

# Performance of New Sugarcane Varieties in the Northern Humid Coastal Plains of Puerto Rico<sup>1</sup>

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## ABSTRACT

Three sites were selected in the northern humid coastal plains of Puerto Rico for the performance evaluation of 57 new sugarcane varieties. The experiments were located on typical soils of the sugarcane producing northern coastal plain region. A plant crop (fall planting) and two ratoons were harvested at each site.

On the San Francisco farm between Arecibo and Utuado, the outstanding new varieties which outyielded all the others tested were PR 64-2548, PR 1152, PR 65-325 and PR 64-2705. Of these, PR 1152 and PR 64-2705 are the most promising varieties in this area because of their erect growth and the good quality of their juice.

On the Las Claras farm, near Arecibo, the most promising new varieties for the area were PR 1141 and PR 62-258.

On the Consejo farm at Barrio Bajadero, Arecibo, varieties PR 1117, PR 1152, Selección Sóller, PR 1048, PR 62-469 and the PR 65-2523 performed best on the basis of cane tonnage. As a commercial variety for the area, PR 1152 was the most promising variety, having a good juice quality and intermediate cane tonnage per acre (40 to 45 tons). It can be harvested mechanically without difficulties because of its erect growth habit.

PR 980 produced good tonnage, but was low in sucrose content, indicating that it should not be recommended for the northern humid coastal plains of Puerto Rico.

## INTRODUCTION

The farm value of the sugarcane crop in Puerto Rico in 1973-74 was \$70,945,000 (2). Crop yield and acreage have decreased sharply during the past 15 years. About 263,347 acres were planted to sugarcane in 1966-67; only 140,000 in 1973-74. Mean cane yield in 1974 was

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about 30 tons/acre with an 8.013% sucrose content for a total sugar production of 287,269 tons (4).

Sugarcane hybridization, selection for disease resistance, and evaluation are the three phases of the Experiment Station's sugarcane variety research program. The goal is to develop varieties that outyield those in present commercial use and also are suitable for mechanized cultivation and harvesting. One of the variety testing areas is located in the northern humid coastal plains in the vicinity of Cambalache sugar mill. In 1974 there were approximately 15,550 acres planted to sugarcane in this region. A total of 462,752 tons of cane were ground with a mean sucrose content of 7.52%. The area's principal varieties are PR 1028 (early maturing, high sucrose), H 32-8560 (intermediate maturing, good juice quality), and PR 980 (late maturing cane with low juice quality, particularly on poorly drained soils). A large proportion of the area's cane is harvested mechanically. Much damaged cane is left in the field after harvesting, and the cane arriving at the mill is high in foreign matter and low in sugar content. Previous work conducted in 1967-68 showed that varieties PR 62-626, PR 62-357 and PR 62-147 produced 21, 10 and 7% more sugar, respectively, than the standard variety PR 980 in that area (1). None, however, outyielded PR 1028.

This paper reports the results from field experiments conducted from 1970 to 1974 at three sites in the region, involving 57 varieties selected from the 1961-65 breeding program together with two standard commercial varieties.

Several features must be considered in addition to yield performance in a program geared toward replacement of traditional varieties by new ones in attempts to meet industry requirements in a particular area. Varieties should have high juice quality, and produce a relatively high tonnage. Further, they must be suitable for mechanized harvesting. Lodged or badly inclined canes are unsuitable for harvesting with machines designed for erect or semi-erect stalks. Propensity to lodge is thus a decisive feature which normally disqualifies a candidate variety.

Special consideration also should be given to maturity. A planned

TABLE 1.—*Rainfall data (inches) for each crop season at the three experimental sites*

Site	Rainfall		
	Plant cane	First ratoon	Second ratoon
San Francisco	102.5	66.8	52.7
Las Claras	97.9	66.6	55.3
Consejo	107.9	72.5	56.3

balance of early-to-late maturity varieties provides full-grown or fully ripe cane throughout the harvest season. Agronomic characteristics such as germination, growth habit, stooling, stalk development, lodging and ratooning also should receive due consideration.

Fiber content is of considerable importance. An accepted fiber range is from 12 to 16%. Fiber over 16% is considered undesirable from the standpoint of juice extraction in the factory. Varieties with less than 12% may exhibit recumbent growth in the humid northern coastal plains even though they are low-tonnage canes.

#### MATERIALS AND METHODS

The experiments were located as follows: San Francisco farm between Arecibo and Utuado; Las Claras farm near Cambalache Sugar Mill, and Consejo farm at Barrio Bajadero, Arecibo.

