

DATE OF PLANTING AND VARIETY TEST  
FORT COLLINS, COLORADO  
1938

Location:

Ments tract. College Farm.

Plan of Test:

Split plot design. Four replicates of three planting dates; planted in randomized strips eight rows wide and four hundred feet long. The four varieties randomized in each date strip

Variety-date plots: 3 rows one hundred feet long.

Spacing: Twenty inch rows. beets spaced ten inches in row.

Dates:

Early: March 21. Normally a very small proportion of the beets in this area are planted in late March in years when seeding conditions are good at that time. Germination conditions for this planting were excellent except that the ground was too cold for quick germination.

Medium: April 26. This date is a few days later than the recommended optimum date of planting, but approximated the date in 1935 when a very large proportion of the beet planting was done in this area. Germination conditions excellent.

Late: May 17. This date is definitely late for planting a beet crop. Germination conditions good. Due to the strips left for this planting being too narrow to work with machinery weeds which had germinated earlier were present at the time of planting and in a few spots this competition may have slightly retarded early growth of the beet seedlings. The plots were cultivated and cleaned before this weed competition was serious.

Varieties:

Great Western: 1937 crop southern grown commercial seed.

Original Normal: Commercial. German origin seed received prior to 1937.

U. S. No. 217: 1937 crop southern grown commercial seed.

Hybrid (1937 Rocky Ford Seed No. 304): Original cross of forty roots of commercial sugar beet (low yield, high sugar type) and ten roots unknown red garden beet, probably Detroit Dark Red. Seed of an all white root third and fourth generations was produced from this hybrid in 1935. The 1937 seed is from

Varieties: (Continued)

a group of over five hundred reselected roots and is essentially a fourth generation of the hybrid; twice selected for size and percent sucrose.

Culture:

Early Planting March 21: Emergence of seedlings approximately April 15. Heaviest germination stand and best early vigor were shown by U. S. No. 217 and the hybrid. Thinned May 14th. Stands excellent. Soon after thinning the inside four rows were checked for doubles.

Medium Planting: April 26: Emergence approximately May 5th. Heaviest germination stands were shown for Great Western and Original Normal. This is the reverse of the early planting. The differences were very slight and may be of no significance. Thinned May 27th. Stands excellent. Soon after thinning the inside four rows were checked for doubles.

Late Planting May 17: Emergence approximately May 26-27th. Varietal differences in germination stand and seedling vigor were not evident; possibly attributable to the previously mentioned weed competition and slightly poorer germination conditions in general. Thinned June 11 and 13th. Stands very good. The inside rows were not checked for doubles. This probably accounts for the slightly greater number of beets harvested per plot from the late planting.

Cultivations, hoeing and irrigations were given as needed and conformed to good practice for this area.

Harvest:

Preharvest samplings: Beginning September 9th four preharvests at ten day intervals were made from this test. Ten feet of the four inside rows of each plot were harvested on each of the following dates; September 9, 19, 29 and October 10th. All beets were taken and *divided* into two approximately equal samples; the samples were washed, weighed and percent sucrose determined. From the data actual tons of beets per acre and gross pounds of sugar per acre were calculated.

September 9th harvest. No previous frost. Soil still muddy from rains at first of the month.

September 19th harvest. No previous frost. Soil very moist, but not muddy.

September 29th harvest. No previous frost. Soil moist.

October 10th harvest. No previous frost. Soil slightly dry.

Main Harvest; October 19 and 30th. Light snow and moderate freeze few days previous. Surface soil somewhat moist.

**Harvest: (Continued)**

**Details of Main Harvest:** Fifty feet of the inside four rows were harvested; two hundred feet of row per plot. First all "competitive" beets were hand dug; from these two twenty beet samples were taken for analysis and the remainder sacked to be washed and weighed. All remaining ("non-competitive") beets were then dug and sacked. From the data yields of beets and sugar per acre were calculated for a theoretical perfect stand and as the actual yield.

Plot and general summaries follow.

DATE OF PLANTING AND VARIETY TEST  
 SEPTEMBER 9. HARVEST  
 1938

PLOT SUMMARIES EARLY DATE OF PLANTING

<u>Var.</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>SUG.</u>	<u>Gross</u> <u>SUGAR</u>
G.V.	10	48	18.79	14.40	5410
	21	43	19.37	14.35	5560
	29	44	19.54	14.20	5548
	38	46	17.81	13.95	4968
	Mean		45	18.88	14.22
Normal	5	48	16.43	14.90	4897
	14	45	16.92	14.85	5026
	34	48	14.47	14.55	4212
	45	49	16.60	13.75	4564
	Mean		48	16.10	14.51
217	2	51	17.87	14.75	5272
	17	44	15.71	14.40	4526
	33	46	15.00	13.75	4124
	46	48	14.64	13.15	3849
	Mean		47	15.80	14.01
304	9	42	16.20	13.25	4294
	22	48	15.22	13.35	4065
	26	48	15.19	12.95	3935
	41	48	15.09	12.75	3849
	Mean		46	15.42	13.08

