

Studies on the Performance and Response of Some Exotic Rice Varieties to Two Levels of Manuring at Coimbatore

by

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Introduction: Attention is now being given to the development of rice varieties possessing high yield capacity, stiff straw, good response to fertiliser and wide adaption to our country. To study the established varieties of diverse origin namely Taiwan, Philippines and India, with respect to their desirable characters and to accommodate them in the cropping pattern of Tamil Nadu, the present investigation was taken up at Paddy Breeding Station, Coimbatore under the All India Co-ordinated Rice Improvement Project for five seasons comprising *Kharif* and *Rabi* (Samba and Navarai) seasons of 1966, 1967 and 1968.

Materials and Methods: The seed materials tested comprised eighteen varieties from International Rice Research Institute, Philippines, eleven varieties from Taiwan and ten varieties developed in India (either by crossing Indian varieties with exotic varieties or by pure line selection) which included CO 29, ADT 27 and CO 32 of Tamil Nadu. Taichung (native)-1 Taichung (native)-2 and Tainan-3 are the important varieties to be mentioned from Taiwan. IR 5 and IR 8 are the important varieties from Philippines. The varieties were studied under two levels of manuring namely L 1 (50 kg N + 25 kg P_2O_5 + 25 kg K_2O) and L 2 (100 kg N + 50 kg P_2O_5 + 50 kg K_2O) / ha in split plot design with four replications. P_2O_5 and K_2O were applied as basal dose and 75% of N at the time of planting and another 25% top dressed at the time of panicle initiation of crop. Planting was done with two seedlings per hill adopting 20 cm \times 10 cm spacing. Besides yield, other ancillary characters like height of plant, flowering duration, ear bearing tillers per clump, panicle length etc., were also recorded. Since the varieties tested were large in number and varied from season to season, the performance of varieties from each origin taking as a unit is discussed in this paper.

Results and Discussion: *Rabi* season (January-May): During *Rabi* 1966, eight Taiwan varieties, one Philippine variety, and three from India were tested for yield. Under L1, the average yield of varieties from Taiwan, Philippines and India were 3718 kg, 4570 kg and 3443 kg / ha respectively. Under L2, Taiwan and Philippine varieties recorded 1009 kg and 826 kg / ha over L1 and showed response to heavy fertilisation. The varieties from Indian origin which included Cul. 2410 and CO 29 recorded less yield of 78 kg / ha.

In 1967 *Rabi* three Taiwan varieties, eight from Philippines and one Indian variety (ADT 27) were under trial. Both under L1 and L2 Philippine varieties recorded maximum yields of 4009 kg and 4698 kg/ha, followed by Taiwan and Indian varieties. The response to high fertiliser was found to be more in the case of Philippine varieties followed by Indian and Taiwanese varieties. The high response of Indian variety to high fertiliser is due to good performance of ADT 27, a japonica \times indica hybrid. In 1968 *Rabi*, two Taiwan varieties, six Philippine varieties and six varieties of India were tried. The trend in yield was found to be the same as in previous *Rabi* season. The increased yield over L1 was also found to be maximum *i. e.*, 1151 kg/ha in the case of Philippines varieties followed by Taiwan and Indian varieties. It can be seen from the data that the response of Indian varieties to higher doses of fertiliser was increasing steadily, year after year. This is due to the performance of newly developed rice varieties which are resistant to lodging and responding to high level of N, evolved by crossing Taichung (native)-1 with promising varieties of India. Three years average yield also showed the high response of Philippines and Taiwan varieties. The data are as follows :

Year and season Origin of varieties	1966 Rabi		1967 Rabi		1968 Rabi		Mean	
	L1 (kg/ha)	L2	L1 (kg/ha)	L2	L1 (kg/ha)	L2	L1 (kg/ha)	L2
Taiwan	3718	4727	3718	4208	3996	4961	3811	4632
Over L1		+1009		+490		+965		+821
Philippines	4570	5396	4009	4698	4475	5626	4351	5240
Over L1		+826		+689		+1151		+889
India	3443	3365	3052	3636	3272	4146	3256	3716
Over L1		-78		+584		+874		+460

