

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

*Carlos L. González-Molina, Rafael Gandía-Caro, and  
Edwin Acevedo  
Borrero<sup>2</sup>*

## ABSTRACT

Performance of new sugarcane varieties was evaluated in two experiments in the western, humid, coastal plains of Puerto Rico. Results from the plant cane and the first and second ratoon of 30 varieties tested showed that PR 1140 and PR 62-469 are the best varieties for the Coloso Valley. They performed better than commercial varieties of the area, are suitable for mechanical harvesting, and produced sugar more economically.

In another 30-variety test in the Añasco Valley, PR 1141, PR 1140, PR 62-258 and PR 64-610 produced better juice quality than commercial varieties. They are high sugar producers and well adapted to mechanical harvesting. These six superior varieties are recommended for release as commercial varieties for the western region.

## INTRODUCTION

In 1973, about 141,740 acres of sugarcane were harvested in Puerto Rico with mean yields of only 26 tons of cane and 1.78 tons of sugar per acre. This is a decline of 17% cane and 15% sugar when compared to the 1972 crop (1). Most of the canes harvested in 1973 (81%) were ratoons.

For the Coloso and Igualdad Sugar Mills in the western, humid, coastal plains, the situation was as follows<sup>3</sup>: In 1973, Coloso Mill ground 469,282 tons of cane with a sucrose content of 6.423% for a total of 30,140 tons of sugar from 17,739 acres. In 1972, about 555,743 tons of cane were harvested containing 6.532% sucrose for a total of 36,302 tons of sugar. Igualdad Sugar Mill harvested 171,951 tons of cane in 1973 with a sucrose content of 6.201%, producing 10,663 tons of sugar from 6,956 acres. In 1972, the mill ground 218,373 tons of cane with 5.622% sucrose, producing 12,278 tons of sugar. In both mills the decline in tonnage and in sugar was of real economic importance.

The Commonwealth Department of Agriculture and the Agricultural Experiment Station, in view of the consistent decline in sugar production during the past fifteen years, combined efforts and initiated an accelerated sugarcane variety evaluation program throughout the Island in 1970<sup>4</sup>. Thirty six experiments were established to test the best

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<sup>2</sup> Plant Breeder, Associate Agronomist and Research Assistant, respectively, Agricultural Experiment Station, Mayagüez Campus, University of Puerto Rico, Río Piedras, P. R.

<sup>3</sup> Informe Anual, Junta Azucarera de Puerto Rico, 1972-73.

<sup>4</sup> Informes de Progreso, Programa de Evaluación Regional (Crash Program), Est. Exp. Agr. Univ. P.R., Río Piedras, P.R., 1971-72, 1973-74.

hybrid material from the 1961-1965 breeding cycle. In those areas, the main varieties grown commercially are PR 980, PR 1028 and PR 1002. Under present conditions, where most of the cane is harvested mechanically, these varieties present difficulties because they are not easily adaptable to mechanization. Also, the sugar content in the case of PR 980 is generally low, particularly when planted in poorly drained soils like some of those in the vicinity of the Coloso and Igualdad mills.

This paper reports the performance of new sugarcane varieties compared to commercial varieties of the region.

#### MATERIALS AND METHODS

Two experiments were conducted to evaluate yield potential and performance of new sugarcane varieties in the coastal, humid plains of western Puerto Rico. The varieties tested were obtained from the Agricultural Experiment Station introduction, breeding, and selection program.

The first experiment was established near the Coloso Sugar Mill in a Toa soil, a Fluventic Hapludolls, fine, mixed, isohyperthermic<sup>5</sup>. A rectangular lattice design was used with six replications and five treatments per block. The trial included 30 varieties planted in October 1970 (fall planting) and harvested in April 1972. The first ratoon crop was harvested in May 1973; the second ratoon was harvested in March 1974.

