

INTRODUCTION OF NUTRIENT DENSE SWEETPOTATOES IN ZAMBIA: WORKING WITH FARMERS ON-FARM



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Summary

The Sweetpotato Breeding Program in Zambia has been for the past few years engaged in introgressing high β -carotene genes in white fleshed high dry matter sweetpotato varieties that are preferred by consumers. Through this process five varieties were identified for on-farm testing and introduction to farmers in the 2011/2012 season. The objectives were to introduce the varieties to farmers, to test the performance of top orange fleshed sweetpotato varieties under farmer growing conditions and researcher-farmer management, to test farmers' acceptance and ranked preference of the varieties for yield and quality attributes (with taste tests), to obtain feedback (farmer preference) to breeders for standardizing of methods and to build farmers' capacity on variety assessment. The methodology involved partner identification and field selection, identification of farmers/farmer groups, planning for the variety trial with farmers, planting the trial, field assessment and monitoring, Agronomic and taste evaluations for SPVD assessment and weeding, leaf taste-test evaluation and root taste-test (quantitative and participatory) evaluation. The varieties planted were Olympia, Kokota, Twatasha, Orange Chingovwa and Zambezi. These were planted in plots of 5 x 6 m ridges per variety spaced at 1 m and each farm served as a replication. Eighty one farmers participated in leaf evaluations for vegetable among which were 38 female farmers. Variety Chingovwa and Orange Chingovwa were the most preferred for vegetable across the testing sites after boiling. Root taste evaluation involved 114 participants among which were 69 females. Variety Olympia and Chingovwa were preferred before cooking and Chingovwa and Orange Chingovwa after boiling. Mean root fresh yields ranged from 7.3 t ha⁻¹ for variety Zambezi to 9.6 t ha⁻¹ for Chingovwa. Experience from this activity has shown that clear protocol interpretation by partners and researchers is indispensable. Farmer selection and field location is critical. Field selection by farmers occurs in July-September and the location must facilitate regular monitoring especially of disinterested farmers. Simplification of data collection to facilitate farmer participation is required. There is need to further develop the on-farm standard protocol to include challenges of vine re-establishment/replanting and cooking methodology that was different for each district. Overall, each variety was preferred either for roots or vegetable or both.

Introduction

On-farm variety testing is aimed to bridge the gap between breeders and farmers during the variety development process



