

Identification of Superior Cowpea Mutant Genotypes, Their Adaptability, and Stability Under South African Conditions

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Abstract : Cowpea is an essential legume for the nutrition and health of millions of people in different regions. The production and productivity of the crop are very limited in South Africa due to a lack of adapted and stable genotypes. The improvement of nutritional quality is made possible by manipulating the genes of diverse cowpea genotypes available around the world. Assessing the adaptability and stability of the cowpea mutant genotypes for yield and nutritional quality requires examining them in different environments. The objective of the study was to determine the adaptability and stability of cowpea mutant genotypes under South African conditions and to identify the superior genotypes that combine grain yield components, antioxidants, and nutritional quality. Thirty-one cowpea genotypes were obtained from the Agricultural Research Council grain crops (ARC-GC) and were planted in Glen, Mafikeng, Polokwane, Potchefstroom, Taung, and Vaalharts during the 2021/22 summer cropping season. Significant genotype by location interactions indicated the possibility of genetic improvement of these traits. The genotype plus genotype by environment indicated broad adaptability and stability of mutant genotypes. The principal component analysis identified the association of the genotypes with the traits. Phenotypic correlation analysis showed that Zn and protein content were significant and positively correlated and suggested the possibility of indirect selection of these traits. Results from this study could be used to help plant breeders in making informed decisions and developing nutritionally improved cowpea genotypes with the aim of addressing the challenges of poor nutritional quality.

Keywords : cowpea seeds, adaptability, stability, mineral elements, protein content

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