

REPORT ON 1943 TESTS OF U. S. 215 X 216, IMPROVED U. S.

215 X 216, AND OTHER VARIETIES FROM SUGAR-BEET

LEAF-SPOT-RESISTANCE BREEDING INVESTIGATIONS

OF THE U. S. DEPARTMENT OF AGRICULTURE

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Agronomic evaluation tests were conducted in 1943 with U. S. 215 X 216, with Improved U. S. 215 X 216, recently introduced, and with allied varieties obtained in the federal leaf-spot-resistance breeding project. Tests were conducted at a total of 20 locations by members of the staff of the Division of Sugar Plant Investigations, Bureau of Plant Industry, Soils, and Agricultural Engineering, in cooperation with agricultural experiment stations, and by other cooperators. Dr. J. H. Torrie of the Wisconsin Agricultural Experiment Station, in cooperation with the Superior Sugar Refining Co. and the Menominee Sugar Co., conducted tests at two locations in Wisconsin. In addition, cooperators in research organizations of the beet-sugar industry conducted tests with these varieties and have contributed results as follows: F. R. Bach, Michigan Sugar Co., test at Saginaw, Mich.; M. J. Buschlen and Perc Reeve, Farmers and Manufacturers Beet Sugar Association, test at Findlay, O.; C. E. Cormany and F. F. Lynes, test at Sidney, Mont.; H. W. Dahlberg, Dr. H. E. Brewbaker, H. L. Bush, and R. R. Wood, Research Department, Great Western Sugar Co., tests at Brush, Colo., and Huntley, Mont.; A. W. Skuderna and C. W. Doxtator, American Crystal Sugar Co., tests at Rocky Ford, Colo., and Mason City, Iowa.

The distribution of the tests was as follows: 6 in Colorado, 1 in Wyoming, 2 in Nebraska, 2 in Montana, 1 in Minnesota, 1 in Iowa, 2 in Wisconsin, 2 in Ohio, and 3 in Michigan. Tests at Waseca, Minn., and at Findlay, Ohio, were not considered reliable by those conducting the tests. These have not been included in the Summary. Hence results from 18 of the 20 tests conducted are reported.

In table 1 are shown the comparisons of U. S. 215 X 216 (S.P.I. Seed No. 2-1-00) and Improved U. S. 215 X 216 (S.P.I. Seed No. 1-8-00) with U. S. 200 X 215 (S.P.I. Seed No. 1-7-00). In former tests, comparisons have been made with a variety designated as Synthetic Check that was taken as representative of European brands formerly grown. Synthetic Check was obtained by pooling equal quantities of European brands and using this mixture as planting stock to produce seed. In a series of 83

tests from 1938 to 1942, inclusive, U. S. 200 X 215 showed, as an average, 4.7 percent superiority over Synthetic Check in the production of sugar; surpassing it, usually by significant amounts, in 55 of the 83 trials. The leaf-spot resistance of U. S. 200 X 215, although moderate as compared with newer varieties under trial, was considered as probably responsible for this favorable showing.

In the 1943 tests, Synthetic Check was omitted and the performance of U. S. 200 X 215 was taken as the base for comparison. Hence in appraising new introductions the general superiority of U. S. 200 X 215 over susceptible European brands should not be overlooked. In general, the 1943 season was one in which leaf spot did less damage than usual. Readings of leaf-spot prevalence were made in only 7 tests in 1943.

As an average of the 18 tests, U. S. 215 X 216 produced 344 pounds, or nearly 8 percent more sugar per acre than U. S. 200 X 215, this relationship holding closely in the tests in both irrigated and non-irrigated districts. Improved U. S. 215 X 216 showed, as an average of all tests, 111 pounds, or 2.3 percent superiority in sugar production over its parent variety, U. S. 215 X 216, a relation that also held when the data for irrigated and non-irrigated sections were considered separately. The indications are that Improved U. S. 215 X 216 tends to produce a heavier tonnage than U. S. 215 X 216, with sucrose percentage being somewhat lower. There is some evidence that Improved U. S. 215 X 216 is more leaf-spot resistant than the parent variety. In 1942, U. S. 215 X 216 (1-10-00) and Improved U. S. 215 X 216 (1-8-00) were compared in 18 evaluation tests, similar in character to those here reported. In 1942, the improved variety exceeded the parent in sugar production by 5.7 percent, and the trends as to root production and sucrose percentages similar to those in 1943 were shown.

The beet-sugar industry formerly used, almost exclusively, sugar-beet varieties imported from Europe. In western United States, curly-top-resistant varieties now have replaced non-resistant types with extremely advantageous results. In the more eastern districts in which leaf spot has been a serious problem, replacement of susceptible sorts by leaf-spot-resistant varieties has taken place. From the comparative tests over a 5-year period U. S. 200 X 215, moderately resistant to leaf spot, was judged to be significantly superior in production of sugar to susceptible European brands. On the basis of further comparative tests, U. S. 215 X 216 proved significantly superior to U. S. 200 X 215 in leaf-spot resistance and in sugar production. It is expected that the new variety Improved U. S. 215 X 216, in its turn, will register significant advance.

