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Co. 43 — A SALT TOLERANT RICE VARIETY

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An attempt to evolve a high yielding salt tolerant rice suitable for saline and alkaline area of Tamil Nadu has resulted in the isolation of a promising culture. This culture, TNAU 17005 was obtained by crossing IR 20 with Dasal, a variety from West Bengal. This culture yielded 6.3 t/ha under normal condition, the yield increase over IR 20 being 21.5%. Under saline/alkaline condition it has an yield potential of 4.1 t/ha which is 56.6% higher than IR 20. It is a semi-dwarf type maturing in 135 to 140 days. Rice colour is white with fine quality suitable for raw and boiled rice. Hence, this culture was released as a high yielding variety Co 43 for saline/alkaline as well as other areas of Tamil Nadu where IR 20 is grown at present

Rice, the staple food crop of Tamil Nadu is mostly grown under low land condition with good irrigation facilities. About 20,000 hectares in coastal areas of South Arcot, North Arcot, Thanjavur, Ramanathapuram and Tirunelveli districts are cultivated under saline and alkaline conditions. Several patches of lands in Dharmapuri, Salem, Coimbatore and Periyar districts have developed alkal-

inity due to lack of drainage of excess water leading to water logging. In these areas the average yield is only about a ton per hectare. Varieties such as SR 26 B, PVR 1 and other local cultivars grown in these area belong to tall indica group of varieties with low yield and poor quality of rice. Hence, a high yielding salt tolerant rice is a long felt need. With the objective to

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Table 1. Yield performance of TNAU 17005 at paddy breeding station, Coimbatore.

Year	No. of trials	TNAU 17005	IR 20	Percentage over IR 20
1975	2	4470	3703	20.8
1976	1	6785	5357	26.7
1977	2	6383	5096	25.3
1978	7	5657	4609	22.7
1979	3	6387	5472	16.7
1980	3	6425	5238	22.7
1981	1	7950	6875	15.6
Mean	19	6294	5193	21.5

Table 2. Yield performance of TNAU 17005 under saline/alkaline/waterlogged conditions

Location	pH/EC	TNAU 17005	IR 20	Dasal	Percentage over	
					IR 20	Dasal
Coimbatore	8.1 0.77	4350	3092	1921	40.7	126.4
Kaveripattinam	8.3 0.3	3888	2167	—	79.4	—
Paiyur	8.9 1.3	6782	—	3586	—	88.6
Barur	9.8 1.1	6262	—	3586	—	74.6
Mean		5316	2630	3031	56.6	96.5

enhance the yield level in these areas, breeding work was undertaken at the Paddy Breeding Station, Tamil Nadu Agricultural University, Coimbatore, and the results are presented hereunder.

MATERIALS AND METHODS

A few types from the germplasm collection maintained in the station viz., Gettu, Dasal, PVR 1, SR. 26 B, Pokkali and Kattisamba were chosen as donor parents for salt resistance and crossed with IR 20 during 1971. For hybridization the wet cloth method was adopted. The F_1 plants were studied

during summer, 1971 along with the parents and hybrids were identified. The pedigree method of selection was followed from F_1 to F_2 generation. Three promising genotypes were isolated in F_2 generation of the cross Dasal x IR 20 and their yield performance was assessed at the station for three seasons during 1975 and 1976. Based on the performance, the culture TNAU 17005 was selected for large scale trials. It was tested under saline/alkaline conditions at the Agricultural Research Station, Kaveripattinam, Paiyur and Barur. Coordinated yield trials were conducted in the six research

Table 3. Yield performance of TNAU 17005 in the research stations of Tamil Nadu

Research Station	No. of trials	TNAU 17005	IR 20	Percentage over IR 20
Bhavanisagar	3	4913	4236	16.0
Aduthurai	3	4045	2893	39.8
Madurai	3	3969	2933	35.3
Coimbatore	3	4841	1841	26.0
Pondicherry	3	3490	1905	20.1
Srivilliputhur	1	5488	238	4.8
Mean	16	4791	3674	23.7

