

Performance and Release of two African nightshade lines from World Vegetable Center (WorldVeg) germplasm in Northen Tanzania

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Introduction

African nightshade comprise several species of the genus *Solanum* in the section solanum. The genus *Solanum* is the largest and most diverse genus in the family of Solanaceae. African nightshade is reported to be rich in vitamin A, iron and calcium. It is one of popular traditional leafy vegetables in many African countries, and leaf yield is the major trait farmers look in an ideal cultivar. Despite the potential of this vegetable crop, most species remain at the level of landraces, with only few improved cultivars released for commercial production. With the effort to bring more improved cultivars, 17 advanced lines, including three check cultivars, were evaluated in three locations (Moshi, Mbuguni, and World Vegetable Center Eastern and Southern Africa (WorldVeg-ESA) in northern Tanzania in 2015 and 2016.

Objectives

The objective of the evaluation was to identify superior lines for release and registration.

Materials and methods

Plant materials: Eight lines plus two check cultivars of *Solanum scabrum* and nine lines plus one check cultivar of *S. villosum* were evaluated. The lines were developed by single plant selection from World Vegetable Center germplasm accessions and selfed at least for three generations.

Locations and experimental layout: The materials were evaluated in the field in randomized complete block design with three replications at WorldVeg-ESA’s research station in Arusha (loamy to clay soil, altitude 1290 masl), Moshi on-farm (red soil, altitude 854 masl) and Mbuguni (mostly volcanic soil, altitude 934 masl).

Results

Significant differences among entries in all locations were found for yield, leaf length, leaf width and number of branches per plant. Line RC10-ES13-3 (*S. scabrum*) consistently gave the highest fresh vegetable yield at each of the three locations in 2015 and at each of the two locations in 2016 (Tables 1 and 2). The line has broad leaf that is less bitter in taste, and is late in flowering which gave it an advantage of long harvesting period hence high yield. Line RC18-ES13-3 (*S. villosum*) gave the highest fresh vegetable yield of 27.6 and 31.8 t/ha at Mbuguni and Worldveg-ESA, respectively in 2016. RC18-ES13-3 has narrow leaf that is bitter in taste that is liked by most of farmers/consumers. The two lines were released in Tanzania in 2018 under the commercial name ‘**Ambureni**’ and ‘**Malala**’ after passing the Distinctiveness, Uniformity and Stability (DUS) test conducted by the Tanzania Official Seed Certification Institute (TOSCI).

Table 1: Fresh vegetative yield of 13 African nightshade (*Solanum* spp.) entries tested at three locations in northern Tanzania, 2015.

Entry	Solanum species	Fresh vegetative yield (t/ha)			FSel
		WorldVeg	Moshi	Mbuguni	
BFS1-ES13-2	<i>S. scabrum</i>	14.1	13.5	18.9	1.4
SV-ES13-2	<i>S. villosum</i>	14.7	5.4	4.9	3.6
BG 22-ES13-3	<i>S. scabrum</i>	18.1	14.8	19.0	2.6
MW 22-ES13-4	<i>S. scabrum</i>	14.0	9.4	9.9	2.4
MW 26-ES13-4	<i>S. scabrum</i>	14.4	11.8	15.3	2.4
MW 13 -ES13-4	<i>S. villosum</i>	4.7	2.3	2.6	2.7
SS 52-ES13-1	<i>S. scabrum</i>	18.1	11.0	14.3	2.4
BG 18-ES13-1	<i>S. scabrum</i>	17.0	13.9	15.9	2.4
RC 10-ES13-3	<i>S. scabrum</i>	19.2	14.4	21.4	2.6
RC 09-ES13-3	<i>S. villosum</i>	8.0	5.0	3.9	2.8
Nduruma (check)	<i>S. scabrum</i>	10.1	7.9	16.6	2.2
Olevolosi (check)	<i>S. scabrum</i>	10.2	7.2	10.6	2.4
Mnavu (check)	<i>S. villosum</i>	9.7	4.4	2.5	3.2
Mean		12.9	9.2	12.1	
LSD (5%)		4.2	3.8	6.5	0.4

FSel= Farmers’ selection score



Fig 1: Line RC18-ES13-3, Released under commercial name ‘**Ambureni**’



Fig 2: Line RC10-ES13-3, Released under commercial name ‘**Malala**’

Table 2: Fresh vegetative yield of 20 (*Solanum* spp.) entries tested at two location in northern Tanzania, 2016.

Entry	Solanum Species	Fresh vegetative yield		Entry	Solanum Species	Fresh vegetative yield	
		WorldVeg	Moshi			WorldVeg	Moshi
BFS1-ES13-2	<i>S.scabrum</i>	28.5	12.95	SV-ES13-2	<i>S.villosum</i>	26.0	22.3
BG22-ES13-3	<i>S.scabrum</i>	26.3	14.36	MW 13 -ES13-4	<i>S.villosum</i>	11.0	24.7
MW22-ES13-4	<i>S.scabrum</i>	22.4	10.59	RC09-ES13-3	<i>S.villosum</i>	24.2	25.7
MW26-ES13-4	<i>S.scabrum</i>	26.9	11.91	RC09-ES13-5	<i>S.villosum</i>	20.7	23.7
SS52-ES13-1	<i>S.scabrum</i>	27.6	7.48	IP 03-ES13-1	<i>S.villosum</i>	19.6	21.2
BG18-ES13-1	<i>S.scabrum</i>	23.2	10.22	MW 13-1-ES13-3	<i>S.villosum</i>	13.8	22.4
RC10-ES13-3	<i>S.scabrum</i>	33.8	14.99	RC09-ES13-4	<i>S.villosum</i>	19.7	20.8
RC10-ES13-2	<i>S.scabrum</i>	28.3	11.51	MW 13-1-ES13-2	<i>S.villosum</i>	13.9	24.3
Nduruma (check)	<i>S.scabrum</i>	28.2	11.24	RC18-ES13-3	<i>S.villosum</i>	31.8	27.6
Olevolesi (check)	<i>S.scabrum</i>	30.4	10.82	Mnavu (check)	<i>S.villosum</i>	18.8	21.8
Mean		27.6	11.61	Mean		20.0	23.4
LSD (5%)		5.71	3.925	LSD (5%)		9.09	ns

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