

SOYBEAN VARIETY RESPONSE TO WIDE-BED STALE SEEDBED TILLAGE SYSTEMS

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ABSTRACT: Wide stale seedbed systems for drainage have potential for use with drill soybeans on bottomland soils. The beds provides surface drainage which may be essential for good stand establishment and early growth on soils with poor surface and internal drainage, especially when rainfall occurs during the soybean emergence period. A long-term wide-bed tillage study on a Leeper silty clay soil with 0.25% slope was continued in 2001. The environmental growing conditions ranged from good early season to poor in mid July through early August, with above normal rainfall in mid-August through early September. The study mean yield was 40 bu/ac. AgriPro 4882 (MG IV) variety produced similar yield to Bolivar (MG V) in all treatments except the fall-chisel-harrow where Bolivar produced 6.87 bu/ac more than AgriPro 4882, and 12 bu/ac more than the standard treatment maturity group VI Pioneer 9361 variety planted in mid June. However, both varieties indicated the raised beds showed no yield advantage over the fall chisel-harrow system. These results indicate productive maturity group IV and V varieties planted no-till the first of May into a fall prepared stale seedbed have potential for equal or higher yield the MG VI varieties and allow earlier fall harvest than MG VI varieties, more time for fall land preparation, if needed, and a more timely spring planting.

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KEY WORDS: Soybean, varieties, stale seedbed, tillage, wide-bed system.

MATERIALS AND METHODS: A long-term wide-bed tillage system study was continued in the 2001 growing season. The study was conducted as a randomized complete block design with 3 replications. Plots were 20 ft x 500 ft long. Soil test results indicated high levels of both P and K nutrients. Potash (K₂O) at 200 lb/ac was applied surface broadcast on 10/30/00.

The stale seedbed tillage systems evaluated were: no-tillage, fall chisel-bed (80 and 120 inch) followed by no-tillage for 2 years ('00 and '01); annual fall chisel-bed with 80 and 120 inch wide beds; and annual fall chisel-harrow. The fall chisel-bed and fall chisel-harrow treatments were applied on 12/08/00. All treatments, except the standard, received a burndown application of Glyphos (glyphosate) + Weedar 64 (2,4-D amine) at 0.5 + 0.95 ai/ac on 4/02/01. Both AgriPro 4882 maturity group (MG) IV and Bolivar MG V varieties were planted on 4/30/01 in 15-inch rows at 5 seed/ft row in all treatments, except the standard treatment. Squadron (imazquin + pendimethalin) + surfactant at 0.125 + 0.75 lb ai/ac + 0.5 pt/ac was applied preemergence after planting AgriPro 4882 and Bolivar on 4/30/01. Front Row (cloransulam + flumetsulam) + surfactant at 0.25 oz ai/ac + 0.096 oz ai/ac + 0.5 pt/ac was applied on 5/17/01. An application of First Rate (cloransulam) + surfactant at 0.25 oz ai/ac + 0.5 pt/ac was applied to AgriPro 4882 and Bolivar on 6/21/01.

The standard system for comparison was disked twice on 5/07/01 and doaled and planted with a maturity group VI variety Pioneer 9631 on 6/18/01. Prowl + Scepter at 0.75 + 0.125 lb ai/ac was applied preemergence to Pioneer 9631 variety on 6/18/01. First Rate + surfactant at 0.25 oz ai/ac + 0.5 pt/ac was applied to Pioneer 9631 on 7/11/01.

Plant population, plant height at maturity, and grain yield were recorded for all treatments. A 15-ft wide swath in the center of each plot was harvested with a combine 5 to 7 days after maturity of each variety to determine yield. Seed moisture at harvest was determined with a Dickey John® GAC II grain analyzer. Grain yield was adjusted to 13% seed moisture. Data was subjected to statistical analysis and treatment means were separated by Fisher's Protected LSD at the 5% probability level.

RESULTS AND DISCUSSION: The environmental growth conditions were poor in early May and mid July through early August, due to dry soil conditions. Iron chlorosis symptoms showed up in late May in both varieties.

The chlorosis also was more prominent in no-tillage treatments than the annual fall chisel-wide-bed (80 and 120 inch) or the annual fall chisel-harrow stale seedbed system. The study mean yield was 40 bu/ac. AgriPro 4882 (MG IV) variety produced similar yield to Bolivar (MG V) in all treatments, except the fall-chisel-harrow where Bolivar produced 6.87 bu/ac more than AgriPro 4882, and 12 bu/ac more than the standard treatment maturity group VI Pioneer 9361 variety planted in mid June. The fall chisel-harrow with Bolivar, and the fall chisel 120 inch bed with both varieties had similar but higher yield than no-tillage. However, both varieties indicated the raised beds showed no yield advantage over the fall chisel harrow system. Populations at maturity indicated all treatments had more than 100,000 plants/ac which was adequate to maximize yield. Plant height at maturity indicated that AP 4882 showed no difference in response to tillage system. Bolivar was shorter in height with no tillage than other tillage systems. These results indicate productive groups IV and V soybean planted no-till 4/30/01 on a fall tillage stale seedbed produced yield equivalent or greater than a maturity group VI variety planted in mid June. The maturity group IV and V varieties planted the first of May allow early fall harvest and allows time for fall land preparation, if necessary, and more timely planting the next spring.

Table 1. Soybean yield and height at maturity response to wide-bed tillage systems on a Leeper silty clay loam soil in 2001, Verona, MS

Tillage	Variety	Soybean population at maturity	Soybean height at maturity	Yield
		Pl/ac x 1000	----- Inch -----	----- bu/ac -----
No-tillage 80 in. Wide-bed ¹	AP 4882	159.4	28	37.23
	Bolivar	136.8	27	40.23
Fall Chisel 80 in. Wide-bed	AP 4882	154.9	26	40.40
	Bolivar	134.2	27	45.70
No-tillage 120 in. Wide-bed ¹	AP 4882	127.2	27	38.60
	Bolivar	138.1	24	40.70
Fall Chisel 120 in. Wide-bed	AP 4882	143.3	27	42.77
	Bolivar	143.3	27	45.53
No-tillage flat	AP 4882	134.9	25	30.83
	Bolivar	113.0	22	38.17
Fall Chisel - Harrow	AP 4882	136.1	27	40.00
	Bolivar	136.8	27	46.87
STD Disk (2x)	P 9631	109.7	29	34.87
Grand mean		135.2	27	40.15
LSD (0.05)		17.1	3	5.33
CV %		7.5	6	8

¹Fall chisel-bed in the fall 1998.