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Rajarajan (CO.40) A New High Yielding Rice Vatiety to Replace CO. 25

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Rajarajan (CO. 40) i. e. culture TNAU. 13493 a derivative of a cross between CO.25 and IR.8 was synthesised at the Paddy Breeding Station, Coimbatore during 1969 This variety has a duration of 165-175 days, and can replace the tall *indica* strain CO.25 which is grown in a large area in Samba (August-January) Thaladi or Pishanam (October-February) and late samba (November-March) seasons. Reduction of height to eliminate lodging, high harvest index for increasing the yield of grain, a duration similar to strain CO.25 and resistance to blast disease were the four main features of this variety. The results of the trials in cultivators' holdings during 1974-75 samba seasons are reported in this paper.

Data on the performance of CO.40 at the Research Stations, at Aduthurai, Pondicherry, Madurai and in several holdings of farmers in Thanjavur district revealed that this new variety was superior to CO.25 in yield. As against the average grain yield of 35 quintals/ha recorded for CO.25 in these trials, CO.40 gave 60 quintals which represents an increase of 72 per cent over CO.25.

Although many high yielding dwarf rice varieties have been developed and released for large scale cultivation in the past decade in Tamil Nadu, no single variety was found suitable for cultivation in about 40 per cent of the rice area in the State where rice varieties of 165–180 days duration are cultivated. Strain CO.25 is still the most important and ruling variety grown in such areas, along with other varieties like BCP. 1 and CO. 19 particularly, in the Cauvery delta of Thanjavur and Trichy districts and in the Southern districts of Madurai, Ramanathapuram and Tirunelveli during the samba (August-January) and *Thaladi* or *Pishanam* (October-February) and late samba (November-March) seasons. Strain CO.25 has wide adaptability and comes to maturity in clear and bright weather. It has an yield potential of 4 to 5 tonnes of grain and 6 to 7 tonnes of straw per hectare. Before the advent of the high yielding dwarf varieties in 1966, it was CO. 25 which recorded the highest yield among the improved tall *indica* varieties cultivated. It is also resistant to blast disease. Being a tall variety, the yield of straw is more than grain and it is susceptible to lodging often resulting in considerable reduction in grain yield. A variety with improved plant type, high yield potential, non-lodging habit and resistance to major pests and diseases which will replace CO. 25 is a long

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felt need. To achieve this objective, rice research was intensified in this direction in 1969 and as a result, selection TNAU 13493 was developed at the Paddy Breeding Station, Tamil Nadu Agricultural University, Coimbatore. For confirming the superior performance of Culture 13493 trials were undertaken in farmers' holdings and the results are reported.

MATERIALS AND METHODS

The variety CO.25 was crossed on in the year 1969 at the Paddy Breeding Station, Coimbatore in order to infuse high yield potential and improved plant type in strain CO.25. A large number of hybrid progenies of the cross were grown and studied in different generations. Reduction of height to eliminate lodging, high harvest index for increasing the yield of grain, a duration similar to the variety CO. 25 and resistance to blast disease were the four main criteria for screening and selection in the segregating progenies in F_2 and F_3 generations. Screening for blast disease was done in the F_2 and subsequent generations by growing the segregants in plots manured at a high level of nitrogen viz. 200 kg N per hectare and planting the susceptible variety ADT. 10 as bombardment to induce artificial epiphytotic conditions for blast incidence. In addition, blast spore suspension of the disease inoculum was also sprayed. As a result of intensive testing and screening, a selection TNAU 13493 was identified during *Samba* 1972 for further evaluation. Comparative yield trials were conducted during *samba* 1974 and 1975 at the Paddy Breeding Station, Coimbatore with this culture and other varieties including CO. 25. Its yield stability coupled with the desired duration merited its inclusion in the multilocation trials in the farmers' holdings as well as in other rice research centres in Tamil Nadu and Pondicherry States during 1975.

RESULTS AND DISCUSSION

The high yield potential of this selection TNAU 13493 among the long duration varieties was evident even in the early trials. In the trials conducted at the Paddy Breeding Station, Coimbatore during *Samba* seasons of 1974 and 1975 the selection recorded an average yield of 7623 kg per ha as against 5649 kg per ha recorded by CO. 25 with an increase of 34.9 per cent (Table I).

TABLE. I Performance of TNAU 13493 (CO. 40) at the Paddy Breeding Station, Coimbatore.

Season and year	TNAU 13493 (CO. 40)		CO. 25	
	Yield kg/ha	Maturity days	Yield kg/ha	Maturity days
Samba 1974	7350	170	5188	175
Samba 1975	7930	175	6110	180
Mean	7623	173	5649	178
Percentage on CO. 25	134.9	—	100	—

During *Samba* 1975, trials were conducted in the farmers' holdings as well as in other rice research centres in Tamil Nadu. The results from these centres confirmed the high yield potential of the selection. It recorded an average yield of 6050 kg of grain per hectare as against 3523 kg per hectare recorded by CO. 25, the increase in grain yield being 71.7 per cent (Table II).

Besides being a variety of high yield potential it possesses an improved plant type with semi-tall habit. It has also synchronous flowering behaviour, profuse tillering habit, upright leaves with late senecence and well exerted long compact panicles with round grains similar to that of CO. 25. With regard to disease and pest reaction the culture is moderately resistant to stemborer, blast and bacterial leaf

TABLE. II Performance of TNAU 13493 in farmers' holdings in Thanjavur District and in other rice research centres.

