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Stability Analysis for Yield and its Attributing Traits in Advanced Breeding Lines of Rice (*Oryza sativa* L.)

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A B S T R A C T

Twenty-two advanced breeding lines of rice were evaluated for their stability parameters with respect to yield and its attributing characters like Days to fifty per cent flowering, plant height (cm), panicle length (cm), number of tillers per plant and grain yield (kg/ha) in a multi-locational trial at three different sites *viz.* ZAHRS, Mudigere, ZAHRS, Bramhavara and College of Agriculture Shivamogga. Pooled analysis of variance reflects existence of genotype x environment interactions. Through stability parameter analysis, it was found that the advanced breeding line JB 15-2 found suitable for all environments. JM 15-4 (Mudigere), JK2 15-7 (Bramhavara) and JK 15-1(Shivamogga) are identified as suitable lines for specific locations.

Introduction

Rice is the most important staple food in Asia. More than 90% of the world’s rice is grown and consumed in Asia, where 60% of the world’s population lives. Rice accounts for 35-60% of the caloric intake of three billion Asians (Guyer *et al*., 1998). Over 150 million hectares of rice is planted annually, covering about 10% of the world’s arable land. In 1999/2000, this amounted to some 600 million tonnes of rice seed, equal to 386 million tonnes of milled rice. With the world population estimated to increase from 6.2 billion in the year 2000 to about 8.2 billion in the year 2030, the global rice demand will rise to about 765 million tonnes, or 533 million tonnes of milled rice (Annon, 2002). The increasing population rate dictates the world’s food requirements, especially for rice, so the extra rice required to feed the accelerating population ought to be met only by improving the productivity of rice.

In India, rice is being grown as a major food crop under diverse agro-climatic conditions. It is very much necessary to develop varieties having stable yield performance over diverse environments. Hence, knowledge on the nature and magnitude of genotype x environment interactions is important in understanding the stability of a particular variety before it is being recommended for a given situation. Testing of genotypes under different environments differing in unpredictable variation is an accepted approach for selecting stable genotypes (Eberhart and Russel, 1966).

Materials and Methods

The present experiment material comprised of twenty two advanced breeding lines with two checks developed at department of genetics and plant breeding, Agriculture college Shivamogga. The trials were conducted in a randomized complete block design with two replications at three locations ZAHRS, Mudigere. ZAHRS, Bramhavara and College of Agriculture (CoA), Shivamogga representing diverse agro climatic conditions during *kharif* 2015. Observations were recorded on five randomly selected plants in each replication in each environment in respect of 13 quantitative characters *viz.*, Days to fifty per cent flowering, days to maturity**,** plant height (cm), panicle length (cm), number of tillers per plant, number of productive tillers per plant, number of spikelets per panicle, number of grains per panicle, Panicle fertility (*per cent*), Test weight (g), grain yield (kg/ha), Straw yield per hectare (kg/ha) and Harvest index. Stability analysis was carried out by using the stability model proposed by Eberhart and Russell (1966).

Results and Discussion

Pooled analysis of variance showed highly significant mean sum of squares for genotypes and environments for all the characters studied, indicating the presence of substantial variation among the genotypes over environments (Table 1). Mean sums of squares due to varieties found significant for panicle length. Mean sum of square due environments found highly significant for all characters studied except for panicle length and number of grains per panicle. The variance due to Genotype X Environment (Linear) shows no significant for all the traits except for number of spikelets per panicle, panicle fertility, test weight and straw yield indicating the absence of genetic differences among varieties for regression on environmental indices and thus the further predication of genotypes would be difficult for these traits. Significant pooled deviation found significant for all traits except for plant height (cm), number of tillers per plant and number of spikelets per panicle suggested that the performance of different genotypes fluctuated considerably in respect to their stability for respective characters. Thus both predictable and unpredictable components contributed significantly to differences in stability among genotypes. These results are in agreement to those reported by Nayak (2008) and Shadakshari (2001) in rice. Environmental index can provide the basis for identifying the favourable environments for the expression of maximum potential of the genotype.

