Corn Variety Trials on a Eutrustox in Puerto Rico[1, 2]

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ABSTRACT

Four corn (*Zea mays* L.) variety trials were conducted during 1976–78 at the Isabela Agricultural Experiment Substation near the northwest coast of Puerto Rico. The Pioneer brand hybrid X304C ranked highest in three experiments with yields of 9,782, 3,962 and 8,998 kg/ha of 15.5%-moisture grain, and was second only to X5800 (6,559 kg/ha) in a fourth trial with 5,856 kg/ha. Other leading hybrids were X304A, X304B, X306B, X105A, H638 and H652. While certain hybrids and local open pollinated varieties yielded significantly less, grain yields among the top ranked entries in each experiment were not significantly different.

INTRODUCTION

Innovative studies to test and demonstrate the transfer of agricultural technology from one tropical area to another on the basis of soil classification were initiated in 1975 by the University of Hawaii (UH) and the University of Puerto Rico (UPR). The two studies are collectively known as the Benchmark Soils Project (BSP). The rationale of the agrotechnology transfer concept and the BSP is discussed by Beinroth et al. (2) and in greater detail in BSP Progress Reports 1 and 2 (3, 4).

A standard test-crop was essential for use throughout the network of BSP experiments. Corn was selected, since it is one of the most important and widely adapted food crops in the developing world and because a wealth of fundamental knowledge relative to its production is already available for application. Requirements of the test-crop variety are that it be well adapted to the experiment locations, and that it be responsive to management inputs, and yield well.

In the past, open pollinated varieties such as Diente de Caballo and Mayorbela were commonly planted in Puerto Rico. These two cultivars are still grown, but recently higher grain yields have been reported for various commercial hybrids which respond well to more intensive management. Fox et al. (6) obtained grain yields during the summer of 1970 from Pioneer brand hybrid X306 ranging from 1,700 to 5,100 kg/ha with 0 to 134 kg/ha of N applied in experiments conducted on a Coto clay (Tropeptic Eutrustox) at Isabela, Puerto Rico; they also reported yields

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up to 6,300 kg/ha for the same season on a Catalina clay (Tropeptic Haplorthox) at Barranquitas in the interior uplands of the island. Later, X306B and hybrid Funks G 795W produced up to 6,100 and 5,000 kg/ha, respectively, on a Bayamón sandy loam (Typic Haplorthox), but G795W was damaged by leaf blight and earworms (11). Talleyrand et al. (10) recorded that the same hybrid, G795W, yielded 5,400 kg/ha of grain on the Bayamón sandy loam (irrigated) with 200 kg/ha of N, and 3,800 kg/ha on the Catalina clay (unirrigated) with no response to applied N. In an experiment with 7 cultivars on a Coto clay at Isabela, Badillo-Feliciano et al. (1) obtained grain yields ranging from 4,828 to 8,237 kg/ha. Pioneer's X306B ranked highest, followed by Diente de Caballo with 7,387 kg/ha. Mayorbela and G795W were less productive. Timing of the N application was more important than the amount applied, with the best results when N was applied 1 month after planting.

Sotomayor-Ríos (9) conducted field trials with 12 corn entries on a Coto clay at Isabela and reported first-crop yields of the top 5 entries of 5,975, 5,734, 5,593, 5,331 and 5,223 kg/ha of 15.5%-moisture grain for Pioneer hybrids X304C, X306B, X105A, Dekalb hybrid B666, and open pollinated variety Diente de Caballo, respectively. Second and third crops of the same entries were planted on the same land to complete one full year of cropping. After the first crop, yields diminished slightly, fewer yield differences were significant, and ranking of the top entries changed somewhat for the succeeding two crops, probably because of seasonal effect.

The variety trials described herein were conducted for three years during both so-called wet and dry seasons at Isabela, Puerto Rico. The primary purpose of these experiments was to select a variety responsive to management inputs and well adapted to the soil family of clayey, kaolinitic, isohyperthermic Tropeptic Eutrustox, and climatic conditions prevailing in a network of UPR-BSP experiment sites.

