

VARIETIES AND STRAINS TRIAL
FORT COLLINS, COLORADO, 1938

Location:

This test was on the north side of the ridged east end of the College Farm field.

Plan of Test:

Planted as ten by ten Latin square. Plots eight rows wide, thirty feet long. Rows eighteen inches apart on the ridges and twenty two inches apart between the ridges. Spacing in the row variable, but generally quite close. On many portions of rows which had a thick germination stand the thinned stand left was spaced only six to nine inches apart.

Varieties and Strains:

1. 1935 Rocky Ford Seed No. 520. This is the white skinned F_3 of the sugar - red hybrid previously tested in 1936 and 1937.

2. 1937 Rocky Ford Seed No. 304. A reselection of the above number. Seed grown from several hundred roots selected for size and sucrose percent.

3. 1937 Rocky Ford Seed No. 302. The second sib pollinated group increase of 1933 Breeding Strain No. 62; a once selfed line.

4. Single root selfed in 1933, sib pollinated groups 1935 and 1937. This line is the sugar parent of No. 6.

5. 1937 Rocky Ford Seed No. 313. Seed produced from group of roots selected for size, quality and small crown. Most of these roots selected from Original Pioneer and Flat Foliage.

6. 1937 Rocky Ford Seed No. 314. White skin F_3 of sugar - red hybrid. The red parent is unknown. The F_2 generation appeared very good with higher percent sucrose than that of No. 1 above.

7. No. 7099. A mechanical mixture of four strains believed to be highly resistant to leaf spot. Received from a commercial beet breeder.

8. 1937 Rocky Ford Seed No. 353. Single root selfed 1933; single root selection selfed 1935; sib pollinated group 1937. 1936 Breeding Strain row appeared highly resistant to several diseases.

9. Synthetic Check.

Varieties and Strains: (Cont'd)

10. Commercial, southern grown, Great Western. Check.

Culture:

Planted April 23 - 24. Emergence approximately May 5. Thinned June 1. Difficulty was encountered in holding the planter on the ridges and germination stands were spotted. At thinning time the seedlings were heavily infected with black root. Great care was used in thinning and where plants were available in the rows a rather close spaced stand was saved.

Harvest:

Stands were greatly reduced or entirely lost on portions of the block adjacent to the field road at the east end of the field. These losses appeared to be due to poor germination conditions, grasshoppers and black root. Before harvest the plots in this block were cut down to that portion having a fair stand and these parts of rows measured and harvested. The six inside rows of the plots in the other nine blocks were lifted with a beet puller; two samples taken for analysis and all remaining beets washed and weighed. This test was harvested the second week in October. Yields were calculated as the actual yields from 150 feet of row per plot except in the case of the plots which had been reduced in size where the actual feet of row harvested in each case was used in the yield calculations.

Plot and general summaries follow.

