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Characterization of Rice Bean Germplasm through Seed Quality Attributes

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ABSTRACT
The present study were taken to evaluate 34 germplasm line of rice bean including four check PRR-1,PRR-2,RBL-1,RBL-6 for seed quality parameters at Seed Testing Laboratory of the Department of Seed Science and Technology, College of Forestry, Uttarakhand University of Horticulture and Forestry, Ranichauri. Analysis of variance revealed significant difference for all seed quality parameters among all rice bean germplasm lines. The genotype IC-340616 had high speed of germination as compared to other genotypes. The standard germination was highest in IC-19338 as compared to other genotypes maximum seedling fresh weight was recorded in RBHP-304 and the maximum seedling dry weight was recorded in PRR-2. From this study, genotypes IC-340616 (76.50%), IC-19338 (91.25%)., IC-2567 and RBHP-302. RBHP-304, EC-18260 and IC-341998, having high mean performance for seed quality attributes may be used as donor parents in hybridization programme for improving the seed quality.
***Key words**: Rice bean, Germination, Physical Purity, Moisture content and seed Vigour*

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INTRODUCTION

Ricebean (*Vigna umbellata* [Thunb] Ohwi and Ohashi*)* is one of the summer legumes grown by subsistence farmers in hill areas of Nepal. It is known by different local names in different parts of the country, such as Masyang, Jhilinge, Gurous or Siltung . It thrives well in marginal lands, rain-fed tars, drought-prone areas and exhausted soils. It is generally grown as a mixed crop or intercrop with maize. It is also cultivated along rice bunds and terrace-margins in the midhills [1].

Ricebean is one of the minor legumes grown by Nepalese farmers and its area under cultivation is too low compared to other legumes as lentil, blackgram and chickpea. There is an increasing trend in area, production and productivity of grain legumes in the country [2]. However, in recent years farmers are gradually decreasing ricebean cultivation and the productivity has also gone down. The shading effect of the high yielding maize varieties and increasing use of chemical fertilizers in maize field has led to excessive vegetative growth, poor pod formation and low productivity of ricebean. Moreover, its consumption is declining due to increased availability of other preferred pulses in local markets [3]. The dry seeds of ricebean are good sources of carbohydrates, proteins, minerals and vitamins. Protein in ricebean is rich in limiting amino acids methionine and trytophan [4]. The seeds are also rich in other amino acids including valine, tyrosine and lysine [5]. Ricebean seeds contain vitamins such as thiamine, riboflavin, niacin and ascorbic acid [3]. One of reason of low productivity in ricebean germplasm is limited variability and poor germination, Keeping in view 34 germplasm were collected and evaluated for seed quality parameters for determination of best germplasm. Since rice bean is self pollinated crops, the variability is expected to be low and studies on seed quality attributes are meagre.

MATERIAL AND METHODS

The present investigation was undertaken during the year 2015 at Department of Seed Science and Technology, College of Forestry, Ranichauri, Tehri Garhwal, Uttarakhand. Experimental material *i.e.,*

consists 34 diverse genotypes of rice bean including four checks *viz*., PRR-1, PRR-2, RBL-1,RBL-6 were collected from Research Block of Genetics and Plant Breeding. The observation were recorded on namely Speed of germination, Standard germination (%), Root length (cm), Shoot length (cm), Seedling IC-fresh weight (g), Seedling dry weight (g), Moisture content (%), Accelerated ageing test (%). For determination of standard germination 25 seeds in four replications are germinated on towel paper at 25°C in seed germinator for 7 days. The papers were moistened with distilled water. At final day of germination normal seedling counted which determine the germination percentage. For the determination of root length and shoot length 5 seedlings were taken from each replication. Moisture content estimated by grinding 5g seed and put that grind powder in the petri-plate kept in the oven for drying at 130°C for 17 hour. After that weight that powder and calculated moisture content by using moisture per cent formula [6].

For accelerated ageing test sufficient number of seed in a single layer from each genotype was taken on wire mesh tray fitted in plastic boxes having 40 ml of distilled water. The boxes were placed in ageing chamber after closing their lids. The seed were aged at 40+1°C temperature and about 100 percent RH for 96 hours and tested for germination in three replication of 100 seeds in each genotype. The number of normal seedling including hard seeds were counted on 8th day and expressed as percent germination [7].

The data obtained during the entire study was statistically analyzed. Analysis of variance was calculated following completely Randomized Design.

RESULT AND DISCUSSION

Analysis of variance showed significant differences for all seed quality parameters viz**.** Speed of germination, Standard germination (%), Root length (cm), Shoot length (cm), Seedling fresh weight (g), Seedling dry weight (g), Moisture content (%), Accelerated ageing test (%).The mean value of various quality parameters for rice bean germplasm is given in Table 2.