A second experiment was planted in the Añasco Valley, at Trinidad Farm, near the Igualdad Sugar Mill, in a Coloso soil, an Aeric Tropic Fluvaquents, fine, mixed, non-acid, isohyperthermic (3). Thirty varieties were included in a rectangular lattice design with six replications and five treatments per block. The experiment was planted in November 1970 (fall planting) and harvested in April 1972 at 17 months of age. The first ratoon crop was harvested at the end of April 1973; the second ratoon was harvested in February 1974. This crop had to be harvested at such a young stage because of an accidental fire.

At both sites, the Louisiana modified planting system with rows 5 1/2 ft apart was used. Plots were 22 × 20 ft, close to 1/100th of an acre. Planting, cultivation, fertilization, weeding, and crop protection followed the general practice of each area.

Performance of the varieties was observed and information taken on germination, stooling, growth habit (whether erect, semi-erect, or inclined), stalk characteristics (vigor, thickness, height, solidity, and lodging), ripening, ratooning, and other characteristics. The cane, hand cut, was burnt the day before harvesting.

<sup>5</sup>USDA Soil Conservation Service, Soil Series of the United States, Puerto Rico, and the Virgin Islands. Their taxonomic classifications.

Cane tonnage was recorded and sucrose and fiber were determined by the standard pol-ratio method. Yield results (sucrose content, cane tonnage, and sugar tonnage per acre) from each crop at each site were analyzed statistically. Combined statistical analyses, pooling together all three crops of each site, were also made

### RESULTS AND DISCUSSION

The economic status of the sugarcane industry in the western region depends to a very large extent on variety performance. Commercial varieties planted at present, such as PR 980, PR 1002, and PR 1028, are not well adapted to the prevailing ecological conditions of the area nor to mechanized cultivation and harvesting. Varieties of an intermediate cane tonnage (35 to 45 tons) and high sucrose content are best adapted to the region. High sucrose varieties can produce sugar more economically than high cane tonnage varieties because of the extra tonnage that has to be handled and processed with the latter. PR 980, the main commercial variety of the area, produces high cane tonnage, but poor juice quality. It does not perform well on the poorly drained soils of the western coast. PR 1028 and PR 1002 are early varieties that need to be harvested early in the season to avoid sucrose inversion. At present, there are no suitable intermediate varieties.

### COLOSO AREA

Table 1-A presents results on cane tonnage for the plant crop. Unfortunately, juice samples did not clarify enough for sucrose determinations. Results based on cane tonnage are not relevant to variety performance.

Results for the first ratoon crop are given in table 1-B. Varieties PR 1140, PR 63-227, PR 1251, PR 1059, and UCW 53-69 produced sucrose percentages (rendment) of 14.28, 13.99, 13.98, 13.59, and 13.51, respectively. That of PR 1140 was significantly higher than that of varieties PR 980, PR 1117, PR 1085, PR 1028, PR 62-258, and CP 52-43. No differences were found in sucrose content among the varieties highest in this property.

Sucrose content and cane tonnages are yield components of the total sugar recovered at the mill. An increase in cane tonnage without a corresponding increase in rendment reduces the economic benefits because of the extra cane tonnage that has to be processed. This can be seen in CB 49-260, which ranked fourth in total sugar produced. It was necessary to process 48.3 tons of cane with a rendment of 10.92% to produce 5.32 tons of sugar. But PR 1251 produced 5.46 tons of sugar from only 39 tons of cane with a 13.98% rendment. The cost of harvesting and transporting cane is about \$5.00 per ton. Thus an economic analysis

TABLE 1.—Mean yields of 30 sugarcane varieties in the experimental field at Coloso sugar mill

