



CSIR-CROPS RESEARCH INSTITUTE RESEARCH FOR DEVELOPMENT



GHANA SWEETPOTATO IMPROVEMENT PROGRAMME

Progress report on sweetpotato breeding in Ghana

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OBJECTIVES OF OUR BREEDING PROGRAMME



Under the West Africa Agricultural Productivity Programme (WAAPP) and collaboration with SASHA (GHANA),

- 1. Development of high and stable yielding consumer accepted sweetpotato varieties.**
- 2. Production and distribution of healthy primary (breeder) planting materials.**
- 3. Promotion of sweetpotato utilization (Product development).**
- 4. Studies on the availability, marketing and consumption of sweetpotato in Ghana.**



Specific Breeding Objectives



To develop varieties that are

- high and stable yielding
- disease and pest resistant (SPVD and *Cylas* sp.)
- high nutritional and processing qualities

(high dry matter, high β -carotene, high starch , high flour yield with adequate mineral content)

- consumer acceptable and preferred

Most important bred SP varieties in Ghana



GHANA / Name of Variety	Root yield t/ha	Flesh color	Dry matter (%)	Early	SPVD	Beta-carotene $\mu\text{g}/100\text{g}$	Remarks
CRI-Okumkom	20	W	31	E	MR		1998,MR Weevil
CRI-Faara	22	W	36	E	MR		1998,MR Weevil
CRI-Sauti	19	Y	40	E	MR		1998,MR Weevil
CRI-Santom pona	17	Y(light)	34	E	MR		1998,MR Weevil
CRI-Apomuden	35	LO	21	Extra E	MR	40000	2005, MR Weevil
CRI-Otoo	23	LO	32	E	MR	545	2005, MR Weevil
CRI-Ogyefo	20	W	40	E	MR		2005, MR Weevil
CRI-Hi starch	18	W	40	E	MR		2005, MR Weevil
CRI-Patron	20	Y	34	L	MR	2800	2012, MR Weevil
CRI-Bohye	22	LO	31	L	MR	5500	2012, MR Weevil
CRI-Ligri	22	Y(light)	35	L	MR		2012, MR Weevil
CRI-Dadanyuie	18	W	35	L	MR		2012, MR Weevil

Flesh color: White (w), cream (cr), yellow (y), light orange (lo), orange (o), deep orange (do). Include beta-carotene

Earl (Earliness: Early (E) (about 4 months), late (L) about 5 or more months

SPVD resistance (r: resistant, s:susceptible)

Alt (Altenaria blight resistance, r: resistant, s: susceptible)

Summary of progress 2009- 2014



Type of trial		Details	2009	2013/14
Crossing block				
	1	No. of parents in crossing block		18
	2	No. of seed collected from OP		10,482
		a. Total no. of families of OP seed		17
	3	No. of seed collected from crosses		3767
		a. Total no. of families of controlled crosses		34
Seedling nursery				
	1	No of seeds planted		2500
	2	No of seedlings established		2125
	3	Total no. of families planted		51

Summary of progress 2009- 2014



Observation trial				
(OT)	1	No of clones planted		300
	2	No of checks (check clones) planted		5
	3	No. of locations		3
Preliminary yield (PT)				
	1	No of clones planted		170
	2	No of checks (check clones) planted		3
	3	No. of locations		3
Advanced yield trial (AT) / Varietal Trial				
	1	No of clones planted	21 / 8	5
Varietal trial (VT)	2	No of checks (check clones) planted	1	3
	3	No. of locations	4	5
On-farm trials				
	1	No of farms/farmers/region/district / province		
No of varieties released			8	12
No. of clones in pipeline for release by 2016				2

Summary of progress 2009- 2014



Type of trial	Details	2009-2012	2013/14
On-farm trials			
1	No of farms/farmers per region/district / province		
		10	10
2	Total no. of trials whole country		
		120	
No of varieties released		4	
No. of clones in pipeline for release by		2016	2
Package used for data analysis			
2009-2012		GenStat and CloneSelector	
2013/14		GenStat and CloneSelector	

Sweetpotato Foundation Seed system



Tissue culture lab:	Response (a)	Response (b)
No. of lamina flow benches (a)	6	
No. of CVs maintained in tissue culture (a)	12 + 13 + 60	
No. of screenhouses/need repair (a)	1	
No. of good screenhouses (a)	2 (NARS) + 3 (SASHA)	
No. of in vitro plantlets wined:		
a) Every 3-4 months (b) every year)		
No. of vine cuttings:		
a) Distributed every 4-5 months (b) every year)		90,000
a) Sold every 4-5 months [(b) every year]		
How long does it take to breed a variety (years)?	3 - 4	
How long does the variety release process take? (Assuming all data is available)/1 season/1 year (a)?	2 seasons / 1year	