The soil on the San Francisco farm is classified as Coloso, an Aeric Tropic Fluvaquents, fine, mixed, non-acid, isohyperthermic (3). Thirty varieties were tested in a  $5 \times 6$  rectangular lattice design experiment, with six replications. The experiment was planted in October 1970 (fall planting) and harvested in February 1972 at 16 months of age. The first ratoon crop was harvested in April 1973 at  $13\frac{1}{2}$  months while the second was harvested in April 1974 at 12 months.

On the Las Claras farm, the soil is classified as Sabana Seca, an Oxic Plinthaquults, clayey, mixed, isohyperthermic (3). Thirty varieties were tested in a  $5 \times 6$  balanced lattice design experiment with six replications. The experiment was planted in October 1970 (fall planting) and harvested in February 1972 at  $16\frac{1}{2}$  months of age. The first ratoon crop was harvested in April 1973 at  $13\frac{1}{2}$  months while the second was harvested in April 1974 at 12 months.

On the Consejo farm, the soil is classified as Toa, a Fluventic Hapludolls, fine, mixed, isohyperthermic (3). Twenty-eight varieties were compared in a partially balanced incomplete block design experiment with six replications. The experiment was planted in October 1970 (fall planting) and harvested in March 1972 at 16 months of age. The first ratoon crop was harvested in April 1973 at  $13\frac{1}{2}$  months while the second was harvested in April 1974 at 12 months.

The plots were  $22 \times 20$  ft with furrows at  $5\frac{1}{2}$  ft at all sites. Cultivation, fertilization, weeding and crop protection followed standard Puerto Rican practices for each location. Observations were conducted periodically relative to germination, stooling, growth habit, stalk characteristics (vigor, thickness, height, solidity and lodging), ripening, ratooning and others. Rainfall data was recorded at each site (table 1). The cane was burned prior to harvesting and then cut with machetes. Data was

TABLE 2.—Means yields and relative values of 30 sugarcane varieties in the experimental field at San Francisco Farm

Rank	Variety	Sucrose content	TCA <sup>1</sup>	TSA <sup>2</sup>	Relative value on TSA as compared to checks		Fiber content	Outyielded varieties in TSA (P = 0.05)
					PR 980	PR1028		
		%					%	
<i>A. Plant cane crop 1972</i>								
1	PR 65-325	12.25	52.6	6.40	1.231	1.286	13.84	17 to 30
2	PR 64-2548	11.84	52.5	6.16	1.184	1.239	13.19	20 to 30
3	PR 64-2705	13.95	43.9	6.09	1.170	1.225	13.21	21 to 30
4	PR 1242	11.66	50.8	5.99	1.152	1.204	14.58	23 to 30
5	PR 65-292	10.95	50.1	5.56	1.067	1.117	13.10	29 to 30
6	PR 61-324	12.37	43.3	5.39	1.036	1.085	11.41	30
7	PR 1152	11.93	43.3	5.27	1.011	1.058	13.77	30
8	PR 980	11.35	45.8	5.20	1.000	1.046	13.29	30
9	PR 63-525	11.26	45.5	5.13	.986	1.032	12.79	30
10	PR 61-902	12.69	40.6	5.11	.982	1.027	13.82	30
11	PR 62-456	11.33	45.5	5.09	.977	1.022	12.29	30
12	PR 1028	12.21	40.7	4.97	.955	1.000	15.08	
13	PR 1140	13.71	36.5	4.95	.950	.994	13.51	
14	PR 65-1539	11.28	42.7	4.91	.942	.986	14.41	
15	PR 64-1791	11.26	42.1	4.74	.912	.953	14.83	
16	PR 1002	11.26	39.7	4.74	.912	.951	13.27	
17	PR 62-285(I)	12.13	37.4	4.59	.882	.923	13.05	
18	PR 62-626	12.06	37.7	4.58	.881	.922	13.58	
19	PR 63-227	12.00	37.6	4.52	.869	.909	12.33	
20	PR 63-833	12.98	35.5	4.47	.858	.899	13.02	
21	PR 63-523	10.98	39.4	4.33	.832	.871	12.13	
22	PR 65-229	12.08	35.3	4.33	.832	.871	13.10	
23	PR 1048	11.00	39.1	4.31	.829	.867	12.52	

24	PR 63-861	12.17	35.9	4.31	.829	.867	12.48
25	PR 62-469	11.54	36.5	4.27	.821	.859	12.96
26	PR 63-851	11.08	37.7	4.22	.811	.849	14.74
27	PR 63-489	11.76	35.0	4.15	.797	.835	11.81
28	PR 63-192	11.01	38.8	4.15	.797	.835	13.82
29	PR 63-862	12.19	31.4	3.79	.729	.763	14.68
30	PR 1016	12.29	27.1	3.39	.651	.682	13.74

