not significantly different at P = 0.05.

NS = not significant.

Summary

Supplemental nitrogen applied to soybeans during the R4 stage did not increase yields. This study complements work done at Farm Focus in 1999, whereby nitrogen applied to soybeans at the R2 reproductive stage did not increase yields. Urea requires at least 0.5 inch of rainfall for incorporation, otherwise nitrogen may be lost from volatilization. Agrotain can delay these losses 10-14 days after application. In 2000, total rainfall accumulation after 14 days was 1.37 inches, with 0.98 inches of rainfall occurring within two days of the application. Thus, it is safe to assume there was adequate incorporation of the urea.

In this study, the results showed a significant decrease in yield for the two treatments that received equipment traffic during the R4 reproductive stage. This can be expected when a plant is run over during a critical stage of growth. Fertilizer equipment used in this study left two tire tracks in the 14.5-foot-wide strip that was harvested from each plot. This indicates that when an application is made to soybeans during this late stage, it probably should be done by aircraft, or the producer should be willing to accept yield loss.

Acknowledgment

The authors wish to express their appreciation to Royster Clark for donating material used in this study.

For additional information, contact Andy Kleinschmidt, Gary Prill, or Ed Lentz
The Ohio State University Extension
kleinschmidt.5@osu.edu, prill.1@osu.edu, or lentz.38@osu.edu