

Progress Review and Work Plan

Jude Obidiegwu

National Root Crops Research Institute Umudike Nigeria

16th September 2022

Primary Outcome 1. Enhanced capacity for more efficient and effective yam breeding in NRCRI Nigeria



Mr Jerry Nwogha: PhD Candidate at Jimma University, Ethiopia

Course of study: Plant breeding

Project topic: Metabolomics and transcriptomics profiling of genes implicated in tuber dormancy regulation in white yam (*Dioscorea rotundata* poir)

Mrs Eluwa Eunice: PhD Candidate at Michael Okpara University of Agriculture, Umudike

Course of study: Plant breeding and genetics.

Project topic: Agro-morphological and Molecular characterization of some *Dioscorea bulbifera*





Mr Anthony Udeagbara: MSc. Candidate at Michael Okpara University of Agriculture, Umudike.

Course of study: Plant breeding and genetics.

Project topic: Profiling of Nigerian yam landraces using morphological, genetic and postharvest markers.

Mr Paul Umezinwa: MSc. Candidate at University of Nigeria, Nsukka.

Course of study: Plant Genetics and Breeding.

Project topic: Morphological and food quality evaluation of some advanced yam breeding clones.



Training/Meeting

- AfricaYam/RTBfoods training on yam quality evaluation- ***3 personnel attended***
- Data collection and analysis training organized for NRCRI yam breeding team
- Team building workshop
- Product advancement workshop

Conferences/workshops presentation (2021)

- On farm evaluation of pre-released water yam (*Dioscorea alata*) genotypes for farmer preferred sensory and tuber qualities. – *Okereke et al.*
- Functional qualities of bitter Yam (*Dioscorea dumetorum*): A Review. – *Ano et al.*
- Assessment of formal seed yam system in Abia state: A value chain thinking approach. – *Nwaekpe et al.*
- On-farm evaluation of selected pre-release white yams (*Dioscorea rotundata*) genotypes for disease resistance and agronomic performance in some Nigeria agro-ecozones. – *Nwadili et al.*
- Evaluation of selected pre-release water yam (*Dioscorea alata*) genotypes for disease resistance and agronomic performance in some Nigeria agro-ecozones. – *Nwadili et al.*

Establishment /Installation of Semi-Autotrophic Hydroponics (SAH) infrastructure

- The facility for Semi-Autotrophic Hydroponics (SAH) for yam at NRCRI, Umudike has completed and commissioned by the management.



Semi-Autotrophic Hydroponics (SAH) building at NRCRI, Umudike.

Status of traditional yam barn



NRCRI, Umudike Traditional yam barn is still maintained

Status of modern yam barn



Back view



Front view

Status of screen houses

- Reinforcement of foundation edges
- Renetting of damaged areas
- Re-roofing of the entire screen house



Exchange visits

- AfricaYam in NRCRI hosted a number of work partners in the year 2021/2022
- Dr. Agrey Paterny and Mr. Alex Edemodu visited for inspection and sample collection.
- Our field trials in Umudike and Akwa Ibom states were visited.



Primary Outcome 3. Next-generation of superior yam varieties for traditional and emerging products/markets.

Analysis of farmers' preferred yam attribute

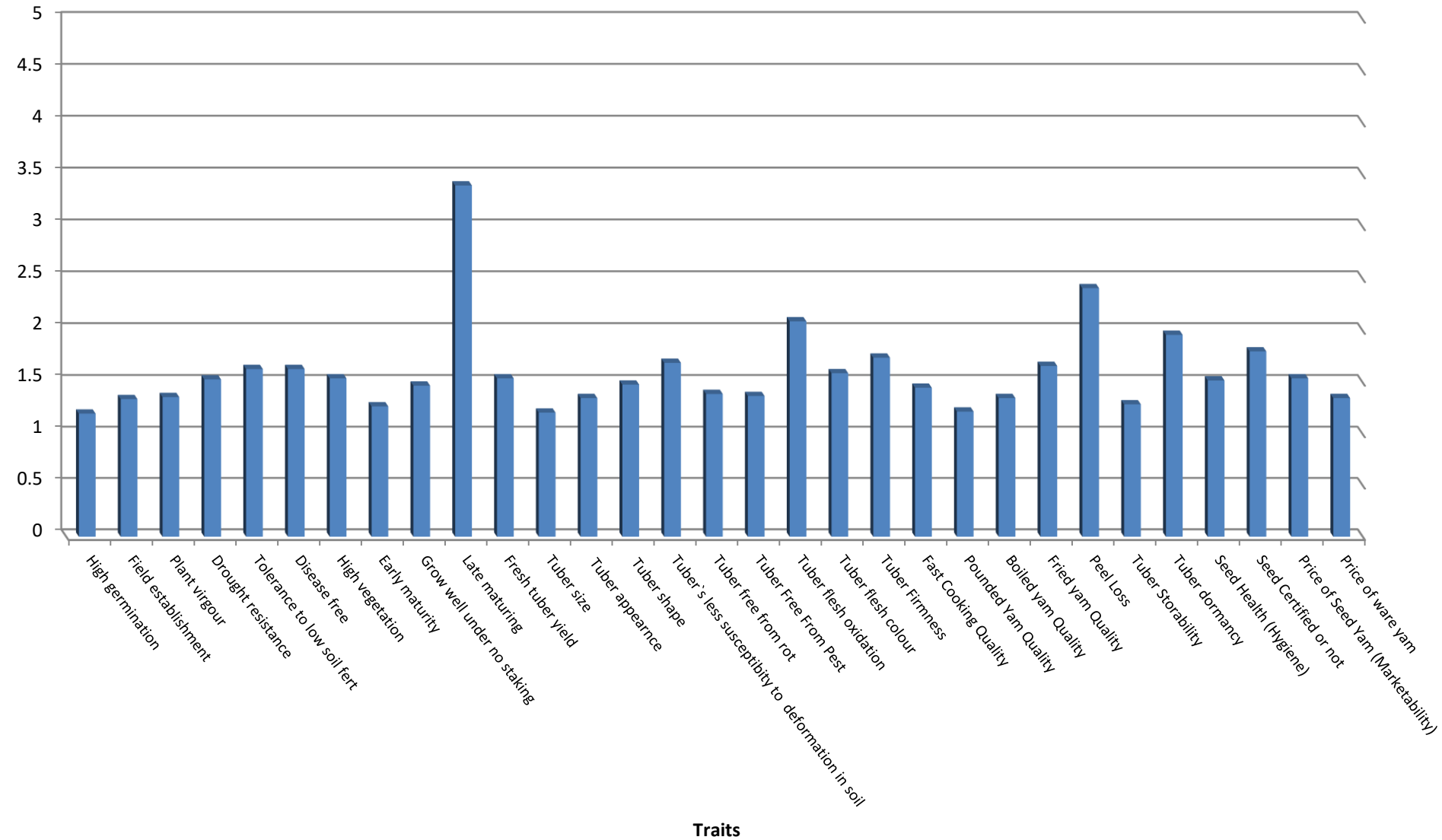
A household survey was conducted in Nigeria as part of the deliverables

