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## Sugarcane Variety Trials in Puerto Rico, 1951-55

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### INTRODUCTION

The adoption of new varieties by the farmer has been one of the major reasons for our advancement in agriculture throughout the centuries. New varieties have given man greater yields, better quality of product, plants resistant to diseases and insects, and plants able to tolerate wide variations in climate and soil. This has been especially true of sugarcane.

The need for new sugarcane varieties has led to never-ending work of the agricultural experiment stations to provide them for the farmer. However, to insure that the varieties provided the farmer are superior in sugar-yielding power to existing varieties, that they have high disease resistance, and that they possess desirable agronomic qualities, the varieties to be compared are subjected to field trials. Since its establishment, in 1910 as the Sugar Cane Experiment Station, the Agricultural Experiment Station of the University of Puerto Rico has been devoted to the task of developing and testing new sugarcane varieties for Puerto Rican use. Today, almost 50 years later, modern scientific techniques have refined the field-testing and enabled us to make more accurate comparisons. However, the task still remains the same: to find new sugarcane varieties which will yield more sugar per acre than those now in commercial use.

### PROCEDURE

The sugarcane variety trials planted and harvested for the period 1951-55 were included in 19 separate experiments totalling 33 crops (see fig. 1) located at various sites in the Island. For convenience of presentation, as well as for reader's convenience, these experiments have been grouped arbitrarily into geographic areas (see table 1). For six of the experiments a plant crop and two ratoons were harvested; two experiments included a plant cane and one ratoon; and 11 experiments were on plant canes only.

<sup>1</sup> Agronomists of the Agricultural Experiment Station, University of Puerto Rico, Río Piedras, P. R. The authors wish to acknowledge the cooperation of those members of the Agronomy and Horticulture Department, past or present, and other cooperators who assisted in carrying out the fieldwork.

These 11 plant-cane experiments will be continued for two ratoons. The new data will then be reported in forthcoming variety-trial reports.

All experiments were laid out in the field in lattice designs with from six to eight replications. Twenty-five varieties were used in each experiment. The majority of the varieties used were seedlings developed by the Agricultural Experiment Station at Río Piedras. Some imported Barbados and Hawaiian varieties were also included as checks in every experiment with from one to three commercial varieties commonly grown in the area where the field trials were conducted. The commercial varieties used for comparison were M. 336, B. 37161, P.O.J. 2878, P.R. 902, and M. 275. The size of the cane plot for a replication consisted normally of four rows of

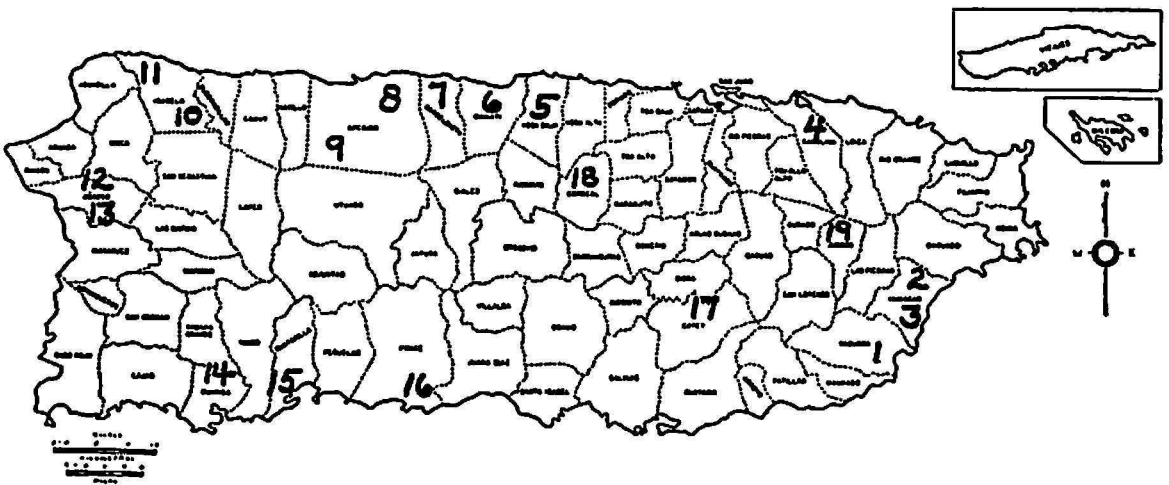


FIG. 1.—The location of the 19 sugarcane variety experiments performed by the Agricultural Experiment Station, University of Puerto Rico, Río Piedras, P. R. (1951-55).

cane 24 feet in length and 4 feet apart, comprising an area of 18 by 24 feet or approximately one one-hundredth of an acre.

