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Evaluation of Recombinant Inbred Lines (F_8) of Sabita/Sambamahsuri Derivatives for Quality Characters

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A B S T R A C T

Study on genetic variation and interrelationship of different quality characters was carried out using twenty-three recombinant inbred lines (RILs) of Sabita/Sambamahsuri derivatives developed at Regional Research Station, Bidhan Chandra Krishi Vishwavidyalaya, sub-centre - Chakdaha, Nadia, West Bengal along with four check varieties viz. Swarna sub-1, Dhanarasi, Sambamahsuri and Sabitain RBD with two replications. Grain yield and eight quality characters were studied and statistical analysis carried out for the estimation of GCV, PCV, heritability (BS), genetic advance and correlation coefficient for all characters. It was observed from grain quality performance that the genotypes S_{17} (81.235%) was superior in hulling percentage and S_{11} (69.235% and 59.825%) for milling percentage and head rice recovery. Among the selected genotypes, S_1, S_7, S_9, S_{10}, S_{12}, S_{13}, S_{18}, S_{21} and S_{22} reported intermediate (20% - 25%) amylose content. Analysis of variance revealed highly significant differences among the genotypes for all the characters under study. Alkali spreading (26.667% and 27.657%) value exhibited highest estimates of GCV and PCV. High heritability coupled with high genetic advance as percentage of mean was observed for amylose content (99.310% and 43.201%), volume expansion ratio (98.985% and 36.493%) and alkali spreading value (92.970% and 52.967%). Grain yield plant^{-1} exhibited significant positive correlation with hulling percentage, milling percentage and head rice recovery and showed negative significant correlation with water uptake ratio and alkali spreading value. Therefore, direct selection would be effective for quality improvement of rice against these characters.

Introduction

Rice (*Oryza sativa L.*) is the most widely consumed staple food for more than 60% of global population; especially in Asia. More than 90% of the world's rice is grown and consumed in Asia. Rice accounts for between 35-60% of the caloric intake of three billion Asians (Guyer *et al.,* 1998). Although yield improvement is considered to be the prime objective of any breeding programme but after achieving self-sufficiency in crop production, quality traits became important consideration of rice breeding in India (Mishra, 2004). With increase in yield, there is also a need to look into the quality aspects to have a better consumers' acceptance, which determine the profit margin of rice growers which in turn dictates the export quality and foreign exchange in India (Dhanwani *et al.,* 2013). The many diverse uses of rice both domestically and for export, require the quality be evaluated according to its suitability for specific end uses (Sonowal and Barooah, 2015).The large spectrum of genetic variability in segregating populations depends on the level of genetic diversity among genotypes offer better scope for selection. Information on GCV, PCV, heritability, genetic advance and genotypic correlation coefficient would be helpful for tailoring a sound breeding programme. Selection for improvement of milling, cooking, eating and processing qualities is crucial to get consumers' preference and industrial standard.

Chikkalingaiah *et al.,* (1999) derived information on mean, range, GCV, PCV and heritability from eight quality traits like grain length, grain breadth, L/B ratio, Kernel elongation ratio, amylose content, milling recovery, test weight as well as plant characters in 23 scented and one non-scented genotypes. They reported high heritability and genetic advance coupled with large genetic variability for amylose content, milling recovery, total number of tillers and total number of effective tillers. Binodh *et al.,* (2007) analysed 55 rice cultures for 14 quality parameters. High heritability with moderate to high GA and GCV and PCV were observed for all the quality characters, except for linear elongation ratio. Kishore *et al.,* (2008) studied genetic variability and heritability of different yield and grain quality characters for 70 rice genotypes. They obtained significant genotypic differences for all the 18 characters studied. The characters, namely, days to 50% flowering, plant height, head rice recovery percentage, L/B ratio, kernel length after cooking, elongation ratio, volume expansion ratio, water uptake, alkali spreading value and gel consistency were less affected by environment. High heritability coupled with high GA was exhibited by characters like days to 50% flowering, plant height and water uptake and gel consistency.

The present study is to find out superior genotypes of rice suitable for the gangetic plains of West Bengal. In this context, keeping the prior points in view, the present investigation was undertaken to assess the recombinant inbred lines of Sabita/Sambamahsuri derivatives, to identify the promising genotypes in F_8 progenies of Sabita/Sambamahsuri derivatives, to determine the genetic variability present in recombinant inbred lines of Sabita/Sambamahsuri derivatives and to understand the interrelationship among different traits for selection of desirable genotypes.

