

Studies on the performance of Sathgudi Sweet orange (*Citrus sinensis* Osbeck) budded on different strains of Rangapur lime, Rough lemon and Cleopatra Mandarin under southern Telangana zone of Andhra Pradesh

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ABSTRACT

Evaluation of Sathgudi Sweet orange budded on different rootstock strains of Rangapur lime, Rough lemon and Cleopatra mandarin was conducted from 2001- 2008 at Arid Horticulture Research Station, Kondamallepally, Nalgonda district of Andhra Pradesh. The aim of this study was to assess the impact of rootstock genotypes on performance of sathgudi sweet orange (Citrus sinensis Osbeck). Ten rootstock strains were evaluated by measuring cumulative yield for seven years with Rangapur lime (4 strains), Rough Lemon (5 strains) and Cleopatra Mandarin (1 strain) rootstocks. Among the different rootstock strains used, the sathgudi sweet orange budded on Rangapur lime Brazil strain has recorded maximum cumulative yield of 538 kg/tree whereas lowest cumulative yield of 237 kg/tree was recorded in sweet orange budded on Aboher strain of Rough Lemon.

Keywords: Sathgudi Sweet orange, Root stock, Fruit yield, Irrigated, Chalka soils

INTRODUCTION

India ranks fifth in the production of citrus fruit crop in the world and occupies third position after Mango and Banana. In India mainly three citrus fruits viz., Mandarins, Sweet oranges and Acid limes in that order are cultivated commercially. Among different citrus species, sweet orange (*Citrus sinensis* Osbeck) is one of the prominent groups with wide range of varieties and distribution. In Andhra Pradesh, the variety Sathgudi Sweet

orange is predominantly cultivated in different districts namely Nalgonda, Ananthapur, Prakasham, Kadapa and Mahbubnagar districts. The Sathgudi Sweet orange is mostly budded on Rough lemon and Rangapur lime rootstocks.

Rootstocks have contributed largely to success and failure of citrus industry. The potential effects in rootstock on tree growth, yield and quality of fruits has been reported (S N Ghosh and Ranjan K Tarai, 2007).

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In addition to supporting the tree in soil the rootstock is responsible for absorption of water and nutrients, then altering development of tree canopy and photosynthesis (Richardson *et al.* 2003), providing storage of carbohydrates, adaption of scion to particular soil conditions and inducing tolerance to some diseases. The rootstock effect on tree growth, fruit quality and production has been comprehensively elaborated by many research workers (Ahmed *et al.*, 2006) Diverse effect of rootstocks on different parameters of fruit crops has been advocated by them.

Majority of the citrus plantation in Andhra Pradesh is on Rough lemon root stock. The rough lemon rootstock is susceptible Phytophthora (Lacey *et al.*, 2012) which has resulted in the decline in the productive raise of the orchards. Trees budded on rough lemon rootstock are generally vigorous with large fruit size, thick peel and have poor juice quality in comparison to trees on other rootstocks (Nasir *et al.*, 2011). To harness the beneficial effects of rootstocks which were standardized suitable for other regions of the country (Kusuma Grace *et al.*, 2005)

MATERIALS AND METHODS

The present study was conducted at Dr.YSR Horticulture University, Arid Horticulture Research Station, Konda Malleshpally, Nalgonda district during the period of 2001 to 2008. The Station falls under southern Telangana zone of Andhra Pradesh (Latitude 17.0586693 and Longitude 17.265585) with average rainfall of 560 mm with mean temperatures of 17°C minimum and 40°C maximum. The soils are red chalka type. The trial was conducted in Randomized Block Design with ten treatments in three replications of two plants each. The ten rootstock strains were employed for Sathgudi sweet orange namely Rangapur Lime Knorr (RGPL Knorr), Rangapur Lime Texas (RGPL Texas), Rangapur Lime Brazil (RGPL Brazil), Rangapur lime Limero Brazil (RGPL Limero Brazil), Rough Lemon 8779 (RL

8779), Rough Lemon 14-9-13 (RL 14-9-13), Rough Lemon 8780 (RL 8780), Rough Lemon Shomydong (RL Shomydong), Rough Lemon Aboher (RL Aboher) and Cleopatra mandarin. The plant to plant distance and row to row distance of 6 meters was maintained. Uniform cultural practices are given to all the plants maintained under irrigation conditions. The data on fruit yield was recorded from 2001-2008 and the cumulative yield data analysed statistically to an analysis of variance (ANOVA) and the difference among the means were determined for significance at $P < 0.05\%$.

RESULTS AND DISCUSSION

Fruit yield in Sathgudi Sweet orange significantly varied on different rootstocks. The fruit yield of sathgudi sweet orange budded on RGPL Texas has recorded maximum yield during the 1st year with 49.5 kg/tree and the lowest yield was recorded which was significantly superior over all the treatments whereas the lowest yield was recorded in RL Aboher with 15.4 kg/tree. During the 2nd year, maximum fruit yield was recorded in RGPL Texas with 51.2 kg/tree which was on par with RGPL Brazil with fruit yield of 50.2 kg/ tree and the lowest yield was recorded in RL Aboher. From the third year (2003-04) onwards, maximum fruit yield was recorded in RGPL Brazil with 68.2 kg/tree, 92.3 kg/tree, 98.2 kg/tree, 87.8 kg/tree, 100.6 kg/tree up to seventh year.

Among the different rootstock strains, maximum cumulative fruit yield was recorded in Sathgudi sweet orange budded on RGPL Brazil (538.0 kg/tree) which was significantly superior over all other rootstock strains. The Rangapur Lime Brazil is adaptive to chalka soils which might have helped in absorption of more nutrients resulting in vigorous growth in turn obtained maximum fruit yield. Kusuma Grace *et al.* (2005) also reported more nutrient utilization ability (0.98) in Rangapur lime rootstock.

Table 1: Yield performance of Sathgudi sweet orange budded on different rootstock strains

Treatment	Fruit yield (kg/tree)							Cumulative yield (2001 to 2008) (Kg/tree)
	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	
T ₁ - RGPL Knorr	36.5	42.2	44.7	50.4	46.4	65.7	61.6	348.5
T ₂ - RGPL Texas	49.5	51.2	60.2	55.3	63.2	67.8	73.5	421.7
T ₃ - RGPL Brazil	40.7	50.2	68.2	92.3	98.2	87.8	100.6	538.0
T ₄ - RGPL Limero Brazil	35.3	40.1	50.8	56.6	71.1	61.9	80.7	397.5
T ₅ - RL 8779	23.4	29.5	40.4	35.1	39.6	50.3	58.2	277.5
T ₆ - RL 14-9-13	38.4	45.5	60.4	71.2	69.3	63.8	70.5	419.1
T ₇ - RL 8780	38.7	40.5	55.9	45.7	53.9	65.7	73.3	374.7
T ₈ - RL Shomydong	16.3	25.8	35.4	43.7	42.6	56.8	55.3	276.9
T ₉ - RL Aboher	15.4	23.4	34.6	26.9	42.4	53.8	40.2	237.7
T ₁₀ - Cleopatra mandarin	35.4	42.4	49.8	58.2	63.8	69.1	79.6	398.2
C.D.	3.953	1.483	0.379	0.245	0.222	0.513	0.145	9.42
SE(m)	1.32	0.495	0.126	0.082	0.074	0.051	0.049	3.15

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