

**EFFECTS OF VARIETY AND STORAGE METHODS OF CASSAVA PLANTING
CUTTINGS ON ESTABLISHMENT AND EARLY GROWTH VIGOUR**

BY

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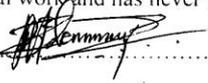
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DECLARATION

I, Baraka Barnabas Mdenye, declare to the Senate of the University of Nairobi that; this thesis is my original work and has never been submitted for award of a degree in any other University.

Signature  Date 21/11/2016

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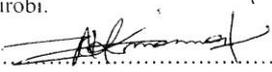
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ABSTRACT

Storage of cassava planting materials has been a challenge due to properties of losing moisture and carbohydrates loss under storage for more than two months. Objective of the study was to contribute to effective storage of cassava cutting for improved crop establishment and food security. Two varieties of cassava cuttings 1 m long, Karemba & KME4 were stored for four months under four different storage methods in two locations Kabete and KARLO Kiboko. The storage methods were clamp and double shade (CUDS), horizontal under shade (HUS), vertical under shade (VUS) and the control horizontal under open ground (HUOG). In each storage method hitag 2 xsense data loggers were installed to record data on temperature and RH. Percentage carbohydrate, moisture content (MC), 100% dry cuttings (DC) and cuttings dried to 25% or more of its stored length but not 100% were measured at intervals of 4 weeks (0, 4, 8, 12 and 16). Data were subjected to analysis of variance (ANOVA) using GenStat and mean separated using LSD. CUDS in both locations had low temperature and higher RH 18.78 °C, 72.07% in Kabete, respectively and 24.99 °C, 60.13% in Kiboko, respectively. This could explain why the storage methods performed better than the rest. The higher temperature and lower RH recorded under control (HUOG) at Kabete 21.13 °C, 61.89% respectively and 28 °C, 40.91 % at Kiboko respectively further supports this argument. The results showed less desiccation to stored cuttings in CUDS than those stored in HUOG. The moisture loss in CUDS was from 70.16 % - 56.69 % while that of HUOG dropped from 70.16 % to 27.26 %, 8 weeks after storage (WAS). Also the results showed that temperature and RH have effects on carbohydrate loss of stored cuttings. In Kiboko stored cuttings lost more carbohydrate than cuttings stored in Kabete with difference in loss of 0.99 (LSD = 0.18). The results have proven that safe storage of cassava planting material is affected by plant related factors such as cultivar as well as environmental conditions such as temperature, RH and radiation.

Sampled cuttings from each storage methods were taken to field in the same locations to evaluate their sprouting ability, number of primary shoots formation, number of leaves, rate of leaf formation and early growth vigour at 8 WAP. From stored cuttings 10 cm from each end was discarded and the remaining 80 cm was cut into 20 cm cuttings having 4-7 nodes each. The trial was split plot design in RCBD with main plot as storage method and sub plots were varieties replicated three times. The sprouting test was done at interval of 4 weeks (0, 4, 8 12 and 16 weeks after storage). The cuttings were planted at 60° slanting position and irrigated three days per week to maintain field capacity soil moisture levels. Data were subjected to analysis of variance (ANOVA) using GenStat and means separated by LSD. The results showed that storage methods, variety and duration of storage were highly significant ($p > 0.01$) between treatments. The results also showed significant differences in storability between varieties KME4 and Karemba and number of primary shoots per plant (ANPS). Kabete had 1.60 ANPS compared to Kiboko with 1.04. This implies temperature influences carbohydrate loss in stored cuttings and it affects early growth vigour of cassava sprouts from the planted cuttings. Also results shown that number of leaf formation per day was higher in Kiboko than Kabete.

From this study cassava planting material were sensitive to environmental conditions especially temperature and RH, during storage. Thus, optimum temperature and relative humidity should be factored in cassava cuttings storage to avoid increased death of stored cuttings. Where possible cassava cuttings should be planted immediately or few days after harvest to avoid loss of carbohydrate and moisture which occurs in storage particularly when stored for more than 8 weeks as it affects early growth vigour and number of primary shoots which has an effect on the final crop production.

Keywords: carbohydrate, cassava cuttings, cassava planting materials, moisture, storage methods