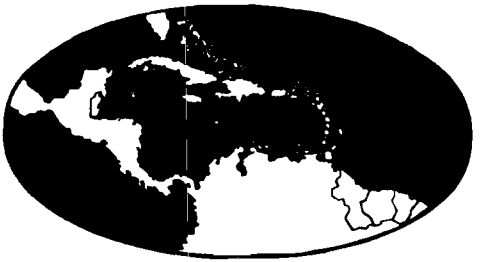
CARIBBEAN FOOD CROPS SOCIETY



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RICE STUDIES AT THE UNIVERSITY OF THE WEST INDIES

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SUMMARY

Forty cultivars of rice (*Oryza sativa* L.) recommended for cultivation in Trinidad by the Ministry of Agriculture, Lands and Fisheries were grown at the University Field Station, Champs Fleurs, Trinidad. About five to ten of these cultivars with desirable characteristics are to be selected for detailed studies to recommend the most suitable fertilizer practice, cropping system and method of weed control. With no fertilizer applied on the River Estate Loam, fifty per cent of the cultivars, some of the local selections included, gave yields above 3,927 kilogrammes paddy per hectare. Some of the local selections gave better yields than the improved types but lodged severely and had longer crop durations. Blast disease was observed in most plots and birds were a serious pest.

INTRODUCTION

Rice (*Oryza sativa* L.) is an important food staple in Trinidad and some 56,000 metric tonnes are consumed annually (Ganpat, 1975). Total local annual production has been estimated to be about 9,000 metric tonnes paddy (Pantin, 1974) so that large quantities are imported every year, mainly from the Republic of Guyana. Traditionally the crop is cultivated by peasant farmers mainly as swamp rice in rotation with dry season vegetables. The cultivars grown are Indica types and they frequently give poor yields under the existing low standards of management. The current emphasis on increasing the local production of the crop in an effort to reduce the quantity imported necessitates the cultivation of better cultivars and the adoption of improved cultural practices. Ganpat (1974) described recommended cultural methods and outlined the assistance available to farmers from the Government of Trinidad and Tobago for the cultivation of swamp-land paddy.

The object of the present work being conducted in the Department of Crop Science of the University of the West Indies, St. Augustine, is to select about five to ten cultivars with desirable characteristics (in-

cluding high yield potential, non-photoperiod sensitivity, resistance to pests and diseases and good milling and cooking qualities) for further detailed studies with a view to providing information on suitable fertilizer practices, cropping systems and systems of weed control. This paper presents some of the results of the preliminary trial at the University Field Station with some forty cultivars, most of which were originally tested by the Ministry of Agriculture at El Carmen and are available to rice farmers.

MATERIALS AND METHODS

The experiment was located at the University Field Station, Champs Fleurs, Trinidad, on River Estate Loam (ph 5.7 and deficient in major nutrients). The experimental design was a randomised block with four replications. Each plot consisted of eleven rows 3.7 metres long spaced 30.5 centimetres apart.

Pre-germinated seeds of the different cultivars were sown by hand on June 14, 1974. The area was saturated one week later and plants were thinned to 10 centimetres apart within rows within two weeks of planting.

The number of days to flowering (the day when approximately 50 per cent of the plants in a plot were flowering) and the number of days to maturity (the day when approximately 50 per cent of the plants in a plot had matured) were recorded. At maturity, using a sample size of five plants per plot, plant heights were measured, counts of the number of spikelets per panicle and the number of panicles per plant were made and the grain weight per plant was determined. The number of unfilled grains per plot and the seed size (weight of 500 grains in grammes) were determined by random sampling of the material obtained from the five plants. All plants in each plot were harvested by hand when the particular cultivar was ripe. The material was threshed and winnowed manually, dried to 15 per cent moisture and weighed (together with the sampled material) as yield.

RESULTS AND DISCUSSION

The mean performance of the forty cultivars are presented in Table 1. Despite the fact that no fertilizer was used in the experiment good crop growth was obtained and most of the cultivars had more than 80 per cent of their grains filled. Ganpat (1974) suggested that, with

seed material of most of the cultivars tested and the recommended cultural and fertilizer practices, a yield of 3,927 kg paddy per hectare may be expected. In this trial, more than 50 per cent of the cultivars gave yields greater than this standard and the following cultivars yielded over 7,500 kg per hectare: Joya 47-15-51-9, IR 8 272, T.L.S. 52-354, D 52-37 47-8-51-23 and IR4 67-1. Eight of the fifteen local selections tested yielded over 3,927 kg/ha but yields of IR 8 40, IR 24 and IR 20 were disappointingly low, being less than 3,000 kg/ha.

Regrettably bird damage, blast disease and the fall of ripe grain from plants which were subjected to delayed harvest because of the unavailability of labour were probably important contributory factors to the sub-standard yields recorded in some cultivars. The absence of other rice cultivations within the vicinity of the experimental site might have been the reason for the bird problem experienced especially in the IR 24, IR 20 and T.L.S. 52-403 plots. Mechanical bird-scarers were unavailable at the time of the experiment and the presence of personnel in the experimental area had little desirable effect on the feeding of the birds. In an effort to overcome this problem, some of the early maturing cultivars were protected with Durex netting but the prohibitive cost of this practice limited its extension to the entire experiment. In any case such a practice would not only prove uneconomic but impractical in peasant farming.

