https://doi.org/10.29321/MAJ.10.A02962

Madras agric. J. **66** (6) : 351 – 354, June 1979

Genetic Improvement in Ponni (Mashuri) Rice

P. NARAYANASAMY[1] and S. R. SREERANGASAMY[2]

Ponni (Mashuri) is a medium duration rice variety largely grown during *Samba* and *Thaladi* seasons in Tamil Nadu extending from August to February. It is known for its fine and good quality rice coupled with adaptability to monsoon conditions followed by cold weather period. But being a tall *indica* variety it is susceptible for lodging resulting in drastic reductions in yields. Therefore to improve this variety for plant type, high yielding with fine grains resembling that of Ponni and adaptability for monsoon period hybridization was effected with IR 8 in the year 1972. Twenty selections confirming to these objectives were finally evaluated in F 6 for the yield and yield components and grain type. It has been identified that genotypes P. 151, 162, 166, 174 and 191 appear promising from their desirable level of expression of yield components, and higher yields coupled with the duration and grain type of *Ponni*.

Rice variety Ponni (Mashuri) is one of the few successful *japonica* × *indica* (Taichung 65 × Mayung Epose 80) derivatives largely grown in *Samba* and *Thaladi* seasons in Tamil Nadu extending from August to February. It also occupies a large area under a single variety in all the rice growing tracts in India. It is a variety with fine and good quality rice and possessing adaptability for North East monsoon period followed by cold weather conditions. None of the high yielding varities so far released for general cultivation possesses such fine grains like Ponni (Mashuri) coupled with adaptability to rainy season followed by cloudy cold weather conditions. Despite possession of these desirable features, this variety being a tall and weak stemmed in nature is susceptible for lodging thereby resulting in drastic reductions in yields. The mean yield fluctuations is very high in this variety depending upon the extend of lodging and stage at which it lodges. A variety with improved plant type erect and resistance to lodging, high in yielding and fine in grain type with field duration similar to Ponni with adaptability to late planting (Oct-November to January/February) could also increase the grain production by replacing this popular tall rice *Ponni*. To fulfill these objectives, breeding was initiated and the results are reported.

MATERIAL AND METHODS

Ponni was crossed with IR 8 in the year 1972 at Paddy Breeding Station, Coimbatore to incorporate the plant type and yield potential of IR 8

1 Assistant Professor (Plant Breeding), Krishi Vigyan Kendra, Pondicherry.
2 Dean, Basic Sciences and Humanity, Tamil Nadu Agricultural University, Coimbatore-641 003.

in Ponni. Subsequently the seggregating progenies were studied at three centres viz. Coimbatore, Bhavanisagar and Pondicherry. In order to induce lodging the progenies from F2 were heavily manured at 200 kg N/ha besides being raised during the period from September - February for screening for adaptability for monsoon period followed by cloudy cold weather conditions. Altogether, a total of 5000 plants was evaluated in F2 generation of Ponni × IR 8. Out of this, 200 F2 plants were selected and grown as progenies in F 3. As a result of further evaluation and selection in F3, 60 progenies were advanced to F4 and following similar procedures in F4, 50 progenies were carried forward to F5. Among the selections studied in F5, 45 genotypes were selected and carried forward for evaluation in F6 generation.

The evaluation of the progenies in F6 was done along with Ponni at the experimental farm of Krishi Vigyan Kendra, Pondicherry in the year 1976-77 *Samba* season (September-February). Thirty days old seedlings were transplanted in progeny row trials, each progeny comprising three lines of 5 Mt. length. Single seedling hole was planted adopting a spacing of 20 × 10 cm. The crop was manured at 120 kg N, 60 kg P_2O_5 and 60 kg K_2O/ha. Besides collecting data on days to flowering, plant height, productive tillers, panicle length grain, number per ear, grain weight, length, breath and l/b ratio of grains, the centre row from each progeny was harvested separately for grain yield and yield was computed to one square metre for comparative evaluation. Reduction in plant height to eliminate lodging, high expression of yield indices and components for increasing the grain yield and maintaining the flowering duration and grain type similar to Ponni were the main criteria applied in the selection of the progenies in F6.

RESULTS AND DISCUSSION

Altogether 45 progenies were examined and 20 premising homozygous genotypes were finally identified to confirm to the objectives. The data are presented in Table.

