

## Final Report:

# Effects of Planting Rate, Planting Date, and Plant Type on Soybean Yield in Northwest Minnesota.

### Objective:

This research trial will determine if there are significant yield differences comparing three plant population of soybeans planted at a normal and late planting date utilizing Early (00.5 to 00.8), Medium (0.1 to 0.3), and Late (0.4 to 0.6) maturity group varieties. The study will also compare a tall versus an intermediate height plant and the effect of population and planting date on yield.

### Procedure:

The research trial was established in a grower's field near Warren, MN. utilizing a factorial statistical design with two planting dates, three plant populations and six soybean cultivars. The first planting date was established on May 16, 2018 and the second planting date was planted May 31, 2018 which was about two weeks later. All varieties were planted at 120,000, 140,000 and 160,000 seeds per acre. Six varieties were planted representing two Early, two Medium and two Late soybean relative maturity groups. The plots were seeded with a Haldrup cone planter with each plot consisting of 4 15- inch rows wide and 25 foot in length. Plots were end trimmed to 20-foot lengths to reduce border effects and harvested with a Zurn plot combine on October 2, 2018. Statistical analysis of the data was completed utilizing the SAS computer software package.

### Climate Data:

The plot received 10.1 inches of rainfall from April through August or about 3.2 inches short of normal rainfall for the location. The moisture supply was adequate at planting, but turned dry through harvest.

Results:

The main factors: Planting Date and Variety were significant at the  $p=.05$  level and Population was significant at the  $p=.10$  significance level as can be noted in the following statistics table 1. There were no other significant interactions among factors.

Table 1.

Factor	p-value	Significance
Plant Date	0.0221	0.05
Variety	0.0001	0.05
Pop	0.0707	0.1
CV	14.4%	

The 160,000-plant population was statistically different from the 120,000 but not the 140,000-population as noted in Table 2.

Table 2.

Population	Mean	Std Dev	Mean sep
120000	47.1	9.7	b
140000	49.0	8.7	ab
160000	50.4	8.1	a
LDS			
.05	NS		
.10	2.4		

The early planting date had the greatest yield (51.3 bu./ac.) in this trial averaged across varieties and populations which was statistically significant from planting date two as noted in table 3.

Table 3.

Planting Date	Mean	Std Dev	Mean sep
PD			
1	51.3	8.8	a
2	46.4	8.3	b
LSD			
0.05	3.6		
0.10	2.6		

Table 4.

Variety	Mean	Std Dev	Mean sep
04-04	57.6	8.2	a
16-RO1	49.0	9.2	b
30-07	42.0	6.6	c
501-10	48.0	7.3	b
Astro	47.0	7.2	b
X160-40N	49.4	7.6	b
LSD			
.05	4.0		
.10	3.4		

The varieties chosen for this trial were Thunder-Astro an Early maturity Tall type (00.8RM), Proseed 30-07 an Early maturity Bush type (.00.7RM), Peterson Farm Seed 16R01 a Mid maturity Tall type (0.1RM), Proseed 501-10 a Mid maturity Bush type (0.1) , Dairyland 04-04 a Late maturity Tall type (0.4) and Proseed X160-40N a Late maturity Bush type (0.4RM) as shown in Table 4 above.

Dairyland 04-04 variety had the greatest yield at 57.6 bu./ac. which was significantly different than all other varieties. Proseed 30-07 had the least yield at 42.0 bu./ac. which was significantly different from all other varieties. The other four varieties yielded from 48.0 to 49.4 bu./ac. and were not significantly different from each other. There was no clear statistical evidence gathered from this trial whether a Bush type or Tall type variety would yield better.