

ADVANCED GENERATIONS TRIAL  
FORT COLLINS, COLORADO, 1938.

Several strains of beet seed were available, each of which originated as a relatively small selected group of roots and each of which had been increased one or more times without further selection; except such selection as occurred by the action of adaption or climatic factors.

Location etc:

Location, planting, spacing, culture etc. were the same as for the Varieties and Strains Test. The plan and time of harvest were also the same.

Test Plan and Plot Size:

This test was an equalized random block test of eight replications. Equalization was used to secure good distribution of the varieties in the planting plan and disregarded in the analysis of the data, that is the data was analyzed as a random block planting. The plots were of eight rows each, forty feet long.

Strains:

Group I. Flat Foliage.

1. Commercial Seed; 1934 New Mexico crop.
2. First increase of selected group; 1933 Rocky Ford crop.
3. Second increase, 1934 Rocky Ford crop.
4. Third increase, 1935 Las Graces, New Mexico crop.
5. Second or third (data lost) increase, 1936, Rocky Ford crop.  
This increase was from a few hundred roots only.

Group II. Synthetic Check.

6. Original Seed.
7. First increase of original stock, Avon, Colorado 1935 crop.
8. First increase; small group selected roots, Rocky Ford, 1935 crop.

Group III. Great Western.

9. Bartels overwinter crop 1935. (Not necessarily comparable to two following numbers.)
10. Windsor overwinter crop 1937. (Winterkilling over 90%)
11. Stock seed used for above Windsor planting.

**Group IV. Original Normal.**

12. Unselected group, 1935 crop.
13. First increase, 1936 crop. (Overwinter planting, little killing).
14. Second increase, 1937 crop (Over winter planting, some killing).

**Group V. Pioneer.**

15. Selected group, 1931 crop.
16. First increase 1933 crop (selected)

**Plot and general summaries follow.**

ADVANCED GENERATIONS TEST  
PLOT SUMMARIES  
1938

Var. No.	Plot No.	No. of Beets.	T. Beets. Per A.	S Sugr.	App. Coef. of Purity	Lbs. Sug. per A.		Harvest Stand <sup>o</sup>
						Gross	Ind. Av.	
1	418	333	17.42	15.10	90.90	5260	4781	146
	439	297	16.85	14.90	90.00	5022	4520	124
	451	372	16.72	15.00	91.35	5016	4582	155
	469	285	13.67	14.85	91.95	4059	3732	119
	479	326	16.74	15.45	92.90	5172	4805	136
	491	303	15.19	15.40	92.85	4677	4343	126
	521	363	15.83	15.20	91.25	4814	4393	151
	526	237	17.54	14.50	92.65	5086	4712	146
Mean			16.24	15.05	91.73	4888	4484	138
2	426	331	12.97	14.00	88.55	3632	3216	145
	438	309	14.82	16.45	90.15	4874	4394	129
	448	292	15.46	16.90	91.65	5101	4675	122
	459	294	13.13	16.15	91.90	4240	3897	122
	488	316	14.78	15.70	89.70	4642	4164	132
	499	366	12.18	15.80	90.75	3849	3493	152
	509	336	13.49	16.10	92.15	4343	4002	140
	530	246	12.52	16.20	93.45	4056	3790	152
Mean			13.67	15.86	91.04	4342	3954	137
3	415	281	13.10	15.35	90.30	4021	3631	123
	442	310	13.66	15.30	87.55	4180	3660	129
	456	274	14.55	15.90	90.35	4628	4181	114
	462	277	12.20	16.00	91.75	3905	3583	115
	476	310	13.79	15.75	92.15	4345	4004	129
	501	260	10.97	15.90	90.55	3489	3159	108
	513	287	13.00	15.70	91.90	4081	3750	120
	531	202	12.90	15.05	89.15	3882	3461	125
Mean			13.02	15.62	90.46	4066	3679	120
4	422	284	13.65	15.80	91.15	4314	3932	125
	436	333	14.96	15.95	91.65	4771	4373	139
	447	331	15.22	15.75	91.30	4796	4379	138
	472	302	13.95	15.60	90.65	4352	3945	126
	478	328	13.31	16.00	92.70	4260	3949	137
	506	344	13.74	15.00	89.05	4121	3670	143
	514	331	13.57	15.60	91.60	4233	3877	138
	524	239	15.18	15.55	91.30	4721	4310	148
Mean			14.20	15.66	91.18	4446	4054	137

