

EVALUATION OF ACID LIME (*CITRUS AURANTIFOLIA*) VARIETIES IN LATERITIC SOIL CONDITIONS OF ANDHRA PRADESH

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ABSTRACT

The present study was undertaken at Agricultural Research Station, Kavali during 2022–2024 to assess the performance of three acid lime cultivars, namely Pramalini, Balaji and Petluru Selection 1 under red lateritic soil conditions. The experimental layout followed a Randomized Block Design comprising seven replications for comparative evaluation. Among the tested cultivars, Petluru Selection 1 recorded superior growth (plant height 4.47 m; plant spread 4.18 m), yield (414 fruits/plant; 15.71 kg/plant) and juice content (55.3%), along with higher consumer preference, indicating its suitability for lateritic soils of Andhra Pradesh.

Keywords: Acid lime, Andhra Pradesh, Laterite soils, Fruit weight, Fruit Yield.

INTRODUCTION

Acid lime (*Citrus aurantifolia* Swingle) is an extensively cultivated citrus crop in tropical and subtropical regions of India, commonly referred to as Pati or Kagzi lime. It is classified under the family Rutaceae and is characterized by its thorny growth habit. The crop has gained commercial importance due to its adaptability and economic returns. The crop is cultivated across multiple states including Andhra Pradesh, Gujarat, Maharashtra, Karnataka, Bihar, Madhya Pradesh, Assam and Chhattisgarh. India ranks among the leading producers of acid lime globally (Rajamanickam *et al.*, 2024). Within India, Andhra Pradesh contributes a substantial share of area and production.

The fruit is recognized for its high ascorbic acid content and possesses

considerable antioxidant potential, making it valuable for nutritional and industrial uses. The red and lateritic zones of Andhra Pradesh, covering districts such as YSR Kadapa, Anantapur, Nellore, Prakasam and Kurnool, are characterized by low rainfall and prolonged dry periods, which favor acid lime cultivation. Although flowering occurs throughout the year, distinct bahar seasons (*Ambe, Mrig and Hasta*) influence productivity (Deshmukh *et al.*, 2016). Despite its importance, systematic evaluation of varieties under these specific soil conditions is limited; therefore, the present study was undertaken to identify suitable cultivars for this region.

MATERIAL AND METHODS

The varietal evaluation trial was conducted at Agricultural Research Station, Kavali in SPSR Nellore district. Three acid lime

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cultivars, Pramalini, Balaji and Petluru Selection 1, were included in the study. The experimental layout followed a Randomized Block Design with seven replications. One-year-old seedlings were transplanted at a spacing of 6 × 6 m under square planting geometry during 2016. The experimental field consisted of red lateritic soils, with high temperature conditions reaching up to 47°C during summer and extended dry periods.

All recommended agronomic practices related to nutrient, irrigation and plant protection were uniformly adopted as per recommendations of Dr. YSR Horticultural University. Growth observations such as plant height and canopy spread were recorded from the seventh year of planting during 2022–23 and 2023–24, across different bahar seasons.

Yield parameters including number of fruits per plant, fruit weight and total yield were documented for the same period. Fruit quality attributes such as juice content, total soluble solids (°Brix), titratable acidity (%) and ascorbic acid (mg/100 ml) were estimated using standard laboratory procedures.

Consumer acceptability was evaluated using a 9-point hedonic scale considering attributes such as fruit colour, texture, flavour

and overall appearance. The evaluation was carried out by a panel of semi-trained judges, and mean scores were calculated for each variety.

The collected data were statistically analyzed through Analysis of Variance (ANOVA) to determine treatment effects after appropriate transformation to assess treatment differences.

RESULTS AND DISCUSSION

Data summarized in Table 1 demonstrated that the acid lime cultivars differed significantly with respect to plant height and canopy spread. The pooled data (2022–24) revealed that Petluru Selection 1 attained the maximum plant height (4.47 m) and spread (4.18 m), followed by Balaji, whereas Pramalini recorded the lowest values. The variation observed may be explained by differences in varietal response to soil and environmental conditions. Similar trends were reported by Mukunda Lakshmi *et al.* (2023), Rajamanickam (2023) and Srinivas and Govindarajulu (2017).