The survey was designed to elicit information from farmers on preferred yams and attributes

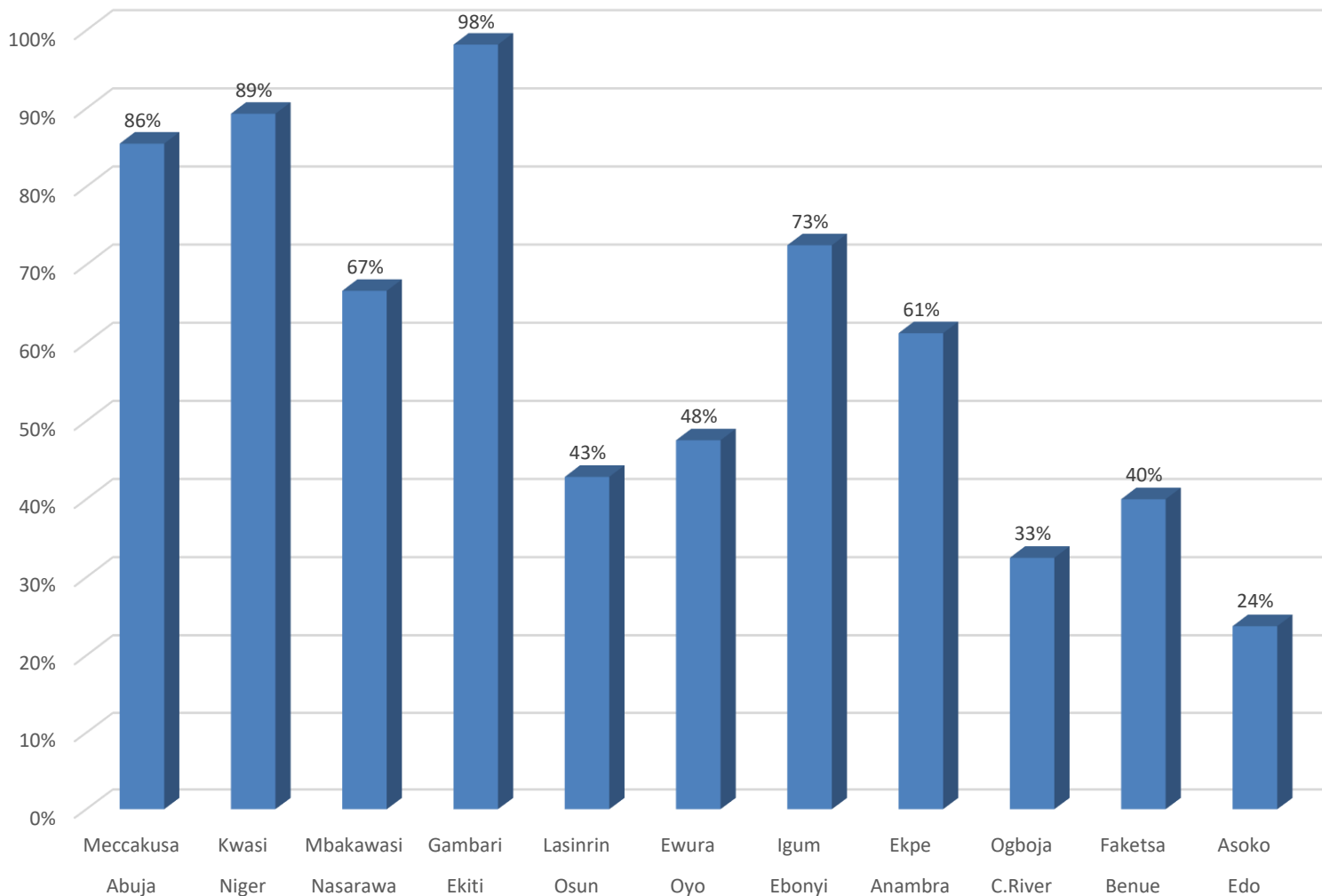
A multi-stage random sampling technique was adopted in selecting the farming households from the ten states namely Anambra, Ebonyi, Cross River, Edo , Benue , Oyo, Ekiti, Osun, Nasarawa, Abuja and Niger.

Eighty (80) households were sampled per state

Trait perceptions



Most preferred cultivars across sampled states



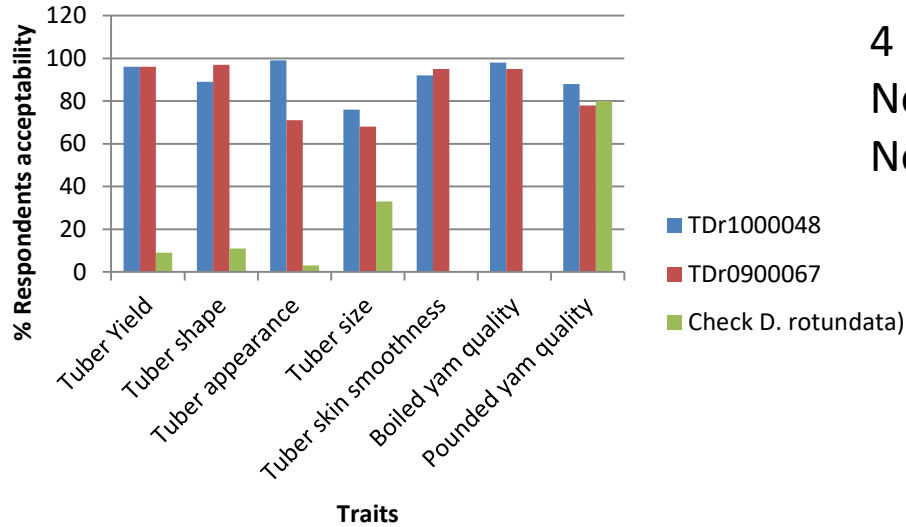
Demand Creation Trial

D. rotundata

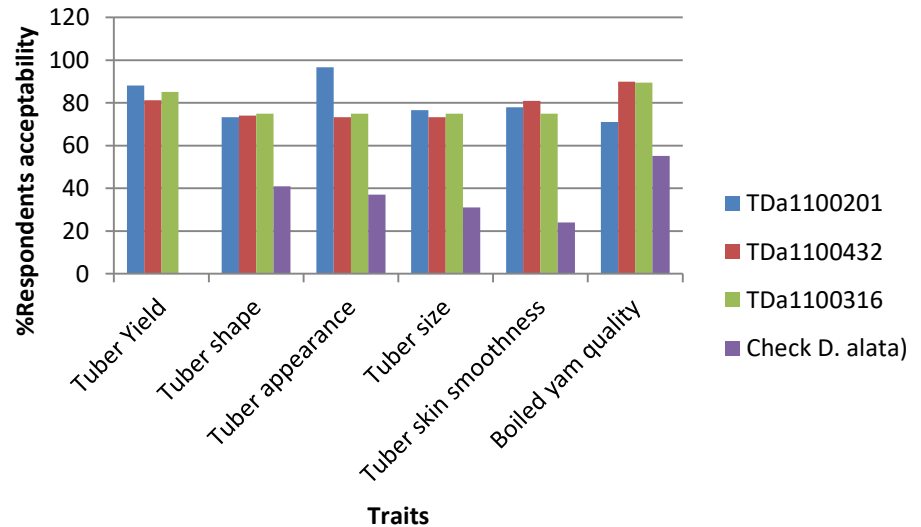
4 locations= *Umudike, Uyo, Igbariam, Otobi*

