2018-2019
Spreckels Sugar
RESEARCH REPORT

Spreckels Sugar Brawley, CA

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Nitrogen rate and timing study in Imperial Valley
2018-2019 growing season

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Justification: Growers in the Imperial Valley have recently adopted glyphosate resistant varieties in their sugar beet production system. One of the advantages of the use of glyphosate resistant varieties is the reduction of the need to cultivate for weed control at layby (November). This cultivation operation at layby was also combined with a split application of nitrogen. The cultivation at layby required that irrigation basins be deconstructed for equipment access to the field. With the advent of glyphosate resistant varieties, weed control is obtained without cultivating and thus the irrigation basins do not need to be deconstructed. This requires growers to apply all of their nitrogen fertilizer pre-plant instead of the former split application. Some research from the Imperial Valley has been conducted on the effect of N application timing in recent times, (Kaffka 2007). This report suggested that delaying N application until January was not needed and that the optimum N application rate for sugar beets harvested in June and July was 220 lb N/A with another 100 lb nitrate-N/A in the surface 43 inches of soil at planting. Nothing has been reported if the layby N application is not used. New information is needed because of the introduction of glyphosate resistant varieties and the absence of a layby application of N fertilizer.

Objective: Determine the effect of nitrogen rate and timing on sugar beet root yield and quality.

Materials and Methods: 2018-2019 There were two locations established in the Imperial Valley. One site was at the Imperial Valley Research Center near Brawley, CA and the second was located near Westmorland, CA. The treatments were a factorial combination of eight nitrogen application rates (0, 40, 80, 120, 160, 200, 240, and 280 lb N/A) and two application times (pre-plant and layby), Table 1. All plots at the Imperial Valley Research Center received 20 lb N/A from the pre-plant application of phosphate fertilizer as 11-52-0. Pre-plant applications at the Westmorland site included 16 lb N with the 11-52-0 application and a broadcast application of 30 lb N A[-1] as 32-0-0. The nitrogen source used for the pre-plant and lay-by treatments at both sites was liquid UAN (32-0-0). Variety, planting date, fertilizer treatment dates, petiole sampling date, harvest date, and soil nitrate-N information is presented for each site in Table 2. At layby, all plots were cultivated to insure irrigation water flow. The study had four replications. Petioles were sampled from the most recently matured leaves to determine the effect of the treatments on the nitrogen status of the sugar beet plants. The roots were harvested and quality was determined by the Spreckels Sugar tare laboratory.

Table 1. Treatments for the Nitrogen rate and application time study.

Treatment number	N rate	N application timing
1	0	Pre-plant
2	40	Pre-plant
3	80	Pre-plant
4	120	Pre-plant
5	160	Pre-plant
6	200	Pre-plant
7	240	Pre-plant
8	280	Pre-plant
9	0	Layby
10	40	Layby
11	80	Layby
12	120	Layby
13	160	Layby
14	200	Layby
15	240	Layby
16	280	Layby

Table 2. Summary of soil test, planting date, variety, harvest date, and fertilizer applications for the 2018-2019 growing season.

Activity	Imperial Valley Research Center	Westmorland, CA
Variety	SES 604	SES 604
Planting	October 12, 2018	October 16, 2018
Pre-plant fertilizer application	October 11, 2018	October 4, 2018
Lay-by fertilizer application	January 4, 2019	December 3, 2018
Petiole sampling	March 13, 2019	March 13, 2019
Harvest	June 12, 2019	June 28, 2019
Soil nitrate-N 0-4 ft. (lb A^{-1})	108	65
Soil nitrate-N 0-2 ft. (lb A^{-1})	92	57
Soil nitrate-N 2-4 ft. (lb A^{-1})	16	8
Olsen-P (ppm)	11	3
Soil test K (ppm)	530	97

Results from 2018-2019:

IVRC

The statistical analysis for the N timing by N rate study is presented in Table 3. There was an interaction between N timing and N rate for root yield, extractable sucrose per acre, purity, and petiole nitrate-N. Sucrose concentration, extractable sucrose concentration, and extractable sucrose per ton did not have an interaction with N timing and N rate but were affected by N timing and N rate.

Table 3. The statistical analysis of the N timing by N rate study at the Imperial Valley Research Center, 2018-2019.

Source of variation	Root yield	Sucrose concentration	Extractable sucrose			Purity	Petiole nitrate-N
	ton/A	%	%	lb/ton	lb/A	%	ppm
Rep	0.28	0.13	0.21	0.21	0.15	0.24	0.0007
N timing	0.21	0.02	.002	0.02	0.90	0.06	0.0001
N rate	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001
N timing X N rate	0.02	0.29	0.22	0.22	0.04	0.08	0.007
C.V. (%)	6.1	2.5	3.3	3.3	6.5	0.7	43.5
Grand mean	59.0	17.3	14.4	288	16931	89.51	971

Sucrose concentration, extractable sucrose concentration, and extractable sucrose per ton:

Because sucrose concentration, extractable sucrose concentration, and extractable sucrose per ton were not affected by an interaction between the time of application and N rate treatments, they will be discussed together. Time of application significantly affected all three of these parameters. The pre-plant treatments resulted in greater sucrose concentration, extractable sucrose concentration, and extractable sucrose per ton compared to the layby treatments, Table 4. The N rate also affected these parameters. For N rates from 0 to 200 lb N A^{-1}, sucrose was not affected by N application but at N rates greater than 200 lb N A^{-1} sucrose declined, Table 5 and Figure 1.

Table 4. The effect of N timing on sucrose concentration, extractable sucrose concentration, and extractable sucrose per ton at the Imperial Valley Research Center, 2018-2019.

Application time	Sucrose concentration	Extractable sucrose	
	%	%	lb/ton
Pre-plant	17.4	14.5	291
Layby	17.2	14.2	285

Table 5. The effect of N application rate on sucrose concentration, extractable sucrose concentration, and extractable sucrose per ton at the Imperial Valley Research Center, 2018-2019.

N rate	Sucrose concentration	Extractable sucrose	
lb/A	%	%	lb/ton
0	17.5	14.8	295
40	17.4	14.6	291
80	17.5	14.7	294
120	17.4	14.5	290
160	17.4	14.5	290
200	17.4	14.5	291
240	17.1	14.1	283
280	16.5	13.3	267
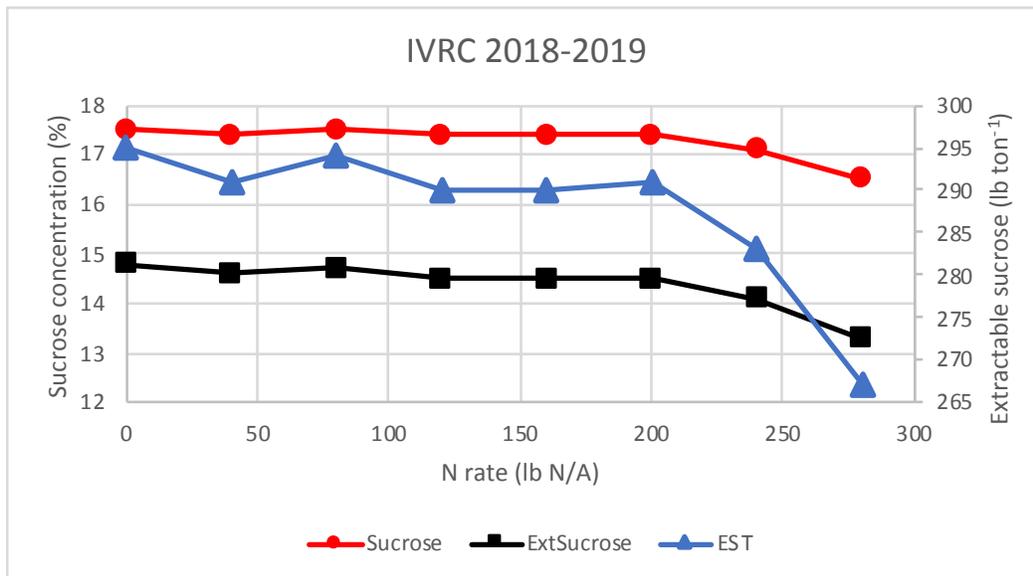
Figure 1. The effect of N rate on sugar beet sucrose at the Imperial Valley Research Center, 2018-2019.

Root yield:

The mean root yield at the Imperial Valley Research Center site was 59 tons A^{-1}. There was a statistically significant interaction between N application time and N application rate, Figure 2. While the time of N application did perform differently at different N rate, there was no constant trend. The N application time did not significantly affect root yield. The N rate did increase root yield, Table 3, 6, and Figure 3. At this site, N rate continued to increase root yield through the greatest N rate, 280 lb N A^{-1}.
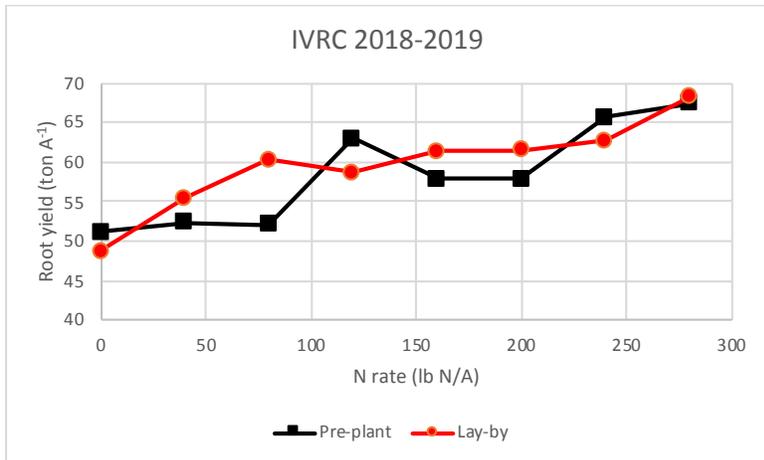
Figure 2. The effect of N rate and time of N application on root yield at the Imperial Valley Research Center, 2018-2019 growing season.

Table 6. The effect of N application rate and time of application on root yield at the Imperial Valley Research Center, 2018-2019.

N rate	Pre-plant	Layby	Mean
lb/A	---------- tons A^{-1} ----------		
0	51.1	48.7	49.9
40	52.4	55.4	53.9
80	52.1	60.3	56.2
120	63.0	58.7	60.9
160	57.8	61.4	59.6
200	57.9	61.5	59.7
240	65.7	62.7	64.2
280	67.4	68.2	67.8
Mean	58.4	59.6	59.0
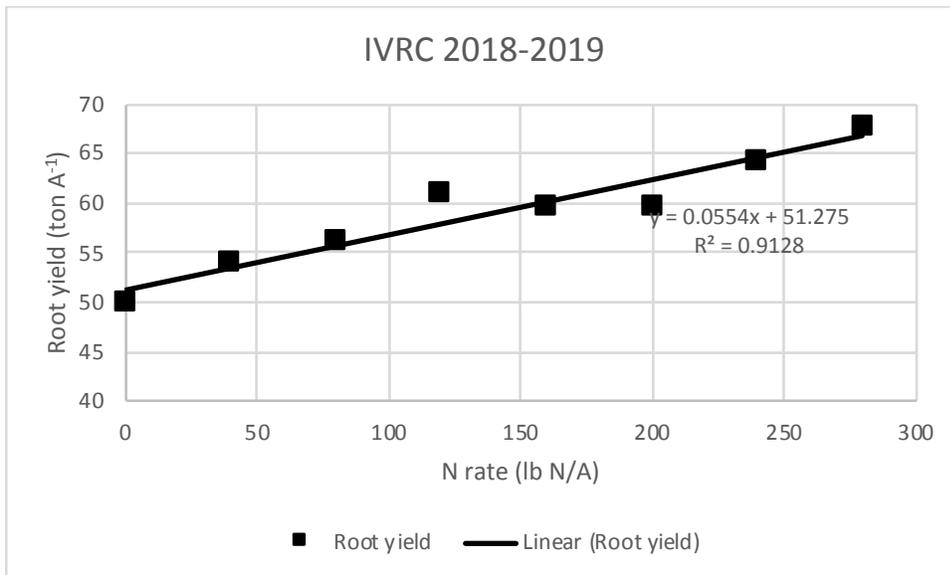
Figure 3. The effect of N rate on root yield at the Imperial Valley Research Center, 2018-2019 growing season.

