

KANJANGAD - A SWEET POTATO VARIETY FOR UPLANDS

P. Manju and Sunny K. Oommen

College of Agriculture, Vellayani 695 522, Trivandrum, India

Abstract: In an investigation to identify superior clones of sweet potato (*Ipomoea batatas* [L.] Lam) suitable for uplands, 36 clones were evaluated in a preliminary yield trials and 14 superior ones were clonally selected and subjected to comparative yield trial for three years. The types SPC-13, SPC-18, SPC-20 and Kanjangad gave higher tuber yield in comparison to others. SPC-13 had the highest total acceptability score followed by Kanjangad which show their superior cooking quality. The results of the farm trial conducted at 12 locations revealed the superiority of SPC-18 and Kanjangad with respect to tuber yield and low weevil incidence. However, the farmers' preference and consumer acceptability were more towards Kanjangad due to its attractive spindle shape and purple colour. Kanjangad was hence released as variety for cultivation in the uplands of Kerala.

Key words : Kanjangad, sweet potato, upland variety, yield trial.

INTRODUCTION

Sweet potato (*Ipomoea batatas* [L.] Lam.) is an important root crop of the tropics and is a subsidiary food crop. It is the sixth most important food crop in the world with an annual production of 126.19 million tonnes from 9.26 million hectares (FAO, 1992). The prime objective in sweet potato breeding is to develop varieties with high tuber yield having resistance to sweet potato weevil and those with high sucrose and carotene content together with high proportion of starch. High amount of variability is present in sweet potato, both in plant and tuber characters, which can be exploited through selection. Being a short duration crop, sweet potato can be conveniently fitted into the cropping pattern in uplands. Hence a study was undertaken to identify clones with superior quality and high yield potential which can be suitably fitted into the cropping pattern in uplands of Kerala.

MATERIALS AND METHODS

Sweet potato types were collected from the different agroclimatic regions of Kerala and the CTCRI, Trivandrum. The 36 clones collected were subjected to preliminary evaluation in RBD with two replications during kharif 1983. The tubers were subjected to organoleptic studies for assessing tuber quality (cooking quality). The characters considered were colour, appearance, fibre, flavour, taste and sweetness and scoring was done based on a four point

scale and computed as a total acceptability score (1-24 scale). Based on yield and quality of tubers, 14 promising clones including "Sree Vardhini" were selected and evaluated in comparative yield trials during 1985, 1986 and 1988 and farm trial during kharif 1989 at 12 locations in Trivandrum district. A station trial was also conducted at the College of Agriculture, Vellayani, Trivandrum.

RESULTS AND DISCUSSION

The data on tuber yield, tuber quality and weevil incidence of the 36 clones under preliminary evaluation are given in Table 1. The clones SPC-13, SPC-18 and H. 268 were on par with the highest yielding clone SPC-20 (15.19 t ha⁻¹). Based on the total acceptability score, the clone SPC-13 ranked first (19.4/24) followed by Kanjangad indicating their superior cooking quality.

The clone Kanjangad had spindle shaped tubers which was acceptable to the farmers as compared to the spherical, partially spherical or elongated tubers of many other clones. Based on tuber yield, weevil incidence and total acceptability score, 14 clones were selected from the preliminary evaluation trial and subjected to comparative yield trials (CYTs) during 1985, 1986 and 1988 (Table 2). The pooled mean of the three CYTs indicated the superiority of clones SPC-20 and SPC-18 in respect of tuber yield. Kanjangad exhibited superiority with respect to quality over the