No of farmers = **100**

No varieties = **5**



D. alata



Visit to DCT trial sites



Summary of *D. rotundata* of crossing blocks

Parents	No. of pollination	Date pollinated	No. of fruits set	No. of fruits harvested	No. of seeds obtained
TDr 99/00917 x TDr 1100497	212	11/08/2021	41	41	144
TDr 95/119158 x TDr 1100163	192	14/08/2021	33	27	132
TDr 00003 x TDr 07/0405	183	05/08/2021	9	7	86
TDr 9700917 x TDr Ekpe	313	18/08/2021	20	19	56
TDr 10/00021 x TDr 07/0405	214	20/08/2021	27	26	121
TDr 11/00396 x TDr Fakesta	92	21/08/2021	15	14	77
TDr 1000016 x TDr 1100497	99	27/08/2021	21	21	104
TDr 11/00873 x TDr 1100421	252	28/08/2021	30	30	63
TDr 11/00582 x TDr Fakesta	217	08/08/2021	11	10	94

***D. rotundata* crossing block**



Summary of *D. alata* crossing block

SN	Parents	No. of pollination	Date pollinated	No. of fruits set	No. of fruits harvested	No. of seeds obtained
1	TDa 05/00793 x TDa 0200012	305	09/10/2021	36	36	129
2	TDa 01/00003 x TDa 1100010	204	18/10/2021	14	14	37
3	TDa 00/00194 x TDa 9900048	167	02/10/2021	18	18	83
4	TDa 11/00245 x TDa 11/00204	301	16/10/2021	27	26	28
5	TDa 99/000240 x TDa Sakata	135	12/10/2021	12	9	44
6	TDa 05/00015 x TDa 0100039	232	11/10/2021	14	11	50
7	TDa 1401003 x TDa Sakata	276	30/10/2021	9	9	46
8	TDa 00005 x TDa 0100039	238	05/10/2021	14	12	32
9	TDa 140100 x TDa 02/00061	208	17/10/2021	10	10	42

Seedling Nursery Evaluation In Screenhouse

S/N	Parents	No. Planted	No. Germinated	No. Survived	No. Harvested
<i>D. alata</i>					
1	TDa 99/00240 x TDa 01/00061	65	61	56	52
2	TDa 99/00240 x Sakata	20	17	2	2
3	TDa 99/00240 x TDa 11/00204	38	26	20	20
<i>D. rotundata</i>					
1	TDr 97/00917 x TDr 14/01317	33	19	2	2
2	TDr 11/00163 x TDr Fakesta	101	82	45	37
3	TDr 97/00917 x TDr 07/0145	50	31	19	16
4	TDr 1000459 xTDr 0710405	42	19	7	4
5	TDr 99/00240 x TDr 10360	30	11	3	3
6	TDr 1401593 x TDr 89/0405	21	8	2	2
7	TDr 1401593 x TDr Fakesta	40	16	7	3
8	TDr 3010 x TDr 1500100	70	52	26	18
9	TDr 3010 x TDr 1500135	49	34	17	17
10	TDr 3010 x TDr 150031	72	47	40	32
11	TDr 3010 x TDr 1500043	55	39	12	19
12	TDr 2826 x TDr 1500096	76	50	20	14
13	TDr 97/00917 x TDr Fakesta	30	18	5	2
14	TDr 99/00240 x TDr 1100360	22	5	1	0
Total		814	532	284	243



Overview of open pollinated seed nursery

S/N	Parents	No. Planted	No. Germinated	No. Survived	No harvested
<i>D. rotundata</i>					
1	TDr 1400158	28	14	1	1
2	TDr 09000	36	16	4	3
3	TDr 10/00021	17	9	1	0
4	TDr 10/00344	24	12	5	5
5	TDr Giwa	51	46	32	27
6	TDr Anyamayon	25	14	3	1
7	TDr Amola	92	77	45	33
<i>D. alata</i>					
8	TDa 1100432	46	24	6	4
9	TDa 000317	46	31	7	5
Total		365	243	104	79



Clonal evaluation of *D. rotundata* candidates

- Three hundred and seventy six (376) clones of *D. rotundata* weighing 20grms were all planted in an unreplicated trial at the NRCRI experimental field.
- The planting date - 6 June, 2021
- These clones were planted one per stand at 25cm X 25cm. All the agronomical practices were done.
- The plants were phenotyped for plant vigor, tuber yield, tuber shape, tuber colour and reactions to disease
- **68 clones** which represented 18.09% were selected for PPT.

Clonal evaluation of *D. alata* candidates

- Seventy (70) *D. alata* weighing 20grms were all planted in an unreplicated trial at the NRCRI experimental field.
- The planting date – 10 June 2021
- These clones were planted one per stand at 25cm X 25cm. All the agronomical practices were done.
- The plants were phenotyped for plant vigor, tuber yield, tuber shape, tuber colour and reactions to disease
- **41 clones** representing 58.6% were advanced

Overview of preliminary performance trial of *D. alata* clones

- Sixty four (64) genotypes of *D. alata* were planted in NRCRI, Umudike
- Each genotype was planted in a plot of 2m x 3m comprising 6 stands per plot with a spacing of 0.5m x 1m.
- The yams were phenotyped for stand count, plant vigour, yam anthracnose disease, yam mosaic disease, tuber yield, tuber shape, dry matter, tuber oxidation, tuber colour, and reaction to post-harvest diseases.
- **30 *D. alata*** clones selected from 64 accessions planted in 2021 cropping to be advanced to AYT

Overview of preliminary performance trial of *D. rotundata* clones

- Fifty four (54) genotypes of *D. rotundata* were planted in NRCRI, Umudike
- Each genotype was planted in a plot of 2m x 3m comprising 6 stands per plot with a spacing of 0.5m x 1m.
- The yams were phenotyped for stand count, plant vigour, yam anthracnose disease, yam mosaic disease, tuber yield, tuber shape, dry matter, tuber oxidation, tuber colour, and reaction to post-harvest diseases.
- **30 *D. rotundata* clones** selected from 54 clones planted in 2021 cropping to be advanced to APT

