

USE OF MORPHOLOGICAL AND MOLECULAR PROFILING FOR THE ESTABLISHMENT OF RELATEDNESS BETWEEN COMMERCIALY AVAILABLE AND ELITE SOYBEAN GENOTYPES

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ABSTRACT

Molecular profiling is a reliable tool for establishing distinctive differences between plant cultivars or lines and authenticating genomic data vital for tracking germplasm and breeding purposes. The objective of fingerprinting the soybean accessions was to characterize 11 soybean genotypes from the CSIR-Crop Research Institute Soybean breeding program for morphological traits characterization and to reveal genetic diversity using Simple sequence repeat (SSR) markers. Genomic DNA was isolated from young tender leaves and PCR-based techniques were used for SSR molecular analysis. A set of 25 SSR markers were used to determine the genetic diversity and relatedness among 11 soybean (*Glycine max* (L) Merr.) genotypes (5 released varieties and 6 elite lines) in Ghana. The cultivars under study were grown on the field till maturity to assemble quantitative and qualitative morphological data. Morphological description was performed with 10 qualitative and 11 quantitative traits. Cluster analysis based on qualitative morphological characters revealed clear separation of the genotypes on the basis of their seed coat colour. The polymorphic information content (PIC) among genotypes varied from 0.541 (Satt 171) to 0.023 (Satt 160, Satt 148 and Satt 285) with an average of 0.142. In addition, only one polymorphic SSR marker (Satt 171) was able to uniquely identify all 11 varieties and would be useful for DNA fingerprinting. The results suggest that SSR markers were found to be superior in measuring relatedness and identifying varieties of soybean.

Keywords: DNA fingerprinting, genetic diversity, Simple Sequence Repeats, polymorphic information content, Genomic DNA.