

Evaluation of Different Sweet Orange Varieties for Better Quality and Yield under Akola Conditions

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Abstract Eight sweet orange varieties were compared their performance in Akola conditions in the present studies eight sweet orange cultivar including pera, Pineapple, Jaffa, Washington navel, Hamlin, Valencia late, Sathgudi and Blood red malta are evaluated. Valencia late produced maximum number of fruit⁻¹ plant⁻¹ (232.76) with yield of (32.75) kg plant⁻¹. Pineapple produced the largest fruit weighing 258.5 g and diameter of fruits (9.64 cm) the highest juice percentage (53.13 ml), TSS (12.1 °Brix), Vitamin–C (57.02 mg/100 ml juice) maximum recorded in Valencia late. Sathgudi and Blood red malta varieties had medium yields but their good characteristics of quality, juice volume low and rind thickness thin (0.30 mm) and thick (0.82 m) produced in Hamlin and Pineapple varieties respectively.

Keywords Sweet orange; Cultivars, Physico-chemical properties.

Introduction

Citrus is a major fruit crop of the country both in area and production. These fruits are grown in India on an area of 1042 thousand hectares with a production of 100,90 thousand tonnes. In Maharashtra, it is grown on an area of 277 thousand hectares with annual production of 861 tonnes and productivity 3.1 MT/ha [1]. These fruits carry special significance in view of their nutritional, therapeutic and economic values. Their richness in ascorbic acid (vitamin C and many other mineral substances), iron, calcium, phosphorus, magnesium and potassium is very well recognized. Sweet orange (*Citrus sinensis* Osbeck) belongs to Rutaceae family. Orange fruit is commonly used as desert, apart from the aforesaid qualities, several products can be prepared from citrus fruits particularly the canned juices, canned sections, essential oils, soft drinks, candies, pickles, juice concentrates and citrus pulp. Dried sweet orange peel is used as additive in sweet dishes and to treat coughs.

Economically these fruits have attained ever-increasing significance from export point of view. Establishment of grading plants and processing units has enabled us render maximum volumes of good quality fruits for export purposes to boost our agro-based foreign exchange earnings. Besides India has export potential for Middle East, Far East and European countries.

There are many varieties and cultivars of sweet

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Table 1. Growth characteristics and yield of different sweet orange varieties at the age of 12 years.

Variety	Plant height (m)	Plant spread (m)	Plant volume (m ³)	No. of fruits plant ⁻¹	Yield (kg/plant)
Pera	2.81	3.06	13.81	62.83	10.09
Pineapple	3.37	3.68	23.95	76.40	12.73
Jaffa	4.07	3.65	28.47	131.72	16.47
W. Navel	3.94	3.05	25.32	163.61	20.19
Hamlin	3.74	3.80	28.25	145.15	20.98
Valencia late	4.42	4.17	40.31	232.76	32.75
Sathgudi	3.23	3.76	23.88	220.00	29.32
Bloodred malta	4.15	3.90	33.07	186.85	23.35
SE(m)±	0.17	0.08	0.77	4.38	0.93
CD at 5%	0.54	0.24	2.32	13.24	2.83

orange which differ in quality characters in changing the specific environment. Effect of rootstock on scion fruits of different sweet orange varieties also showed diversity. The present study was aimed to find out the best varieties of sweet orange having more yield and better quality with good commercial value suited to conditions of Akola.

Materials and Methods

Eight sweet orange varieties viz. Pera, Pineapple, Jaffa, Washington navel, Hamlin, Valencia late, Sathgudi and Blood red malta were selected for study. The studies were conducted from at All India Coordinated Research Project on Tropical Fruits (Citrus), Dr. Panjab rao Deshmukh Krishi Vidyapeeth, Akola 2012-13. All the trees were of same age (12 years) raised on Rough Lemon (*C.limon* Linn. Burn) rootstock. Plantation was made according to randomized block design (RBD). The plants were spaced at 6 × 6 m and subjected to similar cultural practices throughout the growing period. The plants were allowed to grown normally without pruning. The data on plant height, spread, plant volume, fruits plant⁻¹, fruit yield (kg/plant) fruit weight, fruit diameter, number of seeds fruit⁻¹, juice content, rind thickness, total soluble solids, acidity, ascorbic acid and yield were collected. Ten fruits tree were randomly selected and were analyzed chemically.

Table 2. Flowering and physical characteristics of fruits of different varieties of sweet orange. * NS–Non significant at 5% level.

