

Morpho – Agronomic Characteristics of a Newly Released Rice Variety BNKR – 1 (Dhiren)Mallick¹ G K, K Jana¹, S Ghosh¹, G Sardar¹ and K K Bhadra²

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ABSTRACT

BNKR – 1 (Dhiren), a late duration rice variety developed at Rice Research Station, Bankura, West Bengal, India. It was released by the 'State Variety Release Committee, West Bengal', India in 2011. Morpho – Agronomic Characteristics of BNKR – 1 (Dhiren) are described in this paper in details through DUS test data.

Key words: Rice Variety, Late duration, IET 20760, BNKR – 1 (Dhiren)

Key words: Rice variety, BNKR-1, Dhiren, Morpho Agronomic characteristics.

INTRODUCTION

Rice is a complicated crop which grown in diverse agro-climatic condition. To utilize its food yield potentiality specific adaptability of rice is most important. So study of agro-morphic characteristic will be very much helpful to the breeder for future crop improvement. Morpho-agronomic characteristics of newly released rice variety "Puspa" developed at rice research station Bankura West Bengal had already been studied by Mallick *et al.* (2013). CN 1340-76-1-BNKR 23-7-1, a rice culture developed through pedigree selection from a cross between IR 42 (female parent) and Patnai 23 (Male parent) at Rice Research Station, Bankura. It was nominated to Directorate of Rice Research, Hyderabad for AICRIP trial IVT-Late in 2008 from the end of Rice Research Station, Bankura, West Bengal. It completed three years (2008; 2009 and 2010) of National Testing in the name of IET 20760. After three years of testing IET 20760 had been recommended for release in irrigated areas of Bihar and West Bengal under transplanted condition in 46th National group Meeting on Rice organized by Directorate of Rice Research (ICAR), Hyderabad, April 2011 (Progress Report, 2010). Before release as BNKR – 1 (Dhiren) by 'State Variety Release Committee, West Bengal' in 2011, DUS testing of IET 20760 was conducted at Rice Research Station, Bankura, West Bengal during *Kharif* 2009 and 2010, following National Guide lines (Shoba Rani *et al.*, 2004).

MATERIALS AND METHODS

Thirty days old seedling of IET 20760 was transplanted in the well prepared puddled field of Rice Research Station, Bankura during *Kharif* 2009 and 2010. N, P₂O₅, K₂O applied at the dose of 60:30:30 kg ha⁻¹. Full dose of P₂O₅ and K₂O applied as basal. Half dose of N applied as basal, one fourth dose of N applied during tillering and rest one fourth dose applied during panicle initiation stage. Field test carried out under conditions ensuring normal growth of plant. Row to row distance 30 cm and plant to plant distance 20 cm, row length 10 m, number of rows 50, five replications were maintained as per requirements of DUS test. Assessment of each characteristic was made as indicated by guide lines of DUS test of rice. Phenol reaction of lemma was tested following the Methods of Chang and Bardenas (1965).

RESULTS AND DISCUSSION

DUS test characteristics of rice variety BNKR – 1 (Dhiren) (IET 20760) are presented in Table 1. From this, it is evident that 'BNKR-1 (Dhiren)' is a late maturing semi dwarf, semi-erect rice variety with medium thick stem and medium tillering ability. It has no anthocyanin colouration on its nodes and internodes, leaf consist of light green colour, medium broad and medium long leaf with late leaf senescence, there was no anthocyanin colouration on leaf, leaf sheath and auricle with light purple in colour. Colour of ligule light purple, split ligule.

Table 1: Showing the morpho-agronomic characteristics of BNKR – 1 (Dhiren) (IET 20760)