Environmental index provide the basis for identifying the favourable environments for the expression of maximum potential of the genotype. ZAHRS, Mudigere found to be the most favourable location for days to fifty per cent flowering, panicle length and test weight (g) and harvest index. While, COA, Shivamogga found to be the most favourable location for number of tillers/plant, number of productive tillers per plant, number of spikelets per panicle, number of grains per panicle grain yield (kg/ha) and straw yield (kg/ha). ZAHRS, Bramhavara found to be the most favourable location for days to maturity, plant height (cm) and panicle fertility (%)

In the present study, stability of 22 rice advanced breeding lines with respect to 5 characters was judged by three parameters *viz.*, mean (x), regression coefficient (bi) and deviation from regression(S2di) using the model proposed by Eberhart and Russell (1966). Taking these parameters into consideration, the results obtained are discussed character wise.

Days to fifty per cent flowering

Among 22 advanced breeding lines JK2 15-2 and JK2 15-3 (Mudigere), JK2 15-5 (Bramhavara) and JK2 15-2 (Shivamogga) are identified as stable lines for specific locations. The advanced breeding line JK10 15-1 exhibited mean value (94.83) less than population mean for days to fifty per cent maturity, had regression coefficient unity and least deviation from regression identified as stable across all the environments (Table 3).

Days to fifty per cent flowering

JK10 15-1 and JK10 15-2 (Mudigere), JK2 15-3 (Bramhavara) and JM 15-4 (Shivamogga) are identified as stable lines for specific locations. The advanced breeding line JM 15-1, JM 15-2 and JK2 15-7 exhibited less mean value for days to maturity than population mean, also had regression coefficient value around unity and less deviation from regression is identified as stable across the environments (Table 3).

Plant height (cm)

Among 22 advanced breeding lines JM 15-2 exhibited more mean value for plant height than the population mean also had regression coefficient value is around unity and less deviation from regression. Hence, it is identified as stable across the environments. Whereas, JK10 15-2 (Mudigere), JK2 15-2 (Bramhavara) and JT 15-2 (Shivamogga) are identified as stable lines for specific locations (Table 3).

Panicle length (cm)

JT 15-1 (Mudigere), JT 15-1 is (Bramhavara) and JT 15-3 (Shivamogga) are identified as stable lines for specific locations. The advanced breeding line JM 15-4 exhibited more mean value than the population mean for panicle length and also had regression coefficient value is around unity and less deviation from regression for panicle length is identified as stable across the environments (Table 3).

Number of tillers per plant

Among 22 advanced breeding lines JT 15-1 (Mudigere), JK2 15-3 (Bramhavara) and JM 15-1 and JK10 15-2 (Shivamogga) are identified as stable lines for specific locations. The advanced breeding lines JM 15-4, JK 15-2 and JK2 15-1 exhibited more mean value than the population mean and also had regression coefficient value is around unity and less deviation from regression for number of tillers per plant is identified as stable across the environments (Table 3).

Number of productive tillers

JT 15-3, JK 15-1 and JK2 15-7 (Mudigere), JB 15-2 and JK2 15-3 (Bramhavara) and JK10 15-2 (Shivamogga) are identified as stable lines for specific locations. The advanced breeding lines JM 15-4 and JK2 15-7 exhibited more mean value than the population mean and also had regression coefficient value is around unity and less deviation from regression for number of productive tillers per plant is identified as stable across the environments (Table 3).

Number of spikelets per panicle

JK 15-1 (Mudigere), JM 15-5 (Bramhavara) and JK2 15-1 (Shivamogga) are identified as stable lines for specific locations. The advanced breeding lines K10J 15-1 and JK2 15-4 exhibited more mean value than the population mean and also had regression coefficient value is around unity and less deviation from regression for number of spikelets per panicle across the environments (Table 3).

Number of grains panicle

JK2 15-1 (Mudigere), JK2 15-1 (Bramhavara) and JK2 15-1 (Shivamogga) are identified as stable lines for specific locations. The advanced breeding line JM 15-3 exhibited more mean value than the population mean and also had regression coefficient value is around unity and less deviation from regression for number of grains per panicle across the environments (Table 3).

Table.1 Pooled MSS values for different quantitative traits over three environments

Source of Variations	df	X1	X2	X3	X4	X55
Rep within Env.	3	1.07	2.17	1.96	1.03	124033.52
Varieties	23	8.12	27.55	1.47*	1.31	332757.80
Env.+ (Var.*Env.)	48	53.70**	64.04	0.62	9.75**	1244740.03
Environments	2	1153.60**	957.04**	0.58	210.17**	12590050.84**
Var.*Env.	46	5.88	25.22	0.62	1.04	751465.65
Environments(Lin.)	1	2337.19**	1914.07**	1.15	420.34**	25180101.68**
Var.*Env.(Lin.)	23	3.92	12.42	0.49	1.04	394179.79
Pooled Deviation	24	7.52**	36.43**	0.72**	1.00	1062553.35**
Pooled Error	69	0.84	5.45	0.21	0.63	86867.30
Total	71	38.94	53.22	0.89	7.02	949309.17

