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Short Communication

CHARACTERIZATION OF TRADITIONAL RICE CULTIVARS FROM PLATEAU REGION OF BIHAR AND EASTERN UTTAR PRADESH

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Thirty-five traditional rice cultivars from 4 districts of Eastern Uttar Pradesh and Hazaribagh district of Bihar were evaluated and characterized for 12 agro-morphological traits and high density grain index during 1996 wet season. A large variation was observed for the characters studied. High coefficients of variation was recorded for high density grain index, spikelets/panicle, secondary branches/panicle, panicle weight, and grain weight. Accession Karni (HRC 318) and Jhalore 1 (HRC 336) had extra long kernels (> 7.5 mm); of the two, former showed L:B ratio more than 3.0. High-density grain index was high in Madrasi (HRC 331), Katika (HRC 326), and Tilakchandan-2 (HRC 325). Several accessions were identified as potential donors for improving yield and quality. Of these 9 accessions possessed multiple desirable traits.

Key words : Rice, high density grain index, rainfed ecosystem, germplasm characterization

The success of breeding programme depends on the continuous supply of resource genes for yield components, quality traits and biotic and abiotic stresses. The traditional and locally adapted varieties offer an important gene pool whose vast potential is yet to be fully utilized. With the fast replacement of old land races by the new high yielding varieties, such sources may be lost. Concerted efforts have been underway at CRURRS, Hazaribag to conserve the enormous genetic diversity in rice especially from rainfed ecosystem. This paper reports the characteristics of new collections from 4 districts of Eastern Uttar Pradesh and Hazaribagh district of Bihar.

The materials for the present investigation comprised thirty-five traditional cultivars collected during 1995 crop season from the Hazaribag district of Bihar (4) and four districts of Eastern Uttar Pradesh : Ghazipur (7); Jaunpur (2) Sonbhadra (2); Mirzapur (11) and Varanasi (9). These new accessions were evaluated during the crop season (July-Dec.) of 1996 in three-row plots. Thirty day-old-seedlings were transplanted (single seedling/hill) with plant-to-plant and row-to-row distance of 15 cm each. A basal dose of fertilizer @ 40 Kg N/ha, 40 Kg P_2O_5/ha and 20 Kg K_2O/ha was applied just before transplanting and 20 Kg N/ha was top dressed. Plant protection measures were followed as and when required. Observations were recorded on 10 plants from the middle row. The characters studied were : days to 50% flowering (on row basis); plant height (cm); panicle length (cm); panicle weight (g); primary and secondary branches per panicle (no); spikelets per panicle (no); filled spikelets per panicle (%); 200-grain weight (g); kernel length (mm); breadth (mm), shape (L:B ratio) and high-density grain index (HDI). A

random sample of 200 grains from each accession was used to separate high-density grains using brine solution (1.2 specific gravity) and HDI was computed as suggested by Padmaja Rao *et al.* (1985) excluding chaffs. The range, mean and coefficients of variation were computed using standard statistical methods to assess the variability.

The accessions exhibited substantial variation for all the characters investigated. A wide variation was recorded for HDI, secondary branches per panicle, spikelets per panicle, panicle weight and grain weight, the CV ranging from 29.2 to 122.5 per cent (Table 1). In the previous studies also secondary branches/panicle varied the most (Sinha *et al.*, 1991; Shukla *et al.*, 1996). The rest of the characters had moderate level of variability (CV. 11.3-16.1%). The accession Bakaine 3 (HRC 328) was the earliest to flower (49 days). Plant height varied from 78.2 (Adamchini, HRC 329) to 119.8 cm (Tilakchandan-2, HRC 325). Fifteen accessions had long panicles (= 24.0 cm). Kalanamak (HRC 332) had the longest panicles. Panicle weight was high (= 4.0 g) only in three accessions, viz., Pahadidhan (HRC 204), Bakaine-2 (HRC 312) and Karni-1 (HRC 317).

Table 1. Range, mean and coefficient of variation (CV) for various agro-morphological characters

Character	Range	Mean ± SEm	CV %
Days to 50% flowering	49.0-79.0	69.0 ± 1.8	15.0
Plant height (cm)	78.2 - 119.8	104.1 ± 1.9	11.3
Panicle length (cm)	16.1-27.7	22.1 ± 0.2	10.0
Panicle weight (g)	0.8-4.2	2.8 ± 0.1	30.0
Primary branches/panicle	6.0-12.0	9.8 ± 0.3	15.3
Secondary branches/panicle	10.3-44.0	28.2 ± 1.5	31.6
Spikelets/panicle	71.1-246.2	152.6 ± 8.5	33.0
Filled spikelets/panicle (%)	47.3-97.5	79.1 ± 2.2	16.1
200-grain weight (g)	2.6-8.0	5.4 ± 0.3	29.2
Kernel length (mm) (L)	4.3-7.7	5.9 ± 0.2	15.0
Kernel breadth (mm) (B)	1.9-3.1	2.53 ± 0.05	11.7
L : B ratio	1.79-3.04	2.32 ± 0.05	13.1
High-density grain index (%)	0.0-87.5	24.1 ± 5.0	122.5

