Morphological and Genetic Diversity of Local Mango Accessions from the Eastern Region of Kenya

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Abstract

Mango (*Mangifera indica* L.) is an important tropical fruit tree known to have highly nutritious fruits with a delicious taste. In Kenya, cultivation is mainly done by small scale farmers and is based on three categories of cultivars/landraces; local small fruited (often with fibers), local big fruited (mostly without fibers) and improved cultivars mostly introduced from Florida. The Kenyan local small fruited landraces are said to be well adapted and stress-tolerant, however, their diversity has not been documented and their numbers are decreasing. This study aimed at analysing morphological and genetic diversity of local Kenyan mangoes. Leaves of 36 mango accessions were sampled from three locations in the eastern region of Kenya. Simple sequence repeats (SSR) markers were used for genetic diversity assessment. Fruits from the same 36 accessions were collected for morphological characterisation using 29 qualitative and 20 quantitative descriptors according to IPGRI's "Descriptors for Mango". The level of polymorphism revealed by 19 SSR markers was 54 %, while genetic diversity among samples was 59 % and heterozygosity 64 %. AMOVA revealed that variation within the individuals was high at 89 %, while among the populations/locations and among individuals it was 2 % and 9 %, respectively. Cluster analysis of the genetic data resulted in three major clusters. Cluster 1 (n=10) grouped accessions mostly from Ukambani region (50%) and fruits with a 'roundish' shape. Cluster 2 (n=22), combined accessions from both Ukambani (41 %) and Embu regions (36%) having large-sized and 'oblong' fruits. In cluster 3 (n=4), accessions mostly from Ukambani were found and fruits had an orange-colored flush on their skin. Morphological characterization of the fruit samples revealed high variability among the accessions. Fruit length ranged from 5.6-12.4 cm, while fruit weight from 95-578 g. The most frequent fruit shape was 'roundish', and the most frequent ground color of the fruit skin was 'green'. Hierarchical cluster analysis with 8 discriminant morphological variables resulted in three clusters which were, however, not consistent with the genetic clusters. Findings from this characterization study may help to improve mango farming and productivity in Kenya and to develop "conservation through use" strategies for Kenyan local mangoes to retain their valuable genetic resources.

Keywords: Cluster analysis, conservation, fruit characterisation, SSR marker

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