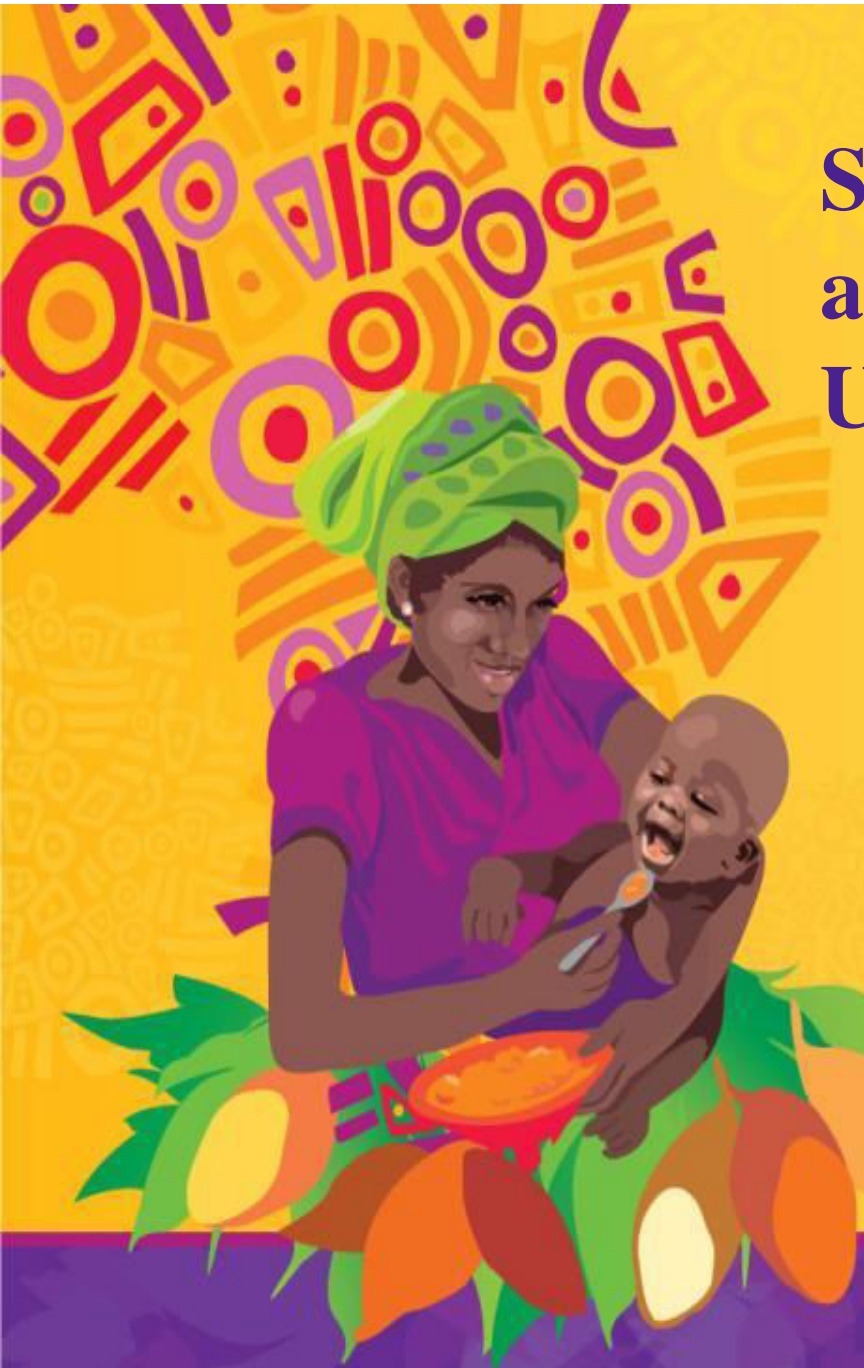# Sweetpotato breeding activities at the NRCRI, Umudike in 2015

Afuape, S.O., Ogbonna, C.L., Uzuegbu, D.C., Nwaigwe, G., Igbokwe, C., Njoku, J.C., Tongoona, P., Offei, S.K. Asante, I.K. and Egesi, C.N.