Rank	Variety	Sucrose content	TCA <sup>1</sup>	TSA <sup>2</sup>	Fiber content %
<i>A. Plant cane crop 1972<sup>3</sup></i>					
1	PR 1250		70.0		14.4
2	CB 49-260		62.6		16.7
3	PR 1085		59.6		17.4
4	CP 52-43		59.2		18.3
5	PR 65-192		59.1		16.3
6	PR 62-285 (I)		56.9		16.6
7	PR 1028		55.3		17.9
8	PR 980		55.1		16.6
9	PR 62-258		55.0		17.5
10	PR 1141		54.6		15.1
11	PR 64-2705		53.6		16.1
12	PR 1117		53.3		17.6
13	PR 1048		52.8		17.1
14	PR 65-292		52.7		15.5
15	PR 63-473		52.3		16.0
16	UCW 53-69		52.2		19.6
17	PR 65-325		51.3		16.2
18	PR 63-227		50.9		15.6
19	PR 62-469		50.8		17.5
20	PR 65-276		50.5		16.5
21	PR 1251 <sup>4</sup>		49.8		15.7
22	PR 1140		49.7		16.4
23	Q 68		47.6		16.3
24	Pr 1002		47.0		16.9
25	PR 62-456		46.9		15.6
26	PR 65-214		45.8		16.4
27	PR 61-902		45.4		16.9
28	PR 1016		45.0		16.0
29	PR 1059		44.1		16.2
30	PR 64-211		33.5		17.1
<i>B. First ratoon Crop (1973)</i>					
1	PR 1251	13.98	39.1	5.46 a <sup>5</sup>	16.5
2	PR 1141	13.05	41.6	5.44 a	17.5
3	PR 65-192	13.02	41.0	5.33 ab	16.8
4	CB 49-260	10.92	48.3	5.32 ab	18.0
5	PR 62-469	12.51	42.2	5.30 ab	18.5
6	PR 63-227	13.99	37.2	5.29 ab	16.8
7	PR 1140	14.28	36.5	5.20 ab	16.3
8	PR 63-473	12.90	40.6	5.17 ab	16.8
9	PR 62-285 (I)	12.54	39.7	5.15 ab	18.2
10	PR 61-902	12.83	37.2	4.97 ab	17.6
11	PR 1117	11.47	43.7	4.94 ab	19.0
12	PR 1048	12.27	41.5	4.94 ab	19.6
13	PR 1002	12.73	37.8	4.79 abc	18.0
14	PR 62-258	12.06	38.5	4.72 abc	20.0

TABLE 1.—Continued

Rank	Variety	Sucrose content	TCA <sup>1</sup>	TSA <sup>2</sup>	Fiber content %
15	PR 1085	11.36	40.9	4.61 abc	18.3
16	PR 980	12.07	37.2	4.48 abc	19.5
17	PR 65-292	13.22	32.3	4.32 abc	17.4
18	PR 65-325	11.20	37.3	4.30 abc	17.3
19	PR 1028	10.06	42.4	4.24 abc	19.9
20	PR 62-456	12.65	33.3	4.23 abc	17.1
21	PR 1059	13.59	28.6	4.16 abc	15.6
22	PR 1250	11.93	34.4	4.14 abc	15.7
23	PR 65-214	13.17	31.3	4.13 abc	18.4
24	PR 65-276	12.00	34.1	4.08 abc	17.5
25	PR 1016	13.04	31.1	4.07 abc	17.6
26	CP 52-43	10.84	37.5	3.95 bcd	17.9
27	PR 24-2705	13.42	29.9	3.87 bcd	16.5
28	UCW 53-69	13.51	29.0	3.86 bcd	19.7
29	Q 68	12.22	28.1	3.48 bcd	17.2
30	PR 64-211	11.96	23.7	2.74 d	19.2
<i>C. Second ratoon crop 1974</i>					
1	PR 1140	15.02	29.1	4.37 a	16.5
2	PR 1250	12.26	32.6	3.96 ab	17.2
3	CB 49-260	12.14	32.4	3.94 ab	17.3
4	PR 1016	14.31	27.3	3.89 ab	17.7
5	PR 1251	12.02	29.2	3.79 ab	17.4
6	PR 62-285 (I)	12.97	29.0	3.71 ab	18.7
7	PR 62-469	13.11	28.4	3.71 ab	19.1
8	PR 62-258	13.38	26.8	3.63 abc	19.6
9	PR 63-473	12.89	27.7	3.61 abc	16.3
10	PR 63-227	14.43	24.5	3.55 abc	17.2
11	PR 1085	13.44	26.2	3.55 abc	19.1
12	PR 64-2705	14.23	24.9	3.53 abc	17.7
13	PR 1002	13.41	26.1	3.51 abc	17.1
14	PR 1141	13.89	25.1	3.48 abc	17.7
15	PR 65-276	14.67	23.6	3.48 abcd	17.0
16	PR 62-456	13.47	25.6	3.39 abcd	18.3
17	PR 1028	11.04	28.8	3.23 bcde	19.7
18	PR 1117	11.32	27.9	3.18 bcde	20.4
19	CP 52-43	13.26	24.0	3.18 bcde	18.1
20	PR 980	11.03	28.5	3.17 bcde	19.7
21	PR 65-192	12.08	23.9	3.13 bcde	17.3
22	Q 68	14.16	21.9	3.09 bcde	18.3
23	PR 61-902	13.69	21.8	3.01 bcde	17.4
24	PR 1048	12.03	25.1	3.00 bcde	19.7
25	PR 65-325	12.94	23.1	2.92 bcde	17.4
26	PR 1059	14.52	19.7	2.83 bcde	17.1
27	PR 65-292	12.99	19.5	2.51 cde	17.1
28	PR 64-211	13.14	18.7	2.50 cde	20.2
29	UCW 53-69	13.04	18.1	2.38 de	19.4
30	PR 65-214	13.02	17.9	2.34 e	19.0