SR. No.	Characteristics	2009		2010		Stage of observation	Type of assessment
		States	Note	States	Note		
1.	Coleoptile: Colour	Colourless Green* Purple	1 2* 3	Colourless Green* Purple	1 2* 3	10	VS
2.	Basal Leaf: Sheath Colour	Green* Light Purple Purple Lines Purple	1* 2 3 4	Green* Light Purple Purple Lines Purple	1* 2 3 4	40	VS
3.	Leaf: Intensity of green colour	Light* Medium Dark	3* 5 7	Light* Medium Dark	3* 5 7	40	VG
4.	Leaf: Anthocyanin Colouration	Absent* Present	1* 9	Absent* Present	1* 9	40	VG
5.	Leaf: Distribution of anthocyanin colouration	On tips only On margins only In blotches only Uniform	1 2 3 4	On tips only On margins only In blotches only Uniform	1 2 3 4	40	VG
6.	Leaf sheath: Anthocyanin colouration	Absent* Present	1* 9	Absent* Present	1* 9	40	VG
7.	Leaf sheath: Intensity of anthocyanin colouration	Very weak Weak Medium Strong Very strong	1 3 5 7 9	Very weak Weak Medium Strong Very strong	1 3 5 7 9	40	VG
8.	Leaf : Pubescence of blade surfaces	Absent Weak* Medium Strong Very strong	1 3* 5 7 9	Absent Weak* Medium Strong Very strong	1 3* 5 7 9	40	VS
9.	Leaf: Auricles	Absent Present*	1 9*	Absent Present*	1 9*	40	VS
10.	Leaf: Anthocyanin colouration of auricles	Colourless Light purple* Purple	1 2 3*	Colourless Light purple* Purple	1 2 3*	40	VS
11.	Leaf: Collar	Absent* Present	1* 9	Absent* Present	1* 9	40	VS
12.	Leaf: Anthocyanin colouration of collar	Absent Present	1 9	Absent Present	1 9	40	VS
13.	Leaf: Ligule	Absent Present*	1 9*	Absent Present*	1 9*	40	VS
14.	Leaf: Shape of ligule	Truncate Acute Split*	1 2 3*	Truncate Acute Split*	1 2 3*	40	VS
15.	Leaf: Colour of ligule	Green Light purple* Purple	1 2* 3	Green Light purple* Purple	1 2* 3	40	VS
16.	Leaf: Length of blade	Short Medium* Long	3 5* 7	Short Medium* Long	3 5* 7	40	MS
17.	Leaf: Width of blade	Narrow Medium * Broad	3 5* 7	Narrow Medium * Broad	3 5* 7	40	VS
18.	Culm: Attitude(for floating rice)	Non procumbent Procumbent	1 9	Non procumbent Procumbent	1 9	40	VS

	only)						
19.	Culm: Attitude	Erect Semi-erect* Open Spreading	1 3* 5 7	Erect Semi-erect* Open Spreading	1 3* 5 7	40	VS
20.	Time of heading(50% of plant with panicles)	Very early(< 71 days) Early(71-90 days) Medium(91-110 days) Late(111-130 days)* Very late (>130 days)	1 3 5 7* 9	Very early(< 71 days) Early(71-90 days) Medium(91-110 days) Late(111-130 days)* Very late(>130 days)	1 3 5 7* 9	55	VG
21.	Flag leaf: Attitude of blade(early observation)	Erect* Semi-erect Horizontal Deflexed	1* 3 5 7	Erect* Semi-erect Horizontal Deflexed	1* 3 5 7	60	VG
22.	Spikelet: Density of Pubescence of lemma	Absent Weak Medium* Strong Very strong	1 3 5* 7 9	Absent Weak Medium* Strong Very strong	1 3 5* 7 9	60-80	VS
23.	Male sterility	Absent* Present	1 9	Absent* Present	1 9	65	VG
24.	Lemma: Anthocyanin colouration of keel	Absent or very weak Weak Medium Strong Very strong	1 3 5 7 9	Absent or very weak Weak Medium Strong Very strong	1 3 5 7 9	65	Vs
25.	Lemma: Anthocyanin colouration of area below apex.	Absent* Weak Medium Strong Very strong	1* 3 5 7 9	Absent* Weak Medium Strong Very strong	1* 3 5 7 9	65	VS
26.	Lemma: Anthocyanin colouration of apex	Absent* Weak Medium Strong Very strong	1* 3 5 7 9	Absent* Weak Medium Strong Very strong	1* 3 5 7 9	65	VS
27.	Spikelet: Colour of stigma	White* Light green Yellow Light purple Purple	1* 2 3 4 5	White* Light green Yellow Light purple Purple	1* 2 3 4 5	65	VS
28.	Stem: Thickness	Thin Medium* Thick	3 5* 7	Thin Medium* Thick	3 5* 7	70	VS
29.	Stem: Length(excluding panicle: excluding floating rice)	Very short (<91cm) Short (91-110cm)* Medium (111-130cm) Long (131-150cm) Very long (>150cm)	1 3* 5 7 9	Very short (<91cm) Short (91-110cm)* Medium (111-130cm) Long (131-150cm) Very long (>150cm)	1 3* 5 7 9	70	VS
30.	Stem: Anthocyanin colouration of nodes	Absent* Present	1* 9	Absent* Present	1* 9	70	VS
31.	Stem: Intensity of anthocyanin colouration of nodes	Absent* Weak Medium Strong	1* 3 5 7	Absent* Weak Medium Strong	1* 3 5 7	70	VS

