Comparative analysis of the performance of cassava clones for dry matter and total carotenoids at the seedling nursery and clonal stages of breeding

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INTRODUCTION

Global efforts are underway to biofortify cassava (*Manihot esculenta* Crantz) with provitamin A carotenoids to help combat dietary vitamin A deficiency afflicting the health of more than 500 million resource-poor people in Sub-Saharan Africa. To further the biofortification initiative in Nigeria, To leverage vitamin A deficiency (VAD) afflicting more than 500 million people in SSA alone, a novel effort referred to as HarvestPlus Challenge Program was initiated to biofortify staple crops (Mayer *et al.* 2008).

OBJECTIVES

Comparative analysis was conducted to estimate the performance of provitamin A clones for dry matter content (DMC) and total carotenoid content (TCC) at seedling nursery and clonal stages in cassava roots

MATERIALS AND METHODS

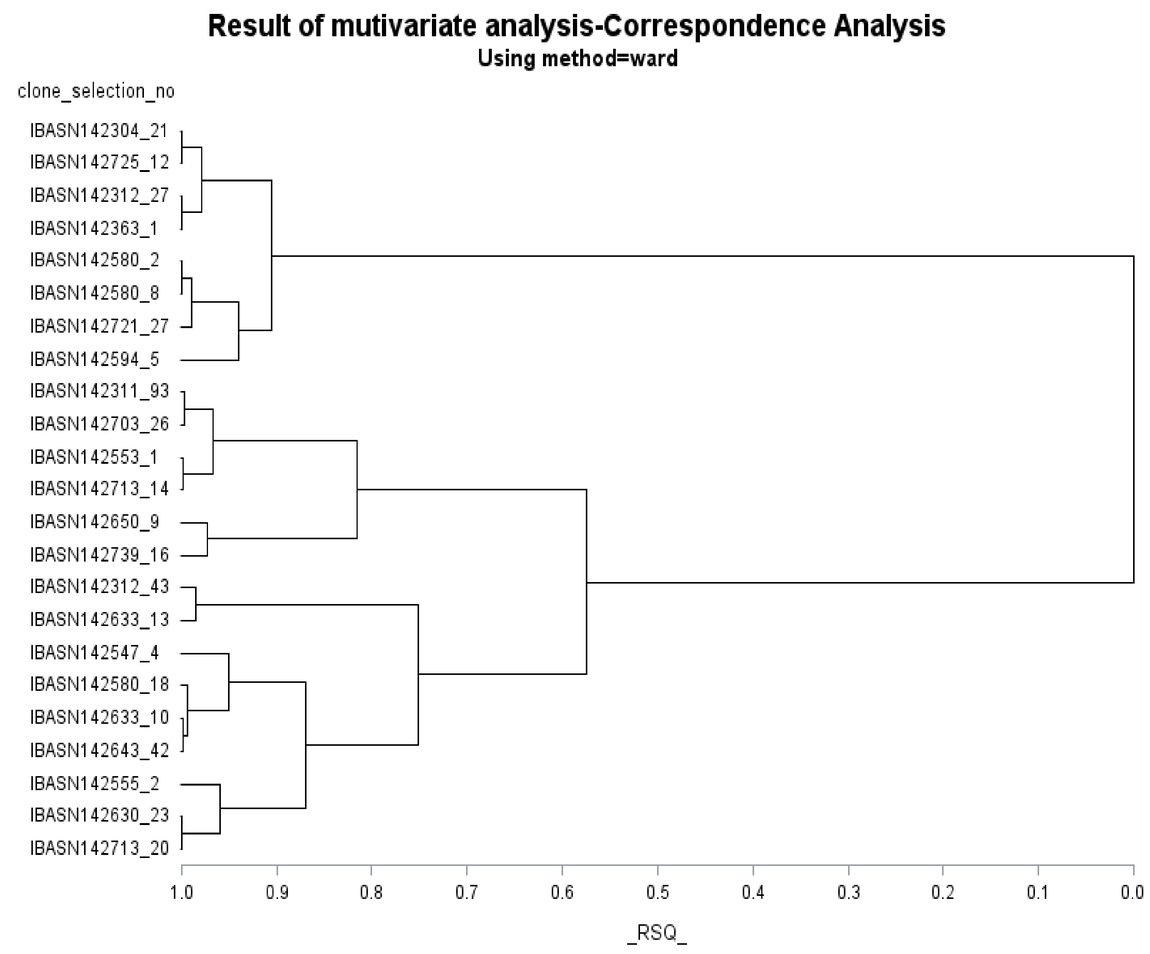
The study was conducted at the International Institute of Tropical Agriculture (IITA), Ibadan, Oyo State.This research is a product of 2015 seedling nursery and 2016 clonal trials at International Institute of Tropical Agriculture (IITA). The trial consisted of 295 plants selected 23 clones for DM and for TC. Traits evaluated included; DM and TC as detected by iCheck™ analysis

