

cross, ZS 97A/IR 8, only IR 8 recorded high degree of expression for panicle length. Gilbert (1958) recorded that generally parents with high order of mean *per se* performance of characters resulted in hybrids with mean performance. The result of the present study indicated that the parents mentioned above were with high order of *per se* performance.

The *gca* effect is considered as the intrinsic genetic value of the parent for a trait which is due to additive genetic effect and it is fixable (Simmonds, 1969). Singh and Harisingh (1983) and Jagtap (1986) opined that the *per se* performances of the parents were not always associated with high *gca* effects. In the present study eventhough all the characters studied except the volume of 100 grains exhibited non-additive gene action, most of the parents showed high order of expression for both *per se* performance and *gca* effect.

From the study it is revealed that ZS 97A possessed high *gca* effect for number of productive tillers per plant, number of filled

Madras Agric. J.77, (9-12): 355-358 (1990)

grains per panicle, 100 grain weight, grain yield per plant and straw yield per plant. Among the pollinators, IR 50 possessed high *gca* effect for number of days to panicle emergence, number of productive tillers per plant, number of spikelets per panicle, number of filled grains per panicle, grain yield and straw yield per plant. Hence, these two parents may be exploited further for crop improvement programme.

#### REFERENCES

- GILBERT, N.E. 1958. Diallel crosses in plant breeding, *Heredity*, 12: 477-492.
- JAGTAP, D.R. 1986. Combining ability in upland cotton. *Indian. J.Agric.Sci.*, 56: 833-840.
- KEMPTHORNE, O. 1957. *An Introduction to Genetic Statistics*. John Wiley and Sons. Inc. New York.
- SIMMONDS, N.W. 1969. Genetic basis of plant breeding. *J. Rubb. Res. Inst., Malaya*, 21: 1-10
- SINGH AND HARISINGH, 1983. Combining ability and heterosis for seed yield, its component characteristics on Indian Mustard sown early and late. *Indian J.agric.Sci.*, 55: 309-315.
- YUAN, L.P. and VIRMANI, S.S. 1986. Current status of hybrid rice research and development, Int Symp. Hybrid Rice. Changsha. Hunan, China 6-10 October, 1986.

<https://doi.org/10.29321/MAJ.10.A01963>

## A SUPERFINE RICE VARIETY PAIYUR 1 FOR SALEM DHARMAPURI REGION

1. SURESH, A. NARAYANAN, P. VAIDYANATHAN, J. CHANDRASEKARAN and S.D. PETER  
Regional Research Station, Tamil Nadu Agricultural University,  
Paiyur - 635 112.

#### ABSTRACT

In Salem - Dharmapuri region of Tamil Nadu, the traditional rice variety GEB 24 is predominantly grown for its fine rice quality. The yield potential of this strain is, however, very low. Several genotypes obtained from national and international sources were evaluated to identify high yielding strains with quality grains. The culture DPI 591, a multiple cross derivative was found to be high yielder with good cooking qualities. It registered a grain yield of 5827 kg/ha with an increase of 16.2 and 54.6 per cent over Bhavani and GEB 24, respectively. This has been released as Paiyur 1.

Key Words : Fine rice, High Yield, Rice Variety.

Rice, the staple food crop of Tamil Nadu, is grown in an area of 32.5 lakh hectares of which nearl 4.5 per cent of the

area is in North-Western parts of the State comprising Salem and Dharmapuri districts. Fine grained rice varieties at

Table 1. Performance of DPI 591 rice culture at Regional Research Station, Paiyur

Year	Grain Yield (kg/ha)		
	DPI 591	Bhavani	GEB 24
1977	8688	6950	-
1978	6908	6367	3835
1979	5680	5189	4032
1980	4898	4840	3625
Mean	6543	5837	3831
% on Bhavani	112.1	100.0	65.6
% on GEB 24	170.1	152.4	100.0

generally preferred by the consumers of this region. The variety GEB 24 which is locally known as "Kitchili Samba" is predominantly grown in this tract as it possesses good cooking quality, fetching high premium in the market. However, being a tall indica type, this variety inherently gives low yields and responds poorly to high fertilizer application. In order to replace this traditional variety with high yielding ones possessing similar grain characteristics, research work was initiated at the Regional Research Station, Tamil Nadu Agricultural University, Paiyur and the results are reported.

#### MATERIALS AND METHODS

One hundred and twenty homozygous lines obtained from national and international sources were evaluated during

Kharif 1976. The genotypes possessing intermediate plant height with fine grain were selected and forwarded for further yield trials. Based on the performance, a culture DPI 591, derivative of the cross IR 1721-14/IR1416//IR 1330-3-3-2 was selected and tested in other Research Stations of Tamil Nadu Agricultural University during 1979-80. On-farm trials were conducted simultaneously in farmers' holdings in 20 locations during 1979 and in 30 locations during 1980.

#### RESULTS AND DISCUSSION

In the station trials, the improved rice culture DPI 591 recorded consistently higher grain yield over the standard varieties Bhavani and GEB 24 registering a mean yield increase of 12.1 and 70.1 per cent, respectively (Table 1).

