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RESEARCH ARTICLE

ARE THE TRADITIONAL RICE VARIETIES LOW YIELDING? A CASE STUDY ON TRADITIONAL RICE VARIETIES OF LATERITIC REGION OF WEST BENGAL

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Manuscript Info

Abstract

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Manuscript History:	To check the yield potentiality of traditional rice with the high yielding
Received: 18 April 2015 Final Accepted: 29 May 2015 Published Online: June 2015	that, landraces varieties like Agniban, Bachi, Bahurupi, Byamajhupi, Barani, Chandrakanta, Daharlagra, Kaksal, Khuch and Talmugurdhan etc. possess high yield potential. They produced 54.04 q/ha, 46.6 q/ha, 53.82 q/ha, 56.65
Key words:	q/ha, 48.49 q/ha, 47.84 q/ha, 51.26 q/ha, 46.53 q/ha and 56.16 q/ha rice respectively in comparison with 48.93 q/ha of Mtu 7029. It was also
Traditional variety, High Yielding variety, Lateritic region, Yield potentiality, West Bengal.	observed that traditional varieties like Agniban, Bahurupi, Byamajhupi, Kheuch and Talmugurdhan are produce much more yield than the HYVs.
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INTRODUCTION

Yield attributes of a rice variety is top most important criteria for the selection, cultivation and domestication of a particular rice variety. Present HYVs are mostly welcome by the farmers because of their high production. Lateritic region of West Bengal possesses large number of traditional rice varieties but the number is decreasing very fast¹. Place of folk rice varieties gradually filled by the high yielding varieties². In spite of having many spectacular characters marginal farmers are uninterested to cultivate these varieties only because of their low production yield³. Yield potentiality of traditional varieties depends upon some clause and queue and production is solely depends upon some environmental condition and physiological factors of the rice field. Though most of the folk rice varieties are long in habit they are intended to lodge very frequently in time of flowering and grain filling stage, which is the main reason of grain loss. Varietal differences of grain yield were previously reported by Biswas *et al.*⁴. It was observed that there is a direct relation between the number of effective tillers or panicle density, number of grain, weight of 100 grains and the yield potentiality of a particular rice variety. The genotypes, which produced higher number of effective tillers per hill and higher number of grains per panicle also showed higher grain yield in rice^{5,6}. It was observed that most of the traditional varieties possess few numbers of effective tillers in comparison with HYVs.

Materials and methods

Traditional rice varieties were screened from all over the lateritic region of West Bengal. Among them fifty five traditional varieties were cultivated in test farm of Ranbahal village of Bankura district in randomized block design. Landraces are grown in study plots with $6m^2$ blocks in control condition. Name of the fifty five landraces of rice are given in Table 2 along with their yield characters.

Agronomic characters that determine yield potential of rice cultivars are- number of effective tillers (bearing panicle) per hill, panicle density (number of grains per panicle or number of panicle/unit area), number on unfilled

grains/panicle, weight of 5 panicles, length of grain, length of kernel, width of grain, width of kernel, length width ratio of kernel and 100 grains weight. Among them characters number of effective tillers (bearing panicle) per hill, panicle density (number of grains per panicle or number of panicle/unit area), number of unfilled grains/panicle and 100 grain weight has been used to calculate yield potential of the landraces.

Yield potential of 55 landraces of rice was estimated as the mean grain weight per ha. Mean production of yield form each landraces per hector was calculated using the following formula.⁷

Yield
$$(q/ha) = \frac{cSW X (PDEN - ST) X H X PAN}{A X 10}$$

Where,

cSW = dry weight of hundred seed (in gm).

PDEN = mean panicle density.

ST= men number of unfilled (sterile) grains/panicle.

H= standard sample number of hills grown on a unit plot area.

PAN= model number of effective tillers (with panicle).

A= unit plot area (in cm2).

Results and discussion

Various agronomic parameter and mean yield production by the 55 landraces of rice of lateritic region of West Bengal is presented in Table 2.

In comparison with yield potentiality of the present High Yielding Variety, landraces were grouped into six category i.e. Very low yielding group (< 10q/ha), Low yielding group (11-25 q/ha), Medium yielding group (26-35q/ha), Moderately High yielding group (36-45q/ha), High yielding group (46-50q/ha) and Very high yielding Variety (>50q/ha) group.