MATERIALS AND METHODS

Hybrids and open pollinated varieties that had appeared well adapted to local conditions were selected for further study. In addition, available cultivars selected from those showing the best performance in the CIMMYT International Maize Adaptation Nursery (IMAN) 1970–71 (5), at elevations and latitudes similar to those of UPR-BSP, sites were included in the BSP variety trials at Isabela. Other cultivars recommended by cooperators were also included.

The experiments were conducted at the Isabela Agricultural Experiment Substation in northwestern Puerto Rico at 128 m above sea level and at lat. 18°28′ N, where the mean annual minimum and maximum air temperatures are 18.9° and 29.4° C, respectively, and mean annual rainfall

is 1,658 mm. The soil at the Substation is predominantly Coto clay with some Cotito clay at some sites. Both soils are classified as Tropeptic Eutrustox; clayey, kaolinitic, isohyperthermic. Surface soil pH ranged from 5.2 to 6.8 in the areas used. Table 1 shows weather data recorded during each experiment.

Four experiments were conducted during the following periods: May 14 to August 30, 1976; June 17 to October 4, 1977; December 13, 1977, to April 18, 1978; and April 26 to August 10, 1978. Maize varieties planted in each experiment are listed in tables 2, 3, 4 and 5. In the first two experiments, 16 varieties were tested at two levels of P: approximately .01 (P.01) and .05 (P.05) p/m P in the soil solution. For the third trial, seven varieties were grown at the two levels of P, and in the fourth, eight varieties were tested at both P-levels plus 2 levels of N, 90 and 166 kg/ha. Phosphorus levels were determined and adjusted according to the method of Fox and Kamprath (7). Phosphorus applied was triple superphosphate, and the N source was ammonium sulfate.

In all experiments, a split-plot design was used. Phosphorus levels were assigned to main plots, and varieties to sub-plots. For the fourth experiment, N treatments were randomly assigned to sub-sub-plots. Experiments 1, 2 and 4 were all conducted on the same plots; thus, phosphorus treatments were randomly assigned for only the first experiment. Desired P-levels were attained in subsequent experiments by analyzing new soil samples and applying the required amounts of P. Variety assignment was done randomly each time. The N-level sub-sub-plots in the fourth experiment were made possible in the same area by halving the number of varieties tested.

A flat seedbed without furrows was plowed twice to a depth of approximately 25 cm and then disced and rototilled. All plots received a blanket application of 125, 100, 15 and 2 kg/ha of K, Mg, Zn and B, respectively; nutrient sources were KCl, $MgSO_4$, $ZnSO_4$ and borax. All plots in the

TABLE 1.—*Mean daily rainfall, evaporation and solar radiation and the mean wind speed during corn variety trials 1, 2, 3 and 4 conducted at the Isabela Agricultural Experiment Substation, Isabela, Puerto Rico*

Weather statistics	Experiment No.			
	1	2	3	4
Rainfall (mm/day)	4.38	3.97	3.72	6.22
Evaporation (mm/day)	5.21	5.02	4.20	5.09
Wind speed (km/hr)	4.7	5.4	5.3	5.0
Radiation (Ly/day)	461	470	365	480
Period (mo-day-yr)	5-14 to 8-30-76	6-17 to 10-4-77	12-13-77 to 4-18-78	4-26 to 8-10-78
Duration (days)	108	109	126	106

TABLE 2.—*Grain yield and other agronomic data for corn varieties in experiment 1 planted May 14 and harvested August 30, 1976 (108 days) at Isabela, Puerto Rico*[1]