TABLE 1.—Continued

Rank	Variety	Sucrose content	TCA <sup>1</sup>	TSA <sup>2</sup>	Fiber content %
<i>D. Combined analyses</i>					
1	PR 1140	14.41	38.7	5.62 a <sup>6</sup>	16.4
2	CB 49-260	11.04	50.2	5.49 ab	17.3
3	PR 1250	12.02	45.9	5.35 abc	15.9
4	PR 62-285 (I)	12.58	42.0	5.32 abc	17.9
5	PR 62-469	12.89	40.8	5.29 abc	18.4
6	PR 63-227	13.77	37.8	5.25 abc	16.6
7	PR 63-473	12.84	40.2	5.24 abc	16.4
8	PR 1141	12.99	40.4	5.21 abc	16.8
9	PR 65-192	12.38	41.1	4.98 abcd	16.9
10	PR 62-456	13.14	35.2	4.75 abcd	17.1
11	PR 1085	11.68	42.2	4.74 abcd	18.3
12	PR 65-292	12.25	34.8	4.74 abcd	16.7
13	PR 1251	12.75	39.2	3.73 abcd	16.6
14	PR 61-902	13.53	34.7	4.71 bcd	16.4
15	PR 1048	12.18	39.1	4.62 bcd	17.8
16	CP 52-43	11.82	40.0	4.59 abcd	18.1
17	PR 65-325	12.28	37.4	4.58 abcd	17.0
18	PR 64-2705	13.08	36.3	4.56 abcd	16.3
19	PR 62-258 (I)	12.07	40.1	4.56 abcd	19.1
20	PR 980	11.24	40.6	4.53 bcd	18.7
21	PR 1016	13.37	34.5	4.53 bcd	17.1
22	PR 1002	12.43	36.5	4.50 bcd	17.4
23	PR 1117	11.11	41.1	4.44 bcd	19.2
24	PR 65-276	12.41	36.0	4.39 bcd	16.7
25	PR 1059	13.40	30.7	4.14 cd	15.7
26	Q 68	12.72	32.6	4.04 d	17.3
27	UCW 53-69	12.16	32.5	4.00 d	19.5
28	PR 65-214	12.56	31.2	3.92 e	17.0
29	PR 1028	9.62	42.2	3.84 e	17.4
30	PR 64-211	12.02	25.3	3.06 e	18.8

<sup>1</sup> Tons of cane per acre.<sup>2</sup> Tons of sugar per acre.<sup>3</sup> Pol-ratio analysis was not conducted due to clarification difficulties with the juice.<sup>4</sup> Permanent number given to Sel. Manatí.<sup>5</sup> Differences between values with the same letter are not significant.<sup>6</sup> Based on first and second ratoon data.

would indicate that the cost of producing one ton of sugar from CB 49-260 is significantly higher than that of varieties PR 1251, PR 1141, PR 65-192, PR 63-227, and PR 1140, whose rendments were more than 13%. Based on total sugar produced, PR 1251 and PR 1141 had significantly higher yields than CP 52-43, PR 64-2705, UCW 53-69, Q 68, and PR 64-211. However, no significant differences were observed among the first 25 varieties which produced from 4.07 to 5.46 tons of sugar per acre.

