www.ThePharmaJournal.com

The Pharma Innovation

TK Singh
Department of Horticulture,
JNKVV, College of Agriculture
Rewa, Madhya Pradesh, India

Shruti Singh
Department of Horticulture,
JNKVV, College of Agriculture
Rewa, Madhya Pradesh, India

US Bose
Department of Horticulture,
JNKVV, College of Agriculture
Rewa, Madhya Pradesh, India

New promising guava hybrids for growth yield and quality under Kymore plateau of Madhya Pradesh

TK Singh, Shruti Singh and US Bose

Abstract
A field experiment was conducted during 2016-17 to 2020-21 at Fruit Research Station Kuthulia Farm, College of agriculture Rewa under All India Coordinated Research Project on Fruits. The experiment was laid out in Randomized Block Design (RBD). The experiment was laid out in Row trial comprising 11 treatments. Data were recorded on tree height, canopy volume, tree spread, No of fruit, Fruit weight, TSS (^{o}B), acidity (%), Pulp weight (g), Fruit length & fruit breadth (cm) and seed weight (g), yield tree^{-1}, yield ha^{-1} and benefit: cost ratio of different treatments. The results revealed that various hybrid of guava exhibited significant effect on canopy, yield and quality of the fruits. Different plant character maximum plant height MPUAT S-1 (3.29m) in treatment (T_1) however minimum SRD H-1 (1.62m) treatment (T_5). The maximum Canopy Volume (2.30 m^3) were observed in treatment T_1 Mpuat S-1 followed by (2.10m) was noted in T_{10} - RCGH-11 tree spread E-W and N-S (1.96 m and 2.01m), were observed with the treatments T_1 – Mpuat S-1, (Table 1), The higher No of fruit and weight of fruit (2.10 and 205.20 g), were observed with the treatment T_7 – Allahabad Safeda, (Table 1). The maximum fruit length, fruit breadth highest was recorded Allahabad Safeda (8.02cm and 7.38cm) with the treatment T_7, maximum TSS were recorded Allahabad Safeda (10.91 ^{o}B) followed by SRD H-4 (9.62 ^{o}B). Here it is mention that the results related to vegetative and quality parameters on the basis of only 1 year data. The pooled yield data 5 years clearly indicated that fruit yield tree^{-1} and yield ha^{-1} (22.41 and 89.63 q.) have been registered with the treatment T_7 – Allahabad Safeda followed by 16.75 & 67.00 q were observed with the treatments T_3 – Arka Kiran. The benefit cost ratio was also found higher with the treatment T_7 – Allahabad Safeda 3.48 (hectare basis) showed better, are recommended performance of promising hybrids of guvava cv. Allahabad Safeda. Guava orchard to increase the productivity and quality of fruits. as compared to other treatments in orchards of guava.

Keywords: Growth, yield & quality of Guava

Introduction

Guava (*Psidium guajava* L.) belongs to the family Myrtaceae is one of the important fruit crops in India. Guava is considered as one of the wonderful, nutritionally valuable and remunerative fruit crop of the world. Besides India, it is grown widely throughout the tropics of the world. Its cultivation is getting popularity due to increasing international trade, better nutritional contents and recessing of its value added products like jam, jelly etc. It is a hardy fruit crop thriving well under a wide range of soil type varying from sandy loam to clay loam with ph of 4.5 to 8.2 Guava fruit is rich in 'vitamin-C', minerals like calcium, iron and phosphorous with pleasant aroma and flavour. It can be utilized at all the stages of development both in immature, mature and over ripe stage. It can be simply grown under humid and dry conditions. It requires good rainfall for growth stage (June to August) and rainless dry weather from November onwards during the flowering, fruit setting to ripening in guava. The guava is hundred percent edible fruit and is consider as apple of the poor' due to its low cost, easy availability and high nutritive value. It plays as important role in reducing nutritive disorders due to deficiency of vitamin C in human health. Many researchers have studies the nutritional quality of guava fruits under various modified atmospheric conditions. Archana and Siddiqui (2004) [2]. It can be simply grown under humid and dry conditions. It requires good rainfall for growth stage (June to August) and rainless dry weather from November onwards during the flowering, fruit setting to ripening in guava. In India guava is very popular as a fresh fruit because of its excellent taste, medicinal properties and hundred per cent edibility. This fruit is equally important for processing industry (Jain *et al*., 2011). The studies on newly developed guava hybrid with commercial cultivar for growth, yield and quality traits have not been studied so far in Rewa region of Madhya Pradesh. The yield and quality of local cultivars grown by the farmers is quite poor.