Extractable sucrose per acre:

Similar to root yield, extractable sucrose per acre had a significant interaction from N application time and rate, Table 3. Figure 4 and Table 7 present the response to N rate at both N application times. Similar to root yield, the interaction for extractable sucrose per acre was not consistent over the N rates and N application time did not significantly affect extractable sucrose per acre on its own. The response of extractable sucrose per acre to N rate was positive and maximized at the application of 250 lb N A^{-1}, Figure 5. With the amount of nitrate-N in the soil before the study plus the N in the pre-plant phosphorus fertilizer, that would bring the total to 378 lb N A^{-1}. This amount of N is much greater than expected.
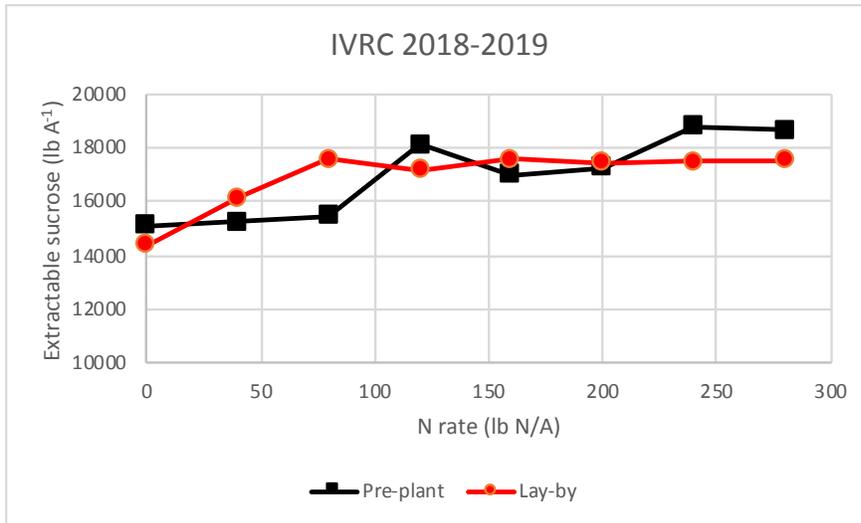
Figure 4. The effect of N rate and time of N application on extractable sucrose per acre at the Imperial Valley Research Center, 2018-2019 growing season.

Table 7. The effect of N application rate and time of application on extractable sucrose per acre at the Imperial Valley Research Center, 2018-2019.

N rate	Pre-plant	Layby	Mean
lb/A	---------- lb A^{-1} ----------		
0	15094	14365	14730
40	15231	16154	15693
80	15458	17553	16506
120	18111	17177	17644
160	17001	17576	17288
200	17246	17455	17351
240	18797	17489	18143
280	18645	17535	18090
Mean	16948	16913	16931
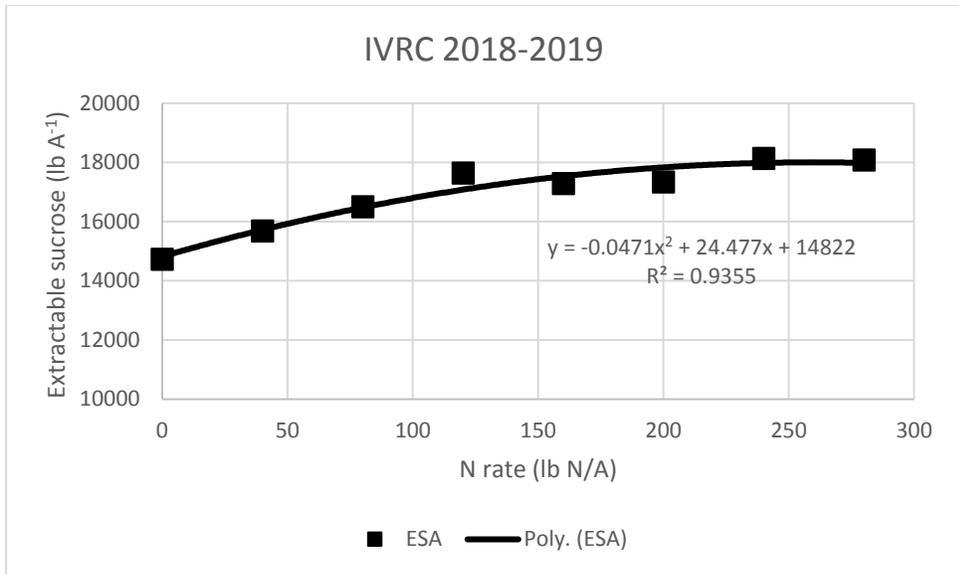
Figure 5. The effect of N rate on extractable sucrose per acre at the Imperial Valley Research Center, 2018-2019 growing season.

Sugar beet purity:

Application time of N and N rate significantly affected sugar beet purity, Table 3. Sugar beet purity decreased with increasing N application for both application times, Table 8 and Figure 6. The N applied at lay-by decreased the purity at the greater N rates more than the N applied pre-plant. This could be caused by the application time at lay-by being closer to harvest than the pre-plant application.

Table 8. The effect of N application rate and time of application on sugar beet purity at the Imperial Valley Research Center, 2018-2019.

| N rate	Pre-plant	Layby	Mean
lb/A	---------- ppm-N ----------		
0	90.39	90.33	90.36
40	89.96	90.06	90.01
80	90.52	89.57	90.05
120	89.09	89.92	89.51
160	89.85	89.37	89.61
200	89.89	89.41	89.65
240	89.13	88.87	89.00
280	88.56	87.33	87.94
Mean	89.67	89.36	89.51
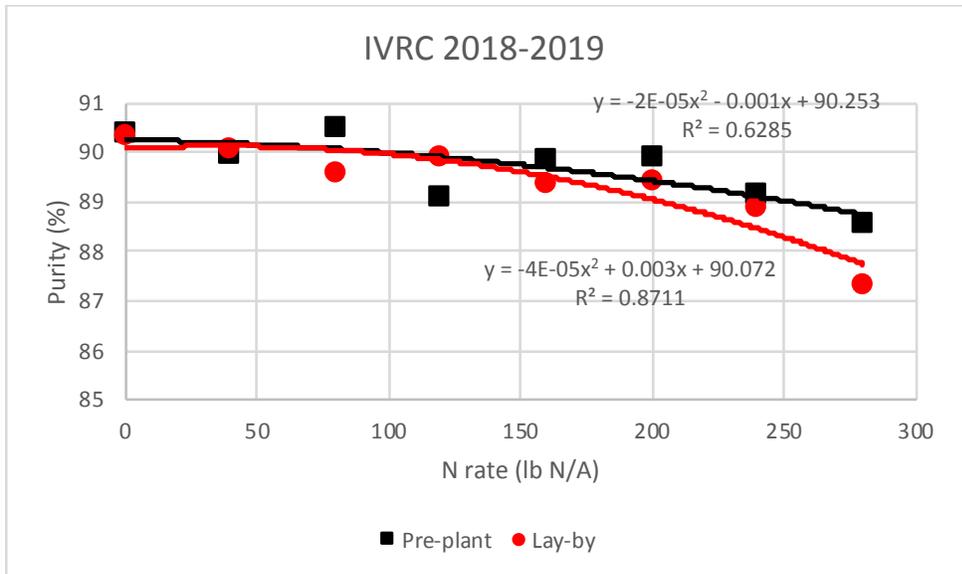
Figure 6. The effect of N rate and time of N application on sugar beet purity at the Imperial Valley Research Center, 2018-2019 growing season.

Sugar beet petiole nitrate-N on March 13, 2019:

Sugarbeet petiole nitrate-N concentration was significantly affected by N application time and N application rate, Table 3. There also was an interaction between N application time and N application rate on the petiole nitrate-N concentration on March 13, 2019, Table 3. As the N rate increased, the petiole nitrate-N increased, Table 9. This increased petiole nitrate-N was greater for the sugar beet that was treated at lay-by as opposed to the pre-plant application of N, Figure 7. This would indicate that the difference in application dates did affect the nitrogen status or the sugar beet at this site. This also would suggest that the reduced sugar beet purity at lay-by compared to pre-plant applications was a product of a later application time.

Table 9. The effect of N application rate and time of application on sugar beet petiole nitrate-N at the Imperial Valley Research Center, 2018-2019.

N rate	Pre-plant	Layby	Mean
lb/A	---------- ppm-N ----------		
0	109	176	143
40	138	285	212
80	112	828	470
120	423	1560	992
160	444	1939	1191
200	286	1068	677
240	1129	2602	1865
280	1720	2709	2214
Mean	593	1396	971
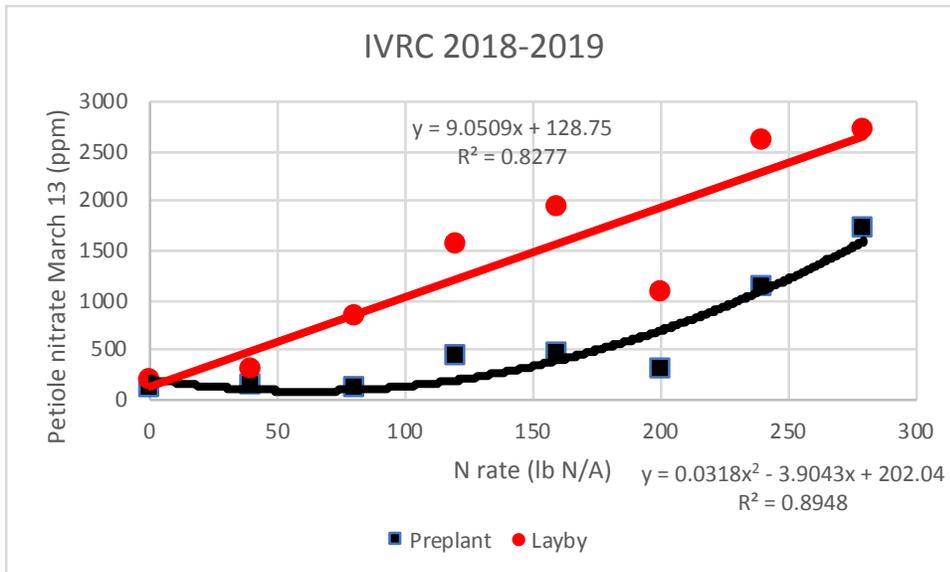
Figure 7. Petiole nitrate-N for pre-plant and lay-by treatments.

Summary IVRC:

The application of N fertilizer increased root yield and extractable sucrose per acre. Root yield was not maximized by the use of N at this site. The soil test N (108 lb A^{-1} in the surface four feet plus 20 lb N A^{-1} in the pre-plant phosphorus fertilizer plus 280 lb N A^{-1} did not maximize root yield. This is considerably more than expected. The extractable sucrose per acre was maximized with the application of 250 lb N A^{-1} or 378 lb N A^{-1} soil test nitrate-N in the surface four feet plus N in pre-plant phosphorus. The time of application did affect sucrose concentration, extractable sucrose concentration, extractable sucrose per ton petiole nitrate-N concentration and purity. The application of N fertilizer at lay-by resulted decreases in the quality when compared to the pre-plant application of N fertilizer.

Westmorland

The statistical analysis for the N timing by N rate study at Westmorland is presented in Table 10. Purity was not affected by the nitrogen treatments, time or rate. Root yield, sucrose concentration, extractable sucrose concentration, extractable sucrose per ton, and extractable sucrose per acre were only affected by N application rate. There was an interaction between N timing and N rate for petiole nitrate-N.

Table 10. The statistical analysis of the N timing by N rate study near Westmorland, 2018-2019.