*B. First ratoon crop 1973*

1	PR 980	12.09	51.83	6.22	1.000	1.271	17.27	20 to 30
2	PR 1152	11.88	49.97	5.86	.940	1.196	15.51	23 to 30
3	PR 1002	12.20	47.87	5.83	.935	1.190	15.63	22 to 30
4	PR 64-2548	11.90	45.90	5.40	.866	1.102	17.79	28 to 30
5	PR 62-285(I)	11.72	44.85	5.32	.855	1.087	16.23	29 to 30
6	PR 1048	12.07	44.09	5.29	.850	1.081	15.64	29 to 30
7	PR 64-2705	12.37	42.38	5.28	.848	1.079	16.24	29 to 30
8	Pgr 63-192	11.85	43.83	5.27	.845	1.075	16.93	29 to 30
9	PR 62-626	12.40	40.95	5.11	.821	1.044	18.25	30
10	PR 65-325	11.71	43.44	5.05	.811	1.032	15.56	
11	PR 63-525	12.06	41.44	5.05	.811	1.032	15.56	
12	PR 62-456	12.46	39.96	5.02	.805	1.024	15.65	
13	PR 63-523	12.04	41.91	5.02	.805	1.024	15.63	
14	PR 1028	11.44	42.84	4.89	.786	1.000	18.02	
15	PR 65-1539	13.50	36.27	4.88	.782	.995	16.04	
16	PR 63-861	12.14	40.71	4.88	.782	.995	14.59	
17	PR 63-851	11.85	42.51	4.88	.782	.995	17.43	
18	PR 61-324	14.17	32.86	4.72	.759	.963	15.84	
19	PR 65-292	10.93	42.65	4.71	.757	.961	15.87	
20	PR 63-227	12.51	36.37	4.58	.736	.936	16.47	
21	PR 1140	11.23	40.57	4.50	.723	.920	16.28	

Table 2.—Continued

Rank	Variety	Sucrose content	TCA <sup>1</sup>	TSA <sup>2</sup>	Relative value on TSA as compared to checks		Fiber content	Outyielded varieties in TSA (P = 0.05)
					PR 980	PR1028		
		%					%	
22	PR 64-1791	9.87	43.69	4.21	.676	.860	17.98	
23	PR 63-489	12.21	33.86	4.16	.668	.850	16.23	
24	PR 1242	10.01	41.24	4.12	.660	.840	17.48	
25	PR 1016	13.70	29.48	4.02	.644	.820	16.28	
26	PR 62-469	11.30	34.69	3.94	.633	.805	15.74	
27	PR 65-229	11.50	32.28	3.83	.614	.781	16.09	
28	PR 63-862	11.24	33.76	3.78	.606	.770	17.29	
29	PR 61-902	10.85	33.41	3.61	.580	.738	17.07	
30	PR 63-833	12.33	29.25	3.57	.573	.730	15.65	
<i>C. Combined analysis for the plant cane and the first ratoon crop</i>								
1	PR 64-2548	11.87	49.16	5.77	1.010	1.168	15.49	20 to 30
2	PR 65-325	11.99	48.22	5.75	1.007	1.164	14.89	22 to 30
3	PR 980	11.72	48.78	5.71	1.000	1.156	15.28	23 to 30
4	PR 64-2705	13.18	43.14	5.70	.998	1.154	14.73	23 to 30
5	PR 1152	11.90	46.74	5.57	.977	1.129	14.64	25 to 30
6	PR 1002	12.05	43.73	5.26	.922	1.066	14.45	28 to 30
7	PR 65-292	10.92	46.45	5.12	.896	1.036	14.49	29 to 30
8	PR 63-525	11.66	43.40	5.10	.894	1.034	14.18	29 to 30
9	PR 61-324	13.26	38.33	5.08	.889	1.028	13.63	29 to 30
10	PR 1242	10.83	46.24	5.07	.889	1.028	16.03	29 to 30
11	PR 62-456	11.89	42.84	5.06	.885	1.024	13.97	29 to 30
12	PR 1028	11.82	41.84	4.94	.864	1.000	16.55	30