Materials and Methods

The experiment was conducted at the Instructional Farm, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal during kharif, 2015 in RBD with two replications. The experimental materials consisted of twenty-three F_8 recombinant inbred lines (RILs) of Sabita/Sambamahsuri derivatives and four checks viz. Swarna sub-1, Dhanarasi, Sambamahsuri and Sabita. RILs were developed at RRS, NAZ, Bidhan Chandra Krishi Vishwavidyalaya, SC-Chakdaha, Nadia. The Progenies were designated according to selection number and they are listed in Table-1. Each genotype was grown in 5 m^2 plot with the spacing of 20 × 20 cm and recommended management practices were followed to obtain good harvest. The seed was dehusked in a Satake laboratory huller and polished in a Satake Rice Polisher. The polished seed obtained was then utilized for the analysis of eight quality traits namely Hulling percentage (%), milling percentage (%) and head rice recovery (%) according to Nayak *et al.,* (2003), amylose content (%) following the method of Juliano (1971), water uptake ratio, kernel elongation ratio and volume expansion ratio according to Patil *et al.,* (2012) and alkali spreading value as suggested by Little *et al.,* (1958) along with grain yield plant^{-1}. The data were used for statistical analysis following appropriate computer based statistical software (OPSTAT) for the estimation of analysis of variance, mean, range, genotypic, phenotypic and environmental variance, GCV, PCV, heritability (BS), genetic advance and correlation coefficient for all characters.

Results and Discussion

Mean performance of twenty-three lines of Sabita/Sambamahsuri derivatives along with check varieties has been presented in Table-2. A wide variation was observed for hulling percentage (67.330% to 81.235%). S_{17} registered highest hulling percentage (81.235%) followed by S_{21} (80.465%), S_{19} (80.435%) and S_{23} (79.650%) respectively, while the minimum hulling percentage was observed in Sambamahsuri followed by Swarna sub-1. Milling percentage varied from 57.360% to 69.235%. S_{11} possessed highest value (69.235%) for milling percentage followed by S_{12} (69.200%), S_6 (68.950%) and S_{19} (68.410%) respectively while the minimum value recorded for Sambamahsuri followed by Dhanrasi in this regard. A high degree of variation (44.492% to 59.825 %) was observed for head rice recovery percentage. The maximum head rice recovery percentage was observed in S_{11} (59.825%) followed by S_{16} (59.620%) and S_{12} (59.587%) respectively, while minimum value of this trait was recorded for Sambamahsuri (44.492%) followed by S_{22} (54.509%). Amylose content ranged from 10.792% to 26.304%. Varieties with intermediate amylose content are preferred by most rice consumers. Among the selected genotypes S_1, S_7, S_9, S_{10}, S_{12}, S_{13}, S_{18}, S_{21} and S_{22} reported intermediate amylose content. Sabita recorded highest amylose content followed by S_{19} and the minimum amylose content recorded in S_{17} followed by S_{23} and S_4 respectively. The range for the water uptake ratio was found to be 1.300 to 1.674. The maximum water uptake ratio was observed in S_{23} followed by S_{20}, Swarna sub 1 and Sambamahsuri respectively while the minimum water uptake ratio observed in S_3 followed by S_{11}, S_{16} and S_{21} respectively. The range for volume expansion ratio was found to be 1.815 to 3.540. Most of the variety possessed moderate degree of volume expansion ratio. Sonowal and Barooah (2015) obtained moderate degree of volume expansion ratio in their experiment. The maximum value for volume expansion ratio was recorded in the S_{23} followed by $S_{5,}$ while minimum value recorded in S_{10} followed by $S_{12.}$ Kernel elongation ratio ranged from 1.167 to 1.657. The maximum kernel elongation ratio was recorded for S_1 followed by S_5 and the minimum value was recorded for S_{12} followed by S_3. The observed range for alkali spreading value was 2 to 5. The highest alkali spreading value recorded in S_7, Dhanrasi, Sambamahsuri and Sabita while the lowest value obtained in S_5 and S_{19} in this regard.

Analysis of variance

Analysis of variance (Table-3) showed significant differences among the genotypes for all the characters under study. Similar results in rice were also reported by Yadav *et al.*, (2002), Singh *et al.*, (2006) and Sharma and Sharma (2007) in their experiment. So there is a large scope to bring about qualitative improvement in rice selection. Roy *et al.*, (2009) observed conspicuous variability in quality parameters of rice.

Genetic parameters of quality and its attributing characters

The mean, range, phenotypic, genotypic and environmental variances, coefficient of variance (CV), genotypic coefficient of variation (GCV), phenotypic coefficient of variance (PCV), heritability (BS), genetic advance (GA) and genetic advance as percentage of mean against twenty-three genotypes along with check varieties are presented in Table-4.

