https://doi.org/10.29321/MAJ.10.A03905

PVR. 1—A high yielding alkali resistant strain of paddy

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Synopsis: The release of PVR. 1 as a high yielding alkali resistant strain of paddy for the Madras state is discussed in this paper.

Introduction: Out of 5·9 million acres under paddy in Madras State, atleast two lakhs of acres are estimated to be either alkaline or saline and this large area lies scattered throughout the State. None of the important rice varieties except SR. 26B from Orissa possesses any appreciable tolerance to such adverse soil conditions. The varieties which are now being cultivated in such areas are inferior in quality not only from the commercial point of view but also from their yield potential, the yield obtained from them being invariably poor. It was therefore felt necessary to evolve superior high yielding saline and alkaline resistant strains of paddy suitable to the vast area of adverse soil conditions obtaining in the State.

Review of work done: Abdul Samad *et al* (1960) reported about the varietal tests which were conducted in a comprehensive manner at the Paddy Breeding Station, Coimbatore for assessment of the varietal differences in their reaction to salinity and alkalinity. Seventyfour varieties obtained within the State as well as from other States of Kerala, Andhra Pradesh, Bombay and Orissa and a few exotic introductions were studied in alkaline fields of an average pH of 8·9, besides controlled conditions in Lysimeters and pot culture. The salinity of the soil maintained in the pots was 0·5 and 0·25 per cent strength of Sodium chloride. The most desirable sources of resistance such as SR. 26B, T. 892 *(Thellathokkavadlu), Orkayama, Kuthir, Orthadiyan* and *Bairuvadlu* were fixed up based on the performance of the above varietal collection and these were used in the hybridisation programme commenced as early as 1942—'43. For purpose of screening, the hybrid progenies were grown in saline and alkaline areas in different locations with limited facilities as there was no breeding centre to undertake this special item of work earlier. With the inception of the Saline and Alkaline Rice Research Station at Peravurani in Thanjavur district in 1959—'60, all the available materials in different stages of study were transferred to this centre for pursuing the studies further under typical adverse soil conditions.

Materials and Methods: From among the materials transferred from the Paddy Breeding Station, Coimbatore, after earlier adaptation studies in some alkaline areas, two outstanding cultures of the cross MTU. 1 x SR. 26B viz., 10022 and 10034 were advanced for district trials. These were tested against the standard SR. 26B both at the station in Peravurani as well as in 27 centres in

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* Received on 8—11—1963.

different parts of the State having the problem area for three years from 1960—'61 to 1962—'63 under different grades of alkalinity with pH up to 9·0 and E. C. 2·60.

Results and Discussion: The results of the trials are furnished in tables I and II. The results at Peravurani station (Table I) showed that culture 10034 has recorded the highest grain yield of 1060 kg. per acre and it was significantly superior to SR. 26B, with 19·8% increase under a pH of 8·7 and electrical conductivity (E. C.) of 2·3. In the district trials also, culture 10034 was found to be the best in 21 centres out of 27 centres of trial. The yields obtained from 11 centres of moderate alkalinity with a pH range of 7·9 to 8·7 and E. C. of 0·20 to 1·5 (Table II) showed that culture 10034 has recorded an average grain yield of 1006 kg. per acre with 14·0% increase over the standard SR. 26B. Under slightly alkaline conditions in two centres with pH 8·2 and 7·9, culture 10034 recorded as much as 1,273 and 1,485 kg. of grain yield per acre respectively.

The data on milling and cooking quality of culture 10034 and 10022 as compared to SR. 26B are given in Table III. The outturn of rice to paddy on milling was 4% higher in culture 10034 than that of SR. 26B and there was lesser breakage of rice during milling the culture 10034 due to its finer grain than SR. 26B. The weight of cooked to uncooked rice was also 30% greater in culture 10034 than SR. 26B.

