

Performance of New High Yielding Varieties of Rice at Coimbatore

by

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Introduction: Rice Research at Paddy Breeding Station, Coimbatore was intensified in the year 1969 when it was recognised as the Zonal Headquarters for the Southern Peninsula under the All India Co-ordinated Rice Improvement Project popularly known as "AICRIP". The main objective of the programme of research at this centre is to carry out multi-disciplinary and multilocational co-ordinated research on rice as per the programme of work drawn at the Rice Research Workshops held twice in a year. This Co-ordinated approach to rice research has enabled rice research workers make rapid progress in finding out newer technologies in Rice Production. Research on varietal improvement under the project has so far resulted in the release of fourteen high yielding varieties of rice for large scale cultivation in India. During the Rice Research Workshop held at Hyderabad during February, 1971 eleven more varieties were recognised as fit for pre-release multiplication. Besides these, there are also varieties released by the State Departments and Agricultural Universities for specific locations, such as the variety Hamsa for Andhra Pradesh, Suma and Kusuma for Mysore, Annapoorna, Ashwathi, Rohini and Tiruveni for Kerala and Karuna and Pennai for Tamil Nadu. As new varieties have started coming in quick succession, it is necessary to study their performance under local conditions to choose the best suited strains that are to be popularised in each State. The data on the performance of the varieties at Paddy Breeding Station, Coimbatore are discussed with a view to fix the best for large scale cultivation in Tamil Nadu.

Materials and Methods: A list of new varieties released already and those that have been accepted for pre-release together with the details of the varieties released by the State Departments and Agricultural Universities for specific locations are furnished in Appendix I. The performance of the 36 varieties listed, in the trials held at the Paddy Breeding Station, Coimbatore since 1969 was studied. The yield data recorded for the different seasons were compiled and the average of all seasons worked out and compared against the mean yield recorded in the multilocation trials held in the major rice growing centres of the Indian Union under the varietal testing programme of the All India Coordinated Rice Improvement Project.

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Results and Discussion: Data on the average yield of grain in kilogram per hectare, the seasons in which they were tried and the All India average in the multilocation trials in each of the 36 varieties are furnished in the Table.

TABLE

S. No.	Variety	Duration in days (seed to seed)	Season grown	Average yield of grain in kg per ha	All India average
1	2	3	4	5	6
I. <i>Early duration:</i>					
(a) Below 110 days					
1.	Bala	100-110	Kharif 69, Kharif 70 Rabi 70, Rabi 71	3923	3453
2.	Annapoorna	100-110	Kharif 70, Rabi 71	4607	4643
3.	Karuna	105-110	Rabi 69, Rabi 71, Kharif 70	5493	Not available
4.	Cauvery	105-110	Rabi 69, Rabi 70, Rabi 71, Kharif 69, Kharif 70	5202	4090
5.	Rohini	80-110	Rabi 70	3156	4357
6.	Pusa 2-21	100-110	Rabi 69, Rabi 70, Rabi 71 Kharif 70	5890	4222
(b) (110-120 days)					
7.	Kanchi	115-120	Rabi 69, Rabi 70, Rabi 71, Kharif 69, Kharif 70	5280	4041
8.	Pennai	115-120	Kharif 69	4575	Not available
9.	Padma	115-120	Rabi 69, Rabi 70, Rabi 71, Kharif 69, Kharif 70	4636	4018
10.	Suma	115-120	Rabi 70	4110	3971
11.	Triveni	100-120	Rabi 70	4969	4444
12.	IET. 849	115-120	Kharif 69, Kharif 70, Rabi 70, Rabi 71	6191	4843
13.	CR. 44-1	115-120	Kharif 70, Rabi 71	5409	4242
(c) (120-125 days)					
14.	Hamsa	120-125	Rabi 69, Rabi 70, Rabi 71, Kharif 69, Kharif 70	4364	3591
15.	Sabarmathi	120-125	Rabi 69, Rabi 70, Kharif 70	3988	4155
16.	Krishna	120-125	Rabi 69, Rabi 70, Rabi 71 Kharif 69, Kharif 70	5098	4133