	Yield in kg/ha		Total duration in days	
	TNAU 13493 (Rajarajan) or CO.40	CO.25	TNAU 13493 (Rajarajan) or CO.40	CO.25
Thanjavur	4963	3770	167	167
Kumbakonam	5563	4125	181	181
Pattukottai	4500	3900	—	—
Nagapattinam	5400	4005	175	175
AICRIP-Aduthurai				
Trial I	8279	5638	171	175
Trial II	6231	2444	—	—
Trial III	4039	2013	174	183
Trial IV	7555	1930	169	172
Trial V	6054	2416	171	171
Trial VI	6175	3878	168	168
Paddy Experiment Station, Aduthurai				
N P K kg/ha				
Manurial trial 100 50 50	7808	4927	169	171
50 25 25	7390	5447		
Paddy Experimental Station, Aduthurai	4675	2326	169	175
Multiple crop Experimental Station, Pattukottai	4510	2512	—	—
Krishi Vigyan Kendra, Tamil Nadu Agrl. University, Pondicherry	7437	6050 (CO.38)	—	—
Agrl. College & Res. Inst., Madurai	6231	—	—	—
Average	6050	3523	—	—
Percentage on CO. 25	171.7	100.0	—	—

TABLE. III Important traits of TNAU 13493 (CO.40).

Particulars	TNAU 13493 (CO. 40)	CO.25
Duration in days	165-175	165-180
Average yield kg/ha	6050	3523
Plant height (cm)	105-110	140-150
Number of panicles/sq. m.	100	350
Panicle length (cm)	22.6	21.1
No. of grains/panicle	135	114
Weight of 1000 grains (g)	23.0	21.7
Grain to straw ratio	1:1.1	1:1.3
L/B retio	2.17	2.65
Commercial grading of grain	Short-bold (round)	Short-bold (round)
Disease reaction		
Blast	M R	R
Bacterial leaf blight	M R	M R
Pest reaction		
Stem borer	M R	S
Cost benefit ratio	1:2.46	1:1.92

R=Resistant. M R=Moderately resistant. S=Susceptible.

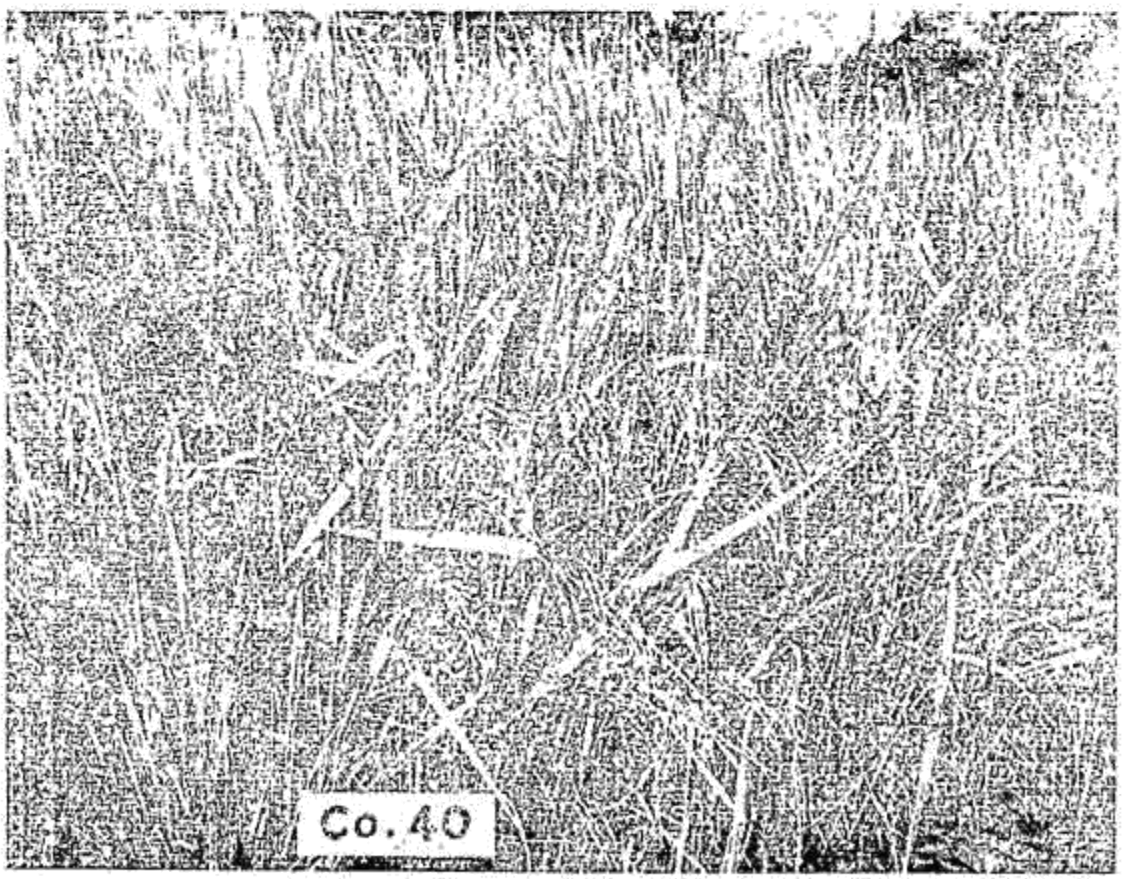

Fig. 1. Crop of CO. 40 (Rajarajan)