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## Evaluation of red fleshed guava (*Psidium guajava* L.) accessions for growth and fruit yield under north-eastern transitional zone of Karnataka

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**Abstract**

Ten red fleshed guava varieties comprising of improved viz., Arka Kiran, Arka Rashmi, Lalit, H-17-16, Punjab Pink and SRD-HYD-1 and local types viz., SR-I, SR-II, GR-I and GR-II were evaluated for growth and fruit yield under North-Eastern transitional zone of Karnataka. The accessions evaluated showed wide range of variation with respect to plant growth and yield traits of fruit. The accession H-17-16 registered significantly superior values for plant height (2.36 m) and number of quaternary branches (76.45). While, the variety Arka Kiran recorded significantly superior values for stem girth (6.21 cm), east-west (3.06 m) and north-south (2.52 m) spread, canopy volume (13.85 m<sup>3</sup>) which was found statistically on par with H-17-16. The vigorous growing accession H-17-16 recorded maximum per cent fruit set (90.47%), maximum number of fruits harvested per plant (104.67) and highest yield (11.45 kg/plant and 12.72 t/ha) which was followed by Arka Kiran (5.75 kg/plant and 6.38 t/ha). On the basis of different characters the accessions H-17-16, Arka Kiran and Punjab Pink were found to be superior in their performance for growth and fruit yield.

**Keywords:** Guava, growth, yield, evaluation, accession

**Introduction**

Guava (*Psidium guajava* L.) belongs to the family myrtaceae and is an important fruit crop of tropical and sub-tropical region of the country. It is one of the most popular fruit because of its hardy nature and prolific-bearing habit even in marginal lands. The fruit is commonly known as "apple of tropics" and is ranked the fifth most important fruit in terms of area and production (Anon, 2017) [3]. It is cultivated in India in 2.60 lakh hectare with an annual production of 38.26 lakh tons and productivity is 14.75 t/ha. While, in Karnataka it occupies an area of 6,740 hectare, with a production 1.31 lakh Metric tonnes and the productivity of 19.39 t/ha (Anon, 2017) [3]. Important districts growing guava in Karnataka are Kolar, Bengaluru (rural), Dharwad and Shimoga, (Anon, 2014) [1]. Guava shows large variability in growth habit, fruit character and pulp colour. It has diverse branching habits like erect, spreading and drooping, Fruit shape also shows variability with round, pear shaped, truncated, pointed and necked at the stalk end, pulp of the fruit shows diversified colours like white, yellow, pink, red and red purple (Anon, 2016) [2]. The natural variability available within the species is often exploited to identify superior varieties. Only two white fleshed varieties are popularly grown in India since for long time viz., Allahabad Safeda and Sardar (Joshi, 2016) [6], hence there is a need to evaluate the varieties suitable for different agro-climatic conditions particularly red pulp varieties of late is owing to the consumer preference because of its natural colour and antioxidant properties. Therefore the present study on evaluation of red fleshed guava accessions for growth and fruit yield under north-eastern transitional zone of Karnataka.

**Material and Methods**

Six genetically diverse red fleshed guava varieties viz., Arka Kiran, Arka Rashmi, Lalit, H-17-16, Punjab Pink and SRD-HYD-1 and four local collections viz., SR-I, SR-II, GR-I and GR-II were evaluated with respect to growth and yield traits of fruit at Department of Fruit Science, College of Horticulture, Bidar (Karnataka) during 2017-18. The experiment was laid out in Randomized block design with three replications and five plants in each replication. Well-established grafted plants of these collections were planted in August, 2015. Observations during the course of this study on growth parameters viz., plant height (m), stem girth (cm), plant spread (m), number of tertiary and quaternary branches, canopy volume (m<sup>3</sup>) and leaf

area index were recorded as per standard methods during October, 2017. Leaf area index was measured by using an instrument ceptometer (ACCUPAR LP-80).

Yield parameters in terms of percent fruit set, number of fruits harvested per plant (from October 2017 to December 2017), average fruit weight (g), yield (kg/plant) and yield (t/ha) were recorded during fruiting period.

## Results and Discussion

The results pertaining to evaluation of red fleshed guava accessions is presented in Table (1 and 2). The interpretation