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1	2	3	4	5	6
17.	Kusuma	120-125	Rabi 70, Kharif 70	4321	3359
18.	Jamuna	120-125	Rabi 69, Rabi 70, Kharif 70	3756	4022
19.	CR. 44-35	120-125	Rabi 69, Rabi 70, Rabi 71 Kharif 69, Kharif 70	5262	4288
20.	Ashwathi	120-125	Rabi 70	5016	5417
II. <i>Mid-duration:</i> (125-140 days)					
21.	Ratna	125-130	Kharif 69, Kharif 70, Rabi 69, Rabi 71	4844	5687
22.	IR. 20	130-135	Rabi 69, Rabi 70, Kharif 70	5671	5468
23.	IR. 22	125-130	Rabi 70, Rabi 71, Kharif 70	6033	5944
24.	Jaya	130-135	Rabi 69, Rabi 70, Rabi 71, Kharif 69, Kharif 70	6137	5452
25.	IR. 8	135-140	Rabi 69, Rabi 70, Rabi 71, Kharif 69, Kharif 70	6006	5185
26.	IR. 24	135-140	Rabi 71	6090	Not available
27.	Vijaya	135-140	Rabi 69, Rabi 70, Rabi 71, Kharif 69, Kharif 70	4890	5006
28.	CR. 36-148	125-130	Rabi 70, Rabi 71, Kharif 70	5963	5429
29.	CR. 10-114	125-130	Rabi 70, Rabi 71, Kharif 70	5666	5162
III. <i>Long Duration:</i> (140 days and above)					
30.	CR. 10-4103	140-145	Rabi 70, Rabi 71, Kharif 70	5699	6122
31.	IR. 5	140-145	Kharif 70	3295	3428
32.	Pankaj	145-155	Kharif 70	4844	3859
33.	Jagannath	145-170	Kharif 70	3398	3973
34.	CR. 10-5071	135-145	Rabi 70, Rabi 71, Kharif 70	4676	4321
35.	IET. 722	140-145	Kharif 69, Kharif 70, Rabi 70	5720	6479
36.	IET. 1136	140-145	Rabi 69, Rabi 70, Rabi 71	5035	5163

Out of the six varieties having a duration shorter than 110 days, Rohini and Bala have proved to be of low yield potential. Pusa 2-21, the best among the six, has yielded 5890 kg of grain per hectare. Besides its high yield potential it has also many desirable attributes such as synchronised tillering, adaptability to a wide range of environmental conditions, superior performance in all India trials and non-sensitivity to cold weather conditions. Among the varieties grouped under 110-120 days duration, IET. 849 is the best giving an average grain yield exceeding 6 tonnes per hectare. It scores over Kanchi in its higher yielding ability and wider adaptability. Of the seven varieties belonging to the 120-125 days duration group, Krishna and Ashwathi have given yields over 5 tonnes per hectare, while others have given lower yield. In the mid-duration group viz., 125-140 days maturity, the yield of Ratna and Vijaya was about 20 per cent less than that of the high yielding variety Jaya but both of them were superior to it in quality of rice. IR. 20, IR. 22, CR. 36-148, CR. 10-114 and IR. 24 combine in them both high yield potential and good quality rice. In the long duration group, the performance of IET. 722, IET. 1136 and CR. 10-4103 is satisfactory. Of these, CR. 10-4103 has the additional trait of possessing long slender grains of good cooking quality besides high yielding ability.

Conclusion: Reviewing the data presented above, it may be concluded that Pusa 2-21, Karuna and Cauvery in the very early group, IET. 849, CR. 44-1 and Kanchi in the 110 to 120 days maturity group, CR. 44-35, Krishna and Ashwathi in the 120-125 days duration group, Jaya, IR. 8, IR. 24, IR. 22, CR. 36-148, IR. 20 and CR. 10-114 in the mid-duration group and IET. 722, IET. 1136 and CR. 10-4103 in the long duration group can be considered fit for taking up intensive trials in Tamil Nadu for fixing up the most suitable varieties for large scale cultivation in the varied agro-climatic regions of the State.