Source of variation	Root yield	Sucrose concentration	Extractable sucrose			Purity	Petiole nitrate-N
	ton/A	%	%	lb/ton	lb/A	%	ppm
Rep	0.0001	0.06	0.04	0.04	0.0001	0.70	0.0001
N timing	0.95	0.23	.29	0.29	0.88	0.65	0.0001
N rate	0.003	0.004	0.002	0.002	0.09	0.67	0.0001
N timing X N rate	0.86	0.80	0.76	0.76	0.60	0.30	0.009
C.V. (%)	9.0	4.5	4.9	4.9	7.5	1.2	29.0
Grand mean	67.8	16.2	13.4	267	18010	89.13	1787

Root yield, sucrose concentration, extractable sucrose concentration, extractable sucrose per ton, and extractable sucrose per acre:

The mean root yield at the Westmorland site was 68 tons A^{-1}. Root yield was not affected by the time of N application. Nitrogen application rate did increase root yield, Table 11, and Figure 8. Nitrogen rate of application maximized root yield at 160 lb N A^{-1}. With the N applied before the treatments and in the soil, this would indicate maximum root yield occurred at 271 lb N A^{-1}.

Table 11. The effect of N application rate on root yield, sucrose concentration, extractable sucrose concentration, extractable sucrose per ton and extractable sucrose per acre at the Westmorland site, 2018-2019.

N rate	Root yield	Sucrose concentration	Extractable sucrose		
lb/A	ton/A	%	%	lb/ton	lb/A
0	60.2	17.0	14.0	280	16756
40	67.0	16.5	13.7	274	18336
80	68.2	16.0	13.1	261	17732
120	70.3	16.5	13.6	272	19010
160	71.2	15.9	13.1	262	18303
200	63.4	16.6	13.8	275	17437
240	71.7	15.7	12.9	259	18565
280	71.8	15.6	12.7	254	18194
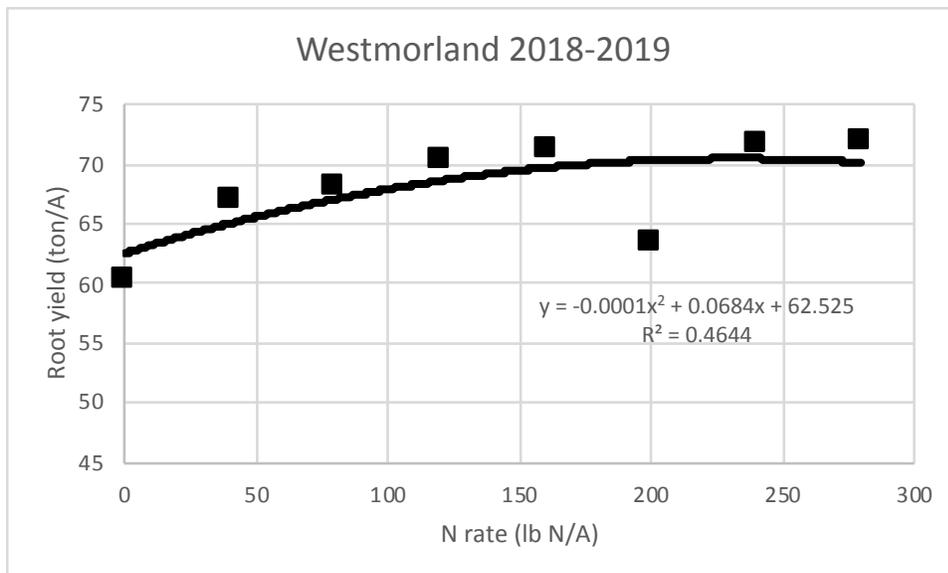
Figure 8. The effect of N rate on root yield at Westmorland, 2018-2019 growing season.

Extractable sucrose per acre:

Similar to root yield, extractable sucrose per acre was not affected by the time of N application. Extractable sucrose per acre was increased significantly from N application rate, Table 11. Figure 9 presents the response to N rate. The maximum extractable sucrose occurred at 120 lb N A^{-1} application rate. Accounting for the N in the pre-plant applications and the soil nitrate-N, the optimum extractable sucrose per acre occurred with 231 lb N A^{-1}.
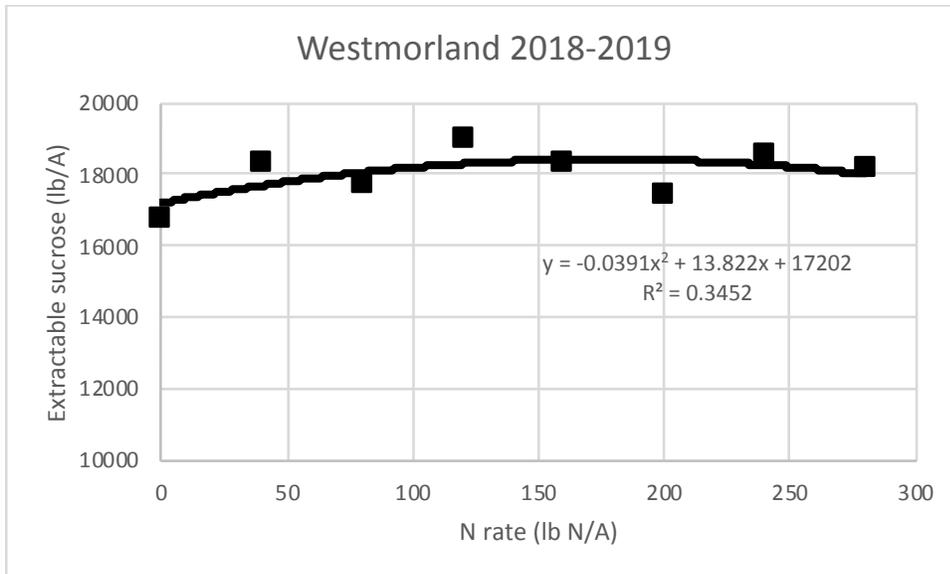
Figure 9. The effect of N rate on extractable sucrose per acre at Westmorland, 2018-2019 growing season.
Sugar beet purity:

Sucrose concentration, extractable sucrose concentration, and extractable sucrose per ton:

Because sucrose concentration, extractable sucrose concentration, and extractable sucrose per ton were not affected by N application time, they will be discussed together. Nitrogen application rates from 0 to 200 lb N A^{-1}, sucrose was not affected by N application but at N rates greater than 200 lb N A^{-1} sucrose declined, Table 11 and Figure 10.
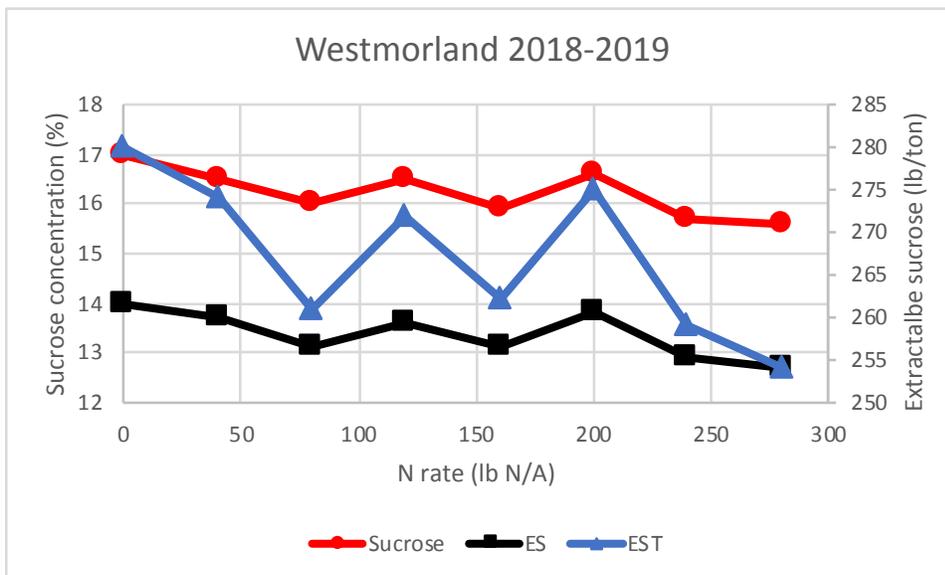
Figure 10. The effect of N rate on sugar beet sucrose at Westmorland, 2018-2019.

Sugar beet petiole nitrate-N on March 13, 2019:

Sugarbeet petiole nitrate-N concentration was significantly affected by N application time and N application rate, Table 10. There also was an interaction between N application time and N application rate on the petiole nitrate-N concentration on March 13, 2019, Table 10. The interaction between petiole nitrate-N concentrations was because the response to N application rate at pre-plant was different than the response to N application at lay-by. Petiole nitrate-N concentrations from the pre-plant N applications increased as the rate N applied increased. The petiole

nitrate-N concentrations for N applications at lay-by increased as N applications increased but at the 200 and 280 lb N A^{-1} the petiole nitrate-N concentrations were reduced. The petiole nitrate -N concentration for the 200 and 280 lb N A^{-1} could be in error. If so then the petiole nitrate-N concentrations would reflect that there was more N available to the plants on March 13 for the plants with N applied at lay-by compared to the plants that had N applied at pre-plant. This would indicate that the difference in application dates did affect the nitrogen status or the sugar beet at this site.

Table 12. The effect of N application rate and time of application on sugar beet petiole nitrate-N at Westmorland, 2018-2019.

N rate	Pre-plant	Layby	Mean
lb/A	---------- ppm-N ----------		
0	539	548	541
40	1039	801	920
80	1127	1475	1301
120	1162	2752	1957
160	1755	2767	2261
200	1163	1454	1308
240	2132	3514	2823
280	2808	3562	3185
Mean	1465	2108	1787
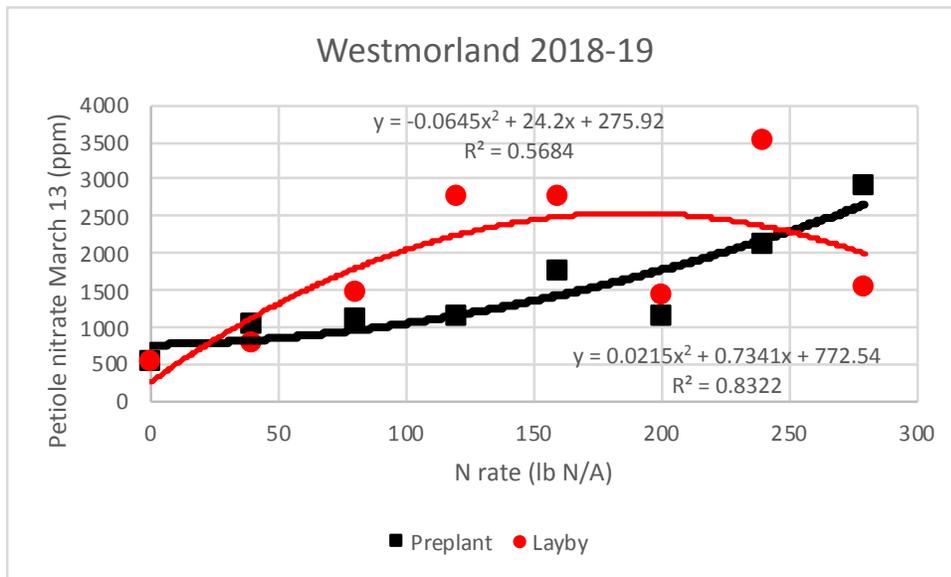
Figure 11. Petiole nitrate-N for pre-plant and lay-by treatments at Westmorland, 2018-2019.

Summary Westmorland:

The application of N fertilizer increased root yield and extractable sucrose per acre. Root yield and extractable sucrose per acre were maximized by the use of N at this site. The soil test N (65 lb A^{-1} in the surface four feet plus 46 lb N A^{-1} in the pre-plant phosphorus fertilizer plus 160 lb N A^{-1} did maximize root yield (271 lb N A^{-1}. This is 20 lb N A^{-1} more than expected. The extractable sucrose per acre was maximized with the application of 120 lb N A^{-1} or 231 lb N A^{-1} soil test nitrate-N in the surface four feet plus N in pre-plant fertilizers. At N applications rate above 200 lb A^{-1}, sucrose concentration, extractable sucrose concentration, and extractable sucrose per ton was reduced. Purity was not affected by N addition at this site.

