

Soybean Yield Response to Nitrogen

Rationale and Objective

- As higher soybean yields become more common due to improvements in genetics and management practices, nitrogen additions may be needed to maximize potential yields.
- A nitrogen "budget" developed from numerous research studies shows that soil and fixed nitrogen are generally sufficient to supply nitrogen needs at yields up to 60 bu/acre. As yields increase to 80 bu/acre and higher, a nitrogen deficit may result.
- An experiment was conducted in Johnston, IA in 2015 to evaluate yield response of two Pioneer® brand soybean varieties to nitrogen fertilizer applied at the R2 growth stage.

Study Description

Location: Johnston, IA **Replicates:** 5
Planting Date: June 1, 2015 **Row Width:** 30 inches
Plot Layout: Small plots (10 x 17.4 ft.), RCBD

Factors:

- **Pioneer® brand soybean varieties**

Variety/Brand¹: 93M11 (R)
P25T51_R (R)

- **Nitrogen Rate:** 0, 25, and 50 lbs/acre

- Nitrogen was hand-applied as ammonium nitrate at the R2 growth stage (full flowering).

Results

- The average yield of P25T51_R (R) was significantly greater (+2.4 bu/acre) than that of 93M11 (R) at $\alpha=0.05$ (Figure 1).
- Application of 50 lbs/acre of nitrogen significantly increased average soybean yield relative to the non-treated check (+4.8 bu/acre) (Figure 2).
- No significant effect on soybean yield relative to the non-treated check was observed with the 25 lbs/acre nitrogen application.
- The yield effect of nitrogen treatment did not significantly differ between soybean varieties.
- It is notable that yield levels in this study were below the range where a nitrogen deficit might be expected based on previous research, but a significant yield increase with nitrogen application was still observed.



Soybean nitrogen fertility experiment at Johnston, IA prior to harvest (October 8, 2015).



Figure 1. Average yield of Pioneer® variety 93M11 (R) and Pioneer® variety P25T51_R (R).

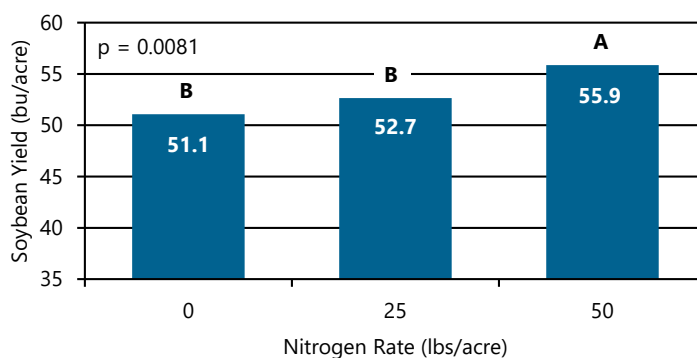


Figure 2. Average soybean yield by nitrogen rate. Means designated with the same letter are not significantly different at $\alpha=0.05$.

Glyphosate Tolerant

¹All Pioneer products are varieties unless designated with LL, in which case some are brands. R - Contains the Glyphosate Tolerant trait. Always follow grain marketing, stewardship practices and pesticide label directions. Varieties with the glyphosate tolerant trait (including those designated by the letter "R" in the product number) contain genes that confer tolerance to glyphosate herbicides. Glyphosate herbicides will kill crops that are not tolerant to glyphosate. Pioneer® brand products are provided subject to the terms and conditions of purchase which are part of the labeling and purchase documents. 2015 data are based on average of all comparisons made in one location through October 8, 2015. Multi-year and multi-location is a better predictor of future performance. Do not use these or any other data from a limited number of trials as a significant factor in product selection. The foregoing is provided for informational use only. Please contact your Pioneer sales professional for information and suggestions specific to your operation. Product performance is variable and depends on many factors such as moisture and heat stress, soil type, management practices and environmental stress as well as disease and pest pressures. Individual results may vary.

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