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Study of morphological characters of rice germplasm accessions used for wild rice eradication in Chhattisgarh

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SUMMARY

An experiment was conducted during *kharif* 2000 comprised of 100 genotypes to study morphological characters of rice germplasm accessions used for wild rice eradication. Out of 100 genotypes anthocyanin pigmentation was recorded in 63 and 72 genotypes at seedling and flowering stage, respectively while, remaining were non-pigmented. For kernel colour 65 genotypes reported to have white kernel and 35 genotypes have red kernel. Regarding lemma and palea colour 44 genotypes have straw lemma and palea colour, golden lemma and palea for 14 genotype and only one genotype has black lemma and palea colour and best twenty genotypes were selected on the basis of pigmentation, lemma and palea colour, kernel colour and with better grain yield per plant.

Key words : Anthocyanin, Pigmentation, Rice, Rice morphology

Wild rice is a problem for rice growing farmers in Chhattisgarh, where, *biasi* (Beaushening) method of cultivation is prevalent thereby a great yield loss has been observed. It is estimated to be Rs. 7 crores in Madhya Pradesh (Shrivastava *et al.,* 1986). Actually at initial stage of crop. growth there has been no difference between wild rice and cultivated rice. Wild rice can be differentiated only among purple plant or plants part having some pigmented parts *viz.,* purple sheath, purple auricle and purple ligule and later stage pigmented apiculus. The use of pigmented rice cultivars can be used to rouge out wild rice, as was reported by Fujisaka *et al.* (1993). Thus, breeders need to develop varieties with pigmentatism to overcome the problem of wild rice in this region.

MATERIALS AND METHODS

The present research work was conducted at Research Farm, Department of Plant Breeding and Genetics, Indira Gandhi Agricultural University, Raipur (Chhattisgarh) during *kharif* 2000. The experimental material for this study was comprised of 100 genotypes either bearing whole plant purple or some plant parts purple. Each genotype was grown in single row in each replication. Normal agronomic practices were followed throughout the crop period. Five plants from each row were randomly selected and were tagged for recording characters. The pigmentation was recorded on various major plant parts *viz.,* leaf sheath, leaf blade, auricle, ligule and apiculus as they were either purple or green.

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RESULTS AND DISCUSSION

In seedling stage out of 100 genotypes 37 genotypes were green and 63 genotypes had purple leaf colour thus number of green leaves genotypes were less than those of purple leaves genotype. On the contrary at flowering stage leaf blade pigmentation increased as compared to seedling stage and the number noted being 72. The same pattern of observation was recorded by Nadaf *et al.* (1992 a). Pigmentation pattern observed was pigmentation in leaf blade, leaf sheath, auricle, ligule, 56 genotypes and apiculus, pigmentation in leaf blade, leaf sheath, ligule and apiculus, 17 genotypes, pigmentation in leaf sheath, auricle, ligule and apiculus, 9 genotypes, pigmentation in leaf sheath, ligule and apiculus, 9 genotypes, pigmentation in auricle, ligule and apiculus one genotype, pigmentation in leaf sheath, auricle and apiculus, 2 genotypes, pigmentation in leaf blade, leaf sheath and apiculus one genotype and pigmentation in apiculus 3 genotypes.

Out of 100 genotypes, 65 genotypes possessed white kernel where as 35 genotypes possessed red kernel are presented in Table 1. Out of 100 genotypes only one genotype has been found to posseses black husk while majority of the genotypes (44 genotypes) were recorded to have straw lemma and palea colour, 13 genotypes had purple furrow on straw and next 13 genotypes reddish to light purple, 14 genotypes golden colour of lemma and palea, one genotype with purple lemma palea, one