DATE OF PLANTING AND VARIETY TEST  
 SEPTEMBER 9. HARVEST  
 1938

PLOT SUMMARIES MEDIUM DATE OF PLANTING

<u>Var.</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>Sugar</u>	<u>Gross</u> <u>Sugar</u>
O.V	3	45	17.48	14.65	5121
	16	47	17.32	14.75	5108
	32	47	15.75	13.95	4393
	48	52	18.88	12.30	4645
Mean		48	17.36	13.91	4617
Normal	8	53	18.07	14.60	5275
	24	50	16.34	14.15	4623
	27	50	16.14	14.40	4648
	40	44	13.43	14.20	3813
Mean		49	16.00	14.34	4590
217	12	43	14.34	13.85	3973
	15	47	14.80	14.40	4262
	28	47	15.94	14.05	4480
	44	50	15.49	12.50	3871
Mean		47	15.14	13.70	4146
304	4	51	18.56	13.20	4899
	20	46	15.26	13.35	4074
	36	50	15.84	12.90	4088
	39	52	16.40	12.60	4133
Mean		50	16.52	13.01	4298

DATE OF PLANTING AND VARIETY TEST  
 SEPTEMBER 9. HARVEST  
 1938

PLOT SUMMARIES LATE DATE OF PLANTING

<u>Var.</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>G</u> <u>Buor.</u>	<u>Gross</u> <u>Sugar</u>
O.W.	7	49	12.32	13.55	3338
	23	53	12.97	13.70	3554
	25	50	12.77	12.35	3155
	42	46	10.55	12.55	2649
Mean		50	12.15	13.04	3174
Normal	1	49	12.74	13.30	3389
	18	48	10.78	13.80	2976
	31	50	11.99	13.40	3213
	47	48	13.33	12.00	3199
Mean		49	12.21	13.12	3194
217	6	51	12.38	13.10	3244
	*19	35	10.28	12.75	2621
	35	51	12.97	12.75	3307
	37	50	11.83	12.20	2886
Mean		50	11.86	12.70	3014
304	11	52	10.94	12.05	2638
	13	48	11.47	11.85	2718
	30	49	11.34	11.45	2596
	43	50	10.03	11.25	2257
Mean		50	10.94	11.65	2552

\* 30 feet of row.

DATE OF PLANTING AND VARIETY TEST  
 SEPTEMBER 19, HARVEST  
 1938

PLOT SUMMARIES EARLY DATE OF PLANTING

<u>Var.</u> <u>No.</u> <u>G.V.</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>SUG.</u>	<u>Gross</u> <u>SUGAR</u>
	10	53	20.34	14.15	5757
	21	50	19.44	14.30	5559
	29	50	18.33	14.35	5260
	38	48	21.10	14.25	6015
Mean		48	19.80	14.26	5648
Normal	5	51	18.69	14.75	5513
	14	50	18.43	14.50	5343
	34	48	16.47	14.45	4759
	45	47	15.91	14.30	4550
Mean		49	17.38	14.50	5041
217	2	47	19.57	14.10	5519
	17	48	18.36	14.05	5159
	33	45	14.31	13.75	3935
	46	47	16.83	13.70	4610
Mean		47	17.27	13.90	4806
304	9	47	16.11	12.80	4123
	22	44	14.51	12.90	3742
	26	50	18.56	13.00	4825
	41	44	12.81	13.10	3355
		46			
Mean		46	15.50	12.95	4011

• 30 feet of row.

DATE OF PLANTING AND VARIETY TEST  
 SEPTEMBER 19, HARVEST  
 1938

PLOT SUMMARIES MEDIUM DATE OF PLANTING

<u>Var.</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>Gross</u> <u>Sugar</u>
G.W.	3	51	19.77	13.95	5515
	16	47	18.65	14.05	5242
	32	53	17.87	13.95	4986
	48	46	18.75	13.10	4913
Mean		49	18.76	13.76	5164
Normal	8	48	17.51	13.85	4851
	24	46	15.22	14.15	4708
	27	51	15.75	14.25	4488
	40	49	15.03	14.20	4268
Mean		48	15.88	14.11	4479
217	12	49	17.64	13.95	4922
	15	48	16.01	13.50	4322
	28	49	15.55	13.70	4261
	44	50	17.41	13.65	4754
Mean		49	16.65	13.70	4565
Mean	4	48	18.95	13.15	4983
	20	47	17.48	13.25	4632
	36	47	18.07	13.10	4733
	39	44	17.54	13.20	4632
Mean		46	18.01	13.18	4745



DATE OF PLANTING AND VARIETY TEST  
 SEPTEMBER 19, HARVEST  
 1938

PLOT SUMMARIES LATE DATE OF PLANTING

<u>Variety</u> <u>No.</u> <u>G.V.</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>Sugar</u>	<u>Gross</u> <u>Sugar</u>
G.V.	7	47	12.38	13.55	3395
	23	48	12.71	13.50	3431
	25	49	14.02	13.10	3672
	42	50	12.58	13.50	3396
Mean		48	12.92	13.41	3464
Normal	1	49	13.36	13.05	3487
	18	51	12.28	14.05	3452
	31	46	11.30	13.50	3052
	47	47	14.11	12.35	3486
Mean		48	12.76	13.24	3369
217	6	48	12.77	13.50	3449
	*19	53	12.33	13.60	3353
	35	48	12.38	13.30	3294
	37	41	12.84	12.15	3120
Mean		48	12.58	13.14	3304
304	11	48	11.66	12.10	2822
	13	51	14.37	12.10	3479
	30	48	9.87	11.45	2259
	43	51	10.68	12.30	2628
Mean		50	11.64	11.99	2797

