

GENETIC STUDIES ON FINGER MILLET  
(Eleusine coracana L.) GEARTN.

By

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Approved.

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## A B S T R A C T

An investigation was carried out on 180 accessions of finger millet (*Eleusine coracana* (L.) Gaertn.) from India, Nepal, Sri Lanka, Ethiopia, Malawi, Kenya, Uganda and Tanzania during two seasons at three locations in Sri Lanka. The study included genetic variability and divergence, genotype x environment interactions, stability parameters, character correlations and path analysis.

The analysis of variance for the 180 genetic stock revealed highly significant differences among entries for most of the nine characters studied both at single and combined levels. Days to flower, plant height, grain yield and 1000-grain weight were affected more by environment, while tiller number, finger number spikelets per centimeter, seeds per spikelet and finger length were less affected. High or moderate heritability for tiller number, finger length, finger number and yield indicate that phenotypic selection may be possible.

Seven groups were identified through the  $D^2$  statistic and canonical variate analysis. The genotypes did not group themselves according to their geographic origins. Clusters A, C, D and E were closer together but far from the scattered



groups B, G and F, indicating that the first four groups could have originated from the same center of origin. Few clusters with few genotypes could be identified for possible selection of parents for hybridization.

Days to flower, finger number and plant height were the main contributing characters towards genetic divergence.

Highly significant linear genotype x environment interactions were found for all characters except days to flower. Genotypes differed for their regression over environmental index, suggesting that multi-environmental testing is necessary. Generally genotypes were unstable with respect to all characters except days to flower and spikelets per centimeter. With respect to grain yield, 54 out of 180 genotypes were stable. Two genotypes from India (IE 450, IE 667) and one from Kenya (FAO 49497) could be recommended for good environments as against from Malawi (SAD 384) for poor environments.

Characters such as tillers/plant, spikelets/centimeter, seeds/ spikelet, 1000-grain weight and plant height were significantly and positively correlated with yield. Path analysis showed that they also exerted appreciable positive direct influence on yield. The characters which have reasonably high or moderate heritability values (except for spikelets/centimeter and 1000-grain weight) can be considered useful for selection for grain yield in finger millet.