Summary 2018-2019:

The application of N fertilizer increased root yield and extractable sucrose per acre at both sites in the 2018-2019 growing season. At the IRVC site root yield was not maximized by the use of N. The soil test N (108 lb A^{-1} in the surface four feet plus 20 lb N A^{-1} in the pre-plant phosphorus fertilizer plus 280 lb N A^{-1} made the maximum amount of N at IRVC of 408 lb N/A. The extractable sucrose per acre at IRVC site was maximized with the application of 250 lb N A^{-1} or 378 lb N A^{-1} soil test nitrate-N in the surface four feet plus N in pre-plant phosphorus. The N application caused a reduction of sucrose and decreased purity in the roots. The time of application did effect sucrose concentration, extractable sucrose concentration, extractable sucrose per ton petiole nitrate-N concentration and purity. The application at lay-by resulted in decreases in the quality compared to the pre-plant application.

At the Westmorland site, the application of N fertilizer increased root yield and extractable sucrose per acre. Root yield and extractable sucrose per acre were maximized with a total N amount of 271 lb N A^{-1} and 231 lb N A^{-1} for root yield and extractable sucrose per acre, respectively. The optimum N rate for extractable sucrose was within the expected value. At N application rates above 200 lb A^{-1}, sucrose concentration, extractable sucrose concentration, and extractable sucrose per ton was reduced. Purity was not affected by N addition at this site.

At both locations, root yield and extractable sucrose per acre were not affected by time of N application.

Literature Cited:

Kaffka, S.R., 2007. Fertilizer N management for high-yielding sugar beets in California. Proceedings of IIRB Summer Congress, Marrakech, Morocco. Brussels, Belguim: International Institute for Beet Research.

At What Plant Stand is Replanting Needed?
A report for the 2018-2019 growing season
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Justification: Establishing an optimum sugar beet plant stand is important to maximizing extractable sucrose yield in the Imperial Valley of California. If conditions are right at planting, then an optimum stand is the result. If there are problems such as seed quality, hot weather, or crusting soil, the stand will be reduced. Currently, the growers in the Imperial Valley aim for a plant stand of 30 sugar beet plants per ten feet of row for optimum production. At what plant stand should a grower decide to replant when the emergence is sub-optimal? The current answer to the question is 15 to 16 sugar beet plants per 10 feet of row. Since the advent of glyphosate resistant sugar beet varieties, there has been no research information from the Imperial Valley about replanting thresholds.

Objective: Determine the threshold plant stand that requires replanting in early and late harvested sugar beet production.

Methods and Materials: The treatments are listed in Table 1. The study was a randomized complete block design with 4 replications. There were seven plant stand treatments to represent different plant population thresholds. Stands were thinned after emergence. Treatments 1, 2, 3, and 4 were thinned to an even stand while treatments 5, 6, and 7 were thinned unequally simulating an uneven stand that would occur when poor emergence would occur (gappy). Treatment 8 was similar to a replant decision was made. During the 2018-2019 growing season, two sites were established. Site 1 was a late harvest site while Site 2 was an early harvest site. Site 2 was lost to very poor and erratic stands. The planting, thinning, and harvest dates are listed in Table 2. Sugar beet variety Beta 5460 was used. Root yield was determined on the date reported in Table 2. Root quality determined by the Spreckels Sugar Tare Laboratory.

Table 1. Treatments for the proposed reduced stand study.

Treatment	Sugar beet per 10 feet of row
1.	34
2.	30
3.	26
4.	22
5.	18 gaps
6.	14 gaps
7.	10 gaps
8.	30 replant – planted at 3 weeks after original planting.

Table 2. Planting, thinning, and harvest dates for the replanting study.

Site	Planting date	Thinning date	Replant	Harvest date	Variety
Site 1 2018-2019	Oct. 19, 2018	Nov. 27, 2018	Dec. 12, 2018	July 15, 2019	Beta 5460

Results:

Early harvest 2018-2019 Site 1:

The root yields and quality were good for a late harvest location. The population treatments significantly affected root yield, extractable sucrose per ton, extractable sucrose per acre, purity, brei nitrate, and stand, Table 3. The root yields for all of the population treatments, 1 through 6 were not significantly different, Table 4. Root yield for the treatment, 7, was significantly less that the root yields for treatments 1, 2, 4 and 6. The root yield for the replant treatment, 8, was significantly less that the root yields for the other treatments.

Extractable sucrose per ton was the greatest for treatment 3. The extractable sucrose for treatments 1, 2, 4, 5 and 6 were significantly less than the greatest extractable sucrose per ton while extractable sucrose per ton for treatment 7 was 5 lb/ton less than the middle group. The replant sugar beet for treatment 8 had the least amount of extractable sucrose per ton.

The extractable sucrose per acre at this site was over 20,000 lb A^{-1} for sugar beet treated with planting treatments 1, 2, 3, 4, 5, and 6. Treatment 7 had less extractable sucrose per acre than the other non-replanted treatments. The replanted treatment, 8, had the least amount of extractable sucrose per acre.

Purity was only significantly affected by the replanted treatment 8. The rest of the sugar beet planted to the different stands were similar.

Brie nitrate-N in the sugar beet root was affected by the plant stand treatment. The replant treatment, 8, had the greatest brie nitrate-N while the sugar beet roots from the other treatments were less. There was no relationship between the plant stand and the amount of brie nitrate-N in the sugar beet roots.

The stand was significantly affected by the treatments. This shows that the treatment did get established as intended.

Table 3. Statistical analysis for the Late Harvest Replanting Trial – Site 1 2018-2019.

Statistics	Root yield	Extractable sucrose per ton	Extractable sucrose per acre	Purity	Brei nitrate	Stand
Rep	0.25	0.001	0.77	0.66	0.89	0.31
Treatment	0.0001	0.0001	0.0001	0.03	0.0007	0.0001
C.V. (%)	6.6	1.5	6.6	0.7	21.2	4.7
Grand mean	69.6	285	19841	90.25	66	85
$LSD_{0.05}$	6.8	6.1	1920	0.92	20	5.9

Table 4. Means for root yield, extractable sucrose per ton, extractable sucrose per acre, purity, brei nitrate, and stand for early harvest replant study, Site 1, 2017-2018.

Treatment	Root yield	Extractable sucrose		Purity	Brei nitrate	Stand
plants per 10 ft of row	ton/A	lb/ton	lb/A	%	ppm	plants/plot
1 (34)	78.9	286	22544	90.4	61	131
2 (30)	77.7	285	22103	90.6	66	118
3 (26)	74.4	297	22050	91.1	43	106
4 (22)	77.2	284	21932	90.4	62	85
5 (18 gappy)	72.9	285	20742	90.1	75	71
6 (14 gappy)	77.3	286	22086	90.2	46	52
7 (10 gappy)	70.2	279	19596	90.1	73	40
8 (30 replant)	27.9	276	7679	89.2	96	77

Summary:

In the growing season of 2018-2019, the replanting of a reduced stand of sugar beet would not have been advisable. This is not what was expected. As the stand was reduced to 1.4 sugar beet plants per foot of row and with an uneven distribution of plants in the row, the sucrose yield was the same as an uniform stand at an optimum density. The treatment with only 1 sugar beet per foot of row did have reduced root yield, extractable sucrose per ton, and extractable sucrose per acre compared to the other non-replanted treatments. The reduction may not have been enough to overcome the reduction in yield from a three-week delay in replanting. The sugar beets from the gappy reduced populations (treatments 5 to 7) were very difficult to harvest and would be a large problem for commercial harvesting equipment. The large beets caused issues with plugging the harvester. The replant treatment, 8, was not as successful as originally thought. The replanting treatment had to be replanted because of bird feeding damage so the planting was significantly delayed. **Caution: Reported are the results of one year!!** This study is planned to continue for two years and thus the results could be different.

2018 – 2019 Imperial Valley Official Variety Trial Results

Imperial Valley Early Harvest Official Variety Trials
3 Year Data (2017-2019)

Variety	Approval Status for 2019-20 crop	Extractable Sugar/ Acre	Extractable Sugar/ Ton	Gross Sugar/ Acre	Tons/ Acre	% Sugar	Final Stand[1/]	% Bolt	Purity	Percent Emergence		Curly Top	% of Mkt.	Erwinia Root Rot+ (DI)	% of Mkt. Avg.	Powdery Mildew	% of Mkt. Avg.	Rhizomania Root Rating
												--- M = 150 ---		--M = 300		-- M = 100		
BTS 5678	Full Approval																	
2019 Trial		11,448	316.8	13,453	36.1	18.6	213	0.0	90.8	65.1		5.7	97.2	31.3	144.0	6.1	126.8	1.5
2018 Trial		11,230	295.0	13,466	38.2	17.7	207	0.0	89.6	43.9		6.6	100.9	51.4	169.9	5.2	94.5	1.6
2017 Trial		12,543	258.4	15,017	48.3	15.5	233	0.0	90.0	72.0		6.6	99.1	--	--	--	--	2.1
Average		11,740	290.1	13,979	40.9	17.3	218	0.0	90.1	60.3		--	--	--	--	--	--	--
SV501	Full Approval																	
2019 Trial		11,306	326.4	13,240	34.8	19.1	196	0.0	91.0	42.0		5.8	98.9	2.2	10.2	4.7	97.7	2.1
2018 Trial		11,438	279.3	13,896	40.7	17.0	192	0.0	88.9	35.9		6.7	102.4	4.1	13.6	5.1	92.7	1.4
2017 Trial		12,357	250.7	14,915	49.3	15.1	241	0.0	89.7	76.9		6.7	100.6	--	--	--	--	1.9
Average		11,700	285.5	14,017	41.6	17.1	210	0.0	89.9	51.6								
BTS 5775	Full Approval																	
2019 Trial		11,514	328.2	13,478	35.1	19.2	214	0.0	91.0	61.8		6.0	102.3	36.2	166.5	3.8	79.0	2.1
2018 Trial		10,491	277.2	12,877	37.6	17.0	202	0.0	88.2	52.2		6.8	103.9	57.0	188.4	3.6	65.5	1.5
2017 Trial		11,672	243.7	14,357	48.0	15.0	240	0.0	88.7	85.5		--	--	--	--	--	--	--
Average		11,226	283.0	13,571	40.2	17.1	219	0.0	89.3	66.5		--	--					
BTS 5460	Full Approval																	
2019 Trial		10,945	313.3	12,903	35.1	18.5	212	0.0	90.6	71.0		5.8	98.9	45.3	208.2	4.3	89.4	1.4
2018 Trial		11,246	285.2	13,616	39.4	17.3	204	0.0	89.0	46.4		6.2	94.8	52.4	173.2	4.8	87.3	1.0
2017 Trial		11,760	242.3	14,434	48.4	14.9	235	0.0	88.6	64.7		6.4	96.1	--	--	--	--	1.8
Average		11,317	280.3	13,651	41.0	16.9	217	0.0	89.4	60.7								
SV401	Not available for sale for 2020 crop																	
2019 Trial		12,254	312.0	14,382	39.4	18.3	208	0.0	91.0	53.8		6.1	104.1	16.4	75.4	5.9	122.6	2.5
2018 Trial		11,545	273.8	13,956	42.3	16.6	206	0.0	89.4	57.4		6.7	102.4	16.0	52.9	7.4	134.5	3.2
2017 Trial		11,889	239.3	14,488	50.2	14.5	239	0.0	89.6	86.8		6.9	103.6	--	--	--	--	2.1
Average		11,896	275.0	14,275	44.0	16.5	218	0.0	90.0	66.0								
SV 972	Full Approval																	
2019 Trial		11,957	309.0	14,052	38.9	18.1	208	0.0	91.0	49.9		6.1	104.1	12.3	56.5	3.9	81.0	1.8
2018 Trial		11,343	279.9	13,586	41.2	16.8	203	0.0	89.7	48.2		6.8	103.9	11.9	39.3	6.1	110.9	1.0
2017 Trial		12,638	236.0	15,261	53.7	14.3	233	0.0	90.1	68.4		--	--	--	--	--	--	--
Average		11,979	275.0	14,300	44.6	16.4	215	0.0	90.3	55.5		--	--	--	--	--	--	--
SV 602	Full Approval																	
2019 Trial		12,058	305.9	14,191	39.1	18.0	209	0.0	90.8	50.1		6.0	102.3	5.3	24.4	6.7	139.2	1.7
2018 Trial		12,201	275.6	14,692	44.1	16.6	198	0.0	89.4	37.1		6.9	105.5	14.0	46.3	5.7	103.6	1.7
2017 Trial		13,215	240.4	15,957	54.9	14.6	237	0.0	89.9	70.7		7.0	105.2	--	--	--	--	2.0
Average		12,491	274.0	14,947	46.0	16.4	215	0.0	90.0	52.6								