Corresponding Author:
TK Singh
Department of Horticulture,
JNKVV, College of Agriculture
Rewa, Madhya Pradesh, India

To study variability among fruit crops, plant growth, yield and fruit quality are the important traits (Aulakh, 2005 & Pandey et al; 2007) [1, 12] Hence, it is pre-requisite to trace the guava genotypes with higher yield and good quality. Hence. In the present investigation, attempts were made to test genotypes suitable for Madhya Pradesh region.

Material and Methods
A field experiment was conducted during 2016-17 to 2020-21 at Fruit Research Station Kuthulia Farm, College of agriculture Rewa under All India Coordinated Research Project on Fruits. The experiment was laid out in Randomized Block Design (RBD) A field experiment was laid out in 2011, with the objectives, To study the standardize the promising new hybrid on yield and quality of guava, To taste the performance of new guava hybrid. Comprising ten new hybrids and one check (Allahabad Safeda). The experiment was laid out in Row trial comprising 11 treatments. The treatments were namely T_1 Mput S-1, T_2 Mpuat S-2, T_3 Arka Kiran, T_4 SRD H-1, T_5 SRD H-4, T_6 CISH G-35. T_7 Allahabad Safeda, T_8 RCGH-7, T_9 RCGH-1, T_{10} RCGH-11, T_{11} RCGH-4. Data were recorded on tree height, canopy volume, tree spread, No of fruit, Fruit weight, TSS (ºB), acidity (%), Pulp weight (g), Fruit length & fruit breadth (cm) and seed weight (g), yield tree^{-1}, yield ha^{-1} and benefit: cost ratio of different treatments. The experimental site was situated at 24.510 latitude and 81.291 Longitude at an elevation of 365.87 above MSL. The climate and of the site is subtropical with minimum & maximum temperature ranging from 3 ºC to 45 ºC and with average annual rainfall of 1020 mm (40.2 inch per year) Total four replication having two trees per replication of each hybrid and cultivar situated and data were taken from selected from with respect to growth, yield and quality traits. Ten fruits were randomly harvested from each plant for recording observations. Growth and yield parameters were taken in terms of plants height (m) Canopy volume (m^3), Canopy Spread (N-S & E-W), Number of Fruits, Yield (Kg/tree), Fruit Weight (g), Fruit length (cm), Fruit Diameter (cm), 100 Seed weight (g). The fruit quality was studies in term TSS (ºB), Acidity (%), TSS Total Soluble Solid (TSS) was determined with the help of digital refractometer. Acidity was determined by titrating the juice against N/10 NaOH and expressed as percent citric acid. The treatments were comprised, 11 hybrid cultivar, These are planted 5x5 m spacing. Data were recorded on tree height, stem girth, canopy volume (m^3), tree spread, (M) No of fruit, Fruit weight, yield tree^{-1}, yield ha^{-1}, and benefit: cost ratio of different treatments. and benefit: cost ratio of different treatments. The data was statistically analyzed by method of analysis of variance using RBD as described by Panse and Sukhatme, 1985 [11].

