The Pharma Innovation Journal 2022; 11(6): 1213-1216

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(6): 1213-1216

www.thepharmajournal.com
Received: 01-02-2022
Accepted: 08-05-2022

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Assessing comparative performance of advanced generation rice breeding lines for yield, yield attributing and quality traits

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Abstract
Thirteen advanced generation rice breeding lines were evaluated along with two checks so as to ascertain yield, yield attributing and quality traits possessed by the lines. The experiment was conducted in Randomized Block Design (RBD) with three replications having a plot size of $15m^2$. Analysis of variance depicted sufficient variation among the lines indicating that these lines are diverse from each other with respect to yield, yield attributing and quality traits. As regards yield among the thirteen advanced generation lines under evaluation SJR 82-2-3 was found to exhibit highest grain yield of 45.50 q/ha followed by the lines SJR 92-2-2 and SJR 80-1-1 exhibiting 43.30 q/ha and 41.90 q/ha respectively. With respect to per cent superiority over the checks it was found that SJR 82-2-3 exhibited 34.61 per cent yield superiority over Basmati 370 and 29.50 per cent over Basmati 564 followed by SJR 92-2-2 and SJR 80-1-1 exhibiting 28.10, 28.93 and 23.96 and 19.26 per cent yield superiority over the checks respectively. In addition disease and insect pest reaction revealed that all these three identified lines were found to be moderately resistant to brown spot, leaf blast, Bacterial leaf blight and stem borer under field conditions.

Keywords: Advanced generation lines, comparative performance, yield and yield attributing traits

Introduction
Rice occupies a prominent place among major food crops in Indian agriculture. Being self-pollinated species it is rich in carbohydrates and feeds half of the world's population. During *Kharif* 2020 it was cultivated over an area of 44.0 million hectares in India with production and productivity of 120.3 million tonnes and 2.73 tonnes/hectare respectively (Anonymous, 2020) [1]. While in the Union Territory of J&K it was cultivated over an area of 280.51 thousand hectares with production and productivity of 5874 thousand quintals and 20.94 quintals per hectare, respectively (Anonymous, 2020 b) [2]. Several native rice varieties, rich in diversity varying from fragrant long grain basmati rice in northern India to roundish medium grained glutinous rice in southern India with several variations in between are being cultivated. Among various rice types *viz*,. coarse, fine, semi fine etc. rice having pleasant aroma, sweet taste and superfine long grains is the premium group cultivated in the Himalayan foothill regions of India and Pakistan. The demand of this group is increasing worldwide and it ensures higher returns to the farmers being priced three times more than non-basmati rice in the International as well as in Indian domestic markets. A number of cross combinations being attempted are generation advanced following pedigree method of breeding by attempting selection within and between progenies following panicle to row procedure. Homozygous and homogeneous lines obtained by repeated selfing are usually evaluated in station varietal experiments along with checks so as to identify better lines for further evaluation and testing in multi-location and national trials. In the present experiment an attempt was made to assess comparative performance of advanced generation lines along with checks so as to ascertain their suitability under the prevailing conditions.

Material and Methods
Present experiment consisted of thirteen advanced generation rice breeding lines *viz*., SJR 72-1-1, SJR 76-1-1, SJR 76-1-2, SJR 80-1-1, SJR 80-1-2, SJR 80-2-1, SJR 80-3-1, SJR 82-2-3, SJR 92-2-1, SJR 92-2-2, SJR 103-2-3, SJR 103-4-1 and SJR 129-2-1. These lines were evaluated in Randomized Block Design with three replications along with two checks *viz*., Basmati 370 and Basmati 564 during *kharif* 2016 at Experimental Area of Division of Plant

Breeding and Genetics, Chatha Jammu having a plot size of 15m^2 (15 rows of 5m length) with row to row and plant to plant spacing of 20 x 15cm, respectively. Single seedling per hill was transplanted and all the recommended practices as per package of practices were followed to raise a healthy crop. Data were recorded on various yield and quality traits *viz*., days to 50 per cent flowering, number of effective tillers/m^2, grain yield (kg/plot), grain yield (kg/ha), kernel length (mm), kernel breadth (mm), grain length/breadth ratio Analysis of variance was done as suggested by Panse and Sukhatme (1967) [4] while disease and insect pest reaction of the newly developed cultures was also recorded as per SES scale (IRRI, 1996) [3].

