



ISSN (E): 2277-7695  
ISSN (P): 2349-8242  
NAAS Rating: 5.23  
TPI 2022; 11(8): 1846-1848  
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[www.thepharmajournal.com](http://www.thepharmajournal.com)  
Received: 06-05-2022  
Accepted: 16-06-2022

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## Morphological characterization of various cultivars of Guava (*Psidium guajava*. L) Under western U.P conditions

**Rishabh Shukla, Manoj Kumar Singh, Sunil Malik, Mukesh Kumar, Arvind Kumar and Atar Singh**

### Abstract

The present experiment was carried out to investigate morpho-physiological and productivity characteristics of various cultivars of Guava (*Psidium guajava* L.) under Western Uttar Pradesh conditions. Six guava cultivars viz., Lalit, Pusa Red Fleshed, Dhaval, Shweta, Lucknow-49 and Pant Prabhat showed wide range of variation with respect to plant growth and quality traits of fruits were evaluated during the winter season of the years 2020-21 and 2021-22. An experiment was carried out at, Horticultural Research Centre, College of Horticulture, Sardar Vallabhbhai Patel University of Agriculture & Technology, Modipuram, Meerut. An investigation was carried out to evaluate the morphological characters that is flowering percentage (92.35%), fruit setting percentage (75.67%), Number of fruits per plant (198.94), fruit weight (135.96 g), fruit length (6.67 cm) and width (6.36 cm). Guava variety Pant Prabhat was found to top the list in relation to all the morphological parameters and maximum values and proved significantly superior over both the varieties Shweta and Pant Prabhat followed by Pusa Red fleshed and Dhaval.

**Keywords:** Guava, variability, growth, flowering, fruiting, fruit quality

### 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. Due to its high nutritive value, wide adaptability in adverse agro-climatic condition, early and prolific bearing with a good return, the crop has been gaining popularity as a commercial crop in Northern India. The fruit is a rich source a vitamin C, calcium, iron and pectin. Guava crop bear twice a year, i.e., during rainy season and winter season. The bearing behavior is related to the growth plants in different vegetative flushes, which is general guided by climatic conditions (Dubey *et al.*, 2000) [6]. The variation in plant growth, yield and physio-chemical composition among the different guava cultivars. Cultivars varied according to shape, colour, size and smoothness of skin. Origin in place, bushy or erect tree, acidic in nature, flowering, fruiting and fruit quality behaviors. In guava the bearing occurs on current season growth and flower appears on axis of new leaves. It is amenable to pruning too. It depends on cultivars. It is highly cross pollinated and pollination generally performed by insects. Fruit of guava are developing from inferior ovary and exhibits double sigmoid growth curve and fruit takes nearly 4-5 months to change from dark green to yellowish green to attain maturity and perishable in nature. Guava fruits are considered as one of the delicious and luscious with highly nutritive values. Therefore, fruits are an ideal for nutritional food security. Guava is one of the cheapest and good sources of vitamin-C (210-305mg/100g fruit pulp) and (0.5-1.8%) pectin but has low energy (66cal/100g). The ripe fruits contain dry matter 12.3-26.3%, moisture 77.9-86.9%, ash 0.51-1.02%, crude fat 0.10-0.70%, crude protein 0.82-1.45% and crude fiber 2.0-7.2%. The fruit of guava also rich in minerals like Phosphorus (22.5-40.0 mg/100g pulp), Calcium (10.0-30.0 mg/100 g pulp) and Iron (0.60-1.39 mg/100g pulp) as well as other like Niacin (0.20-2.32 mg/100 g pulp), Pantothenic acid, Thiamine (0.03-0.07mg/100 g pulp), Riboflavin (0.02-0.04 mg/100 g pulp) and vitamin-“A” (Mitra and Bose, 2001) [7].

Guava fruits are consumed either fresh or processed in the form of product like jam, jelly, nectar and good quality ready to serve beverages. Two types of wine, viz, guava juice wine and guava pulp wine can be manufactured from ripe fruits. The seeds of guava contain oil (5-13%) which is rich in essential fatty acids and can be used in salad dressing. Leaves of guava have medicinal properties and are used in curing diarrhea and also for dyeing and tanning.

Selection of varieties suited to a specific climatic condition on the basis of growth, flowering, fruiting and yield is very important to make guava cultivation economically viable. Research work carried out at CISH, Lucknow on evaluation of newly developed guava cultivars and selections showed that Lalit, Shweta and Pant Prabhat were high yielders with moderate quality whereas Hisar Surkha recorded maximum quality attributes (Pandey *et al.*, 2016) [18]. The yield and quality of local types grown by the farmers in the coastal agro climatic region under study is poor and not able to withstand competition from other improved cultivars.