Augmented Design is used for this experiment with no replicate. respectively, Matured 25 cm stake were planted in a row of seven plant per plot at a spacing of 1m x 0.8m for clonal and for seedling nursery is per family with spacing of 1m x 0.25m. Plants were harvested at approximately 10 months after planting (10MAP), following local crop management practices and breeding program procedures.
Data collected were analysis using Cluster and Pearson correlation in SAS was carried out on total carotene concentration and dry matter content.

Table: 1: Pearson correlation coefficient for TC seedling and TC clonal

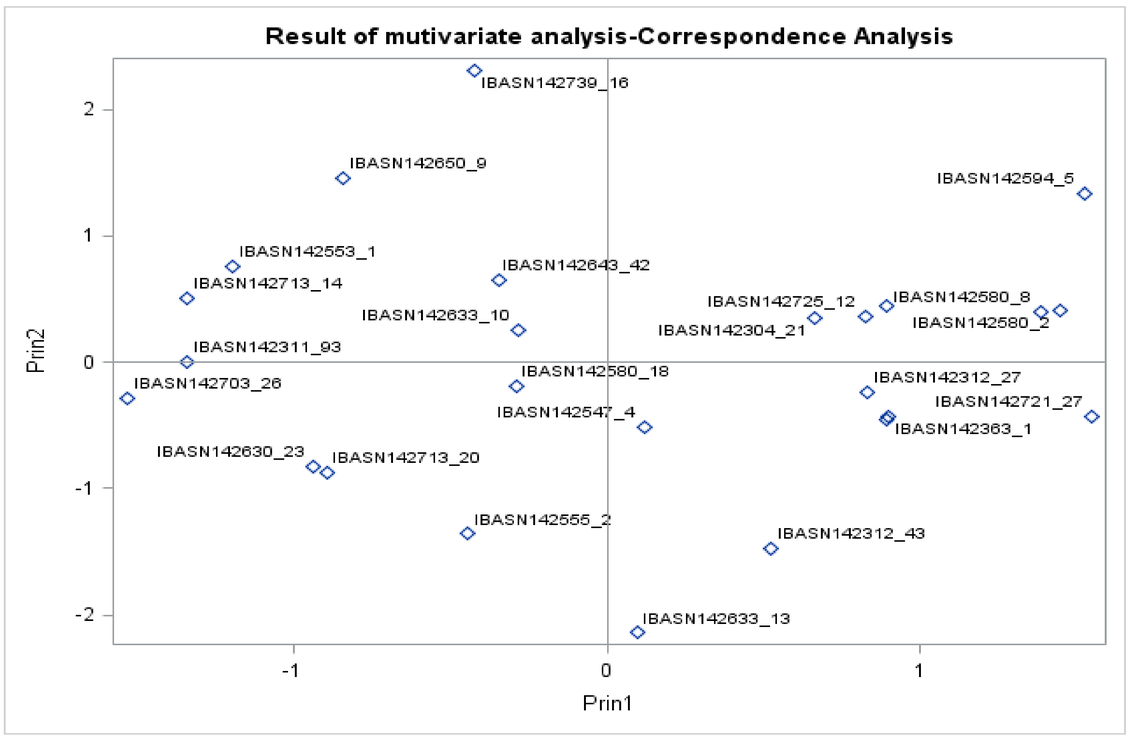
	TC seedling	TC clonal
TC seedling	1.00	0.59
TC clonal	0.59	1.00

Significant probability different = 0.0029
Pearson correlation coefficient for TC seedling and TC clonal (0.59) perfect positive relationship.