Kharif Season (July-December) : The trial was conducted in *Kharif* seasons of 1966 and 1967 also. In 1966 *Kharif*, nine Taiwan varieties, two Philippines varieties and one from India were tried. In 1967 *Kharif* fourteen varieties from Philippines were compared along with three Taiwanese and one Indian variety. While T(N)-1 and Tainan-3 were the important Taiwan varieties, IR 8 and IR 5 were the promising Philippine varieties. CO 32 a pure-line selection of Tamil Nadu, represented Indian origin. Its yielding capacity under low level of manuring requires special mention. In *Kharif* season also,

TABLE 1. *Observations on Ancillary Characters*

Characters	TN 1		Tainan-3		IR 8		IR 5		CO 32		ADT 27	
	L1	L2	L1	L2	L1	L2	L1	L2	L1	L2	L1	L2
<i>1967</i>												
Height (cm)	77.0	82.2	89.9	100.8	74.5	79.8	85.0	91.6	109.1	116.1	—	—
Active tillers/plant	6.5	6.9	5.0	6.5	5.7	6.7	6.6	8.0	5.8	6.6	—	—
Grain duration in days	92	92	84	84	100	100	110	110	103	103	—	—
Length (cm)	20.2	21.3	21.4	23.0	20.5	21.1	19.9	20.6	20.8	21.3	—	—
Grains/panicle	73.0	79.0	103.5	122.2	76.5	89.7	88.0	100.7	138.0	164.7	—	—
Grain weight (g)	23.0	24.6	27.7	27.5	28.3	29.6	28.0	29.5	18.6	21.7	—	—
<i>1967</i>												
Height (cm)	83.9	96.3	95.8	98.6	80.6	83.7	—	—	—	—	107.5	112.9
Active tillers/plant	6.4	7.4	6.4	7.6	7.0	7.6	—	—	—	—	6.2	6.6
Grain duration in days	96	96	87	87	106	106	—	—	—	—	77	77
Length (cm)	20.2	20.0	20.6	19.9	21.0	21.2	—	—	—	—	20.1	22.1
Grains/panicle	80	81	89	102	81	87	—	—	—	—	83	104
Grain weight (g)	22.8	24.1	25.4	26.2	27.4	27.4	—	—	—	—	16.3	17.4

Year & season Origin & varieties	1966 Kharif		1967 Kharif		Mean	
	L1 (kg/ha)	L2	L1 (kg/ha)	L2	L1 (kg/ha)	L2
Taiwan	4095	4710	3657	4518	3876	4614
Over L1		+615		+861		+738
Philippines	3875	4621	4224	4929	4049	4775
Over L1		+746		+705		+746
India	4658	4662	5166	5765	4912	5214
Over L1		-4		+599		+302

Observations on the Characters: Observations on their ancillary characters like plant height, duration of flowering etc., recorded are furnished in Table 1 in respect of some promising varieties of Taiwan, Philippines and Indian origin. The varieties recorded more plant height, earhead length, number of grains per panicle, and 1000 grain weight in L 2 over L 1 level of manuring. In L 1 and L 2, duration of flowering of the varieties did not differ. The flowering duration of the varieties in *Rabi* season was found to be more than in *Kharif* season.

Summary and Conclusion: Certain traits like early maturity, yield potential, fertiliser response without lodging and adaptability to local condition were studied in some varieties from Taiwan, Philippines and India, for fitting up within local cropping schedule. The following conclusions were arrived at:

(1) All the varieties from Philippines and Taiwan responded well to the increased level of fertilisers. The varieties of Indian origin like CO 29, NC 1626 and Cul. 2410 failed to do so. The variety CO 32 has recorded the maximum grain yield under low level of manuring. (2) IR 8 recorded 47.6 % more yield than ADT 27 under heavy level of manuring. (3) IR 8 recorded more grain yield in *Rabi* than in *Kharif* season. (4) The promising varieties like IR 8, Taichung (native)-1 and Tainan-3 were found to have shorter growing period besides yielding capacity. Hence they have definite advantages in accommodating in the cropping schedule of Tamil Nadu. (5) IR 8 which matures from 130 to 135 days has been found to be non-sensitive to photo period while CO 32 is sensitive.

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