13	PR 1048	11.53	42.59	4.93	.863	.997	14.08	30
14	PR 62-285(I)	11.93	40.65	4.93	.836	.997	14.64	
15	PR 65-1539	12.39	39.49	4.89	.857	.991	15.23	
16	PR 62-626	12.23	39.30	4.84	.847	.979	15.92	
17	PR 11401	12.47	38.65	4.73	.829	.959	14.90	
18	PR 63-523	11.51	40.61	4.67	.819	.947	13.88	
19	PR 63-192	11.34	40.62	4.59	.805	.931	15.23	
20	PR 63-861	12.14	38.18	4.57	.800	.925	13.54	
21	PR 63-227	12.26	36.96	4.57	.800	.925	14.40	
22	PR 63-851	11.33	40.10	4.56	.798	.922	16.09	
23	PR 64-1791	10.53	42.80	4.37	.766	.886	16.55	
24	PR 61-902	11.77	36.97	4.36	.764	.884	15.45	
25	PR 63-489	11.99	33.95	4.11	.720	.831	14.02	
26	PR 65-229	11.85	33.82	4.11	.720	.831	14.60	
27	PR 62-469	11.42	35.53	4.10	.719	.830	14.35	
28	PR 63-833	12.66	31.89	3.97	.696	.805	14.34	
29	PR 63-862	11.74	32.71	3.80	.666	.770	15.99	
30	PR 1016	12.99	28.36	3.71	.650	.752	15.01	

<sup>1</sup>TCA = tons of cane/acre.

<sup>2</sup>TSA = tons of sugar/acre.

tabulated on cane tonnage per plot and stalk samples were taken for sugar analysis by the pol-ratio method. Tonnage and sugar yield data were evaluated statistically by site and by pool analyses.

## RESULTS AND DISCUSSION

### SAN FRANCISCO FARM SITE

As shown in table 2 A, PR 65-325 was the leading sugar producing variety for a fall plant crop of 16 months of age, at 6.40 tons/acre. PR 64-2548 and PR 64-2705 followed very closely. Details as to the performance of each variety can be obtained from table 2 A. Varieties PR 65-325, PR 2548 and PR 64-2705 produced over 1.2 tons more sugar than the standard commercial varieties of the area, PR 980 and PR 1028. Fiber content of varieties ranged from 11.41 to 15.08% among the varieties.

The performance of the varieties in the first ratoon followed a different pattern. PR 980 was then the best sugar producer per acre. This is in consequence of the high tonnage of PR 980 coupled with small increases in sucrose content. Fiber content in PR 980 and PR 64-2548 increased to 17.27 and 17.79% respectively. Yield data for this crop is given in table 2 B.

Due to clarification difficulties with juices, only cane tonnage data is available in the second ratoon. For this reason the combined analysis on plant cane and first ratoon crop presented in table 2 C does not include the second ratoon. The analysis reveals that the most outstanding new varieties were PR 64-2548, PR 65-325, PR 64-2705 and PR 1152. However, considering the juice quality, growth habit and fiber content, PR 1152 and PR 64-2705 appear to be the best adapted to the conditions prevailing at the San Francisco farm.

### LAS CLARAS FARM SITE

Data on the production performance of each variety as a plant crop are given in table 3 A. Variety PR 1141 was the best sugar producer. Mean differences between sugar yield of PR 1141 and all other varieties were significant at the 5% level except PR 65-325, P.R. 62-285 (I) and H 32-8560. These three varieties were also outstanding and their yields were higher than those of most other varieties including PR 980. Variety PR 1141 produced at least 1 ton/acre more sugar than any other variety; 2 tons/acre more than PR 980. In terms of relative values, the yield increase over variety H 32-8560 was 21%, and over PR 980, 34%.

Yield data for the first ratoon is given in table 3 B. PR 980, which performed poorly in the plant crop, outyielded all other varieties significantly in tons per acre of sugar except PR 62-285 (I), PR 63-525 and PR 62-258. Although PR 980 is also the best sugar producer in the



TABLE 3.—Mean yields and relative values of 25 sugarcane varieties in the experimental field at Las Claras Farm

Rank	Variety	Sucrose content	TCA	TSA	Relative value on TSA as compared to checks		Fiber content	Outyielded varieties in TSA (P = 0.05)
					H 32-8560	PR 980		
		%					%	
<i>A. Plant cane crop 1972</i>								
1	PR 1141	11.84	66.9	7.85	1.212	1.342	13.62	5 to 25
2	PR 65-325	10.19	68.0	6.85	1.057	1.171	14.80	22 to 25
3	PR 62-285(I)	9.92	67.5	6.72	1.037	1.148	14.42	23 to 25
4	H 32-8560	10.08	65.6	6.47	1.000	1.107	12.78	23 to 25
5	PR 61-53	10.94	57.6	6.36	.981	1.086	16.84	23 to 25
6	PR 1175	10.18	60.6	6.11	.944	1.045	13.90	24 to 25
7	PR 62-521	10.62	56.5	6.07	.937	1.038	14.89	24 to 25
8	PR 63-489	9.73	62.2	6.06	.936	1.036	13.36	24 to 25
9	PR 62-258	9.96	60.4	6.04	.933	1.033	14.00	25
10	PR 62-626	10.94	54.7	5.92	.914	1.012	16.47	25
11	PR 65-292	10.71	55.2	5.91	.913	1.010	13.90	25
12	PR 980	9.63	61.4	5.85	.903	1.000	14.98	25
13	PR 64-1791	9.70	60.1	5.80	.896	.993	16.25	25
14	PR 65-109	10.36	56.2	5.78	.891	.987	14.33	25
15	PR 63-227	10.28	57.3	5.74	.886	.981	13.86	25
16	PR 63-525	9.02	64.1	5.73	.885	.980	13.98	25
17	PR 62-739	9.20	60.0	5.47	.845	.935	14.51	25
18	PR 63-851	9.19	58.0	5.36	.828	.917	15.99	25
19	PR 61-902	10.68	50.5	5.32	.822	.910	13.34	25
20	PR 63-488	8.62	63.1	5.27	.813	.900	12.66	25
21	PR 1238	11.12	47.5	5.24	.808	.895	13.16	25
22	PR 65-229	9.94	51.6	5.16	.797	.883	15.03	
23	PR 65-218	10.43	44.7	4.70	.724	.802	15.25	
24	PR 62-469	9.92	45.4	4.43	.684	.757	15.32	
25	PR 64-211	7.82	49.0	3.75	.579	.641	15.07	

