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Website: www.mutagens.co.in
E-mail: submit@mutagens.co.in
researchsubmission@hotmail.com

Short Communication

BNKR-3 (SAMPRITI) – A NEW LATE DURATION HIGH-YIELDING RICE VARIETY FOR RAINFED SHALLOW LOWLANDS OF WEST BENGAL, INDIA

G. K. Mallick[1], I. Dana[2], K. Jana[3], A. Ghosh[4] and I. Naskar[1]

[1]Rice Research Station, Natunchati, Bankura-722 101, West Bengal, INDIA
[2]Rice Research Station, Chinsurah, Hooghly, West Bengal, INDIA
[3]Bidhan Chandra Krishi Viswavidyalaya, Kalyani, Nadia, West Bengal, INDIA
[4]Zonal Adaptive Research Station, Krishanagar, Nadia, West Bengal, INDIA.

Abstract

BNKR-3 (Sampriti), a new late duration high yielding rice variety developed at Rice Research Station, Bankura, West Bengal, India was released by "State Variety Release Committee" (SVRC), West Bengal in 2014 for cultivation in rainfed shallow lowland areas of West Bengal, India. Before release as BNKR-3 (Sampriti), this rice culture completed two years of national testing (2010 & 2011) in the designation of CN 1317-577-56-BNKR 42-2-3 (IET 21987) and had been recommended for release in rainfed shallow lowland areas of West Bengal under transplanted condition. It gave 1.69, 1.64 & 3.84 % yield advantage over national, regional, local checks in national level. Not only that this culture of rice tested extensively in the farm of Rice Research Station, Bankura, West Bengal and farmer's field. It showed 22.28% yield advantage during 2008 in observational trial, 3.28 to 15.37% yield advantage in on station yield trial during 2009-2011 and 7.60 to 9.63% yield advantage in farmer's field during 2011 to 2013 over Swarna (MTU 7029), which is the most popular rice variety of West Bengal. BNKR-3 (Sampriti) is non-lodging, non-shattering and late maturing variety (seed to seed : 150-155 days). It is moderately resistant to leaf blast, neck blast, brown spot, sheath rot and GLH. It's average yield is 4000-4500 kg ha^{-1}. Grain type is long bold. It is expected that BNKR-3 (Sampriti) can be able to replace Swarna (MTU 7029), the most popular rice variety of West Bengal, India.

Key words: Bankura, BNKR-3(Sampriti), IET 21987, late duration, pedigree selection, Rice (*Oryza sativa* L.), Swarna (MTU 7029), West Bengal.

INTRODUCTION

Rice production in the rainfed shallow lowland in the eastern region of India remained stagnant for a long time. Through All India Co-ordinated Rice Improvement Programme (AICRIP) several breeding lines are being evaluated every year, but when compared with national and regional checks a rare of them could qualify for release (Ram et. al. 2006). This shows that yield improvement per se of varieties bred for rainfed shallow lowland ecosystem is limited. Swarna Sub-1 , CR1002, Pooja, Dhanrasi, Swarna (MTU 7029) are the main late duration rice variety of this region. Among them Swarna (MTU 7029) is the most popular. This variety has been

extensively cultivated by the farmer's of West Bengal for a long time. Farmer of West Bengal want to replace Swarna (MTU 7029) as it has become susceptible to different pest and disease, but due to lack of suitable alternative farmer's till now continuing the cultivation of Swarna (MTU 7029) (Saha et. al. 2008). So there is a need to develop an alternation to Swarna (MTU 7029) with more yield and more resistant to different pest and disease.

Since the systematic research on rice started, mostly hybridization and pedigree selection and to some extent backcross breeding have been adopted on developing improved high yielding rice varieties (Shobha Rani et. al. 2011). Previously many rice varieties developed through pedigree selection, namely Vivek Dham 82 (Sharma et. al. 2003), Santosh (Thakur et. al. 2003), TRY (R) 2 (Rajagopalan et. al. 2004), Rajendra Mahsuri-1 (Sahai et. al. 2004), TXD 85 (Kanyeka et. al. 2004), TXD 306 (Msomba et. al. 2004), Dhanrasi (Ram et. al. 2006), NDR 2026 (Dwivedi et. al. 2006), CSR 23 (Singh et. al. 2006), Karjat-6 (Ingale et. al. 2006) and BNKR-2 (Dhiren) [Mallick et. al. 2013, Mallick et. al. 2014] etc.