Table 1.—1943 comparisons of U. S. 215 X 216 and Improved U. S. 215 X 216 with U. S. 200 X 215; Summarization of 18 tests conducted by Division of Sugar Plant Investigations and cooperators.

(Results given as 8-plot averages unless otherwise noted)

Location	Acre-yield						Sucrose			Leaf-spot reading		
	Gross sugar			Roots								
	U.S. 200 X 215	U.S. 215 X 216	Improved U.S. 215 X 216	U.S. 200 X 215	U.S. 215 X 216	Improved U.S. 215 X 216	U.S. 200 X 215	U.S. 215 X 216	Improved U.S. 215 X 216	U.S. 200 X 215	U.S. 215 X 216	Improved U.S. 215 X 216
	Pounds	Pounds	Pounds	Tons	Tons	Tons	Percent	Percent	Percent			
Colo., Ft. Collins (Sprinkler) J. O. Gaskill	2,188	2,180	2,157	7.97	7.97	8.15	13.76	13.72	13.24	4.0	3.4	3.4
Ault (Clark farm) "	5,651	6,341	6,208	16.66	18.28	18.19	16.91	17.30	17.04	-	-	-
Ft. Collins (Agr. Exp. Sta.) G.W. Deming	4,200	4,218	4,144	13.70	13.80	14.20	15.31	15.21	14.56	1.5	1.0	1.0
Rocky Ford (Sprinkler) Am. Cryst. S.	2,949	2,942	2,728	12.80	12.95	12.46	11.53	11.42	10.94	3.0	2.5	2.5
" " (West Ranch) 1/ "	4,461	5,177	5,076	13.43	15.10	14.94	16.64	17.15	17.03	3.5	2.67	2.75
Brush Great Western Sugar Co.	6,118	6,582	6,902	18.94	20.03	21.42	16.15	16.43	16.11	4.9	3.5	2.5
Wyo., Torrington S. B. Nuckols	4,554	5,492	5,678	13.71	16.63	18.04	16.60	16.50	15.80	-	-	-
Nebr., Mitchell (Irr. Exp. Sta.) "	4,338	5,112	5,548	14.23	16.25	18.04	15.30	15.70	15.40	-	-	-
Scottsbluff (Kath farm) "	4,282	5,026	4,716	11.81	13.54	13.31	18.10	18.60	17.70	-	-	-
Mont., Huntley Great Western Sugar Co.	5,637	5,392	5,745	14.71	14.28	15.15	19.16	18.88	18.96	-	-	-
Sidney Holly Sugar Corp.	4,092	4,185	5,099	13.66	14.47	16.75	15.12	14.64	15.16	-	-	-
Iowa, Mason City Amer. Cryst. Sugar Co.	3,572	3,691	3,494	12.25	12.93	12.64	14.53	14.24	13.78	2.0	1.5	1.5
Wisc., Fox Lake (Wis. Agr. Ex. Sta.) J.H. Torrie	3,945	4,518	4,818	12.50	13.90	14.60	15.70	16.30	16.50	3.0	2.0	1.5
Fond du Lac 1/ "	4,406	4,651	4,855	11.50	11.90	12.60	19.20	19.50	19.30	-	-	-
Ohio, Van Wert (Marsh Found.) J. G. Lill	5,629	6,310	6,569	17.80	19.91	21.24	15.82	15.88	15.48	-	-	-
Mich., Mentha (A. M. Fodd Co.) "	3,610	3,682	3,794	13.24	13.77	14.72	13.50	13.32	12.86	-	-	-
E. Lansing (Mich. Agr. Ex. Sta.) "	3,028	2,980	3,038	7.67	7.76	7.98	19.75	19.18	19.10	-	-	-
Saginaw (Mich. Sug. Co.) F. R. Bach	5,135	5,515	5,398	13.05	13.85	14.21	19.45	19.83	18.91	-	-	-
Average, all tests	4,322	4,666	4,776	13.31	14.30	14.92	16.25	16.32	15.99			
Average, all tests as percentages	100	107.9	110.5	100	107.4	112.1	100	100.4	98.4			
Average, Irrigated Area	4,406	4,786	4,909	13.78	14.85	15.51	15.87	15.96	15.63			
" " as percentages	100	108.6	111.4	100	107.8	112.6	100	100.6	98.5			
Average, Humid Area	4,189	4,478	4,567	12.57	13.43	14.00	16.85	16.89	16.56			
" " " as percentages	100	106.8	109.0	100	106.8	111.4	100	100.2	98.3			

1/ Replications in the test at Rocky Ford, Colo., West Ranch, were 4; at Sidney, Mont., 6; at Fond du Lac, Wisc., 4.

This article all checked against our cc. of orig. <sup>Baltimore</sup> ~~manuscript~~, on 3/18/44  
by C.E.W. & J.K. — no errors found.  
J.O.H.