

## Comparative performance of low land indigenous rice genotypes in Gangetic Alluvial Zone

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### ABSTRACT

Some indigenous rice genotypes of different ecosystem have high yielding potentiality (Deb, 2000). In spite of this, information proper evaluation of indigenous genotypes of different ecosystem is not adequate. Cultivation of indigenous genotypes are decreasing day by day due to ingress of high yielding varieties and non-availability of good quality indigenous rice seeds. Acknowledging this opinion, the present investigation was undertaken to evaluate the potential of eight indigenous low land rice genotypes in New Alluvial Zone, Gontra, Nadia, West Bengal during *kharif* seasons of 2004 and 2005. The experiment was laid out in a Randomized Block Design (RBD) by single planting method. From this evaluation highest plant height, panicle length, effective tiller numbers were found in Langalmuthi, Laljhulur, Chamarmani, respectively and highest grain yield obtained from Chamarmani. Test weight was found in great difference, highest in Katrani (32.9g) and lowest in Masuri (16.34g).

**Key words :** Rice genotypes, Vigour, Yield.

It is well recognized that the planet is getting deprived of genetic diversity at a very fast rate and our contribution to this also cannot be ignored, especially through our over-emphasis on elite cultivars. To counter the loss of genetic diversity for all crop plants, scientists around the world have taken large measure towards conservation. Rice is one of the most widely used cereals in Asia, Africa, Latin America (Richaria, 1960; Chang, 1964; Adair, 1966) and India has a very important position with special reference towards genetic diversity and this further relevant for the whole of Central, North, East, and North-East India. The Gangetic plain covering the undivided Bengal during Pre-Independence could have the boast for wide genetic diversity in rice with regards to wide agro-climatic adaptation and grain quality but were mostly utilized under natural position. Keeping the above facts in mind, the present investigation was undertaken with eight low land indigenous rice genotypes to evaluate different economically useful parameters.

### MATERIALS AND METHODS

The field experiment was carried out at the farmer's field during *kharif* seasons 2004 and 2005 in New Alluvial Zone, Gontra, Nadia, West Bengal. The experiment was laid out in Randomized Block Design; the eight low land indigenous rice genotypes were sown at spacing 25cm X 20cm by single planting method. Observations of different agro-climatic traits

were taken by a specific method, like root length and shoot length were measured 15 days after sowing. Fresh weight was taken at 15 days after sowing on 10 plants. Dry weight was taken after 6 hours by keeping in oven at 75°C. Vigour index was calculated by the formula  $\sum(x/n)$ , where  $x$  = number of normal seedlings,  $n$  = number of day. The record of vigour index was taken from 1<sup>st</sup> day to 15<sup>th</sup> day by daily counting method. The above data were recorded in laboratory condition.

Other parameters like plant height, panicle length, effective tiller number, days to 50% flowering, test weight and yield were recorded from the field experiment. For yield calculation, 4 random samples of one sq. meter area were selected for data collection and hereafter it was converted to tonnes /ha.

### RESULTS AND DISCUSSION

Table-1, 2, 3 & 4 shows the 1<sup>st</sup> year, 2<sup>nd</sup> year and pooled data of relevant characters of some indigenous rice.

#### 1. Laboratory study

Root length, shoot length, fresh weight, dry weight and vigour index was taken to find out their field performance. Generally higher values of above characters show good field performance. Genotypes with higher vigour index can tolerate in stress situation and can produce healthy and stout plant. Here most

of the genotypes showed higher vigour index. Out of 10 vigour index the lowest value was found in Gheus (6.890) and highest in Masuri (9.933). The genotype, Gheus resulted significant lower vigour index than the other genotypes tested (Table 2). The data related to root length also showed significant variation. The genotypes, Langalmuthi and Gheus recorded significantly higher values than other genotypes used (Table 1). The highest shoot length was found in

Langalmuthi (14.48 cm) lowest in Masuri (9.32 cm). The fresh weight ranged from 0.52 to 0.78 g. Considering the dry weight of the genotypes evaluated, the data ranged from 0.07 to 0.13 g. Among the genotypes tested, Langalmuthi, Katrani and Gheus recorded significant higher dry weight than others. So, from the laboratory studies it was very prominent than most of the desirable field performing characters belong to these indigenous low land rice genotypes.