## Materials and Methods

Six genetically diverse cultivars *viz.* Lalit, Pusa Red Fleshed, Dhaval, Shweta, Pant Prabhat, Lucknow-49 were evaluated with respect to growth, yield and quality traits of fruit at the experiment was conducted at the Horticultural Research Centre of Sardar Vallabh bhai Patel University of Agriculture & Technology, Modipuram, Meerut (Uttar Pradesh) during 2020-21 and 2021-22. The experimental material consists of 24 guava trees. Experiment was performed in 7-year-old guava orchard. The plants were planted at spacing of 5 m x 5 m. Experiment was conducted with one season in both years. The experiment was laid out in Randomized Block Design (RBD) consisting of 6 treatments and 4 replications. The observations were recorded on, flowering percentage, fruit set percentage, Fruit retention, Number of fruits per tree and fruit length(cm), fruit width(cm), and fruit weight(g). Statistical analysis of the data obtained in the different sets of experiments were calculated, as suggested by Panse and Sukhatma (1989) [14].

## Results and Discussion

### Physical attributes

There were wide variations among different cultivars with respect to flowering (%), fruit setting (%) Number of fruits per plant, fruit weight (g), fruit length(cm) and fruit width(cm) evaluated under the Tropical- and Sub-Tropical condition of Uttar Pradesh.

A significant variation in flowering (%) was recorded among different guava cultivars Table 1. The maximum Flowering (%) i.e. (91.67% and 92.35%) was found in cultivars Pant Prabhat had the maximum and which was statistically at par with the variety Lucknow-49 (89.21 and 89.21%) and 'Shweta' (88.98% and 88.64%), and least flowering (%) was recorded in 'Lalit' (81.53% and 81.24%). Similar trend observed in terms of flowering (%) during both the years.

The data pertaining to fruit set in different cultivars of guava are presented in Table 1. There were wide variation in fruit set among different cultivars. The maximum fruit set (75.25 and 75.67%) were recorded in Pant Prabhat during both the year and it was followed by Lucknow-49 (71.69 and 71.07%) and Shweta (70.20 and 70.37%). Whereas, minimum fruit set

(55.91 and 56.07%) was recorded in Lalit during both the years of experimentation. The results are in accordance with the findings of Sharma *et al.* (2011) [13], who recorded highest fruit set (82%) in cultivar Lucknow-49(Sardar) under North Indian conditions. The variation in fruit set is entirely based on the genetic makeup of cultivars, pollen fertility and prevailing climatic conditions.

It was quite apparent from the data depicted in the Table 1., The maximum number of fruits were recorded in Pant Prabhat (198.94 and 195.14) during both years followed by Lucknow-49 (182.37 and 181.20). The minimum number of fruits per plant (143.91 and 143.41) were obtained in Lalit in two constitute years. It has also noted a significant in differences among the varieties respect in the number of fruits per plant.

A significant variation in fruit weight was recorded among different guava cultivars Table 1. Data reveals that cultivars Pant Prabhat had the maximum fruit weight i.e. (135.15 and 135.96 g) and which was statistically at par with the variety 'Shweta' (128.70 and 129.32g), and followed by Lucknow-49 (117.97 and 117.39 g). The least fruit weight (95.73 and 94.22g) were recorded in 'Lalit' (95.73 and 94.22g). Similar results were found respect of fruit weight (g) during both the years.

Data pertaining to fruit length for winter season crop is given in Table 1. The maximum fruit length (6.57 and 6.67 cm) was measured in cultivars Pant Prabhat, followed by Shweta (6.51 and 6.44 cm) and Dhawal (5.91 and 5.91 cm) respectively. However, the minimum fruit length (5.68 and 5.74 cm) were obtained in Lucknow-49 (5.68 and 5.74 cm) during both the years.

Fruit width Significant variation for fruit width was also observed in guava cultivars as given in Table 1. shows that in winter season, during both the years, the maximum (6.33 and 6.36 cm) fruit width in Pant Prabhat and followed by Shweta (6.20 and 6.24 cm) and found statistically at par with the variety 'Lucknow-49' (6.13 and 6.17 cm). However, the minimum fruit width was recorded in 'Lalit' (5.82 and 5.80 cm). Similar trend during both the years of experimentation.

In the present investigation, it was observed that physical and growth characteristics of fruits differed due to genetic makeup and varied soil climatic condition and variation in fruit weight, fruit length, and breadth might be due to genetic behavior of different cultivars with bigger or smaller sizes varying with weight. These observations were in accordance to the Babu *et al.* (2002) [16] and Man Suryanarayan (2011) in guava.