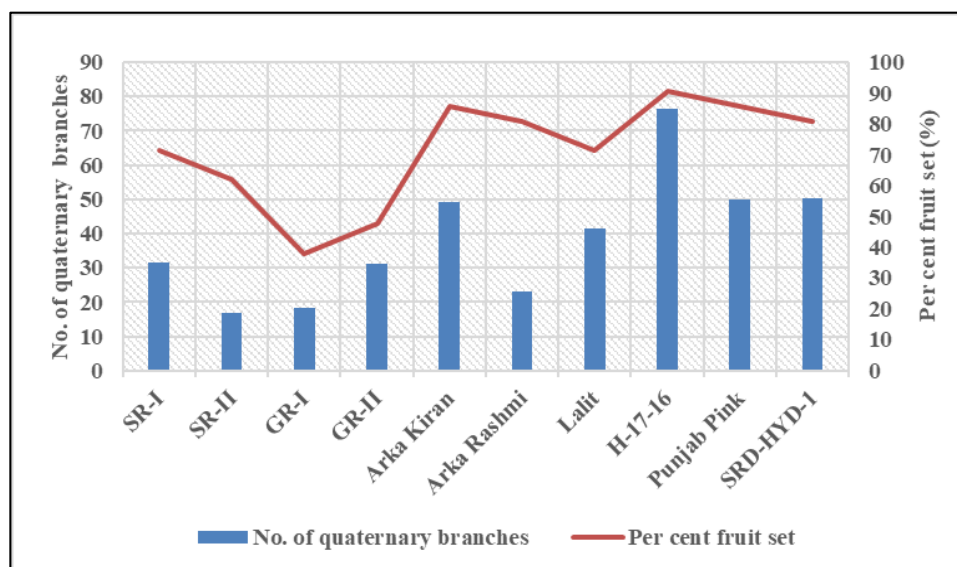
of data revealed significant differences with respect to their growth and fruit yield attributes. It is evident from the results mentioned in Table 1 that accession H-17-16 had the maximum plant height (2.36 m) which was found statistically on par with Punjab Pink, Lalit and Arka Kiran respectively. The good plant height in accession H-17-16 is due to semi-erect nature of plants with vigorous growth habit noticed in the present study, similar findings were reported by Meena *et al.* (2013) [8] in red fleshed guava selection FRSG-R4.

**Table 1:** Performance of different red fleshed guava accessions for growth under North-Eastern transitional zone of Karnataka.

Varieties	Plant height (m)	Stem girth (cm)	Plant spread (m)		No. of tertiary branches	No. of quaternary branches	Canopy volume (m <sup>3</sup> )	LAI
			(E-W)	(N-S)				
SR-I	2.17	4.04	1.75	1.75	17.00	31.50	4.25	1.73
SR-II	2.03	4.02	1.80	2.22	10.33	17.00	6.10	1.95
GR-I	1.93	3.43	1.17	1.03	15.00	18.33	1.04	0.70
GR-II	1.79	4.38	1.61	1.91	15.00	31.33	4.16	1.15
Arka Kiran	2.17	6.21	3.22	3.04	17.78	49.00	13.85	3.44
Arka Rashmi	1.47	3.13	1.74	1.64	15.11	23.19	2.80	1.41
Lalit	2.26	4.98	2.56	2.67	16.11	41.33	10.29	2.56
H-17-16	2.36	5.83	3.29	3.17	17.67	76.45	16.87	2.60
Punjab Pink	2.08	4.91	2.90	2.80	15.33	50.00	11.30	1.62
SRD-HYD-1	1.74	5.92	2.23	2.77	15.67	50.33	8.05	1.52
S. Em±	0.17	0.55	0.18	0.24	2.12	5.21	1.42	0.10
C. D. @ 5%	0.50	1.64	0.55	0.72	NS	15.59	4.24	0.29
C. V. (%)	14.84	20.20	14.35	18.34	23.71	23.21	31.88	9.03

The maximum stem girth was recorded in Arka Kiran (6.21 cm) which was found statistically on par with SRD-HYD-1 and H-17-16. The result of this observation is supported with the findings of Athani *et al.* (2007) [4] in cv. Seedless. Further Marak and Mukunda (2007) [7] in their studies opined that higher stem girth is an indicator of vigorous growth and has a strong relation with yielding ability. Plant spread reflects the growth habit and shows a correlation with fruit yielding ability. In the present investigation also the plant spread has shown significant difference, the maximum east-west (3.22 m) and north-south (3.04 m) spread was found in Arka Kiran which was statistically on par with H-17-16. The results are supported with observations of Phadnis (1970) [10] in Seedless and Singh *et al.* (2016) [11] in guava cv. Allahabad Safeda, who reported that plant spread has an association with

yielding ability in guava. The observations with respect to fruit bearing quaternary branches revealed that the plants of H-17-16 recorded maximum number of quaternary branches (76.45) suggesting a vigorous growing nature of the accession with more number of well distributed fruit bearing shoots which registered maximum fruit yield/plant (Fig. 1). These results are in agreement with Marak and Mukunda (2007) [7]. However, the mean maximum canopy volume was observed in Arka Kiran (12.04 m<sup>3</sup>) which was statistically on par with H-17-16 (Fig. 2). The similar results were reported by Dholkar *et al.* (2014) [5] in Allahabad Safeda, Ulemale and Tambe (2015) [12] in GWS<sub>6</sub>. The mean maximum Leaf area index was observed in Arka Kiran (3.44) followed by H-17-16.



**Fig 1:** Number of quaternary branches versus percent fruit set as recorded in different accessions of red fleshed guava.

Which coincided with good canopy spread and canopy volume which might have resulted in maximum light interception into the canopy and conversion into better fruit

yielding ability of plants (Fig. 2). Similar views were opined by Patil *et al.* (2017) in guava cv. Allahabad Safeda.