Variety	Flowers shoot ⁻¹	Fruitset (%)	Fruit weight (g)	Juice percentage (%)	Seeds fruit ⁻¹
Pera	95.50	19.60	184.00	2.34	15.01
Pineapple	111.16	22.67	258.50	21.42	16.14
Jaffa	106.50	28.36	174.00	37.00	13.00
W. Navel	126.83	26.45	177.33	36.48	12.55
Hamlin	126.50	29.33	163.46	42.58	13.51
Valencia late	138.83	37.58	233.66	53.13	7.90
Sathgudi	126	34.41	157.60	38.67	12.08
Bloodred malta	129.66	27.33	175.60	35.23	13.57
SE(m)±	3.77	1.27	3.52	0.60	NS
CD at 5%	11.40	3.84	10.63	1.83	–

Results and Discussion

Maximum height (4.42 m) was attained by Valencia late (Table 1) while Pera attained the lowest height (2.81 m). Madhavi and Babu [2] observed similar variation in height of tree among the seven varieties of sweet orange and they found the maximum height of tree in jaffa (4.28 m) and minimum in blood Red Malta (2.41 m). Shinde et al. [3] also reported that, the height of tree in different kagzi lime varieties, further Ingle et al. [4] also reported maximum plant height in PDKV lime (4.51 m) compare to other varieties. The highest spreading variety Valencia late (4.17 m) whereas the least spreading variety was Pera (3.06 m) variety. Patil et al. [5] also studied the spread of tree of two sweet orange varieties and observed maximum spread was recorded in Nucellar and minimum spread was recorded Sathgudi. Maximum plant volume was observed in variety Valencia late (40.31 m³) followed by Blood red malta (33.07 m³) where as the variety Pera recorded the minimum tree volume (13.81 m³) Number of flowers per 1m shoot were maximum observed in variety Valencia late (138.83) which was at par with Blood red malta (129.66), whereas minimum number of flowers per 1m shoot was observed in Pera (95.50).showed that Pawar [6] reported number of flower per shoot in PDKV lime ranges from 115-148 in control treatment. Maximum fruit set percentage was recorded in Valencia late (37.58%) which was at par with Sathgudi (34.41%) where as minimum fruit set percentage was recorded in Pera (19.60%) . Ganvir [7]

Table 3. Chemical composition of different varieties of sweet orange.

Variety	TSS (°Brix)	Acidity (%)	Ascorbic acid (mg 100 ml ⁻¹ juice)
Pera	8.20	1.07	51.81
Pineapple	9.00	0.96	46.61
Jaffa	9.37	0.72	51.10
W. Navel	9.65	0.62	51.36
Hamlin	10.26	0.61	53.02
Valencia late	12.10	1.01	57.86
Sathgudi	11.10	0.51	51.50
Bloodred malta	9.66	0.84	54.04
SE (m) ±	0.29	0.06	1.48
CD at 5%	0.88	0.20	4.46

also showed that 30.12% fruit set in PDKV lime.

Yield and yield components

Valencia late was the highest yielder with 232.76 fruits plant⁻¹ whereas Pera produced only 62.83 fruits plant⁻¹ (Table 1). The varieties with medium number of fruits were Sathgudi and Blood red malta.

Physical characteristics of fruit

The data (Table 2) revealed that Pineapple were the heaviest in weight (258.) followed by Valencia late (233.66 g). Maximum juice percentage fruit was recorded in Valencia late (53.13%) while Hamlin, Sathgudi and Jaffa, it was 42.58%, 38.67% and 37.00, respectively. Minimum juice percentage was recorded in Pineapple (21.42%). Among eight varieties, fruits of pineapple were the most seedy hav-

ing 16.14 seeds fruit⁻¹ followed by Pera and Blood red malta having 15.01 and 13.57 seeds fruit⁻¹, respectively.

Fruit quality characters

The values of T. S. S. of all the varieties were statistically similar and ranged from 8.0 to 12 (Table 3). Maximum T. S. S. was recorded in Valencia late (12.1°Brix) where as minimum T. S. S. (8.2 °Brix) was recorded in Pera. The acidity was the lowest in Sathgudi (0.51%) and the highest in Pera (1.07%). Regarding ascorbic acid contents, the highest value was recorded in Valencia late (57.5 mg 100⁻¹ ml juice) and minimum in Pineapple (46.61 mg 100⁻¹ ml juice).

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