The results from the second ratoon crop are presented in table 1-C. PR

1140 again had the highest rendment, 15.02%, which was significantly higher than that of 17 varieties, including PR 980 and PR 1028. Four varieties, PR 65-276, PR 1059, PR 63-227, and PR 1016 produced rendments of 14.67, 14.52, 14.43, and 14.31%, respectively. The rendments of these four varieties were significantly higher than that of PR 980 and PR 1028, although there was no significant difference among the former. Tons of cane per acre were drastically reduced during the second ratoon, probably due to the adverse climatic conditions prevailing during the crop cycle. However, PR 1140 produced 4.37 tons of sugar, being significantly higher than that of 14 other varieties, including commercial varieties PR 980 and PR 1028. There was no difference in sugar tonnage among PR 1250, CB 49-260, PR 1016, and PR 1251 against PR 980 and PR 1028.

The general performance of the varieties could be detected with more reliability when the results of the various crops were pooled into a combined analysis, because some varieties performed very well during the plant cane crop, but productivity dropped in ratoon crops. The best varieties are those that can maintain a high production throughout the plant crop-ratoon crops cycle.

Results of the combined analysis are given in table 1-D. Rendments of PR 1140 were significantly higher than those of 22 other varieties, including the commercial checks PR 980, PR 1028, and PR 1002. Sugar production (5.62 tons/acre) was also significantly higher than the same commercial varieties. CB 49-260 and PR 1250, which were among the five top varieties, required 50.2 and 45.9 tons of cane to produce 5.49 and 5.35 tons of sugar per acre respectively. On the basis of economical sugar production, PR 1140 performed significantly better in the Coloso area than the other varieties. This variety exhibits an erect growth and is suited to mechanical harvesting. Its fiber content is rather low, 16.4%, the second lowest among the 30 varieties tested.

#### AÑASCO VALLEY

Results from the plant cane crop are presented in table 2-A. PR 1140 had the highest rendment (13.05%) among the 30 varieties tested. The difference was significant at the 5% level over 14 varieties, including PR 1016, PR 1028, and CP 52-43 that are grown commercially in the area. PR 65-109, PR 64-610, PR 65-292, and PR 64-211 had rendments over 12.5%. These were also significantly higher than those for PR 1016, PR 1028, and CP 52-43. In total sugar per acre, PR 1141 led with 6.19 tons of sugar, this being significant at the 5% level over commercial varieties PR 980, PR 1002, PR 1117, and CP 52-43.

Table 2-B presents results from the first ratoon crop. PR 1140 led again with a 14.83% rendment, significantly greater than commercial

TABLE 2.—Mean yield of 30 sugarcane varieties in the experimental field at Igualdad sugar mill