The agronomic management of the cane was similar to the current commercial practices used in the area where the experiment was located. The fertilizer analyses used, rates of application, and other information pertaining to soils and rainfall were given at the bottom of the table reporting each experiment, in a footnote or otherwise.

The harvested cane from each plot was weighed using a special portable crane. From each plot 10 whole canes, minus tops, were selected at random, properly tagged, and sent to the hydraulic mill of the Station at Río Piedras for determination of their available sucrose content. All cane samples were milled not later than 24 hours after cutting.

A hydraulic Squier mill was used which had two rollers, each measuring 12 by 16 inches. These rollers averaged 6.4 revolutions per minute, using a 10-horsepower electric motor (3)<sup>2</sup>. The rollers exerted a pressure of 29

<sup>2</sup> *Italic numbers in parentheses refer to Literature Cited, p. 160.*

TABLE 1.—Location, number of crops, soil type, and date of variety field trials with 33 crops of sugarcane in different areas of Puerto Rico<sup>1</sup>

Location	Number of crops		Soil type	Years
	Plant cane	Ratoon		
<i>East</i>				
1. Colonia Laura, Central Roig, Yabucoa	1	0	Talante sandy loam	1953-55
2. Colonia Mandry, Eastern Sugar Associates, Humacao	1	0	Piñones clay	1953-55
3. Colonia Santa Teresa, Eastern Sugar Associates, Humacao	1	2	Josefa clay	1951-55
<i>Northeast</i>				
4. Colonia Buena Vista, Land Authority of P. R., Carolina	1	2	Coloso silty clay	1951-55
<i>North Central</i>				
5. Colonia Doña Inés, Land Authority of P.R., Vega Baja	1	0	Coloso silty clay loam	1953-55
6. Colonia Santa Rita, Central Monserrate Manatí	1	2	Toa silty loam	1952-55
7. Colonia Catalana, Land Authority of P.R., Barceloneta	1	2	Toa loam	1951-55
8. Barrio Garrochales, A. Márquez, Arecibo	1	2	Espinosa sandy clay	1952-55
9. A. Fraticelli farm, Arecibo	1	0	Coloso silty clay	1953-55
<i>Northwest</i>				
10. Barrio Guerrero, Agr. Exp. Station, Isabela	1	0	Coto clay	1954-55
11. Barrio Arenales Bajo, F. Juliá, Isabela	1	1	do.	1953-55
<i>West</i>				
12. Colonia Librada, García Méndez, Añasco	1	0	Fortuna clay loam	1953-55
13. Comunidad Pagán, Añasco	1	0	do.	1952-54
<i>South</i>				
14. Hacienda Santa Rita, Land Authority of P. R., Guánica	1	0	San Antón clay loam	1953-55
15. Colonia Central, Central Rufina, Guayanilla	1	1	Santa Isabel silty loam	1952-55
16. Colonia Boca Chica, Central Mercedita, Ponce	1	0	San Antón silty clay loam	1953-55

TABLE 1.—Continued

Location	Number of crops		Soil type	Years
	Plant cane	Ratoon		
<i>Interior</i>				
17. Colonia Factoría, Eastern Sugar Associates, Cayey	1	0	Juncos clay	1953-55
18. Barrio Padilla, Agr. Exp. Station, Corozal	1	2	Lares clay	1951-55
19. Colonia Batey, Central Juncos, Juncos	1	0	Via sandy clay loam	1953-55

<sup>1</sup> 25 varieties were used in each experiment.

tons per square inch for the extraction of the juice from the cane passing through them. Each cane sample was milled once and the bagasse also passed through once.

All yield results were statistically analyzed. For the sake of brevity and clarity only the leading four varieties in each experiment site, plus the commercial variety used in the experiment, were then arranged in tabular form. The ranking given to the varieties in each experiment in the tables applies to the rank held when all 25 varieties were compared. Thus, if M. 336 has a rank number of 16, this means that it ranked sixteenth when compared with all 25 varieties tested in that particular trial. Least significant differences given for tons of 96° available sugar per acre are based also on all 25 varieties tested in each trial.

## RESULTS

### AVAILABLE 96° SUGAR

In the East, the Barbados varieties B. 37161, B. 37172, B. 40105, and B. 41227 were the leading varieties occupying first or second place in all three experiments in this area (table 2). The commercial check variety M. 336 ranked poorly, as did P.O.J. 2878.