VARIETIES AND STRAINS TRIAL
 FORT COLLINS, COLORADO
 1938

PLOT SUMMARIES

| Var. No. | Plot No. | No. of Beets | T. Beets Per A. | S Sugar | App. Coef. of Purity | Lbs. Suc. per A. | | Stand • |
|-------------|-------------|-----------------|--------------------|------------|-------------------------|------------------|----------|------------|
| | | | | | | Gross | Ind. Av. | |
| 1 | 312 | 239 | 16.42 | 13.05 | 88.55 | 4287 | 3796 | 124 |
| | 330 | 238 | 18.81 | 13.20 | 91.05 | 4966 | 4522 | 124 |
| | 337 | 238 | 20.68 | 12.85 | 87.60 | 5316 | 4657 | 124 |
| | 341 | 261 | 18.08 | 13.65 | 90.25 | 4937 | 4456 | 136 |
| | 356 | 244 | 17.35 | 13.65 | 88.85 | 4736 | 4208 | 127 |
| | 364 | 291 | 19.87 | 14.00 | 89.65 | 5563 | 4987 | 152 |
| | 378 | 222 | 19.07 | 13.75 | 93.95 | 5245 | 4928 | 116 |
| | 389 | 248 | 17.44 | 13.60 | 92.00 | 4745 | 4365 | 129 |
| | 393 | 235 | 14.68 | 13.40 | 89.95 | 3935 | 3540 | 122 |
| | 405 | 250 | 17.31 | 13.40 | 88.75 | 4638 | 4116 | 145 |
| | Mean | | | 17.97 | 13.46 | 90.06 | 4837 | 4358 |
| 2 | 317 | 196 | 16.92 | 13.80 | 90.25 | 4669 | 4214 | 108 |
| | 325 | 277 | 18.34 | 13.15 | 88.15 | 4822 | 4251 | 144 |
| | 333 | 241 | 18.47 | 13.90 | 89.40 | 5133 | 4589 | 126 |
| | 348 | 188 | 18.36 | 14.25 | 91.55 | 5234 | 4792 | 98 |
| | 351 | 266 | 19.85 | 13.65 | 88.70 | 5418 | 4806 | 139 |
| | 362 | 253 | 18.69 | 14.20 | 89.75 | 5308 | 4764 | 132 |
| | 374 | 284 | 18.61 | 14.25 | 90.80 | 5303 | 4815 | 148 |
| | 390 | 216 | 17.51 | 14.00 | 92.00 | 4903 | 4511 | 112 |
| | 396 | 271 | 17.13 | 14.25 | 89.40 | 4882 | 4365 | 141 |
| | 409 | 267 | 18.26 | 12.95 | 90.55 | 4730 | 4283 | 128 |
| Mean | | | 18.21 | 13.84 | 90.06 | 5040 | 4539 | 128 |
| 3 | 319 | 202 | 11.41 | 12.85 | 87.00 | 2932 | 2551 | 105 |
| | 323 | 226 | 13.03 | 14.15 | 88.75 | 3689 | 3274 | 118 |
| | 338 | 172 | 14.86 | 12.90 | 86.80 | 3833 | 3327 | 90 |
| | 342 | 238 | 14.63 | 14.85 | 89.50 | 4346 | 3890 | 124 |
| | 354 | 258 | 12.56 | 14.40 | 88.80 | 3619 | 3214 | 134 |
| | 370 | 209 | 15.29 | 13.95 | 89.90 | 4267 | 3836 | 109 |
| | 371 | 245 | 13.32 | 14.25 | 89.00 | 3796 | 3378 | 128 |
| | 386 | 215 | 10.75 | 14.10 | 90.25 | 3031 | 2735 | 112 |
| | 395 | 234 | 11.31 | 13.65 | 88.75 | 3088 | 2741 | 122 |
| | 407 | 233 | 12.10 | 13.90 | 88.80 | 3362 | 2985 | 132 |
| Mean | | | 12.93 | 13.90 | 88.76 | 3596 | 3193 | 117 |

