



## Short Communication

# BNKR-2 (DHRUBA) – A NEW LATE DURATION HIGH-YIELDING RICE VARIETY FOR WEST BENGAL, INDIA

G.K.Mallick<sup>1\*</sup>, I.Dana<sup>2</sup>, K.Jana<sup>3</sup>, P. P. Ghosh<sup>1</sup>, V. Mandi<sup>1</sup>, S. Ghosh<sup>1</sup> and A.Ghosh<sup>4</sup>

<sup>1</sup>Rice Research Station, Natunchati, Bankura-722 101, West Bengal, India

<sup>2</sup>Rice Research Station, Chinsurah, Hooghly, West Bengal, India

<sup>3</sup>Bidhan Chandra Krishi Viswavidyalaya, Kalyani, Nadia, West Bengal, India

<sup>4</sup>Zonal Adaptive Research Station, Krishanagar, Nadia, West Bengal, India

## Abstract

BNKR-2 (Dhruba), 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 and notified by Central Sub-Committee on Crop Standards, Notification and Release of Varieties for Agricultural Crops (Notification Number S.O. 1007 (E) dated 30-03-2017) for cultivation in irrigated areas of West Bengal, India. Before release as BNKR-2 (Dhruba), this rice culture completed three years of national testing (2008-2010) in the designation of CN 1340-76-1-BNKR 23-7-2 (IET 20761) and had been recommended for release in irrigated areas of West Bengal under transplanted condition. It gave 3.82 to 7.76 % yield advantage over national check 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 16.17% and 17.35% yield advantage during 2006 and 2007 in observational trial, 7.88 to 10.04% yield advantage in on station yield trial during 2008-2010 and 7.50 to 14.82% 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-2 (Dhruba) is non-lodging, non-shattering and late maturing variety (seed to seed : 143 days). It is moderately resistant to leaf blast, neck blast, brown spot, sheath rot and leaf folder. It’s average yield is 5000-5500 kg ha<sup>-1</sup>. Grain type is short bold. It is expected that BNKR-2 (Dhruba) can be able to replace Swarna (MTU 7029), the most popular rice variety of West Bengal, India.

**Key words :** Bankura, BNKR-2 (Dhruba), IET 20761, late duration, pedigree selection, Rice (*Oryza sativa* L.), Swarna (MTU 7029), West Bengal.

## Introduction

Swarna (MTU 7029) is the most popular late duration rice (*Oryza sativa* L.) variety of West Bengal, India. This Variety has been extensively cultivated by the farmer’s of West Bengal for a long time. Farmer’s of West Bengal want to replace Swarna as it has become susceptible to different pest and diseases, but due to lack of suitable alternative to farmer’s till now the cultivation of Swarna (MTU 7029) is continuing (Saha *et. al.* 2008). So, there is a need to develop an alternative to Swarna (MTU 7029) with more yield and more resistance to different pest and diseases.

Since the systematic research on rice crop

improvement started, mostly hybridization and pedigree selection and to some extent backcross breeding have been adopted for the development of improved high yielding rice varieties. (Shobha Rani *et. al.*, 2011). Previously many rice varieties developed in India through pedigree selection namely Vivek Dhan 82 (Sharma *et al.*, 2003); Santosh (Thakur *et al.*, 2003); Rajendra Mahsuri 1 (Sahai *et. al.*, 2004); BNKR-1 (Dhiren) [Mallick *et. al.*, 2013, 2014] etc. To develop a rice variety with high yield for irrigated late situation, a cross was made during 2000 A.D. between IR42 (Female parent) and Patnai 23 (Male parent). A promising rice culture CN 1340-76-1-BNKR 23-7-2 was developed through the pedigree selection method. Before being nominated to the All India Coordinated trial for testing under Initial

\*Author for correspondence : E-mail : mallickkgene@gmail.com

**Table 1 :** Yield Performance of IET 20761 (CN 1340-76-1-BNKR-7-2) in comparison with Swarna in different trials in West Bengal, India.

Year	Trial	IET 20760	Swarna (kg ha-1)	Yield increase over Swarna (%)
2006	On-station observational trial	5008	4311	16.17
2007	On-station observational trial	6000	5113	17.35
2008	On-station yield trial	5405	5010	7.88
2009	On-station yield trial	5750	5225	10.04
2010	On-station yield trial	5500	5008	9.82
2011	On-farm trial (12 location) 36 farmer's field	5632	4905	14.82
2012	On-farm trial (4 location) 20 farmer's field	5640	5047	11.74
2013	On-farm trial (4 location) 20 farmer's field	5580	5190	7.5

**Table 2 :** Yield Performance of IET 20761 (CN 1340-76-1-BNKR-7-2) in All India Coordinated Trials (Mean Basis) from 2008-2010 in comparison with checks.

Name of trial	Year of testing	No. of Location	IET 20761 (kg ha-1)	National check (kg ha-1)	Regional check (kg ha-1)	Local check (kg ha-1)	C.D.
IVT-L	2008 (1 <sup>st</sup> Year)	18	4703	4364	4305	4651	307
AVT1-L	2009 (2 <sup>nd</sup> Year)	19	5163	4862	4635	4948	326
AVT2-L	2010 (3 <sup>rd</sup> Year)	22	5167	4977	4902	4569	326
	Mean	59	5011	4753	4634	4716	
Percent increase or decrease over the checks	2008			+7.76*	+9.24*	+1.12	
	2009			+6.19*	+11.39*	+4.34	
	2010			+3.82	+5.40*	+13.08*	
	Mean			+5.43	+8.13	+6.25	
Frequency in top group (pooled for 3 years)		33/59		24/59	22/59	30.59	

No:\*observed difference is significant at 0.05 level.