<u>Yr.</u> <u>No.</u>	<u>Plot</u> <u>No.</u>	<u>No. of</u> <u>Beets</u>	<u>T. Beets.</u> <u>Per A.</u>	<u>%</u> <u>Sucr.</u>	<u>App. Coef.</u> <u>of Purity</u>	<u>Lbs. Suc. per A.</u>		<u>Harvest</u> <u>Stand</u>
						<u>Gross</u>	<u>Ind. Av.</u>	
5	421	248	14.10	15.20	90.20	4286	3866	109
	430	260	14.56	15.65	91.50	4557	4170	108
	457	257	13.45	15.70	89.35	4225	3775	107
	466	296	12.89	15.60	91.25	4023	3671	123
	483	288	12.72	15.45	91.20	3930	3584	120
	492	290	11.90	16.00	93.20	3807	3548	121
	519	232	13.34	15.65	90.05	4175	3760	97
	527	169	12.85	14.30	91.80	3675	3374	104
Mean			13.23	15.44	91.07	4085	3718	111
6	420	318	16.99	14.55	92.00	4945	4549	139
	429	334	16.12	14.85	92.50	4788	4429	139
	449	365	17.48	15.80	93.55	5523	5167	152
	460	345	16.50	15.00	92.05	4951	4557	144
	480	279	16.33	14.65	93.00	4785	4450	116
	504	265	16.30	14.00	90.00	4565	4109	110
	518	235	13.79	14.40	90.60	3971	3598	98
	537	218	17.75	13.65	90.00	4847	4362	135
Mean			16.41	14.61	91.71	4797	4403	129
7	411	273	16.44	14.25	93.00	4687	4359	120
	432	292	17.67	14.35	91.15	5071	4622	122
	458	398	16.96	13.35	88.85	4529	4024	149
	471	250	14.70	14.65	91.20	4306	3927	104
	486	262	14.86	14.20	91.70	4022	3688	109
	497	336	16.65	15.10	92.70	5027	4660	140
	515	290	14.40	14.20	90.30	4089	3692	121
	525	206	16.39	14.60	93.30	4786	4465	127
Mean			15.92	14.34	91.52	4565	4180	124
8	424	294	15.82	14.80	91.55	4684	4288	129
	441	356	15.49	15.20	91.15	4709	4292	148
	445	351	15.96	15.45	93.05	4931	4588	146
	470	291	15.28	14.50	91.30	4432	4046	121
	482	368	16.16	14.70	92.65	4751	4402	153
	496	288	15.21	15.45	92.55	4701	4351	120
	516	297	13.31	14.55	91.60	3874	3549	124
	523	183	16.59	15.85	92.90	5257	4884	113
Mean			15.48	15.06	92.09	4667	4300	132

