

‘NASPOT 7’, ‘NASPOT 8’, ‘NASPOT 9 O’, ‘NASPOT 10 O’, and ‘Dimbuka-Bukulula’ Sweetpotato

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Five sweetpotato [*Ipomoea batatas* L. (Lam.)] cultivars named NASPOT 7 (Namulonge Sweetpotato 7), NASPOT 8, NASPOT 9 O (Namulonge Sweetpotato 9 orange-fleshed), NASPOT 10 O, and Dimbuka-Bukulula were approved for release by the Ugandan Plant Variety Release Committee in July 2007 (Mwangi et al., 2007a). This is the fourth group of sweetpotato cultivars to be officially released by the Sweetpotato Program in Uganda. The first three groups were released in different years, six in 1995 (Mwangi et al., 2001), six in 1999 (Mwangi et al., 2003), and two in 2004 (Mwangi et al., 2007c). The five cultivars released in 2007, described here, have acceptable storage root shapes when grown in light soils. They also have high dry matter content ($\approx 30\%$) and good to excellent consumer acceptance, particularly among children younger than 6 years old and women (Mwangi et al., 2007b, Odongo et al., 2002; Potts and Nagujja, 2007; Wamaniala, 2008). The cultivars have low to moderate levels of field resistance to sweetpotato virus disease (SPVD) and *Alternaria bataticola* blight and high storage root yields compared with the average national storage root yield of 4.0 t·ha⁻¹ (International Potato Center, 1999). The release of these five cultivars provides consumers and farmers with high-quality sweetpotatoes with cream- and orange-fleshed storage roots and moderate to high provitamin A contents with

potential to alleviate widespread vitamin A deficiency in Uganda and other developing countries (Jaarsveld et al., 2005; Low et al., 2007; Ruel, 2001; UDHS, 2001) and contribute to food security (Mwangi et al., 2007a).

Origin

Throughout evaluation at the National Crops Resources Research Institute (NaCRRI), Namulonge, and in on-station and on-farm trials in major selected agroecologies in Uganda, the five clones were coded using the following nomenclature: Namulonge *Ipomoea* selection (NIS)/the initial year selected/the female parent/the selection (genotype) number/similarity code number (if present). The codes for the releases were ‘NASPOT 7’ (NIS/2002/SPK004/1), ‘NASPOT 8’ (NIS/2002/SPK004/1/1), ‘NASPOT 9 O’ (NIS/2002/SPK004/6), ‘NASPOT 10 O’ (NIS/2002/SPK004/6/6), and ‘Dimbuka-Bukulula’ (Dimbuka). ‘Dimbuka-Bukulula’, collected from Bukulula subcounty in Masaka District, is a superior Ugandan farmers’ cultivar selected out of 1256 landrace germplasm accessions. The sweetpotato germplasm was collected from 21 major sweetpotato-producing districts in Uganda and assembled at NaCRRI in 2006. The pedigree of ‘Dimbuka-Bukulula’ is not known, but it is assumed to be a chance seedling or sport selected by farmers. The other four cultivars, NASPOT 7, NASPOT 8, NASPOT 9 O, and NASPOT 10 O, are seedling selections from the sweetpotato program at NaCRRI and were selected from bulked seed from an open-pollinated polycross nursery of 24 parents grown during 2000 to 2001. The 24 parents in the polycross block consisted of 10 released cultivars, three

introductions, five advanced clones from the Ugandan sweetpotato breeding program, and six landrace cultivars (Table 1). The three introductions, Zapallo (PI 420027), Jewel (PI 440031), and Beauregard (PI 440132), were received from the International Potato Center (CIP), Lima, Peru, as pathogen-tested *in vitro* plantlets. The six landraces and the districts (in parentheses) from where they were collected were ‘Arivumaku-2’ and ‘Ngujja’ (Arua), ‘Kala’ (Kumi), ‘Kanyasi’ (Kabale), ‘Araka’ (Soroti), and ‘Bunduguza’ (Kamuli). The 24 parents were included in the polycross nursery for improvement or as sources of one or a combination of genes for control of desirable traits such as orange-fleshed roots (provitamin A), high dry matter (30% or greater), resistance to SPVD and *Alternaria* stem blight, and early maturity (3 to 4 months) (Table 1). The four released breeding lines described here were all progenies of ‘Kakamega’ (‘SPK004’) as the female parent, but because seed was open-pollinated, their male pedigrees are not known.

Diffusion of Cultivars

The global HarvestPlus Program (HarvestPlus, 2007; Pfeiffer and McClafferty, 2007) was involved in an effectiveness case study to promote orange-fleshed sweetpotato (OFSP) to alleviate vitamin A deficiency in Uganda. The OFSP high provitamin A cultivars, NASPOT 9 O and NASPOT 10 O (Bengtsson et al., 2008), were given new names, ‘Vita’ and ‘Kabode’, respectively, in the HarvestPlus project areas (Wamaniala, 2008). The adoption rates for both ‘NASPOT 9 O’ and ‘NASPOT 10 O’ in three target HarvestPlus project area districts in Uganda reached 100% (3261) in Bukedea, 90% (3504) in Kamuli and 80% (3511) in Mukono; the numbers in parentheses were households growing both cultivars by Sept. 2008, three seasons after the farmers received them (Wamaniala, 2008). Spread of the other released cultivars in the three and other districts was not as fast and was mainly through farmer-to-farmer exchange or sale of planting materials and promotions by nongovernment organizations, schools, farmer groups, and government departments. In the absence of a seed company that deals in sweetpotato-planting materials, the released cultivars have already reached the following 22 districts in Uganda: Amuria, Bukedea, Busia, Jinja, Kabale, Kampala, Kamuli, Karamoja, Katakwi, Kayunga, Kumi, Lira, Manafwa, Masaka, Mayuge, Mpigi, Mukono, Nakasongola, Padel, Soroti, Tororo, and Wakiso (Potts and Nagujja, 2007; Wamaniala, 2008).

