

Digital Seed Morpho-metric Characterization of Tropical Maize Inbred Lines for Cultivar Discrimination

I.O. Daniel, K.A. Adeboye, O.O. Oduwaye and J. Porbeni

Department of Plant Breeding and Seed Technology, University of Agriculture, PMB 2240, Abeokuta, Nigeria

Corresponding Author: I.O. Daniel, Department of Plant Breeding and Seed Technology, University of Agriculture, PMB 2240, Abeokuta, Nigeria

ABSTRACT

Cultivar discrimination of parental inbred lines is essential for genetic purity of F1 hybrid seed products. It is also essential for the purpose of maintenance of agronomic performance, variety registration, issuance of breeders' rights, proper labeling of seed products and protection of investments in plant breeding. Digital imaging analysis had been identified as a fast and reliable method for variety discrimination and was applied in this study. With the aid of a digital imaging software (Veho™) 10 seed morpho-metric traits were digitally measured and/or calculated from captured images of 17 inbred lines drawn from the *Striga*-resistant tropical maize population. The seed metric data were subjected to Pearson's correlation analysis, the Principal Component Analysis (PCA) and the Single Linkage Cluster Analysis (SLCA). All the parameters showed positive correlation except embryo angle, seed shape factor and circularity index. Seed area, length, perimeter and flatness index contributed the largest variability within the population (eigenvectors = 0.332, 0.328, 0.323 and 0.318), respectively, suggesting their potential usage for cultivar discrimination by digital imaging of maize seeds. Dendrogram constructed from the SLCA showed four major clusters of the inbred population. The clusters constitute a classification tool for future evaluation of genetic purity of test inbred and F1 hybrid samples within *Striga* resistant maize population. Results of this study demonstrated applicability of digital imaging for analysis of seed genetic quality and will ultimately improve the hybrid seed sector in Nigeria.

Key words: Tropical maize, seed geometry, digital imaging, clustering analysis, cultivar identification, genetic purity