Imperial Valley Early Harvest Official Variety Trials
3 Year Data (2017-2019)

Variety	Approval Status for 2019-20 crop	Extractable Sugar/Acre	Extractable Sugar/Ton	Gross Sugar/Acre	Tons/Acre	% Sugar	Final Stand[1/]	% Bolt	Purity	Percent Emergence		Curly Top	% of Mkt.	Erwinia Root Rot+ (DI)	% of Mkt. Avg.	Powdery Mildew	% of Mkt. Avg.	Rhizomania Root Rating
BTS 566N	Full Approval																	
2019 Trial		9,440	304.5	11,247	31.8	18.2	208	0.0	90.0	72.7		5.4	92.1	14.2	65.1	4.4	91.4	1.9
2018 Trial		9,972	273.1	12,286	36.7	16.8	208	0.0	88.0	46.7		6.3	96.3	36.0	119.0	4.9	89.1	1.8
2017 Trial		10,315	240.4	12,711	43.0	14.8	239	0.0	88.6	76.2		6.2	93.1	--	--	--	--	2.1
Average		9,909	272.7	12,081	37.2	16.6	218	0.0	88.9	65.2		--	--	--	--	--	--	--
BTS 5600	Full Approval																	
2019 Trial		11,930	305.4	14,166	39.0	18.1	208	0.0	90.2	66.0		6.1	104.1	27.2	125.2	4.6	95.6	0.8
2018 Trial		10,959	264.4	13,511	41.6	16.3	211	0.0	88.1	54.1		6.4	97.8	37.9	125.3	5.4	98.2	0.6
2017 Trial		12,576	244.5	15,210	51.4	14.8	240	0.0	89.5	80.1		6.8	102.1	--	--	--	--	1.4
Average		11,822	271.4	14,296	44.0	16.4	220	0.0	89.3	66.7								

		Extractable Sugar/Acre	Extractable Sugar/Ton	Gross Sugar/Acre	Tons/Acre	% Sugar	Final Stand	% Bolt	Purity				Curly Top	% of Mkt.	Erwinia Root Rot+ (DI)	% of Mkt. Avg.	Powdery Mildew	% of Mkt. Avg.	Rhizomania Root Rating
Mean of Fully Approved (18-19)		11,554	278.4	13,892	42.1	16.7	216	0	89.7			2019 Mean	5.9	100	21.8	100	4.8	100	1.7
97% of Fully Approved (18-19)		11,207	270.1	13,475	40.8	16.2	210	0	87.0			2018 Mean	6.5	100	30.3	100	5.5	100	1.6
												2017 Mean	6.7	100	--	--	--	--	1.9

Pr>F

		Extractable Sugar/Acre	Extractable Sugar/Ton	Gross Sugar/Acre	Tons/Acre	% Sugar	Final Stand	% Bolt	Purity	Percent Emergence		Curly Top		Erwinia Root Rot+ (DI)		Powdery Mildew		Rhizomania Root Rating
2019 Trial		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	n/a	0.036	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001
2018 Trial		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	n/a	<0.0001	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001
2017 Trial		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	n/a	n/a	<0.0001			0.0001		<0.0001		n/a		<0.0001

CV

2019 Trial		8.3	1.9	8.2	8.5	1.4	3.4		0.7	12.0		4.2		44.2		25.0		n/a
2018 Trial		6.1	2.6	5.9	5.8	1.8	5.4		0.8	16.7		4.0		37.8		12.5		n/a
2017 Trial		6.2	4.1	5.6	4.9	3.1			1.0			6.0		62.7		n/a		n/a

LSD (0.05)

2019 Trial		922.3	6.0	1014.2	3.0	0.3	7.1		0.6	6.6		0.3		7.8		n/a		0.6
2018 Trial		633.5	7.1	743.3	2.1	0.3	10.6		0.7	7.6		0.4		n/a		0.6		0.6
2017 Trial		689.3	9.9	765.8	2.3	0.5			0.8			0.6		n/a		n/a		0.3

Cooperator	Planted	Harvested	Plot Size		Notes:
Imperial Ag	10/31/19	6/5/19	Plot Size: 2 rows. 30" rows.		Experimental Trial Design : 4X5 lattice
Paul Cameron	9/21/17	4/17/18	Plot Size: 2 rows. 30" rows.		Experimental Trial Design : 5X5 lattice
Von Medearis	9/24/16	4/07/17	Plot Size: 2 rows. 30" rows.		Experimental Trial Design : 5X5 lattice

* Emergence counts taken prior to thinning and converted to a percent.

** Final Stand counts converted to beets per 100 foot of row. Final stand counts taken after thinning.

*** 2018 Powdery Mildew Ratings taken from 2017-2018 Mamer Warva Early Harvest Official Trial Location. Ratings are on 1-10 scale. 1=clean, 10= completely covered in disease.

Ratings taken by Israel Santiago and Mark Bloomquist.

Imperial Valley Early Harvest Official Variety Trials
2 Year Data (2018-2019)

Variety	Approval Status for 2019-20 crop	Extractable Sugar/ Acre	Extractable Sugar/ Ton	Gross Sugar/ Acre	Tons/ Acre	% Sugar	Final Stand[1]	% Bolt	Purity	Percent Emergence	Curly Top	% of Mkt.	Erwinia Root Rot (DI)	% of Mkt. Avg.	Powdery Mildew***	% of Entry Avg.	Rhizomania Root Rating
											--- M = 150 ---		--M = 300		-- M = 100		
SV 983																	
2019 Trial		11,241	327.2	13,126	34.2	19.1	211	0.0	91.1	64.5	5.5	93.4	3.2	16.3	7.0	140.6	1.8
2018 Trial		11,762	293.9	14,101	40.3	17.6	201	0.0	89.6	38.0	6.1	93.2	5.5	18.2	3.7	67.3	1.6
Average		11,502	310.6	13,614	37.3	18.4	206	0.0	90.4	51.3							
BTS 582N																	
2019 Trial		10,097	323.0	11,838	31.1	18.9	213	0.0	91.0	68.7	5.9	100.2	27.1	137.7	4.2	84.4	1.6
2018 Trial		10,417	290.8	12,812	34.9	17.9	207	0.0	87.9	53.3	--	--	--	--	4.9	89.1	--
Average		10,257	306.9	12,325	33.0	18.4	210	0.0	89.5	61.0							
BTS 5678	Full Approval																
2019 Trial		11,448	316.8	13,453	36.1	18.6	213	0.0	90.8	65.1	5.7	96.8	31.3	159.4	6.1	122.5	1.5
2018 Trial		11,230	295.0	13,466	38.2	17.7	207	0.0	89.6	43.9	6.6	100.9	51.4	169.9	5.2	94.5	1.6
Average		11,339	305.9	13,460	37.2	18.2	210	0.0	90.2	54.5							
SV501	Full Approval																
2019 Trial		11,306	326.4	13,240	34.8	19.1	196	0.0	91.0	42.0	5.8	98.5	2.2	11.3	4.7	94.4	2.1
2018 Trial		11,438	279.3	13,896	40.7	17.0	192	0.0	88.9	35.9	6.7	102.4	4.1	13.6	5.1	92.7	1.4
Average		11,372	302.9	13,568	37.8	18.1	194	0.0	90.0	39.0							
BTS 5775	Full Approval																
2019 Trial		11,514	328.2	13,478	35.1	19.2	214	0.0	91.0	61.8	6.0	101.9	36.2	184.4	3.8	76.3	2.1
2018 Trial		10,491	277.2	12,877	37.6	17.0	202	0.0	88.2	52.2	6.8	103.9	57.0	188.4	3.6	65.5	1.5
Average		11,002	302.7	13,178	36.4	18.1	208	0.0	89.6	57.0							
BTS 5460	Full Approval																
2019 Trial		10,945	313.3	12,903	35.1	18.5	212	0.0	90.6	71.0	5.8	98.5	45.3	230.5	4.3	86.4	1.4
2018 Trial		11,246	285.2	13,616	39.4	17.3	204	0.0	89.0	46.4	6.2	94.8	52.4	173.2	4.8	87.3	1.0
Average		11,096	299.3	13,260	37.3	17.9	208	0.0	89.8	58.7							
SV 972	Full Approval																
2019 Trial		11,957	309.0	14,052	38.9	18.1	208	0.0	91.0	49.9	6.1	103.6	12.3	62.6	3.9	78.3	1.8
2018 Trial		11,343	279.9	13,586	41.2	16.8	203	0.0	89.7	48.2	6.8	103.9	11.9	39.3	6.1	110.9	1.0
Average		11,650	294.5	13,819	40.1	17.5	205	0.0	90.4	49.1							
SV401																	
2019 Trial		12,254	312.0	14,382	39.4	18.3	208	0.0	91.0	53.8	6.1	103.6	16.4	83.4	5.9	118.5	2.5
2018 Trial		11,545	273.8	13,956	42.3	16.6	206	0.0	89.4	57.4	6.7	102.4	16.0	52.9	7.4	134.5	3.2
Average		11,899	292.9	14,169	40.9	17.5	207	0.0	90.2	55.6							
SV 981	Limited Approval																
2019 Trial		11,841	309.0	13,987	38.5	18.3	210	0.0	90.5	46.9	6.1	103.6	2.8	14.2	6.3	126.6	1.8
2018 Trial		12,260	275.6	14,801	44.9	16.6	207	0.0	89.6	46.1	--	--	--	--	5.5	100.0	--
Average		12,051	292.3	14,394	41.7	17.5	209	0.0	90.1	46.5							
SV 602	Full Approval																
2019 Trial		12,058	305.9	14,191	39.1	18.0	209	0.0	90.8	50.1	6.0	101.9	5.3	27.0	6.7	134.6	1.7
2018 Trial		12,201	275.6	14,692	44.1	16.6	198	0.0	89.4	37.1	6.9	105.5	14.0	46.3	5.7	103.6	1.7
Average		12,129	290.8	14,441	41.6	17.3	204	0.0	90.1	43.6							

Imperial Valley Early Harvest Official Variety Trials
2 Year Data (2018-2019)

Variety	Approval Status for 2019-20 crop	Extractable Sugar/Acre	Extractable Sugar/Ton	Gross Sugar/Acre	Tons/Acre	% Sugar	Final Stand[1/]	% Bolt	Purity	Percent Emergence		Curly Top	% of Mkt.	Erwinia Root Rot (DI)	% of Mkt. Avg.	Powdery Mildew***	% of Entry Avg.	Rhizomania Root Rating
BTS 566N	Full Approval																	
2019 Trial		9,440	304.5	11,247	31.8	18.2	208	0.0	90.0	72.7		5.4	91.7	14.2	72.0	4.4	88.4	1.9
2018 Trial		9,972	273.1	12,286	36.7	16.8	208	0.0	88.0	46.7		6.3	96.3	36.0	119.0	4.9	89.1	1.8
Average		9,706	288.8	11,766	34.3	17.5	208	0.0	89.0	59.7								
BTS 5600	Full Approval																	
2019 Trial		11,930	305.4	14,166	39.0	18.1	208	0.0	90.2	66.0		6.1	103.6	27.2	138.6	4.6	92.4	0.8
2018 Trial		10,959	264.4	13,511	41.6	16.3	211	0.0	88.1	54.1		6.4	97.8	37.9	125.3	5.4	98.2	0.6
Average		11,445	284.9	13,838	40.3	17.2	209	0.0	89.2	60.1								
Mean of Fully Approved (18-19)		11,284	295.1	13,500	38.5	17.7	206	0	89.8	53.0	2019 Mean	5.9	100	19.7	100	5.0	100	1.7
97% of Fully Approved (18-19)		10,945	286.2	13,095	37.3	17.1	200	0	87.1	51.4	2018 Mean	6.5	100	30.3	100	5.5	100	1.6

Pr>F														
2019 Trial	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	n/a	0.036	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
2018 Trial	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	n/a	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

CV														
2019 Trial	8.3	1.9	8.2	8.5	1.4	3.4	n/a	0.7	12.0	4.2	44.2	25.0	n/a
2018 Trial	6.1	2.6	5.9	5.8	1.8	5.4	n/a	0.8	16.7	4.0	37.8	12.5	n/a

LSD (0.05)														
2019 Trial	922.3	6.0	1014.2	3.0	0.3	7.1		0.6	6.6	0.3	7.8		0.6
2018 Trial	633.5	7.1	743.3	2.1	0.3	10.6	n/a	0.7	7.6	0.4	n/a	0.62	0.6

Cooperator	Planted	Harvested	Plot Size	Notes:
Imperial Ag.	10/31/18	6/5/19	2 rows. 30" rows.	Experimental Trial Design : 4X5 lattice
Paul Cameron	9/21/17	4/17/18	2 rows. 30" rows.	Experimental Trial Design : 5X5 lattice

* Emergence counts taken prior to thinning and converted to a percent.

