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"Development on the margin"

Classification of Local Mango Varieties in Kenya by Using a Morphological Characterisation and Identification Approach

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Abstract

Mango (*Mangifera indica*) is a highly valued fruit in Kenya, but its potential is not yet fully exploited. The available data and literature focuses on the economically important introduced, commercial varieties. Nevertheless about 30 % of mangos grown in Kenya are local varieties, which are greatly treasured for home consumption and are regarded as relatively drought tolerant and less susceptible to pests and diseases. These characteristics would make them interesting as rootstocks and for breeding purposes, but no data to support the statements and to lead further research activities are available. The diversity of local languages and names for mangos in Kenya leads to difficulties in clear identification of mango varieties. No documentation about the number of local varieties exists. A descriptor list for mango was developed by Bioversity International (former IPGRI) to standardise morphological characterisation, but as many as 95 plant characteristics need to be determined. The objective of the present study was to develop a method for easy variety characterisation under field conditions by testing the effectiveness of bioversity's descriptors and selecting the most discriminant ones. In central and eastern Kenya, 37 local mango varieties were collected from 90 farms for characterisation using 67 selected qualitative (41) and quantitative (26) descriptors for leaf and fruit traits. Factor analysis was performed in a first step to identify highly auto-correlated morphological descriptors. Second, hierarchical cluster analysis was performed using Wards method after z-score standardisation of the quantitative and qualitative variables. Third, discriminant analysis followed by ANOVA and post-hoc analysis as well as chi^2-tests were used to identify those variables mainly responsible for the cluster formation. Seven qualitative descriptors (fruit shape, shape of fruit apex, depth of fruit stalk, fruit neck prominence, slope of fruit ventral shoulder, fruit sinus type and quantity of fibre on stone) and three quantitative descriptors (fruit length to width ratio, skin weight and seed length) were identified as highly discriminating variables. We recommend using these key descriptors to perform easy and time-efficient variety characterisation under field conditions. Classification of varieties by the selected morphological characteristics is planned to be compared with results of molecular marker analysis.

Keywords: Cluster analysis, intra-specific diversity, morphological descriptor, variety characterisation

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