

Soybean Yield Response to Nitrogen

2015

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.



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

Study Description

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

Factors:

Pioneer® brand soybean varieties

Variety/Brand¹: 93M11 (R)
 P25T51R (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 P25T51R (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.

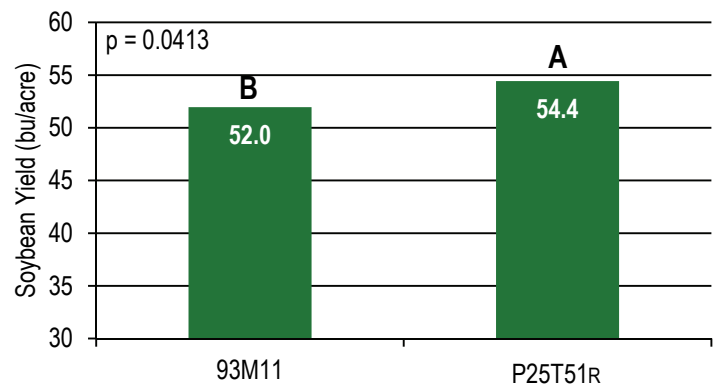


Figure 1. Average yield of Pioneer® variety 93M11 (R) and Pioneer® variety P25T51R (R).

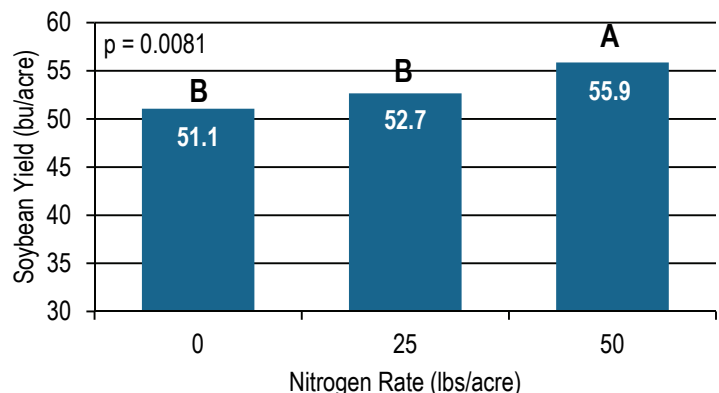


Figure 2. Average soybean yield by nitrogen rate. Means designated with the same letter are not significantly different at $\alpha=0.05$.

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