Table 3.—Continued

Rank	Variety	Sucrose content	TCA	TSA	Relative value on TSA as compared to checks		Fiber content	Outyielded varieties in TSA (P = 0.05)
					H 32-8560	PR 980		
		%					%	
<i>B. First ratoon crop 1973</i>								
1	PR 980	12.51	51.01	6.31	1.440	1.000	17.14	
2	PR 62-285(1)	12.19	47.17	5.77	1.315	.912	16.91	5 to 25
3	PR 63-525	12.42	45.81	5.68	1.294	.898	14.70	18 to 25
4	PR 62-258	12.31	45.38	5.61	1.280	.889	18.21	18 to 25
5	PR 1141	13.22	38.64	5.10	1.164	.808	14.94	19 to 25
6	PR 62-626	11.26	44.51	5.05	1.152	.800	18.19	24 to 25
7	PR 65-325	12.53	40.03	5.03	1.148	.797	15.44	24 to 25
8	PR 62-739	11.35	44.11	5.02	1.143	.796	16.01	24 to 25
9	PR 62-469	12.84	38.70	4.94	1.127	.782	17.88	24 to 25
10	PR 63-227	12.30	40.04	4.92	1.123	.779	16.39	24 to 25
11	PR 63-489	11.00	43.82	4.85	1.105	.767	16.13	24 to 25
12	PR 64-1791	8.61	53.99	4.79	1.093	.759	18.35	24 to 25
13	PR 65-109	13.12	35.96	4.77	1.086	.754	15.17	24 to 25
14	PR 61-902	11.84	40.00	4.74	1.079	.749	17.91	24 to 25
15	PR 63-488	11.28	41.58	4.72	1.077	.748	14.66	24 to 25
16	PR 65-292	11.88	39.76	4.70	1.073	.744	17.98	24 to 25
17	PR 62-521	11.41	40.79	4.65	1.059	.735	17.63	24 to 25
18	H 32-8560	11.39	38.09	4.39	1.000	.694	17.22	
19	PR 1238	12.60	33.18	4.16	.949	.659	15.98	
20	PR 63-851	10.75	37.23	4.12	.938	.651	18.85	
21	PR 1175	12.26	33.09	4.10	.933	.650	16.87	
22	PR 65-218	12.28	34.07	4.09	.932	.648	18.19	
23	PR 64-211	13.45	30.32	4.08	.929	.647	17.75	
24	PR 65-229	11.91	28.11	3.35	.762	.529	17.24	
25	PR 61-53	8.72	38.01	3.23	.737	.511	18.38	

