

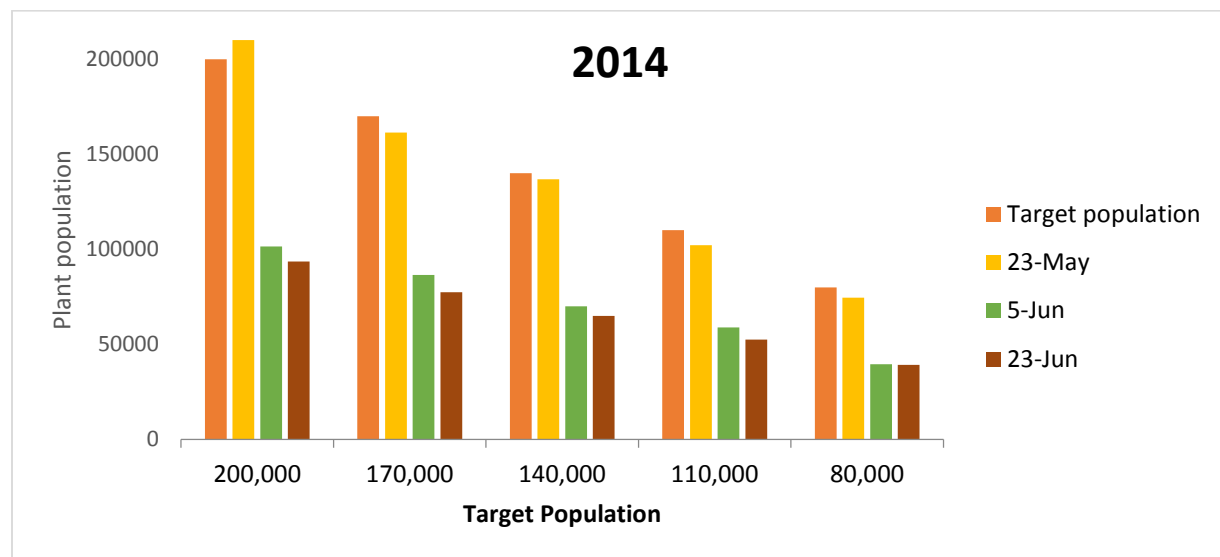
Soybean Planting Dates and Rates

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Studies were established in 2014 and 2015 to evaluate the effect of a range of soybean plant populations at various planting dates. These studies had several goals. One of the primary goals was to determine when it may be appropriate to replant soybeans and when they should be left as is. By comparing the range of populations at each planting date, a person could compare the yield potential of an ideal planting date with reduced population to a late planting date with an ideal population, for instance.

In 2014, planting dates were May 23, June 5, and June 23. In 2015 planting dates were May 5, May 19, June 2 and June 16. Plant population targets ranged from 80,000 to 200,000 plants per acre. Target populations were established by using the pure live seed plus 10 percent overage. The variety for both years was Dairyland 0404, planted to 14" rows. The trial consisted of four replicates of each treatment combination designed as a randomized complete block with a split-plot arrangement. Planting date was the main plot effect and plant population was the subplot. The data will be discussed separately as there were dramatically different results each year.

In 2014 actual populations were similar to targeted with the first planting date (Figure 1). The last two planting dates did not reach targeted planting rates. This was likely due to the change of environmental conditions when hot and wet weather caused harder soils to develop which reduced stands. In 2015, the first planting date was severely affected by the cold weather that occurred in mid-May, which caused a delay of over three weeks between planting and emergence and soil crusting. The final three planting dates mostly exceeded targeted plant populations due to very ideal seedbed conditions at the time of those plantings.