Linkage to Vine multipliers for further multiplication



Linkage to vine multipliers	Proportion (%)	Comment
<i>Government institutions (list):</i>		
MOFA- GGLDB	30	
MOFA-RTIP	10	
MOFA- DCS	50	
<i>NGOs (list):</i>		
<i>Farmer multipliers</i>		
FBOs	10	
<i>Others (list them)</i>	%	

Status of AGRA grant (delete what is not applicable)



Project title:	Response
SWEETPOTATO FOR PROFIT AND HEALTH IN GHANA	
Approved but has not started	
Funded since	
Amount	\$180,260.00
Expiration date	
Renewal proposal (delete what is not applicable):	
Not yet written/ In process of writing	
Written but not submitted	Yes
Submitted, waiting for feedback	
2 nd phase funded since (year), amount (USD)	
Other information on AGRA grant:	

Number of SP varieties released 2009 - 2014



No. of varieties released		No. of release document(s)*	No. of release papers /Manuscripts**
Non-orange	Orange		
2	2	1	
No. of clones in pipe in pipeline for release (final tests/data already compiled)			
Non-orange	Orange		
-	-		

* Document submitted to Variety Release Committee/Authority; Each release has a separate document (several varieties released at the same time have one document)

**Papers published in journal(s) or manuscript for journal/submitted/to be submitted

Detailed information of variety release documents (2009-2014)



*Document submitted to Variety Release Committee/Authority

J.N.Asafu-Agyei, K. Adofo, E. Baafi, P. Appiah Danquah, J.N.L. Lamptey, E. Adu-Kwarteng, Patricia Acheampong, Victor Amankwaa, Adelaide Agyeman, Harrison K. Dapaah, Edward Carey, N Asamoah Obeng and J.K Awoodzie, Sweetpotato genotypes proposed for release, 2012, CSIR-CRI, Kumasi, Ghana pp 44

**Papers published in journal or manuscript for journal submission

Give details, author(s)., year, title, journal (target journal if not submitted yet), page number(s)/where applicable

Papers published/Manuscripts (2009-2014)



1. J.N. Asafu-Agyei, K. Adofo, E. Baafi, E. Carey, E. Adu-Kwarteng , E. Bio, J. N. Lamptey, N. Asamoah-Obeng, and J. Awoodzie , 2012, Testing the adaptability and acceptability of elite sweetpotato genotypes in Ghana, 16th Proceedings of ISTRC, Abeokuta-Nigeria
2. K. Adofo, J.N. Asafu-Agyei., J.N.L Lamptey, E. Carey, E. Baafi, E. Obeng-Bio, E. Adu-Kwarteng, E. Owusu-Mensah, P. Acheampong, J. Haleegoah, Victor Amankwaah, N. Asamoah-Obeng and J. K Awoodzie, 2013, Farmer Participatory Development of Four Sweetpotato Varieties in Ghana, 12th Proceedings of ISTRC-AB, Accra-Ghana.

**Papers published in journal or manuscript for journal

Give details, author(s)., year, title, journal, page number(s) (for manuscript(s) indicate target journal

Current staff on sweetpotato research



Sweetpotato (SP) Staff Category	No.	Gender (M/F)	Age <35 / > 35 years
PhD (Agronomist)	1	M	>35
MSc (Plant breeder)	2	M	>35
PhD(Virologist, 10%)	1	M	>35
PhD(Entomologist, 10%)	1	M	>35
PhD (Biometrician, 10%)	1	F	>35
MSc (Agronomist, 20%)	1	M	>35
MSc(Food Science and Post-Harvest, 20 %)	1	F	>35
MSc (Socio-economist, 10%)	1	F	>35
MSc (tissue culture, 10%)	1	M	<35
Technicians:			
Diploma (breeding & seed systems)	2	M	>35
Total	12	(9 M:3F)	
Comment:			

Update Other Project Information



1. Funding source/amount /duration

WORLD BANK / GOVERNMENT OF GHANA

\$350,000 (2013 – 2017)

2. Constraints

- * Inadequate irrigable lands
- * Changing climatic and edaphic conditions
- * Poor attitudes of some farmers

3. Proposed future activities

- * Resubmission of AGRA proposal
- * Germplasm collection (Local and Foreign)
- * Development of Fact sheets on new varieties

Acknowledgement



- CIP (SASHA)
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- CSIR