Effects of row spacing, seed rate and maturity group on late planted soybean under irrigated and dryland conditions in Oklahoma

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SUMMARY POINTS:

- For Irrigated Soybean a plant population of 180,000 resulted in the highest yields.
- Given the harsh environmental conditions, no response was observed between treatments at the dryland location.

Introduction

Soybean Production has increased significantly in Oklahoma the past few years. However, some production aspects, unique to the state, still need to be addressed. A majority of the soybean acreage is double cropped after winter wheat harvest in June. This results in a soybean planting dates after June 10, which is the date that has been identified as the point when yield potential starts to decrease. This purpose of this study is determine the best planting strategies in regards to row spacing, seeding rate, and maturity group (MG) for late planted soybean under irrigated and dryland conditions in Oklahoma.

This study was initiated in 2011 at the Oklahoma State University Eastern Research Station in Haskell, under dryland conditions, and at the Agronomy Research Station in Stillwater, OK, under irrigated conditions. At both locations, the established plots were 10 feet wide by 25 feet long. The two soybean varieties (REV 48R22 and AG 5632) used in the study were glyphosate-resistant and were selected based on their performance from previous variety trials (www.oilseeds.okstate.edu). Row spacings of 7.5, 15, and 30 in were evaluated. Plots with 30 in row spacing were planted with a 4-row Monosem vacuum planter (Monosem, Inc. Edwardsville, KS). Plots with 7.5 and 15 in row spacing were planted with a Great Plains Drill model 3P600 (Great Plains Mfg., Salina, KS) with 7 rows spaced at 7.5 inches. Inoculants, soil

fertility, and pest management practices were conducted according to Oklahoma State University recommended practices.

Irrigated Study

This experiment was planted on June 27th, using a complete randomized block design with three replications and three variables (MG, row spacing, and seeding rate). Table 1 shows all different treatments utilized for each replication. One and a half inches of irrigation was applied weekly throughout the growing season.

Table 1. Maturity groups, row spacing, and seed rates used on irrigated conditions at Stillwater, OK.

Treatment	Maturity Group	Row Spacing	Seed Rate
		inches	seeds/acre
101	4.8	7.5	100,000
102			140,000
103			180,000
104		30	100,000
105			140,000
106			180,000
107	5.6	7.5	100,000
108			140,000
109			180,000
110		30	100,000
111			140,000
112			180,000

Dryland Study

This experiment was planted on July 14th, using the same experimental design and variables. Table 2 shows all different treatments utilized for each replication.

Table 1. Maturity groups, row spacing, and seed rates used on dryland conditions at Haskell, OK.

Treatment	Maturity Group	Row Spacing	Seed Rate
		inches	seeds/acre
101	4.8	7.5	80,000
102			105,000
103			130,000
104			155,000
105		15	80,000
106			105,000
107			130,000
108			155,000
109		30	80,000
110			105,000
111			130,000
112			155,000
113	5.6	7.5	80,000
114			105,000
115			130,000
116			155,000
117		15	80,000
118			105,000
119			130,000
120			155,000
121		30	80,000
122			105,000
123			130,000
124			155,000

All plots were harvested using a Wintersteiger Delta plot combine (WINTERSTEIGER Inc., Salt Lake City, UT), at maturity. Grain yield and moisture were determined. All harvested

plots were collected in bags to determine seed mass.

Results for irrigated soybean

In 2011, climate conditions were not conducive to high yielding soybean, even with irrigation. The heat was extreme during reproductive stages which limited yield potential. Yields from the irrigated location are given in Figure 1.

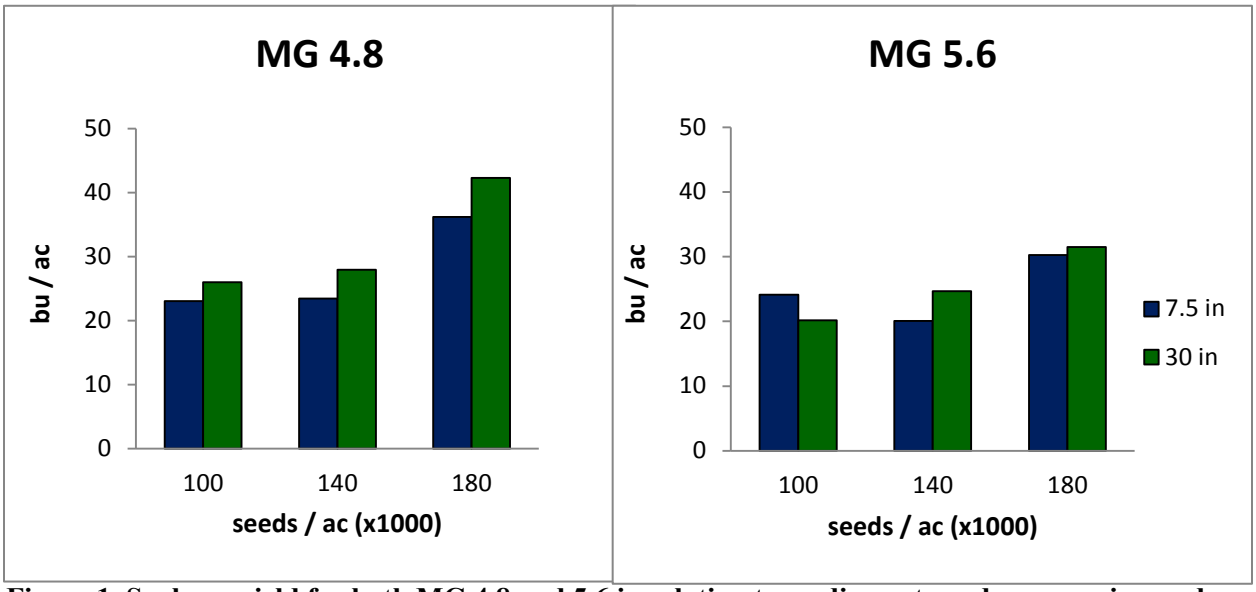

Figure 1. Soybean yield for both MG 4.8 and 5.6 in relation to seeding rate and row spacing under irrigation.