| <u>Var. No.</u> | <u>Plot No.</u> | <u>No. of Beets</u> | <u>T. Beets Per A.</u> | <u>% Sucr.</u> | <u>App. Coef. of Purity</u> | <u>Lbs. Suc. per A.</u> | | <u>Stand *</u> |
|-----------------|-----------------|---------------------|------------------------|----------------|-----------------------------|-------------------------|-----------------|----------------|
| | | | | | | <u>Gross</u> | <u>Ind. Av.</u> | |
| 4 | 316 | 223 | 12.67 | 14.75 | 91.55 | 3737 | 3421 | 116 |
| | 322 | 225 | 16.20 | 14.80 | 91.45 | 4795 | 4385 | 117 |
| | 340 | 224 | 16.99 | 15.05 | 92.75 | 5114 | 4743 | 117 |
| | 347 | 233 | 17.15 | 15.05 | 91.30 | 5163 | 4714 | 121 |
| | 353 | 193 | 14.67 | 15.00 | 90.10 | 4400 | 3964 | 101 |
| | 369 | 209 | 17.03 | 14.95 | 90.65 | 5092 | 4626 | 109 |
| | 375 | 233 | 15.69 | 15.65 | 91.20 | 4910 | 4478 | 121 |
| | 384 | 282 | 15.87 | 15.45 | 93.60 | 4902 | 4588 | 147 |
| | 398 | 228 | 17.89 | 14.75 | 91.70 | 5279 | 4841 | 119 |
| | 401 | 16 | 10.45 | 14.20 | 90.30 | 2969 | 2681 | 114 |
| | Mean | | | 15.46 | 14.96 | 91.48 | 4636 | 4244 |
| 5 | 315 | 247 | 14.68 | 14.35 | 89.10 | 4213 | 3754 | 129 |
| | 329 | 237 | 16.44 | 15.05 | 91.75 | 4950 | 4542 | 123 |
| | 332 | 240 | 16.40 | 15.30 | 89.70 | 5017 | 4500 | 125 |
| | 390 | 234 | 15.54 | 15.15 | 91.30 | 4708 | 4298 | 122 |
| | 357 | 243 | 15.80 | 15.15 | 88.65 | 4787 | 4244 | 127 |
| | 361 | 264 | 17.19 | 15.55 | 90.80 | 5347 | 4855 | 138 |
| | 376 | 251 | 14.95 | 15.90 | 92.50 | 4755 | 4398 | 131 |
| | 383 | 239 | 15.94 | 15.80 | 90.75 | 5037 | 4571 | 124 |
| | 294 | 290 | 13.62 | 15.25 | 90.20 | 4154 | 3747 | 151 |
| | 408 | 257 | 16.71 | 14.40 | 90.75 | 4813 | 4368 | 124 |
| | Mean | | | 15.73 | 15.19 | 90.55 | 4778 | 4328 |
| 6 | 320 | 176 | 13.40 | 13.70 | 91.45 | 3672 | 3358 | 92 |
| | 326 | 147 | 12.63 | 12.85 | 89.90 | 3247 | 2919 | 77 |
| | 331 | 244 | 15.98 | 14.15 | 89.90 | 4523 | 4066 | 127 |
| | 349 | 192 | 15.35 | 14.25 | 90.05 | 4376 | 3941 | 100 |
| | 358 | 177 | 14.86 | 14.10 | 91.95 | 4190 | 3853 | 92 |
| | 363 | 203 | 15.78 | 14.95 | 90.10 | 4717 | 4250 | 106 |
| | 377 | 190 | 14.89 | 13.50 | 89.70 | 4019 | 3605 | 99 |
| | 385 | 197 | 12.87 | 14.20 | 92.70 | 3655 | 3388 | 103 |
| | 392 | 212 | 14.55 | 13.80 | 90.60 | 4016 | 3638 | 110 |
| | 404 | 138 | 12.56 | 13.15 | 90.50 | 3304 | 2990 | 105 |
| | Mean | | | 14.29 | 13.86 | 90.68 | 3972 | 3601 |