To develop a rice variety with high yield for rainfed shallow lowland situation a cross was made in 2000 between Vikramarya (Female parent) and Mahsuri (Male parent). A promising rice culture CN 1317-577-56-BNKR 42-2-3 was developed through the pedigree selection method. Before being nominated to the All India Coordinated trial for testing under Initial Varietal Trial - rainfed shallow lowland as IET 21987 in 2010, this rice culture was tested for its yield during *Kharif* 2008 in observational trial at the farm of Rice Research Station, Bankura, West Bengal, India. It showed 22.28% yield advantage over Swarna during *Kharif* 2008 (Table 2). It was tested for two years (IVT-RSL, 2010; IVT-RSL, 2011) through "All India Co-ordinated Rice Improvement Project" at 18 locations all over the country under the supervision of Directorate of Rice Research, Rajendranagar Hyderabad. On the basis of All India Mean yield IET 21987 gave 1.69%, 1.64% and 3.84% more yield than National, Regional and Local check respectively (Table 1). After two years of testing IET 21987 was recommended for release in rainfed shallow lowland areas of West Bengal under transplanted condition. It was tested at Rice Research Station, Bankura, West Bengal through on-station yield trial for three years (2009 to 2011) and gave 3.28 to 15.37% yield advantage over Swarna (MTU 7029). Not only that it was also tested on farmer's field during 2011 to 2013 through on-farm trials and gave 7.60% to 9.63% more yield than the farmer's choice variety Swarna.

State Variety Release Committee, West Bengal, India released IET 21987 as BNKR-3 (Sampriti) in 2014 for cultivation in rainfed shallow lowland areas under transplanted condition in West Bengal. BNKR-3 (Sampriti) is a non-loding, non-shattering and late maturing variety. Its average yield is 4000-4500 kg ha^{-1} and yield potentiality 7,452 kg ha^{-1}. Details morphological characteristics given in Table 3. It was tested through National Screening Nurseries for its reaction to different pest and diseases during *Kharif* 2011. It showed moderate resistance against leaf blast, neck blast, sheath rot, brown spot and green leaf hopper.

BNKR-3 (Sampriti) yielding higher than the most popular HYV rice variety Swarna of the same maturity group (late) is a boon for the farmer's of West Bengal, India. There is a great demand for seed of BNKR-3 (Sampriti) from farming community and gaining popularity day by day among the farmers of Bankura, Purulia and Paschim Medinipur districts of West Bengal. This variety has the potential to be an alternative/replacement for MTU 7029 (Swarna), Pooja, Dhanrasi, CR 1002 etc. in rainfed shallow lowland areas of West Bengal.

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Table 1. Yield Performance of IET 21987 (CN 1317-577-56-BNKR 42-2-3) in All India Coordinated Trials (Mean Basis) in 2010 & 2011 in comparison with checks.

Name of trial	Year of testing	No. Of Location	IET 21987 (kg ha-1)	National check (kg ha-1)	Regional check (kg ha-1)	Local check (kg ha-1)
IVT-RSL	2010 (1st Year)	08	4224	4118	4107	3607
IVT-RSL	2011 (2nd Year)	10	4033	4002	4017	4345
	Mean	18	4129	4060	4062	3976
Percent increase or decrease over the checks	2010			+2.57	+2.84	+17.10
	2011			+0.77	+0.39	-7.10
	Mean			+1.69	+1.64	+3.84
Frequency in top group (pooled for 2 years)		6/18		6/18	4/18	5/18

Note-
National check = Dhanrasi used as national check.
Regional Check = Regional checks were Swarna Sub-1 (Eastern region) and Savitri (Southern region)
Local Check = Swarna (MTU 7029) , CR 1014, Sashi, Jallahari, Neeraja, Abhilash and Asha etc.
IVT-RSL = Initial variety trial- Rainfed shallow lowland

Table 2. Yield Performance of IET 21987 (CN 1317-577-56-BNKR 42-2-3) in comparison with Swarna in different trials in West Bengal, India.

Year	Trial	IET 21987	Swarna (kg ha-1)	Yield increase over Swarna (%)
2008	On-station observational trial	5833	4770	22.28
2009	On-station yield trial	6300	5500	14.54
2010	On-station yield trial	5913	5125	15.37
2011	On-station yield trial	5190	5025	3
2011	On-farm trial (8 location) 24 farmer's field	5565	5076	9.63
2012	On-farm trial (9 location) 27 farmer's field	5617	5152	9.02
2013	On-farm trial (5 location) 15 farmer's field	5205	4837	7.60

Table 3. Description of the rice variety BNKR-3 (Sampriti).