The data showed that all the progenies recorded higher yield than Ponni ranging from 13 to 34 per cent and exhibited dasirable levels of expression of yield components that could contribute to high yield. The progeny rows of IR 8 × Ponni showed high degree of homozygosity within progenies but marked variations between progenies. About 300 to 400 panicles and 35000 to 45000 grains/sq. m. are considered optimum for higher yields (Anon. 1969). The extent of variation was striking and high for number of panicles per square metre, number of grains per panicle and in days to flowering, while the variation was considerable for the other traits.

TABLE 2. Yield and yield components and other metric traits of the genotypes of Ponni×IR 8

Selections	Grain yield/ sq. m. (kg)	Yield increase over Ponni (%)	Maturity in days	Plant height in cm	Panicles/sq. m. (nos)	Panicle length (cm)	Grain No. / panicle	1000 grain weight (g)	GRAIN		
									Length (mm)	Breadth (mm)	L/B ratio
151	0.83	34	145	97	400	21.4	165	22.0	7.0	2.5	2.3
153	0.70	13	145	104	375	22.0	155	19.1	7.5	2.8	2.6
154	0.74	19	145	108	370	21.4	150	18.3	7.7	2.7	2.8
155	0.72	16	145	106	400	21.6	145	19.5	7.2	2.7	2.6
157	0.70	13	135	103	330	18.2	140	18.1	7.0	2.7	2.5
159	0.70	13	135	110	340	22.9	138	20.8	7.0	2.7	2.5
161	0.71	14	135	104	330	20.8	138	19.9	7.2	2.6	2.7
162	0.72	16	134	101	350	20.5	160	18.2	7.2	2.7	2.6
163	0.73	17	132	108	360	21.8	132	22.0	7.5	2.9	2.5
166	0.70	13	135	100	315	23.0	160	19.0	7.8	2.8	2.7
167	0.70	13	134	101	360	19.8	155	21.6	7.8	2.7	2.8
172	0.73	17	135	102	315	19.0	120	22.0	7.7	2.9	2.5
174	0.70	13	138	93	320	22.0	155	21.0	7.1	2.7	2.6
179	0.71	14	134	102	310	22.7	140	22.1	7.1	2.9	2.4
180	0.79	27	136	106	330	21.5	130	20.8	7.3	2.8	2.6
184	0.70	13	138	100	310	21.6	145	20.5	7.5	2.5	2.9
185	0.70	13	135	100	330	21.5	150	22.7	7.8	2.6	3.0
190	0.81	31	138	105	325	20.4	135	22.4	7.4	2.9	2.5
191	0.74	19	136	96	330	22.5	160	21.6	7.1	2.6	2.7
192	0.71	14	135	98	320	19.3	155	22.0	7.5	2.7	2.7
194	0.73	14	135	99	310	20.1	145	22.0	7.2	2.6	2.7
Ponni	0.62	—	140	110	320	22.4	160	17.2	7.3	2.2	3.2

All the progenies had resemblance of panicles and grain type like Ponni. The progenies in F6 exhibited character - combinations of IR 8 and Ponni and differed in their levels of expression of desirable features. The plant height

was reduced upto 10 to 13 cm, while the increase in yield was from 13 to 34 per cent. Among the progenies, four of them were longer in duration than Ponni, three are almost equal to Ponni (138 days) and the rest were shorter in duration by a week. Six progenies were almost equal to Ponni (105 - 110 cm) in respect of plant height and the rest were dwarf (95 - 104 cm). Panicle length was slightly longer in four progenies and in remainings it was either equal to or shorter than Ponni. However, panicle length was not always correlated with yield (Chandramohan and Narayanasamy, 1975). In 1000 grain weight all the genotypes exceeded that of Ponni. In all the progenies the ripening colour of the spikelets was gold brown exactly like Ponni (Mashuri). The grain measurements on length, breath and l/b ratio (2.6 to 3.0) indicated that in more than 50 per cent of the genotypes the grain type approximated Ponni. An overall assessment of yield components, with concemittant selection for days to flowering, grain type and maturity like Ponni, revealed that of the 20 progeny rows finally evaluated five progenies are worth considering and are selected. It is concluded from the results of the study that by virtue of combinations of desired features viz. reduction in height to resist lodging, high yielding ability with grain type and field duration of Ponni, and adaptability to monsoon periods followed by cloudy weather conditions, genotype P. 151, 162, 166 174 and 191 could be suitable to replace the rice Ponni (Mashuri).

REFFERENCES

ANONYMOUS 1969 — Progress rep. AICRIP Hyderabad.

CHANDRAMOHAN, J. and P. NARAYANASAMY 1973 Correlation of yield components and other metric traits with yield in tall and dwarf *Indica* rice. *Madras agric.* J. **60**: 1162 - 168.