Variety/Source	Lodging	Ear length	Ear weight	Shelling	Grain[2]	Stover DM
	%	*cm*	*g*	%	*kg/ha*	*kg/ha*
X304C, Pioneer	0.7 f	16.2 ab	268 ab	78 defg	9782 a	10200 ab
X304B, Pioneer	4.3 ef	15.1 bcd	262 abc	77 efgh	8957 ab	8936 bc
X304A, Pioneer	9.3 bcde	15.5 bc	275 a	74 h	8349 bc	8535 cde
H638, Hawaii	9.7 bcde	17.0 a	227 cdef	82 bc	8315 bc	4351 i
X105A, Pioneer	8.8 bcde	14.5 cde	237 bcd	79 cdef	8186 bcd	7028 fg
H652, Hawaii	7.5 bcde	15.2 bc	191 fg	83 b	8019 bcd	4487 i
X306B, Pioneer	11.3 abcd	13.6 e	246 abcd	76 fgh	7687 cde	8740 bcd
H788, Hawaii	13.2 ab	15.2 bc	232 bcde	75 gh	7659 cde	6114 gh
UPCA-1, Phil.	4.3 ef	14.5 cde	210 defg	79 cdef	7238 cdef	8626 cde
H610, Hawaii	5.2 def	14.2 cde	190 g	79 cdef	7094 def	5297 hi
H507 INIA, Mex.	12.3 abc	14.9 bcde	249 abc	77 efgh	7059 def	10473 a
H5, Honduras	17.5 a	14.7 bcde	236 bcd	78 defg	7029 def	7037 fg
Diente de Caballo, P.R.	11.2 abcde	15.7 abc	228 cdef	80 bcde	6966 def	7370 defg
Mayorbela, P. R.	5.5 cdef	15.7 abc	195 efg	75 gh	6672 ef	6984 fg
D M R, Philippines	5.3 def	13.7 de	191 fg	81 bcd	6402 f	7158 efg
Oaxaca 179, Mex.	5.7 cdef	10.2 f	99 h	89 a	4670 g	3882 i

[1] In each column means followed by one or more letters in common do not differ significantly at the 5% probability level. Each value represents the mean of 6 plots (3 replicates and 2 levels of P).

[2] Adjusted to 15.5% moisture.

TABLE 3.—*Grain yield and other agronomic data for corn varieties in experiment 2 planted June 17 and harvested October 4, 1977 (109 days) at Isabela, Puerto Rico*[1]

Variety/Source	Lodging	Ear length	Ear weight[2]		Shelling	Grain[3]	Stover DM
			P .05	P .01			
	%	*cm*	*g*	*g*	%	*kg/ha*	*kg/ha*
X304C, Pioneer	44.2 cd	12.5 a	102 ab	125 abc	78 a	3962 a	10051 cd
X304B, Pioneer	51.0 c	11.4 abcde	106 ab	100 cde	76 a	3647 ab	10374 bcde
X306B, Pioneer	41.3 cde	10.6 cde	99 ab	106 bcd	76 a	3388 abc	9134 def
QK231, Australia	15.5 f	10.2 ef	96 ab	133 ab	75 a	3264 bcd	13237 abc
S1973 Central Mex. Br.	17.1 f	12.4 ab	105 ab	150 a	72 a	3234 bcd	12006 abcde
UPCA-1, Philippines	43.3 cd	11.4 abcde	89 abc	93 de	78 a	3181 bcd	9650 def
H638, Hawaii	17.0 f	11.8 abc	106 ab	80 defg	77 a	2970 cde	13982 ab
QK217, Australia	19.2 f	11.2 bcde	107 a	129 abc	71 a	2709 def	14120 ab
H507, INIA, Mexico	26.4 def	11.5 abcd	76 abcd	104 bcde	72 a	2478 ef	13412 abc
IAC 1110	23.6 ef	11.2 bcde	99 ab	76 defg	75 a	2447 ef	12755 abcde
IAC Maya X 1975	25.6 def	12.4 ab	63 cd	85 def	73 a	2354 ef	14471 a
Ag 504, Agroceres, Br.	53.2 c	11.5 abcd	60 cde	59 fgh	79 a	2168 f	8672 ef
111, Cargil, Br.	55.6 bc	11.8 abc	73 bcd	72 efg	73 a	2155 f	8786 ef
Ag 259, Agroceres, Br.	72.0 ab	10.4 de	49 de	37 h	73 a	1229 g	9280 def
QK 487, Australia	47.7 c	8.4 g	51 de	51 gh	74 a	1217 g	9354 def
H 610, Hawaii	88.8 a	9.2 fg	31 e	35 h	62 b	962 g	6127 f

