Seeding Date and Cultivar Influence on Soybean Performance in Northeastern North Dakota

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Soybeans have become an important crop in the northeast region of North Dakota. Seeding date and cultivar selection are two important production decisions that producers make in order to maximize yields. The objective of this study was to determine the relationship between cultivar maturity and seeding date on yield and agronomic traits.

Methodology:
The field design was a randomized complete block in a split-plot arrangement with four replications. Seeding dates were May 21, May 29, June 5, June 12, and June 19. Three Roundup Ready cultivars were used with maturity ratings of 00.5, 00.9 and 0.1. An established stand density of 180,000 plants/a was the target. Plot size was 3.5' x 22' with seven six-inch rows. Net Return $/a = yield x $10.83 bu/a.

Results:
Plant stands were uniform across all seeding dates and maturity groups. A frost/freeze of 29°F occurred on September 8. All varieties planted on the May 21 seeding dates had matured prior to the frost/freeze. Varieties planted on subsequent dates had varying degrees of plant damage on the upper portion of the leaves and stems while little damage was observed on the lower leaves and stems. The next freeze of 27°F occurred on October 2, at which point all varieties had been called mature prior to that date. Percent grain protein increased and oil content decreased at later planting dates with differences among varieties the smallest at the latest seeding date. There were significant interactions between seeding dates and cultivar maturity groups for yield and net return. Yields were the greatest at the earliest seeding date and decreased at each of the subsequent dates (Figure 1). Yields were similar among varieties at the May 19 seeding date. On subsequent dates the 00.5 cultivar always had the highest yield followed by the 00.9 cultivar. Yield differences between the varieties varied at each seeding date. Net Return $/a results followed the same trends as yield (Figure 2).

Table 1. Seeding date effects on various agronomic traits averaged over cultivars.

Seeding Date	Plant Stand	Plant Height	Days to Mature	Grain Protein	Oil	1000 KWT	Test Weight
	plt/ft^2	inches	DAP[1]	%	%	g	lbs/bu
May 21	5.2	34.2	108.2	33.4	15.3	171.0	57.2
May 29	4.6	36.2	107.8	34.4	14.6	181.1	57.7
June 5	4.7	35.0	105.2	34.7	14.1	175.1	57.9
June 12	4.6	36.8	100.9	35.2	13.6	184.1	57.9
June 19	4.7	35.1	100.1	35.6	13.3	175.3	57.8
Mean	4.7	35.5	104.4	34.7	14.2	177.3	57.7
C.V. %	13.3	6.0	1.3	1.2	1.8	6.0	0.6
LSD 5%	NS	NS	1.3	0.8	0.4	NS	0.4

Cultivar effects on various agronomic traits averaged over seeding dates.

Cultivar Maturity	Plant Stand	Plant Height	Days to Mature	Grain Protein	Oil	1000 KWT	Test Weight
	plt/ft^2	inches	DAP[1]	%	%	g	lbs/bu
00.5	4.5	37.3	102.2	34.1	14.6	186.5	57.9
00.9	5.0	33.5	104.2	34.8	14.2	167.6	57.5
0.1	4.7	35.6	106.9	35.1	13.7	177.8	57.7
LSD 5%	NS	1.4	0.9	0.3	0.2	6.9	0.2

[1]Days after planting.

Figure 1. Seeding date and cultivar effect on soybean yield.

Yield bu/a

May 21: 62.9, 63.0, 62.3
May 29: 62.1, 56.0, 52.0
June 5: 49.9, 44.7, 36.3
June 12: 41.9, 40.3, 33.6
June 19: 33.5, 32.8, 25.4