Significant variation for all the characters was noted and this may help to identify desirable genotype on the basis of different quality parameters. In general the phenotypic variances were higher than the respective genotypic variances. Most of the quality character showed a small difference between phenotypic variance and genotypic variance suggested less influence of environment on these characters namely, head rice recovery, amylose content, water uptake ratio, volume expansion ratio, kernel elongation ratio and alkali spreading value. The environmental variance for kernel elongation ratio was recorded zero indicating no influence of environment on this trait.

The relative values of genotypic and phenotypic coefficient of variation provide important information on the magnitude of variation. All the quality characters under study showed slight difference in GCV and PCV. Kole *et al.*, (2008) and Dhanwani *et al.*, (2013) also reported slight difference in GCV and PCV for quality traits. Alkali spreading value (26.667% and 27.657%) exhibited the highest estimates of GCV and PCV followed by amylose content (21.044% and 21.177%). The high magnitude of GCV and PCV (>20%) for the above traits suggested the presence of high degree of variability and so better scope for the improvement through simple selection. Presence of high genetic variability for alkali spreading value may help in developing superior flaky cooked rice. In this regard, Veerabadhiran *et al.*, (2009) reported high GCV and PCV for Alkali spreading value.

Moderate GCV and PCV (10-20%) was observed for volume expansion ratio (17.805% and 17.896%). This indicates the existence of moderate variability for this character, which could be exploited for improvement through selection in advanced generations. Low GCV and PCV (<10%) were observed for hulling percentage (3.408% and 3.710%), milling percentage (3.696% and 4.119%), head rice recovery percentage (5.047% and 5.179%), water uptake ratio (6.848% and 7.038%) and kernel elongation ratio (7.837% and 7.974%). This indicates narrow genetic base for these characters. Improvement in these characters can be brought about by hybridization or induced mutagenesis to widen genetic base followed by pedigree selection in advanced generations. Umadevi *et al.*, (2010) and Gampala *et al.*, (2015) reported low GCV and PCV for hulling percentage.

Table.1 Recombinant Inbred Lines

S. No.	Selection No.	S. No.	Selection No.	S. No.	Selection No.
1.	S_1	10.	S_{10}	19.	S_{19}
2.	S_2	11.	S_{11}	20.	S_{20}
3.	S_3	12.	S_{12}	21.	S_{21}
4.	S_4	13.	S_{13}	22.	S_{22}
5.	S_5	14.	S_{14}	23.	S_{23}
6.	S_6	15.	S_{15}	24.	Swarna sub1**
7.	S_7	16.	S_{16}	25.	Dhanrasi**
8.	S_8	17.	S_{17}	26.	Sambamahsuri*
9.	S_9	18.	S_{18}	27.	Sabita*

*=Parental checks ** =Check varieties

Table.2 Mean Performance of 23 RILs of Sabita/Sambamahsuri derivatives for different quality characters

S. N.	Selection number	Hulling percentage (%)	Milling percentage (%)	Head rice recovery (%)	Amylose content (%)	Water uptake ratio	Volume expansion ratio	Kernel elongation ratio	Alkali spreading value	Grain yield plant^{-1} (g)
1.	S_1	75.875	67.500	57.513	22.094	1.464	3.106	1.657	2.500	29.900
2.	S_2	78.525	66.210	57.974	19.603	1.491	2.997	1.399	3.000	30.055
3.	S_3	76.540	66.165	57.395	14.863	1.300	2.052	1.181	3.000	29.500
4.	S_4	78.660	67.010	57.745	13.757	1.368	3.166	1.434	4.000	28.680
5.	S_5	78.310	65.590	57.606	14.632	1.552	3.372	1.491	2.000	25.355
6.	S_6	77.375	68.950	57.348	18.672	1.545	2.887	1.414	4.000	26.660
7.	S_7	76.005	64.169	58.397	23.235	1.497	2.467	1.411	5.000	23.785
8.	S_8	78.680	68.385	58.988	14.943	1.385	2.419	1.351	3.000	28.915
9.	S_9	77.840	66.968	56.634	20.738	1.521	3.257	1.325	3.000	23.445
10.	S_{10}	79.200	66.600	54.730	23.082	1.379	1.815	1.325	4.000	27.100
11.	S_{11}	78.445	69.235	59.825	18.310	1.332	2.249	1.222	3.000	32.515
12.	S_{12}	78.225	69.200	59.587	22.175	1.350	2.002	1.167	2.500	30.735
13.	S_{13}	78.540	65.975	58.459	22.129	1.424	2.248	1.320	3.000	27.270
14.	S_{14}	78.125	63.635	58.786	14.026	1.352	2.456	1.226	4.000	25.085
15.	S_{15}	77.575	66.870	58.008	16.714	1.372	2.294	1.264	4.000	30.675
16.	S_{16}	77.125	67.490	59.620	17.314	1.337	2.429	1.211	3.000	31.245
17.	S_{17}	81.235	67.180	56.508	10.792	1.396	2.256	1.311	2.500	29.870
18.	S_{18}	78.760	66.990	58.785	20.466	1.420	2.607	1.263	2.500	27.945
19.	S_{19}	80.435	68.410	58.640	26.108	1.441	2.248	1.284	2.000	30.695
20.	S_{20}	76.785	68.320	57.104	19.068	1.623	3.181	1.348	2.500	27.905
21.	S_{21}	80.465	68.125	55.228	22.306	1.338	2.237	1.284	3.500	28.945
22.	S_{22}	77.605	62.930	54.509	21.517	1.397	2.325	1.237	3.000	24.105
23.	S_{23}	79.650	68.000	54.812	13.726	1.674	3.540	1.439	4.000	31.625
24.	Swarna sub 1**	71.795	66.635	57.170	24.323	1.576	3.065	1.313	3.000	29.075
25.	Dhanrasi**	74.900	62.033	55.836	21.551	1.560	3.128	1.287	5.000	28.625
26.	Sambamahsuri*	67.330	57.360	44.492	21.010	1.570	2.939	1.335	5.000	22.050
27.	Sabita*	76.590	64.175	56.001	26.304	1.421	2.825	1.374	5.000	29.195
	Mean	77.429	66.300	56.952	19.387	1.447	2.651	1.329	3.370	28.184
	C.D.	2.347	2.492	1.378	0.703	0.049	0.099	0.040	0.511	3.370

