

# A study on selection of promising germplasm of guava from kymore & satpura plateau of Madhya Pradesh

## Summary

The experiment was conducted at department of Horticulture JNKVV, Jabalpur for selection of superior germplasm of guava from available existing materials in rural area of Kymore & Satpura Plateau of Madhya Pradesh. On the basis of local information and the characters of plant and fruits of 23 germplasm were identified. All germplasm were compared each other and with check variety Allahabad Safeda and Red Fleshed for characters like plant type, stem type, leaf shape, leaf base, plant height, fruit per tree and yield of trees. The yield of fruits was varied from 11.34 kg to 35.29 kg per tree, number of fruits per plants was ranged from 78 to 152 and average weight of fruits was observed 89.15 to 230.21 gram per fruit. Accession number JPG-17 was found better amongst all genotypes in terms of yield and price of fruits.

**Keywords:** guava germplasm, morphological parameters, germplasm selection

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## Introduction

Guava is one of the popular fruit crops of tropical and sub-tropical region of India. Guava fruit is nutritionally rich and has good amount of vitamin-C, pectin and minerals. Variability is the prime requirement for any crop improvement programme and rural area of the Kymore and Satpura Plateau region has greater extent of variability among guava plants. Morphological characters i.e. age of tree plant height spread plant types leaf size are determining factors for yield. Morphological characters of plants provide base for comparison among various guava germplasm. Thus, the experiment was conducted for screen out the high yielding germplasm/ varieties which can be suggested for plantation in new orchards of this area. **Materials and methods**

The experiment was conducted in the department of Horticulture

JNKVV, Jabalpur during 2004-05. On the basis of available information from the local market, cultivators and state department of Horticulture different locations were selected for the survey work. The diversity in the available genotypes exists of guava have been developed in nature through seed from the existing plants. The potential locations for the survey work selected were Jabalpur, Katni and Seoni districts of M.P. On the basis of visual appearance and experience of the villagers. Jagtap and Kokate<sup>1</sup> also selected trees of custard apple on the basis of visual appearance and experience of the concerned villagers. Twenty three genotypes were selected during the survey from different location for detail study. Two varieties Allahabad Safeda and Red Fleshed were using as check (Table 1).

Selected plants were compared on the basis of observations like age of plants plant type, stem type, leaf shape, leaf margin, leaf base, plant height, fruit per tree average fruit weight and yield of trees.

**Table 1** Twenty three genotypes were selected during the survey from different location for detail study

S.No.	Locations	Sample code	Accessionnumber
1.	Fruit Research Station Imaliya, JNKVV, Jabalpur	Im-1	JPG-1
2.	Fruit Research Station Imaliya, JNKVV, Jabalpur	Im-2	JPG-2
3.	Fruit Research Station Imaliya, JNKVV, Jabalpur	Im-3	JPG-3
4.	Krishi Nagar	Kn-1	JPG-4
5.	Krishi Nagar	Kn-2	JPG-5
6.	Krishi Nagar	Kn-3	JPG-6
7.	Krishi Nagar	Kn-4	JPG-7
8.	Jodhpur	Jp-1	JPG-8
9.	Jodhpur	Jp-2	JPG-9
10.	Jodhpur	JP-3	JPG-10
11.	Jalgaon	Jg-1	JPG-11
12.	Bargimohla	Bm-1	JPG-12
13.	Urdua	Urd-1	JPG-13

Table Continued....

S.No.	Locations	Sample code	Accessionnumber
14.	Gudganva	G-1	JPG-14
15.	Pipariya	P-1	JPG-15
16.	Pipariya	P-2	JPG-16
17.	Khiriya	Kh-1	JPG-17
18.	Khiriya	Kh-2	JPG-18
19.	Tihari	Th-1	JPG-19
20.	Tihari	Th-2	JPG-20
21.	Teori	Ho-1	JPG-21
22.	Ganeshganj	Gg-1	JPG-22
23.	Ganeshganj	Gg-2	JPG-23