**Table 1** Studies on morphological characters of some indigenous rice genotypes under laboratory condition

Sl. No.	Genotypes	Root length (cm)			Shoot length (cm)			Fresh weight (g) of 10 seedlings		
		1 <sup>st</sup> year	2 <sup>nd</sup> year	pooled	1 <sup>st</sup> year	2 <sup>nd</sup> year	pooled	1 <sup>st</sup> year	2 <sup>nd</sup> year	pooled
1	Masuri	12.66	12.80	12.73	9.40	9.23	9.32	0.532	0.508	0.520
2	Chamarmani	19.77	19.40	19.58	11.78	11.62	10.70	0.554	0.526	0.540
3	Laljhulur	9.48	9.93	9.70	9.53	9.50	9.51	0.580	0.600	0.590
4	Langalmuthi	26.43	26.90	26.67	14.70	14.27	14.48	0.778	0.782	0.780
5	Katrani	15.67	15.53	15.60	10.83	10.70	10.77	0.700	0.673	0.687
6	Kumargore	17.21	17.73	17.47	11.37	11.40	11.38	0.620	0.633	0.627
7	Gheus	14.83	14.57	14.60	13.40	13.43	13.42	0.734	0.746	0.740
8	Birpalla	12.96	12.93	12.95	11.30	1.40	11.35	0.511	0.531	0.521
	CD at 5% level		3.267		2.192		0.027			

**Table 2** Studies on dry weight of seedlings at 15 DAS and vigour index of some indigenous rice genotypes under laboratory condition

Sl. No.	Genotypes	Dry weight (g) of 10 seedlings			Vigour index		
		1 <sup>st</sup> year	2 <sup>nd</sup> year	Pooled	1 <sup>st</sup> year	2 <sup>nd</sup> year	Pooled
1	Masuri	0.084	0.076	0.080	9.967	9.900	9.933
2	Chamarmani	0.093	0.087	0.090	9.850	9.907	9.878
3	Laljhulur	0.073	0.067	0.070	9.783	9.717	9.750
4	Langalmuthi	0.129	0.131	0.130	8.157	8.237	8.197
5	Katrani	0.103	0.090	0.096	8.783	8.712	8.733
6	Kumargore	0.073	0.091	0.082	9.633	9.363	9.498
7	Gheus	0.087	0.103	0.095	6.870	6.910	6.890
8	Birpalla	0.085	0.100	0.093	8.120	8.230	8.175
	CD at 5% level		0.035		0.276		

## 2. Field study

### Morphological character

Among the genotypes evaluated, the lowest plant height was found in Katrani (105.67 cm) and highest in Langalmuthi (167.67 cm). The genotypes, Langalmuthi and Gheus differed significantly from other genotypes (Table 3). Considering days to 50% flowering, the range was varied from 111.83 days to 130.80 days. The genotype, Langalmuthi took significantly shorter duration to 50% flowering than other genotypes.

### Yield attributes and yield

The data related to the effective tiller number per hill showed considerable variations. The highest number of effective tiller was recorded in Chamarmani (11.72) and lowest was in Katrani (7.33). The genotypes, Laljhulur, Katrani and Gheus recorded significantly higher panicle length. The range of panicle length was from 22.93 cm to 29.10 cm. The lower panicle length was recorded in Birpalla and highest in Laljhulur.

The range of thousand-grain weight was from 16.34 to 32.96g. Katrani, Gheus and Birpalla resulted significant higher 1000-grain weight. Most of the rice genotypes produced good yield but the days to 50% flowering as well as total crop duration was quite high, that's why these genotypes were not generally preferred by the farmer. The highest number of grains/panicle was recorded in Masuri and lowest in Birpalla. Among the eight genotypes Masuri recorded significantly higher number of grains/panicle than

other genotypes. The highest yield was recorded from Chamarmani (4.33 t/ha) and lowest in Birpalla (3.51 t/ha). The genotypes, Chamarmani, Kumargore, Katrani, Laljhulur and Langalmuthi recorded higher yield and on an average these genotypes provided 13% higher grain yield than Birpalla and Masuri.