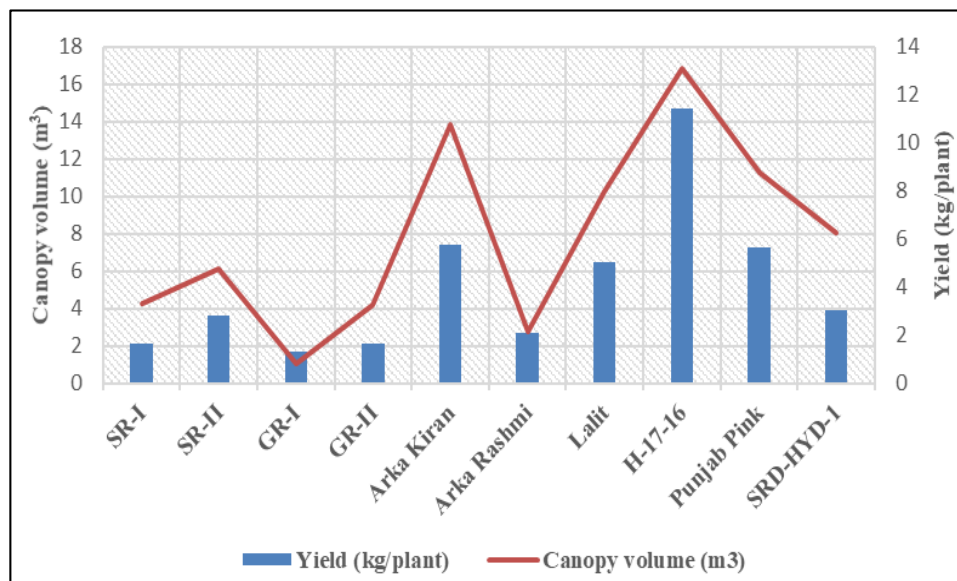


Fig 2: Canopy volume (m<sup>3</sup>) versus fruit yield (kg/plant) as recorded in different accessions of red fleshed guava

The data pertaining to yield parameters showed significant differences among the accessions and is depicted in table 2. Significantly maximum fruit set percentage was observed in vigorously growing accession H-17-16 (90.47%) which was statistically on par with Arka Kiran, Punjab Pink and Arka Rashmi (Fig. 1). Higher fruit set may be attributed to production of maximum number of well spread fruit bearing quaternary branches with better leaf area index (Table 1). This might have resulted in better exposure of leaves and fruiting shoots to sunlight which intern increased the percent fruit set. The similar results were reported in guava cv. Lucknow-49 by Dholkar *et al.* (2014) [5]. Investigations also revealed

significantly the highest number of fruits harvested per plant (104.67) in H-17-16 followed by Arka Kiran. This might be due to highest number fruit set percentage in plants of H-17-16 with maximum number of fruit bearing quaternary shoots. The above results are in agreement with finding of Singh (2003) in chittidar. The Average fruit weight was found to be maximum in Punjab Pink (217.00 g) followed by Arka Kiran and Lalit. However the accession H-17-16 recorded moderate values of 161.27 g per fruit. This might be due to varietal character and crop load on plants. The results are in agreement with Athani *et al.* (2007) [4] and Dholkar *et al.* (2014) [5] in Sardar.

Table 2: Performance of different red fleshed guava accessions for yield under North-Eastern transitional zone of Karnataka.

Varieties	Per cent fruit set	Number of fruits harvested per plant	Average fruit wt. (g)	Yield (kg/plant)	Yield (t/ha)
SR-I	71.43	22.33	95.78	1.67	1.86
SR-II	61.91	26.67	117.13	2.83	3.15
GR-I	38.10	14.00	95.33	1.29	1.44
GR-II	47.62	13.89	106.67	1.64	1.82
Arka Kiran	85.71	52.33	181.23	5.75	6.38
Arka Rashmi	80.95	22.78	147.67	2.10	2.34
Lalit	71.43	35.73	166.40	5.02	5.58
H-17-16	90.47	104.67	161.27	11.45	12.72
Punjab Pink	85.71	45.50	217.20	5.67	6.30
SRD-HYD-1	80.95	22.50	127.00	3.03	3.36
S. Em±	9.08	4.72	9.70	0.61	0.68
C. D. @ 5%	27.18	14.13	29.04	1.84	2.04
C. V. (%)	22.01	22.68	11.87	26.29	26.29

Significantly highest yield (11.45 kg/plant and 12.72 t/ha) was recorded in third year of plants of H-17-16 followed by Arka Kiran (5.75 kg/plant and 6.38 t/ha) and Punjab Pink (5.67 kg/plant and 6.30 t/ha) The good performance of accession H-17-16 for fruit yield may be attributed to the higher values for yield contributing characters recorded in this variety. Marak and Mukund (2007) [7] also observed and suggested a strong correlation between growth parameters like trunk, girth plant spread, canopy volume with fruit yield in guava. The study

concluded that the genotype H-17-16 was superior to other varieties in relation to growth and yield parameters and the other varieties *viz.*, Arka Kiran, Punjab Pink, SRD-HYD-1 and Arka Rashmi were moderate yielders.



**H-17-16**



**Arka kiran**



**Punjab Pink**



**SRD – Hyd - 1**

Photographs of high yielding red fleshed guava accessions

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