The maximum speed of germination was observed in IC- 340616 (76.50%) followed by EC-18260 (73.50%), RBL-6 (73 %) and RBL-1 (72%). However, the lowest value for this character was noticed in EC-16136 (63.25%) followed by IC-2567 (63.5%).

The highest standard germination was recorded in IC-19338 (91.25%) followed by RBHP-310 (91.00%) and lowest standard germination was recorded in IC-469195 and RBHP-310 (80.50%) followed by RBHP-306 (82%) and RBHP-309 (83%).

The maximum root length was measured in IC-2567 (13.62 cm) followed by IC-15640 and RBHP-305 (13.55 cm) and minimum value for root length was measured in EC-18260 (11.15cm) followed by RBHP-304 (11.55 cm). The maximum shoot length was measured in RBHP-302 (13.32 cm) followed by EC-16136 and IC-18465 (13.15 cm),while minimum value for shoot length was observed in EC-18260 (10.15 cm) followed by RBHP-304 (10.45 cm).

The higher seedling fresh weight was observed in RBHP-304 (4.53 g) followed by IC-341991 (4.33 g), IC-2567 (4.21 g) and EC- 18260 (4.10 g),while lowest value was recorded in IC-469195 (1.43 g) followed by IC-469192 (1.47 g), RBL-1 (1.53 g) and RBL-6 (1.82 g). The maximum seedling dry weight was observed in PRR-2 (0.198 g) followed by EC-98452 (0.140 g), LRB-336 (0.128 g) and IC-19338 (0.126 g), while minimum seedling dry weight was recorded in RBHP-308 (0.038 g) followed by IC-18456 (0.054 g).

The higher value was recorded for moisture content in RBHP-301(11.70%) followed by IC-341998 (11.13%) and RBHP-303 (9.72%), while the minimum value was recorded in EC-18260(7.77%) followed by PRR-2 (8.3%).

The higher value recorded for physical purity test in PRR-2 (96.87) followed by PRR-1 (94.81) and IC-340616 (94.8), while the minimum value was recorded in EC-14075 (70.61) followed by EC-16136 (71.22) and IC-19338 (75.45)

The maximum value of germination after accelerated ageing test recorded in IC-341998 which is significantly higher than all the genotypes followed by EC-18260 (46.50%).However, the lowest germination was recorded in IC-18553(29.00%) followed by RBL-6 and IC-18553 (29.5%).

In characterization of rice bean studies were collected in related to seed quality parameters. In this experiment speed of germination was occurred maximum in IC-340616 (76.50%) while highest standard germination was recorded in IC-19338 (91.25%).The maximum seedling fresh weight was recorded in RBHP-304 (4.53g), while maximum seedling dry weight was observed in PRR-2 (0.198 g). Germination after ageing was occurred in IC-341998. PRR-2 (96.87) followed by PRR-1 (94.81) and IC-340616 (94.8).

From this study, genotypes IC-340616 (76.50%) , IC-19338 (91.25%)., IC-2567 and RBHP-302. RBHP-304, EC-18260 and IC-341998, showed high mean performance for seed quality attributes may be used as donor parents in hybridization programme for improving the seed quality.

Table 1. Analysis of variance (ANOVA) for seed quality parameters of different genotypes of rice bean.

Source of variance	DF	Mean Sum of square								
		Speed of germination	Standard germination	Root length	Shoot length	Physical purity test	Seedling fresh weight	Seedling dry weight	Moisture test	Accelerated ageing test
Treatment	33.0	40.219**	39.503**	21.340**	17.083**	158.996**	3.414**	0.00375**	2.330**	153.920**
Error	102.0	1.262	1.036	0.00580	0.00637	.433	0.0000861	0.00000071	0.177	.899

Significant at 1%

Table 2. Mean performance of rice bean genotypes for seed quality parameters.