Only two varieties (2%) fall under the Very low yielding group, 12 varieties (24%) fall under the Low yielding group, 17 varieties (33%) fall under the Medium yielding group, 10 varieties (16%) fall under the Moderately high yielding group, 7 varieties fall under the High yielding (11%) group and 7 varieties (14%) fall under the Very high yielding group among the all 55 studied landraces of rice. Various yield groups and the landraces of rice falling under each group are depicted in Table no 1.

Mean yield potential of 55 landraces of rice is given in Table no 2. Yield production by various landrace in control study condition without giving any synthetic manure give promising results. The mean productions of these landraces varied from 7.87 q/ha to 56.65 q/ha. The lowest yield potential was observed in Bhadoi variety and the highest yield potential was observed in Byamajhupi variety. Landraces varieties like Agniban, Bachi, Bahurupi, Byamajhupi, Barani, Chandrakanta, Daharlagra, Kaksal, Khuch and Talmugurdhan etc. possess high yield potential. They produced 54.04 q/ha, 46.6 q/ha, 53.82 q/ha, 56.65 q/ha, 48.49 q/ha, 47.84 q/ha, 51.26 q/ha, 46.53 q/ha and 56.16 q/ha rice respectively. If we compare this yield potential of the landraces of rice to the presently most widely cultivated high yielding variety 'Lal Swarna' (Mtu 7029) of maximum agriculture field of this region, it was observed that a significant number of landraces possess same yield potential, even in some case yield production have significantly higher than this H.Y.V. Generally yield potential of Mtu 7029 is near about 48.93 q/ha but in Agniban, Bahurupi, Byamajhupi, Khuch and Talmugurdhan product much more yield than the HYV, and they produced 54.04 q/ha, 53.82 q/ha, 56.65 q/ha, 51.26 q/ha, 56.16 q/ha yield respectively.

Yield production of these traditional varieties depends upon some control agricultural condition. Landraces should be grown on control condition. Availability of requisite amount of water throughout the growing period, water lodging of the plant being minimum or absent especially in time of flowering, weed control, application of organic manure in requisite amount etc. are some of the fundamental requirement to obtain the maximum yield potential from the rice landraces. It was observed that landraces with quality character like some aromatic varieties (Badshabhog, Danarguri, Baskamini, Radhatilak, Kanakchur, Kalojira, Kataribhog, Lalbadshabhog etc.) have low yield potential. Varieties with fine grain like Sitasal, Dudherswar (etc.) also possess low yield potential. This observation was previously made by Shakeel *et al.*⁸ who reported that most of the high quality rice cultivars are low yielding.



Fig. 1. Various yield groups among the 55 landraces of rice

Table 1.	Various yield	groups and	Landraces fall	under the ea	ach group
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Yield group	Name of Landraces		
Very low yielding group (< 10 q/ha)	Kelesh, Bhadoi		
Low yielding group (11-25 q/ha)	Malsira, Neta, Sitasal, Sindurmukhi, Tulsibhog,		
	Vutmuri, Fulkhar, Fulpagri, Gangajali, Kakua,		
	Kalobyar, Kanakchur		
Medium yielding group (26-35 q/ha)	Kataribhog, Lalbadshabhog, Malabati, Marichsal,		
	Nikunja, Nonabogra, Badshabhog, Dhransal,		
	Danarguri, Dudherswar, Jamainadu, Kalamkati,		
	nugenbaro, Patnai-23, Radhatilak, Rupsal, Valki		
Moderately High yielding group (36-45 q/ha)	Langalmura, Nagrasal, Narkeljhopa, Badamsaru,		
	Baskamini, Bhuri, Chotodidi, Kalobhat, Kartiksal,		
	Kalojira.		
High yielding group (46-50 q/ha)	Kheuch, Laltipa, Suakalma, Bachi, Barani,		
	Chandrakanta, Daharlagra		
Very high yielding Variety (>50 q/ha)	Khajurchari, Rupsal, Talmugurdhan, Agniban,		
	Bahurupi, Bymajhupi, Kaksal		

Table 2. Yield potential of 55 landraces of Rice of Lateritic region of West Bengal

Code no	Name of Landraces	No of eff. Tillers/ hill	Panicle density	100 grain weight (gm)	Mean yield (q/ha)
V1	Agniban	15	203	2.8	54 04
V1 V2	Badshabhog	13	268	1.16	26.94
V3	Bachi	15	211	2.33	46.6
V4	Bahurupi	21	170	2.57	53.82
V5	Badamsaru	16	218	1.9	42.56

