Journal of Applied and Natural Science 6 (1): 258-261 (2014)

JANS

Screening of three promising rice genotypes for rainfed shallow lowlands of red and lateritic areas of West Bengal, India

G.K. Mallick*, K. Jana, S. Ghosh and G. Sardar

Rice Research Station, Nutanchati, Bankura – 722101 (West Bengal), INDIA
*Corresponding author. E-mail - mallickgkgene@gmail.com

Received: April 10, 2014; Revised received: May 17, 2014; Accepted: June 1, 2014

Abstract: A field experiment was conducted during *kharif* 2011-12 at Rice Research Station, Bankura, West Bengal to screen promising rice genotypes suitable for rainfed shallow lowland situation of red and lateritic areas of West Bengal. Among the thirty genotypes of rice tested, only three genotypes gave significantly higher yields over best check variety Swarna sub-1 (5324 kg ha^{-1}). These three promising genotypes of rice were IET 21987 (6898 kg ha^{-1}), IET 21979 (6759 kg ha^{-1}) and IET 21996 (6342 kg ha^{-1}). It is to be noted that IET 21987 is a nomination from Rice Research Station, Bankura, West Bengal. It was nominated to AICRIP trial IVT-RSL during 2010 in the designation of CN 1317-557-56-BNKR 42-2-3.

Keywords: Bankura, IET 21987, Rainfed shallow lowlands, Red and lateritic areas, Rice genotypes

INTRODUCTION

Rice is a crop which grows under widely divergent agro-ecological situation. It requires specific genotypes for specific regions/seasons. Out of total rice area in Eastern India, 48% (12.9 mha) is under rainfed low-land, which is dominated by rice during kharif season (Singh and Hossain, 2000). Production of rice in rainfed shallow lowland in Eastern region remained stagnant for a long time. However, for shallow low-lands of Eastern India, a few rice varieties like CR 1002, Pooja, Bipasa were released for cultivation (Ram *et al*., 2006). This shows that yield improvement per se of varieties bred for these ecosystem, especially for favourable shallow lowlands, is limited. For maximiza-tion of yield level in relatively favorable rainfed lowland ecologies in Eastern India thrush should be given to develop new plant type varieties with higher yield and better adaptation. Specific adaptability is the key for varietal success in ecologically handicapped regions. Several breeding lines are being evaluated every year in these ecosystem in trials organized under the All India co-ordinated Rice Improvement Programme (AICRIP).

Previously several early and mid-early rice genotypes have been screened for uplands of red and lateritic areas of West Bengal (Mallick *et al.,* 2012; Mallick *et al.,* 2013a,b,c,d; Mallick and Kundu, 2014). The present study was conducted at Rice Research Station, Bankura, West Bengal as one location of AICRIP trial to screen promising genotypes of rice suitable for cultivation in rainfed shallow lowland situation of Red and Lateritic areas of West Bengal.

MATERIALS AND METHODS

The experimental material consisted with thirty-three genotypes of rice including three checks. Rice Research Station, Bankura obtained all the genotypes from Directorate of Rice Research, Hyderabad except the local check 'Shashi'. Swarna sub-1, recently started to gain popularity in West Bengal used as regional check. A popular rice variety for rainfed shallow situation in South India, Dhanarasi was used as National Check (Ram *et al.,* 2006). The weather data during crop growing period and composition of rice genotypes tested under this experiment are given in table 1 and 2. Among the rice genotypes tested under this experiment one genotype IET 21987 was nominated from Rice Research Station, Bankura. It was nominated in the designation of CN 1317-557-56-BNKR 42-2-3 to Directorate of Rice Research, Hyderabad, for IVT-RSL trial in 2010 and promoted to IVT – RSL 2011.

Seeds were sown in 29th June, 2011 in rice research station's farm, Bankura, West Bengal. Seedlings were transplanted in the main field at the age of thirty days. Spacing between rows and plants were 20 cm and 15 cm, respectively. Fertilizer dose used N, P_2O_5, K_2O @ 60:30:30 kg ha^{-1}. The experiment was laid out in RBD with 3 replications. Records on 50% flowering, plant height, panicles / sq meter and yield (kg ha^{-1}) were taken. The co-efficient of variation (CV) was estimated according to Burton (1952).

RESULTS AND DISCUSSION

The performance of thirty genotypes of rice along with national check (Dhanarasi), regional check (Swarna Sub-I) and local check (Shashi) during kharif 2011 at rice research station, Bankura, West Bengal is presented in table 3.50% flowering ranged from 103 days (IET 22438) to 135 days (IET 22417) and

Table 1. Meterological data during crop growing period (kharif 2011).

Month	Temperature (°C)		Rainfall (mm)	Rainy days
	Maximum	Minimum		
July 2011	33.61	25.80	132.8	8
Aug 2011	31.94	25.31	335.8	15
September 2011	31.82	25.10	457.4	16
October 2011	31.61	23.91	55.2	3
November 2011	31.15	17.41	14.0	1

Source: Observatory, State Agricultural Farm (SAF), Bankura, West Bengal, India

Table 2 . Showing composition of promising rice of genotypes tested under the experiment.

