

The Performance of the Salt-Resistant Paddy, Pokkali in Ceylon

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THE salt-resistant paddy *Pokkali* was obtained from the Economic Botanist, Nagercoil, Travancore, in 1938. It was first sown at Ambalantota Paddy Station in the *maha* season of 1939. The first observations were made on small plots. One acre of a saline field was sown in *maha* 1942 and yielded 37 bushels. In the following *yala* season, 1943, 28 bushels were obtained from an acre. The variety appeared promising and was first recommended for cultivation in 1945, on a request from the Assistant Government Agent, Chilaw, for seed of a salt-resistant variety. The variety proved so successful that its cultivation rapidly spread. It now covers a considerable extent of saline land along the west coast of the Island, particularly in the Mutturajawela area.

Trials with *Pokkali* continued at Ambalantota Paddy Station. Replicated field experiments were set down and *Pokkali* was tested against the salt resistant varieties, *Kagga*, *Bile Kagga*, SR 14, SR 26B, *Uvar Karuppan*, and *Uvar Vellai*. *Pokkali* was the best of these paddies, but no significant differences between varieties could be demonstrated on account of considerable variation in the stand of plants from plot to plot. Variability in stand was caused by the irregular distribution of salinity within blocks. Differences between blocks were even more marked. Soil samples taken from adjacent blocks in *yala* 1945 were examined and reported on by the Chemist as follows:—

TABLE I

Salt per cent. and pH value of saline soils at Ambalantota Paddy Station,
Yala, 1945

Blocks		pH value		Percentage of total salts
1	..	7.1	..	0.23
2	..	6.4	..	0.42
3	..	6.2	..	0.33
4	..	6.6	..	1.50
5	..	6.7	..	0.17

Soil samples were again taken from the same blocks in the next season, *maha* 1945/46 and were found to contain the following percentages of sodium chloride :—

TABLE II

Salt per cent. and pH value of saline soils at Ambalantota Paddy Station, Maha 1945/46

Blocks	pH value	Percentage of sodium chloride
1 ..	6.66	0.47
2 ..	6.61	0.41
3 ..	6.24	0.26
4 ..	7.88	0.90
5 ..	6.96	0.19

The salinity of block 4 was particularly high ; a number of varieties sown in this block in *maha* 1945/46 failed altogether. In this season, $1\frac{1}{2}$ acres planted in *Pokkali* yielded 84 bushels, i.e., the yield per acre was 56 bushels. The extents and yields of *Pokkali* in subsequent seasons are given in Table III.

TABLE III

Yield of *Pokkali* Paddy at Ambalantota Paddy Station

Years	<i>Yala</i>			<i>Maha</i>		
	Extent in acres	Acre yield in bushels		Extent in acres	Acre yield in bushels	
1946 ..	3	..	33	2	..	29
1947 ..	2	..	17	2	..	27
1948 ..	2	..	25	5	..	25
1949 ..	5	..	35	—	..	—

Damage by stem-borer (*Schoenobius bipunctifer*) was responsible for the low yield in *yala* 1947. In *yala* and *maha*, 1948, *Pokkali* was transplanted. The other yields listed above relate to broadcast *Pokkali*. All the yields given above were obtained without application of organic manures or artificials.

The records given in Table IV show that *Pokkali* flowers three weeks earlier in *maha* than in *yala*, and suggest a high degree of sensitiveness to the photoperiod.

TABLE IV

Duration in days from sowing to flowering

Year	<i>Yala</i>	<i>Maha</i>
1945 ..	86	72
1946 ..	92	69
1947 ..	85	68
1948 ..	95	68
Mean ..	89	69

The figures for 1948, both *maha* and *yala*, refer to flowering of transplanted fields. Transplanting did not appreciably extend the duration from sowing to flowering. Sowing-date and transplanting effects on age are of particular interest in the Mutturajawela tract where floods provide as serious a problem

as salinity. *Pokkali*, on account of its short age, succumbs to floods. No salt-resistant paddy is likely to succeed in the Mutturajawela area unless its sowing-to-harvesting duration is extended to five months.

Experience at Mutturajawela indicates that on the very acid (pH value : 4.0) peaty soils of the tract, the maximum salinity that *Pokkali* tolerates does not exceed 0.22 per cent. Salt, among other things, inhibits germination. Seed paddy should be well-sprouted, and plumules and radicles fully developed before sowing. It is also desirable to delay sowing till the early rains have reduced soil salinity. In estimates made by the Chemist in 1948, it was observed that a delay of one month effected a reduction in average salinity of soil water from 0.15 per cent. on May 16, to 0.07 per cent. on June 17. *Pokkali* was introduced to Mutturajawela in 1947. It is premature to pronounce on the potentialities of *Pokkali* in the tract, but the yields so far obtained in areas subject to floods have been depressingly low.

The variety *Pokkali* is characterized by the complete absence of anthocyanin pigment, by its broad leaf, by the pale straw-coloured fertile glumes and by the short, white, sterile glumes of the mature grain. At flowering the fertile glumes are yellowish-green and slightly hairy; the sterile glumes are green at the base and unpigmented above. The grain is awnless. The rice colour is red with abdominal white. The peduncle is well exerted, the panicle is not compact and the flag leaf is erect to oblique. The tillers are erect. Salt-resistance is, of course, the most conspicuous virtue of *Pokkali*. The variety possess, in addition, a high degree of lodging and shedding-resistance. *Pokkali* does not resist floods.