Table.2 Environmental indices for yield and yield components in rice

Traits	**Locations**		
	ZAHRS, Mudigere	ZAHRS, Bramhavara	COA, Shivamogga.
Days to 50% flowering	7.56	-1.49	-6.07
Days to maturity	0.35	9.14	-9.49
Plant height(cm)	-6.47	6.14	0.82
Panicle length(cm)	0.13	0.03	-0.16
No. of tillers / plant	-2.34	-0.99	3.33
No. of productive tillers / plant	-2.24	-1.42	3.66
No. of spikelets / panicle	2.76	-6.23	3.47
No. of grains / panicle	-2.05	-0.59	2.64
Panicle fertility (%)	-3.98	4.26	-0.28
Test weight (g)	0.15	-0.15	0.01
Grain yield (kg/ha)	228.57	-810.99	582.42
Straw yield (kg/ha)	-829.16	-680.04	1509.19
Harvest index	0.094	-0.080	-0.014

Table.3 Mean performance and stability parameters for days to fifty per cent flowering and plant height (cm) in rice

Triats	**Days to 50% flowering**			**Days to maturity**			**Plant height (cm)**		
Advanced breeding lines	**Mean**	**bi**	**Mean**	**bi**	**bi**	**S²Di**	**Mean**	**bi**	**S²Di**
JB 15-1	96.67	0.87	0.36	143.66	0.91**	-1.67	93.16	0.53	-0.41
JB 15-2	97.50	1.23	20.17**	143.83	0.86	1.13	86.51	1.28	115.32**
JM 15-1	99.67	1.31	-0.72	141.50	0.91	-0.97	93.79	1.47	-3.33
JM 15-2	99.50	1.06	2.30	141.33	0.99	-0.65	91.72	0.88	1.62
JM 15-3	98.67	1.29	3.91*	143.33	0.88	-0.58	90.20	0.51	9.80
JM 15-4	96.33	1.21	2.81*	141.66	1.19	11.13**	91.91	0.83	-5.18
JM 15-5	97.67	1.10*	-0.85	141.66	0.91**	-1.67	92.76	0.59	-4.49
JT 15-1	99.17	0.58	1.79	141.83	1.02	0.91	92.60	1.52	83.76**
JT 15-2	99.33	0.53	5.69**	142.33	1.07	-1.54	96.16	0.90	286.59**
JT 15-3	96.17	1.17	3.02*	143.66	1.02	-0.23	93.85	0.46*	-5.27
JK10 15-1	94.83	1.00	1.22	142.00	1.01	6.63*	88.13	1.53	-1.75
JK10 15-2	97.33	0.93	0.89	141.00	1.28	1.46	94.08	0.27	-1.09
K10J 15-1	100.16	1.15	17.77**	141.00	1.15*	-1.65	95.06	0.81	20.77*
JK 15-1	97.50	1.09	0.38	141.33	0.93	-1.63	90.00	0.93	9.19
JK 15-2	98.00	0.83	-0.02	141.66	0.91**	-1.67	85.48	1.59*	-5.18
JK2 15-1	94.83	0.93	9.24**	142.50	1.04	-1.64	88.05	1.36	2.64
JK2 15-2	94.66	0.99	34.92**	141.66	0.88	-1.33	91.70	1.30	111.91**
JK2 15-3	95.00	0.92	28.83**	141.66	0.72	1.34	90.60	1.22	35.36**
JK2 15-4	96.17	0.77	12.96**	141.33	0.96	2.50	90.90	1.07	65.3**
JK2 15-5	95.83	1.14	14.47**	142.33	1.15	-0.79	84.88	1.39	3.77
JK2 15-6	97.33	1.17	-0.60	142.16	1.12	0.00	92.15	1.32	16.22*
JK2 15-7	99.00	0.94	-0.59	140.00	0.96	-0.16	89.40	0.80	0.78
Jyothi	98.00	0.87	1.40	142.00	1.04	-1.64	88.13	0.48	-1.25
KHP 10	97.33	0.93	0.86	141.00	0.99	-0.60	87.43	0.86	11.73
Population mean	97.31			141.96			90.77		