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APPENDIX I

List of new varieties released for cultivation and those accepted for pre-release

	1	2	3	4	5	6
(1) Name	Bala	Annapoorna	Karuna	Cauvery	Rohini	—
2. Culture No.	CR.42-38-173	Culture 28	Culture 11321	IET.355	Culture 1-1-4	Pusa 2-21
3. Parentage	N.22 × T(N)1	PTB.10 × T(N)1	IR.8 × ADT.27	T(N)1 × TKM.6	PTB.10 × IR.8	IR 8 × TKM.6
(4) Duration in days seed to seed	100-110	100-110	105-110	105-110	80-110	100-110
(5) Yield in tonnes per hectare	3 to 5	3 to 5	4 to 6	4 to 6	3 to 5	4 to 6
6. Grain type	Short bold	Short bold	Short bold	Short bold	Short bold	Short bold
7. Kernal size (mm)	4.95 × 2.51	5.3 × 2.3	4.22 × 2.4	5.54 × 2.47	5.9 × 2.1	5.56 × 2.50
8. 1000 gr wt in gm	20.3	23.17	17.9	22.7	26.34	22.2
9. Colour of rice	White	Red	White	White	White	White
10. Presence or absence of abdominal white	Present	Absent	Absent	Absent	Present	Present
11. Hulling per cent	76.4	—	76.5	78.2	—	76.0
12. Milling per cent	70.5	—	74.6	72.5	—	70.0
13. Protein content per cent	10.2	—	9.0	8.9	—	8.8
14. Cooking quality	Very good	Average	Good	Good	Good	Very good
(15) Special attributes if any	Suited for direct sown conditions; resistant to drought	—	Short round grains	Strain of wide adaptability; lodges at high dosage of nitrogen	—	Adapted to a wide range of environmental condition

	7	8	9	10	11	12
1.	Kanchi	Pennai	Padma	Suma	Triveni	—
2.	IET.400	Culture 8690	CR. 28-25	11366-7	Culture 11-8-12	IET.849
3.	T(N)1 × CO.29	T(N)1 × ASD.1	T.141 × T(N)1	T(N)1 × TKM.6	Annapoorna × PTB.15	T(N)1 × CO.29
4.	115-120	115-120	115-120	115-120	100-120	115-120
5.	4 to 6.	4 to 6	4 to 6	3 to 5	4 to 5	4 to 6
6.	Short bold	Short bold	Short bold	Long bold	Medium slender	Long bold
7.	5.39 × 2.42	—	5.50 × 2.4	6.19 × 2.13	5.3 × 2.1	6:19 × 2.13
8.	21.6	21.02	21.4	20.3	23.1	23.6
9.	White	Red	White	White	White	White
10.	Absent	Absent	Present	Absent	Present	Absent
11.	77.7	74.3	78.8	76.8	—	78.0
12.	71.5	69.0	75.1	71.6	—	72.0
13.	9.5	—	8.3	8.9	—	8.6
14.	Good	Good	Good	Very good	Good	Average
15.	—	—	—	—	—	—

	13	14	15	16	17	18
1.	—	Hamsa	Sabarmathi	Krishna	Kusuma	Jamuna
2.	CR.44-1	C.3383	BC.5-55	CR.1-6	10908-31	BC.6-48
3.	TKM.6 × IR.8	HR.12 × T(N)1	BAS.370/5 × T(N)1	GEB.2 × T(N)1	T(N)1 × Basumathi	BAS.370/5 × T(N)1
4.	115-120	120-125	120-125	120-125	120-125	120-125
5.	4 to 6	3 to 4	4 to 5	4 to 6	3 to 5	4 to 5
6.	Short slender	Long slender	Medium slender	Short bold	Long slender	Long bold
7.	5.58 × 1.65	6.36 × 2.07	5.85 × 2.18	5.35 × 2.33	6.13 × 1.74	6.34 × 2.24
8.	20.9	22.9	20.1	20.2	18.2	22.7
9.	White	White	White	White	White	White
10.	Absent	Present	Absent	Present	Absent	Absent
11.	78.8	74.6	78.0	77.5	75.2	78.8
12.	72.8	68.3	73.2	70.5	69.3	74.4
13.	10.2	9.3	12.0	7.0	8.1	9.6
14.	Very good	Acceptable	Good	Good	Very good	Good
15.	Earlier than Ratna	Has tolerance to cold at tillering phase	Scented grains	Heavy tillering type	—	Non-scented, prone to lodging at higher dose