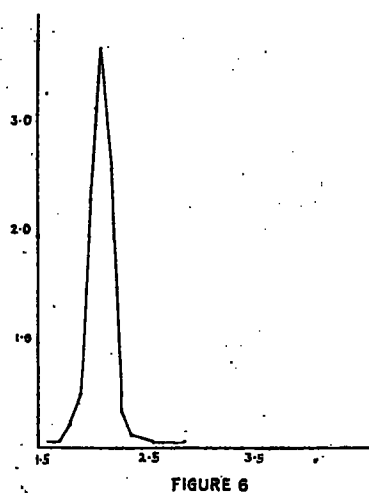
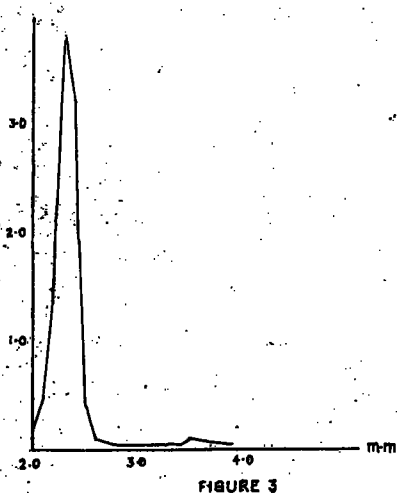
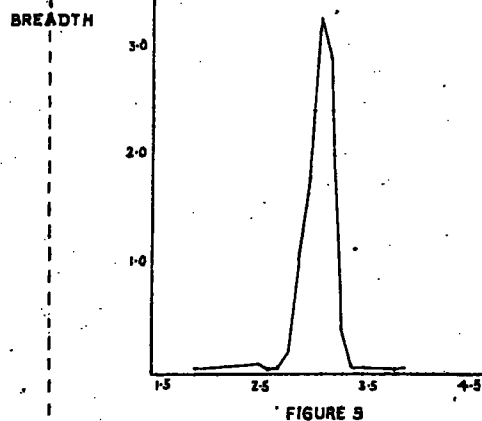
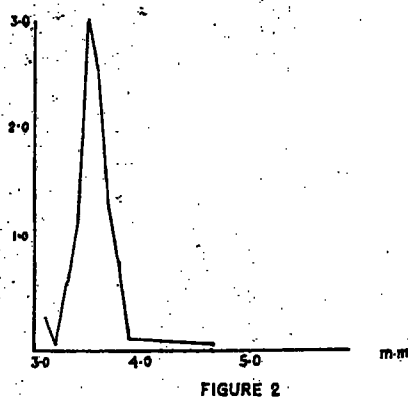
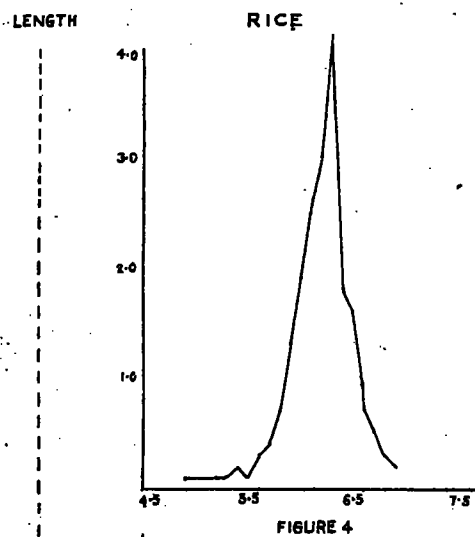
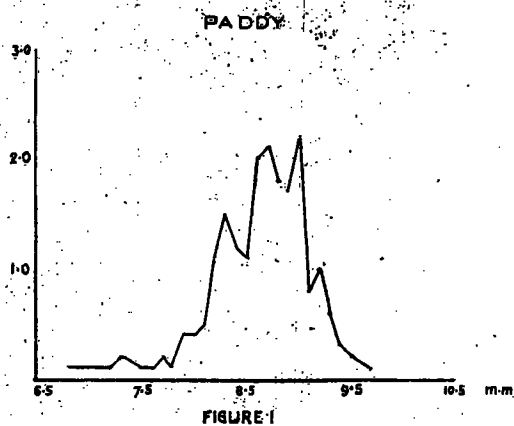
The quantitative characters are expressed in Table V.

TABLE V
Quantitative Characters of *Pokkali*

		Mean		Standard error of the mean
Height	..	60.0 inches	..	± 0.79
Tiller number	..	6	..	± 0.63
Panicle length	..	10.1 inches	..	± 0.27
Grain length	..	8.63 mm.	..	± 0.0327
breadth	..	3.54 "	..	± 0.0123
thickness	..	2.35 "	..	± 0.0153
Rice length	..	6.19 "	..	± 0.0210
breadth	..	3.08 "	..	± 0.0121
thickness	..	2.10 "	..	± 0.0095

The height measurements relate to Ambalantota conditions. The plants are much shorter at Mutturajawela. Grain measurements were made on a random sample of 200 grains. Figures 1-6 represent the frequency distributions of length, breadth and thickness of husked and unhusked grain. Frequency is represented on the vertical ordinate as a percentage, and the dimensions are expressed in millimetres along the horizontal ordinate.

The irregularity of the curve of length of unhusked grain (Figure 1) and the wide range between the lowest and highest values of grain length suggest that *Pokkali* is possibly not a pure line. The standard error is 0.37 per cent., a figure not markedly higher than that for pure-line paddies. Genetic variability does not appear to be sufficiently high to warrant selection within the variety.



FIGS. 1-6. Frequency Distributions of Length, Breadth and Thickness
of Pokkali paddy and rice