Bluebelle and Tongel were the earliest cultivars, flowering and maturing in less than 80 and 110 days respectively after planting. Most of the IR cultivars matured in under 130 days whereas the other cultivars were much later, with the local selections tending to exhibit the longest duration of crop. The quick maturing, non-photoperiod-sensitive cultivars offer further scope for the cultivation of possibly two crops per year provided there is an adequate water supply.

The only cultivars which attained a height of not more than 100 cm were Tongel and the IR selections. Some lodging was observed in some of the plots of D 110, Dima, D 52-37 and Sughandi cultivars, but lodging was more marked in a number of the local selections especially T.L.S. 52-293 and T.L.S. 52-329. Despite the fact that the local selections are good yielders with uniform grain size, their cultivation under fertilized soil conditions would probably, through lodging, result in severe yield loss and difficulty in harvesting.

There was evidence of blast disease in many of the experimental plots and resistance to blast must be considered an important criterion in the selection of cultivars for local cultivation. Some problems were ex-

perienced with weeds in a few plots, especially where the maintenance of an adequate water level was at times difficult. The herbicide Surcopur 360 EC recommended by Ganpat (1974) was tried but control was unsatisfactory. Work on weed control will be undertaken shortly.

This preliminary trial has provided information on the performance of many cultivars available to farmers, and has indicated the need for continuous testing of only the best cultivars from selected rice growing areas of the world to determine their suitability for Trinidad. Further intensive studies are planned with some of the following cultivars: Joya 47-15-51-9, IR 8 272, T.L.S. 52 354, D 52-37 47-8-51-23, IR 4 67-1, D 110 47-9-51-13, IR 5 47-2, IR 8 68, Dima and Tongel.

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TABLE 1. Yield and other characteristics of rice cultivars grown in the wet season at the University Field Station[1]

Cultivar and Line	Grain Yield (kg/ha)	Seed Size (g./500 grains)	Plant Height (cm.)	No. of Spikelets per panicle	No. of Panicles per plant	Grain Weight per plant (g.)	Per cent grains filled[2]	No. of days to flowering	No. of days to maturity
	Five (5) Plant Samples								
Joya 47-15-51-9	19982 a	17.00 abcde	127 bcd	115.3 e	6.3 e	10.0	83.3 e	115	145
IR 8 272	11832 b	12.95 e	94 e	135.2 e	5.1 e	14.8	90.8 abcd	109	139
T.L.S 52-354	8357 bc	14.33 bcde	150 ab	121.8 e	12.6 de	29.2 a	87.0 e	109	143
D52-37 47-8-51-23	8069 bcd	19.33 ab	139 abcde	76.6 e	11.8 e	25.0 bc	88.3 e	112	136
IR 4 67-1	7578 bcde	16.33 abcde	100 e	88.4 e	15.3 ab	25.8 bcde	89.9 abcd	98	123
D110 47-9-51-13	7449 cde	18.00 abcde	136 abcde	117.2 e	12.4 e	23.0 bcde	88.3 de	105	133
D52-37 47-8-51-17	6809 cde	18.33 abcd	134 abcd	91.4 e	11.6 e	22.6 bcde	87.5 e	115	139
IR 5 47-2	6413 cde	16.00 abcde	89 e	79.6 e	12.8 de	20.0 de	86.7 e	111	129
IR 4 731-910	6355 cde	13.67 cde	90 e	113.6 e	11.2 e	21.4 cde	91.2 ab	98	122
IR 8 68	5688 cde	16.00 abcde	77 e	84.8 e	11.3 e	17.0 e	84.7 e	105	130

[1] For each column, means with a common letter are not significantly different at the 1% level using Duncan's Multiple Range Test.

[2] Letters refer to the transformed data (square root transformation used).

TABLE 1. Continued[1]

Cultivar and Line	Grain Yield (kg/ha)	Seed Size (g./500 grains)	Plant Height (cm.)	No. of Spikelets Per Panicle	No. of Panicles Per Plant	Grain Weight Per Plant (g.)	Per Cent Grains Filled[2]	No. of days to Flowering	No. of days to Maturity
	Five (5) Plant Samples								
D 52-37 47-8-51-31	5680 cde	19.67 a	142 abcde	79.8 e	14.2 bc	22.0 cde	85.9 e	115	139
T.L.S. 52-303 A	5543 cde	16.00 abcde	140 abcde	145.4 cde	10.6	22.4 bcde	86.8 e	115	151
Sughandi 47-1-50-7	5539 cde	18.67 abc	136 abcde	94.6 e	9.8 e	22.0 cde	86.7 e	129	162
Dima	5510 cde	12.33 e	145 abcd	133.2 e	9.4 e	23.6 bcd	87.4 e	111	142
IR 22	5055 cde	12.67 e	79 e	98.4 e	13.6 cde	18.0 e	83.2 e	87	115
Sughandi 47-1-50-2	4960 cde	16.00 abcde	132 bcd	145.4 cd	8.4 e	20.4 de	89.2 abcde	129	162
T.L.S. 52-348	4800 cde	10.33 e	132 bcd	134.6 e	8.0 e	16.4 e	85.8 e	115	150
T.L.S. 52-318 A	4729 cde	10.00 e	128 bcd	134.8 c	13.8 cde	12.0 e	87.6 e	119	156
T.L.S. 52-385	4648 cde	13.33 de	137 abcde	149.8 c	15.6 a	17.5 e	84.7 e	119	157
T.L.S 52-419	4454 cde	17.33 abcde	139 abcde	142.4 cde	12.6 de	18.0 e	87.6 e	111	134