Table 1 : Pigmentation on various plant parts at various stages of crop

Sr. No.	Name of variety	Leaf blade pigmentation		Pigmentation in major plant parts at flowering stage					Kernel colour	Lemma and palea colour
		Seedling stage	Flowering stage	Leaf blade	Leaf sheath	Auricle	Ligule	Apiculus		
1.	Lali Ajan	Pr.	Pr.	+	+	+	+	+	Red	Gold
2.	Bade Kudeni	Pr.	Pr.	+	+	+	+	+	White	Redish
3.	Baieani	Pr.	Pr.	+	+	+	+	+	White	Redish
4.	Baieani	Pr.	Pr.	+	+	+	+	+	Red	Straw
5.	Baieani paddy	Gr.	Pr.	+	+	+	+	+	Red	Straw
6.	Balsua	Pr.	Pr.	+	+	+	+	+	White	Gold
7.	Cross	Pr.	Pr.	+	+	-	+	+	White	Straw
8.	Ganea Puriha	Pr.	Pr.	+	+	-	+	+	White	.Straw
9.	Kalam Gurmatia	Gr.	Pr.	+	+	-	+	+	White	Straw
10.	Kalam Gurmatia	Gr.	Pr.	+	+	-	+	+	White	Straw
11.	Kalam Gurmatia	Pr.	Pr.	+	+	-	+	+	White	Straw
12.	Man Keshar	Pr.	Pr.	+	+	-	+	+	Red	Straw
13.	Man Keshari	Pr.	Pr.	+	+	.	+	+	Red	Straw
14.	Man Keshari	Pr.	Pr.	+	+	-	+	+	White	Gold
15.	Nag Keshar	Pr.	Pr.	+	+	-	+	+	Red	Purple furrow on straw
16.	Nand Keshar	Pr.	Pr.	+	+	+	+	+	Red	Redish
17.	Nan Keshar	Gr.	Pr.	+	+	+	+	+	Red	Gold
18.	Nan Keshar	Pr.	Pr.	+	+	+	+	+	White	Radish
19.	Nan Keshar	Pr.	Pr.	+	+	+	+	+	Red	Straw
20.	Ram Keshar	Gr.	Pr.	+	+	+	+	+	White	Golden furrow on straw
21.	Koliyari	Pr.	Pr.	+	+	+	+	+	White	Straw
22.	Kormal	Pr.	Pr.	+	+	+	+	+	Red	Straw
23.	Kosawar	Pr.	Pr.	+	+	+	+	+	Red	Purple furrow on straw
24.	Koyali Langdi,	Pr.	Pr.	+	+	+	+	+	White	Golden furrow on straw
25.	Koyali Ras	Pr.	Pr.	+	+	+	+	+	Red	Golden furrow on straw
26.	Krishna	Pr.	Pr.	+	+	+	+	+	White	Gold
27.	Lahabari	Pr.	Pr.	+	+	+	+	+	Red	Straw
28.	Lahabari	Pr.	Pr.	+	+	+	+	+	White	Purple furrow on straw
29.	Lahbari	Pr.	Pr.	+	+	+	+	+	White	Purple furrow on straw
30.	Lal Baieani	Pr.	Pr.	+	+	+	+	+	Red	Straw
31.	Laldhan	Gr.	Pr.	+	+	+	+	+	Red	Redish
32.	Lali	Pr.	Pr.	+	+	+	+	+	Red	Straw
33.	Lal Kunwar	Gr. Pr. Sh.	Gr. Pr. Sh.	-	+	+	+	+	White	Redish to light purple
34.	Lam Pagiya	Gr. Pr. Sh.	Gr. Pr. Sh.	-	+	+	+	+	White	Redish to light purple
35.	Lankesbwari	Pr.	Pr.	+	+	+	+	+	Red	Straw
36.	Lankeshwari	Gr. All	Gr. Pr. api	-	-	-	-	+	White	Straw
37.	Laxmi Gitas	Gr.	Pr.	+	+	+	+	+	White	Straw
38.	Lahbbadri	Pr.	Pr.	+	+	+	+	+	White	Straw
39.	Luchi Nag Keshari	Pr.	Pr.	+	+	+	+	+	Red	Redish to light purple
40.	Cross Luchai	Pr.	Pr.	+	+	+	+	+	Rd	Redish to light purple
41.	Cross Luchai	Pr.	Pr.	+	+	-	+	+	White	Gold
42.	Kalam Luchai	Gr.	Gr. Pr. api	-	-	-	-	+	White	Gold
43.	Kalam Luchai	Pr.	Pr.	+	+	+	+	+	White	Gold
44.	Krishna Luchai	Gr.	Pr.	+	+	+	+	+	White	Gold
45.	Krishna Luchai	Pr.	Pr.	+	+	-	+	+	Red	Gold furrow on straw
46.	Lal Luchai	Pr.	Pr.	+	+	+	+	+	White	Straw
47.	Lal Luchai	Pr.	Pr.	+	+	+	+	+	Red	Straw
48.	Nae Keshar Luchai	Pr.	Pr.	+	+	+	+	+	White	Gold
49.	Madan Makdo	Pr.	Pr.	+	+	+	+	+	Red	Redish to light purple

Contd….. Table 1

Table 1 contd…..