[1] In each column, means followed by one or more letters in common do not differ significantly at the 5% probability level. Each value represents the mean of 6 plots (2 levels of P and 3 replicates).

[2] Ear weight values are shown for P .05 and P .01 treatments separately. No other parameter reflected treatment × sub-treatment interactions.

[3] Adjusted to 15.5% moisture.

TABLE 4.—*Grain yield and other agronomic data for corn varieties in experiment 3 planted December 13, 1977, and harvested April 18, 1978 (126 days) at Isabela, Puerto Rico*[1]

Variety/Source	Lodging	Ear length	Ear weight	Shelling	100-seed	Grain[2]	Stover DM
	%	*cm*	*g*	%	*g weight*	*kg/ha*	*kg/ha*
X304C, Pioneer	2.9 c	13.4 ab	229 a	79 ab	44.0 b	8998 a	8423 ab
X304A, Pioneer	4.3 bc	12.9 b	225 a	77 cd	47.5 ab	8818 ab	8411 ab
X304B, Pioneer	5.3 bc	11.8 c	205 ab	76 d	45.0 b	8184 abc	8517 ab
X306B, Pioneer	2.1 c	10.8 d	208 ab	78 bc	48.1 ab	7796 abc	9666 a
111, Cargill, Br.	5.4 bc	14.3 a	182 b	79 ab	31.4 c	7520 bc	8474 ab
Diente de Caballo, P.R.	14.4 a	14.0 a	225 a	80 a	50.3 a	7081 c	7295 b
H610, Hawaii	10.3 ab	9.9 e	123 c	78 bc	34.0 c	5036 d	3936 c

[1] In each column, means followed by one or more letterss in common do not differ significantly at the 5% probability level. Each value represents the mean of 6 plots (2 levels of P and 3 replicates).

[2] Adjusted to 15.5% moisture.

TABLE 5.—*Grain yield and other agronomic data for corn varieties in experiment 4 planted April 26 and harvested August 10, 1978 (106 days) at Isabela Puerto Rico*[1]

Variety/Source	Lodging	Ear length	Ear weight	Shelling	100-seed	Grain[2]	Stover DM[2]
	%	*cm*	*g*	%	*weight g*	*kg/ha*	*kg/ha*
X5800, Pioneer	11 d	14.3 abc	180 a	77 abc	37.1 ab	6559 a	6940 ab
X304C, Pioneer	14 d	15.0 a	168 a	77 ab	32.1 bc	5856 ab	5888 bcd
X306B, Pioneer	16 cd	13.5 bc	163 ab	76 bc	38.2 a	5654 abc	6442 abc
X304A, Pioneer	22 cd	14.2 abc	170 a	75 cd	36.7 ab	5300 bc	5506 cd
X4817, Pioneer	26 bc	14.5 abc	157 ab	74 d	29.2 c	5209 bc	5643 bcd
X4816, Pioneer	37 a	13.3 c	140 bc	74 d	29.1 c	4877 c	6147 abcd
Diente de Caballo, P.R.	36 ab	14.8 abc	141 bc	78 a	37.9 a	4433 cd	4937 d
111, Cargill, Br.	19 cd	14.9 ab	115 c	75 cd	26.6 c	3682 d	7314 a

[1] In each column, means followed by one or more letters in common do not differ significantly at the 5% probability level. Each value represents the mean of 12 plots (2 levels of P, 2 levels of N and 3 replicates).