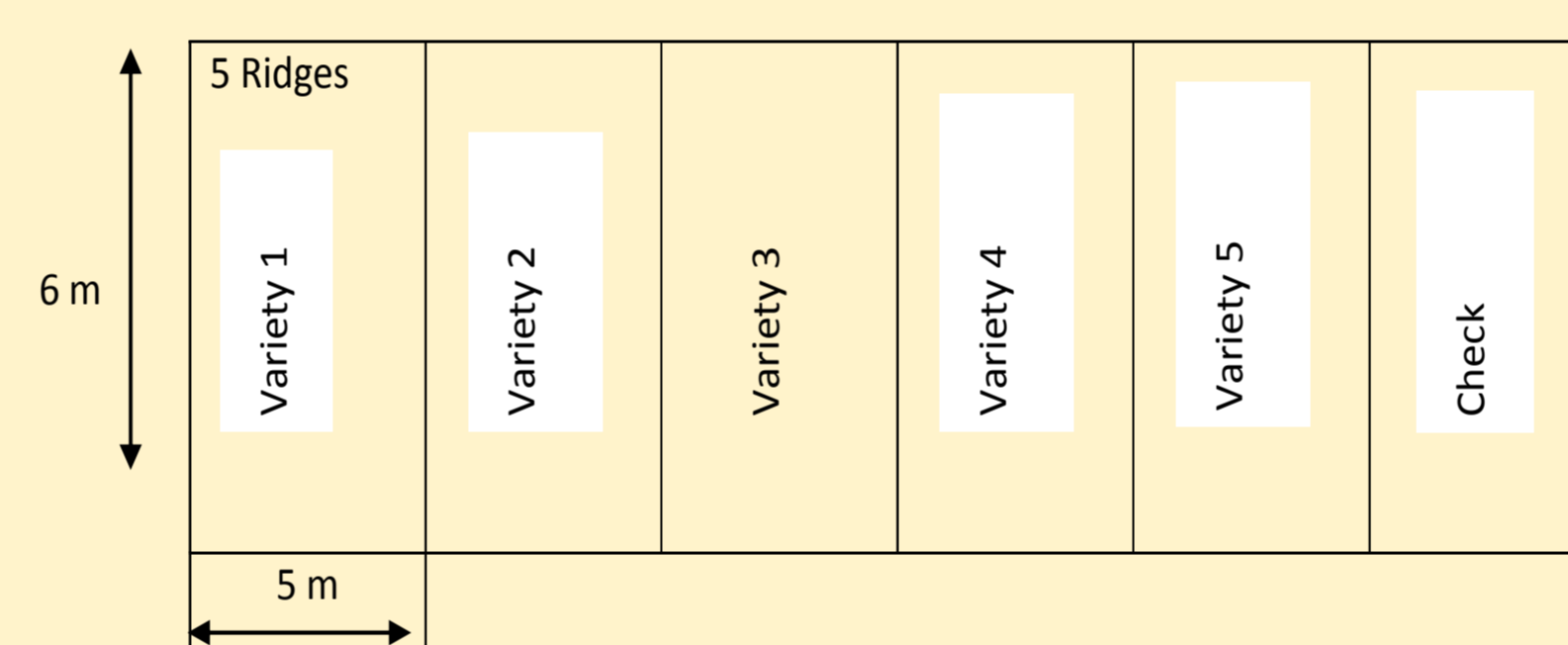
Objectives

- To **introduce** OFSP varieties to farmers
- To **test performance** of OFSP promising varieties under farmer growing conditions and researcher-farmer management
- To **test farmers' acceptance and ranked preference** of the varieties for yield and quality attributes (including taste tests)
- To obtain **feedback (in terms of what farmers like in a variety)** for breeders
- To **build farmers' capacity** on variety assessment