Results and Discussion

Analysis of variance (Table 1) revealed significant differences among the advanced generation lines indicating that these lines are diverse from each other with respect to yield, yield attributing and quality traits studied. Mean performance of various yield, yield attributing and quality traits in advanced generation lines under evaluation along with checks *viz*., Basmati 370 and Basmati 564 is reflected in Table 2a, while their per cent superiority is presented in Table 2b. Traditionally cultivated cultivars are late maturing, tall, prone to lodging, poor yielding as well as low input responsive, necessitating the development of medium and early maturing, high yielding, high input responsive cultivars and a perusal of the table 2a revealed that the mean values for days to 50 per cent flowering ranged from 96.67 to 125 days with overall mean of 103.24 days. Advanced breeding line SJR 92-2-1 took minimum days (96.67) to 50 per cent flowering, followed by SJR 76-1-2 (97.67) and SJR 103-2-3 (98.00), while check cultivar Basmati 370 took maximum days (125.00) to 50 per cent flowering. Plant height ranged from 105.60 cm to 135.20 cm with a overall mean of 119.67 cm and SJR 92-2-1 recorded minimum plant height while, Basmati 370 was found to have maximum plant height among the cultures under evaluation. Number of effective tillers/m^2 ranged from 260.00 to 294.67 with an overall mean of 279.44 and SJR 80-2-1 recorded minimum number of effective tillers/m^2 while SJR 76-1-2 recorded maximum number of tillers/m^2. There were significant differences among the advanced generation breeding lines with respect to yield, yield attributing and quality attributes coupled with reaction to diseases and insect pests. A perusal of the table 2b and figure 1 & 2 revealed that among the advanced generation breeding lines under evaluation SJR 82-2-3 recorded the highest grain yield (45.50 q/ha) followed by SJR 92-2-2 (43.30 q/ha) and SJR 80-1-1 (41.90 q/ha) respectively. The per cent superiority of these lines over the checks revealed that SJR 82-2-3 exhibited 34.61 per cent yield superiority over Basmati 370 and 29.50 per cent over Basmati 564 followed by SJR 92-2-2 (28.10 & 28.93) and SJR 80-1-1 (23.96 & 19.26). Kernel length of advanced generation breeding lines under evaluation revealed that all the lines were found to have higher kernel length over both the checks except SJR 76-1-1, SJR 80-1-2 and SJR-102-2-3 while, per cent superiority in kernel length depicted that SJR 92-2-2 recorded 13.60 and 7.04 per cent superiority over Basmati 370 and Basmati 564 followed by SJR-76-1-2, SJR-80-1-1 and SJR 82-2-3 exhibiting 10.61 and 4.22 per cent superiority in grain length over both the checks respectively. Disease and insect pest reaction table 2a revealed that that SJR 82-2-3, SJR 92-2-2 and SJR 80-1-1 were found to be moderately resistant to brown spot, leaf blast, bacterial leaf blight and stem borer under natural field conditions.

Table 1: Analysis of variance for yield, yield attributing and quality traits

Character	Mean sum of squares		
	Replication (df=2)	Treatment (df=14)	Error (df=28)
Days to 50% flowering	7.06	99.27**	2.94
Effective tillers/plant	3.18	8.29**	1.12
Plant height	243.19	663.06**	57.16
Grain yield kg/plot	6.47	22.07**	1.37
Kernel length	0.115	1.283**	0.111
Kernel breadth	0.03	0.08**	0.01
L/B ratio	0.028	0.639**	0.055

Table 2a: Mean performance of advanced generation breeding lines for various yield, yield attributing and quality traits along with their reaction towards diseases and pests