Triats	**Panicle length**			**Number of tillers per plant**			**Number of productive tillers per plant**		
Advanced breeding lines	**Mean**	**bi**	**S^2Di**	**Mean**	**bi**	**S^2Di**	**Mean**	**bi**	**S^2Di**
JB 15-1	19.52	5.23	-0.26	8.50	1.14	0.61	7.67	1.18*	-0.58
JB 15-2	19.38	-0.23	0.13	9.33	0.88	1.09	8.83	0.78	2.27*
JM 15-1	20.32	7.00	0.85	9.33	1.49	0.58	8.00	1.20	0.52
JM 15-2	19.97	1.85	0.21	8.67	0.95	0.23	7.67	0.90	-0.31
JM 15-3	19.24	-0.54	-0.18	8.67	0.74	-0.12	8.00	0.74	3.68**
JM 15-4	20.28	0.82	-0.25	8.83	0.84	-0.25	8.17	0.92	-0.55
JM 15-5	20.25	0.64	3.86**	8.17	0.87	-0.59	7.00	0.93	0.22
JT 15-1	21.80	4.65	-0.10	10.33	1.12	-0.52	8.50	1.12	0.03
JT 15-2	20.83	2.29	-0.14	8.50	0.77	-0.53	7.33	0.84	0.13
JT 15-3	20.41	-2.48	3.40**	8.50	0.86	0.06	7.67	0.88	0.91
JK10 15-1	19.38	-4.27	2.01**	9.67	0.98	4.66**	8.17	0.98	4.64**
JK10 15-2	20.09	-2.12	0.02	9.00	1.59	0.79	8.00	1.51	-0.55
K10J 15-1	19.40	0.00	-0.26	9.00	1.06	-0.64	7.33	1.27*	-0.58
JK 15-1	20.41	1.71	-0.05	8.67	1.24	0.83	7.50	1.16	5.44**
JK 15-2	19.38	5.02	-0.20	9.00	1.09	-0.10	8.00	1.12	0.03
JK2 15-1	19.27	-2.17	0.54	9.50	1.09	-0.10	8.17	1.21	-0.05
JK2 15-2	19.79	3.17	0.88*	8.67	1.40	0.38	7.67	1.41	1.76*
JK2 15-3	21.12	6.81	-0.28	9.83	1.04	1.67	9.00	1.01	3.06*
JK2 15-4	20.46	3.32	0.92*	8.17	0.70*	-0.64	7.00	0.81	-0.37
JK2 15-5	20.66	-3.24	-0.10	8.67	0.78	1.35	7.50	0.83	-0.53
JK2 15-6	19.93	-1.62	-0.24	8.50	1.02	-0.24	7.33	0.99	-0.26
JK2 15-7	20.33	0.06	-0.20	8.67	0.95	0.23	8.00	0.93	0.22
Jyothi	18.74	1.15	-0.29	7.67	0.67	-0.22	7.17	0.63	-0.45
KHP 10	19.45	-2.96	0.03	7.33	0.76	-0.08	7.00	0.68*	-0.58
Population mean	20.02			8.79			7.77		

