



Tropentag, September 16-18, 2015, Berlin, Germany

“Management of land use systems for enhanced food security:
conflicts, controversies and resolutions”

Aeroponics System: an Effective High Ratio Seed Yam Propagation Technology

NORBERT MAROYA¹, MORUFAT BALOGUN^{2,1}, BEATRICE AIGHEWI¹, ROBERT ASIYEDU¹

¹*International Institute of Tropical Agriculture (IITA), Nigeria*

²*University of Ibadan, Nigeria*

Abstract

Yams (*Dioscorea* spp) are traditionally propagated by tuber with very low multiplication rate (less than 1:10 compared to 1:200 in some cereals). The use of the edible tubers, for propagation makes seed yam scarce and very expensive. Many methods for high ratio propagation were developed these included the “minisetts technique” generating up to 30 setts per tuber of 1kg; the vine cutting multiplication technique with up to 60 vines of one node per plant, the temporary immersion bioreactor system with well-developed tissue culture plantlets up to 100 per container fully developed in 6–8 weeks. In comparison to these methods the aeroponics system that has been applied successfully by the International Institute of Tropical Agriculture for seed yam, has shown more advantages in terms of type and quantity of planting materials (tubers, bulbils and vines) generated. The basic principle of Aeroponics technology is to grow plants in a closed or semi-closed environment by spraying the plants’ roots with a nutrient rich solution. The most important yams species used as foods *D. rotundata* (white yam), *D. alata* (water yam) and *D. cayenensis* (yellow yam), *D. dumentorum* (bitter yam), *D. bulbifera* (bulbil yam) were tested soilless aeroponics. Only vines of *D. dumentorum* did not grow. Vines of all the other 4 species grew profusely, developing good plants. *D. bulbifera* grew for more than 4 months and produced small bulbils before senescence. *D. cayenensis*, *D. alata* and *D. rotundata* are growing like perennial crops in aeroponics. These three species grew for 9, 21 and 28 months, respectively, in aeroponics. The vines of these species originating from field plants grow slowly in aeroponics but vines issued from plants in aeroponics produced roots and shoots easily in soil, sand, carbonized rice husk. Plants in aeroponics offered 3 different types of planting materials: tubers every 3 to 5 months, bulbils regularly starting in the second month and vine cuttings after establishment of canopy. The highest number of harvested materials was 3 tubers per plant ranging from 1 to 6. The tuber mass harvested in aeroponics ranged from 0.1 to 326 g/plant and up 40 bulbils (shoot born tubers) per plant at one harvest. Vines generated ranged from 110 to 300/plant with an average rooting of 99%, of these 93.4% to 96.4% (mean 95.1%) developed into normal plants.

Keywords: Bulbils, clean planting material, propagation ratio, vine cutting