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"Solidarity in a competing world — fair use of resources"

Morphological Diversity of the Underutilised Fruit Species Guava (*Psidium guajava* L.) in Kenya

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Abstract

Guava fruit is highly nutritious and the tree occurs in a wide range of agro-climatic conditions in eastern Africa. Compared to other guava producing countries, the use of guavas for processing and product diversification is limited in Kenya due to lack of adequate agronomic information, poor integration of farmers into value chains and unawareness on the nutritional and economic potential of the species, among other reasons. Moreover, little is known about intra-specific variation in the available guava germplasm. The objective of this study was therefore to assess the morphological diversity in Kenyan guava germplasm. Four regions with diverse agroecological and edaphic conditions comprising of Western, Riftvalley, Eastern and the Coast were purposely chosen for sampling. In total, 105 trees were assessed in the field and 20 fruits from each accession collected for fruit trait assessments. Results indicate significantly higher diameter at breast height (DBH) of trees from the Riftvalley than the Coastal region (51.0 vs. 26.1 cm, respectively; $p = 0.003$). The mean fruits' pericarp thickness was slightly higher in fruits from the Coast (5.17 mm) than from the Eastern region (3.96 mm). Contrarily, mean pulp weight per fruit was significantly higher in fruits collected from the Eastern than from the Coastal region (19.0 vs. 10.9 g; $p = 0.001$). Mean proportion of seed weight from fruit weight was significantly higher ($p = 0.003$) in fruits from the Coast (10.7 %) and Western Kenya (10.6 %) than from the Riftvalley region (8.0 %). Fruit shapes included round (43 % of all 105 accessions), obovate (25 %) and ovate (14 %) among others. Majority (93 %) of all accessions had fruits with yellow-, orange- or reddish-coloured pulp, while 7 % had white fruit pulp. A combined cluster analysis of z-standardised qualitative and quantitative morphological variables using Ward's clustering method resulted in two distinct clusters, with lower values for pulp weight and fruit length, higher values for seed proportion and most accessions from Coast and Riftvalley found in cluster 1. Information on morphological diversity of guava can contribute to selecting suitable accessions for certain uses (e.g. fresh consumption or processing) and to identifying most promising mother trees for future guava breeding programs in Kenya.

Keywords: Guava, Kenya, morphological diversity, underutilised

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