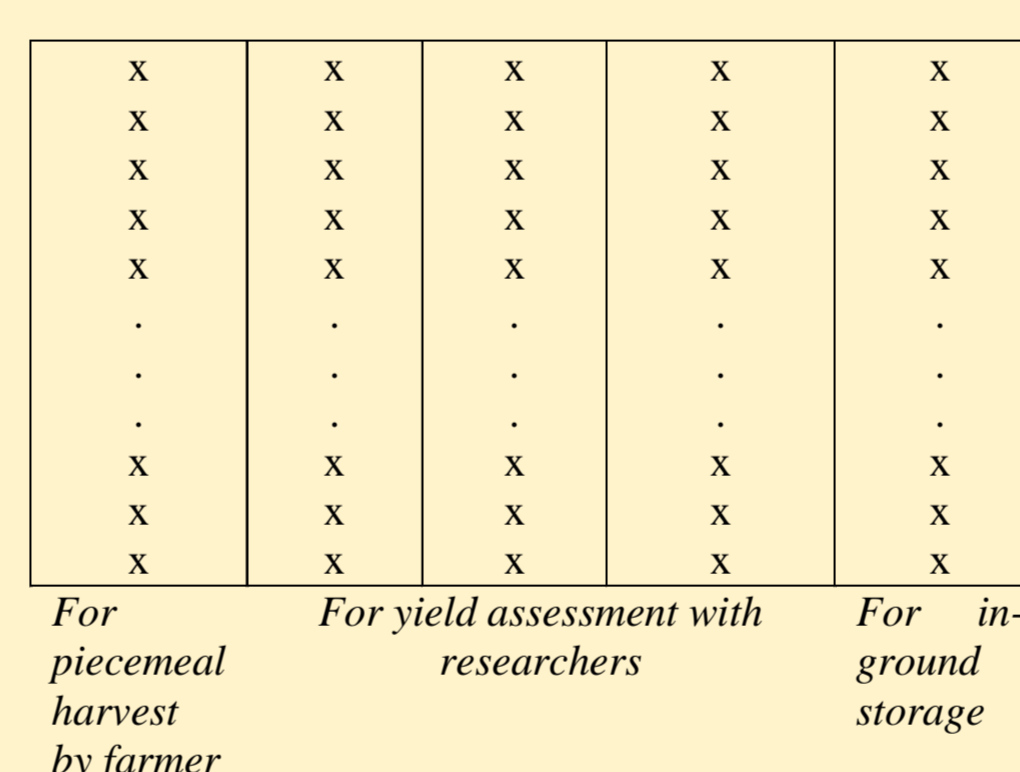
Methods

- Step 1:** Identification of local partner(s) and areas for on-farm trials
Selection of areas for on-farm trials **prioritized capturing the range of different agro-ecological** (rain, soil, temperature) and socio-economic conditions
- Step 2.** Identification of farmers or farmers' groups: This was done by the researcher and the local partner or the local partner alone depending on the level of collaboration and mutual trust.
Have at least 1/2 of the on-farm trials with women
- Step 3.** Planning for the trials with farmers: This is an important step and a training was scheduled with the entire group of farmers or group leaders at Katopola Farm Institute in Chipata.
- Step 4.** Planting the trial: The researchers again explained the trial objectives and design
- 1) Plot sizes of about **30 sq meters arranged in 5 rows 6 meters long were used per candidate variety**. Ridges were at least **40 cm high**. In each ridge, vines were planted at **30 cm apart**. Thus **100 cuttings were used per plot**.

Example of trial layout



Example of individual plot layout (5 rows, 6 m long and 1 m apart)



Results

Leaf tasting of varieties for vegetable in eastern Province in 2011/2012

Clone	Methods of preparing the sweetpotato vegetable				
	Boiling with water				
	Chipata	Katete	Petauke	Lundazi	Overall
Twatasha	5	1	1	4	2
Orange Chingovwa	2	2	2	4	1
Olympia	3	4	3	3	3
Chingovwa	1	3	5	1	1
Kokota	4	6	1	2	3
Zambezi	6	5	4	5	4

Mean varietal yields across districts in Eastern Province in 2011/2012

Clone	Total Yield (Cured plants) (t ha ⁻¹)	Total yield (Uncured plants) (t ha ⁻¹)	Total Yield (t ha ⁻¹)
Chingovwa	9.031	9.934	9.633
Orange Chingovwa	7.108	9.069	8.293
Twatasha	6.739	8.931	8.197
Kokota	6.728	8.313	7.911
Olympia	6.501	8.154	7.544
Zambezi	6.323	7.765	7.344
Grand Mean	7.07	8.69	8.15

Districts' combined yields in eastern Province 2011/2012

District	Total Cured Yield (t/ha)	Total Uncured Yield (t/ha)	Mean Farm Yield (t/ha)	Farmer/district
Chipata	7.466	8.184	7.945	-
Katete	8.970	11.71	10.80	-
Lundazi	7.203	9.129	8.487	-
Petauke	4.647	5.752	5.383	-
Best yielding farm	14.24	19.52	17.76	Khonzhe Phiri/Katete
Least yielding farm	1.895	2.898	2.564	Sofia Daka/Petauke



Considerations

The yield data presented here may not show the actual performance of the varieties in the districts, however, they are indicative of the potential.

- Plants that were planted were not uniform (tips versus the rest)
- Replanting meant plants being at different growth stages
- Sources of planting material were different in some cases hence different ages of the vines planted



Step 5. Monitoring the trial:

- checked on the establishment and ensured timely gap filling;
- ensured timely weeding of the trials by the farmers and
- ensured general good progress of the trials.

Step 6: Evaluation of the trials:

SPVD assessment and 1st Weeding: The first weeding was done 3 weeks after planting and farmers were instructed to do so
Virus incidence at 6 weeks

Step 6: Evaluation of the trials:

Harvested from the **border rows leaves and root**. Leaves were cooked in a **simple local fashion**. The prepared leaves were evaluated for 1) **taste** 2) **appearance** and 3) **texture** using color card system

Leaf taste-test evaluation --- Three months after planting, leaves or leaves and petioles (**depending on local practice**) were harvested from each candidate variety and **prepared for consumption using the local preparation method**.

While the leaves were still on the plant, farmers were asked to evaluate whether each variety was good for cooking and why

Consumer acceptability assessment:

Roots from each variety were labeled; boiled and small pieces were then served on plates for 'blind' assessment using A, B, C etc or 1, 2, 3 etc to code each variety
Care was taken not to overcook the roots, especially those with lower DM. The use of cards in the consumer acceptability exercise was done in a much similar way as for the field evaluation

Acknowledgements

Alliance for a Green Revolution in Africa
International Potato Center/SASHA Project
USAID Zambia FtF Program
Zambian Government