



## ADT 41 (JJ 92) : A DWARF BASMATI RICE FOR TAMIL NADU

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### ABSTRACT

Basmati rice is praised for aroma and super fine quality. Traditional Basmati rice varieties are tall, lodging, photosensitive and with low yield potential. The improved Basmati varieties viz., Pusa Basmati 1 and Kasturi are not suitable for cultivation in Tamil Nadu because of their poor adaptation and yield. The research oriented on this line has resulted in the identification of a dwarf Basmati (AD 90190) with high yield potential retaining Basmati qualities and this selection was identified from the irradiated dwarf mutant of Basmati 370. The average grain yield is 4758 kg/ha in a crop duration of 110 days. This culture has been released as ADT 41 and popularly named as JJ 92, suitable for cultivation during *sornawari* /*kar* /*kuruvai* seasons.

**KEY WORDS :** Dwarf Basmati, ADT41, JJ 92, Rice, Tamil Nadu

Basmati type rice varieties are reputed for their grain quality and pleasant aroma. They are characterised by extra long slender grain, intermediate amylose content, low gelatinization temperature and medium gel consistency. Cooked rice is moist, soft and do not harden upon cooling. But traditional Basmati varieties are tall growing, photosensitive, low yielders and susceptible to pest and diseases. Improved varieties of Basmati viz., Pusa Basmati 1 and Kasturi are not suitable for cultivation in Tamil Nadu because of their poor adaptation and yield. Hence, in order to evolve a dwarf Basmati variety with high yield potential with the desirable features of Basmati rice, research work was started at the Tamil Nadu Rice Research Institute (TRRI), Aduthurai since 1988 and the results are reported.

### MATERIALS AND METHODS

The source material for the study i.e., dwarf mutant of Basmati 370 was obtained from Indian Agricultural Research Institute sub-centre at Aduthurai. The genotype possessing semi dwarf plant type with Basmati rice quality was isolated (AD 90190) and forwarded for yield trials during 1990-92 at TRRI, Aduthurai. The culture was tested in multilocation trial (MRT) (six locations - plot size 10 m<sup>2</sup>) during 1991 at all Rice Research Stations. During 1992, adaptive research trials (ART) (64 locations comprising 15 districts, five cents each) on-farm trials (OFT) (19 locations, 10 cents each) and demonstration trials (DT) at

Research Stations (12 locations, 10 cents each) were conducted. Further, initial yield trial (IYT) - Basmati Type (nine locations, 20 m<sup>2</sup> each) were conducted at all India level under All India Co-ordinated Rice Improvement Project (AICRIP).

### RESULTS AND DISCUSSION

In the station trial, AD 90190 recorded an average grain yield of 3922 kg/ha with a highest yield of 4666 kg/ha in *kuruvai* 1991 (Table 1). A mean grain yield of 2986 kg/ha was recorded by this culture in MLT while Pusa Basmati-1 and Kasturi yielded 10 and 20 per cent respectively less than AD 90190 (Table 2). The mean yield in DT was 3721 kg/ha with the highest yield of 5500 kg/ha in 107 days obtained at the Rice Research Station, Ambasamudram. In the OFT, the highest yield of 9650 kg/ha was recorded from Vadipatti of Madurai district while the mean yield was 4546 kg/ha. Regarding ART, the mean yield of AD 90190 was 5240 kg/ha at Kodumudi of Periyar

Table 1. Performance of ADT 41 (JJ 92) at TRRI, Aduthurai

Trial/Season	Grain yield (kg/ha)
Comparative yield Trial - <i>Thaladi</i> 1990	3040
Observational Trial - <i>Kuruvai</i> 1991	4666
Observational Trial - Summer 1991	3825
Observational Trial - <i>Kuruvai</i> 1992	4157
Mean	3922

Table 2. Performance of ADT 41 (JJ 92) in multilocation trial - 1991

Centre	Grain yield (kg/ha)		
	ADT 41 (AD 90190)	Pusa Basmati-1	Kasturi
TRRI, Aduthurai	3313	2550	2133
PBS, Coimbatore	3820	4020	3472
RRS, Ambasamudram	3255	2595	2750
KVK, Pondicherry	1556	1231	1528
RRS, Tirur	449	1165	1185
AC&RI, Madurai	2333	2740	2073
Mean	2986	2601	2471

% Over Pusa Basmati 1 : 10.8

% Over Kasturi : 20.8

PBS : Paddy Breeding Station; RRS : Rice Research Station; KVK : Krishi Vigyan Kendra; AC&RI : Agricultural College and Research Institute.