DATE OF PLANTING AND VARIETY TEST  
 SEPTEMBER 29. HARVEST  
 1938

PLOT SUMMARIES EARLY DATE OF PLANTING

<u>Var.</u> <u>No.</u> O.V.	<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>Gross</u> <u>Sugar</u>
	10	47	20.71	13.95	5779
	21	50	20.26	14.10	5712
	29	45	17.02	14.25	4851
	38	49	19.28	14.45	5571
Mean		48	19.32	14.19	5478
Normal	5	49	18.88	15.10	5703
	14	45	17.02	15.05	5123
	34	45	16.63	14.80	4922
	45	47	15.58	14.25	4432
Mean		46	17.02	14.80	5045
217	2	47	18.82	14.65	5514
	17	49	17.54	14.85	5210
	33	48	16.24	14.60	4741
	46	47	17.54	13.75	4825
Mean		48	17.54	14.46	5072
304	9	48	17.64	13.75	4651
	22	47	14.15	12.60	3785
	26	47	17.77	13.20	4692
	41	46	16.47	13.15	4330
Mean		47	16.51	13.18	4360

DATE OF PLANTING AND VARIETY TEST  
 SEPTEMBER 29, HARVEST  
 1938

PLOT SUMMARIES MEDIUM DATE OF PLANTING

<u>Var.</u> <u>No.</u> <u>G.V.</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>SUGR.</u>	<u>Gross</u> <u>SUGAR</u>
	3	49	19.74	14.30	5559
	16	47	19.05	15.00	5714
	32	47	18.62	14.60	5438
	48	49	19.50	13.45	5247
Mean		48	19.15	14.34	5490
Normal	8	48	16.53	14.60	4827
	24	49	16.11	15.00	4832
	27	50	16.50	14.55	4801
	40	45	13.20	15.00	3960
Mean		48	15.58	14.79	4605
217	12	46	16.99	14.95	5080
	15	50	15.78	14.45	4560
	28	50	18.16	14.55	5286
	44	47	15.03	14.40	4328
Mean		48	16.49	14.59	4814
304	4	46	20.19	14.25	5754
	20	44	18.46	13.85	5113
	36	50	18.92	13.75	5202
	39	48	17.38	13.75	4780
Mean		47	18.74	13.90	5212

DATE OF PLANTING AND VARIETY TEST  
 SEPTEMBER 29. HARVEST  
 1938

PLOT SUMMARIES LATE DATE OF PLANTING

<u>Var.</u> <u>No.</u>	<u>Plot</u> <u>No.</u>	<u>No. of</u> <u>Plots</u>	<u>% Best</u> <u>Var. A.</u>	<u>1</u> <u>Mean</u>	<u>GROSS</u> <u>SUGAR</u>
O.V.	7	51	11.99	14.25	3417
	23	43	12.06	14.55	3508
	25	49	13.53	14.20	3541
	42	48	13.07	14.85	3681
	Mean		48	12.66	14.46
Normal	1	48	14.83	14.50	4301
	18	49	13.88	14.35	3985
	31	45	12.32	14.50	3572
	47	48	14.15	12.85	3636
Mean		48	13.80	14.05	3874
217	6	54	12.51	14.25	3566
	19	49	13.00	14.25	3706
	35	48	13.69	14.05	3847
	37	44	13.33	12.65	3372
Mean		49	13.13	13.80	3623
304	11	47	12.09	13.10	3167
	13	46	13.82	13.40	3704
	30	44	11.17	12.60	2816
	43	49	13.56	12.90	3498
Mean		46	12.66	13.00	3296

\* Calculated from 35 ' plot.

DATE OF PLANTING AND VARIETY TEST  
OCTOBER 10, HARVEST  
1938  
PLOT SUMMARIES EARLY DATE OF PLANTING

<u>Var.</u> <u>No.</u> <u>G.V.</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>Spur.</u>	<u>App. Coef</u> <u>of Pur.</u>	<u>Lb. Sug. per A.</u> <u>Gross Ind. Av.</u>	
	10	51	20.71	14.60	92.20	6048	5576
	21	45	19.54	14.30	92.70	5666	5252
	29	45	18.43	14.70	91.00	5417	4929
	38	49	21.24	14.70	91.85	6243	5734
Mean		48	19.98	14.62	91.94	5804	5373
Normal	5	47	20.06	14.80	91.80	5938	5451
	14	51	15.78	15.40	92.30	4860	4486
	34	49	17.48	14.95	93.60	5226	4892
	45	49	18.10	14.50	93.30	5249	4897
Mean		49	17.86	14.91	92.75	5318	4932
217	2	52	20.42	13.70	93.25	5595	5217
	17	49	17.28	15.35	92.00	5306	4882
	33	47	17.61	14.90	93.05	5248	4883
	46	48	19.31	14.55	91.95	5619	5167
Mean		49	18.66	14.62	92.56	5442	5037
304	9	49	18.03	13.30	89.55	4797	4296
	22	54	17.71	13.00	92.25	4604	4247
	26	46	17.67	13.00	90.10	4595	4140
	41	42	17.64	13.80	91.20	4869	4441
Mean		48	17.76	13.28	90.78	4716	4281