Activities in 2015

- Analysis of similarities and differences in farmer trait preferences to enhance effectiveness of sweetpotato varietal development.

- Clonal evaluation of new sweetpotato population developed in 2014.

- P

- Hybridization targeted towards development of OFSPs with high yield, high dry matter and SPVD resistance.

Activity 1: Analysis of similarities and differences in farmer trait preferences to enhance effectiveness of sweetpotato varietal development.

Objectives

- To identify key traits that drive farmers' preferences for variety adoption;

- To study similar and divergent trait preferences among sweetpotato farmers in Abia (rainforest belt) and Benue (guinea savanna) states

Methodology:

- *Structured Questionnaires***:**
  - Two states covered (Abia and Benue states)
  - 100 respondents per state.
  - Agricultural Extension Agents helped in the planning and execution.
  - (Sweet)Potato Farmers Association of Nigeria (POFAN) members were involved.

- *Data Analyses:*
1.) Frequency distribution (2) Percentages

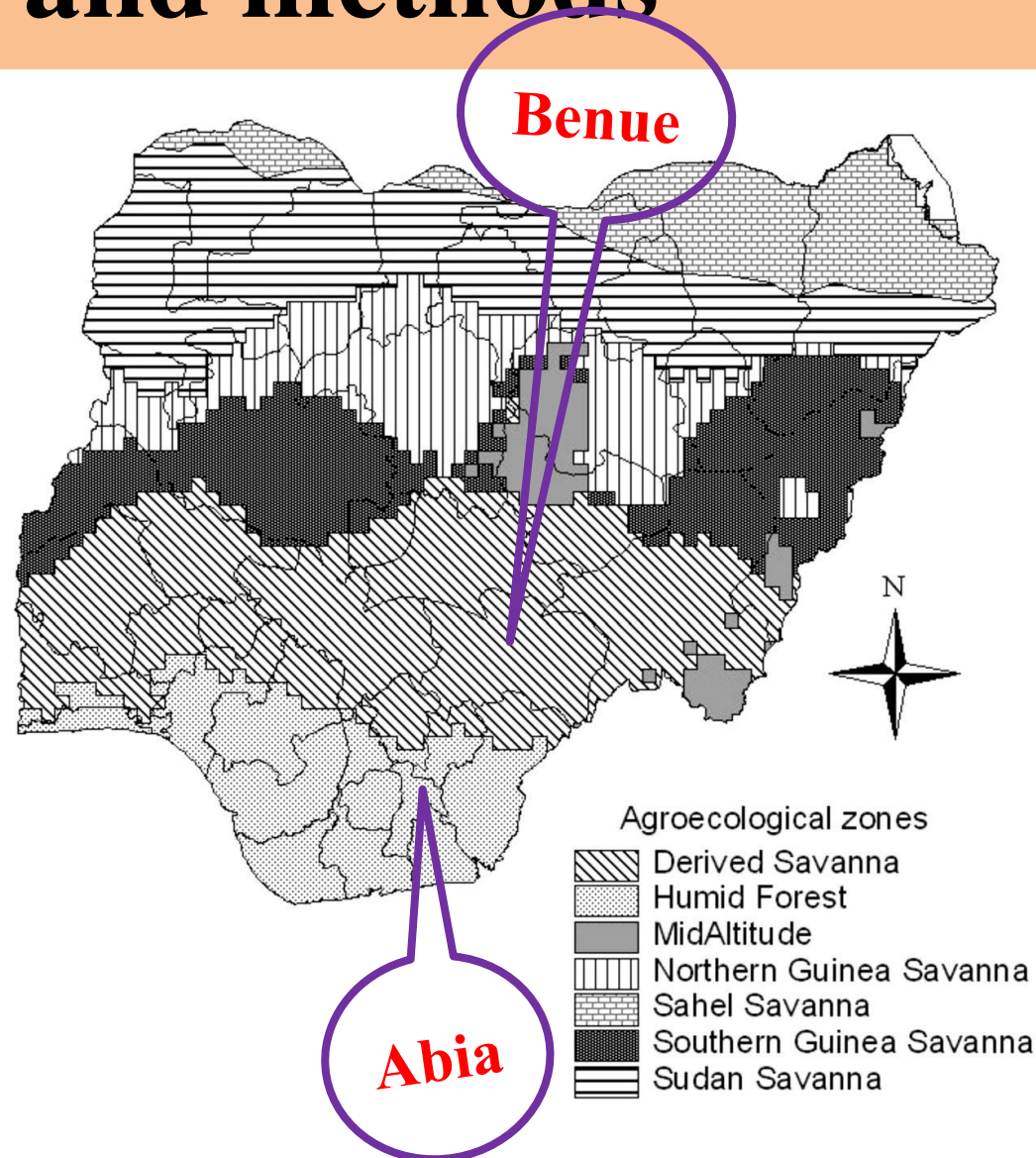**Benue**

Abia

Agroecological zones

▨	Derived Savanna
▦	Humid Forest
▪	MidAltitude
▥	Northern Guinea Savanna
░	Sahel Savanna
■	Southern Guinea Savanna
▤	Sudan Savanna

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Table 1: Sweetpotato production characteristics and trait preferences

Trait	Preference: similar or divergent	Comment
