

Formation of core set in barnyard millet [*Echinochloa frumentacea* (Roxb.) Link] germplasm using data on twenty four morpho-agronomic traits

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SUMMARY

An evaluation of 729 accessions of barnyard millet [*Echinochloa frumentacea* (Roxb.) Link] germplasm for yield and yield attributes over years revealed highly significant variability for almost all the traits studied. Evaluated data on both qualitative and quantitative traits were subjected to a new statistical analysis called Power Core (v. 1.0) to form core set. A core set constituting 50 accessions was formed and the genetic variability of the core set was compared with the entire collection. The mean, range, variance and frequency distribution for entire collection and core set did not differ significantly. The Shannon Weaver diversity index (H') and phenotypic correlations calculated for both the collections were at par with each other. These tests indicated that, new method in formation of core set by using statistical analysis Power Core is useful in retaining in most of the diversity present in the entire collection of barnyard millet germplasm.

Key words : Barnyard millet, Core set, Genetic parameters, Diversity index, Correlation.

Barnyard millet (*Echinochloa frumentacea* (Roxb.) Link) is an oldest crop, which is known as sawan and cultivated for fodder and food grains in particular pockets (Hilly areas) of many states in India. It has been cultivated in Asia including China, Korea, Japan, erstwhile USSR as well as India. It is also grown in USA and Central African countries. Barnyard millet grains are nutritious and cooked as rice after shelling. It is one of the quickest growing short duration crop, some cultivars come to harvest at 6-8 weeks. Barnyard millet belongs to genus *Echinochloa* of the family Poaceae. Different *Echinochloa* species particularly *E. frumentacea* (L.), *E. colona* (L.), *E. crusgalli* (L.) Beauv. and *E. utilis* (Ohwi ex Yabuno) are cultivated. The earliest archeological record of the crop is from china, where it was cultivated earlier to 4150 BC. Different species of this crop are being domesticated in different regions of the world like *E. frumentacea* (L.) in China, *E. colona* (L.) in India and *E. crusgalli* (L.) in Japan. It is a well established fact that the progress in the improvement of a crop depends on the degree of variability in the desired traits in the base material vis-à-vis germplasm collection.

The National Active Germplasm Collection Site (NAGS), All India Co-ordinated Small Millets Improvement Project, Bangalore has 729 accessions of

barnyard millet. These accessions are sources of genes of economically important traits. But due to their large size, it is difficult to evaluate various economically important traits. Hence, sampling of the entire collection to a manageable sample or 'core collection' (Frankel, 1984) becomes relevant. A core collection contains a sub set of accessions from entire collection that captures most of the available diversity of species (Brown, 1989a). The core set thus formed can be evaluated extensively and the information derived could be used to guide more efficient utilization of the entire collection (Brown, 1989b). Hence, the objective of the study was to develop a core set using the data on quantitative and qualitative traits.

MATERIALS AND METHODS

Evaluation of entire germplasm:

A total of 729 accessions of barnyard millet were evaluated for both agronomic as well as morphological traits at Main Research Station, Gandhi Krishi Vigyan Kendra, Bangalore over the years from 2001 to 2005. Each accession was grown in a single row of 3 m length with a spacing of 30 cm between the rows and 10cm between the plants within a row. Data was recorded on 10 quantitative and 14 qualitative traits following the procedures given in *Echinochloa* millet descriptors, IBPGR (1983), FAO, Rome. Agro-morphological evaluation of ten quantitative traits viz., plant height, number of basal tillers, flag leaf length, flag leaf width, length of peduncle, length of inflorescence, length of lower raceme, days to 50 per cent flowering, thousand seed weight and grain yield and fourteen qualitative traits viz., growth habit, plant pigmentation, culm branching, degree

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