DATE OF PLANTING AND VARIETY TEST  
OCTOBER 10. HARVEST  
1938

PLOT SUMMARIES MEDIUM DATE OF PLANTING

<u>Var.</u> <u>No.</u>	<u>Plot</u> <u>No.</u>	<u>No. of</u> <u>Roots</u>	<u>F. Roots</u>		<u>App. Coef</u> <u>of Fur.</u>	<u>Lb. Sug. per A.</u>	
			<u>Per.</u>	<u>A.</u>		<u>Gross</u>	<u>Ind. Av.</u>
G.W.	3	50	20.52	13.50	90.25	5540	5000
	16	48	18.62	15.50	91.70	5773	5294
	32	51	16.89	15.05	91.95	5084	4675
	48	48	16.89	13.95	91.00	4712	4288
Mean		49	18.23	14.50	91.22	5277	4814
Normal	8	49	15.65	14.45	93.65	4523	4245
	24	49	16.99	14.80	93.30	5029	4692
	27	54	16.37	14.65	92.25	4861	4484
	40	50	16.89	14.85	92.35	5016	4632
Mean		50	16.48	14.74	92.94	4857	4513
217	12	46	15.94	15.20	92.30	4847	4474
	15	48	17.05	15.05	91.30	5133	4686
	28	48	16.20	15.30	92.20	4959	4572
	44	50	16.89	15.00	91.60	5067	4641
Mean		48	16.52	15.14	91.85	5002	4593
304	4	51	19.90	13.20	91.30	5253	4796
	20	50	18.72	14.10	90.90	5279	4799
	36	46	18.75	13.85	90.90	5194	4721
	39	48	20.16	13.85	89.35	5884	4989
Mean		49	19.38	13.75	90.61	5402	4826

DATE OF PLANTING AND VARIETY TEST  
OCTOBER 10, HARVEST  
1938

PLOT SUMMARIES LATE DATE OF PLANTING

<u>Var.</u> <u>No.</u> <u>G.V.</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 Fur.</u>	<u>Lb. Suc. per A.</u> <u>Gross Ind. Iv.</u>	
	7	54	10.81	13.85	91.80	2995	2749
	23	46	11.30	14.90	93.15	3369	3138
	25	46	14.24	14.85	89.15	4230	3771
	42	49	12.83	14.15	88.35	3624	3202
Mean		49	12.29	14.44	90.61	3554	3215
Normal	1	39	16.34	14.50	89.40	4737	4235
	18	51	15.98	15.25	93.50	4873	4576
	31	49	12.06	14.75	91.80	3556	3264
	47	47	12.15	14.00	89.25	3403	3037
Mean		46	14.13	14.62	90.99	4142	3773
217	6	47	10.75	13.65	89.85	2934	2636
	19	50	13.00	14.75	92.10	3836	3533
	35	51	15.00	14.10	92.50	4229	3912
	37	49	13.46	13.45	91.00	3621	3295
Mean		49	13.05	13.99	91.36	3655	3344
304	11	43	14.24	13.55	90.05	3860	3476
	13	50	14.64	13.25	90.95	3879	3528
	30	48	12.90	13.70	88.85	3536	3142
	43	53	13.75	14.25	87.70	3920	3438
Mean		48	13.88	13.69	89.39	3799	3396

DATE OF PLANTING AND VARIETY TEST  
 MAIN HARVEST OCTOBER 19 - 20, 1938

PLOT SUMMARIES EARLY DATE OF PLANTING

Var. No.	Plot No.	No. of Beets	Competitive					Actual				
			T. Beets Per A.	% Sucr.	App. Coef of Pur.	Lb. Suc. per A.		Stand *	T. Beets Per A.	Lb. Suc. per A.		
						Gross	Ind. Av.			Gross	Ind. Av.	
G.W.	10	174	20.67	14.45	92.65	5975	5536	233	20.54	5937	5501	
	21	125	19.36	13.85	92.30	5362	4949	223	18.41	5100	4707	
	29	155	19.55	14.90	92.60	5825	5394	225	18.92	5639	5222	
	38	158	21.81	15.25	91.60	6651	6092	228	20.44	6234	5710	
Mean		153	20.35	14.61	92.29	5953	5493	227	19.58	5728	5285	
Normal	5	167	17.52	15.00	92.65	5257	4871	233	18.15	5445	5045	
	14	209	17.85	15.15	93.45	5409	5055	242	18.36	5563	5199	
	34	144	16.29	15.20	93.40	4953	4626	224	15.79	4799	4482	
	45	169	16.00	15.15	92.75	4847	4496	233	15.80	4787	4440	
Mean		172	16.92	15.12	93.06	5116	4762	233	17.02	5148	4792	
217	2	189	19.93	15.30	91.45	6098	5577	238	19.83	6068	5549	
	17	165	18.95	15.85	93.90	6007	5641	237	17.91	5677	5331	
	33	174	16.70	15.15	92.35	5060	4673	231	16.29	4936	4558	
	46	177	14.93	14.30	93.30	4270	3984	236	15.07	4309	4020	
Mean		176	17.63	15.15	92.75	5359	4969	236	17.28	5248	4864	
304	9	204	17.01	13.50	92.20	4593	4235	245	17.53	4733	4364	
	22	143	16.16	12.90	91.45	4041	3695	224	14.90	3724	3406	
	26	220	16.54	14.05	92.40	4647	4294	234	16.39	4605	4255	
	41	201	16.84	13.80	92.60	4647	4303	239	16.88	4658	4313	
Mean		192	16.64	13.46	92.16	4482	4132	236	16.42	4430	4084	

\* Actual Number of beets harvested.