[2] Adjusted to 15.5% moisture.

first three experiments also received 90 kg/ha of N as ammonium sulfate. The blanket application of fertilizer, plus all P treatments and 1/3 of the N, was broadcast on the surface and incorporated into the upper 15 cm of soil with a hand-operated rototiller just prior to planting. The remaining 2/3 of the N was sidedressed 35 days after planting.

Two to three seed were planted per hill approximately 2–4 cm deep and 23 cm apart in rows spaced 75 cm apart. The sub-plots in experiments 1, 2 and 3 and sub-sub-plots in experiment 4 were 2.25 × 6 m consisting of 3 rows 6 m long. At the 4-leaf stage (8) the plants were thinned to 1 per 23 cm within the rows, equivalent to 57,971 plants/ha.

Weeds were controlled with Lasso[4] (Alachlor) applied as a preemergent herbicide and later by hand hoeing. Diazinon AG 500, Lannate and Sevin were applied alternately as required for insect control.

All plots were irrigated when necessary according to observations or when readings of tensiometers placed at 15 and 30 cm depths within selected plots showed 20 centibars tension. Trickle irrigation was applied with Chapin twin-wall tubing with hole spacing of 81 cm and 20 cm in inner and outer walls, respectively. By this method water was applied directly to the crop row.

All data were taken from the center 4 linear meters of the middle row in each plot. The following observations were recorded in the field during harvest of the 4-m row: total number of plants, root- and stalk-lodged plants, ears/plot, total ear weight and stover weight. Ear length and weight, grain weight, 100-seed weight, and percent moisture were obtained from a five- or eight-ear sub-sample from each plot. Stover samples taken from eight randomly selected plants were chopped into 2–5 cm-long sections from which 500 sub-samples were dried to constant weights for dry matter (DM) determinations. Grain and stover yields and shelling percentage were calculated from these data. Grain yield is reported as 15.5% moisture grain and stover yield as DM.

RESULTS AND DISCUSSION

GRAIN YIELD

The varieties tested in each experiment are ranked in tables 2, 3, 4 and 5 in descending order according to their grain yield. In the first three trials the Pioneer brand hybrid X304C ranked highest with mean yields of 9,782, 3,962 and 8,998 kg/ha of 15.5%-moisture grain. In the fourth experiment the same hybrid produced 5,856 kg/ha of grain and ranked

[4] Trade names in this publication are used only to provide specific information. Mention of a trade name does not constitute a warranty of equipment or materials by the Agricultural Experiment Station of the University of Puerto Rico, nor is this mention a statement of preference over other equipment or materials.

second but not significantly below X5800 (6,559 kg/ha) or above X306B (5,654 kg/ha). Hybrid X304B, included in the first three experiments never yielded significantly lower than X304C. Other Pioneer hybrids such as X304A and X306B also ranked high consistently.

Hawaiian hybrids H638, H652 and H788 yielded well in experiment 1 with grain yields of 8,315, 8,019 and 7,659 kg/ha, respectively. H638 was again included in experiment 2 but was then dropped from further trials as it was excelled by a number of other entries. H610, a prospective test-crop variety for Hawaii-BSP Eutrustox sites, ranked tenth in the first trial and last in the next two experiments. It was the most severely lodged (89%, table 3) variety and suffered the heaviest attack by leaf rust in experiment 2 when considerable ear damage resulted from the high incidence of broken stalks. For all varieties, lodging was predominantly due to stem breakage except in experiment 1, when root and stalk-lodged plants occurred in about equal proportions.

Diente de Caballo, a locally grown, open pollinated variety, produced fair to good grain yields of 6,966, 7,081 and 4,433 kg/ha in experiments 1, 3 and 4, respectively, but always significantly less than the top entries. Another locally important open pollinated variety, Mayorbela, was fourteenth (6,672 kg/ha) in the first trial and was thus eliminated from further consideration. Oaxaca, a variety from Mexico selected for phenological observations not reported in this paper, produced 4,670 kg/ha, the lowest grain yield in the first experiment.