Cultivar Maturity — ■ 00.5 ■ 00.9 ■ 0.1

LSD 5%. Compare cultivars at same seeding date – 4.4 bu/a
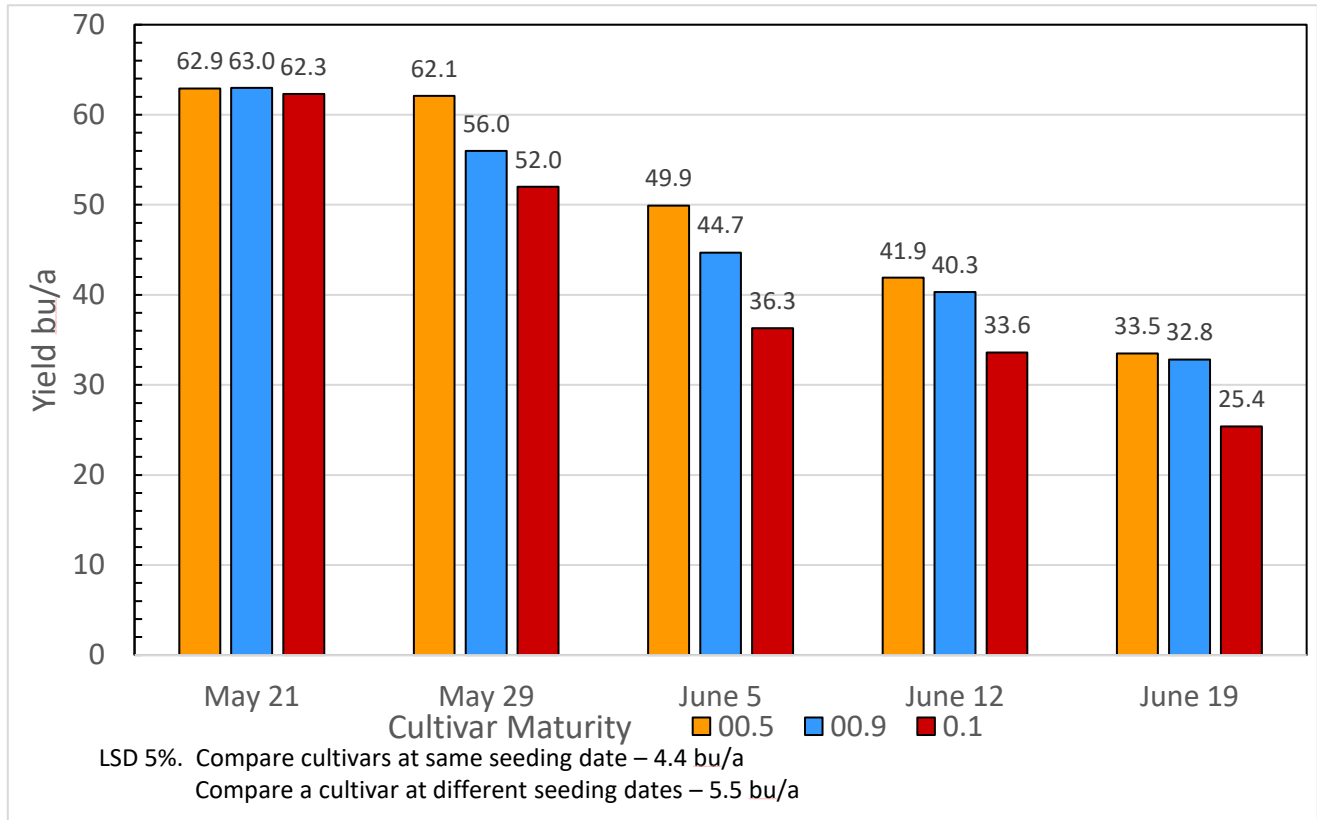Compare a cultivar at different seeding dates – 5.5 bu/a

Figure 2. Seeding date and cultivar effect on net return $/a.

Net Return $/a

May 21: 681, 682, 674
May 29: 672, 606, 564
June 5: 541, 484, 393
June 12: 454, 436, 363
June 19: 363, 355, 275

Cultivar Maturity — ■ 00.5 ■ 00.9 ■ 0.1

LSD 5%. Compare cultivars at same seeding date – 48 $/a
Compare a cultivar at different seeding dates – 59 $/a