

Selected Sweetpotato Research in Nigeria.

BY

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6th SSP Meeting, Erata Hotel, Accra, Ghana, Feb. 25-26,
2013.

Summary Of (Some) Breeding And Research Activities: from

➤ **NRCRI, Umudike**

➤ **Federal University of Agriculture,
Abeokuta**

6th SSP Meeting, Erata Hotel, Accra, Ghana, Feb. 25-26,
2013.

➤ **NRCRI, Umudike**

Summary Of Breeding Activities:

- Population generation — making crosses
- Population evaluation/selection — Scientists and farmers managed
- Varietal release — varietal submission to and release by the National Varietal Release Committee
- Utilization — product development

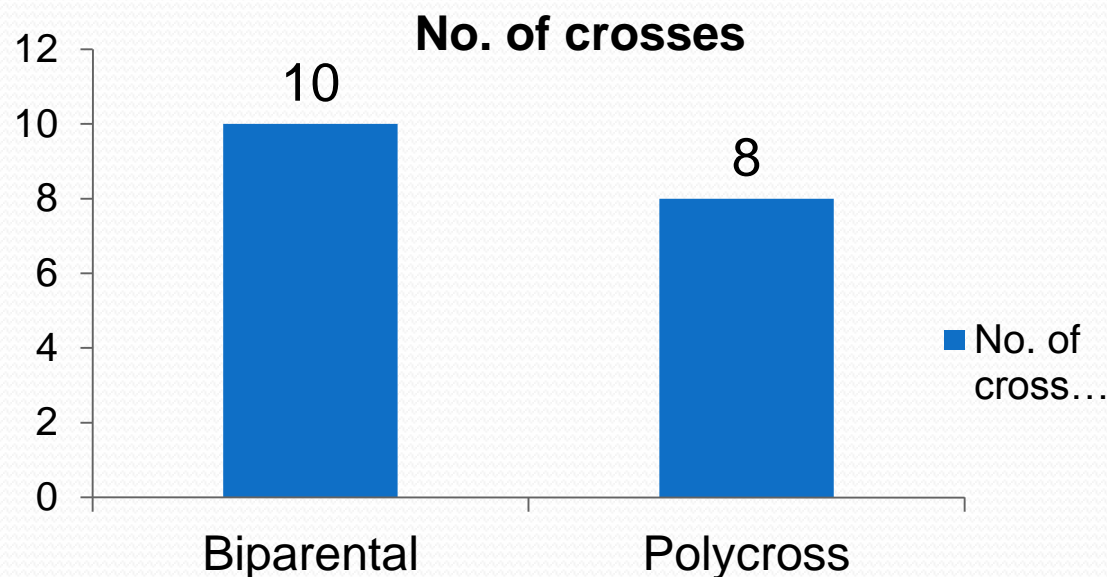
Our traits of interest include (not in the order of importance):

- ⦿ High fresh root yield
 - ⦿ High beta-carotene content
 - ⦿ bland taste
 - ⦿ SPVD and *Cylas* spp tolerance
 - ⦿ high dry matter content
 - ⦿ high starch content
 - ⦿ high flour content
- } We use high dry matter as indirect means to select for these

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- *It is important to note that:*
 - *All sweetpotato breeding activities at the NRCRI were funded by AGRA under the AGRA Sweetpotato Project*

Breeding and research activities:

1) Development of new populations and the selection of desirable genotypes



Picture from: Rossel G., Espinoza C., Javier M. and Tay D. 2008. Regeneration guidelines: sweet potato. CGIAR System-wide Genetic Resource Programme, Rome, Italy. 9 pp.

❖ About **5,000** Sexual seeds developed

2. Population evaluation/selection—Scientist and farmer- managed

- Preliminary yield trial (PYT) of 38 clones in 2012 in two locations.

Trait	Genotypes					
	Umudike			Otobi		
	Mea n	Range	CV	Mea n	Range	CV
No. marketable roots	**	2.0-132.0	57.65	**	2.0-70.0	87.6
No. total roots	**	6.0-170.0	59.0	**	2.0-145.0	99.4
Wt marketable roots	*	0-132.0	60.83	*	0.4-26.1	84.2
Total root wt	*	2.6-41.2	53.9	*	0.6-75.0	120.8



➤ Mean yield (t/ha) of **imported cultivars** evaluated in two locations in 2012.