** Final Stand counts converted to beets per 100 foot of row. Final stand counts taken after thinning.

*** Powdery Mildew Ratings taken from 2017-2018 Mamer Warva Early Harvest Official Trial Location. Ratings are on 1-10 scale. 1=clean, 10= completely covered in disease.

   Ratings taken by Israel Santiago and Mark Bloomquist.

Imperial Valley Early Harvest Official Variety Trials
1- Year Data (2019)

Variety	Approval Status for 2019-20 crop	Extractable Sugar/ Acre	Extractable Sugar/ Ton	Gross Sugar/ Acre	Tons/ Acre	% Sugar	Final Stand**	% Bolt	Purity	Percent Emergence*	Curly Top	% of Mkt.	Erwinia Root Rot (DI)	% of Mkt. Avg.	Powdery Mildew	% of Trial Avg.	Rhizomania Root Rating
											--- M = 150 ---		--M = 300		-- M = 100		
SV 991		10,717	330.0	12,590	32.7	19.4	209	0.0	90.6	63.5	--	--	--		--		--
SV 992		11,608	328.8	13,606	36.5	19.3	203	0.0	90.9	34.9	--	--	--		--		--
BTS 5775	Full Approval	11,514	328.2	13,478	35.1	19.2	214	0.0	91.0	61.8	6.0	101.9	36.2	184.3	3.8	76.3	2.1
SV 983		11,241	327.2	13,126	34.2	19.1	211	0.0	91.1	64.5	5.5	93.4	3.2	16.3	7.0	140.6	1.8
SV 501	Full Approval	11,306	326.4	13,240	34.8	19.1	196	0.0	91.0	42.0	5.8	98.5	2.2	11.3	4.7	94.4	2.1
SV 994		10,890	324.5	12,852	33.5	19.2	213	0.0	90.5	61.7	--	--	--		--		--
BTS 582N		10,097	323.0	11,838	31.1	18.9	213	0.0	91.0	68.7	5.9	100.2	27.1	137.6	4.2	84.4	1.6
BTS 5983		11,037	320.3	12,884	34.4	18.7	215	0.0	91.3	47.0	--	--	--		--		--
SV 993		10,546	319.2	12,504	33.2	18.9	190	0.0	90.1	28.5	--	--	--		--		--
BTS 595N		10,607	316.9	12,454	33.8	18.6	208	0.0	91.0	56.9	--	--	--		--		--
BTS 5678	Full Approval	11,448	316.8	13,453	36.1	18.6	213	0.0	90.8	65.1	5.7	96.8	31.3	159.4	6.1	122.5	1.5
BTS 5919		11,720	313.9	13,831	37.5	18.5	212	0.0	90.6	58.2	--	--	--		--		--
BTS 5460	Full Approval	10,945	313.3	12,903	35.1	18.5	212	0.0	90.6	71.0	5.8	98.5	45.3	230.5	4.3	86.4	1.4
SV 401		12,254	312.0	14,382	39.4	18.3	208	0.0	91.0	53.8	6.1	103.6	16.4	83.5	5.9	118.5	2.5
SV 972	Full Approval	11,957	309.0	14,052	38.9	18.1	208	0.0	91.0	49.9	6.1	103.6	12.3	62.6	3.9	78.3	1.8
SV 981	Limited Approval	11,841	309.0	13,987	38.5	18.3	210	0.0	90.5	46.9	6.1	103.6	2.8	14.4	6.3	126.6	1.8
SV 602	Full Approval	12,058	305.9	14,191	39.1	18.0	209	0.0	90.8	50.1	6.0	101.9	5.3	27.0	6.7	134.6	1.7
BTS 5600	Full Approval	11,930	305.4	14,166	39.0	18.1	208	0.0	90.2	66.0	6.1	103.6	27.2	138.5	4.6	92.4	0.8
BTS 566N	Full Approval	9,440	304.5	11,247	31.8	18.2	208	0.0	90.0	72.7	5.4	91.7	14.2	72.0	4.4	88.4	1.9
Mean of Fully Approved (18-19)		11,340	312.0	13,369	36.5	18.4	208	0.0	90.6	60.1	5.9	100	19.7	100	5.0	100	1.7
97% of Fully Approved (18-19)		11,000	302.7	12,968	35.4	17.9	201	0.0	87.9	58.3							
Pr>F		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	n/a	0.036	<0.0001	<0.0001		<0.0001		<0.0001		<0.0001
CV		8.3	1.9	8.2	8.5	1.4	3.4	n/a	0.7	12.0	4.2		44.2		25.0		n/a
LSD 0.05		922	6.0	1014	3.0	0.3	7.1	n/a	0.6	6.6	0.3		7.8				0.6

Cooperator	Planted	Harvested	Plot Size
Imperial Ag.	10/31/18	6/5/19	Plot Size: 2 rows. 30" rows.

Experimental Trial Design : 4X5 lattice

* Emergence counts taken prior to thinning and converted to a percent.
** Final Stand counts converted to beets per 100 foot of row. Final stand counts taken after thinning.

Entry	Entry Code	Entry Name	Extractable Sugar per Ton	Extractable Sugar per Acre	Gross Sugar per Acre	Tons per Acre	Percent Sugar	Extractable Sugar Percent	Percent Purity	Brei N	Percent Tare	Percent Emergence*	Final Stand Beets/100' **	Percent Bolters
3	2018/19 IVEH	SV 991	330.0	10717	12590	32.7	19.4	16.5	90.6	14.1	1.3	63.5	209	0.0
16	2018/19 IVEH	SV 992	328.8	11608	13606	36.5	19.3	16.4	90.9	12.1	0.8	34.9	203	0.0
7	2018/19 IVEH	BTS 5775	328.2	11514	13478	35.1	19.2	16.4	91.0	13.9	0.8	61.8	214	0.0
6	2018/19 IVEH	SV 983	327.2	11241	13126	34.2	19.1	16.3	91.1	20.4	0.7	64.5	211	0.0
17	2018/19 IVEH	SV 501TT	326.4	11306	13240	34.8	19.1	16.3	91.0	15.9	1.1	42.0	196	0.0
18	2018/19 IVEH	SV 994	324.5	10890	12852	33.5	19.2	16.2	90.5	21.3	0.7	61.7	213	0.0
1	2018/19 IVEH	BTS 582N	323.0	10097	11838	31.1	18.9	16.1	91.0	17.7	2.0	68.7	213	0.0
8	2018/19 IVEH	BTS 5983	320.3	11037	12884	34.4	18.7	16.0	91.3	16.5	1.6	47.0	215	0.0
11	2018/19 IVEH	SV 993	319.2	10546	12504	33.2	18.9	15.9	90.1	21.5	1.3	28.5	190	0.0
9	2018/19 IVEH	BTS 595N	316.9	10607	12454	33.8	18.6	15.9	91.0	17.1	1.4	56.9	208	0.0
15	2018/19 IVEH	BTS 5678	316.8	11448	13453	36.1	18.6	15.8	90.8	16.5	1.4	65.1	213	0.0
13	2018/19 IVEH	BTS 5919	313.9	11720	13831	37.5	18.5	15.7	90.6	24.4	1.6	58.2	212	0.0
2	2018/19 IVEH	BTS 5460	313.3	10945	12903	35.1	18.5	15.7	90.6	18.1	1.4	71.0	212	0.0
12	2018/19 IVEH	SV 401	312.0	12254	14382	39.4	18.3	15.6	91.0	24.6	0.7	53.8	208	0.0
20	2018/19 IVEH	Filler	310.7	11555	13569	36.9	18.3	15.5	90.7	22.2	1.6	52.1	213	0.0
4	2018/19 IVEH	SV 972	309.0	11957	14052	38.9	18.1	15.5	91.0	23.8	0.7	49.9	208	0.0
14	2018/19 IVEH	SV 981	309.0	11841	13987	38.5	18.3	15.5	90.5	23.6	0.8	46.9	210	0.0
5	2018/19 IVEH	SV 602TT	305.9	12058	14191	39.1	18.0	15.3	90.8	19.1	0.5	50.1	209	0.0
19	2018/19 IVEH	BTS 5600	305.4	11930	14166	39.0	18.1	15.3	90.2	17.2	1.3	66.0	208	0.0
10	2018/19 IVEH	BTS 566N	304.5	9440	11247	31.8	18.2	15.2	90.0	17.9	1.6	72.7	208	0.0
		Grand Mean	317.2	11236	13218	35.6	18.7	15.9	90.7	18.9	1.2	55.8	209	
		CV (%)	1.9	8.3	8.23	8.5	1.4	1.9	0.7	39.9	28.2	12.0	3.4	
		LSD (0.05)	6.0	922.3	1014.2	3.0	0.3	0.3	0.6	7.5	0.3	6.6	7.1	
		Pr>F	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.036	0.072	<0.0001	<0.0001	<0.0001	
		Error MS	36.67	862889	1182899	9.23	0.07	0.09	0.41	56.76	0.11	44.47	50.68	
		Reps	8	8	8	8	8	8	8	8	8	8	8	8

*Emergence counts taken prior to thinning and converted to a percent.

**Final stand counts taken after thinning and converted to beets per 100' of row.

Plant Date: October 31, 2018

Harvest Date: June 5, 2019

Plot size: 2 row, 30" rows

Experimental Design: 4X5 Rectangular Lattice

Imperial Valley Late Harvest Official Variety Trials
3 Year Data (2017-2019)