Multi locational trial (MLT1,MLT2,MAFF) of *D. rotundata* in 2021

- Fourteen (14) genotypes comprising of pre-release *D. rotundata* and *D. alata* genotypes and two checks (one national and one local) were planted Umudike, Uyo, Igbariam and Nsukka.
- The trials were planted on 23rd April, 2021 in Umudike, 4th May, 2021 in Essien Udim, 10th June, 2021 in Igbariam, and 20th May, 2021 in Nsukka.
- The trial was laid out in RCB design with three replications.
- The dimension of the experimental area in each of the location was 32mx26m (832m²) with 48 plots.
- Each replicate contains 16 plots representing 16 *D. rotundata* genotypes.
- Forty eight planting yam setts each weighing 150g per set was cut from each genotype and planted in the three replicates with a spacing of 1 m x 1 m
- All necessary cultural practices were carried out.

Yield (t/ha) of *D. rotundata* clones in 2021 MLT1 across locations

Genotypes	Akwa Ibom	Igbariam	Nsukka	Umudike	Mean
TDr0900135	17.17	20.83	16.57	15.80	17.59
TDr0900295	19.30	21.07	22.00	19.53	20.48
TDr1000021	16.87	19.27	20.83	17.07	18.51
TDr1100055	15.80	19.90	21.50	19.17	19.09
TDr1100128	20.10	24.93	21.00	18.27	21.08
TDr1100180	16.50	22.63	22.67	16.67	19.62
TDr1400158	16.37	23.43	18.70	17.53	19.01
TDr1400359	16.60	23.10	22.30	18.87	20.22
TDr1400537	19.90	24.63	20.53	18.17	20.81
TDr1400766	20.27	23.27	17.57	18.03	19.79
TDr1401161	16.50	22.23	22.93	16.73	19.60
TDr1401220	20.33	19.97	18.77	18.03	19.28
TDr1401593	17.83	26.97	22.43	18.40	21.41
TDr1401785	18.63	18.60	20.33	15.83	18.35
TDr8902665	21.03	24.00	24.80	15.93	21.44
TDrMeccakusa	19.60	19.27	19.97	17.80	19.16
HSD	6.48	7.47	6.78	2.71	
CV(%)	33.97	24.36	25.43	37.31	

Yield (t/ha) of *D. rotundata* materials in 2021 MLT2 across locations

Genotypes	Igbariam	Nsukka	Umudike	Mean
TDr0700588	17.57	16.57	18.00	17.38
TDr0900013	16.93	16.07	17.10	16.70
TDr0900122	20.33	19.40	20.77	20.17
TDr0900263	18.30	17.33	17.47	17.70
TDr1000412	18.67	17.17	16.27	17.37
TDr1000605	24.20	19.73	16.77	20.23
TDr1000793	18.70	17.25	15.25	17.07
TDr1001012	18.30	19.67	17.73	18.57
TDr11000793	20.30	14.30	15.20	16.60
TDr1100490	19.10	18.10	15.63	17.61
TDr1301524	21.00	19.63	15.40	18.68
TDr1301550	18.70	17.60	17.13	17.81
TDr1301556	15.00	18.53	17.20	16.91
TDr1401161	17.83	23.27	15.93	19.01
TDr14012120	17.30	18.40	14.40	16.70
TDr1401220	17.65	17.85	16.95	17.48
TDr8902665	21.17	17.53	18.00	18.90
TDrOjuiyawo	14.53	21.00	15.07	16.87
HSD	5.88	4.32	5.76	
CV(%)	29.21	36.79	47.28	

Yield (t/ha) of *D. rotundata* materials in 2021 MLT3 across locations

Genotypes	Igbariam	Nsukka	Umudike	Mean
TDr15000031	17.67	20.67	19.47	19.27
TDr15000035	20.07	17.83	17.70	18.53
TDr15000039	18.10	17.17	19.80	18.36
TDr15000042	16.80	17.67	18.30	17.59
TDr15000043	19.00	18.33	22.23	19.85
TDr15000051	16.50	17.50	20.53	18.18
TDr15000052	17.90	16.67	18.00	17.52
TDr15000054	16.67	14.17	17.17	16.00
TDr15000096	17.70	18.87	18.63	18.40
TDr15000100	17.53	19.17	17.57	18.09
TDr15000101	19.33	19.33	18.47	19.04
TDr15000116	18.20	18.00	21.37	19.19
TDr15000128	17.87	18.67	24.23	20.26
TDr8902665	17.67	15.83	17.10	16.87
TDr9518544	15.07	17.23	16.67	16.32
TDrOjuiyawo	19.47	15.83	21.27	18.86
HSD	5.21	ns	7.31	
CV(%)	26.41	35.46	46.75	

Yield (t/ha) of *D. alata* materials in 2021 MLT4 across locations (RVT)

Clones	Akwa Ibom	Igabriam	Nsukka	Umudike	Mean
TDa0000194	17.70	22.38	21.45	17.30	19.71
TDa1506142	19.40	23.60	25.95	20.15	22.28
TDa1508044	22.05	31.35	28.45	19.15	25.25
TDa1510010	20.20	26.15	29.35	19.50	23.80
TDa1510043	24.75	29.95	26.00	16.15	24.21
TDa1510080	16.40	18.81	29.50	16.55	20.32
TDa1510119	18.45	22.28	38.25	18.80	24.45
TDa1510152	17.50	22.68	23.35	18.05	20.40
TDa1511008	24.65	30.00	33.25	17.85	26.44
TDa1515030	18.30	21.80	33.95	17.50	22.89
TDa1515032	20.05	21.25	19.85	19.60	20.19
TDa1520002	18.85	21.82	28.75	20.20	22.41
TDa1520008	19.65	25.80	25.00	17.10	21.89
TDa1520009	17.80	24.90	44.40	19.35	26.61
TDa1520050	16.30	19.15	33.80	16.40	21.41
TDagborogboro	17.60	19.84	18.40	19.25	18.77

Yield (t/ha) of *D. alata* clones in 2021 MLT5 across locations

Genotypes	Akwalbom	Igabriam	Nsukka	Umudike	Mean
TDa0000194	15.40	27.40	32.80	33.17	27.19
TDa1100224	18.53	30.53	30.40	30.17	27.41
TDa1100247	17.87	29.87	30.67	34.33	28.19
TDa1100250	21.20	33.20	31.40	31.00	29.20
TDa1100374	19.70	31.70	24.23	27.17	25.70
TDa1400301	16.00	28.00	36.67	32.67	28.34
TDa1401253	20.07	32.07	38.00	22.00	28.04
TDa1412030	16.43	28.43	26.60	22.67	23.53
TDa1415201	17.17	29.17	26.17	23.83	24.09
Gborogboro	24.77	36.77	17.60	19.83	24.74
HSD	ns	10.45	ns	15.49	
CV(%)	33.05	20.71	53.55	34.85	