Farming experience in sweetpotato production	Divergent	Benue: More experienced (40% had above 15 years) Abia: 15% had up to 15 yrs
Size of land under sweetpotato cultivation	Similar	> 65% farmers in both states cultivate 0.5-3.0 ha.
Fertilizer use by sweetpotato farmers	Divergent	Benue: 80% no fert. Abia: 70% use fert.
% sweetpotato cultivars often planted by a farmer	Similar	Farmers in both plant more than one cultivar.
How long does it take farmers' current cultivar to mature?	Divergent	Benue: 98% 3 MAP Abia: 93% 4-6 MAP
Preference for cultivar maturity period	Divergent	Benue: 85% 3 MAP Abia: 100% 3-5 MAP

Preference for root shape	Not clear	Benue: 98% cylindrical Abia: 58% round; 40% cylindrical
Preference for root size	Similar	Benue: 100% medium to very big Abia: 86% big to very big.
Preference for root flesh colour	Similar	Benue: White (60%); OFSP (40%) Abia: White (45%); OFSP (23%)
Farming system	Divergent	Benue: Most (85%) do mixed; Abia: 64% do sole cropping.
Crop mixture in farmers' fields	Similar	Benue: SP + 5 other crops Abia: SP + 10 other crops
Farmers' perception of SPVD	Divergent	Benue: 80%-yes Abia: 48%-yes; 30% no idea
Preference for root taste	Similar	Benue: Sweet (90%) Abia: Sweet (70%)
Preference for boiled rot texture	Partially similar	Benue: Soft-50%; Hard (50%) Abia: Soft (50%); Hard-20%

Activity 2: Clonal evaluation of new sweetpotato population developed in 2014.

Objective

- To evaluate the 2014 seedlings for fresh root yield, SPVD resistance and root flesh colour.