** = Check varieties   * =Parental checks

Table.4 Variability and genetic parameters for quality characters of Sabita/Sambamahsuri derivatives

S. N.	Characters	Mean	Range	Variance			CV	GCV	PCV	h^2 (BS)	GA	GA (%)
				Phenotypic	Genotypic	Environment						
1.	Hulling percentage (%)	77.429	67.330-81.235	8.252	6.963	1.289	1.466	3.408	3.710	84.380	4.994	6.449
2.	Milling percentage (%)	66.300	57.360-69.235	7.458	6.006	1.452	1.818	3.696	4.119	80.528	4.530	6.833
3.	Head rice recovery (%)	56.952	44.492-59.825	8.701	8.261	0.440	1.170	5.047	5.179	94.942	5.769	10.130
4.	Amylose content (%)	19.387	10.792-26.304	16.761	16.645	0.116	1.753	21.044	21.117	99.310	8.375	43.201
5.	Water uptake ratio	10.447	1.300-1.674	0.011	0.010	0.001	1.622	6.848	7.038	94.693	0.199	13.728
6.	Volume expansion ratio	20.651	1.815-3.540	0.225	0.223	0.002	1.805	17.805	17.896	98.985	0.967	36.493
7.	Kernel elongation ratio	10.329	1.167-1.657	0.012	0.011	0.000	1.474	7.837	7.974	96.582	0.211	15.865
8.	Alkali Spreading Value	30.000	2.00-5.00	0.869	0.808	0.061	7.333	26.667	27.657	92.970	1.785	52.967
9.	Grain yield Plant^{-1} (g)	28.184	22.050-32.52	8.696	6.037	2.659	5.786	8.718	10.463	69.422	4.217	14.963

Table.5 Genotypic and phenotypic correlation coefficients between quality characters of Sabita/Sambamahsuri derivatives

S. N.	Characters		Milling percentage (%)	Head rice recovery (%)	Amylose content (%)	Water uptake ratio	Volume expansion ratio	Kernel elongation ratio	Alkali spreading value	Grain yield plant^{-1} (g)
1.	Hulling percentage (%)	G	0.735**	0.664**	-0.298*	-0.401**	-0.317*	-0.069	-0.440**	0.488**
		P	0.634**	0.574**	-0.277*	-0.376**	-0.294*	-0.074	-0.415**	0.357**
2.	Milling percentage (%)	G		0.755**	-0.155	-0.213	-0.157	0.024	-0.625**	0.705**
		P		0.685**	-0.146	-0.208	-0.150	0.006	-0.547**	0.613**
3.	Head rice recovery (%)	G			-0.130	-0.388**	-0.216	-0.117	-0.477**	0.519**
		P			-0.124	-0.363**	-0.211	-0.116	-0.448**	0.488**
4.	Amylose content (%)	G				0.101	-0.126	-0.011	0.139	-0.140
		P				0.113	-0.119	-0.001	0.137	-0.123
5.	Water uptake ratio	G					0.799**	0.505**	0.155	-0.287*
		P					0.792**	0.513**	0.146	-0.261
6.	Volume expansion ratio	G						0.639**	0.117	-0.172
		P						0.637**	0.112	-0.164
7.	Kernel elongation ratio	G							0.054	-0.116
		P							0.045	-0.118
8.	Alkali spreading value	G								-0.337*
		P								-0.274*