Results and Discussion
The results revealed that various treatment exhibited significant effect on canopy, yield and quality of the fruits. The tree height recorded significantly highest in MPUAT (3.29 m) T_1. While RCGH-11 (3.10 m) followed by RCGH-7 (2.67 m). The Canopy Volume highest recorded with the treatment MPUAT S-1 (10.07 m^3) followed by RCGH-11 (3.10 m^3) Minimum canopy volume Arka Kiran (2.7 m^3) T_3. Similar views were expressed by (Athani et al. 2007) [3] in

their studies. Number of fruits per plant and fruit weight were recorded highest T_7 Allahabad Safeda (2.10 & 205.20 g) respectively found significantly superior over others (Table 1b) while, no. of fruits/fruit weight was recorded Second height T_2 MPUAT S-2 (198.04 & 125.50g) respectively. CISH G-35 (185.66 & 111.10 g) and Arka Kiran (180.04 & 198.0 g). were at par with each other for number of fruit/fruit weight (g). This type of variation may be due to phenotypic & genotypic intraction among the hybrids and cultivars under test condition. Reported by various viz. (Babu et al. 2002, Aulakh (2005) [1]. Pandey et al. (2007) [12] and Patel et al. (2011) [10] in different agroclimatic conditions from the mean results fruit length was recorded highest to T_7 Allahabad Safeda (8.02 cm) and lowest in T_{10} RCGH-11 (4.59 cm) Similarly fruits breadth was recorded highest in Allahabad Safeda (7.38 cm) while lowest in T_{10} RCGH-11 (4.62 cm) The variation in fruit weight, length & breadth might be due to genetic behavior of different cultivars or genotype with bigger or smaller size varying with weight. These observation were in accordance to the man and surya Narayan (2011) [8] in Guava. In Guava if fruit is loded with higher number of hard seeds fails to attract attention as it influences fruit size and shape. The fruits having less number of soft seeds were preferred both in table and processing purpose. In present investigation wide variation with respect to 100 seed weight (g) were recorded among the hybrids and cultivars and these differences were statistically significant. The 100 seed weight was recorded minimum in T_2 MPUAT S-2 (2.0 g) while maximum was recoded in T7 Allahabad Safeda (4.65 g) followed by SRD H-4 and Arka Kiran (3.50g) Showed at par value. This might be due to different hybrids and cultivars has significant variation in their genetic makeup. The analogous findings were also reported by Babu et al. (2002) & Patel et al. (2007) [13] in different agroclimatic conditions. Among the factors influencing the fruit quality bio chemical traits are most precious for selecting the variety for table processing or both purposes. The results for fruit quality in terms of TSS, acidity, depicted in (Table 2). The T_7 control Allahabad Safeda recorded highest TSS (10.91 ºB) while lowest in SRDH-1 (8.61 ºB) From the mean results lowest Acidity was recorded T_1 MPUAT S-1 (0.40%) followed by RCGH-11 (0.64%). However highest Acidity was observed in T_1 MPUAT S-1 (0.94%) followed by MPUAT S-2 (0.80%). The Similar trends were also observed Ram et al. (1997) [15] Marak, J.K and Mukunda, G.K. (2007) [9]. The sensory evolution of different cultivars, colour flavours, texture testy, overall acceptably out of 10. The highest overall acceptability Allahabad Safeda (8.55). Here it is mention that the results related to vegetative parameters and quality of fruits on the basis of only 1 year data. The pooled yield data 5 years clearly indicated that fruit yield tree^{-1} and yield ha^{-1} (22.41 and 89.63 q.) have been registered with the treatment T_7 – Allahabad Safeda followed by 16.75 & 67.00 q were observed with the treatments T_3 – Arka Kiran. The benefit cost ratio was also found higher with the treatment T_7 – Allahabad Safeda 3.48 (hectare basis) showed better, are recommended performance of promising hybrids of guvava cv. Allahabad Safeda.guava orchard to increase the productivity and quality of fruits. as compared to other treatments in orchards of guava.

Table 1: Performance of new guava hybrid for growth and yield parameter 2020-2021 at FRS, Rewa