PLOT SUMMARIES MEDIUM DATE OF PLANTING

Var. No.	Plot No.	Competitive					Actual				
		No. of Beets	T. Beets Per A.	% Sucr.	App. Coef of Pur.	Lib. Suc. per A. Gross	Stand * Ind. Av.	T. Beets Per A.	Lib. Suc. per A. Gross	Ind. Av.	
O.W.	3	155	17.91	14.75	92.65	5283	4895	234	18.00	5310	4920
	16	178	17.63	14.60	91.25	5148	4698	233	17.24	5033	4593
	32	183	18.70	15.60	91.55	5834	5341	235	18.34	5722	5238
	48	173	18.44	14.90	92.10	5494	5060	234	18.56	5532	5095
Mean		172	18.17	14.96	91.89	5440	4998	234	18.04	5399	4962
Normal	8	185	16.89	14.80	93.05	4998	4651	239	16.90	5003	4655
	24	136	15.27	15.20	93.25	4641	4328	212	13.74	4177	3895
	27	167	14.26	14.95	92.45	4265	3943	229	13.96	4175	3860
	40	193	16.71	15.25	92.50	5098	4716	236	16.07	4900	4532
Mean		170	15.78	15.05	92.81	4750	4410	229	15.17	4564	4236
217	12	156	17.28	15.20	92.10	5253	4838	219	16.72	5083	4681
	15	175	16.42	14.95	93.30	4908	4579	230	16.43	4913	4584
	28	196	15.23	14.55	91.80	4431	4068	232	14.85	4322	3968
	44	177	16.44	15.00	93.35	4933	4605	233	16.73	5018	4684
Mean		176	16.34	14.92	92.64	4881	4522	228	16.18	4834	4479
304	4	170	17.54	13.60	92.55	4772	4416	230	17.49	4758	4404
	20	191	17.68	14.00	92.90	4952	4600	236	17.44	4883	4536
	36	122	15.55	13.50	92.70	4199	3892	218	15.10	4077	3779
	39	187	19.09	13.60	91.25	5191	4737	233	19.11	5197	4742
Mean		168	17.46	13.68	92.35	4778	4411	229	17.28	4729	4365

PLOT SUMMARIES LATE DATE OF PLANTING

Var. No.	Plot No.	No. of Beets	Competitive					Actual			
			T. Beets Per A.	% Sucr.	App. Coef of Pur.	Lib. Suc. per A. Gross	Stand *	T. Beets Per A.	Lib. Suc. per A. Gross	Ind. Av.	
G.W.	7	183	12.32	14.65	92.00	3610	3321	237	12.23	3582	3295
	23	172	11.36	14.75	92.55	3351	3101	263	12.63	3726	3448
	25	126	12.88	14.20	91.35	3658	3342	221	12.11	3440	3142
	42	142	12.77	14.70	92.00	3753	3453	236	12.92	3800	3496
Mean		156	12.33	14.58	91.98	3593	3304	239	12.47	3637	3345
Normal	1	140	13.77	14.30	90.90	3937	3579	223	13.34	3816	3469
	18	181	11.62	15.65	92.10	3634	3347	229	11.52	3606	3321
	31	193	11.88	15.65	91.30	3718	3395	242	12.20	3818	3486
	47	162	11.75	14.65	93.00	3443	3202	234	11.89	3482	3238
Mean		169	12.26	15.06	91.82	3683	3381	232	12.24	3680	3378
217	6	203	12.22	14.50	90.90	3544	3221	240	12.36	3585	3259
	19	176	11.34	15.20	91.80	3448	3165	240	12.23	3718	3413
	35	184	12.32	14.55	90.95	3586	3261	232	12.31	3582	3258
	37	204	12.68	14.00	89.45	3549	3175	244	13.27	3716	3324
Mean		192	12.14	14.56	90.78	3532	3206	239	12.94	3650	3314
304	11	182	14.49	14.40	91.75	4174	3830	228	14.03	4040	3707
	13	179	14.02	13.35	90.90	3743	3402	235	14.08	3760	3418
	30	143	13.98	14.05	91.15	3815	3477	213	11.72	3294	3002
	43	186	14.05	14.25	92.20	4003	3691	233	13.83	3942	3635
Mean		172	14.04	14.01	91.90	3934	3600	227	13.42	3759	3440

\* Actual number of beets harvested.

**DATES OF PLANTING AND VARIETY TEST  
FORT COLLINS, COLORADO, 1938  
General Summary for Planting Dates**

Plant. Date	Competitive Beets					Actual			Stand (1)
	T. Beet Per A.	% Sucr.	App. Coef of Pur.	Lb. Suc. Per A. Gross Ind. Av.	T. Beet Per A.	Lb. Suc. per A. Gross Ind. Av.			
Early Mar. 21	17.53	14.59	92.57	4228 4839	17.53	5138 4756		233	
Med Apr 26	16.94	14.65	92.42	4962 4585	16.67	4881 4510		230	
Late May 17	12.69	14.55	91.52	3685 3373	12.67	3682 3369		234	
Mean	15.84	14.60	92.17	4625 4266	15.64	4567 4212		232	
z	2.3283	#	1.0575	1.8429 1.8435	2.1327	1.7084 1.7048		#	
5% Point	.	.	.	.	.	.	.	.	
1% Point	.	.	.	.	.	.	.	.	
S.E. of Mean of 16 Deter- minations*	.538	.3855	.342	261.2 248.0	.619	211.7 209.1		5.34	
S.E. of Mean in % of "	.2695	.193	.1971	130.6 124.0	.3095	140.8 134.54		2.67	
Dif. nec. for sig. (2)	1.70%	1.32%	.21%	2.82% 2.91%	1.98%	3.08% 3.19%		1.15%	
	.937	.67%	.68%	452 lb 439 lb	1.077	487 lb 466 lb		9 beets	