[1] For each column, means with a common letter are not significantly different at the 1% level using Duncan's Multiple Range Test.

[2] Letters refer to the transformed data (square root transformation used).

TABLE 1. Continued[1]

Cultivar and Line	Grain Yield (kg/ha)	Seed Size (g./500 grains)	Plant Height (cm.)	No. of Spikelets Per Panicle	No. of Panicles Per plant	Grain Weight Per Plant (g.)	Per Cent Grains Filled[2]	No. of days to Flowering	No. of days to Maturity
			Five (5) Plant Samples						
T.L.S. 52-299	4353 cde	14.67 bcde	146 abc	128.2 e	12.0 e	17.0 e	87.4 e	109	131
T.L.S. 52-303B	4121 cde	15.33 abcde	118 e	127.0 e	7.8 e	15.2 e	83.0 e	109	136
Tongel	3969 cde	17.00 abcde	74 e	113.2 e	5.0 e	17.0 e	91.6 a	76	104
D110 47-9-51-27	3781 cde	17.67 abcde	124 cd	84.6 e	13.8 cd	14.0 e	91.5 a	108	132
Joya 47-15-51-13	3657 cde	11.37 e	111 e	84.2 e	8.8 e	11.0 e	86.4 e	123	150
T.L.S. 52-329	3630 cde	15.33 abcde	156 a	122.0 e	9.2 e	14.0 e	88.8 cde	123	151
D110 47-9-51-23	3521 cde	15.67 abcde	105 e	73.4 e	10.1 e	10.8 e	87.0 e	109	130
T.L.S. 52-293	3441 de	16.00 abcde	144 abcde	74.2 e	11.6 e	13.0 e	87.3 e	111	133
T.L.S. 52-318B	3396 de	14.67 bcde	137 abcde	159.2 b	5.4 e	23.4 bcde	84.4 e	112	150
T.L.S. 52-342	3135 e	12.33 e	111 e	92.6 e	9.5	9.4 e	90.4 abcde	111	130

[1] For each column, means with a common letter are not significantly different at the 1% level using Duncan's Multiple Range Test.

[2] Letters refer to the transformed data (square root transformation used).

TABLE 1. Continued [1]

Cultivar and Line	Grain Yield (kg/ha)	Seed Size (g./500 grains)	Plant Height (cm.)	No. of Spikelets Per Panicle	No. of Panicles Per Plant	Grain Weight Per Plant (g.)	Per Cent Grains Filled [2]	No. of days to Flowering	No. of days to Maturity
	Five (5) Plant Samples								
Bluebelle	3115 e	15.00 abcde	105 e	228.0 a	1.9 e	6.4 e	91.5 a	66	100
IR 8 40	2930 e	14.50 bcde	78 e	115.0 e	6.2 e	17.6 e	81.4 e	93	120
T.L.S 52-349	2656 e	12.33 e	129 bcd	79.4 e	8.4 e	8.2 e	87.8 e	111	135
T.L.S. 52-340	2604 e	13.50 de	117 e	58.8 e	6.2 e	7.4 e	89.0 cde	111	135
Joya 47-15-51-11	2518 e	11.37 e	110 e	86.8 e	8.9 e	9.0 e	83.4 e	123	146
IR 24	2386 e	12.00 e	80 e	90.2 e	5.2 e	9.2 e	90.0 abcde	87	110
T.L.S. 52-403	2213 e	12.00 e	130 bcd	87.6 e	8.8 e	7.4 e	91.0 ab	119	155
IR 8	2146 e	15.50 abcde	71 e	63.0 e	9.8 e	7.0 e	90.9 ab	105	130
Sughandi 47-1-50-9	1793 e	13.67 cde	136 abcde	103.6 e	10.0 e	6.8 e	83.2 e	129	158
IR 20	1432 e	8.67 e	84 e	86.4 e	11.0 e	6.4 e	83.2 e	87	112
S.E ±	1074.1	1.110	5.1	2.20	0.30	0.88	0.10		
C.V	42.9	15.1	8.7	4.1	6.1	11.2	5.6		

[1] For each column, means with a common letter are not significantly different at the 1% level using Duncan's Multiple Range Test.

[2] Letters and coefficients of variation refer to the transformed data (square root transformation used).