

Characterization of Guava Germplasm for Growth, Yield and Quality Traits in Vindhya Region of Madhya Pradesh

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Abstract The study was conducted during 2013-14 and 2014-15 on fruits. The research was carried out with eleven guava genotypes of five year old guava varieties namely MPUAT S-1, MPUAT S-2, Arka Kiran, SRD H-1, SRD H-4, CISH G-35, Allahabad Safeda, RCGH-7, RCGH-1, RCGH-11 and RCGH-4. The results revealed that significant variation was present with respect to plant growth, yield and quality traits of fruits. Among the different varieties, MPUAT S-1 was found superior in plant height (2.93m), RCGH-7 in Spread N-S (2.07m) and E-W (1.95m). The maximum yield was recorded in cultivar Allahabad Safeda (5.63 kg/tree) followed by hybrid Arka Kiran (3.56 kg/tree). The maximum acidity was recorded in hybrid CISH-35 (1.5 mg/100g). The highest fruit weight of 11.67 g was recorded in cultivar Allahabad Safeda and this was followed by hybrid RCGH-4 (90.00g). Further, maximum 100 seed weight was recorded in cultivar Allahabad Safeda. The maximum TSS were recorded in cultivar Allahabad Safeda (10.60B⁰) followed by hybrid RCGH-11 (9.47B⁰).

Keywords Guava, TSS, Yield, Fruit quality.

Introduction

Guava (*Psidium guajava* L.) belongs to the family Myrtaceae is one of the important fruit crop 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. 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 phosphorus with pleasant aroma and flavor [1]. 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 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. 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.

Materials and Methods

The eleven genetically diverse guava genotypes on

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Table 1. Performance of new guava hybrid and cultivars for growth parameter.

Cultivar/hybrid	Plant height (m)			North-South (m)			East-West (m)		
	2013-14	2014-15	Pooled	2013-14	2014-15	Pooled	2013-14	2014-15	Pooled
MPUAT S-1	2.8	2.93	2.86	1.52	1.65	1.58	1.66	1.74	1.7
MPUAT S-2	2.02	2.1	2.06	1.41	1.51	1.46	1.46	1.56	1.51
Arka Kiran	1.23	1.31	1.27	1.39	1.48	1.43	1.47	1.53	1.5
SRD H-1	1.16	1.22	1.19	0.93	1.02	0.97	1.66	1.72	1.69
SRD H-4	1.26	1.34	1.3	1.41	1.5	1.45	1.46	1.54	1.5
CISH G-35	1.6	1.67	1.63	1.4	1.47	1.43	1.52	1.62	1.57
All. Safeda	1.16	1.25	1.2	0.93	1.08	1	1.07	1.13	1.1
RCGH-7	2.4	2.49	2.44	2	2.07	2.03	1.85	1.95	1.9
RCGH-1	2.03	2.08	2.05	1.71	1.83	1.77	1.75	1.83	1.79
RCGH-11	2.52	2.61	2.56	1.41	1.51	1.46	1.56	1.68	1.62
RCGH-4	1.01	1.07	1.04	1.41	1.48	1.44	1.46	1.53	1.5
SEm $\pm$	0.25	0.3	0.27	0.35	0.04	0.2	0.04	0.03	0.04
CD at 5%	0.56	0.1	0.33	0.8	0.13	0.46	0.1	0.11	0.11

the five year old budded tree of guava viz., MPUAT S-1, MPUAT S-2, Arka Kiran, SRD H-1, SRD H-4, CISH G-35, Allahabad Safeda, RCGH-7, RCGH-1, RCGH-11, RCGH-4 were evaluated with respect to growth, yield and quality traits under AICRP on Fruits at Fruit Research Station, Kuthulia Farm, College of Agriculture, Rewa during the year 2013-14 and 2014-15. Five trees per replication of each genotypes were selected from bearing orchards and data were taken from selected plants with respect to different attributes.