**GENERAL SUMMARY FOR VARIETIES**

Or. Western	16.95	14.72	92.05	4995 4598	16.70	4921 4531		234
Orig. Normal	14.98	15.08	92.57	4517 4184	14.81	4464 4135		231
U. S. 217	15.37	14.88	92.05	4591 4232	15.33	4577 4219		234
Hybrid (304)	15.05	13.72	92.00	4398 4048	15.71	4306 3963		231
Mean	15.84	14.60	92.17	4625 4266	15.64	4567 4212		232
z	1.0802	1.7536	.3636	1.4636 .9619	.8975	.9315 .9261		#
5% Point	.	.	.	.	.	.	.	.
1% Point	.	.	.	.	.	.	.	.
S.E. of Mean of 12 Deter- minations	.292	.105	.1851	59.98 89.9	.3245	102.8 94.1		2.38
S.E. of Mean in % of "	1.84%	.72%	.20%	1.30% 2.11%	2.07%	2.25% 2.23%		1.03%
Dif. nec. for sig. (3)	.857	.30%	.94%	174 lb 261 lb	.947	298 lb 273 lb		7 beets

- \* z Exceeds 5 and 1 percent points respectively.  
 (1) Harvested beets per plot; 200 feet of row.  
 (2) 2.447 times S. E. of a difference.  
 (3) 2.052 times S. E. of a difference.

DATE OF PLANTING AND VARIETY TEST  
 FORT COLLINS, COLORADO, 1938

General Summary Planting Dates and Variety

Plant. Date and Variety	T. Best		App. Coef of Por.	Lb. Sug. Per A.		T. Best		Lb. Sug. per A.		Stand
	Per A.	Sucr.		Gross	Ind. Av.	Per A.	Gross	Ind. Av.		
March 21										
Great Western	20.35	14.61	92.29	5953	4193	19.58	5728	5283	227	
Orig. Normal	16.92	15.12	93.06	5116	4762	17.02	5148	4792	233	
U. S. 217	17.63	15.15	92.75	5359	4969	17.28	5248	4864	236	
Hybrid (304)	16.64	13.46	92.16	4482	4132	16.42	4130	4084	236	
April 26										
Great Western	18.17	14.96	91.89	5440	4998	18.04	5399	4962	234	
Orig. Normal	15.78	15.05	92.81	4750	4410	15.17	4564	4236	229	
U. S. 217	16.34	14.92	92.64	4881	4522	16.18	4834	4479	228	
Hybrid (304)	17.46	13.68	92.35	4778	4411	17.28	4729	4365	229	
May 17										
Great Western	12.33	14.58	91.98	3593	3304	12.47	3637	3345	239	
Orig. Normal	12.26	15.06	91.82	3683	3381	12.24	3680	3378	232	
U. S. 217	12.14	14.56	90.78	3532	3206	12.54	3690	3314	239	
Hybrid (304)	14.04	14.01	91.50	3934	3600	13.42	3759	3440	227	
Mean	15.84	14.60	92.17	4625	4266	15.64	4567	4212	232	
z	.8146	.3556	.3444	1.5419	.8345	.5379	.6154	.6158	.1565	
5% Point	.	.	.	.	.	.	.	.	.	
1% Point	.	.	.	.	.	.	.	.	.	

**DATE OF PLANTING AND VARIETY TEST**  
**FORT COLLINS, COLORADO, 1938**  
**Summary for Varieties (All dates of Harvest)**

Date Harvest	Tons of Beets per Acre.						Percent Sucrose.				
	9/9	9/19	9/29	10/10	10/20	10/20	9/9	9/19	9/29	10/10	10/20
Variety	Act.	Act.	Act.	Act.	Act.	Comp.	Act.	Act.	Act.	Act.	Comp.
Gr. Western	16.13	17.16	17.04	16.83	16.70	16.95	13.72	13.81	14.33	14.52	14.72
Orig. Normal	14.77	15.34	15.47	16.15	14.81	14.98	13.99	13.95	14.55	14.76	15.08
U.S. 217	14.27	15.50	15.72	16.08	15.33	15.37	13.47	13.98	14.28	14.58	14.88
Hybrid (304)	14.30	15.05	15.97	17.01	15.71	16.05	12.58	12.70	13.36	13.57	13.72
Mean	14.87	15.76	16.05	16.52	15.64	15.84	13.44	13.51	14.13	14.36	14.60
Z	.9139	.9901	.6020	.1784	.8975	1.0502	1.2008	1.7226	1.3242	1.2542	1.7536
5% Point	.	.	.	.	.	.	.	.	.	.	.
1% Point	.	.	.	.	.	.	.	.	.	.	.
S.E. of Mean	.350	.353	.380	.395	.3245	.292	.184	.100	.140	.1519	.105
S.E. of Mean in % " "	2.35%	2.24%	2.37%	2.39%	2.07%	1.84%	1.37%	.74%	.99%	1.06%	.72%
Dif Nec Sig <sup>t</sup> *1.02T.	1.02T	1.02T	1.10T	1.15T	.94T	.85T	.53%	.29%	.41%	.44%	.30%

**GROSS POUNDS OF SUGAR PER ACRE**

Gr. Western	4454	4758	4876	4892	4921	4995
Orig. Normal	4153	4296	4508	4773	4464	4517
U.S. 217	3868	4225	4503	4700	4577	4591
Hybrid (304)	3629	3851	4289	4639	4306	4398
Mean	4026	4283	4544	4751	4567	4625
Z	1.1400	1.3001	.6975	†	.9315	1.4636
5% Point	.	.	.	.	.	.
1% Point	.	.	.	.	.	.
S.E. of Mean	114.1	101.5	121.4	121.52	102.8	59.98
S.E. of Mean in % " "	2.83%	2.37%	2.67%	2.56%	2.25%	1.30%
Dif. necessary for signif-**331 lb 295 lb 352 lb 353 lb 298 lb 174 lb.						

