



Performance of important cultivars of guava (*Psidium guajava*) under sloppy wasteland conditions of kaymore plateau of Madhya Pradesh

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Guava (*Psidium guajava* L.) is the most important commercially grown fruit crop that occupies an important place in the horticultural wealth of our nation and ranks fourth with respect to area and production. In recent years, this fruit crop has gained considerable prominence on account of its high nutritive value, pleasant aroma, good flavour and availability at moderate price. It has miraculous adaptability to wide range of soils and climate. Fruit culture on wastelands and degraded forestlands became of major importance in India, due to increasing demand for fruits, and could be met out by cultivating the fruits crops in non-traditional areas or unutilized degraded wastelands with the adoption of suitable technology. Guava, on account of its drought hardiness and miraculous adaptability to wide range of soils appear to be a better choice for rehabilitating such lands. Keeping in view of the increasing commercial significance of this fruit in the country, there is a need to bring wastelands under genetically improved cultivars of this fruit. According to a report in Madhya Pradesh, 59.34 lakh hectares (19.3 %) of the total geographical area of 307.44 lakh ha are wastelands. The large percentage of which is under pastures and grazing lands, gullied/ravenous land, degraded notified forestland, and barren rocky areas (Upadhyaya *et al.* 2005). Although, Several workers have studied the performance of important cultivars of guava on good soils under their agroclimatic conditions and observed good variation among the cultivars in their growth and quality parameters (Dubey *et al.* 2000; Athani *et al.* 2007), but, the information on performance of different cultivars on degraded soils is inadequate, especially for the sloppy lands.

The present study was carried out at the progeny orchard of Krishi Vigyan Kendra, Satna (Madhya Pradesh) during the year 2010. Ten guava cultivars, viz. Sangam,

Allahabad Safeda, Lucknow 49, Apple Colour, Chittidar, Dharidar, Seedless, G 27, Shweta and Lalit were planted in the year 2005 at spacing of 6 m × 6 m apart. The experiment was laid out in a completely randomized block design with four replications having one tree per replication. The soil of the experimental site was stony and gravelly with poor water holding capacity. The observations on plant height were recorded by placing long bamboo pole on the soil surface near the trunk base to the top of the plant. The plant spread was measured as the horizontal distance from one end of the canopy to the other end and was recorded in two directions, viz. North-South and East-West with the help of bamboo pole. The fruit yield/plant was recorded by harvesting the fruits at maturity stage from each of the selected plants. For taking observations on quality parameters, ten mature fruits were randomly sampled from each tree and observations so recorded were averaged. The fruits size was determined by measuring the fruit length from the stalk end to calyx end and fruit diameter at the widest cheeks of fruit using vernier calipers. The volume of fruit was measured by the conventional water displacement method. The fruit weight was recorded by using electronic balance. Total soluble solids (TSS) were determined by using hand refractometer. The acidity was estimated by titrating the known quantity of juice against 0.1 N NaOH solution using phenolphthalein as an indicator.

The data pertaining to the performance of ten cultivars of guava are presented in Table 1. Plant height varied significantly among the cultivars and it was observed maximum in Sangam (3.54 m) and minimum in Apple Colour (2.92 m). The plant spread was also found to differ significantly in both N-S and E-W directions. Among the various cultivars, the spread was found uniform in Sangam, Shweta and Lalit cultivars. Sangam cultivar showed more spread in both directions (N-S and E-W). In N-S direction, plant spread was highest (3.40 m) in Shweta followed by Sangam (3.39 m). However, in E-W direction, plant spread was highest in Sangam (3.65 m) which was at par with Shweta (3.63 m). The minimum plant spread was recorded in Dharidar (2.32 m and 2.85 m) and Apple Colour (2.35 m

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Table 1 Plant growth, fruit yield and quality attributes of guava cultivars

Cultivars	Plant height (m)	Plant Spread (m)		Fruit yield (kg/tree)	Fruit Size (cm ²)	Fruit volume (ml)	Fruit weight (g)	TSS (° Brix)	Acidity (%)	TSS/Acid ratio
		N-S	E-W							
Sangam	3.54	3.39	3.65	49.14	25.10	88.42	87.33	10.6	0.26	40.77
Allahabad Safeda	3.46	2.88	3.13	43.41	24.70	71.58	75.87	9.5	0.24	39.58
Lucknow 49	3.33	3.35	3.62	40.47	24.77	69.29	76.55	9.7	0.24	40.41
Apple Colour	2.92	2.35	2.77	31.14	23.66	62.95	63.66	9.2	0.29	31.72
Chittidar	3.24	2.87	2.93	36.38	24.30	64.78	66.75	10.2	0.31	32.90
Dharidar	3.17	2.32	2.85	38.91	24.58	73.65	71.2	10.3	0.32	32.19
Seedless	3.05	2.88	3.08	31.65	23.09	59.17	58.66	10.1	0.37	27.30
G 27	3.23	2.70	3.20	32.4	24.54	66.86	67.45	9.4	0.35	26.86
Shweta	3.52	3.40	3.63	45.25	24.80	87.90	86.42	12.6	0.32	39.75
Lalit	3.42	3.31	3.47	46.74	25.05	88.58	87.29	11.7	0.30	39.00
SE (m) ±	0.21	0.32	0.28	3.73	0.18	4.89	3.41	0.39	0.02	1.09
CD (P=0.05)	0.43	0.66	0.57	7.65	0.37	10.03	7.00	0.80	0.04	2.24

and 2.77 m) in both N-S and E-W directions respectively. Such variations in plant growth of cultivars have also been reported by Athani *et al.* (2007)

The genetic makeup of the cultivar, care and management of orchard, age of plant and season are the other important factors influencing the yield. In the present study it was observed that among the various guava cultivars, the highest fruit yield/plant was recorded in Sangam (49.14 kg), followed by Lalit (46.74 kg) and Shweta (45.25 kg), whereas lowest yield was observed in Apple Colour (31.14 kg). The differences in yield of cultivars might be due to variations in genetic makeup of the cultivars. This is in conformity with the findings of Marak and Mukunda (2007) and Babu *et al.* (2007).