Rank	Variety	Sucrose content %	TCA	TSA	Fiber content %
<i>A. Plant cane crop 1972</i>					
1	PR 1141	12.41	48.7	6.19 a	15.2
2	PR 64-610	12.60	45.0	5.76 ab	15.7
3	PR 65-292	12.57	41.9	5.32 abc	17.2
4	PR 1028	10.61	49.4	5.24 abcd	20.7
5	PR 1048	11.70	42.3	4.96 abcde	16.5
6	PR 1050	11.09	45.2	4.95 abcde	16.0
7	PR 65-109	12.65	40.3	4.89 abcdef	14.0
8	PR 62-258	12.15	40.4	4.82 abcdef	20.1
9	PR 980	10.81	42.8	4.73 bcdef	17.1
10	PR 1148	9.93	48.1	4.70 bcdef	17.9
11	PR 1140	13.05	34.9	4.61 bcdef	16.0
12	PR 63-227	11.88	37.1	4.50 bcdef	15.5
13	CP 52-43	10.39	43.1	4.48 bcdef	18.3
14	PR 1002	11.57	37.5	4.33 cdef	18.1
15	PR 1117	10.71	40.1	4.31 cdef	18.1
16	PR 63-1079	12.12	35.6	4.28 cdefg	13.9
17	PR 62-195	10.03	40.2	4.12 cdefg	15.6
18	PR 1152	10.19	40.5	4.10 cdefg	17.2
19	PR 64-211	12.54	31.6	3.93 defg	18.9
20	CB 49-260	8.45	45.3	3.89 efgh	16.9
21	PR 1251	11.46	32.5	3.70 fgh	16.8
22	PR 65-276	8.73	42.8	3.61 fgh	15.7
23	PR 62-285 (I)	9.28	36.0	3.54 fgh	17.0
24	PR 62-46	10.74	34.2	3.53 fgh	17.0
25	PR 65-214	10.56	32.5	3.41 fgh	19.6
26	PR 1016	10.39	32.1	3.34 fgh	17.2
27	PR 1238	10.67	28.6	3.04 fgh	17.0
28	PR 62-456	9.68	28.9	2.87 fgh	18.2
29	PR 61-902	10.67	27.1	2.83 fgh	16.8
30	PR 65-246	9.87	25.4	2.47 h	15.6
<i>B. First ratoon crop 1973</i>					
1	PR 1140	14.83	40.6	6.01 a	16.2
2	PR 62-285 (I)	13.74	43.8	5.97 a	17.5
3	PR 1141	13.78	42.7	5.87 ab	16.4
4	PR 62-258	12.49	46.1	5.82 abc	17.9
5	PR 980	12.03	42.9	5.26 abcd	17.9
6	CB 49-260	10.13	50.1	5.10 abcde	16.6
7	PR 62-195	12.88	37.9	4.92 abcde	16.7
8	CP 52-43	12.00	40.6	4.91 abcde	16.5
9	PR 64-610	12.90	37.6	4.84 abcde	15.8
10	PR 65-292	13.39	45.5	4.75 abcde	17.1
11	PR 1002	12.31	39.0	4.74 abcde	18.1
12	PR 1148	12.44	37.4	4.64 bedef	17.5
13	PR 1016	14.19	32.5	4.62 bedef	16.9
14	PR 1152	12.14	37.8	4.61 bedef	17.0



