COMPARING YIELD AND QUALITY OF SUGARBEET AT DIFFERENT PLANT POPULATIONS

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INTRODUCTION AND OBJECTIVE

For many years, growers were advised to plant 150 plants per 100 ft. of 22'' row using conventional sugarbeet varieties for maximum recoverable sucrose. In 2003 and 2004, research done at North Dakota State University and the University of Minnesota showed that a plant population of 175 evenly spaced plants per 100 foot of 22 inch wide rows at the 6-leaf stage was ideal for maximum recoverable sucrose per acre. This spacing was effective for both a high tonnage and a high sugar conventional sugarbeet variety.

In 2008, sugarbeet growers started planted Roundup Ready sugarbeet and currently, over 97% of the US sugarbeet acreage is using this technology.

The objective of this research was to determine the plant population of a widely grown Roundup Ready variety that will provide the highest recoverable sucrose.

MATERIALS AND METHODS

A field trial was conducted at Foxhome, MN in 2013. The experimental design was a randomized complete block with four replicates. Field plots comprised of six 30-feet long rows spaced 22 inches apart. Plots were planted on 14 May with SES 36917RR. Seeds were treated with Metlock Suite. Seed spacing within the row was 2.4 inches and thinned to prescribed population at the 4 leaf stage. Rhizoctonia was controlled with a broadcast application of Quadris on 7 June. Weeds were controlled with three applications (7 June, 1 July and 9 August) of glyphosate. Cercospora leaf spot was controlled with two fungicide applications on 9 August and 22 August.

Plots were defoliated mechanically and harvested using a mechanical harvester on 9 October. The middle two rows of each plot were harvested and weighed for root yield. Twelve to 15 representative roots from each plot, not including roots on the ends of the plot, were analyzed for quality at the American Crystal Sugar Company Quality Tare Laboratory, East Grand Forks, MN. The data analysis was performed with the ANOVA procedure of the Agriculture Research Manager, version 8 software package (Gylling Data Management Inc., Brookings, South Dakota, 2010). The least significant difference (LSD) test was used to compare treatments when the F-test for treatments was significant.

RESULTS AND DISCUSSIONS

There was no significant difference in root yield, sucrose concentration, and recoverable sucrose among the different plant populations. However, the 150 plants per 100 ft of row treatment resulted in the highest tonnage and highest recoverable sucrose per acre, and the 300 plants per 100 ft of row resulted in the highest percent sucrose concentration. These results suggest that Roundup Ready sugarbeet can produce similar root yields and recoverable sucrose when planted at different populations. At lower populations, significantly larger roots are produced than at higher plant populations. The larger roots generally have lower sugar concentration than the smaller roots, but were not significantly different. Growers may be able to reduce production cost by planting so as to have 150 to 200 plants per 100 ft row, rather than striving for higher populations (>200) which will increase seed cost. Too low a population may result in larger beets that may be difficult to harvest which will result in lower tonnage and recoverable sucrose. It should be noted that in research trials, we try to harvest all beets using shovels when necessary which may not be possible in commercial production.

Table 1. Effect of Sugarbeet Plant Populations on Yield, Quality and Recoverable Sucrose at Foxhome, MN in 2013

Treatment – Plants per 100 ft	Mean root weight (lb)	Root yield (t/A)	Sucrose concen-tration(%)	Recoverable sucrose (lb/t)	(lb/A)
50	2.7	23.3	14.1	260	6,030
100	1.9	25.2	14.5	272	6,861
150	1.9	26.9	14.8	277	7,469
200	1.6	24.9	14.5	272	6,785
250	1.5	22.8	14.3	268	6,122
300	1.2	22.2	15.0	282	6,261
LSD (P=0.05)	0.3	NS	NS	NS	NS