\* Z exceeds 5 and 1 percent points respectively

† Z is minus value.

\*\* 2.052 times S. E. of a difference.

DATE OF PLANTING AND VARIETY TEST  
 FORT COLLINS, COLORADO, 1938  
 Summary for Dates (All Dates of Harvest)

Date Harvest Plant. Date	Tons of Beets per Acre						Percent Sucrose				
	9/9	9/19	9/29	10/10	10/20	10/20	9/9	9/19	9/29	10/10	10/20
Early Mar. 20	16.55	17.49	17.60	18.56	17.58	17.88	13.96	13.96	13.90	14.16	14.59
Med Apr 26	16.25	17.32	17.49	17.65	16.67	16.94	13.74	13.69	14.40	14.53	14.65
Late May 17	11.79	12.48	13.06	13.74	12.67	12.69	12.63	12.94	13.83	14.18	14.55
Mean	14.87	15.76	16.05	16.52	15.64	15.84	13.44	13.51	14.13	14.36	14.60
Z	2.2293	2.0443	2.5153	2.4848	2.1327	2.3283	1.8361	1.7108	1.3521	1.0562	*
5% Point	.	.	.	.	.	.	.	.	.	.	.
1% Point	.	.	.	.	.	.	.	.	.	.	.
S.E. of Mean of 16 Deter- minations	.2868	.3685	.209	.2325	.3095	.2695	.1136	.091	.0746	.0603	.193
S.E. of Mean in % of Mean	1.93%	2.34%	1.30%	1.41%	1.98%	1.70%	.85%	.67%	.53%	.42%	1.32%
Dif. nec. for sig. **	.99T	1.28T	.72T	.80T	1.07T	.93T	.39%	.31%	.26%	.21%	.67%

GROSS POUNDS SUGAR PER ACRE

Early Mar. 21	4631	4576	4989	5330	5138	5228
Med Apr 26	4463	4738	5030	5135	4881	4962
Late May 17	2984	3233	3614	3788	3682	3685
Mean	4026	4283	4544	4751	4567	4625
Z	2.4422	2.1813	2.4002	2.5341	1.7084	1.8429
5% Point	.	.	.	.	.	.
1% Point	.	.	.	.	.	.
S.E. of Mean of 16 Deter- minations	78.8	102.9	73.1	66.6	140.8	130.6
S.E. of Mean in % of Mean	1.96%	2.40%	1.61%	1.40%	3.08%	2.82%
Dif. nec. for sig. **	273 lb	356 lb	253 lb	231 lb	487 lb	452 lbs.

Z exceeds 5 and 1 percent points respectively.  
 Z is a minus value.  
 \* 2.447 times S. E. of a difference.

DATE OF PLANTING AND VARIETY TEST  
 FORT COLLINS, COLORADO, 1938  
 LEAF SPOT AND BOLTING

Summary for Planting Dates and Varieties

		Leaf Spot			Bolters
		9/9	9/19	9/29	
March 21	Great Western	3.38	4.12	2.88	2.76
	Original Normal	4.00	4.88	3.12	1.04
	U. S. 217	2.00	2.00	1.62	8.22
	Hybrid (R. F. '37 No. 304)	2.25	2.00	2.00	20.72
April 26	Great Western	3.75	3.62	2.62	.00
	Original Normal	4.50	4.25	3.50	.00
	U. S. 217	2.50	2.12	1.88	.28
	Hybrid (304)	2.25	2.12	2.12	.06
May 17	Great Western	3.12	3.00	3.00	.06
	Original Normal	2.75	3.25	4.75	.00
	U. S. 217	1.75	2.00	2.12	.38
	Hybrid (304)	2.00	2.12	2.12	.00

Values given are averages of four plots.

Leaf spot readings were made by John O. Gaskill.

Bolter value is percent of plants showing any degree of bolting on four hundred feet of row per plot.

## Discussion:

Leaf Spot: A moderately severe attack of leaf spot developed in September. Leaf spot readings were made on three dates by John O. Gaskill. These readings indicate that all planting dates suffered about equally; however the attack on the late planting was not quite so severe and did not reach the maximum till about ten days later than on the other two plantings.

Differences in varietal reaction to the disease were greater than for planting dates. Great Western and Original Normal appear quite susceptible; the latter being the more susceptible of the two. U. S. No. 217 and the hybrid appear to be moderately resistant. The readings indicate that they are about equal in resistance, however the hybrid has been known to suffer rather severe burning in the Arkansas Valley and its apparent resistance may be faster growth of the slightly scanty foliage which is more or less characteristic of this variety.

Bolting: All varieties in the March 21st planting showed an appreciable percentage of bolting. This planting withstood a moderately severe freeze about the time the first pair of true leaves were beginning to show. It is believed that bolting slightly reduced yield in the case of U. S. No. 217 for this date of planting and materially reduced the yield of the hybrid. Bolting in the two later plantings was negligible and consistent only in the case of the variety U. S. No. 217. This variety appears to contain a very small, but definite, percent of true annuals. A study of bolters in the border rows of the early date of planting plots was made and will be discussed in a later part of this report.