| <u>Var. No.</u> | <u>Plot No.</u> | <u>No. of Beets</u> | <u>T. Beets Per A.</u> | <u>% Sugar.</u> | <u>App. Coef. of Purity</u> | <u>Lbs. Sug. per A.</u> | | <u>Stand</u> |
|-----------------|-----------------|---------------------|------------------------|-----------------|-----------------------------|-------------------------|-----------------|--------------|
| | | | | | | <u>Gross</u> | <u>Ind. av.</u> | |
| 7 | 313 | 218 | 15.09 | 16.15 | 90.95 | 4874 | 4433 | 114 |
| | 327 | 249 | 19.24 | 15.10 | 91.55 | 5811 | 5320 | 130 |
| | 335 | 255 | 16.67 | 16.70 | 91.30 | 5567 | 5094 | 133 |
| | 344 | 257 | 14.83 | 16.80 | 92.45 | 4983 | 4607 | 134 |
| | 352 | 234 | 16.16 | 16.60 | 91.90 | 5367 | 4932 | 122 |
| | 366 | 205 | 14.07 | 16.75 | 92.85 | 4713 | 4376 | 107 |
| | 379 | 229 | 16.14 | 15.95 | 91.95 | 5148 | 4734 | 119 |
| | 388 | 218 | 14.68 | 15.60 | 91.20 | 4580 | 4177 | 114 |
| | 391 | 208 | 13.31 | 15.35 | 92.40 | 4085 | 3775 | 108 |
| | 410 | 204 | 12.46 | 15.50 | 90.75 | 3863 | 3506 | 121 |
| | Mean | | | 15.26 | 16.05 | 91.75 | 4899 | 4495 |
| 8 | 314 | 257 | 8.14 | 15.65 | 90.05 | 2548 | 2294 | 134 |
| | 321 | 250 | 10.23 | 15.25 | 90.10 | 3120 | 2811 | 130 |
| | 339 | 214 | 11.79 | 16.00 | 89.80 | 3772 | 3387 | 111 |
| | 346 | 204 | 9.32 | 16.15 | 88.65 | 3012 | 2670 | 106 |
| | 355 | 223 | 10.07 | 16.40 | 89.30 | 3302 | 2949 | 116 |
| | 368 | 150 | 10.45 | 15.45 | 89.40 | 3228 | 2886 | 82 |
| | 372 | 217 | 11.35 | 15.95 | 88.90 | 3619 | 3217 | 113 |
| | 387 | 207 | 6.79 | 15.20 | 89.35 | 2065 | 1845 | 108 |
| | 400 | 193 | 9.73 | 15.10 | 89.00 | 2939 | 2616 | 101 |
| | 403 | 111 | 8.86 | 13.90 | 90.00 | 2463 | 2217 | 111 |
| | Mean | | | 96.73 | 15.51 | 89.46 | 3007 | 2689 |
| 9 | 318 | 127 | 20.18 | 12.90 | 88.75 | 5045 | 4477 | 92 |
| | 324 | 268 | 15.58 | 14.15 | 91.70 | 4409 | 4043 | 140 |
| | 336 | 206 | 17.12 | 14.40 | 90.15 | 4932 | 4446 | 107 |
| | 345 | 214 | 15.35 | 14.70 | 88.40 | 4514 | 3990 | 111 |
| | 360 | 182 | 14.15 | 14.20 | 92.80 | 4019 | 3730 | 95 |
| | 367 | 142 | 12.39 | 13.30 | 87.55 | 3297 | 2887 | 74 |
| | 373 | 224 | 14.46 | 14.40 | 91.95 | 4163 | 3828 | 117 |
| | 381 | 216 | 15.92 | 14.65 | 91.45 | 4665 | 4266 | 112 |
| | 399 | 208 | 17.42 | 13.90 | 91.10 | 4844 | 4413 | 108 |
| | 402 | 63 | 13.91 | 13.10 | 89.85 | 3643 | 3273 | 98 |
| Mean | | | 15.65 | 13.93 | 90.37 | 4353 | 3935 | 105 |

| <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>Sucr.</u> | <u>App. Coef.</u> <u>of Purity</u> | <u>Lbs. Suc. per A.</u> | | <u>Stand</u> <u>*</u> |
|---------------------------|---------------------------|-------------------------------|----------------------------------|---------------------------|---------------------------------------|-------------------------|-----------------|--------------------------|
| | | | | | | <u>Gross</u> | <u>Ind. Av.</u> | |
| 10 | 311 | 235 | 12.96 | 13.30 | 89.70 | 3447 | 3092 | 122 |
| | 328 | 222 | 19.77 | 14.25 | 89.90 | 5633 | 5064 | 116 |
| | 334 | 291 | 16.95 | 15.00 | 90.55 | 5086 | 4605 | 152 |
| | 343 | 229 | 17.15 | 15.35 | 89.85 | 5266 | 4732 | 119 |
| | 359 | 212 | 16.94 | 14.70 | 91.45 | 4981 | 4555 | 110 |
| | 365 | 254 | 18.47 | 15.65 | 90.45 | 5782 | 5230 | 132 |
| | 380 | 234 | 16.79 | 14.70 | 92.95 | 4937 | 4589 | 122 |
| | 382 | 259 | 17.66 | 14.40 | 90.20 | 5085 | 4587 | 135 |
| | 397 | 262 | 16.40 | 14.50 | 91.15 | 4755 | 4334 | 136 |
| | 406 | 272 | 16.73 | 14.55 | 91.95 | 4868 | 4476 | 136 |
| Mean | | | 16.98 | 14.64 | 90.82 | 4984 | 4526 | 128 |