From the above experiment, it is evident that Chamarmani recorded the highest yield which was significantly higher in comparison to other genotypes. With respect to initial seedling establishment in the nursery bed, the vigour showed higher value in Masuri and Chamarmani. Finally it can be concluded that Chamarmani genotype has both higher yield and vigour in comparison to other genotypes.

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**Table 3** Studies on morphological characters of some indigenous rice genotypes under field condition

Sl. No.	Genotypes	Plant height (cm)			Days to 50% flowering			Effective tiller number/hill		
		1 <sup>st</sup> year	2 <sup>nd</sup> year	pooled	1 <sup>st</sup> year	2 <sup>nd</sup> year	pooled	1 <sup>st</sup> year	2 <sup>nd</sup> year	pooled
1	Masuri	140.67	158.33	134.50	128.00	128.00	128.00	7.71	7.13	7.42
2	Chamarmani	141.33	133.00	137.17	127.33	128.00	127.67	12.50	11.00	11.72
3	Laljhulur	136.17	130.00	133.08	128.00	128.00	128.00	10.56	10.30	10.83
4	Langalmuthi	172.33	163.00	167.67	112.00	111.67	111.83	10.00	8.00	9.00
5	Katrani	107.53	104.00	105.67	122.00	121.67	121.83	8.67	6.00	7.33
6	Kumargore	130.90	124.33	127.62	125.00	124.68	124.84	10.82	10.18	10.00
7	Gheus	158.60	153.00	155.80	131.00	130.60	130.80	11.33	9.00	10.17
8	Birpalla	142.40	139.00	142.20	127.00	126.61	126.70	12.00	10.33	11.17
	CD at 5% level			12.541			5.428			1.574

**Table 4** Studies on yield attributing character and yield of some indigenous rice genotypes under field condition

Sl. No.	Genotypes	Panicle length (cm)			No. of grains/panicle		
		1 <sup>st</sup> year	2 <sup>nd</sup> year	pooled	1 <sup>st</sup> year	2 <sup>nd</sup> year	pooled
1	Masuri	26.2	24.06	25.13	174.2	182.1	178.15
2	Chamarmani	27.53	25.40	26.50	90.4	96.5	93.45
3	Laljhulur	30.20	29.00	29.10	87.4	82.5	84.95
4	Langalmuthi	27.17	25.00	26.08	89.2	98.5	93.86
5	Katrani	30.13	28.00	29.07	99.3	108.6	103.95
6	Kumargore	25.17	23.00	24.08	84.1	77.6	80.85
7	Gheus	29.00	27.00	28.00	63.5	66.2	64.85
8	Birpalla	24.10	21.77	22.93	59.8	62.3	61.01
CD at 5% level				2.172			11.12

**Table 5** Studies on yield attributing character and yield of some indigenous rice genotypes under field condition

Sl. No.	Genotypes	Test weight (g)			Yield (t/ha)		
		1 <sup>st</sup> year	2 <sup>nd</sup> year	pooled	1 <sup>st</sup> year	2 <sup>nd</sup> year	pooled
1	Masuri	16.7	16.12	16.34	3.64	3.58	3.61
2	Chamarmani	24.50	23.98	24.24	4.38	4.29	4.33
3	Laljhulur	26.50	25.95	26.22	4.00	3.68	3.82
4	Langalmuthi	27.50	27.47	27.48	3.88	3.72	3.80
5	Katrani	33.33	32.58	32.96	4.35	3.75	4.05
6	Kumargore	29.53	28.97	29.25	4.48	3.78	4.13
7	Gheus	31.50	30.80	31.15	3.80	3.14	3.72
8	Birpalla	31.13	31.10	31.16	3.71	3.32	3.51
CD at 5% level				2.534			0.513