Statistically significant differences were observed among the cultivars for yield parameters (Table 2). Petluru Selection 1 produced the highest fruit yield (15.71 kg/plant) and number of fruits (414 fruits/plant),

Table 1. Comparative evaluation of growth and yield attributes of acid lime cultivars during 2022-23 and 2023-24 and pooled analysis

Cultivars	Plant height (m)			Canopy spread (m)			No. of fruits plant ⁻¹ year ⁻¹		
	2022-23	2023-24	Pooled data	2022-23	2023-24	Pooled data	2022-23	2023-24	Pooled data
Balaji	4.05	4.08	4.06	3.65	3.90	3.77	320	260	290
Petlur Selection- 1	4.26	4.68	4.47	4.09	4.28	4.18	438	390	414
Pramalini	3.40	3.52	3.46	2.82	2.86	2.84	240	160	200
SEm (+/-)	0.15	0.21	0.40	0.22	0.30	0.51	4.48	6.28	3.70
CD @5%	0.46	0.60	1.26	0.68	1.02	1.62	13.93	18.93	11.26

Table 2. Yields of different Acid lime varieties (2022-23, 2023-24 and pooled)

Varieties	Fruit weight (g)			Yields (Kg per plant per year)		
	2022-23	2023-24	Pooled Data	2022-23	2023-24	Pooled Data
Balaji	40.08	37.08	38.58	12.82	9.64	11.23
Petlur Selection- 1	38.90	36.90	37.9	17.03	14.39	15.71
Pramalini	34.64	30.64	32.64	8.31	4.90	6.60
SEm (+/-)	1.35	1.31	1.10	0.74	0.60	0.55
CD @5%	4.21	4.01	3.42	2.30	1.80	1.65

Table 3. Comparative performance of acid lime cultivars for fruit quality parameters and overall acceptability (2022-24)

Name of the Cultivar	Juice (%)	TSS (°Brix)	Acidity (%)	Ascorbic Acid (%)	Over all Acceptability
Balaji	47.5	8.01	6.65	47.6	8
Petlur Selection- 1	55.3	7.8	6.82	45.4	9
Pramalini	46.4	8.55	6.50	49.7	7
SEm (+/-)	0.48	0.08	0.59	1.01	
CD @5%	1.05	0.18	0.13	2.21	

followed by Balaji variety. The enhanced yield performance may be associated with better canopy development and efficient utilization of available resources. In contrast, Pramalini recorded the lowest yield. Fruit weight was highest in Balaji, followed by Petluru Selection 1 and Pramalini. The superior performance of Petluru Selection 1 may be linked to its genetic potential and adaptability to local conditions. Comparable findings were reported by Kamatyanatti *et al.* (2015), Dinesh *et al.* (2018) and Sonkar *et al.* (2025).

Fruit quality parameters (Table 3) showed significant differences among cultivars. Petluru Selection 1 recorded higher juice content (55.3%) and acidity (6.82%), whereas Pramalini exhibited higher TSS (8.55%) and ascorbic acid content (49.7 mg/100 g). These variations are likely influenced by genetic factors and environment interactions affecting biochemical composition. Consumer

preference evaluation based on sensory attributes such as colour, texture and appearance indicated higher acceptance for Petluru Selection 1 and Balaji. Similar observations were reported in earlier studies (Deshmukh *et al.*, 2015; Dinesh *et al.*, 2018).

CONCLUSION

The findings of the present investigation indicate that Petluru Selection 1 is the most suitable variety for lateritic soils of Andhra Pradesh due to its superior yield (15.71 kg/plant), higher fruit number (414 fruits/plant), better juice content (55.3%) and favorable consumer acceptability.

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