Treatment	Hybrid/Cultivar	Growth parameter				Yield Parameter		
		Plant Height (m)	Canopy Volume m³	N->S (m)	E->W (m)	No. of fruits/plant	Av. wt. / fruit (g)	Wt. of fruits kg/tree
T1	Mpuat S-1	3.29	10.07	1.96	2.01	198.04	125.50	24.85
T2	Mpuat S-2	2.46	5.39	1.76	1.82	165.70	98.00	16.24
T3	Arka Kiran	1.69	2.7	1.76	1.76	180.04	198.00	35.65
T4	SRD H-1	1.62	3.24	1.93	2.10	165.33	135.00	22.32
T5	SRD H-4	1.70	2.91	1.79	1.83	179.46	120.00	21.54
T6	CISH G-35	2.07	4.34	1.76	1.93	185.66	111.10	20.63
T7	All.Safeda	1.79	2.07	1.47	1.44	210.00	205.20	43.09
T8	RCGH-7	2.67	6.35	1.81	1.85	170.50	142.00	24.21
T9	RCGH-1	2.59	5.71	1.76	1.79	150.15	125.00	18.77
T10	RCGH-11	3.10	8.29	1.83	1.92	145.66	130.04	18.94
T11	RCGH-4	1.51	2.46	1.87	1.92	165.05	130.00	21.46
	S.Em +	0.04	0.21	0.04	0.03	3.09	4.09	2.00
	CD at 5%	0.02	0.03	0.14	0.09	8.76	11.58	5.65

Table 2: Quality characters of promising guava hybrids during 2020-21 at FRS, Rewa.

Treatment	Hybrid/Cultivar	T.S.S B⁰	Acidity% (mg/100g)	100 Seed Wt.(g)	Pulp Weight(g)	Fruit Breadth (cm)	Fruit Length (cm)
1	Mpuat S-1	9.59	0.94	2.50	123.00	4.76	5.50
T1	Mpuat S-2	9.32	0.80	2.00	96.00	4.63	5.20
T2	Arka Kiran	8.95	0.64	3.50	194.50	6.36	7.10
T3	SRD H-1	8.61	0.59	2.30	132.70	5.74	6.73
T4	SRD H-4	9.62	0.55	3.50	116.50	4.81	5.43
T5	CISH G-35	7.77	0.71	3.10	108.00	5.98	6.51
T6	All.Safeda	10.91	0.55	4.65	200.55	7.38	8.02
T7	RCGH-7	6.93	0.48	2.50	139.50	5.71	.6.56
T8	RCGH-1	9.46	0.54	2.30	122.70	5.40	5.78
T9	RCGH-11	9.55	0.64	2.75	127.29	4.62	4.59
T10	RCGH-4	9.15	0.40	3.20	126.80	5.25	5.85
	S.Em +	0.61	0.03	0.02	0.29	0.19	0.17
	CD at 5%	1.50	0.08	0.07	0.92	0.26	0.18

Table 3: Pooled Analysis 2016-2017 to 2020-2021, FRS Rewa Center

Treatment	Hybrid/Cultivar	2016-17	2017-18	2018-19	2019-20	2020-21	Mean (Yield tree⁻¹ (kg)	Q/ha	B:C ratio
1	Mpuat S-1	3.20	3.72	14.45	17.96	24.85	12.84	51.34	1.56
T1	Mpuat S-2	3.24	3.12	9.02	11.66	16.24	8.66	34.62	0.73
T2	Arka Kiran	3.47	4.15	19.20	21.28	35.65	16.75	67.00	2.35
T3	SRD H-1	2.26	2.92	15.40	17.57	22.32	12.09	48.38	1.41
T4	SRD H-4	3.26	3.74	10.45	12.83	21.54	10.36	41.46	1.07
T5	CISH G-35	2.98	2.96	13.58	15.95	20.63	11.22	44.88	1.24
T6	All.Safeda	5.30	5.63	25.67	32.35	43.09	22.41	89.63	3.48
T7	RCGH-7	2.29	3.18	13.80	17.00	24.21	12.10	48.38	1.41
T8	RCGH-1	3.14	3.86	11.88	13.38	18.77	10.21	40.82	1.04
T9	RCGH-11	2.72	3.31	10.00	14.02	18.94	9.80	39.19	0.95
T10	RCGH-4	2.92	3.06	13.20	15.03	21.46	11.13	44.54	1.22
	S.Em +	0.065	0.044	1.538	1.692	2.00			
	CD at 5%	0.205	0.140	4.349	4.785	5.65			