1	Plant height	: 125 cm
2	Plant Type	: Semi erect
3	Coleoptile colour	: Green
4	Leaf colour	: Light green
5	Flag Leaf	: Erect
6	No. of tillers / plant	: 12.6
7	Average panicle length (cm)	: 25.15
8	Average no. of grains/panicle	: 182
9	Panicle type	: Semi straight
10	Panicle exertion	: 100% full exertion
11	Grain colour	: Straw
12	Grain type	: Long Bold
13	Awning	: Partially awned
14	Kernel length (mm)	: 6.21 mm
15	Kernel breadth (mm)	: 2.32 mm
16	L/B Ratio	: 2.67
17	1000-grain wt	: 30.57 gm
18	50% flowering	: 124 days
19	Time of maturity	: 150-155 days
20	Hulling recovery	: 79.1 %
21	Milling recovery	: 71.9 %
22	Head Rice Recovery	: 70.5 %
23	Alkali spreading value	: 4.0
24	Amylose content (%)	: 19.58

REFERENCES

Dwivedi, J.L., Verma, R.S., Giri, S.P., Tripathi, A.K., and Vishwakarma, R.N. (2006). NDR 2026: a new rice variety released for mid-early irrigate areas of Uttar Pradesh, India. IRRN 31.1 : 15-16

Ingale, B.V., Waghmode, B.D. and Rewale, A.P. (2006). Karjat 6, a new, superfine Medium-duration rice variety in Maharashtra, India. IRRN 31.1 : 19-20

Kanyeka, Z.L., Kibanda, M., Msomba, S.W., Tusekelega, H. (2004). TXD 85 and Line 88 : new high-yielding varieties with acceptable grain quality in Tanzania. IRRN 29.1 : 29-30

Mallick, G.K., Jana, K., Ghosh, S., Sardar, G., and Bhadra, K.K. (2013). Morpho-Agronomic characteristics of a newly released rice variety BNKR-1 (Dhiren). Sci. Res Rept., 3(2) : 223-228

Mallick, G.K., Dana, I., Jana, K., Ghosh, A. and Biswas, A. (2014). BNKR-1 (Dhiren)- A newly released late duration high yielding rice variety, an alternative to Swarna (MTU 7029) for West Bengal, India. J. Appl. & Nat. Sci. 6(2) 869-871

Msomba, S.W., Kibanda, M., Penza, H., Tusekelega, H., Mkuya, M., Kafiriti, E., Mbapila, C., Kangeka, Z. (2004). TXD 306 : a high-yielding and medium maturing aromatic rice for the rainfed lowland and irrigated ecosystem in Tanzania. 29.1 : 30-31.

Rajagopalan, R., Robin, S., Sivasubramanian, P., Naina Mohammad, S.E., Jauhar Ali, A., Kendasamy, M. And Sivanantham, M. (2004). TRY (R) 2 : a short-duration salt-tolerant rice variety, IRRN 29.1 28

Ram, T., Majumder, N.D. and Misra, B. (2006). Dhanrasi, a new lowland rice variety with oryza rufipogon genes for improving yield potential and resistance to biotic stresses. IRRN 31.1 : 13-14

Saha, S., Dutta, A., Ghosh, S. And Mallick, G.K.(2008) Rice diseases in red and lateritic zones of West Bengal, *India. Environ. Ecol.,* 26(4) 1691-1692

Sahai, V.N., Ghosh, S. And Chaudhary, R.C. (2004). Rajendra Mahsuri-1, a potentially high yielding rice variety for medium and shallow lowland ecosystems of Bihar, India. IRRN 29.1 : 26

Sahai, V.N., And Chaudhary, R.C. (2006), Rajendra Sweta, a new high-yielding quality rice variety for Bihar's irrigate ecosystem. IRRN 31.1 : 18-19

Sharma, R.K., Bhatt, C., and Gupta, H.S. (2003), "Vivek Dhan 82: a high yielding, blast-resistant irrigated rice variety for the Indian Himalaya. *IRRN,* 28.2 : 24

Shobha Rani N, Vara Prasad, G.S., Subba Rao L.V., Sudharshan I., Hari Prasad A.S., Prasad A.S.R., Ram T., Ravindra Babu V., Padmavathi G., Bhadana Vijaipal, Suneetha K. And Viraktamath B.C. (2011). High yielding rice varieties of India. Directorate of Rice Research, Hyderabad 500030, Andhra Pradesh, India, pp-2

Singh, R.K., Gregorio, G.B. and Misra, B. (2006). CSR 23 : a new salt-tolerant rice variety for India. IRRN 31.1 : 16-18

Thakur, R., Singh, N.K., Misra, S.B., Singh, A.K. and Singh, K.K. (2003). Santosh- a high-yielding variety for the rainfed lowland of Bihar, India, developed through participatory breeding. IRRN 28.2 : 25