For the one experiment in the Northeastern Area, H. 328560 ranked first with B. 41227 and B. 37161 second and third in tons of sugar yielded per acre.

B. 37161 appeared first in two of the five experiments in the North Central Area. H. 328560, P.R. 980, and B. 40105 each ranked first in single experiments. B. 41227 and B. 37172 ranked second and third in separate experiments. Commercial variety M. 336 made a poor showing in this area ranking from twelfth to seventeenth.

TABLE 2.—Ranking of varieties and their yields of available 96° sugar per acre for sugarcane variety trials in Puerto Rico, 1951–55

Location <sup>1</sup>	First		Second		Third		Fourth		Commercial check			L.S.D. 5-percent <sup>3</sup>
	Variety	Sugar	Variety	Su- gar	Variety	Su- gar	Variety	Su- gar	Variety	Su- gar	Rank <sup>2</sup>	
		Tons		Tons		Tons		Tons		Tons		
East												
1	B. 37161	16.2	B. 37172	14.3	P.R. 968	13.5	P.R. 1000	12.3	M. 336	11.0	10	2.35
2	B. 40105	9.4	B. 37171	9.1	B. 37161	9.0	P.R. 980	8.5	M. 336	5.5	15	1.30
3	B. 41227 <sup>4</sup>	9.3	B. 37161	8.7	C.A. 38102	7.4	P.R. 1000	7.2	P.O.J. 2878	7.0	7	1.20
Northeast												
4	H. 328560	8.7	B. 41227	8.0	B. 37161	7.6	C.A. 38102 <sup>5</sup>	7.3	P.O.J. 2878	6.2	12	.95
North central												
5	B. 37161	13.3	P.R. 1000	12.8	P.R. 980	12.6	P.R. 968	12.3	M. 336	8.4	12	1.25
6	B. 37161	8.9	H. 328560	8.8	C.A. 3874	8.0	B. 37172	7.9	M. 336	6.7	14	.90
7	H. 328560 <sup>5</sup>	11.7	B. 41227	10.8	B. 37161	10.6	P.R. 1000	10.2	M. 336	6.6	16	1.55
8	P.R. 980	7.1	B. 40105	7.0	B. 41227	6.3	P.R. 963	6.3	M. 336	4.7	17	.95
9	B. 40105	17.9	B. 37172	16.7	P.R. 980	16.3	H. 328560	15.6	M. 336	10.4	16	1.60
Northwest												
10	P.R. 980	6.8	P.R. 999	6.7	B. 4362	6.7	P.R. 975	6.7	P.R. 902	5.8	9	1.00
11	P.R. 980	7.0	H. 328560	6.4	P.R. 965	6.0	P.R. 963	5.7	P.R. 902	4.5	16	.75
West												
12	P.R. 980	9.6	P.R. 968	9.4	B. 37172	8.8	P.R. 975	8.5	P.O.J. 2878	6.2	18	1.10
13	P.R. 980	8.2	B. 37161	7.4	B. 37172	7.3	P.R. 954	6.9	M. 336	4.8	14	1.15
South												
14	B. 37161	17.0	P.R. 975	15.3	B. 40105	14.8	B. 41227	14.8	M. 336	8.9	16	1.70
15	P.R. 980	11.0	B. 41227	10.4	B. 41211 <sup>5</sup>	10.0	P.R. 1000	9.9	M. 336	7.8	20	1.25
16	P.R. 980	15.1	P.R. 975	15.0	B. 37161	14.2	H. 328560	14.2	M. 336	11.6	17	1.80
Interior												
17	P.R. 975	11.30	P.R. 980	11.3	B. 37161	11.3	B. 40105	10.6	P.O.J. 2878	8.6	16	1.05
18	H. 328560	8.6	B. 41227	8.3	B. 37161	8.1	B. 41211	8.0	M. 336	5.5	11	1.05
19	P.R. 980	6.1	B. 37172	5.3	P.R. 975	5.0	P.R. 970	5.0	M. 336	2.4	23	.90

<sup>1</sup> Numbers refer to locations given in table 1 and fig. 1.

<sup>2</sup> The rank of the commercial variety as compared with the other 24 varieties tested in that location.

<sup>3</sup> Least significant difference in tons of sugar per acre needed for comparing the varieties listed in that location.

<sup>4</sup> B. 4098 which ranked first was excluded because of its high cane-mosaic susceptibility.

<sup>5</sup> B. 34104 which held this rank was excluded because of its high cane-mosaic susceptibility.

The first-ranking variety for the Northwest was P. R. 980 with the check variety P. R. 902 ranking very poorly as compared to the yields of P. R. 980.

