

SOYBEAN VARIETIES RESPONSE TO TILLAGE SYSTEMS

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INTERPRETIVE SUMMARY

Preliminary research on clay soils had indicated that some soybean varieties showed a yield increase to tillage, while others showed no yield differences. Therefore, a two-year (2000-2001) study was conducted to evaluate 16 soybean varieties' yield response to conventional and no-tillage systems on a Catalpa silty clay loam soil, which had been in no-till production for three years.

The study was conducted as a split split plot with years as main plot, tillage (no-tillage and conventional) as subplot, and varieties as sub-subplot with four replications. The conventional tillage system consisted of two field cultivations (2-3 inch depth) applied in late March or mid April followed by a harrow prior to planting in early May. The seeding rate was 8 seed/ft of row in 30-inch rows. The same weed management was applied across the whole study, except for the burn-down herbicide applied to the no-tillage plots. Appropriate preemergence and postemergence herbicides were applied to all plots to maintain a high level of weed control. No cultivation was applied to the conventional tillage system during the growing season.

Fifty percent bloom dates (50% of the plants with at least one bloom/plant) and maturity dates (95% of the pods dry) were recorded. The two-row x 30 ft long plots were harvested with a plot combine to determine grain yield. Yield data was analyzed using the mixed procedure program in the Statistical Analysis Systems (SAS) software.

Means were separated using Fishers Protected least significant differences (LSD) at the 5% probability level.

Bloom dates ranged from June 19 for the late maturity group IV varieties to July 13 for the late maturity group V varieties. Maturity ranged from early to mid September for late maturity group IV varieties and from early October to mid October for the late maturity group V varieties. Analysis indicated that tillage and varieties had no effect on yield and there was no tillage by variety interactions. These results indicated variety yield was not affected by tillage, which was contrary to preliminary research that showed varieties' yield response interacted with tillage.

However, analysis indicated a year by variety interaction. The varieties differed in yield stability across years, as influenced by different environmental growing conditions. Rainfall was 3.18 inches for July 16 to 31 in 2000 compared to 0.28 inches in 2001. Delta and Pineland DP 4748S, however, had the highest yield of 38 and 28.5 bu/ac in 2000 and 2001, respectively. In 2000, both Delta and Pineland DP 3478 and DP 4748S had similar but higher yields than all other varieties. However, in 2001, DP 4748S had a greater yield than DP 3478 and all other varieties, except Delta and Pineland DP 5655, DP 5915R, and DP 3588. The results suggest that to maximize yield potential, varieties should be selected which have a consistently high yield performance across diverse growing environments or more than one year of evaluation.