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## Evaluation of acid lime (*Citrus aurantifolia* Swingle) cultivars for yield attributes

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**Abstract :** Evaluation studies were carried out in acid lime for selection of cultivars suitable for growing in the tropical region of Tamil Nadu. Six acid lime cultivars viz., PKM1, Saisarbati, Pramalini, Vikram, Tenali and Kasipentla were evaluated for two seasons (July – August and December – February) at Horticultural College and Research Institute, Periyakulam, under Tamil Nadu conditions during 2006 – 2008. Among the cultivars, the highest number of flowers per shoot in both the seasons (10.85, and 12.13), number of fruit set per shoot (7.67 and 8.25), number of fruits retained per shoot (4.85 and 5.35), highest number of fruits per tree (384.85 and 406.35 fruits/tree) and yield per tree (20.54 and 22.56 kg) was recorded in cultivar Vikram during both the seasons. The same genotype Vikram also recorded highest fruit weight (45.53g, and 47.33) and volume of fruits (44.95 and 46.36) during both the seasons. The highest fruit length (6.02) fruit diameter (5.86) was recorded in cultivar Tenali during first season, and during the second season fruit length (5.78) and fruit diameter (6.03) was recorded in the cultivar Vikram. The other genotype PKM – 1 followed as the next best performer for yield attributing characters.

**Key words :** Acid lime cultivars, Evaluation, Number of fruits, Yield

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Acid lime (*Citrus aurantifolia* Swingle) is an important commercial species of citrus considered to be indigenous to India, and is extensively cultivated in many states under tropical and subtropical climatic conditions. India is the largest producer of acid lime in the world, (Chadha, 2002). In Tamil Nadu, it is widely cultivated under rainfed and irrigated conditions in the districts of Dindigul, Trichy, Tirunelveli, Virudhunagar, Ramanathapuram, Madurai, Theni etc., in an area about 1,060 ha with a production of about 4,400 tonnes per annum (Anonymous, 2003). Availability of a wide gene pool in the form of genetic diversity is a prerequisite for crop improvement. Genetic diversity is the extent of genetic variability among the individual in a single species and between the species. In India, collection and conservation of citrus species/ types started long back, in mid of 19<sup>th</sup> century. In recent years collection and conservation were primarily made for the quality of fruits. The great genetic diversity is under serious threat of rapid extinction or depletion of the germplasm mainly due to population pressure and farmers preference (Singh *et al.*, 2004).

Though acid lime has been in cultivation for many years, no significant achievements have been obtained in cultivar improvement. A successful progress in breeding depends upon the genetic variability present in the population.

Acid lime is more popular for its use in preparation of refreshing juice and in seasoning foods and making of pickles. Acid lime pickles are very popular not only in India but also in other parts of the world. India exports small quantum of acid lime pickles to other countries viz., USA, England etc. It is also used in the manufacture of lime squash either alone or in combination with lemons and other citrus fruits. It is a good source of vitamin C and has good antioxidant properties.

The purpose of the present study was to evaluate different varieties of acid lime cv. PKM1, Saisarbati, Pramalini, Vikram, Tenali and Kasipentla with emphasis on their agronomic performance, yield attributing characters and increasing adaptability under tropical region of Tamil Nadu.

## RESEARCH METHODS

The experimental field is situated at the central block of Horticultural college and Research Institute, Periyakulam, which is located at 10°N and 77°E with an altitude of 300 m above MSL. The study was conducted during 2006 – 2008. Six acid lime cultivars viz., PKM - 1, Saisarbathi, Pramalini, Vikram, Tenali and Kasipentla were utilized for the study. The study was carried out in two seasons (July – August and December – February). The experiment was laid out in a randomized block design and replicated four times. Nine year old trees, planted at a spacing of 5m x 5m were selected for evaluation.

## RESEARCH FINDINGS AND DISCUSSION

The highest number of flowers per shoot (10.85), the number of fruits per shoot (7.67), number of fruits retained per shoot (4.85), number of fruits per tree (384.85) and yield of fruits per tree (20.50 kg per tree) were recorded in the cultivar Vikram during the first season. This was in concurrence with the findings of

Babral and Misra (2007).

The cultivar Saisarbathi recorded as the second best performer for number of flowers per shoot (8.95) in the first season. However, for other characters, viz., number of fruit set per shoot (5.70), number of fruits retained per shoot (3.20), number of fruits per tree (340.34) and yield of fruits per tree (18.26 kg). PKM – 1 was found to be the second best performer in the first season (Table 1 and 2).