32.	Stem: Anthocyanin colouration of internodes	Absent* Present	1* 9	Absent* Present	1* 9	70	VS
33.	Panicle: Length of main axis	Very short (<16cm) Short (16-20cm) Medium (21-25cm)* Long (26-30cm) Very long (>30cm)	1 3 5* 7 9	Very short (<16cm) Short (16-20cm) Medium (21-25cm)* Long (26-30cm) Very long (>30cm)	1 3 5* 7 9	70-90	MS
34.	Flag leaf: Attitude of blade (late observation)	Erect Semi-erect* Horizontal Deflexed	1 3* 5 7	Erect Semi-erect* Horizontal Deflexed	1 3* 5 7	90	VG
35.	Panicle: Curvature of main axis	Strong Semi-straight* Drooping Deflexed	1 3* 5 7	Strong Semi-straight* Drooping Deflexed	1 3* 5 7	90	VG
36.	Panicle: Number per plant	Few (<11) Medium (11-21)* Many (>20)	3 5* 7	Few (<11) Medium (11-21)* Many (>20)	3 5* 7	80-90	MS
37.	Spikelet: Colour of tip of lemma	White* Yellowish Brown Red Purple Black	1* 2 3 4 5 6	White* Yellowish Brown Red Purple Black	1* 2 3 4 5 6	80-90	VS
38.	Lemma and palea: Colour	Straw* Gold and gold furrows on straw background Brown spots on straw Brown furrows on straw Brown (tawny) Reddish to light purple Purple spots on straw Purple furrows on straw Purple Black	1* 2 3 4 5 6 7 8 9 10	Straw* Gold and gold furrows on straw background Brown spots on straw Brown furrows on straw Brown (tawny) Reddish to light purple Purple spots on straw Purple furrows on straw Purple Black	1* 2 3 4 5 6 7 8 9 10	90	VG
39.	Panicle: Awns	Absent* Present	1* 9	Absent* Present	1* 9	90	VG
40.	Panicle: Colour of awns (Late observation)	Yellowish white Yellowish brown Brown Reddish brown Light red Red Light purple Purple Black	1 2 3 4 5 6 7 8 9	Yellowish white Yellowish brown Brown Reddish brown Light red Red Light purple Purple Black	1 2 3 4 5 6 7 8 9	90	VS
41.	Panicle: Length of longest awn	Very short Short Medium Long Very long	1 3 5 7 9	Very short Short Medium Long Very long	1 3 5 7 9	90	VS
42.	Panicle: Distribution of awns	Tips only Upper half only Whole length	1 3 5	Tips only Upper half only Whole length	1 3 5	90	VS