S. N.	IET No.	Designation	Cross combination	Grain type
1	IET 21974	CR 2459-12-8	Swarna / IR 64	LB
2	IET 21987	CN 1317-557-56-BNKR 42-2-3	Vikramarya / Mahuri	LB
3	IET 21996	CR 2683-15-5-3-1-1	CRLC 899 / AC 38700	SB
4	Swarna Sub-1	Regional Check		
5	IET 22412	CR 2285-2-3-1-2-1	Ravana / Mahsuri	MS
6	IET 22413	CR 2677-3-1-5-1-1	Gayatri / Utkala prava	LB
7	IET 22414	CR 2986-1-2-1-1-1	CR 2080-169-2 / Sabita	LS
8	IET 22415	CR 2992-1-5-2-1-1	CR 2006-10 / Hanseswari	MS
9	IET 22416	CR 2683-4-1-1-1-1	CRLC 899 / AC 38700	LB
10	IET 22417	CR 2668-1-4-3-1-1	Gayatri / AC 38615	SB
11	IET 22418	CR 2676-4-2-1-1-1	Gayatri / AC 38597	LB
12	IET 22419	CR 2667-5-3-2-1-1	Gayatri / AC 38599	SB
13	Dhanarasi	National Check		
14	IET 22420	CR 2677-3-2-4-1-1	Gayatri / Utkala prava	SB
15	IET 22421	CR 2985-5-2-1-1-1	Gayatri / Bazaya 65	SB
16	IET 22422	CR 2689-3-2-1-2-1	Chakaakhi / AC 38707	LB
17	IET 22423	CR 2985-1-5-2-1-1	Gayatri / Bazaya 65	MS
18	IET 22424	CR 2702-18-56	Swarna / Ratna	MS
19	IET 22425	CR 2702-62-6	Swarna / Ratna	MS
20	IET 22426	CR 997-9-4	Savitri / CR 658	SB
21	Shasi	Local Check		
22	IET 22427	CR-2458-72	Savitri / Swarna	SB
23	IET 22428	CR-2573-621	Swarna / Gayatri	SB
24	IET 22429	CHR 17	IET 1444 / Basmati 370	SB
25	IET 22430	OR 1878-4	Swarna / Banskathi	LS
26	IET 22431	MGD-1102	Antarsali / Siddagiri – 1	SB
27	IET 22432	CR 2942-116	Swarna / Banskathi	LS
28	IET 22433	CR 2942-120	Swarna / Banskathi	LS
29	IET 22434	CRR 649-IR 77298-5-6-18	IR 64 (WH) / Aday Sel// 3* IR 64	LB
30	IET 22435	OR 2331-16	OR 1301-32 / IR 52561	MS
31	IET 22436	OR 2225-37	OR 1206-26-2 / IR 4221	LS
32	IET 22437	OR 2314-4	Mahanandi / IR 74	SB
33	IET 22438	MGD-1101	BPT-5204 / Antarsali	LB

average plant height ranged from 88 cm (IET 22434) to 165 cm (IET 22418). Highest numbers of panicle / sq meter was observed in IET 21987 (314). Among the three checks, best check was Swarna Sub-I. It gave yield 5324 kg ha^{-1}. Among the thirty test entries only seven entries namely IET 21987 (6898 kg ha^{-1}), IET 21974 (6759 kg ha^{-1}), IET 21996 (6342 kg ha^{-1}), IET 22412 (6064 kg ha^{-1}), IET 22418 (5740 kg ha^{-1}), IET 22423 (5602 kg ha^{-1}) and IET 22426 (5692 kg ha^{-1}) gave more yield than the best check variety Swarna Sub-I, of which only three showed significant difference in respect of yield from the best check variety. These genotypes were IET 21987 (CN 1317-557-56-BNKR 42-2-3), IET 21974 (CR 2459-12-8) and IET 21996 (CR 2683-15-5-3-1-1). This means these three genotypes of rice under this experiment response well to rainfed shallow lowlands in red and lateritic areas of West Bengal. Varieties gaining popularity are invariably from the region of their development suggesting that the specific adaptability is the key to varietal success in ecologically handicapped regions (Siddiq, 2013). Previously Mallik *et al.* (2006) developed CN 1231-11-7 (IET 17792), a promising rice genotype for the rainfed low land ecosystem in Eastern India. It is

Table 3. Yield performance of promising rice genotypes at farm of rice research station, Bankura, West Bengal during kharif 2011.