Description and Performance

The five released cultivars were evaluated for five seasons on-station at Namulonge in seedling, observation, preliminary and intermediate trials between 2002 and 2004, and for three seasons in on-station and on-farm trials between 2004 and 2006 in replicated,

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Table 1. Origin and main attributes of 24 sweetpotato parents used in the 2001/2002 polycross nursery at Namulonge, Uganda.

Code	Female parent	Origin of parent	Year released/status/ germplasm (GM)	Desirable/undesirable trait
1	SPK004 (Kakamega)	Kenya	2004	OF ² , HDM ³ , moderately resistant to SPVD ⁴
2	Ejumula	Uganda (landrace)	2004	OF, HDM, highly susceptible to SPVD
3	NASPOT 1	Uganda (bred clone)	1999	OF, HDM, high root yield, susceptible to AB ^w
4	NASPOT 3	Uganda (bred clone)	1999	HDM, moderately resistant to SPVD
5	NASPOT 4	Uganda (bred clone)	1999	Resistant to SPVD
6	NASPOT 5	Uganda (bred clone)	1999	OF, HDM, resistant to SPVD, susceptible to AB
7	New Kawogo	Uganda (landrace)	1995	HDM, resistant to SPVD, susceptible to AB, aggressive to weeds
8	Bwanjule	Uganda (landrace)	1995	HDM, resistant to SPVD
9	Sowola	Uganda (landrace)	1995	HDM, early maturity, light canopy
10	Tanzania	Uganda (landrace)	1995	HDM, taste, moderately resistant to SPVD
11	Zapallo (420027)	CIP/Peru	GM	OF, moderate resistance to AB, susceptible to SPVD
12	Beauregard (44013)	CIP/Peru	GM	OF, good root shape, susceptible to SPVD
13	Jewel (440132)	CIP/Peru	GM	OF, susceptible to SPVD
14	NIS/199/23/60	Uganda (bred clone)	Breeding line	OF, susceptible to SPVD
15	NIS/93/29	Uganda (bred clone)	Breeding line	HDM, resistant to SPVD
16	NIS/199/18/1	Uganda (bred clone)	Breeding line	OF, susceptible to SPVD
17	NIS/199/4/4	Uganda (bred clone)	Breeding line	OF, HDM, susceptible to SPVD
18	NIS/1990/Sowola-6	Uganda (bred clone)	Breeding line	OF, susceptible to SPVD
19	Ngujja	Uganda (landrace)	GM	OF, susceptible to SPVD
20	Arivumaku-2	Uganda (landrace)	GM	OF, low root yield
21	Bunduguzza	Uganda (landrace)	GM	HDM, resistance to sweetpotato weevil
22	Araka	Uganda (landrace)	GM	Adapted to short grassland area
23	Kala	Uganda (landrace)	GM	OF, HDM,
24	Kanyasi	Uganda (landrace)	GM	HDM, susceptible to AB

²OF = orange flesh of storage roots.

³HDM = high dry matter (30% or more in storage roots).

⁴SPVD = sweetpotato virus disease.

^wAB = *Alternaria bataticola* blight.

Table 2. Morphological descriptors of five sweetpotato cultivars released in Uganda in July 2007.²

Descriptor	Cultivar				
	NASPOT 7	NASPOT 8	NASPOT 9 O	NASPOT 10 O	Dimbuka-Bukulula
Plant type	Semierect	Semierect	Semierect	Semierect	Semierect
Predominant color	Green	Green	Vine pigmentation		Green
Secondary color	Purple tip	Purple tip	Purple tip	Purple tip	Green tip
General outline	Lobed	Lobed	Mature leaf shape		Triangular
Lobe type	Deep	Deep	Lobed	Lobed	No lateral lobes
Lobe number	5	5	7	7	1
Shape of central lobe	Elliptic	Elliptic	Elliptic	Semielliptic	Triangular
Mature leaf	Green	Green	Foliage color		Green
Abaxial leaf vein	Purple	Purple	Green	Green	Green
Immature leaf	Green with purple edge	Green with purple edge	Purple	Green	Green
Petiole pigmentation	Green with purple near blade	Green with purple near blade	Light purple	Light purple	Green
Habit	Sparse	Moderate	Flowering		Moderate
Stigma exertion	Same as highest anther	Inserted (shorter than highest anther)	Sparse	Slightly exerted	Inserted (shorter than highest anther)
Seed set	Scarce	Sparse	Capsule		Moderate
Formation	Open cluster	Dispersed	Storage root		Open cluster
Shape	Obovate	Long irregular or curved	Open cluster	Open cluster	Open cluster
Surface defects	Horizontal constrictions	Horizontal constrictions	Obovate	Long irregular or curved	Long irregular or curved
			Longitudinal grooves	Horizontal constrictions	Longitudinal grooves
Predominant Intensity	Purple-red	Purple-red	Skin color		Cream
Secondary	Absent	Absent	Purple-red	Purple-red	Intermediate
			Intermediate	Absent	Absent
Predominant	Intermediate orange	Pale orange	Flesh color		Cream
Secondary	Absent	Yellow	Intermediate orange	Dark orange	Absent
			Absent	Absent	Absent

²Selected descriptors according to International Potato Center, AVRDC, and IBPGR (1991).