** =Significant at 1% level * =Significant at 5% level

Table.3 Analysis of variance for different quality characters of Sabita/Sambamahsuri derivatives (Mean Sum of Square)

S. No.	Characters	Source of Variance with d.f.		
		Replication (1)	**Genotype (26)**	**Error (26)**
1.	Hulling percentage (%)	5.0850	15.2150**	1.2890
2.	Milling percentage (%)	13.582	13.463**	1.4520
3.	Head rice recovery (%)	5.6260	16.9610**	0.4400
4.	Amylose content (%)	0.0250	33.4050**	0.1160
5.	Water uptake ratio	0.0001	0.0200**	0.0010
6.	Volume expansion ratio	0.0020	0.4480**	0.0020
7.	Kernel elongation ratio	0.0001	0.0220**	0.0001
8.	Alkali spreading Value	0.0120	1.5380**	0.0550
9.	Grain yield plant^{-1} (g)	45.9450	14.7330*	2.6590

=Significant at 1% level *=Significant at 5% level **Note: Figure in parenthesis are degrees of freedom

Fig.1 Hulling, Milling and Head rice recovery percentage of RILs of Sabita/Sambamahsuri derivatives along with check varieties

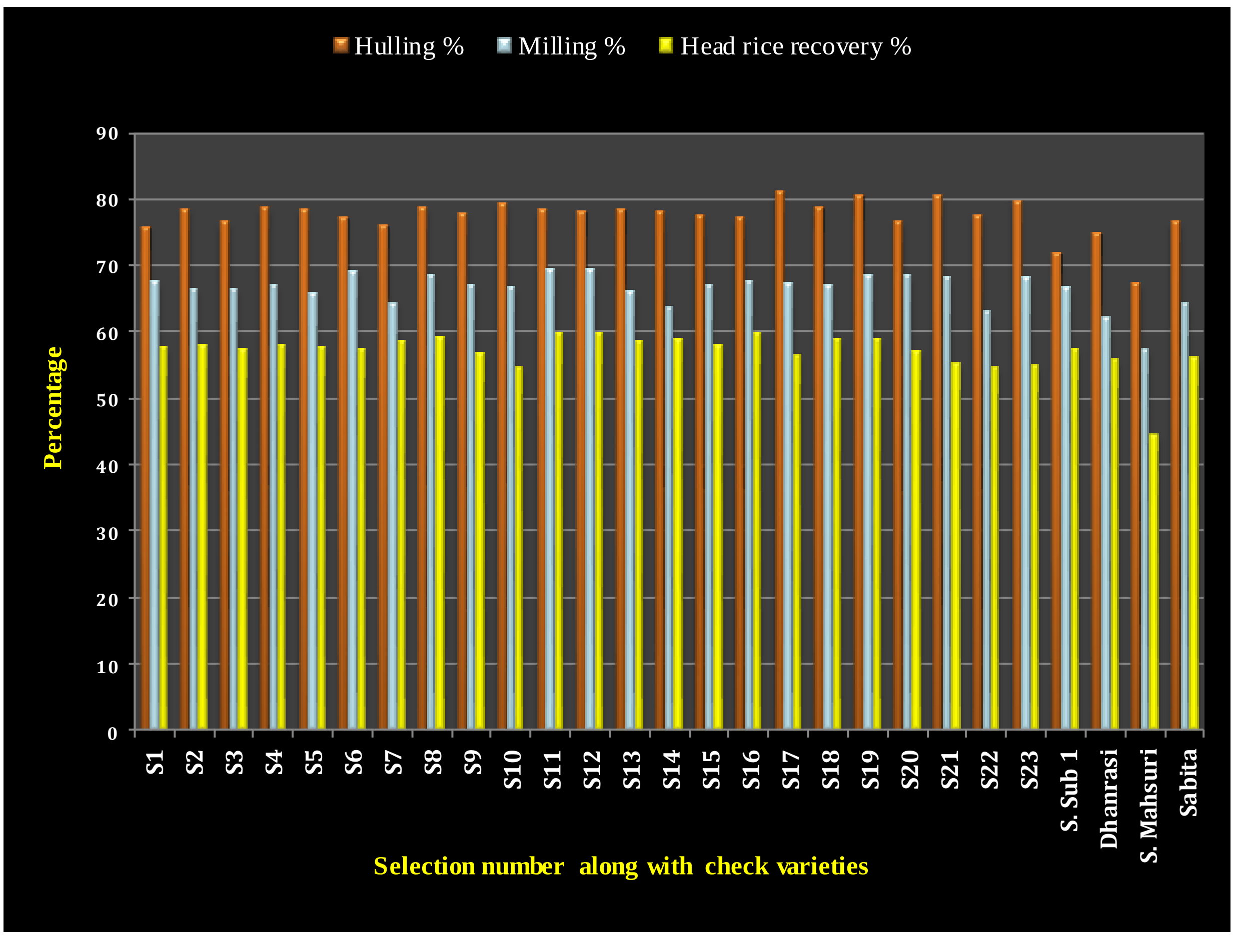
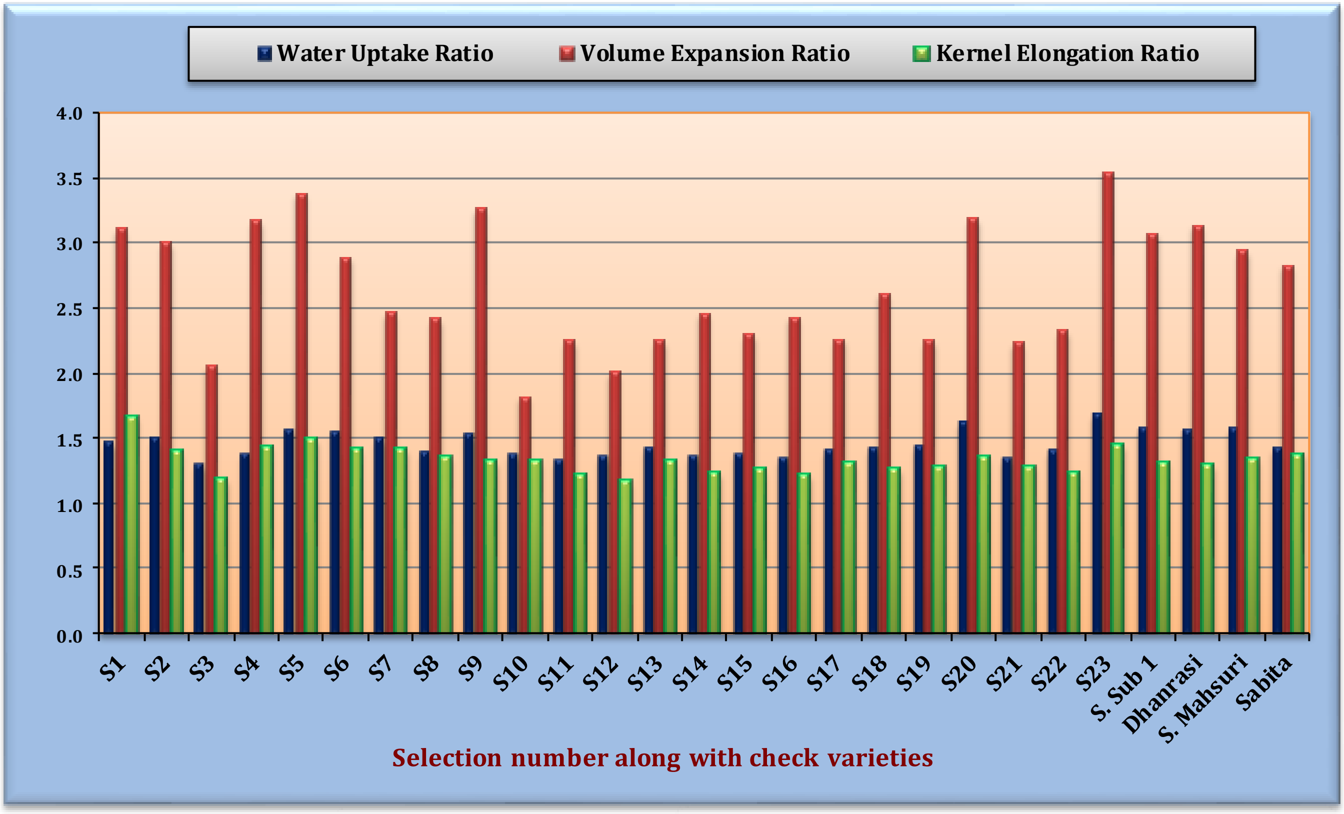


Fig.2 Water Uptake Ratio, Volume Expansion Ratio and Kernel Elongation Ratio of RILs of Sabita/Sambamahsuri derivatives along with check varieties



The heritability estimates were classified as suggested by Johnson *et al.,* (1955).High heritability (BS) was observed for all the characters under study. Such findings were corroborated earlier by Binodh *et al.,* (2007) and Veerabadhiram *et al.,* (2009). Although, the presence of high heritability value indicated the effectiveness of selection based on phenotypic performance, it doesn't show any indication to the amount of genetic progress for selecting the best individuals which is possible by using the estimates of genetic advance (GA).