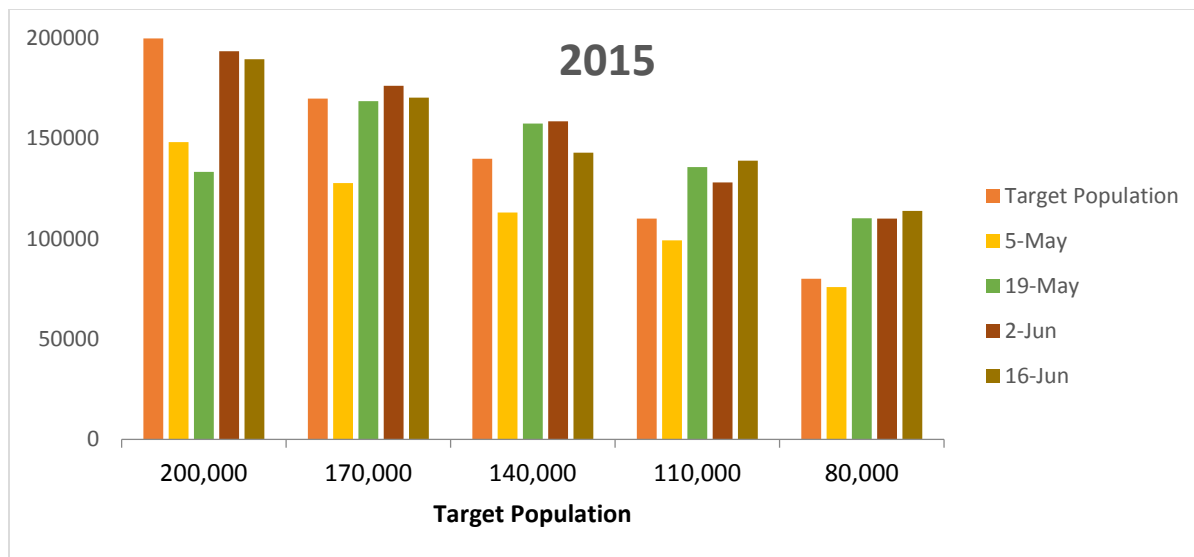


Figure 1. Comparison of targeted versus actual populations across plantings dates in 2014 and 2015.

Soybeans are one of the better crop species at compensating for stand loss. The next item to investigate was the number of branches per plant across the populations at the different planting dates. The higher the plant population, the fewer branches there were per plant (Figure 2). The later the planting date, the more rapid the decline in branch number as plant population increased. Also, as the planting dates got later, there was a stronger correlation between population and branch number. This was especially evident in 2015 where the branch number did not decrease with higher plant populations except for the latest planting date. This indicates that given more time in the growing season, early planted soybeans will attempt to aggressively put on branches regardless of plant population. Meanwhile, late planted soybeans likely do not have enough time to put out as many branches. This would be consistent with expectations.

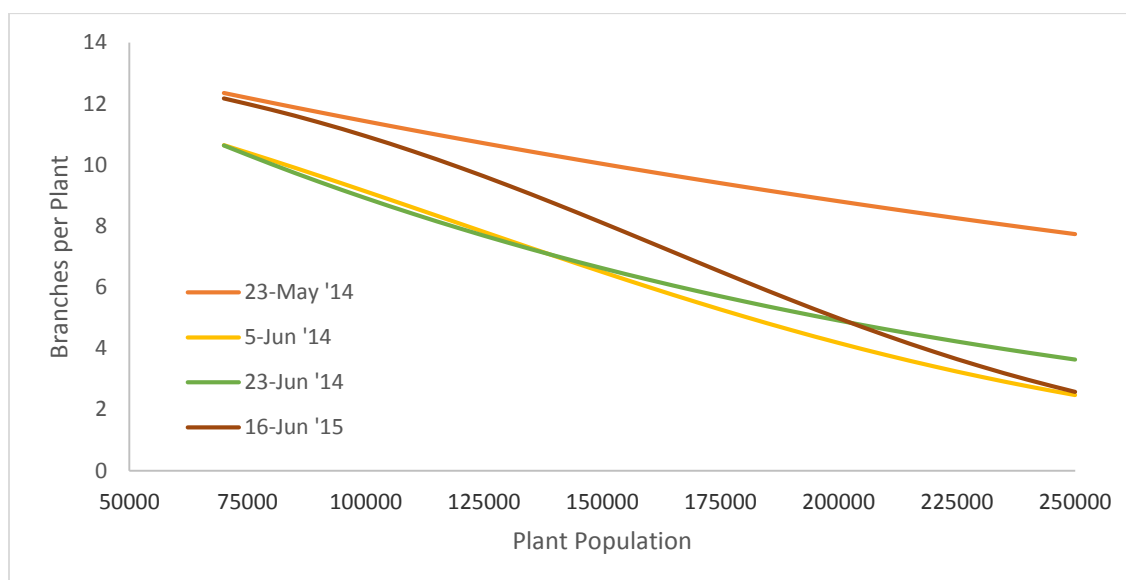


Figure 2. Soybean branch number across planting dates and populations.