S No.	Genotype	Moisture content (%)	Speed of germination (%)	Standard germination (%)	Root length (cm)	Shoot length (cm)	Seedling fresh weight (g)	Seedling dry weight (g)	Physical purity (%)	Accelerated ageing test
1	PRR 1	9.69	65.25	85.5	13.15	12.27	3.13	0.068	94.81	29
2	PRR 2	8.3	67.75	88.5	12.32	11.45	1.99	0.198	96.87	39.5
3	RBL-1	8.94	72	83	13.15	12.25	1.53	0.097	87.21	38.5
4	RBL- 6	9.32	73	90.5	13.4	12.25	1.82	0.064	90.17	29.5
5	EC-14075	9.19	71.5	83.75	12.15	11.25	3.62	0.112	70.61	39.5
6	EC-16136	8.38	63.25	87.25	12.15	13.15	2.62	0.095	71.22	45.5
7	EC-18260	7.77	73.5	85.5	11.15	10.15	4.10	0.115	79.22	46.5
8	EC-98452	9.45	65.5	89.5	12.15	11.15	3.85	0.140	80.19	30.5
9	LRB-336	9.22	71.75	83.75	13.25	12.25	2.12	0.128	81.61	45.5
10	LRB-353	8.04	66	82.25	12.35	11.25	1.96	0.096	80.77	39.5
11	IC- 2567	9.62	63.5	89.5	13.62	12.15	4.21	0.087	91.46	38.5
12	IC-85653	9.54	66.5	89.5	13.3	12.25	3.33	0.102	87.22	37.5
13	IC-15640	9.73	72	87.5	13.55	12.15	2.18	0.091	80.61	35.5
14	IC-18456	8.43	69.25	89.5	12.35	11.17	2.64	0.054	78.22	40.5
15	IC-18465	8.88	65.75	83	14.15	13.15	3.16	0.111	79.66	39.5
16	IC-18553	9.61	67.5	87.5	13.15	12.25	1.84	0.087	78.76	29.5
17	IC -19338	9.65	70.75	91.25	13.25	12.15	2.24	0.126	75.45	40.5
18	IC-341986	8.79	66.5	85.5	13.35	12.25	3.86	0.072	90.63	39.5
19	IC-341991	9.59	72.5	89.5	12.25	11.25	4.33	0.082	80.53	39.5
20	IC-341997	9.36	69.25	89.5	12.25	11.15	2.44	0.111	83.57	45.5
21	IC-341998	11.13	68.5	89	13.25	12.15	3.54	0.121	81.42	47.5
22	IC-340616	9.42	76.5	85	13.35	12.25	2.07	0.124	94.8	45.5
23	IC-469192	8.36	66.5	85	13.37	12.27	1.47	0.105	89.42	39.25
24	IC-469195	8.94	70.75	80.5	12.45	11.35	1.43	0.075	80.74	40.5
25	RBHP-301	11.7	66	91	13.15	12.27	3.87	0.102	79.54	37.5
26	RBHP-302	8.74	65.75	87.5	14.15	13.32	2.34	0.056	80.34	39.5
27	RBHP-303	9.72	68.25	89	12.15	11.15	3.02	0.086	80.67	40.5
28	RBHP-304	9.19	68.5	84	11.55	10.45	4.53	0.057	89.11	45.5
29	RBHP-305	9.39	65.5	87.5	13.55	12.45	3.03	0.067	90.45	35.5

30	RBHP-306	9.68	71.5	82	12.55	11.45	2.62	0.067	85.37	39.5
31	RBHP-307	9.79	65.75	90.5	12.25	11.1	3.11	0.096	84.73	37.5
32	RBHP-308	9.56	68.75	87	13.32	12.25	4.06	0.038	79.86	36.5
33	RBHP-309	9.38	65	83	13.25	12.15	1.87	0.081	81.55	39.5
34	RBHP-310	8.78	68.5	80.5	13.25	12.15	2.84	0.122	81.34	39.5
GM		9.27	68.49	86.56	12.88	11.88	2.84	0.095	83.65	39.213
CV %		1.438	1.64	1.17	0.481	0.502	0.325	0.886	0.787	1.571
SEM(±)		0.006	0.561	0.509	3.0010	2.0098	0.0046	0.422	0.3293	0.308
CD at 1%		0.24	2.08	1.89	0.11	0.11	0.017	0.15	1.22	1.14
Lowest		**7.77**	**63.25**	**80.5**	**11.15**	**10.15**	**1.43**	**0.038**	**70.61**	**29**
Highest		**11.7**	**76.5**	**91.25**	**13.62**	**13.32**	**4.53**	**0.198**	**96.87**	**47.5**

REFERENCES

1. Khadka, K. and Acharya, B.D. (2009). Initiatives for biodiversity research development. Pp 1.
2. Neupane, R.K. (2003). Present scenario of winter grain legumes research in Nepal In: R.K.
3. Joshi, K.D.; Bhandari, B.; Gautam, R.;Bajracharya,J .and Hollington P.A. (2006).Rice bean: a multipurpose underutilized legume.
4. Carvalho, N.M. de and Vieria, R.D. (1996). Ricebean [*Vignaumbellata* (Thunb.) Ohwi and Ohashi]. In: E. Nkowolo and J. Smartt (eds). Legumes and oilseeds in nutrition. Chapman and Hall: 222-228.
5. Mohan, V.R. and K.Janardhan (1994). Chemical composition and nutritional evaluation of raw seeds of six ricebean varieties. *J of Indian Botanical Society.*
6. Anon, (1985), International rules for seed testing . Seed *Seed Sci and Technol. 13: 299-513.*
7. Delouche, J.C and C.C Baskin (1973), Accelerated ageing techniques for Predicting the relatively storability of seed lots . *Seed Sci and Technol.* 1:427-452.

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