Table 3. Performance of ADT 41 (JJ 92) in various trials - 1992

Name of Trial	No. of location	Range (kg/ha)	Mean grain yield (kg/ha)
Demonstration trial (DT)	12	1875 - 5500	3721
On-farm trial (OFT)	19	1587 - 9650	4546
Adaptive research trial (ART)	64	1050 - 10,563	5240

Table 4. Performance of ADT 41 (JJ 92) in AICRIP - initial variety trial (Basmati Type) during 1992

Location	Grain yield (kg/ha)		
	ADT 41 (IET 13544)	Pusa Basmati 1	Karnal Local
Aduthurai	3291	2625	1666
Madurai	4500	3200	1883
Ramachandrapuram	8252	7104	4854
Maruteru	2716	4506	4382
Ragolu <sup>@</sup>	1922	1358	2310
Siruguppa <sup>@</sup>	2600	1154	995
Sabour <sup>@</sup>	880	277	500
Banswara	3200	3375	2950
Borkhara	5718	6150	3091
Mean	4613	4508	3138

@ - Not included in the mean (low mean/high cv)

Table 5. Quality characters of ADT 41 (JJ 92)

Characters	Description
Hulling percentage	73.5
Milling percentage	67.2
Head rice recovery (%)	55.7
Kernel length after cooking (mm)	11.4
Kernel linear elongation ratio	1.4
Kernel Elongation index	1.00
Water uptake (ml)	260
Volume expansion ratio	4.60
Optimum cooking time (Minutes)	17
Aroma	Mildly scented
Amylose content	Intermediate
Protein content (%)	9.81

district, this variety has registered the highest grain yield of 10563 kg/ha in 105 days (Table 3).

In AICRIP Trial, AD 90190 was tested as IET 13544 in comparison with Pusa Basmati-1 and Karnal local as checks. It registered an overall mean yield of 4613 kg/ha with 2.3 and 47 per cent increase over Pusa Basmati-1 and Karnal local (Table 4). The overall mean of this culture in all the above trial is 4758 kg/ha.

This variety has a mean hulling and milling of 73.5 and 67.2 per cent respectively with a head rice recovery of 55.7 per cent. The kernel is translucent, extra long slender (8.3mm) with pleasant and mild aroma. The length of cooked rice is 11.4 mm with

Table 6. Morphological description of ADT 41 (JJ 92)

Character	Description
Plant height (cm)	95-105
Leaf sheath	Green
Auricle	Pale green
Ligule	White, Cleft
Leaf blade	Green
Flag leaf	Erect to horizontal
Apiculus	Green
Awn	Mostly awned
Exsertion	Just exserted
Rough rice L x B x T (mm)	12.02 x 2.30 x 1.88
Brown rice L x B x T (mm)	8.32 x 1.92 x 1.62
L/B ratio	4.3
Rice grade	Extra long slender
Rice colour	White
Abdominal white	Occasionally present
1000 grain weight (g)	24.2
Hulling percentage	73.5
Milling percentage	67.2

an elongation ratio of 1.44. It is rich in protein (9.81%). The cooked rice has volume expansion ratio of 4.6 (Table 5).

This variety is moderately resistant to blast but susceptible to stem borers, leaf- and planthoppers, leaf folders, bacterial leaf blight, brown spot, tungro, and sheath rot which can be controlled by suitable plant protection measures. The morphological features of this variety are given in Table 6. It is semi dwarf in stature, non lodging with moderate tillering. The grains are occasionally awned.

Based on the above desirable features, a Basmati variety of rice ADT 41 (JJ 92) was released for cultivation during *sornavari/kar/kuruvai* season in Tamil Nadu.

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## ANALYSIS OF STABILITY PARAMETERS FOR SEED YIELD OF BLACK GRAM IN SODIC SOIL

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### ABSTRACT

The performance of six diverse black gram genotypes was evaluated in summer and *rabi* seasons during 1992 and 1993 under sodic soil. Pooled analysis of variance indicated significant differences among the genotypes and the environments. The genotype x environment interaction was highly significant indicating differential performance of genotypes under varied environmental conditions. The genotypes SSRC 1 and CO.5 showed higher yields, low stability of yield and adapted better to saline soil conditions. CoBG 282 recorded comparable yield to Co.5 and was better adapted to poor environment with yield stability.

**KEY WORDS :** Black Gram, Sodic Soil, GXE Interaction, Adaptation, Linear Component.

In Tamil Nadu, saline / sodic soil occupies about 0.30 million ha. In salt affected soils, the crop growth either completely fails or produces very little yield. Studies were undertaken at the Soil Salinity Research Centre, Tamil Nadu Agricultural University, Tiruchy to identify suitable crop to this soil. Black gram (*Vigna mungo* (L.) Hepper) is one of the important grain legumes grown in Tamil Nadu. Though several improved varieties have been developed, most of them show inconsistent performance under varied environmental

conditions. Eberhart and Russell (1966) suggested use of linear regression (bi) for measuring response and non-linear ( $s^2_d$ ) components of GXE interaction for judging phenotypic stability of genotypes. The method suggested by Bilbro and Ray (1976) makes use of bi as a measure of adaptation, co-efficient of determination ( $r^2$ ) as the stability parameter.

In the present investigation, an attempt has been made to identify genotypes with higher yield and stability of yield performance.