Table 2. Accessions prossessing useful agro-morphological characters for utilization in the breeding programme

Character	Accessions[a]
Long panicles (= 25 cm)	Kalanamak 1 (332), Tilakchandan 2 (325), Kalanamak (323), Karni 3 (319) Jirabatti 1 (322)
High panicle weight (= 3.4 g)	Pahadidhan (204), Karni 1 (317), Barahasal 1 (202), Bakaine 2 (312), Thupisall (208)
Spikelets/panicle (= 200)	Tilakchandan 1 (324), Karni 1 (317), Jirabatti 1 (322), Pahadidhan (204), Thupisall (208)
Filled spikelets/panicle (= 90%)	Bakaine 2A (316), Bakaine 1A (315), Jirabatti (314), Jirabatti 1 (322), Bakaine 2 (312)
1000-grain weight (= 35 g)	Barahasal 2 (203), Barahasal 1 (202), Jhalore 2 (338), Tilakchandan 2 (325), Adamchini (329)
Long kernels (= 7.0 mm)	Karni 2 (318), Jhalore 1 (336), Barahasal 2 (203), Jhalore 2 (338)
Slender kernels (L : B = 3.0)	Jhalore 1 (336)
High-density grain index (= 75%)	Madrasi (331), Karhai (327), Tilakchandan 2 (325), Katika (326)

a-Hazaribag Rice Collection number is given in parentheses.

High number of secondary branches per panicle is not a desirable trait since grains borne on them have lower weight than those of primary branches. But secondary branches per panicle varied more and ranged from 10.3 (Bakaine-3, HRC 328) to 44 (Adamchini, HRC 334) while primary branches per panicle varied only from 6.0 (Bakaine 3, HRC 328) to 12 (Bakaine 2A, HRC 316). Five accessions had very high number

Table 3. Characteristics of accessions possessing multiple desirable traits

Accession	50% flow. (days)	Plant height (cm)	Panicle length (cm)	Panicle length (cm)	Panicle weight (g)	Spikelets/ panicle (%)	Filled spikelets (%)	200-grain weight (g)	HDI (%)	Kernel length (mm)
Barahasal (HRC 202)	63.0	107.2	23.2	3.9	168.0	73.9	7.7	0.0	6.20	2.06
Pahadidhan (HRC 204)	79.0	110.0	24.1	4.2	208.0	57.9	6.5	3.5	6.10	2.35
Thupisall (HRC 208)	79.0	112.6	24.2	3.8	200.2	81.5	4.5	0.5	6.50	2.83
Bakaine 2 (HRC 312)	79.0	101.0	24.4	4.0	170.9	91.5	4.8	4.0	6.00	2.31
Karni 1 (HRC 317)	53.0	103.0	23.0	4.0	228.8	83.2	3.9	49.0	6.00	1.94
Jirabatti 1 (HRC 322)	79.0	114.0	25.6	2.7	214.7	94.4	4.5	0.5	5.00	2.17
Tilakchandan 2 (HRC 325)	79.0	119.8	26.1	3.6	139.6	86.8	7.6	75.0	6.50	2.17
Jhalore 1 (HRC 336)	70.0	83.7	20.5	2.5	91.4	72.7	6.6	14.5	7.60	3.04
Jhalore 2 (HRC 338)	79.0	88.6	20.7	76.9	85.9	7.7	30.5	7.10	2.96	

Within parenthesis is Hazaribag Rice Collection number. Under lined values indicate desirable trait (s)

of spikelets per panicle and high percentage of filled spikelets (Table 2). Grain weight is an important yield contributing character especially high grain weight (Table 2). Only 4 accessions had long grains (= 6.61 mm), of which Jhalore 1 (HRC 336) and Karni 2 (HRC 318) had slender grains (Table 2). Most of the accessions (62.9%) had low HDI (< 20%). Nevertheless 6 accessions had reasonably high HDI (= 60%) and 4 accessions showed 30.5-56.0% HDI. The accessions with useful agro-morphological traits have been listed in Table 2. Of these Pahadidhan, Barahasal, Thupisall, Bakaine 2, Karni 1, Jirabatti 1, Tilakchandan 2, Jhalore 1 and Jhalore 2 possess multiple desirable traits (Table 3) and could serve as good donors for utilization in the hybridization programme.

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