Materials:

- 320 progenies + 3 checks

Table 1: Percent number of OFSP progenies produced per family

Cross / Family	Total number of progenies	Number of OFSP progeny per family	% OFSP progeny per family	Range of beta-carot per family(mg/100g)
F1M1	87	38	43.67	0.15-11.03
F1M4	40	14	35.00	1.38-12.39
F1M5	17	10	58.82	1.17-7.76
F1M6	6	3	50.00	3.76-10.50
F1M9	3	1	33.33	
F2M1	14	3	21.43	4.92-7.23
F2M5	15	8	53.33	1.50-10.50
F2M6	28	9	32.14	1.50-7.76
F4M2	6	1	16.67	1.65
F4M5	3	1	33.33	1.38
Ex-Igbariam	44	1	2.27	
Ex-Oyunga	13	2	15.38	
TIS 8164	40	7	17.50	

Activity 3: Preliminary yield evaluation of new genotypes for fresh root yield and root flesh colour.

Objectives

- To evaluate the 2013 cycle breeding lines for their root yield and flesh colour attributes.

- To select the promising lines that will be advanced to advance yield trial stage in 2016.

Materials and methods

- Genotypes: 52 lines selected from clonal evaluation trial.

- Design: Randomised Complete Block Design (RCBD)

- Replications: 3

- Data collected:
  - Weight of fresh roots (t/ha)
  - Flesh colour plot

Table1: Fresh root yield (t/ha) and flesh colour of top 13 genotypes evaluated at PYT stage in Umudike in 2015.

Genotypes	Total root yield (t/ha)	Flesh colour	SPVD (1-9)
A 005	14.19	orange	1
E 016	13.49	Yellow	1
D 075	13.36	Yellow	1
A 097	12.72	Light orange	4
C 081	12.13	white	1
A 097B	11.41	orange	1
D 115B	11.06	orange	1
A 176	11.04	white	1
I 012	10.88	yellow	1
A 035	10.55	white	1
D 077	10.38	white	1
A 098	10.33	orange	1
K 003	10.09	yellow	1
TIS 87/0087	16.23	white	1
UMUSPO/1	8.31	Light orange	1
UMUSPO/3	7.43	orange	7
FLSD $_{0.05}$	4.98		

Figure 1: Flesh colour distribution of sweetpotato breeding lines at PYT stage.
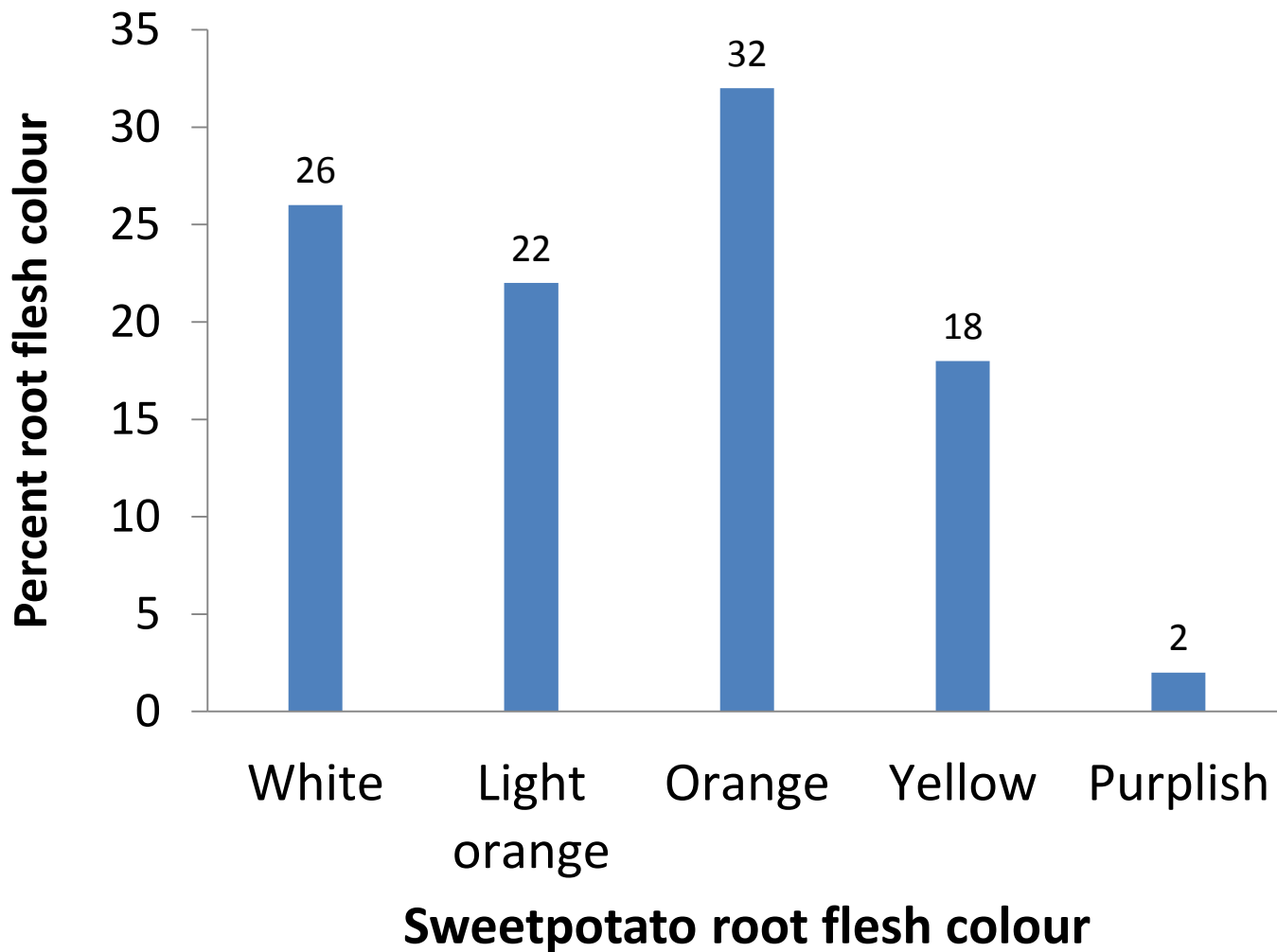
❖Number of genotypes = 52