The cultivars exhibited significant variations in quality parameters of fruits in terms of size, volume, weight, total soluble solids and acidity. The maximum fruit size (25.10 cm²) was observed in Sangam followed by Lalit (25.05 cm²) and Shweta (24.80 cm²) and minimum in Seedless (23.09 cm²). The variation in fruit size can be attributed to genetic constitution of the varieties. Similar findings were reported by Pandey *et al.* (2007). The maximum fruit weight was recorded in Sangam (87.33 g), Lalit (87.29 g) and Shweta (86.42 g), while Seedless cultivar recorded the minimum fruit weight. Other cultivars had medium fruit weights. Similarly, the fruit volume ranged between 59.17 ml in Seedless to 88.58 ml in Lalit. The fruit volume was found to be closely proportionate to fruit weight. The variation in fruit weight may be due to phenotypic and genotypic influence of the cultivars. Similar variations in fruit weight and volume of fruits were also reported by Raghav and Tiwari (2008).

Total soluble solids in the fruit are considered as one of the important criterion for dessert quality. The maximum value of TSS (12.6 °Brix) was recorded in Shweta which was significantly higher than observed in other cultivars. The next best cultivars in term of TSS value were Lalit (11.7 °Brix) and Sangam (10.6 °Brix) whereas, the lowest value of TSS (9.2 °Brix) was observed in Apple Colour.

The higher content of TSS in cultivars Shweta, Lalit and Sangam might be due to phenotypic and genetic characters of these cultivars to absorb more nutrients from soils and sink more carbohydrates into the fruits, thus producing larger fruits with more TSS. Singh (2011) also recorded highest TSS in Shweta and Lalit cultivars of guava. The fruit acidity was recorded minimum (0.24%) in Lucknow-49 and Allahabad Safeda, followed by Sangam (0.26%). Maximum acidity (0.37%) was recorded in the fruits of Seedless which was at par with G 27 (0.35%). Likewise the highest TSS/acid ratio was recorded in Sangam (40.71) and Lucknow-49 (40.41). These values were statistically at par with values recorded in Shweta, Lalit and Allahabad Safeda cultivars. The wide variation in acidity may be attributed to the genetic makeup of the cultivars. This is in conformity with the findings of Babu *et al.* (2007). The lowest value of TSS/acid ratio (26.86) was recorded in the fruits of G 27. The sugars present in the fruits impart the sweetness while sugars and organic acids present in the fruit influence its taste and flavour. Moderate acid content coupled with a high total sugar content as observed in the Sangam, Shweta and Lalit appeared to be favoring good taste and flavour of its fruits, whereas high acidity (0.41%) in Seedless resulted in the poor acceptability of its fruits in market.

SUMMARY

The guava (*Psidium guajava* L.) cultivar Sangam produced the highest fruits yield/plant followed by Lalit and Shweta. Fruit size and weight was also found maximum in these cultivars. The total soluble solids were recorded maximum in fruits of Shweta followed by Lalit and Sangam. Sugar-acid ratio a criteria for taste was found to be highest in Sangam (40.71) and Lucknow 49 (40.41). These values were statistically at par with values recorded in Shweta, Lalit and Allahabad Safeda cultivars. The cultivars Sangam, Shweta and Lalit had good growth and found to be the best in terms of yield and quality parameters. Thus, on the basis of preliminary evaluation, it can be concluded that the

cultivars, Sangam Shweta, and Lalit performed better under sloppy wastelands conditions in comparison to other tested cultivars.

REFERENCES

- Athani S I, Patil P B, Swamy G S K, Sabarad A I and Gorabal K R. 2007. Studies on growth parameters and fruit characters in guava cultivars. *Acta Horticulturae* **735**: 271–5.
- Babu K D, Patel R K and Yadav D S. 2007. Comparative evaluation of guava selection under North Eastern region of India. *Acta Horticulturae* **735**: 99–103.
- Dubey P S, Hoda M N and Singh S. 2000. Studies on growth behavior of guava germplasm under Sobour conditions for rainy season fruiting. *Indian Journal of Horticulture* **57** (4): 326–8.
- Marak J K and Mukunda G K. 2007. Studies on the performance of open pollinated seedling progenies of guava cv. Apple Colour. *Acta Horticulturae* **735**: 79–84.
- Pandey D, Shukla S K, Yadav R C and Nagar A K. 2007. Promising guava (*Psidium guajava* L.) cultivars for North Indian conditions. *Acta Horticulturae* **735**: 91–4.
- Raghav M and Tiwari J P. 2008. Genetic variability and correlation analysis in guava. *Indian Journal of Horticulture* **65** (3): 263–70.
- Singh Gorakh. 2011. Varietal behaviour of guava under meadow orchard. *Progressive Horticulture* **43** (2): 181–5.
- Upadhyaya S D, Agarwal V K and Sharma, Aashutosh 2005. Utilization of Wastelands by cultivating medicinal plants under agro forestry system. National level model training course on Production of Quality Planting Material for Horticultural crops. Singh C B, Dubey O P and Pahalwan D K (Eds). Directorate of extension services, JNKVV, Jabalpur, pp 50–4.