

GREG A. DEAN^{1*}, ELISON, DAVID M.² and FOOTE, PAUL², ¹The Amalgamated Sugar Company LLC, 138 W. Karcher Rd., Nampa, ID 83687 and ²The Amalgamated Sugar Company LLC, 50 S 500 W, Paul, ID 83347. **Understanding Southwestern Idaho sugarbeet planting dates and populations.**

ABSTRACT

There are approximately 180,000 acres of sugar beets (*beta vulgaris L*) grown in The Amalgamated Sugar Company's (TASCO) growing area. TASCO is a sugar beet cooperative owned by Snake River Sugar Cooperative (SRSC). The sugar beets are grown mostly in Idaho, with some acres being grown in Oregon and Washington. For the past 30 years, Sugar Beet Growers have planted sugar beets as early as possible while trying to establish stands of 120-150 sugar beet plants per 100 feet of row (29,000-36,000 plants per acre) using a 22" row spacing. This decision was based upon historical planting dates and research done 30 years ago using different seed genetics, grower agronomic practices and technology. Roundup Ready® (RR) seed technology with its increased seed costs and technology fees along with improvements of sugar beet seed genetics have changed grower agronomic practices. Research was conducted to see if technology changes have also altered the traditional optimal planting dates and plant populations.

In order for sugarbeet growers to optimize sugar production, Growers need to know how timing of planting and plant stand affects yield. From 2012 through 2014, a two factorial study (planting date x plant population) was conducted in Southwestern Idaho to evaluate these planting date and plant population. There were 6 planting dates combined with 6 plant populations that were studied. Results of this research help to identify the point at which a delay in planting negatively affects yield as well as the range of plant stand needed to maximize sugar production.

All plot sites were located inside of a Grower/Cooperator's (Paul Rasgorshek) commercial field. Attempts were made to choose a plot area inside the field's boundaries that had a uniform soil type. The plots were soil sampled to a depth of 3' and TASCO recommended rates of fertilizers were applied if necessary and in accordance to TASCO guidelines. During the growing seasons, the plots were scouted for insects and disease and if found appropriate treatments were applied. All plots were irrigated with drip irrigation. The drip tape was placed between every other row (tape on 44' centers) approximately 2-5 inches deep. Drip tape emitters were located every 8". Plots were arranged in a split-plot randomized complete block design with 6 replications. The main plots were the 6 planting dates. The sub-plots were the 6 plant populations. The planting dates were spaced 10-14 days apart beginning when the cooperator planted the rest of the field and when water was available for irrigation. At the Dry lake location the plant populations started with 55 beets/100' and were increased in 40 beet increments to 95, 135, 175, 215, ending at 255 beets/100' (approximately 13,000, 22,500, 32,000, 41,500, 51,000 and 60,500 plants per acre). Plots were planted with a Monosem® 4 row air planter set up on 22" row spacing. The seed drop was 2 15/16 inches, and the planting depth was 3/4" deep. The drip tape was installed at the time of planting and irrigation was started soon after. The main plots were irrigated separately until all dates plant populations where emerged, and there after all main plots were irrigated the same. The sugar beets were

thinned by hand at approximately the 4-6 true leaf stage of growth to the prescribed populations. The plots were 4 rows wide (7.3 feet wide) by 24 feet in length with a 6 foot alley way between all plots. The center 2 rows of each plot were used for data collection. Plots were defoliated using a 2 row double drum defoliator and harvested with a 2 row harvester. At harvest, the first 3-4 beets on both ends of each plot were marked with paint to insure the border beets were not selected for quality sampling. Sugar beets collected from the data rows were weighed and 3 samples (approximately 25 lbs. each) were taken from each plot and sent to the company's quality lab to determine sugar beet quality results.

The statistical results of the 2012-2014 Nampa (Dry Lake) trials are listed in Tables 1, 2 and 3.

Table 1 2012 Nampa Planting Date and Plant Population Study					
Statistical evaluation by Planting Date	Root	Sugar	Estimated		
	Yield (T/A)	Content (%)	Recoverable (lbs/T)	Sugar (lbs/A)	
5-Apr-12	48.0	a	16.6	280.3	13,436
25-Apr-12	39.6	b	16.9	285.8	11,301
7-May-12	39.4	b	16.7	281.3	11,081
18-May-12	38.2	b	16.4	277.4	10,583
30-May-12	32.9	c	16.7	281.9	9,276
LSD (0.05)	2.2	ns	ns	513	
Pr>F	0.0001	0.0904	0.0757	0.0001	
* 2012 planting date 2 lost to poor stand establishment					
Statistical evaluation by Plant Population	Root	Sugar	Estimated		
	Yield (T/A)	Content (%)	Recoverable (lbs/T)	Sugar (lbs/ac)	
55 Beets/100'	36.5	b	16.6	278.3	10,145
95 Beets/100'	39.7	a	16.6	279.3	11,091
135 Beets/100'	39.7	a	16.8	285.1	11,294
175 Beets/100'	40.5	a	16.7	282.5	11,426
215 Beets/100'	41.0	a	16.6	279.9	11,469
255 Beets/100'	40.6	a	16.7	281.8	11,417
LSD (0.05)	1.61	ns	4.5	451	
Pr>F	0.0001	0.0681	0.0277	0.0001	

