

Abstract

Background: Diversification of global food systems through exploration of traditional varieties and wild edible plant species is a focal mitigation strategy for food security worldwide. The present study determined the phenomic diversity of locally available, affordable and climate-resilient cultivated and wild *Crotalaria* species for breeding purposes. **Methods:** Seed samples were collected from different administrative counties in Kenya spanning different climatic zones. Other seeds were provided by the Genetic Resources Research Institute of Kenya. A randomized complete block design with three replications was used for agro-morphological evaluation of the 83 accessions used in this study. Data on quantitative and qualitative traits was collected. Cluster analysis on R and R-studio was used to generate a dendrogram by the Euclidian genetic distance and dissimilarity indices while the non-metric multidimensional scaling (NMDS) method was used to determine the spatial interrelationship between the accessions. The Pearson's correlation coefficients were used to determine the relationships between qualitative and quantitative traits while the principal component analysis was used to discriminate the accessions. **Results:** Three edible species (*C. brevidens* Benth., *C. ochroleuca* G.Don, *C. trichotoma* Bojer.) were found to be cultivated by Kenyan farmers and a significant variation (p