TABLE 2.—Continued

Rank	Variety	Sucrose content %	TCA	TSA	Fiber content %
15	PR 1250	10.85	41.5	4.60 cdef	17.1
16	PR 1251	14.31	32.1	4.59 cdefg	16.4
17	PR 1028	12.22	37.3	4.57 cdefg	19.1
18	PR 1048	11.00	40.5	4.48 defg	17.1
19	PR 64-211	13.04	33.9	4.47 defg	18.5
20	PR 65-109	13.81	32.8	4.44 defgh	14.5
21	PR 62-46	13.37	29.5	4.00 defgh	17.1
22	PR 1117	12.59	30.3	3.80 efgh	19.8
23	PR 63-1079	13.76	27.7	3.79 efgh	14.5
24	PR 62-456	12.12	28.6	3.44 fgh	17.6
25	PR 65-246	12.52	27.3	3.43 fgh	16.3
26	PR 65-276	12.98	26.3	3.41 fgh	17.4
27	PR 1238	12.86	26.5	3.40 fgh	16.3
28	PR 63-227	11.21	29.5	3.40 fgh	19.2
29	PR 61-902	14.48	22.1	3.26 fgh	16.2
30	PR 65-214	12.50	25.6	3.19 h	17.8
<i>C. Second ratoon crop 1974</i>					
1	PR 1140	12.43	35.9	4.44 a	16.6
2	PR 980	10.71	38.8	4.14 ab	18.0
3	PR 62-258	11.11	38.0	4.04 abc	19.1
4	PR 1028	12.00	32.3	3.86 abc	18.7
5	PR 62-285 (I)	11.01	34.3	3.85 abc	17.5
6	PR 1141	12.43	31.5	3.78 abc	15.7
7	PR 64-610	12.94	28.3	3.69 abcd	13.7
8	PR 1002	10.53	34.8	3.65 abcde	18.0
9	PR 1048	10.85	32.4	3.49 bcdef	16.5
10	PR 1250	10.66	33.1	3.47 bcdef	15.3
11	PR 62-195	11.15	29.5	3.35 bcdef	15.5
12	CP 52-43	11.28	29.9	3.35 bcdef	16.6
13	PR 1251	12.19	25.1	3.23 bcdef	14.6
14	PR 1152	11.18	28.4	3.20 cdef	15.4
15	PR 1148	10.43	30.4	3.19 cdef	16.7
16	PR 63-1079	13.67	22.7	3.13 cdef	13.2
17	PR 1016	11.81	25.4	3.10 cdef	16.6
18	CB 49-260	9.30	30.7	2.86 defh	15.7
19	PR 65-292	10.81	26.6	2.85 defh	16.0
20	PR 65-109	12.60	21.2	2.78 efg	15.7
21	PR 62-46	12.43	21.6	2.78 fg	16.1
22	PR 62-456	10.48	26.1	2.76 fg	18.2
23	PR 64-211	11.28	22.8	2.73 fg	18.6
24	PR 1117	10.23	25.4	2.69 fg	18.7
25	PR 63-227	11.79	24.1	2.65 fg	15.8
26	PR 61-902	11.51	22.5	2.61 g	17.0
27	PR 65-246	11.19	19.1	2.12 gh	15.7
28	PR 65-276	11.75	17.5	2.09 gh	17.0
29	PR 1238	11.42	17.5	2.00 gh	14.8
30	PR 65-214	11.17	13.8	1.51 h	18.0

TABLE 2.—Continued

Rank	Variety	Sucrose content %	TCA	TSA	Fiber content %
<i>D. Combined Analyses</i>					
1	PR 1141	13.21	41.0	5.30 a	15.8
2	PR 1140	13.45	37.2	5.02 ab	16.3
3	PR 62-258	12.02	41.5	4.82 abc	19.0
4	PR 64-610	12.84	37.0	4.76 abcd	15.1
5	PR 980	11.21	41.5	4.74 abcd	17.7
6	PR 1028	11.61	39.7	4.55 abcde	19.5
7	PR 62-285 (I)	11.31	38.0	4.50 bcdef	17.3
8	PR 65-292	12.31	34.6	4.32 bcdef	16.8
9	PR 1048	11.17	38.4	4.31 bcdef	16.7
10	PR 1250	10.79	39.9	4.30 bcdef	16.1
11	PR 1002	11.48	37.1	4.23 bcdefh	18.1
12	CP 52-43	11.43	37.8	4.21 cdefg	17.1
13	PR 1148	10.94	38.6	4.20 cdefh	17.3
14	PR 62-195	11.30	35.9	4.16 cdefh	16.3
15	PR 65-109	12.97	31.4	4.07 cdefg	14.7
16	PR 1152	11.20	35.5	3.97 defg	16.5
17	PR 1251	12.52	29.9	3.95 defg	16.0
18	CB 49-260	9.32	42.0	3.95 deg h	16.4
19	PR 63-1079	12.31	28.7	3.83 fg	13.9
20	PR 64-211	12.19	29.4	3.71 gh	18.5
21	PR 1016	11.96	30.0	3.66 gh	16.9
22	PR 1117	11.14	31.9	3.65 gh	18.9
23	PR 63-227	11.83	30.5	3.55 gh	16.9
24	PR 62-46	12.19	28.4	3.46 ghi	16.7
25	PR 62-456	10.71	27.9	3.05 hi	18.0
26	PR 65-276	11.17	28.9	3.02 hi	16.7
27	PR 61-902	12.21	23.9	2.931 hi	16.7
28	PR 1238	11.63	24.2	2.83 i	16.0
29	PR 65-214	11.39	24.0	2.73 i	18.5
30	PR 65-246	11.17	23.9	2.68 i	15.8