	19	20	21	22	23	24
1.	—	Asbawathi	Ratna	IR 20	IR.22	Jaya
2.	CR.44-35	Culture 1-21-5	CR.44-11	IR.532-E-576	IR.579-160-2	IET.723
3.	TKM.6 × IR.8	PTB.10 × DGWG	TKM.6 × IR.8	IR.262 × TKM.6	IR.8 × Tadukan	T(N)1 × T.141
4.	115-125	120-125	125-130	130-135	125-130	130-135
5.	4 to 6	4 to 6	4 to 6	5 to 7	5 to 7	5 to 7
6.	Long slender	Short bold	Long slender	Medium slender	Long slender	Long bold
7.	6.51 × 1.87	5.8 × 2.2	6.84 × 1.97	5.76 × 2.12	6.88 × 1.99	6.73 × 2.44
8.	22.2	26.3	21.5	19.9	23.2	27.8
9.	White	White	White	White	White	White
10.	Absent	Present	Absent	Absent	Absent	Present
11.	76.8	—	78.0	74.6	76.8	76.4
12.	69.0	—	72.4	68.6	73.4	72.4
13.	7.8	—	9.1	7.1	7.4	7.9
14.	Good	Good	Average	Very good	Good	Good
15.	—	—	—	Has some resistance to stem borer; lodges at high dosage	Weakly photo-sensitive	Wide adaptability; stable yield; panicle better exposed than IR 8

	25	26	27	28	29	30
1.	IR. 8	IR.24	Vijaya	—	—	—
2.	IR. 8-288-3	IR.661-1-140-3-117	CR.10-5437	CR.36-148	CR.10-114	CR.10-4103
3.	Peta Dec-gee-woo gen	IR.8×IR.127-2-2	T.90×IR.8	IR.8×CR.1	T.90×IR.8	T.90×IR.8
4.	135-140	135-140	135-140	125-130	125-130	135-145
5.	5 to 7	5 to 6.5	5 to 6	5 to 6	5 to 6	5 to 6
6.	Long bold	Long slender	Long bold	Long slender	Long slender	Long slender
7.	6.42×2.55	6.3×1.98	6.39×2.17	6.31×2.05	6.77×1.78	6.29×1.86
8.	27.28	20.8	21.3	20.3	17.3	17.1
9.	White	White	White	White	White	White
10.	Present	Absent	Present	Absent	Absent	Absent
11.	77.6	—	75.6	76.7	71.0	73.2
12.	72.0	—	68.9	69.2	68.0	68.4
13.	9.6	—	7.9	9.6	9.5	9.2
14.	Average	Good	Very good	Good	Very good	Average
15.	—	Fine rice with high degree of resistance to pests and diseases	Has high degree of resistance to green leaf hoppers	—	—	—

	31	32	33	34	35	36
1.	IR. 5	Pankaj	Jagannath,	—	—	—
2.	IR. 5-47-2	IR. 5-114-3-1	Dwarf mutant (BBS 879)	CR. 10-5071	IET. 722	IET. 1136
3.	Peta × T.Rotan	Peta × T.Rotan	Resulting from irradiation of T.141	T.90 × IR.8	T(N)1 × T.141	IR.8/2 × B.589 A.4.18/2 × T(N)1
4.	140-145	145-155	145-170	135-145	140-145	140-145
5.	4 to 6	4 to 6	4 to 6	5 to 6.5	5 to 6.5	5 to 6.5
6.	Long bold	Long bold	Medium slender	Long slender	Long bold	Long bold
7.	6.48 × 2.62	6.30 × 2.52	5.64 × 2.24	6.23 × 2.08	6.52 × 2.51	6.66 × 2.34
8.	25.9	25.2	19.1	20.5	27.3	28.9
9.	White	White	White	White	White	White
10.	Absent	Absent	Absent	Present	Absent	Present
11.	77.6	77.0	77.2	72.8	76.0	71.2
12.	73.4	73.0	70.6	67.7	68.8	67.8
13.	8.1	7.1	6.6	10.1	7.4	7.3
14.	Acceptable	Good	Good	Very good.	Good	Good
15.	Taller than IR.8	—	Sensitive to photo- period; susceptible to lodging.	—	A week later than Jaya, Higher yield	—