\*JPG Jawahar Psidium guajava

## Results and discussion

Observations from the Table 2 show in selecting the genotypes, the habit and nature of tree and its growth are prominent diagnostic characters, as reported by Nicholaissen.<sup>2</sup> The selected ten, seven and six genotypes were erect, semi spreading and spreading type respectively. As a consequence of genetical make up of genotypes developed from open pollinated seeds, the seedlings showed variability under different locations. The regions soil and microclimatic conditions also added in exhibiting the inherent characters of genotypes. Very less variation

was noticed amongst the genotypes in terms of stem type, leaf shape, apex and base. The reason may be due to off springs of established variety L-49. The stem, leaf shape, apex and base exhibited no variation and this may result in possibility of close relation with L-49. It was revealed that, these characters of L-49 are being passed into the seedlings in the similar manner. Variation was noticed in the leaf margin in different selected genotypes and it varied from undulate to entire. Entire leaf margin was possessed by the majority of genotypes i.e., sixteen, while other seven possessed undulated margin.

Table 2 Morphological parameters

S.No.	Genotypes	Age of the plant approx. (in year)	Plant height (m)	Spread (m)	
				N-S	E-W
1.	JPG-1	14	3.50	2.93	3.00
2.	JPG-2	21	4.20	1.83	2.94
3.	JPG-3	10	3.70	3.86	3.31
4.	JPG-4	15	3.16	2.64	2.10
5.	JPG-5	13	3.30	4.31	5.20
6.	JPG-6	17	3.49	3.65	3.55
7.	JPG-7	12	1.35	2.48	3.11
8.	JPG-8	16	4.38	5.63	5.76
9.	JPG-9	8	5.68	6.48	6.73
10.	JPG-10	11	4.48	1.88	2.60
11.	JPG-11	10	3.85	3.63	4.12
12.	JPG-12	15	3.31	2.56	2.84
13.	JPG-13	18	3.55	3.12	3.05
14.	JPG-14	9	4.40	3.80	3.35
15.	JPG-15	14	4.00	3.90	3.35
16.	JPG-16	22	3.18	2.42	3.05
17.	JPG-17	16	3.76	4.46	3.89
18.	JPG-18	13	3.83	3.62	4.12
19.	JPG-19	20	3.54	1.93	2.53
20.	JPG-20	12	4.49	3.83	4.02
21.	JPG-21	21	4.85	5.15	5.33
22.	JPG-22	8	4.38	4.05	5.13
23.	JPG-23	17	3.84	3.88	3.75

Table Continued...

S.No.	Genotypes	Age of the plant approx. (in year)	Plant height (m)	Spread (m)	
				N-S	E-W
<b>Check varieties</b>					
1.	Allahabad Safeda	15	3.85	4.90	5.60
2.	Red-fleshed	14	4.18	6.13	5.89

It seems that the genetic constituents of selected genotypes might be the reason for exhibiting variability in leaf margin. Vankataratnam and Satyanarayanswamy<sup>3</sup> also reported variation in leaf shape in genotypes of custard apple. The data given from Table 3 revealed that among the different selected genotypes, the plant height ranged from 1.35 m (JPG-7) to 5.68 m (JPG-9). The genetic constituents of genotypes formed through open pollinated seeds, brought about variability in growth. North-South spread of plant varied from 1.83

m (JPG-2) to 6.48 m (JPG-9). Whereas, the East-West spread of plant varied from 2.10 m (JPG-4) to 6.73 m (JPG-9). More variation was revealed amongst the genotypes in plant spread. The growth habit is controlled and influenced by the genetic characters as well as by the effect of micro-climatic conditions of the region. Variation in growth habit of different cultivars of guava was also recognized by Subramanyam and Dinesh.<sup>4</sup>