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

VARIETY AND STRAINS TRIAL
1938
GENERAL SUMMARY

| Variety | Stand | T. Beets | | App. Coef of Pur. | Lbs. Sug. per A. | |
|---|---------|----------|--------|----------------------|------------------|----------|
| | | Per A. | Sucr. | | Gross | Ind. Av. |
| 1. R.F. 1935 Seed No. 520 Hybrid F ₃ | 130 | 17.97 | 13.46 | 90.06 | 4837 | 4358 |
| 2. R.F. 1937 " " 304 " Sel F ₄ | 128 | 18.21 | 13.84 | 90.06 | 5040 | 4539 |
| 3. " " " " 302 Inbred | 117 | 12.93 | 13.90 | 88.76 | 3596 | 3193 |
| 4. " " " " 309 " | 118 | 15.46 | 14.96 | 91.48 | 4636 | 4244 |
| 5. " " " " 313 Selection | 129 | 15.73 | 15.19 | 90.55 | 4778 | 4328 |
| 6. " " " " 314 Hybrid F ₃ | 101 | 14.29 | 13.86 | 90.68 | 3972 | 3601 |
| 7. Wc. 7099 | 120 | 15.26 | 16.05 | 91.75 | 4899 | 4495 |
| 8. R.F. 1937 Seed No 353 Inbred | 111 | 9.67 | 15.50 | 89.46 | 3007 | 2689 |
| 9. Synthetic check | 105 | 15.65 | 13.93 | 90.37 | 4353 | 3935 |
| 10. Great Western | 128 | 16.98 | 14.64 | 90.82 | 4984 | 4526 |
| Mean | 119 | 15.22 | 14.53 | 90.40 | 4410 | 3991 |
| Z | 1.2407 | 1.7265 | 1.8819 | .9815 | 1.5909 | 1.6015 |
| 5% Point | . | . | . | . | . | . |
| 1% Point | . | . | . | . | . | . |
| S.E. of Mean | 2.97 | .4475 | .1317 | .333 | 138.5 | 128.2 |
| S.E. of Mean in % of Mean | 2.50 % | 2.94% | .91% | .37% | 3.14% | 3.21% |
| Dif. necessary for Significance | 8 beets | 1.267 | .37% | .94% | 392 lb | 363 lb |

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

Discussion:

Of first importance in this test was the performance of No. 2 in relation to No. 1, the parent strain. No. 2 exceeded No. 1 in tonnage by .24 tons; the difference not being significant. It also exceeded No. 1 in percent sucrose by .38% with .37% required for probable significance on the basis of odds of 19 : 1. No. 2 exceeded all varieties in the test in indicated available pounds sugar per acre; however it is not significantly superior to Nos. 1, 4, 5, 7 and 10. The increase in percent sucrose of No. 2 in comparison with No. 1 without loss of tonnage is very gratifying.

No. 3 appears to be of very little value.

No. 4 is not definitely a poor strain and may be of value in breeding work. The roots of this strain are rough and high crowned.

No. 5 is not particularly good. It is possible that in selecting the roots for this increase too much weight was given to high percent sucrose and not enough to size of root. The roots are mostly smooth, good shape and good crown.

No. 6 appears to be inferior to Nos. 1 and 2. The roots are rough and high crowned.

No. 7 was fair in yield of roots and had excellent percent sucrose. Most of the plants of this number were very resistant to leaf spot. A few appeared quite susceptible. A group cross of this number and roots selected from No. 2 for size and fair percent sucrose will be made in 1939.

No. 8 This strain is of no value in its present state. It is unusual in one respect; a fairly high percent sucrose is accompanied by a definitely low purity. This strain has considerable leaf spot resistance; however the very low yield and low purity make it of questionable value for any purpose.

No. 9 performed as usual.

No. 10 maintains its reputation as a good commercial variety for this region.