Table 4 : Yield performance of TNAU 17005 in the adaptive research trials in the districts

District	No. of trials	TNAU 17005	IR 20	Percentage over IR 20
North Arcot	8	4146	2941	41.0
Trichy	9	4349	3658	18.9
Thanjavur	10	3970	3362	18.1
South Arcot	6	3687	3298	12.0
Dharmapuri	1	2100	2000	5.0
Periyar	5	2740	2156	26.5
Madurai	3	4511	4022	12.2
Pondicherry	1	2000	1600	25.0
Mean	43	3438	2878	19.6

stations situated in different agro-climatic zones of the State for three years. Adaptive trials were conducted in 43 locations in eight districts of the State.

RESULTS AND DISCUSSION

Among the hybrid derivatives tested, the recombinants of the cross involving Dasal and IR 20 were found to be promising. Three cultures, based on their superior performance in F_4 , were isolated and tested in the yield trials. Of the three cultures tested, culture TNAU 17005 registered better performance in the trials conducted at the Paddy Breeding Station for three seasons viz., navarai 1975, main season of 1975 and 1976 (Table 1). In the

various trials conducted thereafter in the Paddy Breeding Station at Coimbatore from 1975 to 1981, this culture registered 15.6 to 26.7% higher yield than IR 20 with an average increase of 21.5%.

During 1977-78 the culture was evaluated under saline/alkaline conditions at Kaveripattinam, Barur and Paiyur and under water logged condition at Coimbatore (Table 2). The pH of the soil in these fields ranged from 8.1 to 9.8 and EC, 0.3 to 1.3. At Coimbatore and Kaveripattinam the yield increase was 40.7% and 79.4% over IR 20, respectively. At Coimbatore Paiyur and Barur, the culture recorded 126.4%, 88.6% and 74.6% higher yield than

5. Morphological and quantitative characters of TNAU 17005

Characters	Description
Habit	Erect
Plant height	85-90 cm.
Anthocyanin pigment in internode	Green
Leaf sheath	-do-
Pulvinus	-do-
Septum	-do-
Leaf axil	-do-
Juncture	Colourless
Ligule	White
Auricle	Colourless
Panicle	Long, drooping
Lemma and palea	Green at emergence
Apiculus	Green
Husk colour	Straw
Rice colour	White
Abdominal white	Absent
Length of grain (mm)	8.1
Breadth of grain (mm)	2.3
L/B ratio	3.6
Thickness of grain (mm)	1.8
1000 grain weight (g)	20.0

Dasai respectively. Thus under the adverse conditions, the culture yielded 56.6% and 93.5% more than IR 20 and Dasal respectively on an average.

The culture has been rated good in a trial at Machilipatnam (Andhra Pradesh) under soil pH 8.2 and EC 1.9 in the International Rice Testing Programme nursery trials conducted by IRRI, Philippines. From 1978 to 1980 the culture was tested in 16 trials in six research stations of the State and the yield increase over IR 20 ranged from 4.8 to 39.8% with an average of 23.7% (Table 3). The Adaptive Research Trials conducted in 43 locations of eight districts of the State revealed its superiority over IR 20 by recording 5 to 41% increase with an average of 19.5% (Table 4).

The morphological and quantitative characters of the culture TNAU 17005 are presented in Table 5. The culture

is a semi-dwarf, non-lodging type growing to a height of 85 to 90 cm with profuse tillering. Rice colour is white and fine, closely resembling IR 20. The quality is good for raw and boiled rice. It exhibits field tolerance to green leaf hopper besides being moderately resistant to blast, brown spot and leaf blight diseases. This culture is quite suitable for growing during *sornavari*, *samba*, *thaladi* and *navarai* seasons of various districts of Tamil Nadu. In addition to possessing high yield potential in the normal wetland conditions it is capable of yielding high under alkaline, saline and ill-drained conditions prevailing in the State.

Based on the above desirable features, the culture TNAU 17005 has been released as Co. 43 by the Tamil Nadu Agricultural University, Coimbatore, during 1981, for large scale cultivation, particularly for alkaline/saline/water loaded areas of the State.