Advancement of **TDr1401220**, **TDr1400158**
and **TDa1100374** for on-farm trials

Yield of candidate *D.alata* clones across locations

Clone	ABAKA	ABJ	IBN	IGB	Igbaria	IGBETI	IGHOH	IKENNE	KIS	KOGI	NSUKK	UBJ	UM	UYO	Mean
Local	14.4	7.6	16.8	5.4	5.6	8.4	8.4	19.9	5.9	11.3	7.8	5.4	12.8	10.2	10.0
TDa000															
0194	19.4	13.3	31.0	14.8	20.8	30.0	20.1	22.6	17.8	14.8	21.2	16.0	21.2	9.1	19.4
TDa110															
0224	24.0	14.8	34.0	4.4	18.4	26.8	15.2	26.9	21.5	13.5	18.2	21.6	20.6	10.7	19.3
TDa110															
0247	18.8	17.3	31.1	12.8	18.7	17.8	16.9	25.4	16.7	14.2	22.3	15.0	20.3	9.3	18.3
TDa110															
0250	18.5	16.7	37.4	19.8	19.4	28.4	16.0	25.7	15.3	15.8	19.0	17.5	19.2	13.6	20.2
TDa110															
0374	24.5	18.7	41.3	14.7	12.2	29.9	14.1	26.0	20.6	16.6	15.2	18.2	19.6	12.6	20.3
TDa140															
0301	16.4	17.4	33.3	15.5	24.7	31.2	16.5	24.5	24.2	18.5	20.7	20.4	28.3	12.9	21.8
TDa140															
1253	22.0	21.9	35.5	15.1	26.0	26.5	13.7	31.7	18.4	14.6	10.0	31.6	33.4	12.2	22.3
TDa141															
2030	19.5	11.6	28.3	8.4	14.6	23.4	12.8	21.1	12.6	14.4	10.7	10.2	14.4	8.6	15.0
TDa141															
5201	19.7	6.9	27.7	16.0	14.2	24.3	13.4	16.6	18.0	20.8	11.8	10.9	6.7	8.1	15.4
Mean	19.7	14.6	31.7	12.7	17.5	24.7	14.7	24.0	17.1	15.4	15.7	16.7	19.6	10.7	
HSD	ns	ns	15.0	11.0	10.5	16.1	13.3	8.9	13.6	ns	ns	16.5	11.5	ns	
CV(%)	35.9	77.9	30.9	30.0	20.7	22.6	47.1	24.1	24.0	45.6	53.6	64.4	38.1	59.0	

Post harvest assessment of *D.alata* candidate clones

Clones	DMC	OXBI	Boiled	Pounded
Local	30.9	0.0	3.8	3.6
TDa0000194	30.2	0.2	3.1	3.1
TDa1100224	28.1	0.4	1.7	1.7
TDa1100247	29.7	0.2	3.7	4.0
TDa1100250	34.0	0.2	2.4	3.7
TDa1100374	28.6	0.0	3.6	3.6
TDa1400301	30.9	0.7	4.2	4.4
TDa1401253	28.9	0.9	4.0	4.1
TDa1412030	27.7	0.4	2.4	3.1
TDa1415201	28.4	0.3	3.4	3.4
Mean	29.7	0.3	3.2	3.5
HSD	3.9	0.6	1.4	1.2

DMC-Dry matter content; OXBI-Oxidative browning index; Boiled and pounded expressed as general acceptability on a scale 1 to 5

Yield of candidate *D.rotundata* clones across locations

Clones	ABAKALIKI	ABJ	IBN	Igbariam	IGBETI	IGBOHO	IGB	IKENNE	KIS	KOGI	NSUKKA	UBJ	UM	UYO	Mean
TDr0900135	25.6	19	19.7	20	15.9	6	28.3	23.1	16.2	4	16.7	14.4	8.3	4.4	15.8
TDr0900295	22.9	13.9	19.5	19.3	15.7	3.5	22.9	22.3	17.5	6.6	22.1	13.8	8.9	6.3	15.4
TDr1000021	23.9	22.5	17.2	21.4	19.7	9.5	32.1	22	17.6	6.9	14.2	16.8	9	8.8	17.3
TDr1100055	26.8	22.4	20.8	22	12.8	10	67.7	21.7	16.9	9.7	12.9	11.9	12.8	7.2	19.7
TDr1100128	26.8	9.6	13.1	22.7	12.5	3.7	24	22.5	14.6	7.1	10	9.1	9.6	9.5	13.9
TDr1100180	24.7	16.1	19.6	20.5	9.1	6.8	32.5	23.5	14.2	5.9	17.1	12.8	13.2	3.9	15.7
TDr1400158	28.6	21.3	19.5	21.2	12.5	8.3	29	20.8	25.4	3.6	21.2	13.3	11	8.2	17.4
TDr1400359	22.7	17	18.7	20.1	17.8	7.1	24.8	22	11.7	6.3	18.2	12.5	7.4	10.2	15.5
TDr1400537	24.5	18.5	18.9	19.9	15.8	8.9	26.3	23.7	7.8	8.2	10	10.9	9.2	8.2	15.1
TDr1400766	28.2	19	20	19.5	17.8	6.8	19.2	22.4	16.2	5.7	18.8	10	8.3	4.3	15.4
TDr1401161	26.5	18.5	26.2	22.2	25.2	8.1	25.6	22.7	18.8	10	20.4	14.5	14	5.2	18.4
TDr1401220	26.1	20.9	19.4	20.8	15.3	7.1	26.7	20.7	21.2	6.5	18.8	17.1	11	9.2	17.2
TDr1401419	22.8	19.4	13.6	21.7	12	5.2	20.2	22.7	8.8	4.8	10.4	7.9	10.2	6.5	13.3
TDr1401593	24.9	21.7	20.4	17	24.9	15.7	14.2	21.5	12.5	10.1	12.1	13.5	15	9.6	16.7
TDr8902665	26.4	15.2	13.3	19.1	9	8.5	19	23.1	22.9	3.4	22.5	15.3	11.1	3.6	15.2
TDrMeccakusa	24.8	19.4	11.9	20.5	15.7	9.5	12.8	22.2	17.5	11.1	26.2	10.8	5.2	7.8	15.4
Mean	25.4	18.4	18.2	20.5	15.7	7.8	26.6	22.3	16.2	6.9	17.0	12.8	10.3	7.1	
HSD	ns	ns	ns	ns	13.6	8.6	ns	8.9	ns	4.9	10.3	ns	10.8	ns	
CV(%)	10.5	72.4	50.8	10.8	28.6	7.1	88.0	24.1	45.3	37.6	25.3	60.1	34.9	47.1	

