Proceedings of the 13th ISTRC Symposium, 2007
pp. 622 - 626

Farmers' participatory perspectives on sweetpotato cultivars in Makueni district of Kenya

Githunguri C.M. and Migwa Y.N.
KARI-Katumani, P.O. Box 340, Machakos, Kenya

Abstract. Sweetpotatoes are a major source of subsistence and cash income to farmers in semi-arid regions areas of Kenya. KARI-Katumani in collaboration with the International Potato Centre (CIP) has been selecting and breeding sweetpotato clones for resistance to major biotic and abiotic stresses. Sixteen promising sweetpotato cultivars were planted at Kampi ya Mawe, Makueni district during the 2001/02 cropping season. The crop was harvested in March 2002 and farmers evaluated the cultivars based on taste and appearance. The best cultivars selected by farmers was Kanziga 2-1, Mogamba, Bikiramaria, 192100/103, Salyboro and Kanziga 1-1. The farmers' most important selection criteria were taste, appearance and yield in that order. Taste and appearance should be considered when breeders are developing new cultivars

Introduction

Sweetpotatoes are a major source of subsistence and cash income to farmers in semi-arid regions areas of Kenya. According to Onwueme (1978) sweetpotatoes has high potential for livestock feed and industrial use. In Kenya, sweetpotatoes are produced by small-scale farmers using traditional farming methods and marginal soils produce most of the sweetpotatoes. The yields of sweetpotato vary with cultivar, disease resistance, location and production practices (Onwueme, 1978). In Kenya, constraints to sweetpotato production include the sweetpotato weevil, viruses and lack of adequate disease and pest free planting materials, poor cultural practices, lack of appropriate storage and processing technologies and poor market infrastructure (Lusweti *et al.*, 1997; Githunguri *et al.*, 2003).

In Kenya, sweetpotato covers about 75,000 hectares, or about 1.9% of Kenya's total arable land (Qaim, 1999). Its production has risen significantly during the last four decades, multiplying by a factor of 5. However, most of this is due to increases in the area cultivated and not production per unit area. The crop seems to be increasing importance as a result of pressure on arable land and declining farm sizes. In addition, the crop is adapted to marginal climatic and edaphic conditions. It also yields significantly higher amounts of calories per unit area under low–input production conditions. Sweet-potato production conditions differ by agro-ecological zone due to distinct agro-climatic and socio-economic factors. About 75% of its total production is concentrated in the humid and semi-humid lake Victoria basin in the Western region (Qaim, 1999). Although some of the producing areas in the Central and Coast Provinces have humid conditions, the majority of them are semi-arid. Table 1 shows the area and production estimates for each sweetpotato-growing region by 1998.

KARI-Katumani in collaboration with the International Potato Centre (CIP) has been selecting and breeding sweetpotato clones that are resistant/or tolerant to major biotic and abiotic stresses. KARI-Katumani has recognized the importance of involving farmers in their selection and breeding research programmes as suggested by Bellon (2001) and Fliert and Braun (1999). Research at KARI has identified a number of

sweetpotato varieties adapted to diverse agro-ecological zones, that are high yielding, early bulking, drought resistant/tolerant and resistant to major biotic and abiotic stresses. The objective of this study was therefore to evaluate the performance of 16 promising sweetpotato cultivars in Kampi ya Mawe, a semi-arid area in Makueni district of Kenya.

Materials and methods

The study was carried out with farmers. Sixteen promising sweetpotato cultivars were planted at Kampi ya Mawe, Makueni district during the 2001/02 cropping season. The sweetpotato cultivars were planted in November 2001 at the onset of the short rains. The cultivars were planted in 4-row plots at a spacing of 75x50 cm and replicated three times. Each row had 7 plants. Tanzania, a popular cultivar was included as a check. The crop was subjected to normal cultural practices, and kept weed-free for the first 6 weeks after planting**.**

The sweetpotato crop was harvested in March 2002 and subjected to a rigorous evaluation by farmers. The evaluations were based on taste and appearance. A trained panel of 16 farmers was used for the evaluations, which were conducted under the guidance of both the research and extension staff following the participatory method suggested by Bellon (2001). At least half of the farmers were women. The data was computed as percentage of panel respondents.

Results and discussion

Characteristic of some of the sweetpotato germplasm held at KARI- Katumani in eastern Province of Kenya. Table 2 shows some characteristics of some of the sweetpotato germplasm held at KARI-Katumani. Farmers' evaluation of the sweetpotato cultivars in Kampi ya mawe, Makueni district Tables 3 and 4 shows the results of the farmers' evaluation of the sweetpotato cultivars. Cultivars Bikiramaria, Zapallo, Kanziga 2-1, Tororo, Kemb 10, Salyboro, 192100/103, Cemsa and Tanzania were the best top ten performers. Cultivar KSP20, the local check performed the poorest.