**Table 3** Morphological parameters

S.No.	Genotypes	Plant type	Stem type	Leaf shape	Leaf Margin	Leaf apex	Leaf base
1.	JPG-1	Spreading	Rough	Elliptic	Entire	Acute	Obtuse
2.	JPG-2	Erect	Smooth	Ovate lanceolate	Undulate	Acute	Obtuse
3.	JPG-3	Semi spreading	Smooth	Elliptic	Entire	Acute	Obtuse
4.	JPG-4	Erect	Rough	Oblong lanceolate	Undulate	Acute	Obtuse
5.	JPG-5	Spreading	Smooth	Elliptic	Entire	Acute	Obtuse
6.	JPG-6	Erect	Rough	Elliptic	Undulate	Acute	Obtuse
7.	JPG-7	Spreading	Smooth	Elliptic	Entire	Acute	Obtuse
8.	JPG-8	Semi spreading	Rough	Oblong lanceolate	Entire	Acute	Obtuse
9.	JPG-9	Spreading	Smooth	Elliptic	Entire	Acute	Obtuse
10.	JPG-10	Erect	Rough	Elliptic	Undulate	Acute	Obtuse
11.	JPG-11	Semi spreading	Smooth	Ovate lanceolate	Entire	Acute	Obtuse
12.	JPG-12	Erect	Smooth	Elliptic	Undulate	Acute	Obtuse
13.	JPG-13	Spreading	Rough	Ovate lanceolate	Entire	Acute	Obtuse
14.	JPG-14	Erect	Smooth	Elliptic	Entire	Acute	Obtuse
15.	JPG-15	Erect	Smooth	Elliptic	Entire	Acute	Obtuse
16.	JPG-16	Semi spreading	Smooth	Elliptic	Entire	Acute	Obtuse
17.	JPG-17	Erect	Rough	Elliptic	Undulate	Acute	Obtuse
18.	JPG-18	spreading	Smooth	Oblong lanceolate	Entire	Acute	Obtuse
19.	JPG-19	Semi spreading	Smooth	Oblong lanceolate	Entire	Acute	Obtuse
20.	JPG-20	Erect	Smooth	Elliptic	Entire	Acute	Obtuse
21.	JPG-21	Spreading	Smooth	Oblong lanceolate	Undulate	Acute	Obtuse
22.	JPG-22	Erect	Smooth	Oblong lanceolate	Entire	Acute	Obtuse
23.	JPG-23	Semi spreading	Smooth	Elliptic	Entire	Acute	Obtuse
<b>Check varieties</b>							
1.	Allahabad Safeda	Erect to spreading	Smooth	Elliptical to oblong	Entire	Acute	Obtuse
2.	Red-fleshed	Erect	Smooth	Oblong lanceolate	Entire	Acute	Obtuse

The data depicted from Table 4 showed that the maximum number of the fruits per plant varied in different selected genotypes with the range from 78 (JPG-4) to 152 (JPG-17) fruits. It shows marked variation amongst selected genotypes. The yield of each genotype also varied from 11.34 kg (JPG-4) to 35.29 kg (JPG-17). The weight of fruit widely varied from 89.15 gm (JPG-4) to 230.21 gm (JPG-

17). The variation amongst the genotype as regards is number of fruits, yield and fruit weight may be due to inherent characters and climatic adaptability in a particular region, which may prove a important diagnostic character for selection of genotypes. In many of the genotype number of fruit increased but fruit decreased. This may be due to distribution and diversion of available food material in

more number of fruits. Thimmapaih and Suman<sup>5</sup> noticed that climatic conditions influenced the fruit size and quality of fruits in guava cultivar Allahabad Safeda. Singh<sup>6</sup> studied 25 cultivars of guava for screening better cultivars and he reported variations in morphological,

growth and quality parameters with different cultivars. Jain<sup>7</sup> studied 48 genotypes of guava germplasm under Jabalpur condition. Singh et al.<sup>8</sup> also studied 10 guava germplasm for their phenological and fruiting behaviour.

**Table 4** Yield parameters

S. No.	Genotypes	Number of fruits / tree	Yield / tree (kg)	Average fruit weight (g)
1.	JPG-1	122	14.25	118.67
2.	JPG-2	137	30.87	223.16
3.	JPG-3	118	14.80	122.89
4.	JPG-4	78	11.34	89.15
5.	JPG-5	94	13.82	166.57
6.	JPG-6	108	12.19	125.49
7.	JPG-7	102	15.30	156.16
8.	JPG-8	98	15.34	198.20
9.	JPG-9	1095	19.17	180.70
10.	JPG-10	121	16.83	150.86
11.	JPG-11	105	15.48	148.17
12.	JPG-12	148	33.73	1226.30
13.	JPG-13	135	25.62	168.02
14.	JPG-14	131	26.20	217.00
15.	JPG-15	122	21.14	179.30
16.	JPG-16	132	20.88	156.32
17.	JPG-17	152	35.29	230.21
18.	JPG-18	148	29.03	195.20
19.	JPG-19	128	19.39	128.26
20.	JPG-20	136	19.89	135.69
21.	JPG-21	142	20.37	150.62
22.	JPG-22	123	14.35	118.85
23.	JPG-23	137	33.02	228.00
<b>Check varieties</b>				
1.	Allahabad Safeda	215	42.19	195.02
2.	Red-fleshed	200	37.18	180.89

