

**COLLECTION, MORPHOLOGICAL CHARACTERIZATION AND *IN*
VITRO PROPAGATION OF THE KENYAN YAM
(*Dioscorea spp*)**

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ABSTRACT

Yam tuber is used as food where it provides cheap starch-rich staple food of the hot, humid tropics. In Kenya the yam is mainly boiled, fried or roasted although a minority of consumers also processes it into flour for use in some baked products. A majority of the farmers grow yams both for commercial and subsistence purposes.

A set of three investigations were carried out in the period of August 2007 to August 2008 with the overall objective of collecting and documenting, morphologically characterizing and eventually optimizing an *in vitro* protocol for mass propagation of the Kenyan yam (*Dioscorea spp*). The first objective was achieved by carrying out a survey on 84 farm households in 6 selected administrative districts (Meru, Nyeri North, Nyeri South, Teso, Hamisi and Bungoma West) in the yam growing regions of Kenya. Data collection was carried out through individual interviews using structured and semi-structured questionnaires. 43 named landraces were recorded on farm where it was established that 38 landraces had limited distribution and abundance and only 5 dominant landraces were widely grown within the respective regions. However further studies are required to determine the actual extent of distribution and diversity of these named landraces.

The second objective was to characterize the yam cultivars based on their morphological characters as recorded on farm. This involved subjecting data of seventeen morphological variables that were measured from the accessions to multivariate analysis using principal components and cluster analyses. A Dendrogram generated through agglomerative hierarchical clustering based on a similarity matrix revealed that the 43 landraces belonged to four main groups of the *Dioscorea* genus. However, further confirmatory research through genetic analysis is required. The final objective was to optimize an efficient *in vitro* mass propagation protocol of

this particular species. This experiment involved establishment of the best sterilization procedure for the explants that were initially grown in pots in a screen house at Jomo Kenyatta University of Agriculture and Technology then culturing the nodal cuttings in MS media supplemented with different levels of growth regulators. The two step-wise sterilization procedure using commercial bleach was found to be the best and hence recommended for future work. There were also significant differences among the treatments with the combination of BAP and IAA at levels of 0.5mg/l of BAP + 0.02mg/l of IAA giving the best results for plantlet regeneration. *In vitro* rooting was achieved without the use of hormones and the most vigorously growing plantlets acclimatized in the green house. In conclusion, the study found out that there is morphological diversity among the 43 cultivars grown in Kenya and that a new yam cultivar, “nkone” was documented. Nevertheless, further confirmatory work based on molecular characterization is required. In addition with the development of an efficient *in vitro* protocol for micro-shoots growth, increased rates of multiplication can be achieved. This technique can then be exploited to generate clean, disease free material both for mass propagation and experimental work.