For the West, P.R. 980 was also the leading variety, with P.R. 968 and B. 37161 second and B. 37172 third. Both check varieties P.O.J. 2878 and M. 336 ranked very low in these trials.

In the irrigated cane lands of the South of Puerto Rico, P.R. 980 ranked first in two of the three experiments in this area. In the Guánica experiment (No. 14, table 2), B. 37161 ranked first. P.R. 975 held second place in the South. Check variety M. 336 did very poorly here, ranking from sixteenth to twentieth.

The Interior Area of the Island had P.R. 980, P.R. 975, and H. 328560 all in first place in separate experiments. B. 41227, B. 37172, and B. 37161 all made good showings in this area. Check variety P.O.J. 2878 and M. 336 were significantly outyielded in tons of sugar.

#### TONS OF CANE

High cane tonnage per acre always looks impressive to the grower. If this high tonnage is coupled with high sucrose the benefits to the grower are great. On the other hand, if high tonnage is coupled with low sucrose values, the benefits realized are less. However, for those growers whose interests are in high cane-tonnage production per acre, the results of the variety trials are summarized for tons of cane per acre in table 3.

The two outstanding varieties in tons of cane per acre were B. 37161 and P.R. 980. In the East and North Central B. 37161 made its strongest showing ranking first in four out of the eight trials, second in two trials, and fourth in one trial.

P.R. 980 was the leading variety in cane tonnage for the Northwest, West, South, and Interior Areas placing first in 8 of the 10 trials in these areas.

B. 41227 ranked first in the Northeast and in one trial in the East and Interior Areas.

H. 328560 and B. 37172 also did well in cane tonnage production.

All commercial check varieties did poorly in tons of cane per acre as compared to the leading varieties.

#### SUCROSE-PERCENT-CANE

Undoubtedly the production of the highest yield of sugar per acre may be the farmer's goal, but he always has shown a great preference for sugar-cane varieties with high sucrose content. This preference for a "sweet" cane variety has at times made certain varieties commercially acceptable even though their tonnage-of-cane performance was not outstanding. This

TABLE 3.—Ranking of varieties and their yields of tons of cane per acre for sugarcane variety trials in Puerto Rico, 1951-55

Location <sup>1</sup>	Ranking of varieties and their yields of tons of cane per acre										
	First		Second		Third		Fourth		Commercial check		Rank <sup>2</sup>
	Variety	Cane	Variety	Cane	Variety	Cane	Variety	Cane	Variety	Cane	
	Tons		Tons		Tons		Tons		Tons		
East											
1	B. 37161	115	B. 37172	106	P.R. 968	95	P.R. 1000	93	M. 336	74	11
2	B. 37161	72	B. 40105	71	B. 37172	70	P.R. 980	67	M. 336	40	19
3	B. 41227	77	B. 37161 <sup>3</sup>	71	C.A. 38102	61	P.R. 1000	59	P.O.J. 2878	58	5
Northeast											
4	B. 41227	57	H. 328560	57	C.A. 3874	53	B. 37161	52	P.O.J. 2878	45	12
North Central											
5	B. 37161	107	P.R. 980	102	P.R. 1000	99	P.R. 968	91	M. 336	60	13
6	B. 37161	68	H. 328560	67	B. 37172	64	C.A. 3874	64	M. 336	48	18
7	H. 328560 <sup>4</sup>	91	B. 37161	86	C.A. 3874	86	B. 41227	85	M. 336	51	16
8	P.R. 980	58	B. 40105	56	B. 41227	53	P.R. 963	51	M. 336	34	21
9	B. 40105	148	P.R. 980	131	B. 37172	128	B. 37161	126	M. 336	72	17
Northwest											
10	P.R. 980	56	B. 41227	51	P.R. 999	50	P.R. 975	49	P.R. 902	45	10
11	P.R. 980	54	H. 328560	46	P.R. 965	43	B. 40105	42	P.R. 902	34	16
West											
12	P.R. 980	63	B. 37172	60	P.R. 970	60	P.R. 968	59	P.O.J. 2878	42	17
13	P.R. 980	59	B. 37161	58	B. 37172	57	P.R. 1000	49	M. 336	30	17
South											
14	B. 37161	129	B. 40105	119	P.R. 980	114	B. 41227	113	M. 336	61	22
15	P.R. 980	94	B. 41211	88	B. 41227	87	B. 37161 <sup>4</sup>	82	M. 336	59	23
16	P.R. 980	119	B. 37161	113	B. 37172	107	H. 371933	106	M. 336	78	20
Interior											
17	P.R. 980	78	B. 37161	77	B. 40105	73	B. 37172	73	P.O.J. 2878	61	16
18	B. 41227	70	B. 37161	65	H. 328560	63	P.R. 973	63	M. 336	48	13
19	P.R. 980	43	B. 37172	41	P.R. 999	38	P.R. 973	37	M. 336	21	22

<sup>1</sup> Numbers refer to locations given in table 1 and fig. 1.