50.	Malpa	Pr.	Pr.	+	+	+	+	+	White	Gold
51.	Marad MalkhJln	Pr.	Pr.	+	+	+	+	+	Red	Redish to light purple
52.	Munda Kariya	Pr.	Pr.	+	+	+	+	+	Red	Straw
53.	Nan Kela	Gr.	Pr.	+	+	+	+	+	White	Gold
54.	No. 11	Pr.	Pr.	+	+	+	+	+	Red	Purple furrow on straw
55.	Gurmatia	Gr. Pr. Sh.	Gr. Pr. Sh.	-	+	-	+	+	White	Straw
56.	Bhatha Gurmatia	Gr. Pr. Sh.	Gr. Pr. Sh.	-	+	-	+	+	White	Purple
57.	Mani Gurmatia	Gr. Pr. auri	Gr. Sh. auri	-	-	+	+	+	White	Gold
58.	Bangia Gurmatia	Gr. Pr. Sb.	Gr. Pr. Sh.	-	+	-	+	+	White	Straw
59.	Bangle Gurmatia	Gr. Pr. Sb.	Gr. Pr. Sh.	-	+	-	+	+	White	Straw
60.	Bangla Gurmatia	Gr. Pr. Sh.	Gr. Pr. Sh.	-	+	+	+	+	White	Straw
61.	Kala Gurmatia	Gr. Pr. Sh.	Gr. Pr. Sh.	-	+	+	+	+	White	Straw
62.	Kariya Gurmatia	Gr. Pr. Sh.	Gr. Pr. Sh.	-	+	-	+	+	White	Black
63.	Lali Gurmatia	Gr. Pr. Sh.	Gr. Pr. Sh.	-	+	-	+	+	White	Redish to light purple
64.	Nagpuri Gurmatia	Gr. Pr. Sh.	Gr. Pr. Sh.	-	+	-	+	+	White	Straw
65.	Nagpuri Gurmatia	Gr. Pr. Sh.	Gr. Pr. Sh.	-	+	+	+	+	White	Straw
66.	Jal Keshar	Pr.	Pr.	+	+	+	+	+	White	Purple furrow on straw
67.	Kari Koliyarl	Pr.	Pr.	+	+	+	+	+	White	Purple furrow on straw
68.	Kali Kamod	Pr.	Pr.	+	+	+	+	+	White	Purple furrow on straw
69.	Lali Koliyara	Pr.	Pr.	+	+	+	+	+	White	Purple furrow on straw
70.	Kali Koliyara	Pr.	Pr.	+	+	+	+	+	White	Straw
71.	Jal Keshar	Pr.	Pr.	+	+	+	+	+	White	Purple spot on straw
72.	Jal Keshar	Pr.	Pr.	+	+	+	+	+	White	Brown furrow on straw
73.	Nag Keshar	Pr.	Pr.	+	+	+	+	+	White	Purple furrow on straw
74.	Nag Keshar	Pr.	Pr.	+	+	+	+	+	White	Redish to light purple
75.	Karl Koliyari	Pr.	Pr.	+	+	+	+	+	White	Purple furrow on straw
76.	Bagti Nag Keshar	Pr.	Pr.	+	+	+	+	+	Red	Straw
77.	Baigani	Pr.	Pr.	+	+	-	+	+	White	Straw
78.	Kalam Gurmatia	Pr.	Pr.	+	+	-	+	+	Red	Straw
79.	Kalami Gurmatia	Pr.	Pr.	+	+	-	+	+	Red	Straw
80.	Kari Bilas	Gr. Pr. Sh.	Gr. Pr. Sh.	-	+	-	-	+	White	Redish to purple light
81.	Kari Gilas	Gr. Pr. Sh.	Pr. Pr. Sh.	+	+	-	-	+	White	Redish to purple light
82.	Kehra Basant (K:511)	Pr.	Pr.	+	+	+	+	+	White	Gold
83.	Kali Khu.ii	Gr.	Pr.	+	+	-	+	+	Red	Straw
84.	Lahbari	Pr.	Pr.	+	+	-	+	+	White	Straw
85.	Lal Baigani	Pr.	Pr.	+	+	+	+	+	Red	Straw
86.	Lankeshwari	Pr.	Pr.	+	+	+	+	+	Red	Redish to light purple
87.	Luchi Nag Keshar	Pr.	Pr.	+	+	-	+	+	White	Straw
88.	Nag Keshar	Pr.	Pr.	+	+	+	+	+	Red	Straw
89.	Nag Keshar Bhondu	Pr.	Pr.	+	+	+	+	+	Red	Purple furrow on straw
90.	Ram Shree	Pr.	Pr.	+	+	+	+	+	Red	Redish to light purple
91.	Naumohar	Gr. Pr. Sh.	Gr. Pr. Sh.	-	+	+	-	+	Red	Straw
92.	Jagannath Prasad	Gr. Pr. Sh.	Gr. Pr. Sh.	-	+	+	-	+	White	Purple furrow on straw
93.	Rani Kajar	Gr. Pr. Sh.	Gr. Pr. Sh.	-	+	+	+	+	White	Brown furrow on straw
94.	Jagannath Prasad	Gr. Pr. Sh.	Gr. Pr. Sh.	-	+	+	+	+	White	Straw
95.	Gada Khuta	Gr. Pr. Sh.	Gr. Pr. Sh.	-	+	+	+	+	White	Brown furrow on straw
96.	Makado	Gr. Pr. Sh.	Gr. Pr. Sh.	-	+	+	+	+	White	Straw
97.	Chepti Gurmatia	Gr. Pr. Sh.	Gr. Pr. Sh.	-	+	-	+	+	White	Straw
98.	Mokdo	Gr. Pr. Sh.	Gr. Pr. Sh.	-	+	-	+	+	White	Straw
99.	Kalimai	Gr. Pr. Sh.	Gr. Pr. Sh.	-	+	-	-	+	White	Straw
100.	Rani Kajar	Gr.	Gr. Pr. api.	-	-	-	-	+	White	Straw