Quality: As affected by Date of Planting: The preharvest sampling shows a rise in percent sucrose as the season advanced. This rise was slow from September 9th to 19th. This corresponds to the period of rapid growth in a wet soil following the heavy rains at the first of the month. The rise was rapid from September 19th to 29th. During this period there was a marked drying of the soil and probably a slowing of the rate of growth. In the period from September 29th to harvest on October 20th there was a slow rise in percent sucrose and probably little if any increase in weight of the roots.

Varieties: There appears to have been no change in the relative position of the varieties in percent sucrose as the season advanced; all made approximately proportional gains from the first sampling to the final harvest. Original Normal consistently had the highest percent sucrose with Great Western and U. S. No. 217 about equal. In general the differences shown between these three varieties are probably not significant. At the final harvest the percent sucrose in Original Normal exceeds that in Great Western by .36%. On the basis of odds of 19 to 1 this is .06% greater than the difference required for significance and this difference with the small, but consistently higher percent sucrose of Original Normal at all sampling dates probably justifies the conclusion that in this test Original Normal was slightly superior to Great Western in percent sucrose. Percent sucrose in the hybrid was consistently below that



for any of the other three varieties. The difference in all cases considerably exceeds that required for significance on the basis of odds of 19 to one and justifies the conclusion that the hybrid is definitely lower in percent sucrose than any of the other three varieties. Purity values were not obtained for the preharvest samplings. At the final harvest the difference in purity between the early and medium planting is very small. This value for the late planting is 1.07% less than that for the early planting.  $\Sigma$  indicates the probable significance of this difference. However calculation of the difference required for significance for the exact odds of 19 to 1 shows that this difference is less than that required for probable significance.

Differences in purity of the varieties are small.  $\Sigma$  indicates that none of them reach the level of probable significance. It is worthy of note that while percent sucrose of the hybrid is definitely low this variety shows a relatively very good purity value.

Yield: Dates of Planting: Trend of preharvest samplings. These samplings show a steady increase in yield of roots through September and into early October. When the yield at the final harvest failed to confirm this trend the data was further examined. It is obvious that the small size of plot used for the preharvests might give rise to sampling errors. This appears to have been particularly true of the October 10th harvest. The variety yields for this harvest show inconsistencies with both the previous preharvests and the final harvest. Also it was found that the beets harvested in the preharvests averaged one hundred and twenty per one hundred feet of row and for the final harvest only one hundred and sixteen per one hundred feet of row. Apparently slightly more than forty feet of row were actually taken for the preharvests and this small error when multiplied by the conversion factor resulted in an indicated yield slightly in excess of the true yield as indicated in the final harvest. The number of beets taken in the preharvests correspond to perfect stands for forty feet of row. Disregarding the October 10th preharvest and comparing the values of the September 29th preharvest with the competitive best yields for the final harvest the discrepancies are not so great.

The final harvest indicates that for this test the greater yield from the early date of planting as compared to the medium date is small and does not reach the level of probable significance. In this test the principal, and possibly the only advantage from planting at the early date would be in economic use of the farmers time; if more convenient to plant beets in March in this year there would have been no loss of yield from such an early planting. When yields of the late planting are compared with those of the other two dates it is found that the differences are of considerable magnitude and greatly exceed the differences required for probable significance. In this test May 17th planting resulted in a serious loss of yield in comparison with early or approximately normal dates of planting. Yields of sugar per acre follow the trend of yield of roots for the dates of planting. It should be noted that a possibly significantly lower purity for the late date of planting is an additional cause of a low yield of indicated available sugar per acre for this planting.

Yield of the Varieties: When yields of the varieties are averaged for all dates it is found that Great Western exceeds any of the other varieties in yields of roots and gross sugar per acre. The difference in all cases being greater than the difference necessary for significance as calculated for odds of 19 to 1. Comparing the other three varieties among themselves it is found that the greatest yield of beets is from the hybrid and the greatest yield of sugar per acre from U. S. No. 217; however the greatest differences shown do not quite reach the indicated level of probable significance.

Interaction of Dates and Varieties: The Z value obtained indicates that yields were affected by this interaction. It is believed that the reduction in yield of the hybrid by excessive bolting in the early planting is chiefly responsible for any significant differences attributable to this interaction.

Summary:

Early planting, March 21st, resulted in slightly increased yields which in this test were not significantly higher than the yields from medium planting, April 26th. It is probable that the average of all four varieties for the early date of planting is not quite a true measure since one of the varieties suffered a reduction in yield from excessive bolting when planted early. One may certainly conclude that in this test planting as early as March 21st was not a disadvantage when adapted varieties are used.

Medium planting, April 26th. In this test all varieties planted at this date escaped bolting. Yields of Great Western, Original Normal and U. S. No. 217 were somewhat lower than the yields of these varieties when planted March 21st. The hybrid reversed this trend, its yield being nearly a ton of beets and three hundred pounds of gross sugar higher than for the March 21st planting.

Late planting, May 17th. All varieties gave a very significantly reduced yield in comparison with their performance at the earlier dates of planting.

Great Western appears to be a high yielding well adapted variety, and appears to be able to make full use of a long growing period.

Original Normal is not equal to Great Western.

U. S. No. 217 is fully equal to Original Normal. There is a little evidence that this variety needs a long growing season. It made its poorest relative yield from the late planting and in spite of over 5% bolting in the March 21st planting the relative yield is as good from the April 26th planting.

Hybrid (304). This variety was an excessive bolter when planted early. Its performance at the later dates of planting confirms the conclusions reached from other tests, i.e., it is a high tonnage variety handicapped by a definitely low percent sucrose. It is not good enough for release in its present form, but shows enough promise to justify further selection.