

**NOMINATION OF A NEW *DIOSCOREA ALATA* VARIETY FOR NAMING,
REGISTRATION AND RELEASE IN NIGERIA**

Obidiegwu JE¹, Asfaw A², Oselebe H³, Lopez-Montes A², Nwachukwu EC¹, Agre P², De
Koeyer D², Adebola P², Asiedu R²

¹National Root Crops Research Institute Umudike, Nigeria

²International Institute of Tropical Agriculture Ibadan, Nigeria

³Ebonyi State University Abakaliki, Nigeria

Introduction

Dioscorea alata L. (water yam) is the most widely distributed cultivated *Dioscorea* species in the world (Marcos et al 2011). It is superior to most edible, cultivated yam species due to its potential to yield under low to average soil fertility, ease of propagation, early vigour for weed suppression, and low post-harvest losses (Mignouna et al 2002). Studies have also shown that *D.alata* has higher moisture content, ash, fibre, protein, fat, amylose fraction and total sugar when compared to another major yam specie in Africa, the White Guinea yam (Lim, 2016).

Yams are a major staple and contribute significantly to food security and income generation in tropical and subtropical countries across Africa, the Caribbean, South America and South-east Asia. However, West Africa remains the most important yam producing region, accounting for over 90% of the worlds' yam (FAOSTAT, 2018), with Nigeria leading at 47.532,615 metric tonnes. For millions of people, the crop commands enormous nutritional and cultural significance (Obidiegwu et al, 2017), contributing more than 200 dietary calories per person each day. Sixty eight percent of those who cultivate yam as a primary means of livelihood belong to the poorest income group with daily household expenditure under \$2.30 or \$0.50 per person. (Agbaje et al., 2005). Positioning yam to have a greater role for sustainable food/nutrition security and poverty alleviation can be achieved by the development and deployment of more productive, resilient and consumer preferred varieties through rigorous on-station and on-farm testing. We envisage achieving the following output with our nomination of new improved water yam variety for commercial production in Nigeria:

1. Increased availability of productive and preferred varieties that is approved and eligible for seed multiplication and marketing in the country
2. Increased choice of improved yam varieties for growers and consumers, thus, contributing to better food and income security in the country.

CANDIDATE PEDIGREE

We have developed a *D. alata* clone that have the potential to be released as new variety. The candidate clone **TDa1100432** is a progeny of a female parent TDa0500122 with an unknown male parent or pollen source (half-sib breeding clone developed from open pollen botanical

seed originated from female flower parent TDa0500122). The female parent is tolerant to anthracnose, smooth and cylindrical tuber shape and a slow rate of oxidization. The candidate clone has passed through many evaluation stages including the early clonal stages, preliminary yield trials, advanced yield trials, uniform yield trials. Early selection criteria were based on vigour, pests and disease resistance, tuber shape, tuber flesh colour and non-oxidation.

A. General Descriptors

1. Species: *Dioscorea alata*
2. Name of variety: UMUDa31 (wonder)
3. Old name: **TDa1100432**
4. Origin/Source: IITA Nigeria
5. Type of variety: Clone
6. Pedigree: TDa0500122 x unknown male (generated via open pollinated seeds)
- 7a. Name and address of developing Organization: National Root Crops Research Institute Umudike, Abia State, Nigeria and International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria
- b. Name and address of releasing Organization: National Root Crops Research Institute Umudike, Abia State,
- c. Breeders: Obidiegwu J.E., Oselebe H., Asfaw A., Asiedu R., Lopez-Montes A., De Koeyer D., Adebola P., Agre P.
- d. Collaborating scientists: Nwadili, C., Edemodu A., Okereke, N.R., Ofeze M., Nnabue,I., Dixon M
8. Morphological characteristics: Cordate broad leaf shape with acute apex, square stem cross-section shape at base, no spines or thorn on vine base, green petiole color with purple base, aggressive climber, and elongated cylindrical tuber shape
9. Adaptation: Rain Forest and Derived Savanna ecologies
10. Days to Maturity: 270 – 300
11. Potential Yield (t/ha): 43 t/ha
12. Pest/Disease reaction: Tolerant to anthracnose
13. Outstanding characteristics: Slow rate of oxidization (browning) and high dry matter content
14. Nutrient content: Ash (2.5%), Fat(0.4%), Protein (5.7%), Crude Fibre, Carbohydrate () (1.6%), dry matter content (30.3)
15. Year of release:

B. Specific Descriptors

1. Young vine colour: Light green
2. Mature vine colour: Green
3. Leaf blade: Non-serrated
4. Petiole colour: Green with purple base
5. Twining: Anti-clockwise
6. Type of flower present: female
7. Tuber shape: Cylindrical
8. Corm size: intermediate
9. Roots on tuber: None
10. Spines on tuber: None
11. Hairs on tuber: None
12. Tuber skin surface: Smooth
13. Tuber skin colour: Dark brown
14. Tuber fresh colour: Creamy white
15. Tuber cut surface oxidation: No oxidation
16. Water/gummy exudates: None
17. Dry matter (%): 30
18. Starch yield (%): 77.35
19. Flour yield (%): 23.46
20. Acceptability: very high (6.5 on a 7-point scale)

Variety	Young leaves	Older leaves	Petiole Characteristics	Vine characteristics
TDa1100432				
Cylindrical shape	Pale green	green	All green	Green wing color, high climber

References

- Agbaje G.O., Ogunsumi L.O., Oluokun J.A. and Akinlosotu T.A.. (2005). Survey of yam production system and the impact of government policies in southwestern Nigeria. *Journal of Food, Agriculture and Environment* 3, 222–229.
- Asfaw, A. (2016). SOP for Yam Variety Performance Evaluation Trial. 10.13140/RG.2.1.3656.4887
- FAO, 2018. <http://www.fao.org/faostat/en/>
- Lim, T. K. (2016). *Dioscorea rotundata*. Edible Medicinal and Non-Medicinal Plants. Springer, Dordrecht.
- Marcos J., Cornet D., Bussiere F. and Sierra J. (2011). Water yam (*Dioscorea alata* L.) growth and yield as affected by the planting date: Experiment and modelling. *European Journal of Agronomy*. 34, 247-256.
- MEDA, 2011. Ghana yam market, subsector and value chain assessment. Mennoite Economic Development Associated (MEDA), Canada. 71pp.
- Mignouna H.D, Abang M.M, Onasanya A, Asiedu R. (2002) Identification and application of RAPD markers for anthracnose resistance in water yam (*Dioscorea alata*). *Annals of Applied Biology* 141:61–66
- Obidiegwu, J. E. and Akpabio, E. M. (2017). The geography of yam cultivation in southern Nigeria: Exploring its social meanings and cultural functions. *Journal of Ethics Foods*, 4, 28-35
- R Core Team (2019). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. <https://www.R-project.org/>