Post harvest assessment of candidate *D. rotundata* clones

Clones	DMC	OXBI	Boiled	Pounded
TDr0900135	35.1	0.09	2.5	3.0
TDr0900295	32.3	0.27	3.7	3.8
TDr1000021	33.9	-0.09	2.2	2.7
TDr1100055	34.3	0.68	3.0	3.7
TDr1100128	37.1	-0.08	3.2	3.4
TDr1100180	33.6	-0.01	2.9	3.4
TDr1400158	38.3	0.08	4.7	4.5
TDr1400359	29.7	0.00	3.0	3.0
TDr1400537	29.9	0.00	4.2	3.2
TDr1400766	30.6	0.05	3.2	3.4
TDr1401161	30.5	-0.03	3.0	3.0
TDr1401220	32.7	0.11	4.6	4.2
TDr1401419	34.9	0.03	3.9	4.0
TDr1401593	31.7	-0.03	2.3	3.3
TDr8902665	37.2	0.22	3.8	4.1
TDrMeccakusa	31.0	0.06	4.1	4.1
Mean	33.3	0.08	3.4	3.5
HSD	5.4	0.7	1.3	1.4

DMC–Dry matter content; OXBI–Oxidative browning index; Boiled and pounded expressed as general acceptability on a scale 1 to 5

Rationale for advancement of TDa1100374, TDr1401220 and TDr1400158 to on farm testing in 2022 cropping season

1. Yield performance across locations
2. Relative high dry matter content
3. Slow rate of tuber oxidation
4. High acceptance of the boiled and pounded food products

REGISTRATION AND RELEASE OF TDr1100497 (*favourite*) VARIETY IN NIGERIA

Obidiegwu JE, Asfaw A, Oselebe H, Lopez-Montes A,
Agre, P, Dekoeyer D, Adebola P, Asiedu R

Multi-location trials establishment

Materials and methods

- 19 *D. rotundata* clones that had been screened through seedling evaluation, clonal evaluation, preliminary yield trials and advanced performance trials.
- The trial design for *D. rotundata* across locations (listed below) was lattice with three replications in a plot size of 10 m². The NCRP evaluation was conducted over a two-year planting season of 2016 and 2017.
- All standard agronomic procedures for yam production were observed.

MLT sites:

- Ebonyi State (Abakiliki): Derived Savannah forest
- Abia State (Umudike): Rain Forest zone
- Oyo State (Ibadan): Rain Forest Savannah transition zone
- Edo State (Ubiaja): Rainforest agro zone
- Benue State (Makurdi): Southern Savannah
- Abuja FCT: Northern Guinea Savannah
- Anambara State (Igbariam): Derived savannah

D. rotundata clones

TDr8902157

TDr1100585

TDr1100034

TDr0900002

TDr1100873

TDr8902665-standard check

TDr1100835

Amula (local check)

TDr1100163

TDr1100497

TDr1100396

TDr1100421

TDr0900058

TDr1100101

TDr0500491

TDr1100278

TDr1100492

TDr0900082

TDr1100582

Mean tuber yield (tha⁻¹) of *D. rotundata* clones across multiple location in 2016 - 2017

Clone ID	Abuja	Abakiliki	Ibadan	Makurdi	Ubiaja	Umudike	Mean
Amula	7.4	17.7	22.4	11.9	8.5	13.0	13.5
TDr0500491	11.2	24.5	15.9	8.6	8.1	17.7	14.3
TDr0900002	15.4	23.8	17.9	11.3	9.1	21.1	16.4
TDr0900058	12.1	26.6	18.6	11.2	8.8	21.0	16.4
TDr0900082	11.2	23.4	19.6	11.9	7.0	18.0	15.2
TDr1100034	7.5	13.8	15.6	10.4	7.1	15.2	11.6
TDr1100101	12.4	24.2	19.3	12.3	7.8	14.5	15.1
TDr1100163	11.6	17.8	22.9	11.1	6.5	21.6	15.2
TDr1100278	9.2	18.5	16.1	6.4	7.4	15.3	12.1
TDr1100396	6.4	17.5	11.8	9.5	5.3	11.5	10.3
TDr1100492	9.7	19.4	14.0	10.6	7.5	13.8	12.5
TDr1100497	11.0	22.2	22.0	7.5	6.2	18.0	14.5
TDr1100582	12.4	21.9	24.2	9.9	6.9	19.8	15.8
TDr8902665	11.9	16.6	15.2	8.2	5.7	14.6	12.0
TDr1100585	14.1	18.7	22.1	9.9	6.5	16.9	14.7
TDr1100835	14.7	26.0	15.6	12.4	7.3	17.8	15.6
TDr1100873	9.2	15.4	17.1	11.8	6.4	15.9	12.6
TDr8902157	7.8	25.6	20.8	9.0	8.0	16.3	14.6
TDr1100421	10.2	18.1	15.9	8.2	8.4	15.2	12.7
Mean	10.8	20.6	18.2	10.1	7.3	16.7	
CV(%)	27.3	50.4	33.9	28.4	42.7	38.3	
MSD	10.5	7.8	10.4	5.3	Ns	4.8	
SEM	0.6	0.9	0.8	0.4	0.2	0.6	