Table 2. Performance of DPI 591 rice culture at Research Stations

S No	Research Stations	Grain Yield (kg/ha)	
		DPI 591	Bhavani
1979			
1	Agricultural Research Station, Bhavanisagar	6138	6339
2	TNAU, Coimbatore	4689	4421
3	Agricultural College & Res. Institute, Madurai	3908	2853
1980			
4	Agricultural Research Station, Bhavanisagar	5930	5609
5	Tamil Nadu Rice Research Institute, Aduthurai	3893	3595
6	Agricultural College & Res. Institute, Madurai	4583	4444
7	Krishi Vigyan Kendra, Pondicherry	5303	4121
	Mean	4921	4483
	% on Bhavani	109.	100.00

**Table 3.** Performance of DPI 591 in on-farm trials at farmers' holdings

	No. of Trials	Grain Yield (kg/ha)		
		DPI 591	Bhavani	GEB 24
1979	20	6128	4730	3637
1980	30	5904	4709	3779
	Mean	6016	4720	3708
	% on Bhavani	127.5	100.0	78.6
	% on GEB 24	168.4	130.0	100.0

**Table 4.** Mean Performance of the culture DPI 591 in the Research Stations and On-farm trials

S.No	Experiment	Grain Yield (kg/ha)		
		DPI 591	Bhavani	GEB 24
1.	Regional Research Station, Paiyur	6543	5837	3831
2.	Other Research Stations of TNAU	4921	4483	—
3.	On-farm trials	6016	4720	3708
	Mean	5827	5013	3770
	% on Bhavani	116.2	100.0	75.2
	% on GEB 24	154.6	133.0	100.0

The yield potential of DPI 591 varied from 3.9 to 6.1 t/ha in the various trials conducted at the Research Stations. With a mean grain yield of 4.9 t/ha, it recorded 9.8 per cent yield increase over Bhavani (Table 2).

recorded higher yield in all the locations tested with an average yield of 6016 kg/ha as compared to 4720 kg of Bhavani and 3708 kg of GEB 24. The increase in yield over Bhavani and GEB 24 was 27.5 and 68.4 per cent, respectively (Table 3).

In the on-farm trials conducted at the farmers' holdings, the culture DPI 591

The overall performance of this culture under different yield trials has clearly

**Table 5.** Morphological and quantitative characters of DPI 591

Characters	Description
Habit	Erect, Semi-tall
Plant Height	115-125 cm
Leaf sheath	Green
Septum	Cream
Legule	Colourless
Auricle	Colourless
Panicle	Long, compact
Husk colour	Dirty Brown
Rice colour	White
Abdominal white	Absent
Length of grain (mm)	7.9
Breadth of grain (mm)	2.2
L/B ratio	3.5
Thickness of grain (mm)	1.6
1000-grain weight (g)	15.7



Table 6. Cooking quality of DPI 591

Quality characteristics	DPI 591	Bhavani	GEB 24
Milling out turn (%)	71	65	65
Bulk density	9.7	8.6	8.6
Specific gravity	0.72	0.70	0.70
Time taken for cooking (mt)	13	15	15
Cooked volume/g (ml)	3.2	3.0	3.0
Water absorption (times)	3.2	2.5	2.3
Solid loss	5.83	2.70	4.88
Grain separation after cooking	Lumps	Separated	Lumps
Protein (%)	8.6	-	6.6
Lysine (g/100 g of protein)	2.7	-	2.5

indicated its superiority over Bhavani and GEB 24 in grain yield. It recorded on an average 5827 kg/ha with an increase of 16.2 and 54.6 per cent over Bhavani and GEB 24, respectively (Table 4).

The morphological and quantitative characters of the culture DPI 591 are presented in Table 5. This culture is a semi-tail non-lodging type growing to a height of 115 to 120 cm with profuse tillering. It possesses long compact panicles with spikelets overlapping each other. It is endowed with grain type that is even finer than GEB 24. It has good cooking quality with high volume of expansion,

shorter time taken for cooking and non-sticky nature. It is rich in protein with high lysine content compared to GEB 24 (Table 6). It exhibits field tolerance to blast and stem borer besides being moderately tolerant to thrips and whorl maggot. With a duration of 140-145 days from seed to seed, it is quite suitable for growing during Samba and Navarai seasons of Tamil Nadu. The high straw yield of 8.6 t/ha is an added advantage of this culture.

Based on the above desirable features, the culture DPI 591 was released by TNAU as Paiyur 1 for large scale cultivation in the North-Western region of the State.

Madras Agric. J.77, (9-12): 358-362 (1990)

## INDUCED MUTAGENIC EFFECTS OF QUANTITATIVE CHARACTERS IN RICE (*Oryza sativa* L).

G. NALLATHAMBI and V.D. GURUSWAMY RAJA

### ABSTRACT

Seeds of the rice variety Co 37 were treated with gamma rays, Ethyl methane Sulphonate (EMS) and their combination treatments. The mean, range, variance and co-efficient variation were estimated in the M2 generation for five traits. In general, the mean values of the most of treatments in M2 did not substantially deviate from the control, but variability had increased in mutagenic treated populations. Mean values for productive tillers and yield per plant had shifted in a positive direction with 10 and 20 KR gamma rays than other treatments including control. Selection may be effective for productive tillers and yield per plant at lower dose of gamma rays.

KEY WORDS : Rice, Mutagenesis, Quantitative traits.

1. Assistant Professor (Agrl. Botany), Agricultural Research Station, Thirupathisaram
2. Retired Dean (PG Studies), Tamil Nadu Agricultural University, Coimbatore.