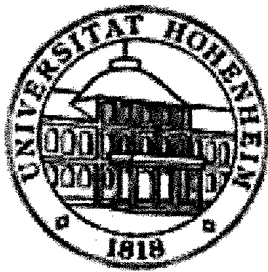


**University of Hohenheim
Institute of
Plant Breeding, Seed Science and Population Genetics
Prof. Dr. agr. Dr. hc. H.H. Geiger**

**Phenotypic characterization of a pearl millet [*Pennisetum glaucum*
(L.) R. Br.] core collection under field conditions in Niger.**



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Jenny Coral Padilla
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5 CONCLUSION

In the core collection useful diversity was found for all yield related traits, maturity and disease resistance. Moreover, the correlations detected between several quantitative traits are helpful to plant breeders. The usefulness of this pearl millet core collection and the testing in Niger was indicated by the identification of three accessions with a potential direct use for pearl millet breeding programs in West Africa and the detection of geographical regions with promising germplasm for several important traits. But nevertheless, some traits were observed at a very low frequency or even not to be represented in the core collection. Thus, there is a demand to examine if these traits are included in the total pearl millet collection. Otherwise, there would be the need of further specific collection of germplasm to include these traits.

The results of the present study can be used for further investigations.

Holbrook *et al.* (2000a) screened a peanut core collection for sources of resistance to *Meloidogyne arenaria*. Afterwards he proved that there is a high success rate of at least 50 percent to detect further resistance sources when screening clusters of the total collection that contain accessions of the core collection found to have the desirable trait (Holbrook *et al.* 2000b). Also, Miklas *et al.* (1999) showed in his investigation on sources of resistance to white mold in a subsample of the common bean core collection, that resistance found in a core collection can lead to an efficient and systematic evaluation of the total collection for additional and perhaps better sources of resistance to diseases. Correspondingly, the results of the present study can be used for targeted screening of the total pearl millet collection for useful traits.

The information gained in this study can also be used to design further evaluation trials of the material with useful traits, but not adapted to the length of growing season at the experimental location, in other regions of West Africa according to their maturity to test their adaptation and potential suitability for specific breeding programs.

The centres of origin of a crop have been reported to be a good source of variation. Accordingly, it should be verified if a reduction of the high proportion of Indian materials in the core collection in favour of materials from the sahelian zone would lead to a higher probability to identify useful traits in the core collection.

6 SUMMARY

Pearl millet [*Pennisetum glaucum* (L.) R. Br.] is an important staple crop of arid regions in Africa and Asia with a mean grain yield of 668 kg/ha and 939 kg/ha, respectively. Evaluation of genetic diversity conserved in genebanks is a prerequisite for successful use of germplasm for crop improvement. The objective of this study was to characterize the core collection consisting of 504 accessions for six categorical and 21 quantitative traits and to identify useful accessions for the West and Central African pearl millet breeding programs. Studying the geographical pattern of the variation for these traits was of additional interest. For these purposes the accessions of the core collection were evaluated with local and Indian standards in a field trial on the ICRISAT research station Sadore in Niger, Africa.

The study revealed a large variation for nearly all traits indicating the potential of the core collection germplasm to serve as sources for crop improvement. For several traits a clear geographical distribution of the germplasm was found. The most striking geographical pattern was revealed for maturity. Three principle components were found to explain 63 percent of the total variation. Major sources of separation between the accessions were grain weight, days to 50 percent flowering, panicle length and leaf length.

For various traits geographical regions could be identified with promising germplasm sources, for broadening the pearl millet breeding material. Besides, three accessions with a direct potential use in West African breeding programs were found.