<u>Yr.</u> <u>No.</u>	<u>Plot</u> <u>No.</u>	<u>No. of</u> <u>Beets</u>	<u>T. Beets</u> <u>Per A.</u>	<u>S</u> <u>Sucr.</u>	<u>App. Ccoef.</u> <u>of Purity</u>	<u>Lbs. Suc. per A.</u> <u>Gross</u>	<u>Ind. Av.</u>	<u>Harvest</u> <u>Stand</u>
9	425	336	14.87	14.70	90.10	4373	3940	147
	433	374	16.73	14.80	92.25	4953	4569	156
	452	332	17.55	15.25	90.50	5353	4814	138
	463	348	16.50	15.35	92.75	5065	4698	145
	475	329	18.26	15.10	91.50	5515	5046	137
	503	269	15.78	14.40	90.40	4545	4109	112
	510	328	16.35	14.75	91.65	4822	4419	137
	534	186	17.88	14.20	90.35	5077	4587	115
Mean			16.74	14.82	91.19	4963	4526	136
10	414	293	19.11	14.90	91.80	5695	5228	129
	440	288	17.96	15.75	89.95	5657	5088	120
	444	345	18.71	15.25	91.65	5706	5230	144
	467	344	15.86	14.90	90.65	4725	4283	143
	490	334	17.11	15.05	92.10	5150	4743	139
	498	350	16.86	15.35	91.45	5175	4733	146
	517	280	13.29	14.80	91.75	3934	3609	117
	528	173	14.48	14.95	92.80	4329	4017	107
Mean			16.67	15.12	91.52	5046	4616	131
11	412	343	18.10	15.05	92.40	5448	5034	150
	434	377	19.22	16.00	92.25	6151	5674	157
	446	371	19.26	16.10	92.90	6203	5763	155
	464	287	17.85	14.65	91.50	5231	4786	120
	489	364	18.48	15.30	91.60	5655	5180	152
	502	294	14.94	14.85	91.05	4437	4040	122
	520	292	17.84	15.25	90.65	5442	4933	122
	532	232	17.57	13.65	89.35	4796	4285	143
Mean			17.91	15.11	91.46	5420	4962	140
12	423	249	16.01	14.45	91.45	4626	4230	109
	428	360	18.10	15.20	92.45	5504	5088	150
	454	292	16.89	14.55	89.85	4915	4416	122
	474	362	16.62	13.70	89.10	4555	4059	151
	477	323	14.80	15.65	93.60	4634	4337	135
	500	333	12.89	14.55	91.40	3752	3429	139
	512	256	16.17	15.35	91.75	4965	4555	107
	529	210	13.06	14.10	91.65	3683	3375	130
Mean			15.57	14.69	91.41	4579	4186	130

<u>Yar.</u> <u>No.</u>	<u>Plot</u> <u>No.</u>	<u>No. of</u> <u>Beets</u>	<u>T. Beets</u> <u>Per A.</u>	<u>1</u> <u>Sucr.</u>	<u>App. Coef.</u> <u>of Purity</u>	<u>Lbs. Suc. per A.</u>		<u>Harvest</u> <u>Stand</u>
						<u>Gross</u>	<u>Ind. Av.</u>	
13	417	318	16.66	14.65	92.15	4882	4499	139
	427	252	15.75	15.00	92.35	4724	4363	105
	455	268	16.81	14.65	90.85	4927	4476	112
	468	348	14.58	14.85	90.70	4331	3928	145
	485	307	14.15	14.75	90.75	4173	3787	128
	493	268	12.33	15.70	92.80	3873	3594	112
	511	294	16.43	14.40	91.40	4733	4326	122
	538	193	17.07	13.45	88.70	4592	4073	119
Mean			15.47	14.68	91.21	4529	4131	123
14	416	274	16.62	14.95	92.55	4968	4598	120
	437	287	18.13	15.25	90.80	5529	5020	120
	490	350	17.48	16.10	92.30	5630	5196	146
	461	312	13.53	15.65	93.00	4235	3939	130
	484	363	14.88	14.85	90.80	4418	4012	151
	505	339	16.65	14.95	90.80	4977	4519	141
	507	288	18.10	15.80	91.45	5719	5230	120
	535	187	17.11	14.65	90.95	5013	4559	115
Mean			16.56	15.28	91.58	5061	4634	130
15	413	326	16.19	14.70	91.80	4760	4370	143
	435	334	16.65	15.15	90.25	5045	4553	139
	443	294	15.67	15.50	92.60	4856	4497	122
	465	369	15.49	14.65	92.20	4539	4185	154
	487	257	15.51	14.65	90.20	4545	4100	107
	495	308	14.03	15.00	91.45	4210	3850	128
	522	335	15.50	14.40	90.25	4463	4028	140
	533	165	11.59	14.40	90.05	3338	3006	102
Mean			15.08	14.81	91.10	4470	4074	129
16	419	316	15.99	15.45	91.60	4939	4524	139
	431	310	15.70	15.20	91.85	4772	4383	129
	453	245	15.90	15.40	91.35	4899	4475	102
	473	316	14.88	15.35	90.50	4567	4133	132
	481	342	14.18	15.80	92.80	4482	4159	142
	494	262	13.08	15.35	92.00	4015	3694	109
	508	264	15.93	15.60	91.60	4971	4553	110
	536	195	17.10	15.15	91.10	5182	4721	120
Mean			15.34	15.41	91.60	4728	4330	123

\* Harvested beets calculated to 100 feet of row.