Mean Performance									Reaction towards diseases and pests			
Advanced Generation Breeding Lines	Days to 50% flowering	Plant height (cm)	Number of effective tillers / m^2	Grain yield (kg/plot)	Grain yield (kg/hec)	Grain Length (mm)	Grain Breadth (mm)	L/B ratio	Brown Spot	Blast	BLB	SB
SJR 72-1-1	103.67	123.80	286.00	4.60	3066.66	7.17	1.74	4.12	3-5	1-3	1-3	1-5
SJR 76-1-1	108.33	118.20	290.67	4.20	2800.00	7.06	1.67	4.22	3-5	1-3	3-5	-
SJR 76-1-2	97.67	112.20	294.67	4.00	2666.66	7.40	1.71	4.32	3-5	3-5	1-3	-
SJR 80-1-1	102.00	119.20	293.33	6.28	4190.00	7.40	1.6	4.62	1-3	-	1-3	1-5
SJR 80-1-2	99.33	127.60	265.33	4.00	2666.66	7.00	1.74	4.02	1-3	-	1-3	-
SJR 80-2-1	101.00	108.20	260.00	3.50	2333.33	7.20	1.75	4.11	3-5	1-3	1-3	-
SJR 80-3-1	102.00	117.80	280.67	4.10	2733.33	7.29	1.62	4.5	5-7	1-3	3-5	1-5
SJR 82-2-3	100.67	122.80	290.33	6.80	4550.00	7.40	1.62	4.56	1-3	-	1-3	1-5
SJR 92-2-1	96.67	105.60	274.67	4.00	2666.66	7.23	1.73	4.17	3-5	-	3-5	-
SJR 92-2-2	101.00	117.80	286.00	6.79	4530.00	7.60	1.64	4.63	1-3	1-3	1-3	1-5
SJR 103-2-3	98.00	119.20	280.00	5.00	3333.33	7.26	1.69	4.29	3-5	-	1-3	6-10
SJR 103-4-1	101.67	129.60	262.67	4.23	3820.00	7.00	1.69	4.14	1-3	-	1-3	-

SJR 129-2-1	98.33	110.60	274.67	4.00	2666.66	7.37	1.75	4.21	3-5	1-3	1-3	-
Basmati 370 (Check I)	125.00	135.20	274.67	5.07	3380.00	6.69	1.64	4.07	3-5	-	3-5	6-10
Basmati 564 (Check II)	113.33	127.33	278.00	5.27	3513.33	7.10	1.63	4.35	3-5	1-3	1-3	6-10
Mean	103.24	119.67	279.44	4.78	3194.44	7.21	1.68	4.28				
C.V	1.43	1.97	4.65	8.65	9.05	1.23	0.95	0.75				

Table 2b: Promising cultures identified and their % superiority over checks

S. No.	Nomenclature of the culture	Grain yield (kg/hec)	% Superiority Over Check	Rank	Grain Length (mm)	% Superiority Over Check	Rank
1.	SJR 72-1-1	3066.66	-		7.17	7.17 & 0.98	8
2.	SJR 76-1-1	2800.00	-		7.06	5.53	
3.	SJR 76-1-2	2666.66	-		7.40	10.61 & 4.22	2
4.	SJR 80-1-1	4190.00	23.96 & 19.26	3	7.40	10.61 & 4.22	2
5.	SJR 80-1-2	2666.66	-		7.00	4.63	
6.	SJR 80-2-1	2333.33	-		7.20	7.62 & 1.40	7
7.	SJR 80-3-1	2733.33	-		7.29	8.96 & 2.67	4
8.	SJR 82-2-3	4550.00	34.61 & 29.50	1	7.40	10.61 & 4.22	2
9.	SJR 92-2-1	2666.66	-		7.23	8.07 & 1.83	6
10.	SJR 92-2-2	4530.00	28.10 & 28.93	2	7.60	13.60 & 7.04	1
11.	SJR 103-2-3	3333.33	-		7.26	8.52 & 2.25	5
12.	SJR 103-4-1	3820.00	13.01 & 8.73	4	7.00	4.63	
13.	SJR 129-2-1	2666.66	-		7.37	10.16 & 3.80	3
14.	Basmati 370 (Check I)	3380.00			6.69		
15	Basmati 564 (Check II)	3513.33			7.10		