The market value of guava fruits is influenced by its physical attributes like shape, size, skin colour and texture. The market value had its range from 4.00 to 8.00 Rs/kg within the chosen genotypes.

Genotypes JPG-17 earned the highest market value (8.00 Rs/kg) whereas, genotypes JPG-4 earned the least market value (4.00 Rs/kg) (Table 5).

**Table 5** Economics

S. No.	Genotypes	Market value of fruits (in Rs.)			
		At I <sup>st</sup> Picking	At II <sup>nd</sup> Picking	At III <sup>rd</sup> Picking	Mean
1.	JPG-1	6	5	4	5.00
2.	JPG-2	8	4	5	6.00
3.	JPG-3	6	4	3	4.33
4.	JPG-4	5	5	3	4.00

Table Continued....

S. No.	Genotypes	Market value of fruits (in Rs.)			
		At I <sup>st</sup> Picking	At II <sup>nd</sup> Picking	At III <sup>rd</sup> Picking	Mean
5.	JPG-5	7	4	3	5.00
6.	JPG-6	6	4	4	4.66
7.	JPG-7	5	4	4	4.33
8.	JPG-8	4	4	5	4.33
9.	JPG-9	6	7	7	4.30
10.	JPG-10	5	5	3	5.00
11.	JPG-11	5	7	6	6.33
12.	JPG-12	7	5	5	5.00
13.	JPG-13	6	5	4	5.33
14.	JPG-14	6	4	5	4.33
15.	JPG-15	6	5	3	5.00
16.	JPG-16	7	8	3	8.00
17.	JPG-17	7	6	9	5.33
18.	JPG-18	4	5	6	5.00
19.	JPG-19	6	4	4	5.00
20.	JPG-20	7	5	4	4.33
21.	JPG-21	5	5	3	5.00
22.	JPG-22	6	5	4	6.00
23.	JPG-23	8	4	5	6.00
<b>Check varieties</b>					
1.	Allahabad Safeda	10	9	8	9.00
2.	Red-fleshed	8	7	7	7.33

\*Average market rate Rs. 5/kg

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None.

## Conflicts of interest

The author declares there is no conflict of interest.

## References

- Jagtap KB, AS Kabate. Promoshing custard apple (*Annena squamosa* L.) selection from pangiri (Sangamner) region in Ahmednagar Distt. of Maharashtra. *J Hort.* 1991;5(2):91–95.
- Nicholaissen N. The most important varieties of spananch. *Zuchter.* 1993;1–8.
- Venkataratnam L, G Satyanarayanswamy. Studies of genetic variability in *A. squamosa*. *Ind J Hort.* 1958;15(3&4):28–238.
- Subramanyam MD, MR Dinesh. Collection and evaluation of germ plasm. group workers meeting for subtropical fruit res. *Rep.* 1993;106–107.
- Thimpppaih, CL Suman. Seasonal effect on fruit quality in guava (*Psidium guajava* L.). *South Indian Hort J.* 1986;34(2): 64–69.
- Singh M. Performance of some cultivars of guava (*Psidium guajava* L.) with special reference to their commercial significance in the central Gangatic Plains. *Punjab Hort J.* 1988;28(1&2):50–55.
- Jain LC. Evaluation of guava (*Psidium guajava* L.) seedlings under jabalpur condition. Thesis submitted to department of horticulture, JNKVV, Jabalpur. 2000.
- Singh S, J Singh, MN Hoda. Evaluation of guava germplasm under sabour (Bihar) conditions. *Indian J Agric Sci.* 2002;72(7): 393–395.