ADVANCED GENERATIONS TEST  
GENERAL SUMMARIES  
1938

<u>Variety</u>	<u>Stand*</u>	<u>T. Beets</u> <u>Per A.</u>	<u>¢</u> <u>Sucr.</u>	<u>App. Coef.</u> <u>of Purity.</u>	<u>Lbs. Sucr.</u> <u>Gross</u>	<u>Per A.</u> <u>Ind. Av.</u>
Group I	1 138	16.24	15.05	91.73	4888	4484
	2 137	13.67	15.86	91.04	4342	3954
	3 120	13.02	15.62	90.46	4066	3679
	4 137	14.20	15.66	91.18	4446	4054
	5 111	13.23	15.44	91.07	4085	3718
Group II	6 129	16.41	14.61	91.71	4797	4403
	7 124	15.92	14.34	91.52	4565	4180
	8 132	15.48	15.06	92.09	4667	4300
Group III	9 136	16.74	14.82	91.19	4963	4526
	10 131	16.67	15.12	91.52	5046	4616
	11 140	17.91	15.11	91.46	5420	4962
Group IV	12 130	15.57	14.69	91.41	4579	4186
	13 123	15.47	14.68	91.21	4529	4131
	14 130	16.56	15.28	91.58	5061	4634
Group V	15 129	15.08	14.81	91.10	4470	4074
	16 123	15.34	15.41	91.60	4728	4330
Mean	129	15.47	15.10	91.37	4666	4264
Z	.4225	1.1939	.9361	†	.9715	.9605
5% Point	•	•	•	•	•	•
1% Point	•	•	•	•	•	•
S.E. of Mean	5	.414	.1675	.422	136.6	130.2
S.E. of mean in % "	3.88%	2.68%	1.11%	.46%	2.93%	3.05%
Dif for Sig. 14 beets		1.17 T	.47%	1.19%	386 lb.	368 lb.

† Z is minus value.

\* Average number of beets harvested for 100 feet of row.

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FORT COLLINS, COLORADO, 1938

Discussion:

Group I. Considerable data previously reported indicates that the original selection resulted in a considerable increase in percent sucrose and a reduction in tonnage in comparison with the commercial variety. All of the increases; Nos. 2 to 5 of this test, confirm this finding. When the increases are compared among themselves No. 4 appears to be superior; the difference when compared to the poorest of the others at least verges on significance. We may certainly conclude that this selection has not deteriorated through three successive increases.

Group II. The unselected increase, No. 7, does not vary significantly from the original, No. 6. The selected increase gave a lower tonnage with higher percent sucrose in comparison with the original and the unselected increase; the differences verging on significance. The 1938 results from these three lines are in accord with tests of 1936 and 1937, previously reported.

Group III. No. 9 may or may not be strictly comparable to No. 11 since the exact relationship of these two lines is not known. No. 10 yielded 1.24 tons less than the parent stock, No. 11. This difference is probably significant and may indicate that the severe winter mortality resulted in a change in the yielding ability of this strain. Nos. 10 and 11 are practically identical in percent sucrose and coefficient of apparent purity; indicating that this change, if any, did not affect the quality of this strain.

Group IV. This group appears to exhibit the reverse of the group just considered in that the progeny of the increase known to have suffered some winter killing is superior in yield and percent sucrose when compared to the original stock and the first increase. The apparent superiority in yield of roots is probably not significant, but that for percent sucrose is probably significant as is also the increase in sugar per acre.

Group V. This group differs from the others in that the second increase was a reselection and appears to have resulted in a significant increase in percent sucrose. This is in line with the generally accepted belief that higher percent sucrose is rather easily attained by selection.

The test as a whole gives no indication that one, two or three direct increases of more or less closely selected strains resulted in any deterioration in yield or quality; with the possible exception that severe natural selection may change the character of the strain. The test was probably not adequate to fully prove or disprove the latter.