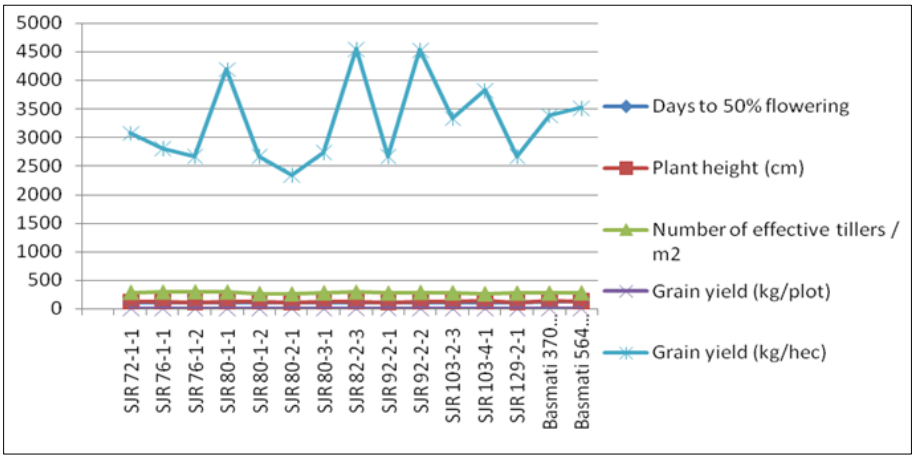

Fig 1: Mean performance of advanced generation breeding lines

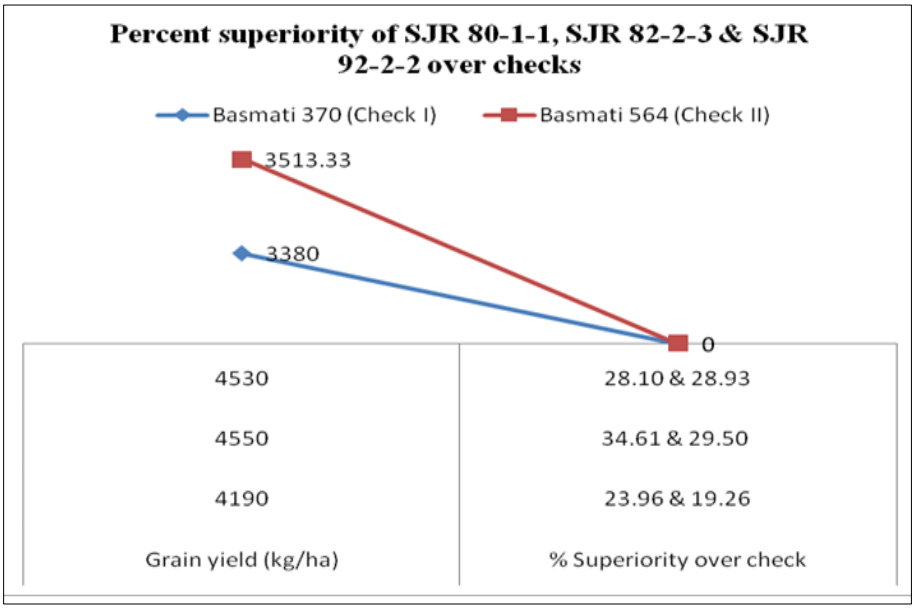

Fig 2: Per cent superiority of better performing lines

References

1. Anonymous. Annual Report 2020. ICAR- National Rice Research Institute Cuttack, India, 2020a.
2. Anonymous. Digest of Statistics. Directorate of Economics and Statistics, Union Territory of Jammu & Kashmir, 2020b.
3. IRRI. Standard Evaluation System Manual. International Rice Research Institute, Manila, Philippines, 1996.
4. Panse VG, Sukhatme PV. Statistical methods for agricultural research worker II edition, ICAR, New Delhi, 1967.