During second season, the highest number of fruits set per shoot was recorded in Vikram (8.25) followed by Saisarbathi (6.51). The lowest number of fruits set per shoot was noticed in Kasipentla (5.07). Similarly the genotype Vikram also recorded the highest number of fruits retained per shoot (5.35), fruits per tree (406.35) and yield per tree (22.56kg). It was followed by PKM – 1 which registered (3.85) number of fruits retained per shoot, (366.25) number of fruits per tree and (19.06 kg) yield per tree. The lowest number of fruits retained per shoot (2.80), number of fruits per tree (285.32) and yield per tree (12.70kg) were observed by the genotype

**Table 1 : Performance of acid lime cultivars on flowering, fruit set, fruit retention, number of fruits/tree and yield of fruits / tree**

Sr. No.	Cultivars	Season									
		July – August I					December - February II				
		No. of flowers/s hoot	No. of fruits / shoot	No. of fruits retained / shoot	No. of fruits/ tree	Yield of fruits (Kg/tree)	No. of flowers/ shoot	No. of fruits / shoot	No. of fruits retained / shoot	No. of fruits / tree	Yield of fruits (Kg/tree)
1.	PKM – 1	8.77	5.70	3.20	340.34	18.26	9.56	6.44	3.85	366.25	19.06
2.	Saisarbathi	8.95	5.52	3.06	314.50	15.18	10.38	6.51	3.70	342.15	15.77
3.	Pramalini	7.22	4.60	2.45	286.61	12.57	7.73	5.04	2.95	317.12	13.29
4.	Vikram	10.85	7.67	4.85	384.85	20.50	12.13	8.25	5.35	406.35	22.56
5.	Tenali	8.32	4.65	2.25	302.19	14.12	9.16	5.45	2.92	323.08	14.72
6.	Kasipentla	7.37	4.32	2.30	273.87	11.72	8.09	5.07	2.80	285.32	12.70
	S.E.±	0.31	0.20	0.12	5.43	0.57	0.34	0.23	0.14	5.42	0.62
	C.D. (P=0.05)	0.66	0.44	0.27	11.58	1.22	0.74	0.49	0.30	11.56	1.33

**Table 2 : Performance of acid lime cultivars for fruit characters**

Sr. No.	Cultivars	season							
		July – August I				December - February II			
		Fruit length (cm)	Fruit diameter (cm)	Fruit weight (g)	Fruit volume (ml)	Fruit length (cm)	Fruit diameter (cm)	Fruit weight (g)	Fruit volume (ml)
1.	PKM – 1	5.33	5.48	44.70	43.67	5.20	5.44	42.53	41.43
2.	Saisarbathi	5.29	5.49	39.25	38.35	4.75	4.91	43.30	42.13
3.	Pramalini	4.55	4.46	41.15	38.93	4.67	4.86	43.62	42.57
4.	Vikram	5.57	5.75	45.53	44.95	5.78	6.03	47.33	46.36
5.	Tenali	6.02	5.86	45.24	44.70	5.63	5.65	45.71	44.15
6.	Kasipentla	4.77	4.79	38.45	37.42	4.30	4.34	39.34	38.25
	S.E.±	0.17	0.26	1.10	0.43	0.17	0.41	1.33	0.58
	C.D. (P=0.05)	0.38	0.57	2.36	0.91	0.37	0.88	2.83	1.24

Kasipentla. Fruit yield per tree could be due to environmental fluctuation and small sample size. These findings were also reported by Sahoo *et al.* (2005) in strawberry.

Among the six cultivars, during first season, highest fruit length (6.02cm) and fruit diameter (5.86cm) was recorded by the cultivar Tenali followed by Vikram (5.57cm). The fruit weight (45.53g) and volume of fruit (44.97ml) was highest in Vikram and this was at par with the fruit weight (45.24g) and volume (44.70ml) of Tenali. The lowest fruit length (4.55cm) and fruit diameter (4.46cm) was noticed in Pramalini. However, the lowest average single fruit weight (38.45g) and lowest volume of fruit (37.42ml) was noticed in Kasipentla. Little influence of environmental traits was observed on some of the traits like the overall population mean for fruit weight, volume, diameter and length of the fruit. This variability may be attributed to climatic difference during the study. These findings were also reported by Singh *et al.* (1977). These fruit characters directly correlated with the yield and have good market acceptability. These findings were also reported by Pujari *et al.* (1991).

During second season, the highest fruit length (5.78cm), fruit diameter (6.03cm), average single fruit weight (47.33g) and highest volume of fruit (46.36ml) was recorded by Vikram. The fruit length of cultivar Vikram was on par with Tenali (5.63cm). Tenali recorded second best performer for fruit diameter (5.65cm), average single fruit weight (45.71g) and volume of fruit (44.15ml). The lowest fruit length (4.30cm), fruit diameter (4.34cm), average single fruit weight (39.34g) and volume of fruit (38.25ml) was recorded in Kasipentla. Fruit weight, fruit diameter and fruit length directly correlated with yield and other yield attributing characters. Among the six varieties, Vikram had good result compared to other varieties during both the seasons. These findings were also reported by Irrullapan *et al.* (1973) and Singh *et al.* (1984) in lemon

### Summary:

Six acid lime varieties were studied for their yield and other yield attributing characters. Among the six varieties cv. Vikram had registered highest yield and other yield attributing characters during both the seasons. Among the six varieties, cv. VIKRAM followed by PKM-1

are suitable for growing in the tropical region of Tamil Nadu.

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