Phoenix IAC 1110, an early choice for UPR-BSP experiments in Brazil, yielded only 2447 kg/ha, significantly less than the leading six entries in the second variety trial in Puerto Rico. Meanwhile, Cargill hybrid 111 was recommended for use on the BSP site in Brazil. Both of these hybrids yielded well in Brazil, but Cargill 111 ranked intermediate to low in Puerto Rico in experiments 2, 3 and 4 with yields of 2,155, 7,520 and 3,682 kg/ha, respectively. The Pioneer brand hybrid X304C consistently performed well in BSP variety trials on Eutrustox in Brazil as well as in Puerto Rico and Hawaii and has therefore been selected for use in all subsequent experiments on all Oxisols sites of the BSP network. More recently, however, this hybrid has shown high susceptibility to lodging under the Brazil site conditions.

Varieties responded significantly to the highest P level only in the first experiment. In all other experiments there were no significant grain yield increases in response to the higher level of P. And there were no significant grain yield response interactions among P levels and varieties for any of the trials. Grain yield data are therefore shown only as means over both levels of P. On the sites selected for these experiments, even the lower level of P was sufficient under the prevailing conditions.

Two nitrogen levels, 90 and 166 kg/ha of N, were superimposed over

varieties and P treatments in the last experiment. Although for each variety, mean grain yield appeared higher where the 166 kg/ha rate of N was applied, a statistically significant response was shown only for X304A, and only the mean values over both levels of each nutrient are shown in table 5. Treatment effects were likely minimized by lateral movement of water and soil during a heavy rain storm soon after seedling emergence. Residual nutrients from previous management also mask possible yield responses that would otherwise be expected on this Eutrustox after a few successive cropping seasons.

Corn grain yields varied sharply from season to season and year to year on the sites utilized. Weather data summarized in table 1 do not show cause for such variation. Grain yields in the second trial were probably restricted by insects and diseases; insect control was not as effective as in other experiments, and all varieties were heavily infested with leaf rust. Lodging was serious throughout the second experiment resulting in damaged ears and further yield reductions.

YIELD COMPONENTS

Ear lengths, ear fresh-weights, and shelling percentages are shown for all experiments in tables 2, 3, 4 and 5. Highest grain yields were generally associated with long and heavy ears, but not all varieties with large ears produced high grain yields. In experiment 1 the highest yielding varieties, X304C, X304B, and X304A also had the heaviest ears with 268, 262 and 275 g/ear, respectively. Variety H507, however, also had heavy ears, 249 g/ear, but ranked eleventh in grain yield. The lowest yielding variety, Oaxaca, had the shortest (10.2 cm) and lightest (99 g) ears; these small ears, however, had the highest shelling per cent, 89%, significantly higher than that of all other varieties. The large ears of the first experiment were not equalled in any of the subsequent tests, nor were grain yields. Ear mean weights analyzed in the first experiment were determined from 5-ear samples, while all of the harvested ears were used for determining mean weights in the last three trials.

In the second experiment, ears were short, 8.4, to 12.5 cm, and light, 31 to 150 g/ear, for all varieties. The ear weights in this trial indicate some variety × P-level interaction, as shown in table 3, that was not apparent in yields or other yield component data, and is not readily explainable. Shelling percentages also were generally lower in experiment 2 than in the first and third and were similar to those of the fourth experiment. The higher yielding varieties, however, maintained fairly constant shelling percentages throughout the study, even though ear size varied considerably among seasons and years for those varieties.

For the last two experiments (tables 4 and 5), 100-seed weights were obtained. Seed were notably heavier for the third experiment, which also

yielded much better than the fourth. Diente de Caballo seed were heaviest, 50.3 g/100 seed, followed by X306B, X304A, X304B and X304C with 100-seed weights of 48.1, 47.5, 45.0 and 44.0 g, respectively, in the third trial. Hawaii H610 and Cargill 111 seed weights were lowest with 34.0 and 31.4 g/100 seed. Seed weights for the last experiment were much lighter but again led by Diente de Caballo, 37.9 g, and X306B, 38.2 g.