Table 4: Sensory Evolution of Guava varieties at FRS Rewa Center 2019-2020

Treatment	Hybrid / Cultivar	Colour	Flavour	Texture	Taste	Overall acceptability
T1	MPUAT S-1	8.35	8.25	8.15	8.45	8.30
T2	MPUAT S-2	7.40	7.05	7.55	7.20	7.30
T3	Arka Kiran	8.60	7.85	8.25	7.90	8.15
T4	SRD H-1	7.30	7.35	7.10	7.25	7.25
T5	SRD H-4	7.65	7.85	7.35	7.95	7.70
T6	CISH G-35	7.75	7.55	7.65	7.45	7.60
T7	All. Safeda	8.65	8.50	8.30	8.75	8.55
T8	RCGH-7	7.60	7.35	7.05	7.60	7.40
T9	RCGH-1	7.75	7.65	7.80	7.60	7.70
T10	RCGH-11	7.50	7.15	7.40	7.35	7.35
T11	RCGH-4	7.55	7.65	7.25	7.35	7.45

References

1. Aulakh PS. Performance of different guava cultivars under the arid irrigated conditions of Punjab. Prog Hort 2005;37:328-330.
2. Archana, Siddiqui S. Biochemical changes in guava fruits under various modified conditions Haryana J Hort. Sci 2004;33:53-54.
3. Athani SI, Patil PB, Swamy GSK, Sabarad AI, Gorabal KR. Studies on growth parameters and fruit characters in guava cultivars. Acta. Hort 2007;735:271-275.
4. Babu KD, Dubey AK, Yadav DS. evaluation of guava cultivars for their performance under mid hill altitude of Meghalaya. Indian J. Hill farming 2002;15:119-121.
5. Dattatreya M, Kaushik P, Kumar R. Evaluation of guava products quality. Int. J Food Sci. Nutri. Eng 2012;2:7-11.
6. Deshmukh NA, Lyngdoh P, Jha AK, Patel RK, Deka BC. Comparative study on newly developed guava hybrids with commercial cultivars under mid-hills of NE-India. The Bioscan 2013;8(4):1467-1470.
7. Dolkar D, Bakshi P, Wali VK, Bhushan B, Sharma A. Growth and yield attributes of commercial guava (Psidium guajava L.) cultivars under sub-tropical condition. Indian J Plant Physiol. DOI 10.1007/s40502-014-0076-9. (2014).
8. Man Suryanarayan B. Genetic diversity, heritability, genetic advance and correlation coefficient in guava (Psidium guajava L.) Indian J.Agril. Sci 2011;81(2):107-110.
9. Marak JK, Mukunda GK. studies on the performance of open pollinated seedling progenies of guava c.v. Apple Colour.Acta Hort 2007**;**735:79-84.
10. Patel RK, Yadav DS, Babu KD, Singh A, Yadav RM. Growth, yield and quality of various guava (Psidium guajava L.) hybrids/cultivars under mid hills of Meghalaya. In: Singh G, Kishun R, Chandra R (eds). Proc 1st Int guava Symp. J Acta Hort 2007;735:57-59.
11. Panse VG, Sukhatme PV. Statistical Methods for Agricultural Workers. 4th ed. ICAR, New Delhi, 1985.
12. Pandey D, Shukla SK, Yadav RC, Nagar AK. Promising guava (Psidium guajaya L.) cultivars for North indian condition. In: Singh G, Kishum R, Chandra R (eds). Proc 1st Int. guava Symp. Acta Hort 2007;235:91-94.
13. Patel RK, Yadav DS, Babu KD, Singh A, Yadav RM. Groth yield and quality of various guava(Psidium guajava L.) hybrids cultivars under mid hills of meghalaya.Acta Hort 2007;735:57-59
14. Patel RK, Yadav DS, Babu KD, Singh A, Yadav RM. Growth, yield and quality of various guava (Psidium guajava L.) hybrids/cultivars under mid hills of Meghalaya. In: Singh G, Kishun R, Chandra R. (eds). Proc 1st Int guava Symp. J Acta Hort 2007;735:57-59.
15. Ram RA, Pandey D, Sinha GC. Selection of promising clones of Guava cv Allahabad Safeda. Haryana Journal of Horticultural Sciences 1997;26:89-90..