Based on appearance Mogamba (100%), 192100/103 (100%), Zapallo (100%), Kanziga 2-1 (88%), Salyboro (63%) were rated best. On the other hand, the six sweetpotato cultivars on the basis of taste are Kanziga 2-1, Bikiramaria, Mogamba, Kanziga 1-1, Salyboro and 192100/103. The farmers overall acceptability of the varieties was in order of preference Kanziga 2-1, Mogamba, Bikiramaria, 192100/103, Salyboro and Kanziga 1-1. Farmers emphasized that even though

Table 1: Sweetpotato Production by Area and tonnage (1996 -1998).

Province	Area (ha)	Production (t)	Production Share (%)
Nyanza	35,950	362,373	49.9
Western	17,953	180,971	24.9
Total	53,903	543,344	74.8
Rift Valley	3,675	32,485	4.5
Central	3,558	31,449	4.3
Eastern	12,414	109,744	15.1
Coastal	1,117	9,871	1.3
Total	20,764	183,549	25.2
Grand total	74,667	726,893	100.0

Source: (Quaim, 1999).

Table 2: Tuberous roots yield and dry matter content and foliage yield of different sweetpotato cultivars grown in Makueni (Kampi ya Mawe) District, Kenya, during the 2001/2002 cropping season.

Cultivar	Fresh roots yield (t/ha)	Dry roots yield (t/ha)	Root dry matter content (%)	Foliage yield (t/ha)
Bikiramaria	14.5	3.8	26.5	21.4
Zapallo	11.0	2.6	23.5	13.3
Kanziga 2-1	10.8	3.6	33.2	13.6
Tororo	9.9	3.1	31.7	13.7
Kemb 10	8.2	2.8	34.0	13.0
Salyboro	8.1	2.8	34.1	13.0
192100/103	7.9	2.6	32.7	12.2
Cemsa	7.2	1.9	26.5	10.4
Tanzania	6.5	2.0	31.1	10.4
Mogamba	5.9	2.1	35.6	9.9
320/06	5.5	1.8	32.2	11.9
Kanziga 1-1	5.4	1.8	33.3	7.6
Tainon	4.9	1.5	30.3	5.5
316/02	4.0	1.4	35.2	10.0
91/316	3.9	0.8	21.2	5.4
320/07	3.8	1.7	44.8	6.7
Jayallo	3.5	1.2	35.3	5.3
Naveto	2.2	0.7	31.0	11.1
Kemb 36	2.2	0.8	36.5	16.3
KSP 20	1.4	0.4	30.0	4.4
Mean	6.3	2.0	31.9	10.8

Table 3: The farmers perception (in %) on the appearance of different sweetpotato cultivars grown in Makueni (Kampi ya Mawe) District, Kenya, during the 2001/2002 cropping season.

Cultivar	Appearance (%)			
	Good	Acceptable	Not acceptable	Undecided
316/02	44	56	0	0
320/06	63	31	6	0
Naveto	56	38	6	0
Bikiramaria	38	62	0	0
Cemsa	56	25	19	0
192100/103	100	0	0	0
Tainon	31	38	25	6
Tororo	0	50	50	0
320/07	31	69	0	0
91/316	50	44	0	6
Zapallo	100	0	0	0
Tanzania	25	69	6	0
Salyboro	63	19	0	18
Kanziga 1-1	13	63	13	11
Mogamba	100	0	0	0
Kanziga 2-1	88	12	0	0

Table 4: The farmers perception (in %) on the taste of different sweetpotato cultivars grown in Makueni (Kampi ya Mawe) District, Kenya, during the 2001/2002 cropping season.

Cultivar	Taste (%)			
	Good	Acceptable	Not acceptable	Undecided
316/02	25	50	25	0
320/06	19	25	0	56
Naveto	19	31	0	50
Bikiramaria	75	25	0	0
Cemsa	0	56	19	25
192100/103	44	31	0	25
Tainon	0	81	0	19
Tororo	0	0	44	56
320/07	0	81	0	19
91/316	6	38	25	31
Zapallo	31	31	0	38
Tanzania	13	31	31	25
Salyboro	56	25	0	19
Kanziga 1-1	50	38	12	0
Mogamba	44	50	0	6
Kanziga 2-1	75	25	0	0

the appearance of the roots was important, taste finally influenced their final selection. This was taken into consideration in arriving at the overall acceptability of the cultivars. Though Kanziga 1-1 had the highest yields it was only selected as the sixth best because it was less appealing in its appearance and taste than the other better 5 cultivars.

Conclusions and recommendations

The overall cultivar selection by farmers was Kanziga 2-1, Mogamba, Bikiramaria, 192100/103, Salyboro and Kanziga 1-1. These cultivars could be multiplied and subjected to rigorous on-farm trials. The farmers' most important selection criteria were taste, appearance and yield in that order. Therefore, plant breeders should in addition to yield include taste and appearance in their selection criteria. Cultivar Kanziga 1-1 was selected as the 6th best cultivar despite being the highest yielder. Plant breeders could consider improving its appearance and taste.

Acknowledgment

We wish to acknowledge the Director KARI and the Centre Director KARI-Katumani for their logistical and financial support in making this work a success. The contributions by the Root and Tuber Crops Programme staff, CIP, the extension staff and farmers in Kampi ya Mawe where this work was carried out are gratefully acknowledged.

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