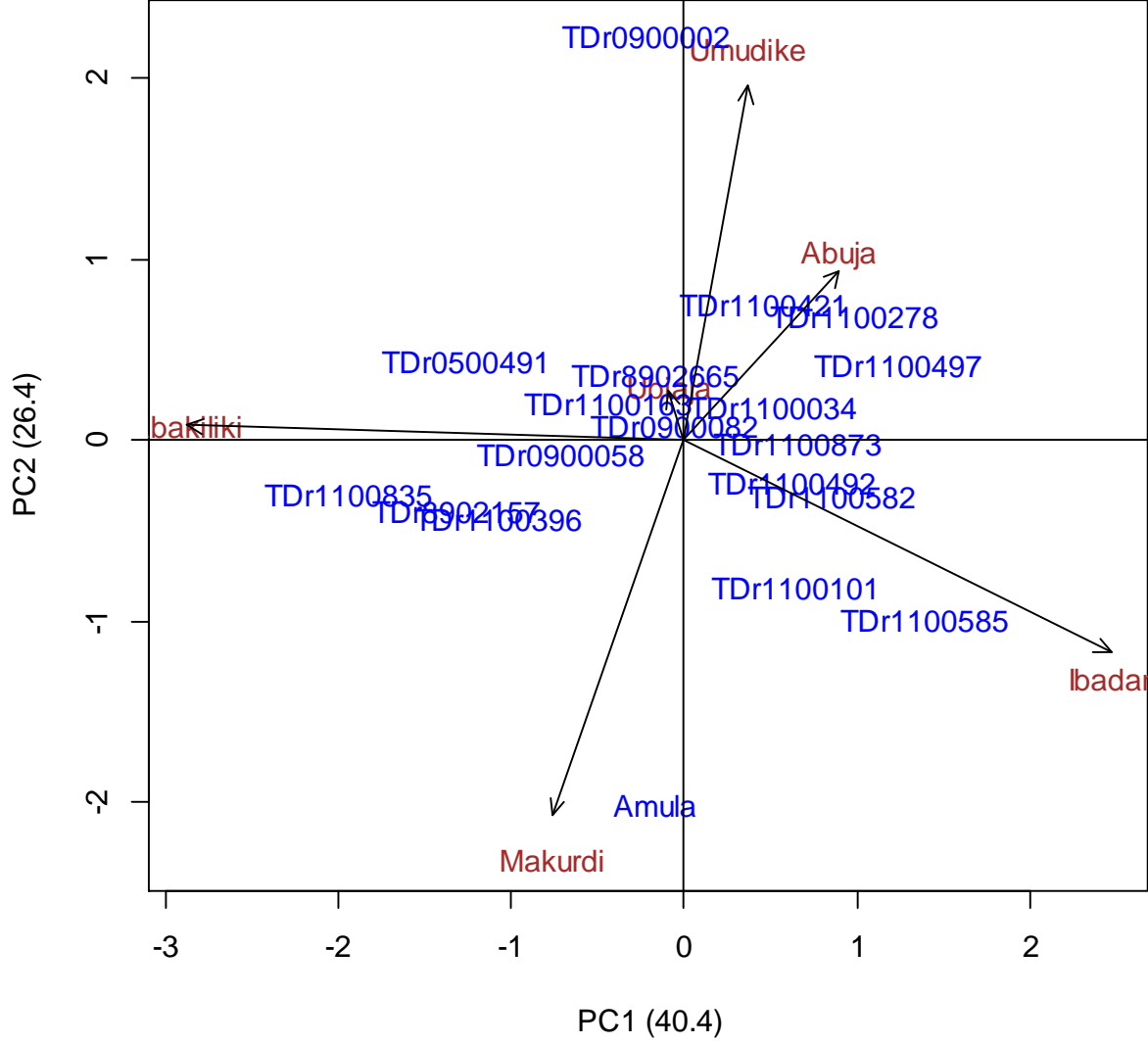
*NS; Not Significant, CV; Coefficient Variation, MSD; Mean Significant Difference, SEM; Standard error of means

Dry matter, starch content, tuber flesh colour and oxidation status of *D. rotundata* clones

Clone ID	Dry Matter	Starch	Tuber flesh colour	Oxidation after 30mins
Amula	33.51	48.43	Creamy White	Slow rate of oxidation
TDr0500491	32.68	56.18	Creamy	Mid rate of oxidation
TDr0900002	32.41	49.38	Creamy White	Slow rate of oxidation
TDr0900058	32.05	51.36	Creamy White	Mid rate of oxidation
TDr0900082	31.75	50.98	Creamy	Mid rate of oxidation
TDr1100034	28.28	43.86	Creamy	Slow rate of oxidation
TDr1100101	32.23	51.99	Creamy White	Mid rate of oxidation
TDr1100163	32.39	52.98	Creamy White	Slow rate of oxidation
TDr1100278	30.78	44.58	Creamy	Mid rate of oxidation
TDr1100396	27.04	48.04	Creamy White	Slow rate of oxidation
TDr1100421	31.31	46.2	Creamy white	Slow rate of oxidation
TDr1100492	33.15	51.57	Creamy	Mid rate of oxidation
TDr1100497	35.91	52.73	Creamy white	Slow rate of oxidation
TDr1100582	30.15	49.4	Creamy White	Mid rate of oxidation
TDr1100585	29.07	44.82	Creamy White	Mid rate of oxidation
TDr1100835	28.04	48.92	Creamy	Mid rate of oxidation
TDr1100873	34.09	54.2	Creamy	Slow rate of oxidation
TDr8902157	36.47	52.3	Creamy White	Slow rate of oxidation
TDr8902665	30.05	45.04	Creamy White	Slow rate of oxidation
Mean	31.7	49.6		
CV%	11.7	15.1		
MSD	4.9	NS		
SEM	0.6	0.8		

*NS; Not Significant, CV; Coefficient Variation, MSD; Mean Significant Difference, SEM; Standard error of means

Biplot of 19 *D. rotundata* clones and six environments for mean yields



On-farm evaluation *D. rotundata* clones-based on proximate composition and yield

Clone ID	Ash	Fat	Protein	Crude Fibre	Amylose	Sugar	Phytate	CHO (%)	Flour yield	Tuber Yield
Amula	2	0.4	5.9	1.2	37.74	27.9	0.8	83.5	31.0	15.01
TDr1100163	2.2	0.4	6	1.1	34.74	23.7	0.9	83.5	32.4	15.20
TDr1100421	3.5	0.4	7.2	1.2	34.5	23	0.9	80.7	32.8	12.70
TDr1100497	2.4	0.4	5.7	1.1	36.13	23.1	0.8	84.4	39.8	14.40
TDr8902665	2.3	0.4	6.1	1.2	38.34	24.5	0.9	83.0	38.7	13.50
Mean	2.5	0.4	6.2	1.2	36.3	24.4	0.9	83.0	34.94	14.2
CV(%)	33.5	38.4	12.4	28.6	3.6	5.8	73.9	1.2	3.1	9.20
HSD	ns	ns	ns	ns	3.5	3.8	ns	2.7	2.9	ns
SEM	0.26	0	0.26	0.02	0.77	0.91	0.02	0.6	1.8	0.47

*NS; Not Significant, CV; Coefficient Variation, MSD; Mean Significant Difference, SEM; Standard error of means

On-farm evaluation *D. rotundata* clones at on-farm trials based on vegetative, harvest and sensory attributes