The yield results are a little more difficult to explain. As expected, in most cases the yield leveled off as plant population rose to and beyond about 130,000 plants per acre. In 2014, there was a strong correlation between yield and population and between planting dates; where the lowest yields from the earlier planting date matched the best yields of next planting date (Figure 3). In 2015, with the cold mid-May temperatures, the first planting date had the lowest yields across plant populations due to soil crusting and environmental stress (Table 1). The second and fourth planting dates had similar yields, and the third planting date, which was early June had the highest average yields. While the first and fourth planting dates in 2015 could be plotted and behaved mostly as anticipated, the second and third planting dates were oddities. With the third planting date, plant population did not influence yield at all. With the second planting date, the yield actually declined with increasing plant populations (data not shown). The odd behavior of the 2015 crop was likely by coincidence of when the plants received moisture relative to their growth stage.

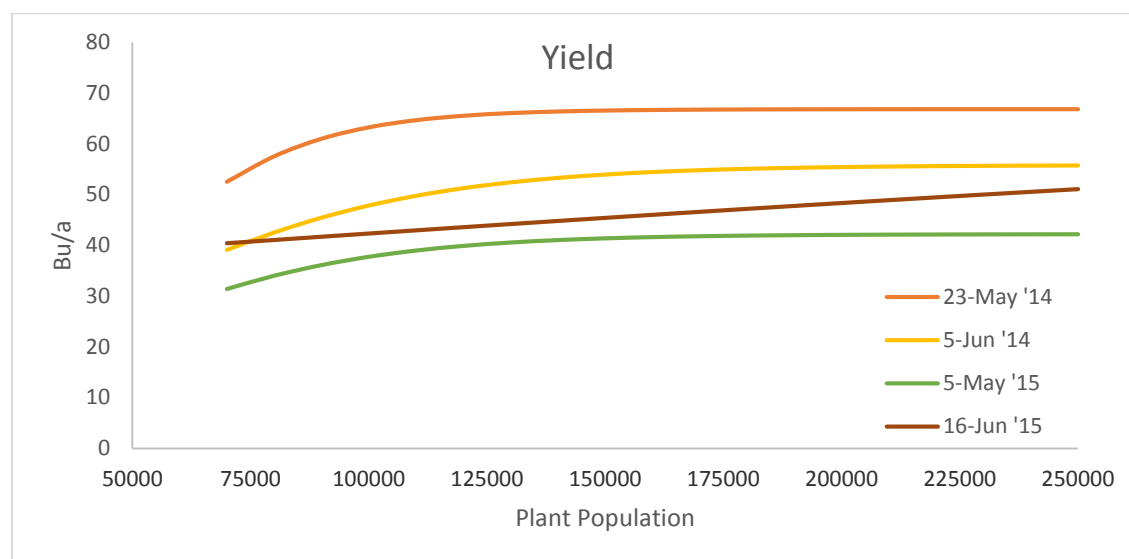


Figure 3. Evaluating soybean yields across plant populations and planting dates.

Table 1. Average soybean yield for each planting date over the two-year study.

Year	Planting Date	Yield bu/ac	Days to Maturity
2014			
	23-May	63.5	121
	5-Jun	38.5	115
	23-Jun	na	
2015			
	5-May	35.0	127.6
	19-May	43.7	112.4
	2-Jun	48.8	107.2
	16-Jun	44.1	99.4

In conclusion, soybeans are very sensitive to planting dates as many physiological events are triggered by day length. When conditions are right, early-planted soybeans can produce much higher yields than normal- or late-planted soybeans due to its ability to put on more branches, pods, and seeds. However, conditions at, or near planting need to be monitored closely to ensure that soybeans are able to get off to a good start. Late season environmental conditions will also heavily influence yields. Even with contrasting data sets, one trend was evident. The later the planting date, the more plants were needed to reach optimum yields, while earlier dates could get by with fewer plants. For the earlier planting dates in each year, 100,000 to 130,000 plants were enough to reach within 1 to 2 bushels of maximum yield, while the later planting dates needed 130,000 to 150,000 plants. Though 2015 data indicated that later planting was better, the 2014 data would be more representative of a typical planting season. The 2014 data and some 2015 data, suggest that only a severe loss of stand would warrant replanting, as plant population often did not influence yield.