PLANT POPULATION STUDIES 2001 – 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 35,640 uniformly spaced plants per acre for good yields of high quality sugarbeet. This means that there should be 150 plants per 100 linear row foot 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 16 May, and at Breckenridge, 14 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 spacing at the six leaf stage. Fertilization was done according to standard recommendation for sugarbeet. Plots were kept weed free using micro-rates of herbicides recommended for sugarbeet, and cultivation. 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 17 and 19 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

Yield, quality, and plant population results are presented in Tables 1 and 2. At Fargo, Beta 6447 thinned to 7'' had the highest recoverable sugar per acre, and a significantly higher number of plants at harvest than those thinned to 5", 6" and 8". At Fargo, Seedex Thunder at the 5" spacing yielded the highest recoverable sugar per acre, and the highest number of plants at harvest. At Breckenridge, Beta 6447 and Seedex Thunder at the 7" spacing resulted in the highest recoverable sugar per acre, and the highest number of plants at harvest.

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Table 1. Effect of Plant Spacing After Thinning On Sugarbeet Yield and Quality at Fargo, ND, 2001.

Treatment Variety – Spacing (in)	Harvest	Recoverable Sucrose		Root Yield	Sucrose Content	LTM*
	Pl/acre	(lb/A)	(lb/T)	(T/A)	(%)	(%)
Beta 6447 - 5	26820	5706	287	20.1	15.7	1.3
Beta 6447 - 6	30240	6217	285	21.9	15.5	1.2
Beta 6447 - 7	37530	6918	292	23.9	15.9	1.3
Beta 6447 - 8	26550	5480	288	19.2	15.7	1.3
Seedex Thunder - 5	32760	6805	286	23.9	15.6	1.3
Seedex Thunder - 6	28350	5700	302	18.9	16.3	1.1
Seedex Thunder - 7	28890	5795	289	20.2	15.7	1.2
Seedex Thunder - 8	30690	6005	300	20.3	16.2	1.2
LSD (P=0.05)	7203	956	21	4.2	1.0	0.1
CV%	16.2	10.7	4.9	13.7	4.2	8.7

*LTM: Sugar loss to molasses

Table 2. Effect of Plant Spacing After Thinning On Sugarbeet Yield and Quality at Breckenridge, MN, 2001.

Treatment Variety – Spacing (in)	Harvest	Recoverable Sucrose		Root Yield	Sucrose Content	LTM*
	Pl/acre	(lb/A)	(lb/T)	(T/A)	(%)	(%)
Beta 6447 - 5	33561	6115	326	18.7	17.5	1.1
Beta 6447 - 6	34155	6439	329	19.6	17.6	1.1
Beta 6447 - 7	44451	6820	324	21.1	17.4	1.2
Beta 6447 - 8	32076	6138	316	19.6	17.1	1.3
Seedex Thunder - 5	38511	6994	325	21.7	17.4	1.2
Seedex Thunder - 6	39699	6866	328	21.0	17.6	1.1
Seedex Thunder - 7	41481	7309	323	22.7	17.3	1.1
Seedex Thunder - 8	33462	6762	330	20.5	17.5	1.2
LSD (P=0.05)	10611.2	985.0	17.1	2.7	0.8	0.1
CV%	19.4	10.0	3.6	9.0	3.1	5.6

*LTM: Sugar loss to molasses