Clones	Otobi	Igbariam	Igboho	Kisi	Uyo	Abakiliki	Kwale	Garatu	Mean
Sensory									
Amula	2.5	2.2	2.8	3.4	3.1	3.0	3.1	2.0	2.8
TDr1100163	2.6	2.4	3.2	2.7	3.6	3.2	2.9	1.8	2.8
TDr8902665	3.3	2.6	3.0	2.5	4.3	2.4	2.4	3.4	3.0
TDr1100421	2.3	1.8	1.8	3.2	2.3	2.7	2.4	2.7	2.4
TDr1100497	1.8	1.0	1.3	1.9	1.2	1.9	1.5	1.5	1.5
Harvest									
Amula	3.7	2.9	1.1	1.0	1.3	3.0	2.2	2.1	2.1
TDr1100163	2.2	3.1	1.6	3.1	1.9	3.7	4.5	3.9	3.0
TDr8902665	1.0	1.5	2.0	1.3	2.4	2.2	1.4	1.3	1.6
TDr1100421	3.1	1.5	2.5	2.9	3.0	1.6	1.7	1.5	2.2
TDr1100497	1.2	1.5	1.5	3.2	2.1	1.2	2.3	2.2	1.9
Vegetative									
Amula	3.0	3.0	3.0	3.0	3.1	3.0	3.0	3.0	3.0
TDr1100163	3.2	1.8	1.4	3.0	1.7	4.1	3.2	2.7	2.6
TDr8902665	1.2	2.9	1.6	1.6	2.3	2.0	2.5	2.3	2.1
TDr1100421	1.9	3.3	1.4	1.5	3.0	1.3	1.2	1.0	1.8
TDr1100497	1.7	2.0	2.1	1.3	2.3	3.9	2.3	1.2	2.1

1= Extremely liked, 2= Liked, 3= neither, 4=don't like, 5= Extremely disliked

On-farm evaluation *D. rotundata* clones– Sensory evaluation

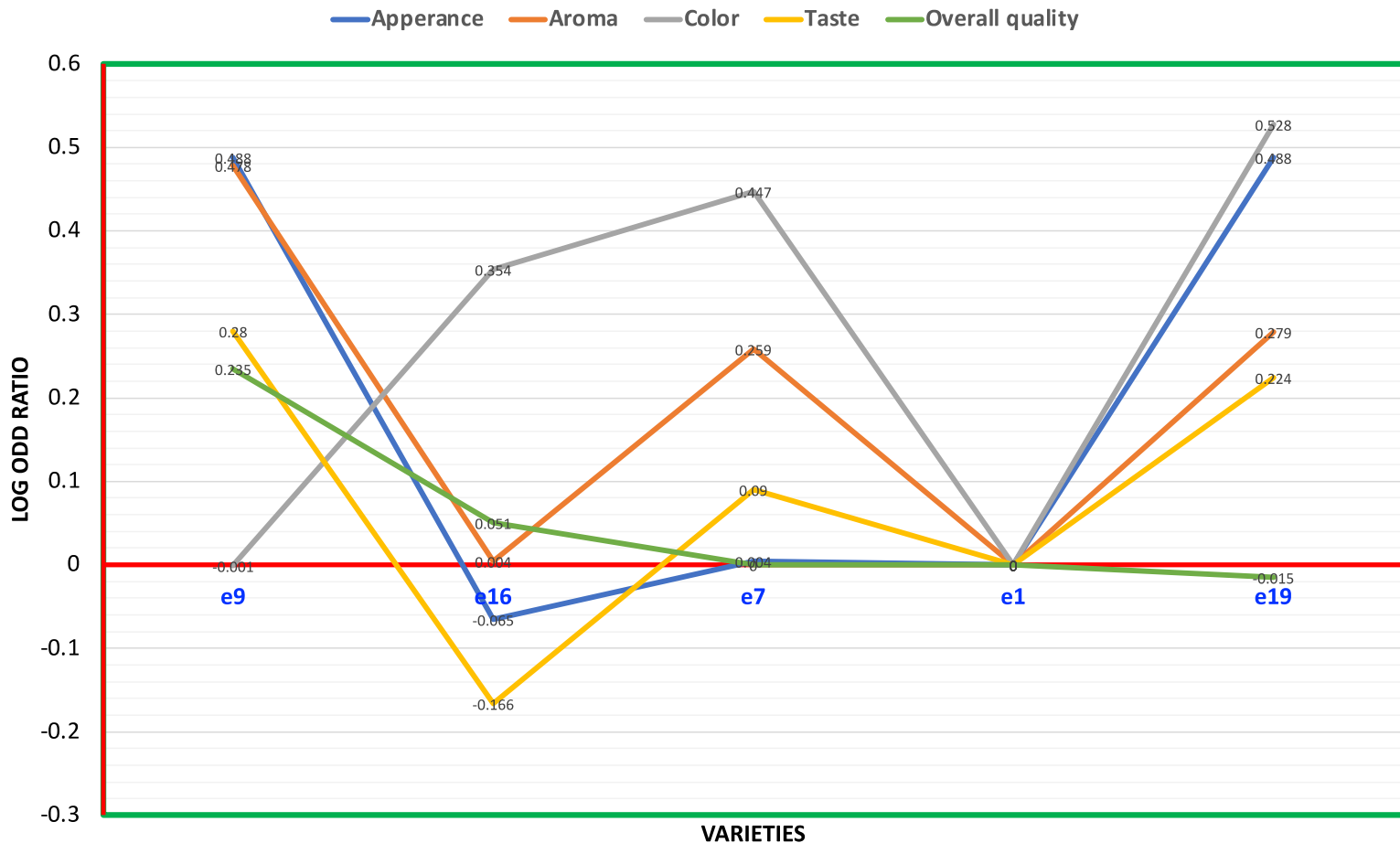


Figure: Likelihood of clones being preferred for sensory qualities in comparison with checks. Where e9 is TDr1100497; e16 is TDr1100421; e7 is TDr1100163; e1 is Amula and e19 is TDr8902665

RATIONALE FOR CANDIDATE RELEASE

- Candidate **TDr1100497** expressed remarkable yield potential and adaptation to Guinea Savannah and Rain Forest agro-ecologies.
- Nutritional qualities of the candidate performed well compared to both local and standard checks.
- The candidate produced **high dry matter (35.9%) and starch (84.4%), potential tuber yield (32.7t/ha) and flour yields (39.8%)** when compared to the standard and local checks. These properties make it commercially attractive for various industries within the yam value chain.
- The candidate is a mid climber and can perform excellently well with medium/minimal staking.
- The clone was also preferred by farmers during on-farm testing, based on overall agronomic performance and sensory properties

Tuber characteristics



Irregular shape, brown skin and rough surface

Creamy white flesh colour

Leaves and petiole characteristics

Young leaves



Pale green

Older leaves



Dark green

Petiole characteristics



Purplish green with dark green pulvinus (base where leaf and petiole connect)

Vine characteristics



Green, mid-climber with anti clockwise twinning

Work plan 2022

Evaluation/ Trials

1. Establishment of crossing blocks
2. Seedling Nursery evaluation
3. Clonal evaluation
4. PPT
5. APT
6. NPT
7. On- farm trials

Variety release

2 candidates = 1 *D. alata* + 1 *D. rotundata*

Acknowledgement



- NRCRI yam program staff
- Patrick Adebola
- Asrat Amele
- Agrey Paterne
- Alex Edemodu
- Happiness Oselebe



THANK YOU