Variety	Marketing Approval	Year	Extractable Sugar/ Acre	Extractable Sugar/ Ton[+]	Gross Sugar/ Acre	Tons/ Acre	% Sugar	Purity	Final Stand Beets/100'	% Bolt	% Rot	Percent Emergence	Curly Top Rating*	% of Mkt. Avg.	Erwinia Rating (DI)*	% of Mkt. Avg.	Powdery Mildew Rating*	% of Mkt. Avg.	Rhizomania Root Rating*
													--- M = 150 ---		--M = 300		-- M = 100		
Beta 5678	Full Approval	2019	22,333	288.7	26,465	77.2	17.1	90.5	255	0.1	0.1	67.9	5.7	98.5	31.3	150.7	6.1	121.7	1.5
		2018	21,807	256.4	27,396	85.0	16.1	86.9	237	0.0	5.6	65.0	6.6	101.7	51.4	159.3	n/a		1.6
		2017	18,626	261.3	23,054	71.1	16.2	87.9	240	0.0	0.1	79.5	6.6	101.5	n/a		n/a		2.1
		Average	20,922	268.8	25,639	77.8	16.5	88.4	244.1	0.0	1.9	70.8							
BTS 5460	Full Approval	2019	21,647	286.0	25,632	75.6	16.9	90.6	257	0.0	0.0	74.5	5.8	100.2	45.3	217.9	4.3	85.8	1.4
		2018	23,310	261.8	28,995	88.3	16.3	87.5	231	1.2	1.2	63.6	6.2	95.6	52.4	162.4	n/a		1.0
		2017	18,739	256.6	23,375	72.9	16.0	87.4	241	0.1	0.3	70.5	6.4	98.5	n/a		n/a		1.8
		Average	21,232	268.1	26,001	79.0	16.4	88.5	242.9	0.4	0.5	69.5							
BTS 5775	Limited Approval	2019	22,758	277.2	27,389	82.2	16.7	89.6	254	0.0	0.5	58.1	6.0	103.7	36.2	174.2	3.8	75.8	2.1
		2018	20,793	252.3	26,362	82.9	16.0	86.5	231	0.4	6.2	70.1	6.8	104.8	57.0	176.7	n/a		1.5
		2017	18,729	254.4	23,550	73.8	16.0	87.0	242	0.2	0.2	85.2	n/a		n/a		n/a		n/a
		Average	20,760	261.3	25,767	79.6	16.2	87.7	242.3	0.2	2.3	71.1							
Beta 566N	Full Approval	2019	20,845	282.2	24,937	73.4	17.0	89.7	255	0.0	0.1	75.0	5.4	93.3	14.2	68.1	4.4	87.8	1.9
		2018	19,013	244.0	24,297	77.8	15.6	86.0	229	0.3	3.3	65.9	6.3	97.1	36.0	111.6	n/a		1.8
		2017	16,826	245.2	21,089	69.2	15.4	87.3	241	0.0	0.0	80.4	6.2	95.4	n/a		n/a		2.1
		Average	18,895	257.1	23,441	73.5	16.0	87.7	241.7	0.1	1.1	73.8							
SV 971	Full Approval	2019	18,553	274.3	22,386	67.4	16.6	89.2	167	0.4	0.7	22.0	5.7	98.5	4.8	23.2	6.7	133.7	2.4
		2018	21,274	242.8	27,156	87.7	15.5	86.2	218	3.5	13.3	51.9	6.6	101.7	8.1	25.1	n/a		1.1
		2017	23,438	242.8	23,438	76.5	15.3	86.9	243	1.6	0.5	91.5	n/a		n/a		n/a		n/a
		Average	21,088	253.3	24,327	77.2	15.8	87.4	209.2	1.8	4.8	55.1							
Beta 5600	Full Approval	2019	22,854	274.7	27,322	83.3	16.4	90.1	252	0.0	0.2	65.4	6.1	105.4	27.2	131.0	4.6	91.8	0.8
		2018	21,571	248.9	27,332	87.7	15.7	86.6	232	0.0	15.0	69.4	6.4	98.7	37.9	117.5	n/a		0.6
		2017	18,707	230.1	23,676	81.1	14.6	86.9	240	0.3	0.5	83.6	6.8	104.6	n/a		n/a		1.4
		Average	21,044	251.2	26,110	84.0	15.6	87.9	241.4	0.1	5.2	72.8							
SV143N	Full Approval	2019	22,000	260.8	26,695	84.2	15.9	89.2	254	0.6	0.5	67.5	5.8	100.2	5.2	24.9	4.4	87.8	2.2
		2018	21,517	237.8	27,711	90.9	15.3	85.7	239	4.0	12.0	83.2	6.4	98.7	6.6	20.5	n/a		0.8
		2017	18,059	240.0	22,751	75.5	15.1	87.1	242	1.1	0.3	84.5	6.5	100.0	n/a		n/a		1.8
		Average	20,525	246.2	25,719	83.5	15.4	87.3	244.9	1.9	4.3	78.4							
SV 604N	Full Approval	2019	21,425	258.4	26,033	82.4	15.7	89.1	254	0.1	0.7	50.5	5.8	100.2	2.1	10.1	5.8	115.7	1.4
		2018	19,614	235.9	25,235	83.1	15.2	85.8	228	1.5	7.9	60.1	6.6	101.7	8.7	27.0	n/a		2.6
		2017	18,129	234.5	23,062	77.5	14.9	86.4	239	0.3	0.1	71.7	6.5	100.0	n/a		n/a		2.0
		Average	19,723	242.9	24,777	81.0	15.3	87.1	240.4	0.6	2.9	60.8							

[+] varieties ranked by Extractable Sugar per Ton

* Disease nursery ratings: Lower numbers are more resistant, higher numbers are more susceptible.

		Extractable Sugar/ Acre	Extractable Sugar/ Ton	Gross Sugar/ Acre	Tons/ Acre	% Sugar	Purity
Mean of Approved		20,490	255.4	25,145	79.4	15.8	87.8
97% of Approved		19,875	247.7	24,390	77.0	15.4	85.1

	Mean of Approved Varieties						
2019 Mean	5.8	100	20.8	100.0	5.0	100.0	1.7
2018 Mean	6.5	100.0	32.3	100.0	n/a		1.4
2017 Mean	6.5	100.0	n/a		n/a		1.9

Imperial Valley Late Harvest Official Variety Trials
3 Year Data (2017-2019)

Variety		Year	Extractable Sugar/ Acre	Extractable Sugar/ Ton	Gross Sugar/ Acre	Tons/ Acre	% Sugar	Purity	Stand	% Bolt*	% Rot	Percent Emergence	Curly Top*	% of Mkt. --- M = 150 ---	Erwinia*	% of Mkt. --M = 300	Powdery Mildew	% of Mkt. Avg. -- M = 100	Rhizomania Root Rating*
	Pr>F	2019	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001		<0.0001		<0.0001
		2018	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001		--		<0.0001
		2017	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.4	0.02	<0.0001	0.4	<0.0001	<0.0001		--		--		<0.0001
	LSD (0.05)	2019	1084.0	7.8	1234.0	3.8	0.4	0.7	5.1	0.5	0.8	5.0	0.3		7.8		--		0.6
		2018	1439.5	9.9	1702.8	4.9	0.4	1.0	7.4	1.3	4.2	7.0	0.4		--		--		0.6
		2017	1176.9	10.8	1280.1	3.5	0.5	N/S	3.7	1.3	N/S	5.5	0.6		--		--		0.3
	C.V.	2019	5.2	2.9	4.9	5.0	2.2	0.8	2.1	254.9	211.0	8.1	4.2		44.2		25.0		n/a
		2018	7.3	4.1	6.7	6.1	2.8	1.1	3.2	76.0	47.8	10.50	4.0		37.8		--		n/a
		2017	6.9	4.6	5.9	4.8	3.2	1.3	1.6	118.5	191.6	6.8	6.0		--		--		n/a

Cooperator	Planted	Harvested	Plot Size
Paul Cameron	10/18/2019	7/15-16/2019	2 rows -- 30 in. 4 x 5 lattice
Gary and Ryan Mamer	10/6/2017	7/16-17/2018	2 rows -- 30 in. 5 x 5 lattice
Paul Cameron	10/5/2016	6/15-16/2017	2 rows -- 30 in. 5 x 5 lattice
Jim Mamer/Vince Wavra	10/12/2016	6/27-28/2017	2 rows -- 30 in. 5 x 5 lattice

Imperial Valley Late Harvest Official Variety Trials
2 Year Data (2018-2019)

Variety	Marketing Approval	Year	Extractable Sugar/ Acre	Extractable Sugar/ Ton[+]	Gross Sugar/ Acre	Tons/ Acre	% Sugar	Purity	Final Stand Beets/100'	% Bolt	% Rot	Percent Emergence	Curly Top Rating	% of Mkt. Avg.	Erwinia* Rating (DI)	% of Mkt. Avg.	Powdery Mildew Rating*	% of Mkt. Avg.	Rhizomania Root Rating*
													--- M = 150 ---		--M = 300		-- M = 100		
Beta 582N		2019	21,166	300.7	24,995	70.8	17.7	90.7	255	0.0	0.4	76.8	5.9	101.9	27.1	130.1	4.2	83.8	1.6
		2018	19,925	261.3	25,000	75.1	16.4	87.1	239	0.0	14.3	75.0	n/a		n/a		n/a		n/a
		Average	20,546	281.0	24,998	73.0	17.1	88.9	247	0.0	7.4	75.9	--				--		
MA722		2019	20,108	289.9	23,927	69.6	17.2	90.3	225	0.9	0.5	33.3	5.7	98.5	4.0	19.4	--		2.8
		2018	20,644	268.1	25,568	75.7	16.7	87.5	221	3.6	8.8	44.3	n/a		n/a		n/a		n/a
		Average	20,376	279.0	24,748	72.7	17.0	88.9	223	2.3	4.7	38.8	--				--		
BTS 5460	Full Approval	2019	21,647	286.0	25,632	75.6	16.9	90.6	257	0.0	0.0	74.5	5.8	100.2	45.3	217.9	4.3	85.8	1.4
		2018	23,310	261.8	28,995	88.3	16.3	87.5	231	1.2	1.2	63.6	6.2	95.6	52.4	162.4	n/a		1.0
		Average	22,478	273.9	27,314	82.0	16.6	89.1	244	0.6	0.6	69.1	--	--	--	--	--		--
BTS 5678	Full Approval	2019	22,333	288.7	26,465	77.2	17.1	90.5	255	0.1	0.1	67.9	5.7	98.5	31.3	150.7	6.1	121.7	1.5
		2018	21,807	256.4	27,396	85.0	16.1	86.9	237	0.0	5.6	65.0	6.6	101.7	51.4	159.3	n/a		1.6
		Average	22,070	272.5	26,931	81.1	16.6	88.7	246	0.1	2.9	66.4	--	--	--	--	--		--
BTS 5775	Limited Approval	2019	22,758	277.2	27,389	82.2	16.7	89.6	254	0.0	0.5	58.1	6.0	103.7	36.2	174.3	3.8	75.8	2.1
		2018	20,793	252.3	26,362	82.9	16.0	86.5	231	0.4	6.2	70.1	6.8	104.8	57.0	176.7	n/a		1.5
		Average	21,775	264.8	26,876	82.6	16.3	88.0	243	0.2	3.3	64.1	--	--	--	--	--		--
BTS 566N	Full Approval	2019	20,845	282.2	24,937	73.4	17.0	89.7	255	0.0	0.1	75.0	5.4	93.3	14.2	68.1	4.4	87.8	1.9
		2018	19,013	244.0	24,297	77.8	15.6	86.0	229	0.3	3.3	65.9	6.3	97.1	36.0	111.6	n/a		1.8
		Average	19,929	263.1	24,617	75.6	16.3	87.9	242	0.2	1.7	70.4	--	--	--	--	--		--
BTS 5600	Full Approval	2019	22,854	274.7	27,322	83.3	16.4	90.1	252	0.0	0.2	65.4	6.1	105.4	27.2	131.0	4.6	91.8	0.8
		2018	21,571	248.9	27,332	87.7	15.7	86.6	232	0.0	15.0	69.4	6.4	98.7	37.9	117.5	n/a		0.6
		Average	22,212	261.8	27,327	85.5	16.1	88.4	242	0.0	7.6	67.4	--	--	--	--	--		--
SV 2983		2019	19,620	273.2	23,836	72.1	16.6	89.0	258	1.0	0.4	79.1	5.5	95.0	4.3	20.9	4.4	87.8	1.8
		2018	19,700	248.3	25,048	80.9	15.6	86.9	235	0.0	13.1	81.9	6.0	92.5	2.4	7.4	n/a		2.4
		Average	19,660	260.8	24,442	76.5	16.1	88.0	247	0.5	6.8	80.5	--	--	--	--	--		--
SV 971	Full Approval	2019	18,553	274.3	22,386	67.4	16.6	89.2	167	0.4	0.7	22.0	5.7	98.5	4.8	23.1	6.7	133.7	2.4
		2018	21,274	242.8	27,156	87.7	15.5	86.2	218	3.5	13.3	51.9	6.6	101.7	8.1	25.1	n/a		1.1
		Average	19,913	258.5	24,771	77.5	16.0	87.7	192	1.9	7.0	36.9	--	--	--	--	--		--
SV 2982N		2019	22,301	264.3	26,987	84.3	16.0	89.4	254	0.2	0.7	69.6	5.5	95.0	8.9	42.7	6.8	135.7	2.0
		2018	19,896	237.7	25,445	83.6	15.3	85.9	242	3.7	14.7	85.8	n/a		n/a		n/a		n/a
		Average	21,099	251.0	26,216	84.0	15.7	87.7	248	2.0	7.7	77.7	--	--	--	--	--		--
SV143N	Full Approval	2019	22,000	260.8	26,695	84.2	15.9	89.2	254	0.6	0.5	67.5	5.8	100.2	5.2	24.9	4.4	87.8	2.2
		2018	21,517	237.8	27,711	90.9	15.3	85.7	239	4.0	12.0	83.2	6.4	98.7	6.6	20.5	n/a		0.8
		Average	21,758	249.3	27,203	87.5	15.6	87.4	246	2.3	6.3	75.3	--	--	--	--	--		--
SV604N	Full Approval	2019	21,425	258.4	26,033	82.4	15.7	89.1	254	0.1	0.7	50.5	5.8	100.2	2.1	10.1	5.8	115.7	1.4
		2018	19,614	235.9	25,235	83.1	15.2	85.8	228	1.5	7.9	60.1	6.6	101.7	8.7	27.0	n/a		2.6
		Average	20,519	247.2	25,634	82.8	15.4	87.5	241	0.8	4.3	55.3	--	--	--	--	--		--

