

PLANT POPULATION STUDIES 2000 – THIN TO STAND

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INTRODUCTION AND OBJECTIVE

Sugarbeet breeders aim to produce stable, dependable varieties, which consistently give the highest possible yield of sugar per unit area in relation to production cost, and which meet various other specific requirements of the growers and sugar cooperatives. The selection for sugar yield, a product of root yield and sugar content, is a selection for greater physiological efficiency. It will be ideal to have varieties expressing simultaneously high root yield and high sugar content. It is difficult to obtain a variety high in root yield and sugar content because there is almost invariably a negative correlation between root yield and sugar content. Consequently, our varieties are considered to be high tonnage, high sugar, or normal that is intermediate in yield and sugar. The choice of the most suitable variety for a particular area is influenced by a number of factors, including nutrient status of soil, prevalent diseases, and payment system for the roots.

Our current recommendation for plant population is to have at harvest about 35,000 uniformly spaced plants per acre for good yields of high quality sugarbeet. This means that there should be about 150 plants per 100 linear row feet after thinning or at the six-leaf growth stage.

The objective of this research was to determine the plant population of a high sugar and high tonnage variety that will produce the highest recoverable sugar per ton (RST) of sugarbeet and/or the highest recoverable sugar acre (RSA).

MATERIALS AND METHODS

Research was conducted at Fargo, ND, on a Fargo silty clay soil and at Breckenridge, MN, on a silty clay loam soil. The high sugar variety was Beta 6447 and the high tonnage variety was Seedex Thunder. At Fargo, planting was done on 5 May, and at Breckenridge, 2 May. Planting was done with a John Deere MaxEmerge 2 planter into plots 11 feet in width and 30 feet in length. Seeds were placed 1.25 inches deep and 3 inches apart in rows that were 22 inches wide. Counter was applied at 11.9 lb/acre at planting to control sugarbeet root maggot. The experiment was arranged in a randomized complete block design with four replications. Plots were thinned manually to 5, 6, 7, and 8 inch spacings at Fargo and Breckenridge on June 13, and 15, respectively. Fertilization was done according to standard recommendation for sugarbeet. Plots were kept weed free using micro-rates of herbicides recommended for sugarbeet. Eminent and Supertin were used for controlling *Cercospora* leaf spot.

The middle two rows of each 6-rows plot were counted and harvested at Fargo and Breckenridge on 18 and 26 September, respectively. Yield was determined, and quality analysis performed by American Crystal Sugar Company Quality Tare Laboratory, East Grand Forks, Minnesota. Data

was analyzed for differences by analysis of variance and LSD using Agriculture Research Manager, version 6.0.

RESULTS AND DISCUSSION

(Please note that this is one year of research work).

At Fargo, Beta 6447 showed no significant difference in recoverable sugar per acre or in recoverable sugar per ton of sugarbeet. Seedex Thunder recoverable sucrose per ton of sugarbeet was significantly higher at the 5 inch spacing than at the 8 inch spacing (Table 1).

At Breckenridge, there was no significant difference in RSA or RST at different plant spacing with either variety.

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Table 1. Effect of Plant Spacing After Thinning On Sugarbeet Yield and Quality at Fargo, ND, 2000.

Treatment	Recoverable Sucrose Lb/A	Recoverable Sucrose Lb/T	Yield T/A	Sucrose Content (%)	Sugar Loss to Molasses (%)	Plant population at harvest/100'
Beta 6447 – 5"	7906	325	24.9	17.4	1.1	187
Beta 6447 – 6"	7637	328	23.8	17.5	1.1	157
Beta 6447 – 7"	7836	330	24.3	17.5	1.1	147
Beta 6447 – 8"	7604	328	23.7	17.5	1.1	142
Seedex Thunder – 5"	8545	325	27.0	17.4	1.1	197
Seedex Thunder – 6"	8423	309	28.0	16.6	1.2	183
Seedex Thunder – 7"	8575	311	28.3	16.7	1.1	170
Seedex Thunder – 8"	8124	299	27.8	16.1	1.2	160
LSD (P=0.05)	847	22	3.0	1.0	NS	10.9
CV	7.1	4.8	8.0	3.9		7.4

Table 2. Effect of Plant Spacing After Thinning On Sugarbeet Yield and Quality at Breckenridge, MN, 2000.

Treatment	Recoverable Sucrose Lb/A	Recoverable Sucrose Lb/T	Yield T/A	Sucrose Content (%)	Sugar Loss to Molasses (%)	Plant population at harvest/100'
Beta 6447 – 5"	9552	341	20.2	18.3	1.3	177
Beta 6447 – 6"	10390	351	29.1	18.9	1.4	157
Beta 6447 – 7"	10096	357	27.6	19.2	1.3	143
Beta 6447 – 8"	10406	348	29.0	18.7	1.3	135
Seedex Thunder – 5"	11446	337	33.4	18.3	1.4	185
Seedex Thunder – 6"	10301	352	29.4	18.9	1.3	178
Seedex Thunder – 7"	10517	351	31.2	18.8	1.3	145
Seedex Thunder – 8"	11534	359	31.7	19.2	1.3	145
LSD (P=0.05)	NS	NS	9.0	NS	NS	10
CV			21.1			7.4

Table 3. Effect of Variety On Sugarbeet Yield and Quality at Fargo, ND, 2000.

Treatment	Recoverable Sucrose Lb/A	Recoverable Sucrose Lb/T	Yield T/A	Sucrose Content (%)	Sugar Loss to Molasses (%)	Plant population at harvest/100'
Beta 6447 – All Spacings	7746	328	24.2	17.5	1.1	158
Seedex Thunder – All spacings	8417	311	27.7	16.7	1.2	178

Table 4. Effect of Variety On Sugarbeet Yield and Quality at Breckenridge, MN, 2000.

Treatment	Recoverable Sucrose Lb/A	Recoverable Sucrose Lb/T	Yield T/A	Sucrose Content (%)	Sugar Loss to Molasses (%)	Plant population at harvest/100'
Beta 6447 – All Spacings	10,111	349	27.5	18.8	1.3	153
Seedex Thunder – All spacings	10,950	350	32.1	18.8	1.3	163