Conclusion

- Genotypes with good root yield, low or no virus incidence and severity, as well as possess acceptable carotenoid content will be selected for advanced yield trials in 2016.

Activity 4: Crossing block for targeted population development

Objectives

- To develop populations for increased yield, β-carotene, high dry matter and resistance to SPVD

Methodology

- No. of parents: 15 (5 OFSP - female; 10 other root flesh types – male)
- Normal field management activities were carried out.
- Normal crossing activities were carried out
- Seeds were collected as at when due and preserved.

Table1: Number of seeds from 10 controlled crosses

Number of parents	Total Number of seeds
F5XM2	53
F5XM5	13
M5XM1	78
M1XM5	54
F5XM3	18
M2XF5	**9**
M5XM2	10
F2XM5	76
F2XM1	138
F5XM1	410
Total	**859**

There was general poor flowering among the parents in 2015.

• Only 6 parents flowered at all.

F5 = Tio Joe;
F2=Centennial;
M2 = TIS 87/0087;
M5 = Solo-Abuja;
M1=TIS 8164;
M3=UMUSP/2

Table2: Number of half-sib capsules and seeds from 8 parents involved in open pollination

Number of parents	Total No. of seeds
UMUSP/2	338
CENTENNIAL	1277
SOLO ABUJA	210
TIO-JOE	1244
TIS8164	426
UMUSPO/3	161
TIS87/0087	104
A034	201
Total	**3961**

Conclusion

- Better understanding of farmers' preferences for some important traits has been achieved. This will help focus the breeding program better.

- Performance information that will aid selection of promising high yielding, high virus resistant and high dry matter available.

- More population that is targeted at segregating for high root yield, high dry matter, high carotenoid and high SPVD resistant developed for further selection.

- Promising lines that will go for advanced yield evaluation phase in 2016 have been selected.

Thank you for listening