MG 4.8 (REV 48R22) soybean performed better when planted in 30 in row spacing compared to 7.5 in, regardless of plant population. No difference in yield was found between seed rate of 100,000 and 140,000 seeds/acre for both row spacing. However, plants at 180,000 seeds/acre had greater yield, 36.2 and 42.3 bu/ac for both row spacings compared to 100,000 and 140,000 seeds/acre, respectively.

For the MG 5.6 (AG 5632), no difference in yield was observed between row spacing at the three plant populations. Similar to the MG 4.8, no difference in yield was found between a seeding rate of 100,000 and 140,000 seeds/acre for both row spacings. However, plants at 180,000 seeds/acre had slightly greater yield for both row spacing compared to 100,000 and

140,000 seeds/acre. There was no difference in yield between MG 4.8 and 5.6 at 100,000 or 140,000 seeds/acre regardless of row spacing. MG 4.8 at 180,000 seeds/acre showed greater yield than MG 5.6 at the same plant population for both row spacing.

Results for dryland soybean

As mentioned previously, very high temperatures and extensive periods without rainfall were observed in 2011. Our study under these conditions and with a late planting date provided poor soybean yields, however differences between some treatments were observed as shown in Figure 2.

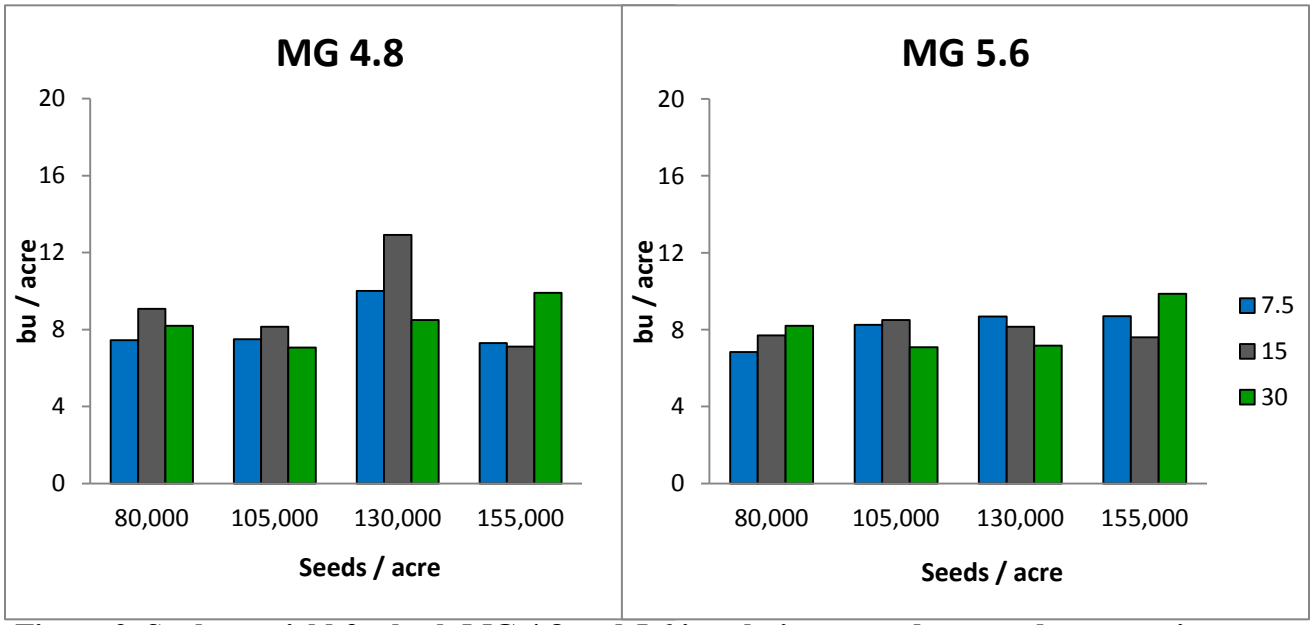

Figure 2. Soybean yield for both MG 4.8 and 5.6 in relation to seed rate and row spacing under dryland conditions.

For all three row spacings from MG 4.8 no difference in yield was observed between seed rate 80,000 and 105,000. Row spacings of 7.5 and 15 in had greater yields, 10 and 12.9 bu/ac, respectively, compared to 30 in at 130,000 seeds/acre. For both MG 4.8 and 5.6, 30 in row spacing performed better when planted at the highest population (155,000 seeds/acre). For MG

5.6, with exception of soybean with 30 in row spacing at the highest seed rate, there were no differences in yield among the other treatments.

These studies will be expanded to more locations in 2012 and hopefully we will experience better growing conditions.