V6	Baskamini	17	231	1.49	37.31
V7	Byamajhupi	15	285	2.06	56.65
V8	Bhuri	14	146	2.85	37.24
V9	Bhadoi	7	77	2.41	7.87
V10	Barani	14	261	2.07	48.49
V11	Chotodidi	14	149	3.19	41.38
V12	Chandrakanta	16	205	2.3	47.84
V13	Dharansal	14	161	2.24	31.56
V14	Daharlagra	17	230	1.91	47.37
V15	Danarguri	12	303	1.1	26.04
V16	Dudherswar	8	234	2.3	27.47
V17	Fulkhar	11	159	2.21	24.14
V18	Fulpagri	11	127	1.69	14.5
V19	Gangajali	10	132	1.96	15.94
V20	Jamainadu	14	166	2.35	35.09
V21	Kakua	13	109	2.87	24.87
V22	Kaksal	18	141	3.03	51.26
V23	Kalamkati	18	119	2.25	29.43
V24	Kalobhat	17	139	2.7	39.47
V25	Kalojira	20	236	1.26	37.96
V26	Kalobayar	10	157	2.05	20.09
V27	Kanakchur	12	167	1.95	24.49
V28	Kartiksal	15	201	1.99	37.81

Table 2 (cont.) Yield potential of 55 landraces of Lateritic region of West Bengal

Code	Name of	No of eff.	Panicle	100- grain	Mean yield
no	Landraces	Tillers/ hill	density	weight	(q/ha)
V29	Kataribhog	18	206	1.4	32.76
V30	Kelesh	11	71	1.97	9.39
V31	Khajurchari	13	239	2.57	51.0
V32	Kheuch	14	194	2.71	46.53
V33	Lalbadshabhog	15	314	1.07	32.1
V34	Langalmura	12	169	3.0	38.16
V35	Laltipa	15	193	2.76	50.5
V36	Malabati	12	170	2.67	34.17
V37	Malsira	13	118	2.0	19.06
V38	Marichsal	14	173	2.13	32.4
V39	Nagrasal	11	188	3.36	43.85
V40	Narkeljhopa	20	185	1.84	42.93
V41	Neta	15	98	2.05	19.47
V42	Nikunja	10	215	2.13	29.11
V43	Nonabogra	11	166	2.93	33.3
V44	Nugenbaro	13	161	2.61	35.51
V45	Patnai-23	14	130	2.76	30.91
V46	Raghusal	19	194	2.45	57.1
V47	Radhatilak	14	270	1.2	30.24
V48	Rupsal	15	137	2.27	28.82
V49	Sitasal	15	157	1.59	23.69
V50	Sindurmukhi	12	128	2.62	25.15
V51	Suakalma	10	284	2.53	46.55
V52	Tulsibhog	9	343	1.01	19.99
V53	Talmugurdahn	16	172	3.25	56.16
V54	Valki	11	141	2.71	26.03
V55	Vutmuri	25	81	2.04	25.5

Reference

1. Sinha, A.K., Mishra, P.K., 2013. Agro-morphological characterization of rice landraces variety (Oryza sative

L.) of Bankura district of West Bengal. Research in Plant Biology, 3(5):28-36.

2. Sinha, A.K., Mishra, P.K., 2012. Rice diversity of Bankura District of West Bengal (INDIA). *Bioscience Discovery*, 3(3):284-287.

3. Sinha, Anjan Kumar, Mishra, P.K., 2013. Selected Agronomic Traits of Indigenous Rice (*Oryza sativa* L.) variety of Lateritic Region of West Bengal. *Environment & Ecology*, 31(2c):1011-1017.

4. Biswas, J.K., Hossain, M.A., Sarker, B.C., Hassan, M. and Haque, M.Z., 1998. Yield performance of several rice varieties seeded directly as late aman crops. *Bangladesh J. Life Sci.*, 10:47-52.

5. Kusutani, A., Tovata, M., Asanuma, K., and Cui, J., 2000. Studies on the varietal differences of harvest index and morphological characteristics of rice. *Japanese J. Crop Sci.*, 69:359-364.

6. Dutta, R.K., Baset Mia, M.A. and Khanam, S., 2002. Plant architecture and growth characteristics of fine grain and aromatic rice and their relation with grain yield. IRC Newslett., 51:51-56.

7. Deb, D., Seeds of Tradition, Seeds of Future : Folk Rice Varieties of Eastern India, Research Foundation for Science, Technology & Ecology, New Delhi.

8. Shakeel, A., Hussain, A., Ali, H. and Ahmad, A., 2005. Transplanted fine rice (*Oryza sativa* L.) productivity as affected by plant density and irrigation regimes. *Int. J. Agric. Biol.*, 7:445-447.