

Assessment of Genetic Variability and identification of genotypes for different traits in Barnyard millet (*Echinochola spp.*)

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ABSTRACT

The present investigation were conducted to study the diversity and extent of variability for different morphological and yield related traits in barnyard millet (*Echinochola spp.*), during *Kharif* 2009, at research farms of Department of Crop Improvement, at Hill Campus of G.B. Pant University of Agriculture & Technology, Ranichauri, Tehri- Garhwal (Uttarakhand). A wide range of variability were observed for all the characters studied in 58 diverse genotypes including PRJ-1 a variety were originally procured from world collections of barnyard millet being maintained at International Crop Research Institute for Semi- Arid Tropics (ICRISAT), Hyderabad. A significant variation was detected for genotypes for all traits suggested that there was considerable variability among the genotypes. It was observed that characters viz., days to maturity (73-90 days), Number of productive tillers (2-15), Number of leaves on main tiller (2-18), ear length (9-21 cm), finger length (21-55 cm), Number of grains/ finger (26-117), grain yield/ ear (0.13-18g) and grain yield per plant (0.35-26 g). Other traits also exhibited great deal of variability and in terms of range and mean and coefficient of variance. Which revealed the presence of wide diversity between the genotypes and selection for these traits could be effective in improving the yield in the genotypes.

Keywords: *barnyard millet, variability, genotypes, grain yield, agronomical traits, coefficient of variance*

1. INTRODUCTION

Barnyard millet (*Echinochloa spp.*), is also known as Madira or Jhangora or Sawan is the second most important small crop after finger millet among *kharif* crops both in terms of acreage and production in the hill region of the Uttarakhand. The respective area in Kumaon and Garhwal regions for these crops has been reported to be 0.48 lakh ha and 0.19 lakh ha respectively. The area under small millets has been steadily sliding down during last 3 decades and in recent years the pace of decline has been much faster. These crops in recent years have been pushed further to marginal and sub marginal areas where no other crop can be grown. As similar to other millets, barnyard millet is also an appropriate food for patients intolerant to gluten causing celiac disease or other forms of allergies/intolerance of wheat, as none of the millets are closely related to wheat, so they are appropriate foods for such patients. Seeds of the crop are very nutritious. Its grain contains 11.2g/100g Proteins, 10.1g/100g crude fibre, 4.4g/100g minerals and 15.2mg/100g iron. (Anonymous, 2010)

The crop is largely grown in harsh and fragile environments, with minimal use of agricultural inputs due to its remarkable ability to withstand erratic rainfall and varying weather conditions it is a regular crop up to 2,300 m msl during *kharif* season in Uttarakhand and form main stay of agricultural diet and cultural system of hill people. (Kumar *et al.*, 2007).

Besides being an important crop very little improvement work has been carried out in barnyard millet. Most of the varieties developed and released are selection from local germplasm of *E. frumentacea* and are susceptible to various diseases and are low yield. Only in recent years some exotic introduction of barnyard millet has been evaluated and one of the successful variety PRJ-1 was released for the cultivation in Uttarakhand (Yadav *et al.*, 2010).). Keeping in view to increase the yield potential and identify the superior sources for different traits the present investigation has been formulated with an objective of assessment of extent of genetic variability for the different morphological traits.

2. MATERIALS AND METHODS

The present investigations were carried out in the Randomized Block Design (RBD) during *khariif* 2009 under rainfed condition at the Research Block of Deptt. of Crop Improvement, G.B. Pant University of Agriculture & Technology, Hill Campus, Ranichauri, Tehri Garhwal, at an altitude of about 2100 m above mean sea level, lying between 30° 15' N latitude and 78° 30' E longitude under mid hill zones of Uttarakhand, India. The experimental materials for the present investigation comprised to 58 diverse exotic genotypes of barnyard millet (*Echinochloa spp.*) including PRJ-1 a variety released from the Department of Crop Improvement, College of Forestry and Hill Agriculture, Hill Campus, Ranichauri, were originally procured from world collections of barnyard millet being maintained at International Crop Research Institute for Semi- Arid Tropics, Patancheru Hyderabad, India.

Table1. Variation of different morphological traits in barnyard millet

Sr. no.	Characters	Range	Mean	SE(m)	CV
1.	Days to 50 %flowering	40-56	47.816	0.915	3.314
2.	Days to maturity	73-90	82.724	0.784	1.643
3.	Plant height (cm)	65.06-182.13	123.730	11.270	15.777
4.	No. of productive tillers	1.800-15.200	4.446	0.273	10.646
5.	No. of leaf on main tiller	2.333-18.000	6.132	0.449	12.683
6.	Culm branching	0.133-42.00	8.051	0.619	13.329
7.	Culm thickness	5.690-12.680	8.735	0.994	19.726
8.	Flag leaf length (cm)	11.006-32.473	23.172	1.928	14.411
9.	Flag leaf width (cm)	1.620-3.373	2.765	0.262	16.451
10.	Peduncle length (cm)	3.400-41.466	19.649	1.889	16.650
11.	Ear length (cm)	9.633-21.413	14.614	0.728	8.639
12.	Node diameter (mm)	3.884-32.792	6.967	23.403	405.843
13.	Finger width (cm)	3.112-33.261	8.930	0.676	13.125
14.	Finger length (cm)	21.429-55.918	30.184	1.206	6.925
15.	No. of fingers/ear	5.666-44.333	22.948	0.768	5.796
16.	No. of grains/ear	12.66-3457.667	1254.87	12.174	1.680
17.	No. of grains/ finger	25.666-117.666	65.005	0.995	2.652
18.	Grain yield/ear	0.130-18.563	4.046	0.141	6.052
19.	Grain yield/plant	0.350-26.756	10.191	0.449	7.505

3. RESULTS AND DISCUSSION

It is an established fact that greater variability would lead to better scope for selection and predicting accurately the yield of a crop. Therefore, for farming an appropriate selection programme, information about the extent of variability is very essential.

The extent of variability in different populations for various morphological characters were recorded and significant variations were observed for days to 50 % flowering from 40 to 56 days and general mean (47.816), days to maturity from 73 to 90 days and general mean (82.724), plant height from 65.06 to 182.13 cm and

general mean (123.730), ear length from 9.633 to 21.413 cm and general mean (14.614), number of grains /ear ranges from 112.66 to 3457.667 g and general mean (1254.874). These findings were supported by Mehta *et al.* (2005) and Mehta *et al.* (2007).

The number of productive tillers from 1.800 to 15.200 and mean ranges from 4.446, seed yield/ plant 0.350 to 26.756 and mean ranges from 10.363. This result is supported by K. John (2007). Flag leaf length 11.006 to 32.473 cm and general mean (23.172) no of finger per ear from 5.666 to 44.333 and general mean (22.948). This result is supported by B. B. Bandhyopadhyay (1998).

Flag leaf length ranges from 11.006 to 32.473. Similar result was also reported by P. Anantharaju and N. Meenakshiganesan (2008) for finger millet.

The large extent of variability in all these characters i.e., Days to 50% flowering, plant height, peduncle length, finger length, no of fingers per ear in the entries might have resulted due to diverse origin of accession coupled with environmental interaction. Sonnad *et al.* (2008) also reported variability for grain yield per plant, days to maturity, plant height, ear head length, finger length, and finger number in white finger millet.

4. REFERENCES

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