The present finding is in close agreement with earlier scientist's *viz.*, Sharma *et al.* (2011) [15], Singh (2002) [15], observed significantly higher flowering percentage, fruit setting percentage, fruit weight (g), number of fruits per plant and fruit length (cm) and fruit width (cm) during winter season. Similar findings also observed by Dolkar *et al.* (2014) [3], Patel *et al.* (2007) [10].

**Table 1:** Morphological and growth characteristics of various cultivars of guava

Cultivars	Flowering (%)		Fruit Set (%)		Number of Fruit per plant		Fruit weight(g)		Fruit Length(cm)		Fruit Width(cm)	
	2020-21	2021-22	2020-21	2021-22	2020-21	2021-22	2020-21	2021-22	2020-21	2021-22	2020-21	2021-22
Lalit	81.53	81.24	55.91	56.07	143.91	143.41	95.73	94.22	5.69	5.77	5.82	5.80
Pusa red fleshed	82.18	81.97	62.60	62.51	147.76	147.93	102.68	102.17	5.76	5.60	5.51	5.49
Dhaval	81.78	81.59	61.64	61.72	152.66	152.73	97.34	97.87	5.91	5.91	5.76	5.75
Shweta	88.98	88.64	70.20	70.37	172.40	171.42	128.70	129.32	6.51	6.44	6.20	6.24
Pant Prabhat	91.67	92.35	75.25	75.67	198.94	195.14	135.15	135.96	6.57	6.67	6.33	6.36
Lucknow-49 (Sardar)	89.21	89.21	71.69	71.07	182.37	181.20	117.97	117.39	5.68	5.74	6.13	6.17
CD (0.05)	4.446	4.245	2.393	1.997	9.501	1.997	5.517	6.104	0.261	0.408	0.190	0.209
SE(m)	1.462	1.395	0.78	0.657	3.123	0.657	1.814	2.007	0.086	0.134	0.062	0.069

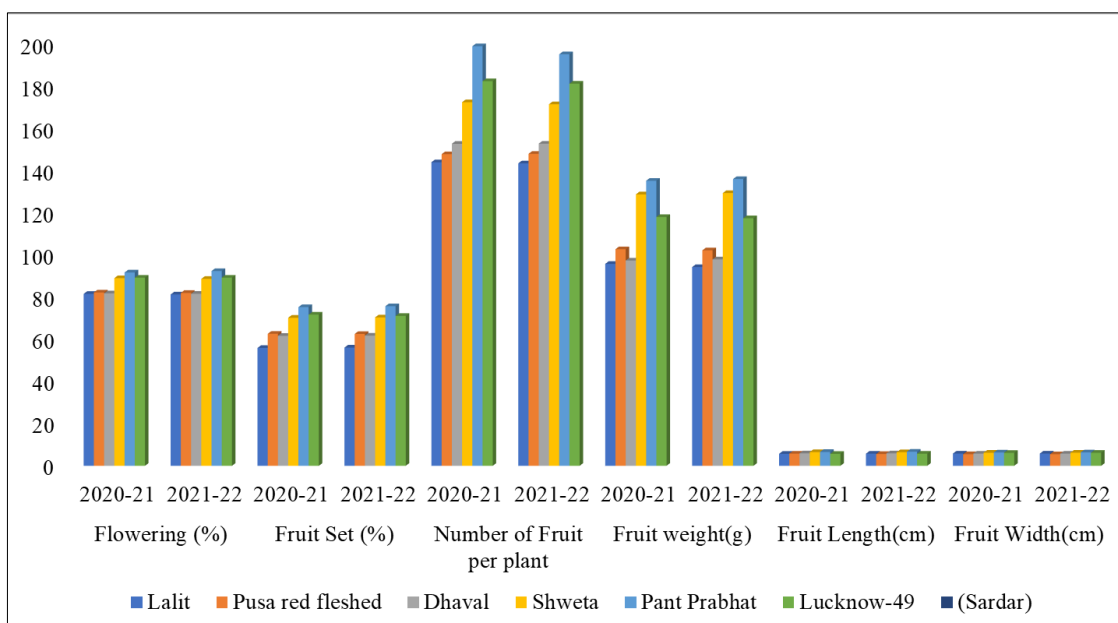


Fig 1: Physical attributes of different guava cultivars

## Conclusion

On the basis of overall performance, it may be concluded that the cultivar Pant Prabhat has been found best suitable for commercial cultivation subtropical conditions in western Uttar Pradesh.

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