Culture 10034 therefore possesses remarkable resistance to medium alkalinity with high yield, besides finer grain characteristics with lesser breakage on milling and better cooking quality than SR. 26B. It has medium maturity and when sown in July, it takes 145 days to come for harvest. It has wide adaptability to different parts in Madras State. This culture has therefore been released as alkali resistant strain Peravurani 1 (PVR. 1) to replace low yielding local varieties possessing poor quality coarse grain that are grown in the alkaline areas of the State.

Summary: For the evolution of an alkali resistant high yielding strain of paddy, trials were conducted with the promising cultures (10022 and 10034) both at the station at Peravurani and in the districts. Culture 10034 was found to be the best in yield with desired resistance to alkalinity and adaptability to the different parts of the State besides possessing finer grain characteristics than SR. 26B. It has therefore been released as a strain (PVR. 1) for moderately alkaline soil conditions obtaining in Madras State.

Acknowledgement: The work was part of the programme of the scheme for evolution of saline and alkaline resistant strains of paddy in Madras State sanctioned by the Indian Council of Agricultural Research, New Delhi. The authors are grateful for the help and facilities given by the Council in the work.

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TABLE I.

Results of replicated yield trial of cultures 10022, 10034 and SR. 26B at Saline Resistant Rice Research Station, Peravurani.

Particulars	10034	10022	SR. 26B	General Mean	Standard Error	Critical difference (P=0.05)	Significant or not
Acre yield in kilograms ...	1060	1023	885	989·33	24·10	70·46	Significant
Yield as a % of SR. 26B ...	119·80	115·50	100·00	111·80	2·72	7·96	,,
Yield as a % of General Mean ...	107·20	103·40	89·45	100·00	2 42	7·12	,,
Flowering duration in days ...	101	104	98				

Conclusion : 10034 > 10022 > SR. 26B

TABLE II.

Average acre yield from the district in moderately alkaline plots with pH 7·9 to 8·7 with reasonably good performance.

S. No.	Name of the centre	District	Nature of soil		Acre yield in kilograms			Remarks
			pH	E. C.	SR. 26. B	10022	10034	
1.	Andankarai	Tanjore	8·7	0·50	731	945	788	pH 7 to 7·8 Normal, 7·9 to 8·7 moderately alkaline. Above 8·7 Alkaline. E. C. (Electrical conductivity). Upto 1·0 millimho — Harmless 1·0 to 3·0 millimhos — Moderately saline. Above 3·0 millimhos — Injurious to growth.
2.	Talainayar	,,	8·2	0·90	988	1235	1273	
3.	Edayiruppu	,,	8·6	0·40	1094	981	1035	
4.	Chandrapadi	,,	8·6	0·80	495	720	720	
5.	Amoor	Trichy	8·6	0·40	1080	1102	900	
6.	Alambadi	,,	8·3	0·50	1094	864	1191	
7.	Soliumkuttam	Ramnad	8·7	0·30	1035	765	1091	
8.	Krishnapuram	Chingleput	8·7	1·50	473	495	540	
9.	Siruvachur	Trichy	7·9	1·00	990	1147	1435	
10.	Sodhungudi	Ramnad	8·7	0·20	952	435	1000	
11.	Thinaikulam	,,	8·6	0·10	775	946	1045	
				Total	9703	9635	11068	
		Average acre yield			882	876	1006	
		Yield as a % over SR. 26B			100·00	99·31	114·00	

TABLE III

Results of milling and cooking tests conducted on cultures 10022, 10034 and SR. 26B.

Culture or variety	% of outturn of rice on milling	Quantity of uncooked rice taken for cooking		Time taken for cooking	Cooked rice obtained		Ratio of cooked rice		Size of cooked rice
		Weight	Vol.		Weight	Vol.	Weight	Vol.	
10022	66.0	20 gm.	16 cc.	16 minutes	60 gm.	53 cc.	1 : 3·0	1 : 3·3	Long
10034	68·0	20 gm.	16 cc.	16 minutes	64 gm.	60 cc.	1 : 3·2	1 : 3·75	Medium
SR. 26B	64·4	20 gm.	15 cc.	17 minutes	58 gm.	57 cc.	1 : 2·9	1 : 3·80	Very long