<sup>2</sup> The rank of the commercial variety as compared with the other 24 varieties tested in that location.

<sup>3</sup> B. 4098 which held this rank was excluded because of its high cane-mosaic susceptibility.

<sup>4</sup> B. 34104 which held this rank was excluded because of its high cane-mosaic susceptibility.

TABLE 4.—*Ranking of varieties and their yields of sucrose-percent-cane for sugarcane variety trials in Puerto Rico, 1951-55*

Location <sup>1</sup>	Ranking of varieties and their yields of sucrose-percent-cane										
	First		Second		Third		Fourth		Commercial check		
	Variety	Sucrose	Variety	Sucrose	Variety	Sucrose	Variety	Sucrose	Variety	Sucrose	Rank <sup>2</sup>
		<i>Percent</i>		<i>Percent</i>		<i>Percent</i>		<i>Percent</i>		<i>Percent</i>	
East											
1	B. 4362	15.21	P.R. 975	14.84	M. 336	14.83	P.R. 968	14.09	M. 336	14.83	3
2	M. 336	13.71	P.R. 975	13.33	H. 328560	13.21	B. 40105	13.13	M. 336	13.71	1
3	M.L. 318	13.70	M. 336	13.66	P.R. 955	13.36	P.R. 902	12.78	P.O.J. 2878	12.01	13
Northeast											
4	M.L. 318	15.26	H. 328560	15.20	P.R. 961	15.07	P.R. 902	15.06	P.O.J. 2878	13.68	18
North Central											
5	M. 336	13.96	B. 4362	13.79	P.R. 975	13.76	H. 328560	13.65	M. 336	13.96	1
6	M. 336	14.01	P.R. 916	13.74	P.R. 929	13.30	S.H. 59-9 <sup>3</sup>	13.25	M. 336	14.01	1
7	P.R. 961	13.84	H. 328560	12.83	M.L. 318	12.82	P.R. 955	12.79	M. 336	12.73	5
8	M. 336	13.71	P.R. 929	13.56	P.R. 907	13.53	P.R. 916	13.45	M. 336	13.71	1
9	P.R. 1007	13.97	M. 336	13.38	P.R. 967	13.37	P.R. 975	13.19	M. 336	13.38	2
Northwest											
10	B. 4362	13.69	P.R. 1007	13.69	P.R. 975	13.60	P.R. 967	13.49	P.R. 902	12.66	12
11	P.O.J. 3016	14.58	P.R. 975	14.31	P.R. 965	14.12	P.R. 929	13.98	P.R. 902	13.42	10
West											
12	P.R. 1007	16.83	P.R. 975	16.74	H. 328560	16.35	P.O.J. 3016	16.22	P.O.J. 2878	14.53	16
13	M. 336	15.58	P.R. 902	15.16	P.R. 907	15.03	P.R. 947	14.92	M. 336	15.58	1
South											
14	P.R. 975	14.81	M. 336	14.27	B. 4362	14.26	H. 328560	14.23	M. 336	14.27	2
15	P.R. 907	14.42	M. 336	13.81	P.R. 951	13.42	P.R. 929	13.23	M. 336	13.81	2
16	B. 4362	14.51	M. 336	14.37	P.R. 975	14.26	P.R. 1007	14.10	M. 336	14.37	2
Interior											
17	P.R. 975	15.97	P.R. 968	15.49	B. 4362	15.07	H. 328560	14.76	P.O.J. 2878	14.19	14
18	P.R. 984	13.85	H. 328560	13.56	M. 336	13.48	M.L. 318	13.16	M. 336	13.48	3
19	P.R. 975	14.68	P.R. 967	14.32	P.R. 968	14.20	P.O.J. 3016	13.96	M. 336	11.03	23

<sup>1</sup> Numbers refer to locations given in table 1 and fig. 1.

<sup>2</sup> The rank of the commercial variety as compared with other 24 varieties tested in that location.

<sup>3</sup> A seedling from the Agricultural Experiment Station, Río Piedras, P. R.



desire is not without reason, for a higher sucrose-percent-cane means a more concentrated product that the farm can harvest at lower costs. In view of this, the varieties with the highest sucrose-percent-cane in each trial were averaged, and a summary of the leading varieties is presented in table 4.