Table 2 2013 Nampa Planting Date and Plant Population Study					
Statistical evaluation by Planting Date	Root	Sugar	Estimated		
	Yield (T/A)	Content (%)	Recoverable (lbs/T)	Sugar (lbs/A)	
28-Mar-13	61.7	a	13.5	222.6	13,732
11-Apr-13	57.5	b	13.6	227.0	13,063
23-Apr-13	54.2	c	13.5	223.1	12,092
1-May-13	54.1	c	13.3	218.3	11,783
13-May-13	48.2	d	13.2	216.9	10,451
23-May-13	42.5	e	13.4	221.9	9,412
LSD (0.05)	2.03	ns	6.6	571	
Pr>F	0.0001	0.0687	0.0423	0.0001	
Statistical evaluation by Plant Population	Root	Sugar	Estimated		
	Yield (T/A)	Content (%)	Recoverable (lbs/T)	Sugar (lbs/ac)	
55 Beets/100'	50.2	b	13.4	219.4	11,012
95 Beets/100'	53.3	a	13.5	223.0	11,881
135 Beets/100'	53.5	a	13.4	221.5	11,860
175 Beets/100'	54.7	a	13.4	221.2	12,111
215 Beets/100'	53.8	a	13.4	222.3	11,964
255 Beets/100'	53.2	a	13.4	222.6	11,836
LSD (0.05)	1.92	ns	4.5	451	
Pr>F	0.0005	0.6069	0.5512	0.0001	

Table 3 2014 Nampa Planting Date and Plant Population Study					
Statistical evaluation by Planting Date	Root	Sugar	Estimated		
	Yield (T/A)	Content (%)	Recoverable (lbs/T)	Sugar (lbs/A)	
8-April-14	54.1	a	15.0	251.6	13,611
18-April-14	47.0	b	14.9	249.5	11,727
29-April-14	46.4	b	14.8	248.1	11,500
12-May-14	41.9	c	14.6	243.7	10,211
20-May-14	35.6	d	14.5	244.0	8,687
2-June-14	32.9	e	14.3	239.6	7,884
LSD (0.05)	1.59	ns	562		
Pr>F	0.0001	0.0220	0.2463	0.0001	
Statistical evaluation by Plant Population	Root	Sugar	Estimated		
	Yield (T/A)	Content (%)	Recoverable (lbs/T)	Sugar (lbs/ac)	
55 Beets/100'	38.4	d	14.6	245.8	9,478
95 Beets/100'	43.3	bc	14.7	246.9	10,689
135 Beets/100'	44.6	a	14.7	245.9	10,994
175 Beets/100'	42.7	c	14.7	247.1	10,572
215 Beets/100'	44.1	ab	14.7	246.3	10,900
255 Beets/100'	44.8	a	14.7	244.8	10,984
LSD (0.05)	1.16	ns	297		
Pr>F	0.0001	0.8354	0.7939	0.0001	

When looking at planting dates (across all plant populations with in each year), it is obvious that sugar beet growers should plant as early as possible because early planting dates T/ac and estimated recoverable sugar/ac yields are significantly better than later ones. Not all planting dates T/ac yields and estimated recoverable sugar/ac were significantly different from one another but earlier planting dates yielded better than later ones. Percent sugar content varied across the different years of the study, sometimes being significant and others not. We are not sure why this trial gave these percent sugar results.

When looking at plant populations (across all planting dates with in each year), the 55 beet/100' (13,000 plants per acre) was statistically not as good as all other plant populations. It is safe to say that a sugar beet grower would not want to have this level of plant population in his field as it will have negative effect on T/ac yield and estimated recoverable sugar/ac. A

grower with plant populations of 55 beets/100' should consider replanting his field to achieve higher plant populations so that optimal T/ac yields and estimated recoverable sugar/ac can be achieved. Plant populations of 95 beets/100' of row through 255 beets/100' (22,500-51,000) were not statistically different when analyzing by T/ac yield and estimated recoverable sugar/ac. This suggests that as long as a sugar beet growers in Western Idaho achieves uniform stands of 95 beets/100' of row or higher that it is possible to get optimal yields in tons/acre and estimated recoverable sugar/ac.

We are continuing to evaluate this study by including growing degree days. We are also pursuing a statistical review to see if we can combine all 3 years of the study. Statistical evaluations were not complete at the time of this poster printing.