Table 1. Preliminary evaluation

Sl. No.	Clone	Tuber yield (t ha ⁻¹)	*TAS	Weevil attack, %
1	H. 42	3.43	10.2	20
2	76 - OP (219)	6.85	16.8	30
3	76 - OP(217)	5.56	8.8	15
4	77 - OP(34)	3.15	12.8	15
5	75 - OP(5)	No tuber	--	--
6	75 - OP(9)	5.83	12.8	15
7	75 - OP(59)	0.19	12.8	15
8	H.620	0.28	10.0	20
9	H.268	10.83	10.0	25
10	S - 73	1.48	8.8	20
11	S - 162	No tuber	--	--
12	Kanjangad (CTCR1)	8.89	18.2	25
13	SPC- 13	12.04	19.4	30
14	SPC- 14	6.30	9.8	20
15	SPC- 15	4.26	10.4	20
16	SPC- 16	1.48	14.4	20
17	SPC- 17	8.33	15.0	20"
18	SPC- 18	13.80	14.8	50
19	SPC- 19	7.41	11.8	40
20	SPC-20	15.19	17.2	33
21	SPC- 21	7.41	12.0	20
22	SPC- 22	6.30	16.6	40
23	SPC- 23	3.52	10.2	17
24	SPC- 24	6.11	14.5	15
25	SPC- 25	6.20	11.2	80"
26	SPC- 26	7.59	13.4	65
27	SPC- 27	5.00	13.2	80
28	SPC- 28	9.63	10.5	60
29	" H."2412	No tuber	-	-
30	H. 2416	1.20	12.9	65
31	H. 2421	3.06	14.1	60
32	H. 2743	2.78	11.1	80
33	H. 4021	6.67	15.7	25
34	H. 4024	0.74	14.2	75
35	H. 4126	0.46	12.5	80
36	Kanjangad (Pilicode)	4.63	18.6	55
CD (0.05)		4.38	-	-

*Total acceptability score (1-24 scale)

Table 2. Tuber yield of sweet potato clones in comparative yield trials

Sl. No.	Clones	Tuber yield, t ha ⁻¹				Duration (kharif 1988) days
		Kharif			Pooled mean	
		1985	1986	1988		
1	76.OP - 219	10	3.1	4.0	5.7	114
2	H. 268	7.7	3.3	3.3	4.8	113
3	SPC-13	8.3	6.3	4.8	6.5	118
4	SPC-18	13.8	5.3	5.0	8.0	108
5	SPC-19	5.8	1.7	2.7	3.3	115
6	SPC-14	4.6	2.5	1.5	2.9	110
7	SPC-20	17.5	5.3	4.3	9.0	112
8	SPC-21	6.7	1.8	7.5	5.3	110
9	SPC-24	2.9	1.7	2.5	2.4	115
10	SPC-26	4.7	2.5	3.3	3.5	110
11	SPC-28	3.0	2.4	2.5	2.6	108
12	H. 2743	3.9	3.9	3.0	3.6	111
13	H. 4021	7.1	4.2	4.5	5.3	112
14	Kanjangad	8.1	2.1	2.5	4.2	116
CD (0.05)		3.93	1.59	1.78	2.66	-

other clones (Table 1). The superiority of the type Kanjangad over the other varieties in respect of tuber yield was reported by Jayakrishnakumar *et al.* (1991).

The results of pooled analysis revealed that the genotype x environment interaction for tuber yield was non-significant indicating the stability of the genotypes over the different years.

The trials conducted during kharif 1986 and 1988 showed great variation and reduction in yield due to adverse climatic conditions at the planting time and during the growth phase of

Table 3. Farm trials during kharif 1989

Sl. No.	Location	Duration of the crop, days	Tuber yield, t ha ¹				Percentage of weevil infested tubers, wt			
			SPC-18	SPC-20	Kanj-angad	Local variety	SPC-18	SPC-20	Kanj-angad	Local variety
1	Uzhamalakal	106	26.3	24.7	18.7	11.3	**	**	*	*
2	Peringamala	119	6.9	8.4	9.5	5.7	*	*	*	*
3	Navaikulam	110	5.7	4.8	7.1	-	**	**	*	**
4	Kizhuvillam	125	3.3	8.3	5.6	-	0.0	0.0	0.0	-
5	Cheriyakonni	114	9.5	16.0	10.0	5.0	*	*	*	*
6	Poudikonam	105	3.4	9.0	6.6	-	*	*	*	**
7	Nallanad	112	4.4	6.2	4.0	1.2	18.2	35.5	15.0	33.3
8	Nellimoodu	92	8.3	6.0	11.0	4.8	**	**	**	**
9	Mangalapuram	108	5.1	4.6	7.1	-	10.0	22.2	10.7	-
10	Amaravila	105	21.3	28.6	24.4	-	0	1.6	0	-
11	Perumpazhuthoor	105	6.8	7.8	8.8	-	*	**	*	-
12	Karode	103	19.2	18.5	23.9	-	7.0	19.8	7.3	-
13	College of Agriculture, Trivandrum	122	12.5	19.2	19.6	-	8.8	7.2	9.0	-
Mean			10.21	12.47	12.02	5.6	-	-	-	-