varieties such as PR 980, PR 1002, PR 1028, PR 1048, PR 62-258, PR 1117, and CP 52-43. PR 61-902 and PR 1251 ranked second and third with rendments of 14.48 and 14.31%, respectively. They also were significantly higher than the same commercial varieties. As to sugar per acre, PR 1140 and PR 62-285 (I) produced 6.01 and 5.97 tons, respectively, which was significantly higher than commercial varieties except PR 980, PR 1002, PR 62-258, and CP 5243. PR 1141 and PR 62-258 ranked third and fourth and were significantly better than PR 1028, PR 1048, and PR 1117, except that PR 62-258 was higher than PR 1028. No significant differences were observed among the first 11 varieties.

Results from the second ratoon crop are presented in table 2-C. As stated earlier, this crop was harvested at 9 months because of an unexpected fire. Cane was harvested and sampled for pol-ratio analysis. It is possible that some varieties were not mature when burned. How-

ever, in most cases high sucrose varieties kept their juice quality, but differences were not great enough to establish statistical significance. PR 63-1079 had the best rendment, 13.67%, which was significantly higher than that of 19 varieties, including five commercial varieties of the area. PR 64-610, PR 65-109, PR 1140, and PR 1141 were among the best performers with rendments of 12.94, 12.60, 12.43, and 12.43%, respectively, although no significant differences were observed among them.

Table 2-D shows results of the combined analyses. No significant differences were observed in tons of sugar per acre among the first eight varieties. Five of them, PR 1140, PR 1141, PR 63-1079, PR 65-109, and PR 64-610, produced rendments of 13.45, 13.21, 13.21, 12.97, and 12.84%, respectively. These differences were significantly greater than those produced by the commercial varieties PR 980, PR 1002, PR 1028, PR 1048, and PR 1117. Evidently, these five experimental varieties produced better juice quality than the commercial varieties grown in this area during the past 20 years. When total sugar per acre is considered, PR 1141, PR 1140, PR 62-258, and PR 64-610 were significantly better than 24 of the varieties tested, but not above PR 980 and PR 1028.

In addition to the high sugar producing capacity of varieties PR 1141, PR 1140, PR 62-258, and PR 64-610 there were other desirable characteristics such as good germination, tillering, and closing ability. They produce sugar more economically than present commercial varieties. They also are suited to mechanical harvesting. Fiber content for the new varieties is within factory standards: 15.8, 16.3, and 15.1% for PR 1141, PR 1140, and PR 64-610, respectively.

The experimental results indicate that in order to establish an efficient sugarcane industry in the western region, new superior varieties should be released. Based on these tests, PR 1140 and PR 62-469 were the best varieties for the Coloso area and PR 1140, PR 1141, PR 62-258, and PR 64-610 were the best for the Igualdad area.

#### RESUMEN

En las zonas de los molinos azucareros Coloso e Igualdad, localizados en los llanos costaneros del oeste de Puerto Rico, se establecieron dos experimentos para evaluar 30 nuevas variedades de caña de azúcar en cada zona.

En la zona de Coloso, el experimento se sembró en un suelo Toa y en el Valle de Anasco (Igualdad), en uno Coloso. Se cosecharon una siembra de gran cultura y dos retoños en cada lugar. Se anotaron el tonelaje de caña, contenido de sacarosa y azúcar por acre, los cuales se analizaron estadísticamente. También se anotaron las características agronómicas de la siembra inicial y de los retoños de las variedades, incluyendo germinación, desarrollo inicial, características del tallo (grosor, solidez, inclinación), madurez, floración y retoñamiento.

Del análisis de los datos se desprende que las variedades más recomendables para la zona de Coloso son la PR 1140 y la PR 62-469, ambas de alto rendimiento y que pueden cosecharse mecánicamente.

Las variedades PR 1140, PR 1141, PR 62-258 y PR 64-610 produjeron los mejores rendimientos en el Valle de Anasco. Estas nuevas variedades son más eficientes en la producción de azúcar, además de adaptarse bien al corte mecanizado.