S. N.	IET No.	Days to 50% flowering	Plant height (cm)	Panicles/m^2	Yield (kg ha^{-1})
1	IET 21974	119	112	310	6759*
2	IET 21987	122	125	314	6898*
3	IET 21996	130	132	305	6342*
4	Swarna Sub-1	118	105	228	5324
5	IET 22412	122	142	306	6064
6	IET 22413	129	134	278	4166
7	IET 22414	119	160	221	3472
8	IET 22415	131	164	274	4907
9	IET 22416	129	135	269	5138
10	IET 22417	135	140	218	3981
11	IET 22418	132	165	291	5740
12	IET 22419	131	140	247	4351
13	Dhanarasi	119	122	267	5185
14	IET 22420	129	103	220	4166
15	IET 22421	126	120	212	4166
16	IET 22422	127	105	268	5222
17	IET 22423	119	115	267	5602
18	IET 22424	119	102	237	4722
19	IET 22425	115	132	279	5555
20	IET 22426	119	107	203	3055
21	Shasi	118	122	230	5046
22	IET 22427	113	110	225	4768
23	IET 22428	118	110	280	5694
24	IET 22429	119	122	222	4079
25	IET 22430	115	125	238	4861
26	IET 22431	116	116	187	2963
27	IET 22432	118	125	178	2639
28	IET 22433	110	124	216	5092
29	IET 22434	101	88	186	3472
30	IET 22435	122	92	248	5416
31	IET 22436	125	96	229	4953
32	IET 22437	126	108	241	5137
33	IET 22438	103	154	273	3800
Experiment Mean					4516
C.D. (0.05)					702
CV%					9.25

*Significant difference in yield observed over the best check; Note: - NC = National Check, RC = Regional Check, LC = Local Check

expected that the newly developed rice genotype IET 21987 (CN 1317-557-56-BNKR 42 -2-3) at rice research station, Bankura, West Bengal, India will be an alternative of the popular rice varieties of rainfed low land ecosystem like Dhanrasi, Sabita, Pooja etc. On the basis of this trial it was concluded that IET 21987, IET 21974and IET 21996 were the promising genotypes of rice for Rainfed Shallow lowlands in red and lateritic areas of West Bengal.

ACKNOWLEDGEMENTS

The authors are grateful to Mr. S. R. Patra, Joint Director of Agriculture (Research), Dr. P. Bhattacharya, Director of Agriculture, Govt. of West Bengal, Jessop buildings, Kol – 1, Dr. B. C. Viraktamath, Project Director of Rice, Dr. N. Shobha Rani, Principal Scientist and Head Crop improvement Division, Directorate of Rice Research, Rajendranagar, Hyderabad for their valuable guidance and encouragement during the period of investigation. .

REFERENCES

Burton, W. (1952). Quantitative inheritance in grasses. Proc. 6th Int. *Grass Land Congr.*, I: 277.

Mallick, G.K., Jana, K., Sardar, G. and Biswas, A. (2012). Performance of IET 17509 in Farmer's field of upland situation in West Bengal. *Environ. Ecol.*, 30:1599-1600.

Mallick, G.K., Jana, K., Sardar, G., Ghosh, S., Mandal, R. and Bhadra, K.K. (2013). Morpho-agronomic characteristics of a newly released rice variety 'Puspa'. *Environ. Ecol.*, 31 (2B): 890-893.

Mallick, G. K. and Kundu, C. (2014). Screening of early rice genotypes for red and lateritic areas of West Bengal. *Research in Plant biology*, 4 (2): 27-30.

Mallick, G.K., Mandal, R., Ghosh, S., Jana, K., and Mandal,

R. (2013 b). yield performance of a promising rice culture IET 17509 in red and lateritic areas of West Bengal. *International Journal of Advanced research,*1 (9):182-185.

Mallick, G.K., Kundu, C., Ghosh, S. and Sinha, A.K. (2013 c). Evaluation of some international rice genotypes in red and lateritic areas of West Bengal. *International Journal of Current research,* 5(11):3360-3363.

Mallick, G.K., Mondal, M., Jana, K., Ghosh, A. and Biswas, A. (2013d): Puspa – A new rice variety alternative to Annada, released for upland areas of West Bengal, India. *Eco. Env & Cons.*, 19(4):1127 – 1129.

Mallik, S., Santra, C. K., Chatterjee, S. D., Ahmed, J. Barman Roy, S., Sarkarung, S and Atlin, G. (2006). CN 1231-11-7 (IET 17792), a alternative to sabita for the rainfede low land ecosystem in eastern India. *IRRN*, 312: 34-37.

Ram, T., Mazumder, N.D. and Mishra, B. (2006). Dhanarasi, a new lowland rice variety with *Oryza rufipogon* genes for improving yield potential and resistance to biotic stresses. IRRN 31.1 : 13.

Singh, V.P. and Hossain, M. (2000). Rice area in different ecosystems in Eastern India. Singh. V.P. and R.K.Singh, editors Rainfed Rice : A source book of best practices and strategies in Eastern India. International Rice Research Institute : 7-8

Siddiq, E. A. (2013). Bridging the rice yield gap in India. FAO CORPORATE DOCUMENT REPOSITORY. [Online] Available: http:// www.fao.org./docrep/003/ x6905c/x6905e09.htm