Table 2 : Selected genotype used for wild rice eradication

Sr. No.	Variety number	Name of variety	Plant part showing pigmentation	Lemma and pela colour	Kernel colour	Grain yield per plant
1.	20	Ram Keshar	Pr. Sheath	Golden furrow on straw	White	17.40
2.	60	Bangia Gurmatia	Pr. Sheath	straw	White	16.31
3.	65	Nagpurl Gurmatia	Pr. Sheath	straw	White	14.98
4.	61	Kala Gurmatia	Pr. Sheath	straw	White	14.85
5.	63	Lali Gurmatia	Pr. Sheath	Reddish to light purple	White	13.80
6.	64	Nagpuri Gurmatia	Pr. Sheath	straw	White	13.71
7.	55	Gurmatia	Pr. Sheath	straw	White	17.69
8.	97	Chepti Gurmatia	Pr. Sheath	straw	White	16.63
9.	96	Makado	Pr. Sheath	straw	White	16.44
10.	98	Mokdo	Pr. Sheath	straw	White	16.26
11.	62	Kariya Gurmatia	Pr. Sheath	Black	White	15.17
12.	81	Karl Gilas	All purple plant	Reddish to light purple	White	13.90
13.	18	Nan Keshar	All purple plant	Reddish	White	17.12
14.	44	Krishna Luchai	All purple plant	Gold	White	15.92
15.	59	Bangla Gurmatia	All purple plant	Straw	White	15.44
16.	53	Nan Kela	All purple plant	Gold	White	13.89
17.	29	Lahbarl	All purple plant	Purple furrow on straw	White	13.86
18.	42	Kalam Luchai	Pr. Apiculus	Golden	White	17.04
19.	36	Lankeshwari	Pr. Apiculus	straw	White	16.12
20.	100	Rani Ka.iar	Pr. Apiculus	straw	White	20.06

genotype possessed purple spot on straw, three genotypes found to have brown- furrow on straw, 5 genotypes had reddish lemma palea and 4 genotypes possessed golden furrow on straw. The same pattern of observation was recorded by Nadaf *et al.* (1992 b).

Out of 100 genotypes studied for morphological characters 20 best genotypes were selected on the basis of pigmentation on plant parts, lemma and palea colour, kernel colour and better grain yield per plant. These selected 20 genotypes (Table 2) with their pigmented plant parts will be helpful in eradication or rouging of wild rice and they were Ram Keshar (20) Bangla Gurmatia (60), Nagpuri Gurmatia (65), Kali Gurmatia (61), Lali Gurmatia (63), Nagpuri Gurmatia (64), Gurmatia (55), Chepti Gurmatia (97), Makado (96), Mokdo (98), Kariya Glirmatia (62) and Kari Gilas (81) possessed purple leaf sheath and white kernel colour.

While, Nan Keshar (18), Krishna Luchai (44), Bangla Gurmatia (59), Nan Kela (53) and Lahbari (29) were selected on the basis of pigmentation and white kernel colour. Kalam Luchai (42), Lankeshwari (36), and Rani Kajar (100) were selected, as these genotypes had purple apiculus and better grain yield per plant with white kernel colour.

All these selected genotypes may be used directly as variety or may be used in hybridization programme as donor parent in the improvement of varieties.

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