[+] varieties ranked by Extractable Sugar per Ton

	Extr. Sugar/Acre	Extr. Sugar/Ton	Gross Sugar/Acre	Tons/Acre	% Sugar	Purity
Mean of Approved	21,269	260.9	26,257	81.7	16.1	88.1
97% of Approved	20,631	253.1	25,469	79.3	15.6	85.4

	Mean of Approved Varieties						
2019 Mean	5.8	100.0	20.8	100	5.0	100	1.7
2018 Mean	6.5	100.0	32.3	100	n/a	n/a	1.4

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Imperial Valley Late Harvest Official Variety Trials
2 Year Data (2018-2019)

Variety	Marketing Approval	Year	Extractable Sugar/ Acre	Extractable Sugar/ Ton[+]	Gross Sugar/ Acre	Tons/ Acre	% Sugar	Purity	Final Stand Beets/100'	% Bolt	% Rot	Percent Emergence	Curly Top Rating	% of Mkt. Avg. --- M = 150 ---	Erwinia* Rating (DI)	% of Mkt. Avg. --M = 300	Powdery Mildew Rating*	% of Mkt. Avg. -- M = 100	Rhizomania Root Rating*
Pr>F		2019	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001		<0.0001		<0.0001
		2018	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001				<0.0001
LSD		2019	1084.0	7.8	1234.0	3.8	0.4	0.7	5.1	0.5	0.8	5.0	0.3		7.8		n/a		0.6
		2018	1439.5	9.9	1702.8	4.9	0.4	1.0	7.4	1.3	4.2	7.0	0.4		n/a				0.6
C.V.		2019	5.2	2.9	4.9	5.0	2.2	0.8	2.1	254.9	211.0	8.1	4.2		44.2		25.0		n/a
		2018	7.3	4.1	6.7	6.1	2.8	1.1	3.2	76.0	47.8	10.5	4.0		37.8				n/a

Cooperator	Planted	Harvested	Plot Size
Paul Cameron	10/18/2019	7/15-16/2019	2 rows -- 30 in. 4 x 5 lattice
Gary and Ryan Mamer	10/6/2017	7/16-17/2018	2 rows -- 30 in. 5 x 5 lattice

* Disease nursery ratings: Lower numbers are more resistant, higher numbers are more susceptible.

Imperial Valley Late Harvest Official Variety Trials
1 Year Data Summary (2019)

Variety	Marketing Approval	Extractable Sugar/ Acre	Extractable Sugar/ Ton[+]	Gross Sugar/ Acre	Tons / Acre	% Sugar	Purity	Final Stand Beets/100'	% Bolt	% Rot	Percent Emergence	Curly Top	% of Mkt. Avg.	Erwinia Root Rot (DI)	% of Mkt. Avg.	Powdery Mildew	% of Mkt. Avg.	Rhizomania Root Rating
												M = 150		M = 300		M = 100		
BTS 582N		21,166	300.7	24,995	70.8	17.7	90.7	255	0.0	0.4	76.8	5.9	101.9	27.1	130.1	4.2	83.8	1.6
MA 722		20,108	289.9	23,927	69.6	17.2	90.3	225	0.9	0.5	33.3	5.7	98.5	4.0	19.4	--	--	2.8
BTS 5983		22,609	289.9	26,700	78.1	17.1	90.8	253	0.1	0.5	46.6	--	--	--	--	--	--	--
BTS 595N		21,083	289.0	24,953	73.0	17.1	90.7	256	0.0	0.4	58.1	--	--	--	--	--	--	--
BTS 5678	Full Approval	22,333	288.7	26,465	77.2	17.1	90.5	256	0.1	0.1	67.9	5.7	98.5	31.3	150.7	6.1	121.7	1.5
BTS 5919		22,446	287.3	26,608	78.2	17.0	90.5	254	0.0	0.0	51.7	--	--	--	--	--	--	--
BTS 5460	Full Approval	21,647	286.0	25,632	75.6	16.9	90.6	257	0.0	0.0	74.5	5.8	100.2	45.3	217.9	4.3	85.8	1.4
BTS 566N	Full Approval	20,845	282.2	24,937	73.4	17.0	89.7	254	0.0	0.1	75.0	5.4	93.3	14.2	68.1	4.4	87.8	1.9
SV 2998		20,944	279.1	25,131	75.2	16.7	89.8	256	0.1	0.9	84.4	--	--	--	--	--	--	--
BTS 5775	Limited Approval	22,758	277.2	27,389	82.2	16.7	89.6	254	0.0	0.5	58.1	6.0	103.7	36.2	174.2	3.8	75.8	2.1
BTS 5600	Full Approval	22,854	274.7	27,322	83.3	16.4	90.1	252	0.0	0.2	65.4	6.1	105.4	27.2	131.0	4.6	91.8	0.8
SV 971	Full Approval	18,553	274.3	22,386	67.4	16.6	89.2	166	0.4	0.7	22.0	5.7	98.5	4.8	23.2	6.7	133.7	2.4
SV 2983		19,620	273.2	23,836	72.1	16.6	89.0	258	1.0	0.4	79.1	5.5	95.0	3.2	15.4	4.4	87.8	1.8
SV 2999		21,854	264.6	26,344	82.6	16.0	89.7	257	0.9	0.3	70.2	--	--	--	--	--	--	--
SV 2997N		22,353	264.5	26,999	84.7	16.0	89.6	256	0.0	0.3	80.7	--	--	--	--	--	--	--
SV 2982N		22,301	264.3	26,987	84.3	16.0	89.4	254	0.2	0.7	69.6	--	--	8.9	42.7	--	--	2.0
SV 143N	Full Approval	22,000	260.8	26,695	84.2	15.9	89.2	254	0.6	0.5	67.5	5.8	100.2	5.2	24.9	4.4	87.8	2.2
SV 604N	Full Approval	21,425	258.4	26,033	82.4	15.7	89.1	254	0.1	0.7	50.5	5.8	100.2	2.1	10.1	5.8	115.7	1.4

[+] varieties ranked by Extractable Sugar per Ton

Mean of Approved		21,380	275.0	25,639	77.6	16.5	89.8					5.8	100.0	20.8	100.0	5.0	100.0	1.7
97% of Approved		20,738	266.8	24,869	75.3	16.0	87.1											
Pr>F		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.0001		<0.0001		<0.0001
LSD		1084.0	7.8	1234.0	3.8	0.4	0.7	5.1	0.5	0.8	5.0	0.3		7.8				n/a
C.V.		5.2	2.9	4.9	5.0	2.2	0.8	2.1	254.9	211.0	8.1	4.2		44.2		25.0		0.6

Cooperator			Planted	Harvested		Plot Size		
Paul Cameron			10/18/2019	7/15-16/2019		2 rows -- 30 in. 4 x 5 lattice		

2018-2019 Imperial Valley Late Harvest Official Variety Trial Results - Location 2

Cooperator: Paul Cameron

Entry	Entry Code	Entry Name	Extractable Sugar per Ton	Extractable Sugar per Acre	Gross Sugar per Acre	Tons per Acre	Percent Sugar	Extractable Sugar Percent	Percent Purity	Brei N	Percent Tare	Percent Emergence*	Final Stand Beets/100***	Percent Rot	Mildew Rating***
1	2018/19 IVLH	BTS 595N	289.0	21083	24953	73.0	17.1	14.4	90.7	42	1.0	58.1	256	0.4	4.8
2	2018/19 IVLH	BTS 5600	274.7	22854	27322	83.3	16.4	13.7	90.1	27	1.0	65.4	252	0.2	5.7
3	2018/19 IVLH	BTS 566N	282.2	20845	24937	73.4	17.0	14.1	89.7	38	0.9	75.0	254	0.1	4.7
4	2018/19 IVLH	SV 2998	279.1	20944	25131	75.2	16.7	14.0	89.8	38	0.3	84.4	256	0.9	5.6
5	2018/19 IVLH	BTS 5460	286.0	21647	25632	75.6	16.9	14.3	90.6	35	0.7	74.5	257	0.0	4.9
6	2018/19 IVLH	SV 604	258.4	21425	26033	82.4	15.7	12.9	89.1	44	0.8	50.5	254	0.7	3.7
7	2018/19 IVLH	SV 2983	273.2	19620	23836	72.1	16.6	13.7	89.0	36	0.8	79.1	258	0.4	4.9
8	2018/19 IVLH	SV 2997	264.5	22353	26999	84.7	16.0	13.2	89.6	35	0.9	80.7	256	0.3	5.0
9	2018/19 IVLH	SV 143	260.8	22000	26695	84.2	15.9	13.0	89.2	41	1.0	67.5	254	0.5	3.7
10	2018/19 IVLH	SV 2999	264.6	21854	26344	82.6	16.0	13.2	89.7	42	0.9	70.2	257	0.3	3.7
11	2018/19 IVLH	BTS 5983	289.9	22609	26700	78.1	17.1	14.5	90.8	31	1.0	46.6	253	0.5	5.2
12	2018/19 IVLH	BTS 5678	288.7	22333	26465	77.2	17.1	14.4	90.5	33	0.4	67.9	256	0.1	5.4
13	2018/19 IVLH	BTS 5775	277.2	22758	27389	82.2	16.7	13.9	89.6	49	0.4	58.1	254	0.5	5.2
14	2018/19 IVLH	SV 2982	264.3	22301	26987	84.3	16.0	13.2	89.4	43	0.6	69.6	254	0.7	4.1
15	2018/19 IVLH	SV 971	274.3	18553	22386	67.4	16.6	13.7	89.2	41	0.5	22.0	166	0.7	5.6
16	2018/19 IVLH	BTS 5919	287.3	22446	26608	78.2	17.0	14.4	90.5	43	1.3	51.7	254	0.0	4.8
17	2018/19 IVLH	BTS 582N	300.7	21166	24995	70.8	17.7	15.0	90.7	33	1.4	76.8	255	0.4	2.8
18	2018/19 IVLH	MA 722	289.9	20108	23927	69.6	17.2	14.5	90.3	42	0.6	33.3	225	0.5	4.4
19	2018/19 IVLH	Filler	294.2	21828	25843	74.2	17.4	14.7	90.5	34	0.7	72.9	255	0.2	4.8
20	2018/19 IVLH	Filler	268.6	20301	24622	76.1	16.3	13.4	89.2	42	1.2	64.1	257	0.6	3.8
		Mean	278.4	21452	25690	77.2	16.7	13.9	89.9	38	0.8	63.4	249	0.4	4.6
		CV (%)	2.9	5.2	4.9	5.0	2.2	2.9	0.8	27.6	39.4	8.1	2.1	211.0	9.9
		LSD (0.05)	7.8	1084	1234	3.8	0.4	0.4	0.7	NS	0.3	5.0	5.1	0.8	0.4
		Pr>F	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.08	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
		Error MS	63.25	1,224,121	1,586,421	14.84	0.13	0.16	0.47	113.18	0.11	26.53	27.20	0.62	0.21
		Reps	8	8	8	8	8	8	8	8	8	8	8	8	8

*Emergence counts taken prior to thinning and converted to a percent.

** Final stand counts taken after thinning and converted to beets per 100' of row.

***Powdery mildew ratings were taken in the trial on June 5, 2019 (1-9 scale). Ratings taken by Mark Bloomquist and Israel Santiago.

Plant Date: October 18, 2019
Harvest Date: July 15-16, 2019
Plot size: 2 row, 30" rows
Experimental Design: 4x5 Rectangular Lattice