GENETIC DIVERSITY AND INTER-CHARACTER ASSOCIATION AMONG AGRO-MORPHOLOGICAL TRAITS IN OKRA (*Abelmoschus esculentus* L.) GENOTYPES

BY

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ABSTRACT

Genetic improvement of staple vegetable crops has recently been advocated as a sustainable rural-based strategy for partially meeting the nutritional requirements of a large proportion of Nigeria's population. Twenty-five accessions of okra were evaluated in a three-replicate field experiment using randomized complete block design (RCBD) across two cropping years. This approach requires information on the extent of genetic diversity and variability among the available genetic resources in addition to traits with high positive correlation to pod yield. However, this information is limiting in okra (*Abelmoschus esculentus* (L) Moench). This study was conducted at the Teaching and Research Farm of the Federal University of Agriculture Abeokuta (7° 15′ N; 3° 25′E), to determine the genetic diversity and inter-character association among agro-morphological traits in Okra. Twenty-five accessions of Okra were evaluated in a three- replicate field experiment in two years (2019 and 2020). Ten agro-morphological characters were measured viz: Number of days to 50% flowering (NDF), plant height at 50% flowering (PHF), Number of branches per plant NBP), Number of leaves at 50% flowering (NLF), pod width (PW), pod length (PL), Number of pods per plant (NPPP), Number of seeds per pod (NAPP), 100seed weight (100SW), pod yield per plant (PYPP). Data collected were subjected to Analysis of variance and means were separated using Duncan's Multiple Range Test at 5% probability level. Mean squares from the combined ANOVA were used for the estimation of genetic parameters. Principal component analysis (PCA) and single linkage cluster analysis (SLCA) (the Ward's method) were employed to study the variation pattern and grouping of the accessions respectively. Genotypic and phenotypic correlation analyses were performed to determine the driving key of high pod

yield. Highly significant variation ($P \leq 0.01$) was obtained among the accessions for all the traits. Accession × environment interaction was present, as reflected by relatively low broad-sense heritability (25%) and progress that could be expecting from selecting the top 5% of the accessions for genetic advance ranged from 0.96 (for number of leaves at flowering) to 13.91 (for pod width). Of the 14 principal components, only four had eigen values greater than one and cumulatively accounted for 65.0% of the variation among the accessions. The PCA identified pod width, number of pods per plant, 100 seed weight pod yield, number of days to flowering, number of branches per pod, number of seeds per pod, pod length, plant height at flowering, number of leaves and pod length as agronomic traits accounting for most of the variability among the okra accessions. The SLCA grouped the accessions into four homogenous clusters on the basis of genetic similarities. Significant positive genotypic and phenotypic correlations were observed between pod yield per plant and number of days to flowering, pod width, pod length, number of pods per plant, seeds per plant and 100 seed weight. Conversely, significant and negative genotypic and phenotypic correlations observed between pod yield per plant and number of branches per plant indicated that care must be taken when using number of branches per plant to serve as indicator for the indirect selection for high pod yield in okra. The traits identified by PCA could be used as dependable selection criteria because of high genetic contribution to total variance. In conclusion, concurrent improvement in pod yield could be possible by selecting promising parents from different homogenous groups. The diversity found among these okra accessions can be exploited for developing varieties with improved pod yield in Abeokuta South West Nigeria.