Estimates of heritability and genetic advance (as suggested by Johnson *et al.,* 1955) would be helpful in predicting the genetic gain under selection. Amylose content, volume expansion ratio and alkali spreading value exhibited high heritability coupled with high GA as percentage of mean, this suggested predominant role of additive gene action for controlling these characters. Therefore, there is an enormous possibility to get the development of superior grain quality with flaky cooked rice to satisfy the consumers' demands. In this regard, high heritability with high GA (%) was reported by Veerabadhiran *et al.,* (2009) for volume expansion ratio and amylose content, Dhanwani *et al.,* (2013) for alkali spreading value and Nirmaladevi *et al.,* (2015) for amylose content.

Head rice recovery, water uptake ratio, kernel elongation ratio and grain yield plant^{-1} recorded high heritability along with moderate GA as a percentage of mean indicated the role of additive as well as non-additive gene action for controlling these characters. Thus these characters cannot be improved simply through selection but selection followed by hybridization would be effective. In this regard, Nirmaladevi *et al.,* (2015) reported high heritability with medium genetic advance for kernel elongation ratio. Hulling percentage and milling percentage recorded high heritability with low genetic advance as percent of mean indicated the role of non-additive gene action. Thus, selection for these characters would not be effective so these characters can be improved by recombination of superior genotypes. The high heritability was being exhibited due to favourable environment rather than genotype. Nirmaladevi *et al.,* (2015) reported high heritability with low genetic advance for hulling percentage.

Character association

Correlation coefficient measures the mutual relationship between various traits and determines the traits on which selection would be effective.Complete knowledge on interrelationship of plant character with other characters is of paramount importance to the breeder for making improvement in complex qualitative characters for which direct selection is not much effective. Hence, association analysis was undertaken to determine the direction of selection. The genotypic and phenotypic correlation coefficients are presented in Table-4. Hulling percentage showed positive significant correlation with milling percentage, head rice recovery and grain yield plant^{-1}representing the genotype with high hulling percentage possesses high milling percentage and head rice recovery. Thus, improvement of these characters can be made by selection of any of the single trait. Similar results were reported by Nayak *et al.,* (2003) and Nirmaladevi *et al.,* (2015) and it showed negative significant correlation with amylose content, water uptake ratio, volume expansion ratio and alkali spreading value. Milling percentage showed positive significant correlation with head rice recovery and grain yield plant^{-1}while negative significant correlation was observed with alkali spreading value. Head rice recovery percentage exhibited significant positive correlation with grain yield plant^{-1} at both genotypic and phenotypic level while it showed negative significant correlation with water uptake ratio and alkali spreading value. Amylose content recorded negative significant correlation with hulling percentage at both genotypic and phenotypic level. Water uptake ratio showed significantly positive correlation with volume expansion ratio and kernel elongation ratio and negative significant correlation with grain yield plant^{-1}. Kernel elongation had positive significant correlation with water uptake ratio and volume expansion ratio. Alkali spreading value showed negative significant correlation with grain yield plant^{-1}. It was found that grain yield plant^{-1} exhibited significant positive correlation with hulling percentage, milling percentage and head rice recovery. With this result the expectation can be made that a high yielding genotype will recover high percentage of head rice and showed negative significant correlation with water uptake ratio and alkali spreading value.

The present investigation highlighted the differential performance of selected RILs of Sabita/Sambamahsuri derivatives were none of the genotype showed superiority over the check varieties for all characters. It was observed from grain quality performance that the genotypes S_{17} was superior in hulling percentage, S_{11} for milling percentage and head rice recovery followed by S_{12}.The amylose content and alkali spreading value determines the texture of cooked rice. Varieties with intermediate amylose content and alkali spreading value are preferred by most rice consumers. Among the selected genotypes S_1, S_7, S_9, S_{10}, S_{12}, S_{13}, S_{18}, S_{21} and S_{22} reported intermediate amylose content.

High estimates of PCV and GCV were obtained for alkali spreading value followed by amylose content, volume expansion ratio and lowest in this regard were obtained for hulling percentage and milling percentage. High heritability coupled with high GA% were observed for amylose content, volume expansion ratio and alkali spreading value revealed the involvement of additive genes for controlling these characters. Therefore, direct selection would be effective for quality improvement of rice against these characters. The correlation study highlighted the importance of hulling percentage, milling percentage, head rice recovery, kernel elongation ratio and volume expansion ratio.