Cultivars	Mean			
CIP 420068	29.556		A	
TIS 87/0087 (control)	28.686		A	
EXIGBARIAM	15.382		B	
CIP 199004.2	12.052		B	C
CIP 440060	11.507		B	C
CIP 44000.1	10.002	D	B	C
SPK/004	7.198	D	B	C
CIP 1990015.14	4.518	D		C
CIP 199004.11	4.347	D		C
NASPORT 4	0.880	D		
NASPORT 2	0.427	D		
CIP 440034	0.270	D		
FLSD0.05	10.01			

Our aim was to select cultivars that could be included in 2013 METs.

➤ **Varietal release** — varietal release by the National Varietal Release Committee

Combined mean fresh root yield (t/ha) of 15 sweetpotato genotypes evaluated in multi-locations trials during the 2011 and 2012 cropping seasons

Varieties	Umudike	Nyanya	Makurdi	Igbariam	Kaduna	Calabar	Mean yield cross location t/ha	Rank
NRSP/05/7C	2.34	9	4.62	5.94	10.81	1.66	5.73	9
NRSP/06/5A	0.91	0.77	5.81	0.36	0.36	2.79	1.83	13
NRSP/05/10D	6.84	13.02	37.76	13.88	19.78	0.5	15.30	2
NRSP/05/1B	2.88	7.48	9.33	10	3.96	1.25	6.19	8
NRSP/05/3D	6.57	10.72	8.59	14.88	6.24	1.35	8.06	6
NRSP/05/3B	0.3	0.19	0.54	0.27	0.63	1.11	0.51	15
440163	4.73	14.65	12.4	1.21	8.2	7.84	8.17	5
440293	3.17	28.45	9.73	13	4.05	1.3	9.95	4
Shaba	3.27	4.7	0.81	1.9	0.45	0.89	2.00	12
199034-1	3.53	0.39	1.31	3.38	3.34	3.18	2.52	11
NRSP/05/022	15	31.37	40.21	25.3	27.01	0.5	23.23	1
Ex-OYUNGA	1.74	3.58	6.44	8.19	2.92	0.39	3.88	10
87/0087	7.59	0	6.85	20.34	22.44	2.27	9.92	3
EX-IGBARIAM	3.57	5.79	11.49	11.98	13.4	0.81	7.84	7
CENTINNIAL	1.91	3.47	0.9	2.07	0.03	0.07	1.41	14
Mean	4.29	8.91	10.45	8.85	8.55	1.73	7.10	-
S.E.	0.94	2.51	3.16	1.99	2.31	0.49	1.56	-

➤ Varietal release

Proximate and nutritional characteristics of 6 Sweetpotato genotypes evaluated in on-farm adaptive trials in Nigeria.

Genotypes	Dry matter (%)	Flour yield (%)	Starch (%)	Crude fibre (%)	Fat content (%)	Ash content (%)	Crude protein (%)	Total carotene content ug/g FW
NRSP/05/3D	39.55	29.30	22.16	1.07	1.10	0.94	5.57	0.58
440163	36.74	27.40	18.72	1.63	1.62	1.30	5.18	1.63
NRSP/05/022	39.27	32.27	19.09	1.47	1.20	1.30	3.94	7.14
440293	28.70	21.15	13.16	1.99	1.72	1.20	5.55	20.83
NRSP/05/10D	35.93	26.29	18.24	1.04	1.32	1.50	5.38	2.41
199004-2	35.18	29.67	18.57	1.29	1.36	1.30	5.18	6.24

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➤ Varietal release...

Two varieties were released in Dec., 2012.

NRSP/05/022 (UMSPO/05/002)	NRSP/05/10D(UMSPW/05/003)
Sweetpotato virus disease resistance	High yielding
Very high yielding	Sweetpotato virus disease resistance
Good for fries and chips	High dry matter
Broadly adapted	Good for white sweetpotato flour
High dry matter	
Good for orange flower	

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➤ Utilization – product development (Omodamiro, R.O)

Finding: OFSP juice compares favorably with commercial juice:

Shelf life and carotenoid retention trials underway.



Panelists sampling OFSP and commercial juice
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2013.

