A FIELD TRIAL OF CO. 290, P.O.J. 2714 AND P.O.J. 2725 WITH UBA.

By H. H. DODDS.

The following papers were read by Mr. MOBERLY. These papers had been prepared by Mr. Dodds for use at Porto Rico, and are included as it was felt they contained matter of interest to members of the Association.

Among the sugar cane varieties that had shown considerable promise in qualitative trials during the 1928-1929 season were P.O.J. 2714 and P.O.J. 2725, and Co. 290.

Each showed a very high degree of resistance to the plant virus diseases, mosaic and streak, and each developed very satisfactory sucrose content, together with vigorous growth, if circumstances were in any degree favourable.

They all showed a fair degree of resistance to drought, P.O.J. 2725 in particular remaining alive and green under rather severe conditions. Co. 290 developed an early withering of the outer leaves during a spell of dry weather, but soon recovered after rain, and showed very few shoots dead from drought.

It was considered desirable therefore to make a quantitative yield trial of these three varieties in competition with Uba.

To this end a series of plots were planted at the Natal Sugar Experiment Station, in a somewhat dry and shallow heavy hillside loam of the following properties :—

	Per cent.
Hygroscopic moisture	3.73
Loss on ignition	5.60
Total carbon	1.872
Total nitrogen	0.132
Carbon-nitrogen ratio	14.2
Total phosphate (P_2O_5)	0.176
Available phosphate (P_2O_5 in 1% citric solution)	0.020
Available potash (K_2O in 1% citric solution)	0.011

Lime requirement, 2.2 tons calcium carbonate per acre. Hydrogen ion concentration, 6.25 pH.

Each variety was replicated five times in plots of approximately 0.045 of an acre in area, each of 4 lines 100 feet long and 5 feet apart.

The field had been carrying the previous crop of cane to within a month of re-planting with this experiment and was ploughed out at once and re-lined and planted, without any rest, so could not be considered in good condition for re-planting. The cane was planted on November 5th and 6th, 1929.

A dressing of fertilizer at the rate of 500 lbs. of superphosphate, 17.1%, 120 lbs. of ammonium sulphate, and 60 lbs. of potassium chloride per acre was given to each plot at the time of planting cane.

The plots were arranged in two rows as follows :—

P.O.J. 2725	(1)		Uba	(11)
P.O.J. 2714	(2)		Co. 290	(12)
Co. 290	(3)		P.O.J. 2714	(13)
Uba	(4)		P.O.J. 2725	(14)
P.O.J. 2725	(5)		Uba	(15)
P.O.J. 2714	(6)		Co. 290	(16)
Co. 290	(7)		P.O.J. 2714	(17)
Uba	(8)		P.O.J. 2725	(18)
P.O.J. 2725	(9)		Uba	(19)
P.O.J. 2714	(10)		Co. 290	(20)

up ↑ Grade ↓ down

The figures in brackets refer to the numbers of the plots.

The crop was cut on August 24th/25th, 1931, after 20 months' growth. The total rainfall over the whole of this period was only 53.5 inches, which is unusually low even for Natal.

The harvesting results were as follows :—

	Uba.	P.O.J. 2714.	P.O.J. 2725.	Co. 290.
Yield of cane in tons (2,000 lbs.) per acre	27.57	21.94	26.45	33.05
Pol (sucrose) per cent. cane	14.79	16.46	17.39	16.15
Purity of juice	92.0	94.2	94.6	92.5
Sucrose yield in tons per acre	4.07	3.61	4.60	5.34
Ratio to standard (Uba = 100)	100.00	88.70	113.02	131.20
Standard deviation from mean of sucrose yield per acre	0.52	0.40	0.30	0.28
Standard experimental error	0.21	0.18	0.12	0.12
Reducing substance ratio	—	0.52	0.20	0.31
Phosphate (mg. P_2O_5 per 100 ml. juice)	20.9	22.4	22.5	21.7
	Uba.	P.O.J. 2714.	P.O.J. 2725.	Co. 290.
Hydrogen ion concentration of juice (pH)	—	5.47	5.44	5.21
Fibre per cent. cane	15.36	12.95	11.87	13.29

It will be seen that Co. 290 surpassed the Uba standard both in cane yield and sucrose content, giving over 31 per cent. more sugar to the acre. P.O.J. 2725 was a little less than Uba in cane yield but more than made up for this in sucrose content, so that it gave 13 per cent. more sugar per acre. P.O.J. 2714, although superior to Uba in sucrose content, also in purity of juice and fibre was so far below in cane yield under the severe conditions of this experiment that the yield of sugar per acre was 11 per cent. less than that of the Uba standard. This latter is not a very significant difference, however, in view of the relatively large experimental error of the two series.

The foregoing results are based on hand mill tests, samples from each of the five plots being analysed separately and averaged. One of the P.O.J. 2725 samples gave a pol test as high as 17.82 per cent. cane, with a brix of 23.3° and 21.94 pol per cent. juice.

Each plot was in fact sampled and tested periodically from March, 1931, onwards, with the following average results :—

Pol per cent. cane :—

VARIETY.	MARCH.	MAY.	JULY.	AUGUST.
P.O.J. 2725 ..	15.70	15.30	17.22	17.39
Co. 290	13.60	14.61	16.20	16.15
P.O.J. 2714 ..	12.95	14.23	16.15	16.46
Uba	10.49	13.74	15.36	14.79

Purity of juice :—

VARIETY.	MARCH.	MAY.	JULY.	AUGUST.
P.O.J. 2725 ..	89.5	92.9	94.9	94.6
Co. 290	86.4	90.4	92.3	92.5
P.O.J. 2714 ..	85.1	91.6	94.0	94.2
Uba	76.4	89.9	91.8	92.0

This illustrates the early ripening character of P.O.J. 2725, and to a lesser extent Co. 290, while P.O.J. 2714 and Uba ripen comparatively late in the season. The Uba appears to have reached the peak of its maturity in July.

This experiment is being continued to the ratoon crops. There is now, January, 1932, little difference in their appearance, all ratooning strongly, P.O.J. 2714 perhaps a little less freely than the others.

Summary and Conclusions.

A field trial (Series "D" of this experiment station) of the following varieties is described : Uba, P.O.J. 2714, P.O.J. 2725 and Co. 290.

The soil was a heavy loam on a moderate (1 in 10) gradient and carried many small stones ; the soil, though not deficient in plant food, was subject to drought and the experiment was carried out during an unusually dry period.

The variety Co. 290 gave considerably the best results, yielding 31 per cent. more sugar per acre than Uba. P.O.J. 2725, though slightly inferior in cane yields to Uba, was much richer in sugar and yielded therefore 13 per cent. more sugar per acre than the Uba. P.O.J. 2714, though superior in sucrose content of cane and purity of juice, was considerably lower in cane yields than the Uba and consequently yielded 11 per cent. less sugar per acre.

Experiment Station,
South African Sugar Association,
Mount Edgecombe,
Natal.

January, 1932.