

Studies on the Varietal Performance of Exotic Sweet Potato Clones under Coimbatore Conditions

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Among the exotic clones viz., IB 751 to 756 from Taiwan, IB 758 (W-13 of USA) and CO 1 (TNAU, Coimbatore), the clone IB 758 excelled other clones in tuber yield and quality. The clone IB 758 has given an yield of 38.37 t/ha followed by IB 756 (Taiwan) with 37.88 t/ha compared to CO 1 33.72 t/ha. The clones IB 758 had attained significance for high ascorbic acid (18.95 mg/100 g), carotene content (12.19 mg/100 g), with high starch (47.79 per cent) compared to Taiwan lines. These clones have shown excellent cooking quality and less weevil incidence.

Sweet potato (*Ipomoea batatas* (L) Lam) is an important food crop of South India and the tubers are used as vegetable and for manufacture of starch. The tuber yield is a highly variable vegetative character and influenced by different agro-climatic conditions. The acclimation of world varieties had profound influence of soil and climatic factors besides varietal characteristics. A knowledge on growth and development of sweet potato is necessary for assessing the optimum cultural requirement for optimum yield and quality of tubers.

MATERIAL AND METHODS

Field experiments were conducted with eight exotic clones viz., IB 751 to 756 (from AVRDC, Taiwan), IB 758 (W-13 from Charleston Vegetable Laboratory, USA) and CO 1 (TNAU variety of clonal selection). These clones were tested for three seasons, viz., September, 1978, February, 1979 and June, 1979, under irrigated con-

ditions. The clones were raised as per the method suggested by Muthukrishnan *et al.* (1974). The plot size was 2.4 X 4.5 m which accommodated 75 plants. Clones were set out in the field in a randomised block design with four replications. Observations on vine length (cm), vine girth (cm), number of branches, number of marketable tubers, yield of tubers during September, 1978, February, 1979 and June, 1979 and weight of weevil infested tubers, are given in Table 1. The tuber quality was also analysed as per procedures of McCready *et al.* (1950), for starch, Roy (1973) for carotenoids and Freed (1966) for ascorbic acid content besides cooking quality and weevil incidence percentage (Table 2).

RESULTS AND DISCUSSION

The results indicated significant yield differences among the clones. The clone IB 758 (USA type) excelled others in morphological characters

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and number of tubers, yield of tubers and quality of tubers compared to the other clones. The clone IB 758 and IB 756 (Taiwan) recorded 13.67 and 12.22 per cent increase over CO 1 which in turn recorded 13.33 per cent over the next best clone of IB 754 (Taiwan) and the other clones showed poor yield. The above clones had shown significant superiority in vine length and girth besides foliage weight.

With regard to tuber yield the clone IB 758 recorded a maximum yield of 38.37 t/ha followed by IB 756 with 37.88 t/ha. It showed the potentiality of the clone under garden land conditions and the initial vigour in foliage growth would have acted as a sink for better utilization and assimilation of solar energy as observed by Lowe and Wilson (1974) Ramaswamy and Muthukrishnan (1980) and Mustafa *et al.* (1980). There was reduced weevil incidence in the above clones which may be attributed to the high starch (47.79 per cent), highest carotene (12.09 mg/100g) and ascorbic acid content of tubers (18.95 mg/100g). Similar results have been reported by Wang (1969). Singh and Mishra (1975) Nakai and Tamaki (1958) Mustafa *et al.* (1980) and Sampathkumar *et al.* (1980) The variety IB 756 had shown maximum percentage of carotene content compared to all the clones with its deep orange flesh colour. The starch content (47.79 per cent) was found to be more in the tubers which had the effect to reduce the weevil population. Whatever may be the varietal characteristics, the clone must be harvested at an appropriate

time so that the scope for weevil damage could be minimised. (Ramaswamy and Muthukrishnan, (1980). The practical point that has emerged from the study is that besides the chemical constituents the nature of tuber formation, viz., 10 to 15 cm below the soil with vertical orientation proves to be a good physical characteristic to show resistance to weevil (*Cylas formicarius*).

The above varieties had scored 80-90 per cent in cooking quality and organoleptic test. Based on its morphological, tuber and quality characters the USA variety IB 758 was found to be superior followed by IB 756 of Taiwan line compared to the CO 1.

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Table 1. Performance of Exotic clones of Sweet Potato with cv. Co. 1.

Varieties	Vine length (cm)	No. of branches	No. of marketable tubers	Yield of tubers (good) g/m	Yield of tubers g/m	Yield of tubers g/m	Weight of weevil tubers mean
V ₁ 751	90.3	19.3	4.0	413.0	393.5	418.8	0.10
V ₂ 752	100.3	12.3	4.1	401.0	346.3	405.3	0.02
V ₃ 753	91.8	18.5	3.8	447.3	391.3	413.3	0.07
V ₄ 754	98.5	26.8	4.5	503.5	452.0	485.8	0.07
V ₅ 755	124.3	9.0	2.6	341.8	299.8	350.3	0.08
V ₆ 756	80.3	27.3	4.4	652.8	542.5	637.8	0.10
V ₇ 758	120.8	24.0	4.7	666.8	548.3	647.0	0.08
V ₈ Co 1	105.8	17.5	4.4	452.3	553.5	627.5	0.11
S.E.D.	0.03	1.4	0.21	18.8	27.0	24.2	0.01
C. D.	0.05	2.8	0.44	39.2	36.1	50.4	0.03
General Mean	0.50	19.3	4.04	484.8	441.6	498.3	0.08
CV per cent	7.5	10.0	7.5	5.5	8.6	6.9	24.4

Table 1. Quality of Tubers.

Varieties	Foliage Weight (g)	Ascorbic acid (mg/100g)	Carotene mg/100 g _w	Starch Per cent (Wet. Wt.)	Cooking quality	Weevil per cent
V ₁ 751	464.3	18.2	7.0	36.6	Good	10.2
V ₂ 752	418.8	10.3	5.1	28.8	Good	10.2
V ₃ 753	534.8	17.0	6.3	28.4	Good	7.1
V ₄ 754	558.0	15.6	6.2	36.8	V. Good	6.9
V ₅ 755	364.3	9.6	4.7	22.0	Soggy	5.1
V ₆ 756	762.8	19.3	9.7	40.6	Excellent	5.1
V ₇ 758	627.5	19.0	12.1	47.8	Excellent	0.5
V ₈ Co 1	655.8	6.8	6.2	35.7	Excellent	10.2
S.E.D.	34.3	0.7	0.8	1.9		
C.D.	71.4	1.5	1.6	3.9		
General Mean	548.3	14.5	7.2	34.6		
C.V. Per cent	8.9	6.9	15.2	7.7		