F - value not significant at 5 per cent level (local excluded from statistical analysis)

*Sweet potato weevil attack was not observed

the crop. Tuber yield is the most complex and variable character (Vimala, 1993). The importance of additive genetic variance more than the non-additive variance for tuber yield was reported by Vimala and Lakshmi (1991), while Pillai and Amma (1989) found that additive and non-additive variance were equally important for tuber yield.

The clones SPC-18, SPC-20 and Kanjangad were advanced to farm trials along with the farmer's local variety as check during kharif 1989 at 12 locations in farmers' field in Trivandrum district and one station trial at the College of Agriculture, Vellayani, Trivandrum.

The data on farm trials are presented in Table 3. The test clones were statistically on par (local variety excluded from statistical analysis since different variety was used as check at different locations) but all of them were better than the local check. However, SPC-18 and Kanjangad had comparatively low weevil incidence.

The extent of damage of tubers by weevil ranged from 15 to 80 per cent in the preliminary trial (Table 1). In the comparative yield trials, the scoring done based on number of emerging weevils from 1 kg sample showed great variation for the clones in the different

years. In the comparative yield trials of the high yielding clones, SPC-18 and **Kanjangad** had comparatively low weevil incidence.

The duration of sweet potato is of great importance in determining the yield of marketable tubers. Progressive increase in tuber yield was influenced by duration of the crop in the field. In the present study, the clone Kanjangad in the CYTs during 1985, 1986 and 1988 had a duration of 115, 116 and 116 days respectively. Ashokan *et al.* (1982) reported that starch percentage in the tubers showed a significantly low value at 120 days after planting as **compared** to early stages.

The farmer's preference and consumer acceptability were in favour of **Kanjangad** since it produced best quality spindle shaped purple tubers with good yield and low weevil incidence. Hence, this type was released as a variety by the State Seed Subcommittee of Kerala on 28 February 1992.

ACKNOWLEDGEMENT

The authors are thankful to Dr. V. G. Nair, Professor of Plant Breeding for the technical guidance. Dr. N. Mohanakumaran, Associate

Director, NARP (SR), **Vellayani** for providing the facilities to conduct the research work and to the Director, CTCRI, Trivandrum for providing some of the clonal materials for the **trial**.

REFERENCES

- Ashokan, P. K., Kurian, T. M. and Nair, R. V. 1982. Determination of proper harvesting stage of sweet potato. *J. Root Crops* 8 : 55-57
- FAO, 1992. *Year Book 1991*. Production Vol. 92-93, FAO, Rome, p. 270
- Jayakrishnakumar, v., Sreekumaran, V., Nair, K. H. and Iyer, R. S. [1991]. Performance of sweet potato varieties in the tribal holdings of Amboori, *J. Root Crops*. 17 : 152-153
- Pillai, P. K. T. and Amma, C. S. E. 19X9. Combining ability in sweet potato. *J. Root Crops* 15 : 39-43
- Vimala, B. 1993. Genetic studies of sweet potato (*Ipomoeabatatas* [L.] Lam.) - A review. *J. Root Crops* 19 : 40-46
- Vimala, B. and Lakshmi, K. R. 1991. Heritability estimates in sweet potato. *J. Root Crops* 17 : 35-38