



○ South Africa: update of sweetpotato breeding

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Objectives

- Sweet taste, low percentage water content,
- High β -carotene content ($\sim 100\text{g}/\mu\text{g}$ fwb)
- High yield, good storage root quality
- Tolerance to Alternaria leaf and stem blight
- additional traits: increased tolerance to drought stress and tolerance to virus.



Most important landraces

Observational results of 1 yr at Roodeplaat

Country/ Name of landrace	Root yield t/ha	Flesh color	Dry matter (%)	Earl	SPVD	Alt	Remarks
Country							
A 2392	46.3	c	30.8	E			Early
A 35	44.7	c, purple	30.9	M			Better root quality
Tshakuma 2	44.4	c	31.6	M			Venda
Maggi	43.1	c	31.4	M			Venda. Hobbly roots
A 2118	42.8	c	31.0	M			Better root quality
A 5799	39.2	c	24.7	M			Cracks
A 29	33.6	c	28.6	L			Cracks
Carrot	33.4	lo	30.5	M			Venda
A 46	23.5	c	28.2	L		s	Many cracks.
Lobed	20.6	c	36.1	M			Venda. Oxidation
Manguzi Purple	17.1	c	35.8	M			eManguzi. Cracks
A 2910	7.5	c	31.2	L			Long irregular

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

Most important varieties

Country/ Name	Root yield t/ha	Flesh color	Dry matter (%)	Earl	SPVD	Alt	Remarks
Blesbok	40.2	c	16.6	early	s	r	ARC1989, major commercial cultivar
Beauregard	30.3	o	18.0	early	?	i	Promoted since 2003 (USA), avg commercial use, export
Ndou	35.0	c	25.6	early	s	r	ARC 2003, avg adoption (Comm. & Informal market)
Bophelo	31.0	o	22.5	med	s	r-i	ARC 2011, best orange, high yield&DM, avg adoption
Impilo	31.1	o-lo	21.4	early	s	r	ARC 2007, 2 nd best orange variety, avg adoption
199062.1	36.0	lo	21.4	early	?r	r	Promoted since 2009 (CIP), avg adoption in KZN province
Monate	35.6	c	23.8	early	s	r	ARC 2003, avg adoption Gauteng province
Resisto	20.7	do	24.2	med	?	s	Promoted since 1996 (USA), home gardens, best taste
A40	~35	c	~24	med	?	r	UKZN 2001, avg adoption in KZN province
W-119	19.6	o	25.1	med	?	s	Promoted since 2003, avg-low adoption

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

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

SPVD resistance (r: resistant, s:susceptible)

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

Type of sweetpotato trials 2012/13

Type of trial		Details	2009	2012/13
Crossing block				
	1	No. of parents in crossing block	39	13
	2	No. of seed collected from OP	24393	to harvest
		a. Total no. of families of OP seed	42	
	3	No. of seed collected from crosses	147	
		a. Total no. of families of controlled crosses	33	
Seedling nursery				
	1	No of seeds planted	17404	5885
	2	No of seedlings established	9553	4399
	3	Total no. of families planted	15	53

Type of sweetpotato trials 2012/13 (cont)

Type of trial		Details	2009	2012/13
Observation trial				
(OT)	1	No of clones planted	75	70
	2	No of checks (check clones) planted	7	10
	3	No. of locations	1	1
Preliminary yield (PT)				
	1	No of clones planted	43	63
	2	No of checks (check clones) planted	7	7
	3	No. of locations	1	1
Intermediate yield (IT)				
	1	No of clones planted	30	0
	2	No of checks (check clones) planted	7	
	3	No. of locations	2	3
Advanced yield trial (AT)				
	1	No of clones planted	20	16
	2	No of checks (check clones) planted	6	7
	3	No. of locations	6	3



Type of sweetpotato trials 2012/13 (cont)

Type of trial		Details	2009	2012/13
On-farm trials				
	1	No of farms/farmers/region/district / province		2 prov
	2	Total no. of trials whole country	3	3
No of varieties released				13
No. of clones in pipeline for release by e.g. Oct. 2013				5

Other Project Information



Other initiatives:

- **Demonstration agronomy of OFSP – National Department of Science and Technology (2010-2013)**
- **Collaboration with Rural-based universities – National Department of Science and Technology (2010-2013)**
- **On-farm trials in Gauteng – Provincial Department of Agriculture and Rural Development (2011-2012)**
- **Mutation breeding – International Atomic Energy Agency (2009-2013)**
- **Agro-processing strategy for sweetpotato – National Treasury (2012-2014)**



Other Project Information (cont).



Number of scientists and technicians in program

- **Scientists:**
 - Program manager: Dr P Adebola (Breeding); Dr Du Plooy (Agronomy)
 - Senior researcher: Dr S Laurie
 - Jnr researcher: Mr A Moalafi (MSc)
- **Technicians**
 - Permanent: Mr M Mtileni
 - Contracts: Ms W Mphela, Mr T Ramathavhana, Ms L Sediane, Mr L Maraganedzha
- **Students: 4 MSc**
- **Agro-processing: 1 Snr res (permanent), 1 jnr res, 2 tech (contract), agric. economist, artisan**

Other Project Information (cont).



Papers published:

- Laurie, S.M. & Van Heerden, S.M. 2012. Consumer acceptability of four products made from beta-carotene-rich sweet potato. *Afr J of Food Science* 6(4):96-103.
- Laurie, S.M., Faber, M., et al. (2012). β -carotene yield and productivity of orange-fleshed sweet potato (*Ipomoea batatas* L. Lam.) as influenced by irrigation and fertilizer application treatments. *Scientia Horticulturae* 142: 180-184.
- Laurie, S.M., van Jaarsveld, P.J., et al. (2012). *Trans*- β -carotene, selected mineral content and potential nutritional contribution of 12 sweetpotato varieties. *J Food Composition and Analysis* 27:151-9.
- Laurie, S.M., Faber, M., et al (2012). The use of sensory attributes, sugar content, instrumental data and consumer acceptability in selection of sweet potato varieties. *Journal of the Science of Food and Agriculture* DOI 10.1002/jsfa.5932
- Laurie S.M., Calitz F.J., et al. (2013). Characterization and evaluation of South African sweet potato (*Ipomoea batatas* (L.) LAM) land races. *South African Journal of Botany* 85: 10-16.

Other Project Information (cont).

Constraints:

- National IP Management Act 2010 for public financed institutions
- Slow procurement of infrastructure

Proposed future activities:

- DRDLR Sweetpotato enterprises
- Genetic analysis - diallel



Thank you for your attention!