STOVER YIELD

When grown for forage, the various varieties tested could be expected to rank somewhat differently than when grown solely for grain. Stover yields are shown in tables 2, 3, 4 and 5. The fairly tall (322 cm) and slightly slower maturing variety H507 from Mexico ranked eleventh for grain yield in experiment 1 but first for stover yield with 10,473 kg/ha of DM. In contrast, Pioneer's X304C produced 10,200 kg/ha of stover, not significantly less than H507, and ranked highest in grain yield as well, 9,782 kg/ha. On the basis of these results, X304C would be an excellent dual purpose hybrid for production of grain only or for silage or green-chop forage. It should be pointed out that the varieties tested were not selected for the purpose of producing high forage yields and their evaluation for forage yield is incidental.

Although the second trial gave low grain yields, stover production was relatively high. The top ranking varieties, IAC Maya X1975, QK217, H638, H507 and QK231 yielded 14,471, 14,120, 13,982, 13,412 and 13,237 kg/ha of dry stover, respectively. The Australian hybrid QK231 also ranked well for grain yield as well as stover, among the second group of varieties tested; other high stover yielding varieties of this group were dropped from further trial because of their relatively low grain yields.

Lodging was a serious problem throughout the second experiment and was most severe for H610, the lowest producer of stover, 6,127 kg/ha, as well as grain, 962 kg/ha. All varieties of this second group were also heavily infested with leaf rust; those most severely attacked, QK487, Ag504 and H610, ranked 11th, 15th and 16th, respectively, for stover yield.

In experiments 3 and 4, varieties were less stratified by forage yields. Out of seven varieties tested in experiment 3, the five highest yielding ones were similar; only H610 produced significantly less, 3,936 kg/ha, than the remaining six varieties. Diente de Caballo was next lowest, 7,295 kg/ha of dry stover, but significantly lower than only the top yielder, X306B, which gave 9,666 kg/ha of DM. In the fourth experiment Cargill's hybrid 111 ranked highest, 7,314 kg/ha, but not significantly higher than the next three, X5800, X306B and X4816, which yielded 6,940, 6,442 and 6,147 kg/ha of dry stover, respectively. The five lowest ranking varieties did not differ significantly among themselves in the last trial.

For forage production on Eutrustox, several hybrids among those tested produced stover and grain yield combinations that demonstrate their suitability for use as silage or green-chop forage crops. The Pioneer hybrids, especially X304 (A, B & C) and X306B, were consistently good yielders. Cargill's 111 and the Australian hybrid QK231 also showed promise and should be further considered, if forage production is the intended purpose.

RESUMEN

Cuatro ensayos con variedades de maíz (*Zea mays* L.) se realizaron en la subestación experimental de Isabela en el noroeste de Puerto Rico, localizada a 128 m sobre el nivel del mar en la latitud 18°28' N. En esta región las medias anuales de temperatura mínima y máxima son 18.9° y 29.4° C, y la media anual de lluvia es 1,658 mm. El suelo es la arcilla caolínica Coto, con un pH que varía de 5.2 a 6.8.

El híbrido Pioneer X304C produjo los rendimientos más altos en tres de los ensayos: 9,782, 3,962 y 8,948 kg/ha de grano con 15.5% de humedad. En el cuarto ensayo le siguió al Pioneer X5800 (6,559 kg/ha), con 5,856 kg/ha.

Otros híbridos muy buenos fueron los Pioneer X304A, X304B, X306B y X105A, y los Hawaii H638 y H652.

Aunque el rendimiento de algunos híbridos y variedades locales de polinización abierta fue significativamente más bajo, los de las mejores variedades no difirieron entre sí significativamente.

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