THE PROGRESSIVE REDUCTION IN THE NUMBER OF RICE VARIETIES UNDER ISSUE IN CEYLON

By

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THE existence of large numbers of cultivated varieties of a crop in any country indicates not only a low level of crop improvement but also the prevalence of primitive cultivation standards. When, for instance, a crop is traditionally grown without the application of fertilizers, as often happens with rice in many areas in South-East Asia, conscious or natural selection eventually leads to the establishment of ecotypes which manifest equilibrium with the soils and climates of the region: in each season of cultivation, as much nutrients are removed by the crop as are replaced by natural processes of weathering and by microbiological activity. Such an ecotype is claimed to possess a high degree of adaptation to the region.

If the adapted ecotype, which is necessarily a low fertilizer response form, is replaced under unfertilized conditions by a high-yielding strain, more nutrients are removed from the soil than are replaced by natural chemical and biological processes, and after a few seasons of cultivation, yields decline, i.e., the high-yielding strain exhibits symptoms of starvation.

If the above analysis of the phenomenon of local specialisation of rice varieties is correct, it should be possible to reduce the number of varieties in general cultivation by the adoption of high levels of fertilizer application. In Ceylon, the successful breeding of high fertilizer response varieties and the promotion of fertilizer use have resulted in a striking reduction in the number of selections under issue to growers. Moreover, it has been the experience of breeders in this country that if fertilizer applications are adequate, high-response

selections manifest a wider range of suitability than low-response forms. It is also true that there is strikingly greater promise of successful selection of such high-response forms within hybrid progenies than by straight selection in indigenous varieties.

A report on Paddy Statistics published by the Department of Census and Statistics in 1956, records two hundred and sixty varieties of rice as grown in Ceylon. Of these 44 have a sowing-to-harvest duration of six months, 45 of five months, 73 of four months and 44 of three months. The distribution of the varieties in the 3, 4, 5 and 6 month age groups in each of the Districts is shown in Table 1. Generally, varieties grown in the *Yala* (South-West Monsoon) season have a shorter duration than those grown in the *Maha* (North-East Monsoon) season, and this is particularly so in the Dry Zone of Ceylon, where an inadequate supply of irrigation water restricts cultivation to varieties of three months duration. With an assured supply of water, four months varieties are generally grown in both seasons, or a long term variety is grown in the *Maha* season with a short-term in *Yala*. In some districts with a high rainfall in *Yala*, the possibility of floods limits cultivation to a single long-duration crop, sown or transplanted in July-August and harvested in January and February.

The multiplicity of varieties grown in Ceylon was ascribed to a high degree of local specialization. When these varieties were tested their performance was generally disappointing, their yields were low, and their genetic variability did not permit much advance on selection. Selections made in the more promising varieties were compared with standard pure lines and introduced varieties. The only outstanding local variety was *Murungakayan*, a selection of which, *Murungakayan* 302, out-yielded all other varieties in about half the Island's acreage in the dry zone of Ceylon, and also in some parts of the wet zone. Of several hundred introduced varieties, only a few, such as Ptb-16, Mas and Sigadis were found promising.

As a result of extensive yield trials forty improved varieties in all were recommended for the Island. More recently, the hybrid selection H-4 derived from a cross between *Murungakayan* 302 and *Mas* out-yielded *Murungakayan* 302 and other improved varieties,

wherever they were compared in Ceylon. The list of Departmental recommendations has now been reduced to 14 varieties which are as follows :—

Varieties	*Age in months*
1. Pachchaiperumal 2462/11	3
2. Vellaiperumal 28724	3½
3. H—105	4
4. Murungakayan 302	4
5. Murungakayan 104	4
6. H—4	4
7. H—501	4
8. Hondarawala 502 (Maha only)	4
9. Pokkali	4
10. Sigadis	4½
11. Periavellai 538 (Maha only)	5
12. Devaredderi 26081 (Yala only)	5
13. Ptb-16 (Maha only)	5½
14. Podiwi a-8 (Maha only)	6

While H-4 satisfies the demand for a variety in the 4 months age class we have so far not been successful in obtaining a three months variety to replace Pachchaiperumal 2462/11, which though extensively grown in *Yala* in the dry zone of Ceylon, is susceptible to blast and is subject to shedding. In the six months age class, Podiwi a-8 is popular because of its small white grain, but its yield is not sufficiently high, especially when it is affected by blast. Ptb-16 is moderately resistant to blast, but it does not meet the demand for a palatable small-grained white rice. Material in the breeding plots appears to fulfil this demand, and a small, white-grained rice may soon be available in both the five and six months age classes.

While both local and introduced varieties are of limited use in this country, there is every possibility that recommended varieties in the future would be few, covering more extensive areas than hitherto imagined. There seems little doubt that in Ceylon these varieties must necessarily be of hybrid origin.

ACKNOWLEDGMENT

I am greatly indebted to Dr. M. F. Chandraratne for his help in the preparation of this paper.

Table I.—Distribution of local rice varieties of various age classes in the districts of Ceylon

District	*Season*	*Number of Varieties in each age-class*				
		3 months	*4 months*	*5 months*	*6 months*	*Total*
Jaffna	Maha	5	10	14	6	35
	Yala	4	—	—	—	4
Vavuniya	Maha	—	17	3	4	24
	Yala	6	—	—	—	6
Mannar	Maha	3	6	2	—	11
	Yala	4	—	—	—	4
Anuradhapura	Maha	—	16	2	—	18
	Yala	13	—	—	—	13
Puttalam-Chilaw	Maha	3	6	1	14	24
	Yala	6	3	4	—	13
Trincomalee	Maha	—	5	3	2	10
	Yala	5	2	—	—	7
Batticaloa	Maha	5	21	4	2	32
	Yala	18	1	—	—	19
Hambantota	Maha	12	2	2	3	19
	Yala	11	2	—	1	14
Polonnaruwa	Maha	—	2	2	—	4
	Yala	2	—	—	—	2
Kurunegala	Maha	7	12	8	23	50
	Yala	15	7	1	—	23
Badulla	Maha	8	15	15	2	40
	Yala	14	12	3	—	29
Nuwara-Eliya	Maha	4	7	11	5	27
	Yala	6	6	3	—	15
Ratnapura	Maha	1	2	1	2	6
	Yala	1	2	2	2	7
Matale	Maha	1	3	2	1	7
	Yala	3	2	1	1	7
Kandy	Maha	1	4	4	19	28
	Yala	9	7	5	—	21
Kegalla	Maha	—	1	2	18	21
	Yala	5	11	3	—	19
Colombo	Maha	5	16	8	28	57
	Yala	4	15	15	6	40
Kalutara	Maha	12	16	3	5	36
	Yala	3	7	25	—	35
Galle	Maha	10	1	3	—	14
	Yala	8	3	9	2	22
Matara	Maha	4	6	4	1	15
	Yala	7	10	4	—	21