RESULTS

Results obtained revealed that there is a highly significant difference between the seedling nursery and clonal stage.



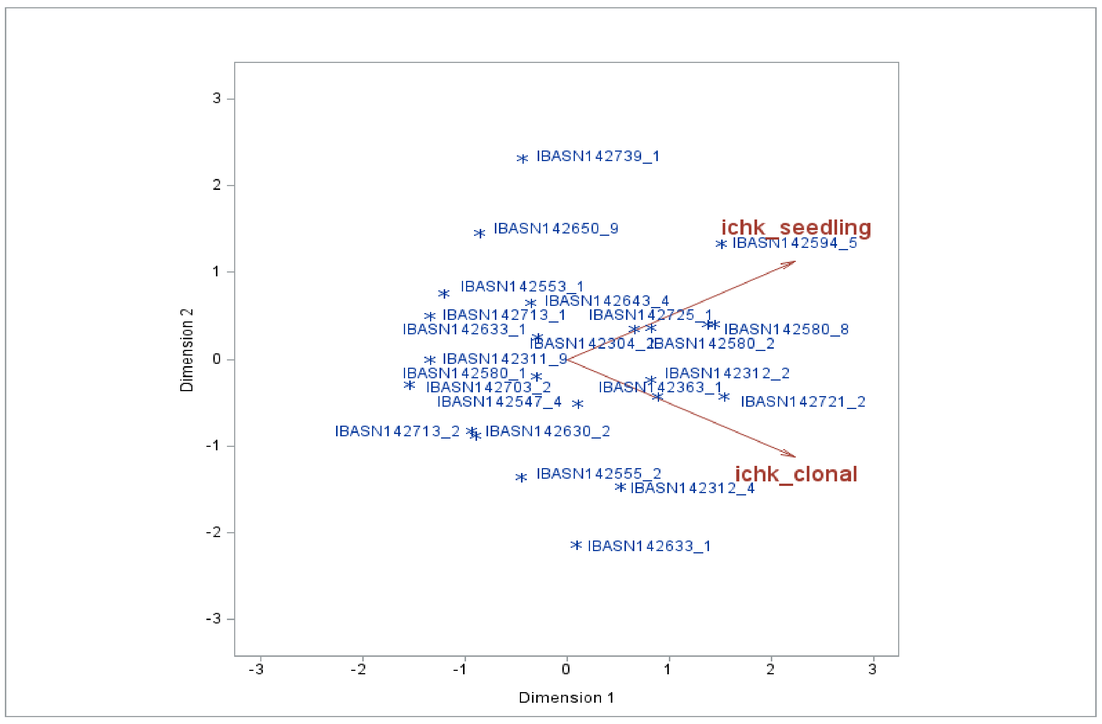


Table 2; Pearson correlation coefficient for Drymatter seedling and Drymatter clonal

	Dm seedling mean	Dm clonal mean
Dm seedling mean	1.00	0.58
Dm clonal mean	0.58	1.00

Significant probability different = <0.001
Pearson correlation coefficient for Drymatter seedling and Drymatter clonal (0.58) perfect positive relationship.

Table: 3: Mean and Standard deviation of Drymatter and Total Carotenoids at the seedling and clonal stages

	Mean	Std.	Min	Max
Dm seedling	32.27	5.26	14.20	44.36
Dm clonal	37.06	4.96	23.80	49.00
TC seedling	6.69	3.47	1.49	13.50
TC clonal	7.71	3.68	2.49	13.50

Conclusions: Correlation coefficient value showed that there is perfect positive relationship between the seedling nursery and the clonal evaluation with the respect to total carotenoids and dry matter content. It is this genetic information that guides breeders to deploy appropriate methods for crop improvement (Acquaah 2012, Nduwumuremyi *et al.* 2013) and information about their mode of inheritance helps breeders to use methods that increase genetic gain[1,2]

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