Triats	Number of spikelets per panicle			Number of grains per panicle			Panicle fertility (%)		
Advanced breeding lines	**Mean**	**bi**	**S^2Di**	**Mean**	**bi**	**S^2Di**	**Mean**	**bi**	**S^2Di**
JB 15-1	83.86	0.32	-74.68	66.17	1.26	-47.10	79.03	0.69	-20.70
JB 15-2	100.00	0.89	-84.51	77.67	1.91	-4.18	75.63	2.03*	-20.53
JM 15-1	87.50	2.43	-45.93	61.83	0.54	-25.66	72.05	1.77	-20.26
JM 15-2	98.33	-0.05	-47.61	76.17	1.91	-4.18	77.00	0.89	-20.50
JM 15-3	92.66	0.99	-88.30	71.17	0.94	-49.07	77.83	0.71	-20.72
JM 15-4	113.66	4.53	170.47	79.67	0.26	62.88	73.05	2.40	-18.24
JM 15-5	119.50	-0.01	-33.14	95.83	1.59*	-50.99	80.15	-0.26**	-20.73
JT 15-1	96.00	-0.18	-42.06	76.83	1.82	-7.87	79.95	0.82	-20.66
JT 15-2	100.17	0.84	-84.40	78.67	1.46	-46.48	78.87	1.14	-20.68
JT 15-3	106.83	2.25	66.76	82.17	-0.12	165.48*	77.13	-0.18**	-20.74
JK10 15-1	112.33	1.26	-88.44	79.33	2.64	183.86*	71.65	3.48*	-20.35
JK10 15-2	83.33	1.02	-88.58	55.50	1.59	-4.54	67.27	2.69*	-20.66
K10J 15-1	113.50	0.82	-78.84	98.17	1.11	-19.03	86.57	-0.18*	-20.70
JK 15-1	101.33	2.74	317.57*	72.83	3.09	350.63*	71.42	0.42	-20.43
JK 15-2	94.16	0.69	-3.85	73.00	2.11	55.80	77.40	0.88	-20.51
JK2 15-1	142.83	3.89	28.24	118.33	0.16	313.85*	83.22	0.94	-20.72
JK2 15-2	117.33	8.58	414.74*	95.50	-2.11	1434.30**	81.93	0.34*	-20.65
JK2 15-3	107.33	0.41	-66.03	85.33	2.40	64.78	79.93	1.99	-20.34
JK2 15-4	108.33	0.87	-82.88	83.50	1.24	-50.07	77.18	0.59*	-20.71
JK2 15-5	109.67	0.77	-78.67	87.67	1.60	-48.43	79.67	0.81	-20.55
JK2 15-6	119.83	0.34	-54.39	102.17	1.55	-50.12	84.98	-0.11**	-20.74
JK2 15-7	100.33	2.09	-67.49	82.00	-0.03	157.47*	81.55	-0.27**	-20.73
Jyothi	97.50	-0.09	-85.66	72.00	-0.67	-1.60*	72.22	0.83	-20.34
KHP 10	102.83	-1.88	42.54	76.67	-2.25	175.51	73.13	1.60	-14.16
Population mean	104.67			81.17			77.45		

Triats	**Test weight (g)**			**Grain yield (kg/ha)**		
Advanced breeding lines	**Mean**	**bi**	**S^2di**	**Mean**	**bi**	**S^2di**
JB 15-1	19.70	5.91**	-0.28	3786.00	0.91	-46573.68
JB 15-2	20.32	2.30	-0.27	4692.50	1.06	296378.44
JM 15-1	19.85	5.59**	-0.28	3832.67	0.38	382825.53*
JM 15-2	20.37	0.98	-0.27	3829.83	0.71	-34081.83
JM 15-3	19.25	-1.31**	-0.28	3508.83	0.63	1430848.39**
JM 15-4	20.70	0.33**	-0.28	4280.50	1.08	3270262.40**
JM 15-5	20.08	1.15	-0.28	3697.17	0.89	527148.99*
JT 15-1	21.80	1.97	-0.28	3900.67	1.28	383601.74*
JT 15-2	20.57	-3.62*	-0.28	3607.33	1.10	906149.80**
JT 15-3	20.92	-7.56**	-0.28	4041.67	0.83	637119.74**
JK10 15-1	20.42	2.62	-0.27	3638.83	1.13	348622.68*
JK10 15-2	21.48	2.13	-0.28	3600.33	0.40	56758.48
K10J 15-1	19.57	-1.32*	-0.28	4025.00	1.18	4230798.51**
JK 15-1	21.23	3.45*	-0.28	4679.83	2.25	1281283.14**
JK 15-2	20.03	10.02*	-0.27	3987.67	1.93	980228.46**
JK2 15-1	20.23	3.78*	-0.27	3942.17	1.50	1208098.07**
JK2 15-2	19.38	-2.80**	-0.28	4403.83	1.68	2134375.21**
JK2 15-3	20.43	0.16	-0.28	3859.83	0.89	3308326.15**
JK2 15-4	20.63	0.16	-0.28	3688.33	0.50	540584.24**
JK2 15-5	21.57	0.99	-0.28	3726.00	0.49	164093.75
JK2 15-6	21.07	3.28	-0.27	3823.83	0.43	273077.44*
JK2 15-7	20.75	-3.94*	-0.28	3642.67	-0.11	1255149.52**
Jyothi	19.60	-0.60	-0.03	3557.50	0.43	-675222.87
KHP 10	19.80	2.31	-0.26	3513.33	0.64*	175.51
Population mean	20.40			3886.09		