43.	Panicle: Presence of secondary branching	Absent Present*	1 9*	Absent Present*	1 9*	90	VG
44.	Panicle: Secondary branching	Weak Strong* Clustered	1 2* 3	Weak Strong* Clustered	1 2* 3	90	VG
45.	Panicle: Attitude of branches	Erect Erect to semi-erect* Semi erect Semi erect to spreading Spreading	1 3* 5 7 9	Erect Erect to semi-erect* Semi erect Semi erect to spreading Spreading	1 3* 5 7 9	90	VG
46.	Panicle: Exertion	Partly exerted Exerted Well exerted *	3 5 7*	Partly exerted Exerted Well exerted *	3 5 7*	90	VG
47.	Time of Maturity:	Very early Early Medium Late* Very late	1 3 5 7* 9	Very early Early Medium Late* Very late	1 3 5 7* 9	90	VG
48.	Leaf: Sencence	Early Medium Late*	3 5 7*	Early Medium Late*	3 5 7*	92	VG
49.	Sterile lemma: Colour	Straw* Gold Red Purple	1* 2 3 4	Straw* Gold Red Purple	1* 2 3 4	92	VS
50.	Grain: Weight of 1000 fully developed grains(gm)	Very low Low Medium* High Very high	1 3 5* 7 9	Very low Low Medium* High Very high	1 3 5* 7 9	92	VS
51.	Grain : Length	Very short Short* Medium Long Very long	1 3* 5 7 9	Very short Short* Medium Long Very long	1 3* 5 7 9	92	MS
52.	Grain: Width	Very narrow Narrow Medium* Broad Very broad	1 3 5* 7 9	Very narrow Narrow Medium* Broad Very broad	1 3 5* 7 9	92	MS
53.	Grain: Phenol reaction of lemma	Absent Present*	1 9*	Absent Present*	1 9*	92	VG
54.	Decorticated grain: Length	Very short Short* Medium Long Very long	1 3* 5 7 9	Very short Short* Medium Long Very long	1 3* 5 7 9	92	MS
55.	Decorticated grain: Width	Narrow (<2.0mm) Medium (2.0-2.5mm)* Broad (>2.5mm)	3 5* 7	Narrow (<2.0mm) Medium (2.0-2.5mm)* Broad (>2.5mm)	3 5* 7	92	MS
56.	Decorticated grain: Shape (in lateral view)	Short slender Short bold * Medium slender Long slender Long bold Extra long slender	1 2* 3 4 5 6	Short slender Short bold * Medium slender Long slender Long bold Extra long slender	1 2* 3 4 5 6	92	MS
57.	Decorticated grain: Colour	White* Light brown Variegated brown Dark brown Light red Red	1* 2 3 4 5 6	White* Light brown Variegated brown Dark brown Light red Red	1* 2 3 4 5 6	92	VG

		Variegated purple Purple Dark purple	7 8 9	Variegated purple Purple Dark purple	7 8 9		
58.	Endosperm: Presence of amylose	Absent Present*	1 9*	Absent Present*	1 9*	92	MG
59.	Endosperm: Content of amylose	Very low (<10 %) Low (10-19 %) Medium (20-25 %)* High (26-30 %) Very high (> 30 %)	1 3 5* 7 9	Very low (<10 %) Low (10-19 %) Medium (20-25 %)* High (26-30 %) Very high (> 30 %)	1 3 5* 7 9	92	MG
60.	Varieties with endosperm of amylose absent only Polished grain: Expression of white core	Absent or very small Small Medium Large	1 3 5 7	Absent or very small Small Medium Large	1 3 5 7	90	MG
61.	Gelatinization temperature through alkali Spreading value	Low Medium* Medium high High	1 3* 5 7	Low Medium* Medium high High	1 3* 5 7	92	MG
62.	Decorticated grain: Aroma	Absent* Present	1* 9	Absent* Present	1* 9	92	MG

*Note: = Right option

10 = First leaf through coleoptile/second leaf visible (less than 1 cm)

40 = Booting (Early boot stage)

50 = First spikelet of inflorescence just visible

55 = Half of inflorescence emerged

60 = Beginning of anthesis

65 = Anthesis half way

70 = Milk development

80 = Dough development

90 = Ripening (Terminal spikelets ripen)

92 = Caryopsis hard (can no longer by thumbnail and over 90% of spikelets ripened)

MG : Measurement by a single observation of a group of plants or parts of plants

MS: Measurement of a number of individuals plant or parts of plants

VG: Visual assessment by a single observation of a group of plants or parts of plants

VS: Visual assessment by observation of individual plants or parts of plant

It has weak pubescence on leaf blade; flag leaf is erect in early observation and semi-erect in late observation. Spike let: Colour of stigma and colour of tip of lemma is white and density of pubescence on lemma is medium. Hull colour is stained in Phenol reaction. It has medium, fully exerted semi-straight type panicle with strong secondary branching. Attitude of branches on panicle axis is erect to semi-erect. Shape of grain short bold, straw coloured and awnless. It's decorticated grain is white in colour and aroma less

and endosperm contains medium ranges of amylose.

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