Table 3.—Continued

<i>C. Second ratoon crop 1974</i>								
1	PR 980	10.27	44.08	4.51	1.288	1.000	19.27	15 to 25
2	PR 62-258	11.19	39.68	4.41	1.259	.977	20.03	17 to 25
3	PR 63-525	11.76	37.22	4.34	1.240	.962	16.05	18 to 25
4	PR 65-325	12.10	35.81	4.33	1.237	.960	17.98	18 to 25
5	PR 62-739	10.86	39.44	4.31	1.231	.955	18.73	18 to 25
6	PR 63-489	11.01	37.92	4.21	1.202	.933	16.60	18 to 25
7	PR 1141	12.34	33.64	4.15	1.185	.920	17.08	18 to 25
8	PR 62-285(I)	10.58	39.30	4.15	1.185	.920	17.69	18 to 25
9	PR 62-626	10.72	38.09	4.08	1.165	.904	20.02	19 to 25
10	PR 63-227	12.40	31.78	3.92	1.120	.869	17.07	23 to 25
11	PR 62-469	11.71	33.48	3.88	1.108	.860	17.72	24 to 25
12	PR 63-488	10.55	36.88	3.81	1.088	.844	16.33	25
13	PR 64-1791	8.90	41.15	3.71	1.059	.822	20.31	25
14	PR 62-521	12.03	30.13	3.67	1.048	.813	17.25	25
15	H 32-8560	11.14	32.11	3.50	1.000	.776	17.11	25
16	PR 1175	11.68	29.58	3.49	.997	.773	17.44	25
17	PR 1238	11.34	30.01	3.41	.974	.756	16.28	25
18	PR 61-53	10.20	30.92	3.15	.899	.698	18.62	25
19	PR 61-902	10.42	30.30	3.13	.894	.694	17.92	25
20	PR 65-292	11.38	27.69	3.10	.885	.687	17.62	25
21	PR 63-851	11.00	27.85	3.05	.871	.676	18.98	25
22	PR 64-211	10.81	27.93	3.05	.871	.676	19.01	25
23	PR 65-109	12.12	24.39	2.93	.837	.649	16.16	
24	PR 65-218	10.64	27.16	2.90	.828	.643	17.98	
25	PR 65-229	10.90	18.78	2.10	.600	.465	16.93	
<i>D. Combined analysis</i>								
1	PR 1141	12.46	46.36	5.70	1.194	1.038	15.21	10 to 25
2	PR 62-285(I)	10.90	51.27	5.54	1.161	1.009	16.34	14 to 25
3	PR 980	10.68	52.22	5.49	1.150	1.000	17.26	14 to 25
4	PR 65-325	11.60	47.96	5.40	1.132	.983	16.07	17 to 25

Table 3.—Continued

Rank	Variety	Sucrose content	TCA	TSA	Relative value on TSA as compared to checks		Fiber content	Outyielded varieties in TSA (P = 0.05)
					H 32-8560	PR 980		
		%					%	
5	PR 62-258	11.15	48.46	5.35	1.121	.974	17.41	17 to 25
6	PR 63-525	10.99	48.98	5.20	1.090	.947	14.91	20 to 25
7	PR 63-489	10.60	47.96	5.05	1.058	.919	15.36	22 to 25
8	PR 62-626	11.01	45.73	5.03	1.054	.916	18.23	23 to 25
9	PR 62-739	10.47	47.79	4.93	1.033	.897	16.42	23 to 25
10	PR 63-227	11.65	43.01	4.85	1.016	.883	15.77	23 to 25
11	PR 62-521	11.41	42.43	4.82	1.010	.877	16.59	23 to 25
12	PR 64-1791	9.09	51.68	4.77	1.000	.868	18.30	23 to 25
13	H 32-8560	10.84	45.23	4.77	1.000	.868	15.70	23 to 25
14	PR 63-488	10.15	47.17	4.60	.964	.837	14.55	24 to 25
15	PR 1175	11.40	41.06	4.58	.960	.834	16.07	24 to 25
16	PR 65-292	11.32	40.85	4.56	.955	.830	16.50	24 to 25
17	PR 65-109	11.86	38.83	4.49	.941	.817	15.22	24 to 25
18	PR 62-469	11.52	39.14	4.43	.928	.806	16.97	25
19	PR 61-902	11.01	40.24	4.41	.924	.803	16.39	25
20	PR 1238	11.68	36.87	4.26	.893	.775	15.14	25
21	PR 61-53	9.99	42.14	4.26	.893	.775	17.95	
22	PR 63-851	10.31	40.99	4.17	.874	.759	17.94	
23	PR 65-218	10.95	35.45	3.81	.798	.693	17.14	
24	PR 64-211	10.72	35.70	3.64	.763	.663	17.28	
25	PR 65-229	10.91	32.79	3.53	.740	.642	16.40	

second ratoon crop (table 3 C), it is evident that overall yield differences between varieties was minimized.

A combined statistical analysis of the data from the plant crop and the two ratoon crops (table 3 D) reveals that PR 1141 was the best variety under the conditions prevailing at Las Claras. It produced the best quality juice, i.e., 12.46% sucrose in the combined analysis of the three crops with a high value of 13.22 for the first ratoon (table 3 B) and 11.84 for the plant crop (table 3 A). These values were the highest obtained throughout the experimental cycle. PR 980 produced more cane tonnage than any other variety for the three crops but was relatively low in sucrose content.