References

Binodh, A. K.,Kalaiyarasi, R. and Thiyagarajan, K. 2007. Genetic parameter studies on quality traits in rice. *Madras Agricultural Journal*, 94(1-6): 109-113.

Chikkalingaiah, Shridhara, S., Lingaraqie, S. and Radhakrishna, R. M. 1999.Genetic variability of plant and quality traits in promising genotypes of scented rice (*Oryzasativa* L.).*Mysore Journal of Agricultural science*, 33(4): 338-341.

Dhanwani, R. K., Sarawgi, A. K., Solanki, A., Tiwari, J. K. 2013. Genetic variability analysis for various yield attributing and quality traits in rice (*Oryzasativa* L.).*The Bioscan*,8(4): 1403-1407.

Gampala, S., Singh, V. and Chakraborti, S. K. 2015.Analysis of variability and genetic parameter for grain quality attributes in high yielding rice (*Oryzasativa* L.) genotypes. *The Ecoscan*, 9(1&2): 411-414.

Guyer, D., Tuttle, A., Rouse, S., Volrath, S., Johnson, M., Potter, S., Gorlach, J., Goff, S.,Crossland, L. and Ward, E. 1998.Activation of latent transgenes in Arabidopsis using a hybrid transcription factor.*Genetics*,149(2): 633-639.

Johnson, H. W., Robinson, H. F. and Comstock, R. E. 1955.Estimation of genetic and environmental variability in soybean.*Agronomy Journal*,47: 314-318.

Juliano, B.O. 1971.A simplified assay for milled rice amylose.*Cereal Science Today*, 16: 334-338.

Kishore, N. S., Babu, V. R., Ansari, N. A. and Prasad, A. R. 2008. Genetic variability, heritability and genetic advance in rice (*Oryzasativa* L.) genotypes of different eco-geographical regions. *Research on Crops*, 9(1): 147-150.

Kole, P. C., Chakrabarthy, N. R. and Bhat, J. S. 2008.Analysis of variability, correlation, path coefficients in induced mutants of aromatic non-basmati rice. *Trop. Agric. Res. Exten*. 113: 60-64.

Little, R. R., Hilder, G. B. and Dawson, E. H. 1958.Differential effect of dilute alkali on 25 varieties of milled white rice.*Cereal Chemistry*,35(2): 111-126.

Mishra, B. 2004. Rice Research in India-Major achievements and thrusts.*Advances in hybrid rice technology*, DRR; Hyderabad, pp: 1.

Nayak, A. R.,Chaudhary, D. and Reddy, J. N. 2003. Genetic variability and correlation study among quality characters in scented rice. *Agricultural Science Digest*, 23(3): 175-178.

Nirmaladevi, G., Padmavathi, G.,Suneetha K. and Babu, V. R. 2015.Genetic variability, heritability and correlation coefficients of grain quality characters in rice (*Oryzasativa*L.). SABRAO *Journal of Breeding and Genetic*s, 47(4): 424-433.

Patil, S. B. and Khan, M. K. 2012.Some cooking properties of germinated brown rice of Indian varieties.*AgricEngInt: CIGR journal*,14(4): 156-162.

Roy, S., Banerjee, A. and Senapati, B. K. 2009.Evaluation of some aromatic rice germplasm in new alluvial soil of West Bengal.*Environment and Ecology*, 27(3A): 1240-1242.

Sharma, A.K. and Sharma, R.N 2007.Genetic variability in early maturing rice.*Journal of Applied Biology*, 15(2): 13-19.

Singh, S. P., Singha, G. S., Parray, G. A. and Bhat, G. N. 2006. Genetic variability and characters association studies in rice (*Oryzasativa* L.). *Agriculture Science Digest*, 26(3): 212-214.

Sonowal, P. and Barooah, M. S. 2015. Physicochemical and cooking properties of some rice varieties from north-east. *The Ecoscan*, 9(1&2): 521-526.

Umadevi, M., Veerabadhiran, P., Manonmani, S., Shanmugasundaram, P. 2010.Physico-chemical and cooking characteristics of rice genotypes.*Electronic Journal of Plant Breeding*, 1(2): 114-123.

Veerabadhiran, P., Umadevi, M. and Pushpam, R. 2009.Genetic variability, heritability and genetic advance of grain quality in hybrid rice.*Madras Agricultural Journal*, 98(1-6):95-99.

Yadav, P. N., Chauhan, M. P. and Singh, R. S. 2002. Genetic variability, heritability and expected genetic advance for certain qualitative characters in rice. *New Agriculturist*, 13(1/2): 89-94.

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