JOURNALS:

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- Ehisianya, C. N., **Afuape, S.O.** and Echendu, T. N. C. (2012). Varietal response of selected **orange-fleshed** sweetpotato cultivars to **yield and the sweetpotato weevil**, *Cylas puncticollis* (Boheman) (Coleoptera: Brentidae) at Umudike, Abia State, Nigeria. International Journal of Agricultural Sciences, Vol. 2 (9): 251-255. Available online at www.internationalscholarsjournals.org
- Etudaiye H. Adinoyi, H.E., Oti E., Sanchez, T., Omodamiro R. M., **Afuape S.O.** and Ikpeama A. (2012). Effect of variety and influence of starch-hydrolyzing enzyme and yeast on the **yield of ethanol generated from sweetpotato flours and starches**. Advances in Applied Science Research, 3 (5):2774-2778. **Available online at** www.pelagiaresearchlibrary.com.
- Nwankwo, I. I. M. Bassey, E. E., **Afuape, S. O.**, Njoku, J., Korieocha, D. S., Nwaigwe, G. and Echendu, T. N. C. (2012). Morpho-agronomic **characterization and evaluation** of in-country sweet potato accessions in Southeastern Nigeria. Journal of Agricultural Science, Vol.4(11): 281-288.

CONFERENCE PRESENTATIONS AND PROCEEDINGS:

- Etudaiye H. A., Oti E., Sanchez, T., Omodamiro R. M., **Afuape S.O.** and Ikpeama A. (2012). Effect of variety on the yield of ethanol produced from sweetpotato starch. Proc. 36th Annual Conf. of Nigerian Institute of Food Science and Technology, 15th-19th October, 2012, pp 9-11.
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- Omodamiro, R.M., **Afuape, S.**, Oti, E. and Echendu, T.N.C. (2012). Effect of method of **processing on** the sensory attributes of **sweetpotato chips**. Proc. 36th Annual Conf. of Nigerian Institute of Food Science and Technology, 15th-19th October, 2012, pp 529-531.
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- Omodamiro, R.M., **Afuape, S.**, Nwankwo, I.I.M. and Ofoeze, M.A. (2012). Root quality evaluation of selected preliminary yield trial sweetpotato genotypes: Implication for breeding. Proc. 36th Annual Conf. of Nigerian Institute of Food Science and Technology, 15th-19th October, 2012, pp 531-532.

Summary of some sweetpotato research activities at FUNAAB

- At the Dept. of Food Science & Technology , the research focus has been on **product development**,
- emphasis on process and product optimization.

Highlights are:

- effect of variety (ten varieties) and processing conditions (four pretreatments & two drying methods) on quality (chemical, functional and pasting properties) of sweet potato flour;
- effect of variety (three varieties) and processing methods (parboiling & soaking in water) on quality of traditional flour ('elubo') and acceptability of the cooked paste ('Amala');

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some sweetpotato research activities at FUNAAB

- sensory characterization of sweet potato cooked paste ('Amala') by Descriptive Analysis;
- effect of variety, frying conditions and packaging on quality of sweet potato crisps;
- quality of tapioca grits from sweet potato;
- quality of bread from sweet potato purée-wheat flour composite;
- effect of form of sweet potato supplementation on quality of Kunun (a millet-based non-alcoholic) beverage;
- vacuum frying of sweet potato crisps;

some sweetpotato research activities at FUNAAB

➤ Activities in Osun State

- Working with farmer groups in Osun State - on production, processing and marketing of sweet potato and its products (Ted actually referred them to us).
- Vines have been supplied to them for multiplication.
- Strategies for marketing and processing of fresh roots are also being planned.

Way Forward for the sweetpotato crop in Nigeria:

- Capacity building in tissue culture approaches to virus cleaning and indexing;
- Aggressive and sustained awareness creation for OFSP as health intervention crop – Funding needed.
- Integration of sweetpotato into the food processing chain
- Sweetpotato production, marketing and utilization survey

ACKNOWLEDGENT:

- The organizers of this meeting
- AGRA – Alliance for Green Revolution in Africa for funding
- Ted for being supportive always.
- Omodamiro has been the food scientist working on sweetpotato utilization at the NRCRI, Umudike.