Among the leading varieties, PR 1141 appears more desirable because of its consistently high sucrose content, relatively high tonnage and good agronomic characteristics. Even when PR 980 yielded 6 tons more cane than PR 1141, the sugar yields per acre of PR 1141 were higher. Still more relevant, PR 1141 is an erect cane suitable for mechanical harvesting. PR 62-285 (I) and PR 65-325 produced good tonnage and good quality juices but they exhibited undesirable characteristics for mechanized harvesting. PR 62-258 is also promising for the region, because of the high sucrose content and the semi-erect growth. In general, fiber content under Las Claras conditions seemed higher than usual, varying from 14.55 to 18.30% (table 3 D). The Sabana Seca compact subsoil in this area could limit available water supplying power, thus inducing stress in the cane plant. This condition could have been a factor in the increased fiber content.

#### CONSEJO FARM SITE

Performance data on the plant crop of the 28 varieties included in this experiment is given in table 4 A. Data on tonnage only was obtained. Due to difficulties in the laboratory, juices did not clarify and sucrose contents of the juice and of the cane could not be determined. In terms of cane tonnage, most of the varieties performed very well, including PR 980 and PR 1028 both of which were used as check varieties.

Data on cane and sugar produced by the first ratoon crop is given in table 4 B. Selección Sóller, PR 65-2523, PR 1117, PR 1048, CB 49-260, PR 1152, PR 980 and PR 62-469 all yielded over 4 tons/acre of sugar. Among them, PR 1152, and PR 62-469 seem to be very promising with high quality juices (12.73 and 12.69%, sucrose respectively). These two varieties also have desirable growth habits.

As only cane tonnage production data are available for the second ratoon, the data are not included in the evaluation.

TABLE 4.—Mean yields of 28 sugarcane varieties in the experimental field at Consejo Farm

Rank	Variety	Sucrose Content	TCA <sup>1</sup>	TSA <sup>2</sup>	Relative value on TSA as compared to checks		Fiber content	Outyielded varieties in TSA (P = 0.05)
					PR980	PR1028		
		%					%	
<i>A. Plant cane crop 1972</i>								
1	PR 1048		61.9					
2	PR 1117		61.7					
3	PR 1152		61.6					
4	PR 62-285(I)		60.8					
5	PR 1028		57.8					
6	PR 980		56.6					
7	PR 65-2523		55.7					
8	PR 1002		55.7					
9	PR 65-292		54.7					
10	PR 62-469		54.1					
11	PR 63-227		53.7					
12	PR 64-2397		52.5					
13	Sel Soller		51.4					
14	Q 68		51.2					
15	PR 65-2507		49.9					
16	PR 65-1422		48.7					
17	PR 1141		48.5					
18	PR 62-626		48.4					
19	PR 1140		47.8					
20	CB 49-260		47.0					
21	PR 1248		46.3					
22	PR 1175		44.2					
23	CP 52-43		42.2					
24	PR 62-46		41.2					
25	PR 62-258		40.9					
26	Sel Manatí		40.4					

27	PR 65-246		37.9					
28	PR 63-1079		33.7					

*B. First ratoon crop 1973*

1	Sel Sóller	11.78	41.83	4.84	1.186	1.241	14.88	26 to 28
2	PR 65-2523	12.13	39.77	4.75	1.164	1.217	14.22	26 to 28
3	PR 1117	11.20	38.80	4.46	1.093	1.143	17.22	
4	PR 1048	12.24	35.60	4.36	1.068	1.117	14.58	
5	CB 49-260	11.82	35.62	4.30	1.053	1.102	14.60	
6	PR 1152	12.73	32.66	4.20	1.029	1.076	15.71	
7	PR 980	11.30	35.72	4.08	1.000	1.046	16.48	
8	PR 62-469	12.96	31.51	4.03	.987	1.033	16.36	
9	PR 1141	12.20	32.51	3.98	.975	1.020	15.14	
10	PR 65-292	12.55	31.29	3.96	.970	1.015	16.54	
11	PR 1028	12.63	30.98	3.90	.955	1.000	17.62	
12	PR 62-285(I)	11.55	32.83	3.81	.933	.976	15.44	
13	PR 64-2397	12.45	30.34	3.81	.933	.976	16.06	
14	PR 1002	12.30	31.49	3.81	.933	.976	16.33	
15	PR 65-246	11.89	32.06	3.79	.928	.971	15.21	
16	Sel Manatí	11.90	31.54	3.79	.928	.971	14.75	
17	PR 65-2507	12.83	29.99	3.68	.901	.943	14.34	
18	PR 63-227	12.75	27.83	3.61	.884	.925	14.06	
19	PR 62-626	11.18	31.01	3.55	.870	.910	18.30	
20	PR 1175	12.50	29.20	3.54	.867	.907	15.74	
21	CP 52-43	12.08	28.87	3.52	.862	.902	16.60	
22	PR 62-258	12.65	27.45	3.46	.848	.887	17.77	
23	Q 68	11.84	29.28	3.44	.843	.882	16.04	
24	PR 1248	11.25	28.59	3.18	.779	.815	14.93	
25	PR 1140	11.69	26.99	3.13	.767	.802	16.22	
26	PR 65-1422	11.83	25.86	2.94	.720	.753	14.25	
27	PR 62-46	12.30	22.76	2.79	.683	.715	16.18	
28	PR 63-1079	11.81	23.94	2.76	.676	.707	14.27	