National check = Savitri used as national check in 2008 and 2009 and Swarna (MTU 7029) in 2010.

Regional Check = Regional checks were Pooja (Eastern region), Salivahana (Western region) and Samba mahsuri (Southern region)

Local Check = Mahanadi, Tapaswini, Ranjit, Karjat-2, SYE-5, Rajendra, Asha etc. Used as local checks in different states of India.

IVT-L = Initial variety trial- Late, AVT1-L = Advanced variety trial-1 Late, AVT2-L = Advance variety trial-2 Late

Varietal Trial (Late) as IET 20761 in 2008, this rice culture was tested for consecutive two years to study its yield performance during *Kharif* 2006 and *Kharif* 2007 in observational trials at Rice Research Station, Bankura, West Bengal, India. It showed 16.17% and 17.35% yield advantage over Swarna during *Kharif* 2006 and 2007 respectively (Table 1). It was also tested for three years (IVT-L, 2008; AVT-IL, 2009; and AVT-2L 2010) through "All India Co-ordinated Rice Improvement Project" at 59 locations all over the country under the supervision of the then Directorate of Rice Research, Rajendranagar, Hyderabad. On the basis of All India Mean yield IET 20761 gave 5.43%, 8.13% and 6.25% more yield than National, Regional and Local check respectively (Table 2). After three years of testing IET 20761 was recommended for release in irrigated 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 (2008 to 2010) and gave

7.88 to 10.04 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 7.50% and 14.82% more yield than the farmer's choice variety Swarna. The results of the study on morpho-agronomic characteristics of BNKR-2 (Dhruba) has already been published by Mallick *et al.*, (2018).

State Variety Release Committee, West Bengal, India released IET 20761 as BNKR-2 (Dhruba) in 2014 for cultivation in irrigated areas under transplanted condition in West Bengal. BNKR-2 (Dhruba) is a non-lodging, non-shattering and late maturing variety. Its average yield is 5000-5500 kg ha<sup>-1</sup> and yield potentiality is 10,608 kg ha<sup>-1</sup> (at Port Blair). The salient characteristics of Dhruba have been given in Table 3. It was tested through National Screening Nurseries for its reaction to different pest and diseases during *Kharif* 2008 and 2009. It showed moderate resistance against leaf blast, neck blast, sheath rot, brown spot and leaf folder.

**Table 3** : Description of the rice variety BNKR-2 (Dhruba) [IET 20761].

1	Plant height	129 cm
2	Plant Type	Erect
3	Average No.of tillers/Plant	12.3
4	Leaf: Intensity of green colour	Medium green
5	Flowering duration (50% flowering)	117 days
6	No. Of panicle/m <sup>2</sup>	310
7	Panicle type	Semi- straight
8	Apiculus colour	yellowish
9	Awning	Awnless
10	Panicle exerting	Well exerted
11	Average length of panicle	25.7 cm
12	Lodging characteristics	Non lodging
13	1000 Grain Weight	22.80 gms
14	Kernel length (mm)	5.11mm
15	Kernel breadth (mm)	2.51mm
16	L/B ratio	2.03
17	Kernel appearance	Translucent, grain chalkiness -VOC
18	Grain type	SB
19	Milling recovery	68.50%
20	Amylose Content	24.41%
21	Alkali spreading	5.0

BNKR-2 (Dhruba) 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-2 (Dhruba) 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) in irrigated areas of West Bengal.

### Acknowledgement

Authors would like to thanks Dr. P. K. Maity, Additional

Director of Agriculture (Research), Mr. S. R. Patra, Director Of Agriculture & Ex-Officio Secretary, Agriculture Department, Govt. Of West Bengal, Jessope Building, Kolkata-700 001, for their guidance & encouragement during the period of the project.

### References

- Mallick, G.K., I. Dana, K. Jana, A. Ghosh and A. Biswas (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.
- Mallick, G.K., K. Jana, S. Ghosh, G. Sardar and K.K. Bhadra (2013). Morpho-Agronomic characteristics of a newly released rice variety BNKR-1 (Dhiren). *Sci. Res Rept.*, **3(2)**: 223-228.
- Mallick, G.K., G. Sardar, P.P. Ghosh, V. Mandi and S. Mukhopadhyay (2018). Morpho-agronomic characteristics of a newly released variety Dhruba. *Discovery Agric.*, **4**: 61-68.
- Saha, S., A. Dutta, S. Ghosh and G.K. Mallick (2008). Rice diseases in red and lateritic zones of West Bengal, *India. Environ. Ecol.*, **26(4)**: 1691-1692.
- Sahai, V.N., S. Ghosh and R.C. (2004). Choudhary Rajendra Mahsuri-1, a potentially high-yielding rice variety for Medium and shallow lowland ecosystems of Bihar, India, *IRRN*, **29(1)**, 26.
- Sharma, R.K., J.C. Bhatt and H.S. Gupta (2003). Vivek Dhan 82: a high yielding, blast-resistant irrigated rice variety for the Indian Himalaya. *IRRN*, **28(2)**: PP-24.
- Shobha Rani, N., G.S. Varaprasad, L.V. Subba Rao, I. Sudharshan, A.S. Hari Prasad, A.S.R. Prasad, T. Ram, V. Ravindra Babu, G. Padmavathi, V. Bhadana, K. Suneetha and B.C. Viraktamath (2011). High yielding rice varieties of India. Directorate of Rice Research, Hyderabad 500030, *Andhra Pradesh, India*, 2.
- Thakur, R., N.K. Singh, S.B. Mishra, A.K. Singh and K.K. Singh (2003). Santosh-a high yielding variety for the rainfed lowland of Bihar, India developed through participatory breeding. *IRRN*, **28(2)**: PP-25.