Triats	**Straw yield (kg/ha)**			**Harvest index**		
Advanced breeding lines	**Mean**	**bi**	**S^2di**	**Mean**	**bi**	**S^2di**
JB 15-1	7565.50	2.06	-38452.60	0.535	1.551	0.007*
JB 15-2	8162.67	2.17	1560122.35*	0.550	1.267	-0.001
JM 15-1	7947.67	0.87	-253661.53	0.507	1.385	0.004
JM 15-2	8335.50	0.91	-402746.37	0.465	0.982	-0.001
JM 15-3	7005.50	0.44	-185273.94	0.533	1.369	-0.002
JM 15-4	8577.67	0.02	-302120.62	0.515	1.680	0.001
JM 15-5	7702.33	0.30	-429291.09	0.487	1.416*	-0.002
JT 15-1	7764.67	1.27	479806.51	0.505	1.319	0.003
JT 15-2	6998.67	0.36	-2460.31	0.508	1.412*	-0.001
JT 15-3	7868.50	0.79	-166870.59	0.520	1.297	0.004
JK10 15-1	6848.67	0.73	767777.66	0.542	1.020	-0.002
JK10 15-2	6410.83	0.08	-393397.71	0.567	1.028	-0.002
K10J 15-1	7261.33	-0.77	2540273.94*	0.547	1.426	0.002
JK 15-1	8190.83	2.72*	-4551157.06	0.612	1.397	0.000
JK 15-2	6821.33	1.11	-118931.85	0.583	1.327	0.022**
JK2 15-1	7720.67	1.93	-159997.15	0.520	0.949	-0.001
JK2 15-2	9288.50	1.96	-95423.35	0.473	0.594	0.002
JK2 15-3	7942.83	2.06	4809571.59**	0.493	0.692	-0.001
JK2 15-4	6731.50	1.08	893184.45	0.547	0.688	-0.002
JK2 15-5	6726.00	0.18	-334612.64	0.573	0.419	0.006
JK2 15-6	8000.17	1.53	-348548.77	0.495	0.601	-0.002
JK2 15-7	6744.83	0.73	5310360.37**	0.565	0.744	-0.001
Jyothi	7313.33	0.76	710940.52	0.500	-0.188	0.003
KHP 10	7773.83	0.71	2350437.11*	0.452	-0.374	-0.001
Population mean	7571.01			0.525		

Panicle fertility (*per cent*)

K10J 15-1 (Mudigere), JK2 15-3 (Bramhavara) and K10J 15-1 (Shivamogga) are identified as stable lines for specific locations. The advanced breeding lines JB 15-1, JT 15-1, JK2 15-1 and JK2 15-5 exhibited more mean value than the population mean and also had regression coefficient value is around unity and less deviation from regression for panicle fertility across the environments (Table 3).

Test weight (g)

JT 15-1 (Mudigere), JT 15-3 (Bramhavara) and JT 15-1 (Shivamogga) are identified as stable lines for specific locations. The advanced breeding line JK2 15-5 exhibited more mean value than the population mean, regression coefficient value is around unity and less deviation from regression for test weight across the environments.

Grain yield (kg/ha)

Among 22 advanced breeding lines including checks only seven advanced breeding lines had significant deviation from regression for grain yield per hectare, which means remaining advanced breeding lines are unstable. The advanced breeding line JB 15-2 had more mean value than population mean also had regression coefficient value is around unity and less deviation from regression. So it is indicated that this advanced breeding line had stable performance across the environments and less sensitive to environment it can adapt to the diverse environments. Hence, it can be used as stable line adopted across the environments and may be proposed for farm trials. JM 15-4 (Mudigere), JK2 15-7 (Bramhavara) and JK 15-1(Shivamogga) are identified as suitable lines for specific locations (Table 3).

Straw yield (kg/ha)

K10J 15-1 (Mudigere), JK2 15-2 (Bramhavara) and JK 15-1 (Shivamogga) are identified as stable lines for specific locations. The advanced breeding lines JM 15-1, JM 15-2 and JT 15-3 exhibited more mean value than the population mean, regression coefficient value is around unity and less deviation from regression for straw yield across the environments (Table 3).

Harvest Index

JK 15-1 (Mudigere), Jyothi (Bramhavara) and JK 15-2 (Shivamogga) are identified as stable lines for specific locations. The advanced breeding lines JK2 15-4 and JK2 15-7 exhibited more mean value than the population mean and also had regression coefficient value is around unity and less deviation from regression for harvest index across the environments (Table 3).

In conclusion, the present study provided an evaluation of genotypic and environmental performance of 22 advanced breeding lines of rice over varied environments. Stability analysis demonstrated that advanced breeding line JB 15-2 is less responsive to changed environmental conditions and can be grown over a range of environments in terms of yield.

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