Table 4.—Continued

Rank	Variety	Sucrose Content	TÇA <sup>1</sup>	TSA <sup>2</sup>	Relative value on TSA as compared to checks		Fiber content	Outyielded varieties in TSA (P = 0.05)
					PR 980	PR 1028		
		%					%	
<i>C. Second ratoon crop 1974</i>								
1	PR 1141		37.40					
2	Sel Söller		35.97					
3	PR 1152		35.50					
4	CB 49-260		35.10					
5	PR 1002		34.83					
6	PR 1117		34.27					
7	PR 980		32.72					
8	PR 62-258		31.97					
9	PR 62-285(I)		31.93					
10	PR 1048		31.18					
11	PR 65-2523		30.82					
12	PR 65-2507		30.70					
13	PR 1028		29.97					
14	PR 1140		29.42					
15	PR 62-626		29.36					
16	PR 1248		28.58					
17	PR 65-292		28.19					
18	PR 64-2397		27.87					
19	PR 63-227		27.21					
20	PR 62-469		26.16					
21	CP 52-43		25.14					
22	Sel Manatí		24.78					
23	PR 62-46		24.50					
24	Q 68		24.06					
25	PR 1175		23.45					
26	PR 63-1079		23.08					
27	PR 65-1422		22.54					
28	PR 65-246		21.57					



### RESUMEN

En los llanos costaneros de la zona norte húmeda de Puerto Rico, se seleccionaron tres sitios para evaluar el comportamiento de 57 nuevas variedades de caña de azúcar. Los experimentos se ubicaron en la finca San Francisco (carretera de Areíbo a Utuado), en la finca Las Claras, cerca del molino azucarero Cambalache y en la finca Consejo, Barrio Bajadero, en Arecibo. Los suelos donde se ubicaron los experimentos se clasifican como Coloso, Sabana Seca y Toa, respectivamente. Estos son suelos típicos de los llanos costaneros de la zona norte dedicados al cultivo de la caña de azúcar en Puerto Rico.

Una siembra de gran cultura y dos retoños se cosecharon en cada uno de los experimentos. Se recopiló información sobre germinación, ahijamiento, madurez, hábito de crecimiento, rendimiento y tonelaje de caña y azúcar producidos por acre. Los valores obtenidos con respecto a rendimiento y producción de caña y de azúcar por acre se analizaron estadísticamente por cosecha. También, donde se justificó, se sometieron a análisis estadísticos combinado los datos de la plantilla y los retoños.

En San Francisco, las variedades nuevas sobresalientes, fueron la PR 64-2548, PR 1152, PR 65-325 y la PR 1242. Estas produjeron más azúcar que las demás incluídas en el experimento. Tomando en consideración el hábito de crecimiento y el rendimiento, las variedades PR 1152 y PR 64-2705 parecen ser las más aceptables para la zona.

En la finca Las Claras, entre las nueve variedades superiores, las PR 1141 y PR 62-258 demuestran ser las más prometedoras, ya que producen rendimientos aceptables, tienen buenas características agronómicas y pueden cosecharse mecánicamente.

En la finca Consejo la PR 1152 parece ser la mejor, pues alcanzó un rendimiento superior y sobrepasó las 40 toneladas de caña por acre. También puede cosecharse mecánicamente.

La variedad PR 980 produjo un tonelaje por acre superior a la PR 1152, pero fue inferior en contenido de sacarosa. La calidad inferior de los jugos de la PR 980 y el crecimiento reclinado nos indica que esta variedad no es recomendable para los llanos costaneros de la zona húmeda del norte.

### LITERATURE CITED

1. González Molina, Carlos et al., Comportamiento agronómico de nuevas variedades de caña de azúcar en Puerto Rico, Est. Exp. Agr. Univ. P.R. Publicación 81, 1970.
2. Pringle, George C., Farm value of agricultural commodities by rank, Puerto Rico, 1973-74, Mimeogr. Rep. Agr. Exp. Sta. Univ. P.R., 1974.
3. Soil Conservation Service, USDA, Soil series of United States, Puerto Rico and the Virgin Islands: Their taxonomic classification, 1972.
4. Troche, Carlos, Información de Prensa Núm. 1120, Servicio de Estabilización y Conservación Agrícola, Area del Caribe, Departamento de Agricultura de los Estados Unidos, 1974.