

# Soybean Yield Response in 30 Inch Rows at Varying Planting Populations

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## Objective

To evaluate soybean yield response over five plant populations when planted in 30 inch rows.

## Background

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Crop Year:	2012	Seed Trtmnt:	Maxim at 0.08fl oz/cwt + Apron XL at 0.64 fl oz/cwt
Location:	Van Wert County	Soil Test:	July 11, 2012
Nearest Town:	Scott, Ohio		pH 6.3 , P 16.7 ppm, K 200 ppm, CEC 26.1
Soil type:	Latty Silty Clay	Planting Date:	May 14, 2012
Tillage:	Conventional	Row width:	30 inches
Drainage:	Surface drainage	Harvest Date:	October 14, 2012
Seed Variety:	Kottman (Rps1k/3 + high partial resistance)		

## Methods

The plot was established in a randomized complete block design. There were five different target planting population treatments. Treatments were replicated six times. Plots were planted using a two-row, tractor mounted, plot planter. Each treatment area was four 30-inch rows measuring 10 feet wide by 30 feet long. Stand counts were conducted when soybeans were at VE/VC growth stage on May 31 and repeated on June 8 at V1 growth stage. Stand measurements were conducted by counting all plants in the second of four rows in each replication. These values are reported as actual plant population. All four rows in the plots were harvested with a small plot combine with an on-board calibrated scale to determine yield measurements. The soybean yield values were adjusted to 13% moisture.

## Results

Target Population (plants/acre)	Actual population at growth stage VE/VC (plants/acre)	Actual population at growth stage V1 (plants/acre)	Yield (Bu/acre)
80,000	40,400 b	42,000 b	63.5 b
100,000	59,500 b	59,100 b	70.1 a
140,000	81,700 a	79,000 a	67.1 ab
180,000	96,700 a	89,500 a	68.2 ab
220,000	100,800 a	97,100 a	69.6 a
LSD (0.05)	20,551	18,358	5.3

Soybean yield was influenced by actual population shown in Table 1. The lowest planting population of 80,000 seeds per acre was significantly different than planting populations of

100,000 and 220,000 seeds per acre. The lowest planting population of 80,000 seeds per acre was not significantly different than planting populations of 140,000 and 180,000 seeds per acre. There was no significant difference in yield of the four highest planting populations.

Table 1 shows the average target and actual populations for each treatment planting populations. The differences between target and actual populations were large. Actual populations at V1 for treatments 80,000, 100,000 and 140,000 were 53%, 59% and 56%, respectively, of the target population. Actual populations at V1 for treatments 180,000 and 220,000 were 50% and 44%, respectively, of the target population. Rainfall shortages during emergence and early development are believed to have reduced the emergence of all treatments. Table 2 shows precipitation totals by month and a departure from a 32 year average (1981-2012). While the season (April-September) precipitation totals were near the 32 year average precipitation, late May and the month of June were dry.

Results of an economic comparison among all planting populations are shown in Table 3. Net return was calculated by yield multiplied by soybean price minus seed cost per acre. Assumptions were soybean seed cost was \$0.36/1000 seeds and a market price of \$13.00 per bushel. The planting population of 100,000 seeds per acre shows the highest net return because of the highest yield and lower relative seed cost. However, caution should be given to net returns because the yield response among the top four planting populations are not significantly different nor are yields among the planting populations of 80,000, 140,000, and 180,000 seeds per acre.

Month	Precipitation (inches)	Departure from 32 year average (1981-2012)
April	1.14	-1.11
May	3.37	+0.05
June	0.75	-3.62
July	4.07	+0.03
August	7.87	+3.71
September	4.38	+4.33
Total	21.58	-0.42

Target Population	Yield	Seed Cost	Soybean Price	Net Return
(seeds/ac)	(bu/ac)	(\$/acre)	(\$/bu)	(\$/ac)
80,000	63.5 <sup>b</sup>	\$28.80	\$13.00	\$796.70
100,000	70.1 <sup>a</sup>	\$36.00	\$13.00	\$875.30
140,000	67.1 <sup>ab</sup>	\$50.40	\$13.00	\$821.90
180,000	68.2 <sup>ab</sup>	\$64.80	\$13.00	\$821.80
220,000	69.6 <sup>a</sup>	\$79.20	\$13.00	\$825.60

## Summary

Overall yields for the plots were excellent given the low rainfall period during crop emergence. Late season rainfall was timely to support critical yield producing periods of the soybean plant. No significant disease or insects were observed during the growing season.

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