For the East, M. 336, B. 4362, M.L. 318, and P.R. 975 were the leading varieties in sucrose content.

M.L. 318 ranked first for the Northeast.

The North Central had M. 336 first in three out of the five trials, second in one, and fifth in another. P.R. 975, which was tested in only two trials in this area, ranked third and fourth in these trials. For the North Central Area, M. 336 still remained the best variety for sucrose-percent-cane pro-

TABLE 5.—*Ranking of the leading varieties tested in the different cane areas of Puerto Rico, in terms of sucrose-percent-cane*

Rank	Variety	Crops	Sucrose-percent-cane	Cane per acre per month (TCAM)
		<i>Number</i>	<i>Percent</i>	<i>Tons</i>
1	P.R. 975	12	14.32	4.19
2	B. 4362	9	14.26	3.86
3	M. 336	13	13.97	3.44
4	P.R. 1007	10	13.93	—
5	H. 328560	14	13.85	4.55
6	M.L. 318	4	13.84	—
7	P.R. 968	10	13.78	4.28
8	P.R. 967	10	13.64	3.96
9	P.O.J. 3016	12	13.54	—

duction. B. 4362, P.O.J. 3016, P.R. 1007, and P.R. 975 held first and second places in the two trials in this area.

In the West, P.R. 1007, M. 336, P.R. 975, and P.R. 902 ranked first and second.

The South had P.R. 975 first in one trial with B. 4362 and P.R. 907 first in the other two trials. M. 336 was second in all three trials.

P.R. 975 held first place in the two trials in which it was tested in the Interior. P.R. 984 was first in the trial. P.R. 975 was not included.

When the average sucrose-percent-cane contents were found for each variety, P.R. 975 and B. 4362 showed higher values than did M. 336 (table 5).

It is interesting to note that these two other varieties, P.R. 975 and B. 4362, not only had higher sucrose-percent-cane values than the favored commercial variety M. 336, but also were higher in tons of cane per acre per month (table 5). That is to say P.R. 975 and B. 4362 not only had high sucrose contents but were also outstanding producers of cane tonnage.

H. 328560 also showed high sucrose and cane-tonnage production, producing 1 ton or more per month than M. 336 with a sucrose-percent-cane value only 0.12 percent less.

TONS OF SUGAR PER ACRE PER MONTH (TSAM)

Inasmuch as varietal experiments usually have different times of planting and harvesting a comparison of any two experiments on a ton-of-cane or sugar basis may be misleading. The use of tons of sugar produced per

TABLE 6.—*A ranking of sugarcane varieties planted in Puerto Rico according to sugar per acre produced per month*

Rank	Variety	Crops	Sugar per month	Rank	Variety	Crops	Sugar per month
		<i>Number</i>	<i>Tons</i>			<i>Number</i>	<i>Tons</i>
1	P.R. 980	18	0.679	16	P.R. 967	10	0.544
2	B. 34104 <sup>1</sup>	11	.655	17	P.R. 965	5	.540
3	B. 37161	33	.640	18	B. 41211	16	.539
4	H. 328560	24	.629	19	B. 4098	18	.523
5	P.R. 963	5	.627	20	H. 371933	20	.506
6	B. 41227	33	.609	21	P.R. 954	17	.497
7	B. 37172	19	.608	22	P.O.J. 2878	11	.492
8	P.R. 975	14	.600	23	P.R. 973	25	.488
9	B. 40105	21	.598	24	P.R. 970	10	.481
10	P.R. 968	10	.589	25	M. 336	25	.480
11	P.R. 962	14	.557	26	P.R. 902	20	.478
12	C.A. 38102	14	.554	27	P.R. 961	13	.453
13	P.R. 1000	33	.554	28	P.R. 999	12	.439
14	C.A. 3874	17	.550	29	P.R. 905	4	.432
15	B. 4362	10	.549	30	M. 275	3	.332

<sup>1</sup> This variety is highly mosaic-susceptible. It should not be planted since this high yield was obtained with healthy planting material which is practically impossible to maintain in large-scale plantings.

acre per month as a basis allows a more suitable comparison to be made of variety experiments for any area or even between different sugar-producing countries.

The different varieties used in the experiments were ranked according to their production in tons of sugar per acre per month, after correcting for variations due to experiment location. The results are given in table 6.

P.R. 980 ranked first with an average yield of 0.679 ton for the 18 trials in which it was used out of a total of 38 trials performed. B. 37161 was second, having been used in every trial. B. 41227 and P.R. 1000 also were used in all 38 trials and ranked sixth and thirteenth, respectively. Of the commercial varieties used as checks, B. 37161 ranked third, P.O.J.

2878 was twenty-second, M. 336 twenty-fifth, P.R. 902 twenty-sixth, P.R. 905 twenty-ninth, and M. 275 thirtieth.

The first eight varieties produced 0.60 ton and over of sugar per acre per month, a commendable rate of sugar production. Varieties which produced

TABLE 7.—*Production of sugar per acre per month of some commercial and experimental cane varieties planted in Puerto Rico*

Varieties	Area planted (census 1955) <sup>1</sup>	Part of total area planted	Sugar per acre per month produced in experiments
	<i>Acre</i>	<i>Percent</i>	<i>Tons</i>
<b>Commercial</b>			
P.O.J. 2878	187,813	51.7	0.492
B. 37161 <sup>2</sup>	41,060	11.3	.640
M. 336	35,149	9.7	.480
P.R. 902	11,012	3.0	.478
B.H. 10(12)	7,981	2.2	.402
M. 275	7,184	2.0	.332
P.O.J. 2725	5,379	1.5	.290
B. 34104 <sup>3</sup>	5,006	1.4	.655
<b>Experimental</b>			
P.R. 980	284	0.07	.679
B. 37161	41,060	11.3	.640
H. 328560	2,637	.72	.629
P.R. 963	—	( <sup>4</sup> )	.627
B. 41227	1,251	.34	.609
B. 37172	396	.10	.608
P.R. 975	—	( <sup>4</sup> )	.600
B. 40105	239	.06	.598

<sup>1</sup> Based on variety census 1955 performed by Agricultural Economics and Rural Sociology Department, University of Puerto Rico, Río Piedras (1), P.R.

<sup>2</sup> B. 37161 was considered an experimental variety at the beginning of these field trials (1951). However, its rapid adoption by growers in the past 5 years gives this variety the status of a commercial cane.

<sup>3</sup> B. 34104 was considered an experimental cane variety at the beginning of these field trials (1951). Because of its high susceptibility to cane mosaic it was discarded by the Station from trials after 1953. However, despite the warnings of the Station, many growers adopted it for commercial use with disastrous results. At present almost all the cane of this variety still standing in Puerto Rico is ratoon cane.

<sup>4</sup> Less than 0.01 percent.

from 0.50 to 0.60 ton of sugar per acre per month ranked from ninth to twentieth. Producing below 0.50 ton were all commercial varieties tested, except B. 37161.

#### DISCUSSION

The results of these sugarcane variety trials cannot be considered satisfactory until the leading varieties have been accepted and planted by the

growers as commercial varieties. Unfortunately, in the past few decades the sugarcane growers in Puerto Rico have been slow in accepting new sugarcane varieties. Since the devastating sugarcane-mosaic epidemic of 1917-20, P.O.J. 2878 has emerged as the most popular cane variety in Puerto Rico. Resistance to change by many of the growers, especially those with small farms, has kept this variety in the majority of the cane acreage, even though many new varieties introduced and tested by the Agricultural Experiment Station has proven superior to it.

Table 7 shows the percentage distribution (1955-56) of commercial cane varieties in Puerto Rico. The production of these (in tons of sugar per acre per month) when used as check commercial varieties in the trials, is compared with the results secured with the leading experimental varieties. It is evident that all experimental varieties recommended are far superior in sugar production to the commercial varieties. Aside from B. 37161, which has gained some commercial acceptance (11.3 percent of total acreage), all commercial varieties now growing produce less than 0.50 ton of sugar per acre per month.

P.O.J. 2878 still occupies about 52 percent of the cane acreage of Puerto Rico. Grower reluctance to plant new varieties is such that the cane census of 1955-56 showed 91 percent of the cane land in Puerto Rico was in ratoons, almost all of which were of the older, poorer yielding commercial varieties. It has been calculated (2) that if the acreage planted to the older cane varieties were planted to the new leading experimental varieties presented, the present sugar produced in Puerto Rico could be grown on about two-thirds of the present cane acreage. Thus over 100,000 acres now in cane could be diverted to other urgently needed crops in Puerto Rico without decreasing sugar production.

The Agricultural Experiment Station of the University of Puerto Rico will continue to breed, introduce, and test better cane varieties for our Puerto Rican farmers. It remains for these farmers to accept these new varieties commercially so that they may obtain higher yields and greater profit on fewer acres.

#### SUMMARY

Sugarcane variety trials performed by the Agricultural Experiment Station, University of Puerto Rico, Río Piedras, P. R., During the period 1951-55, involved 19 separate experiments and 33 crops. The following results are significant:

1. In the production of available 96° sugar per acre B. 37161 was the outstanding variety of East and North Central cane areas of the Island. P.R. 980 was the leading variety in the Northwest, West, South, and Interior of Puerto Rico.

2. B. 40105, B. 37172, B. 41227, H. 328560, and P.R. 975 all were among the leading producers in tons of sugar per acre.

3. The check varieties M. 336, P.O.J. 2878, and P.R. 902, ranked poorly in the trials as compared with the leading varieties in tons of sugar produced per acre.

4. In terms of tons of cane per acre B. 37161 and P.R. 980 were the two leading varieties for the entire Island, with H. 328560, B. 41227, and B. 37172 also showing favorable cane-tonnage figures. All check varieties did poorly in tons of cane per acre as compared to the leading variety.

5. The varieties were also ranked according to their production of sucrose-percent-cane. P.R. 975 and B. 4362 were first and second, respectively. These two varieties also produced higher cane tonnage than the favored commercial variety M. 336, which ranked third.

6. Finally, the varieties were ranked according to the tons of sugar per acre produced per month, and P.R. 980 ranked first. The first eight experimental varieties produced over 0.60 ton of sugar per acre per month as compared with all commercial varieties, except B. 37161, which produced below 0.50 ton of sugar per acre per month.

7. The reluctance of Puerto Rican farmers to adopt the new cane varieties tested and proven superior to the old commercial varieties is very unprofitable to them. Yields are cited which show that if the land now used to grow the older cane varieties were planted to the new leading experimentally tested varieties discussed in this article, the present sugar crop in Puerto Rico could be produced on about two-thirds of the present acreage. This would release over 100,000 acres for other agricultural uses.

### RESUMEN

Las pruebas con variedades de caña de azúcar llevadas a cabo por la Estación Experimental Agrícola de la Universidad de Puerto Rico, Río Piedras, P. R., durante el período de 1951-55, incluyeron 19 experimentos separados y 33 cosechas. Los siguientes resultados son significativos:

1. En la producción de azúcar 96° disponible por acre, la variedad B. 37161 fué la más sobresaliente en las áreas de caña del Este y del Norte de la Isla. La P.R. 980 fué la más sobresaliente en las áreas del Noroeste, Oeste, Sur, e Interior de Puerto Rico.

2. Las variedades B. 40105, B. 37172, B. 41227, H. 328560, y P.R. 975 figuraron entre las mejores productoras de toneladas de azúcar por acre.

3. Las variedades M. 336, P.O.J. 2878, y P.R. 902, usadas como testigo, hicieron una pobre demostración en las pruebas, comparadas con las variedades sobresalientes en la producción de toneladas de azúcar por acre.

4. En términos de toneladas de caña por acre, las variedades B. 37161 y P.R. 980 fueron las dos más sobresalientes en toda la Isla, siguiéndoles con

altos tonelajes de caña las variedades H. 328560, B. 41227 y B. 37172. Todas las variedades usadas como testigo tuvieron rendimientos pobres de toneladas de caña por acre comparadas con las variedades sobresalientes.

5. Las variedades también fueron clasificadas de acuerdo a su producción de sacarosa en caña. P.R. 975 y B. 4362 ocuparon el primer y segundo lugar, respectivamente. Estas variedades también tuvieron mayores rendimientos en tonelaje de caña que la variedad comercial preferida M. 336, que figuró en tercer lugar.

6. Finalmente, las variedades fueron clasificadas según las toneladas de azúcar producidas por acre por mes y P.R. 980 ocupó el primer lugar. Las primeras ocho variedades sobresalientes produjeron por sobre 0.60 toneladas de azúcar por acre comparadas con todas las variedades comerciales (con excepción de la B. 37161) que produjeron por debajo de 0.50 toneladas de azúcar por acre por mes.

7. La renuencia de los agricultores puertorriqueños a adoptar las nuevas variedades de caña probadas y que han demostrado ser superiores a las viejas variedades comerciales, está resultando contraproducente. Según los datos sobre rendimientos lo demuestran, si la tierra que en la actualidad está sembrada de variedades viejas se sembrara con las nuevas variedades probadas experimentalmente que se presentan en esta publicación, la producción actual de azúcar en Puerto Rico podría lograrse en alrededor de dos terceras partes de la tierra que ahora está sembrada de caña. Esto permitiría que sobraran alrededor de 100,000 acres para otros usos agrícolas.

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