The data were recorded on tree height (m), canopy spread N-S and E-W (m). The yield data (kg) per plant fruit weight (g) were also recorded and physio-chemical data like test weight of seed (g), acidity (%), TSS ($^{\circ}$ B) were recorded as physico-chemical attributes are

important parameters to studies the variability among the different fruit crops [2-4]. Total soluble solids (TSS) was measured by portable refractometer of 0-32 $^{\circ}$ B, acidity was measured by Siple acid Alkaline titration method. The data was statistically analyzed by method of analysis of variance using RBD.

Results and Discussion

Regarding growth parameters, the average plant height among 11 tested genotypes ranged from 1.04 m to 2.86 m. The average maximum plant height of 2.86 m was recorded in MPUAT S-1 followed by RCGH-7 (2.44 m). However, average minimum plant height of 1.04 m was recorded in RCGH-4. The average tree spread in N-S and E-W directions ranged from 0.97 m

Table 2. Performance of new guava hybrid and cultivar for yield parameters.

Cultivar/hybrid	No. of fruit/plant			Av. fruit wt (g)			Yield (q/plant)		
	2013-14	2014-15	Pooled	2013-14	2014-15	Pooled	2013-14	2014-15	Pooled
MPUAT S-1	26.08	36.00	31.04	88.44	90.67	89.55	2.31	3.26	2.78
MPUAT S-2	28.42	29.67	29.04	88.6	91.00	89.80	2.52	2.70	2.61
Arka Kiran	37.69	45.00	41.34	85.22	79.00	82.11	3.21	3.56	3.38
SRD H-1	25.95	30.67	28.31	62.73	66.67	64.70	1.63	2.04	1.83
SRD H-4	45.52	55.00	50.26	52.33	60.00	56.16	2.38	3.30	2.84
CISH G-35	28.25	33.67	30.96	84.4	86.67	85.53	2.38	2.92	2.65
All. Safeda	40.24	55.33	47.78	97.27	101.67	99.47	3.91	5.63	4.77
RCGH-7	27.83	31.00	29.41	52.33	60.00	56.16	1.46	1.86	1.66
RCGH-1	36.13	45.00	40.56	62.73	64.33	63.53	2.27	2.90	2.58
RCGH-11	21.85	31.33	26.59	74.86	80.00	77.43	1.64	2.51	2.07
RCGH-4	27.03	32.33	29.68	88.44	90.00	89.22	2.39	2.92	2.65
SEm $\pm$	1.92	3.46	2.69	2.82	3.04	2.93	0.63	0.08	0.35
CD at 5%	5.42	10.18	7.8	7.99	9.53	8.76	1.78	0.28	1.03

Table 3. Performance of new guava hybrid and cultivar for quality parameters.

Cultivar/hybrid	TSS °B			Acidity (%)			100 seed wt (g)		
	2013-14	2014-15	Pooled	2013-14	2014-15	Pooled	2013-14	2014-15	Pooled
MPUAT S-1	9.15	9.33	9.24	1.12	1.23	1.17	0.38	0.40	0.39
MPUAT S-2	8.77	8.93	8.85	1.35	1.31	1.33	0.76	0.80	0.78
Arka Kiran	9.22	8.73	8.97	1.21	1.33	1.27	0.77	0.78	0.77
SRD H-1	8.74	8.53	8.63	1.26	1.13	1.19	0.24	0.24	0.24
SRD H-4	9.30	9.47	9.38	1.12	1.10	1.11	0.72	0.77	0.74
CISH G-35	6.89	6.67	6.78	1.50	1.60	1.55	0.24	0.27	0.25
All. Safeda	10.29	10.6	10.44	1.17	1.18	1.17	1.20	1.20	1.20
RCGH-7	8.74	9.00	8.87	0.82	0.97	0.89	0.45	0.51	0.48
RCGH-1	9.58	9.33	9.45	1.26	1.34	1.30	0.72	0.79	0.75
RCGH-11	9.30	9.47	9.38	1.34	1.40	1.37	0.52	0.54	0.53
RCGH-4	8.77	9.00	8.88	1.12	1.33	1.22	0.76	0.77	0.76
SEm ±	21.51	0.23	10.87	0.04	0.08	0.06	0.05	0.02	0.03
CD at 5%	47.93	0.74	24.34	0.08	0.27	0.18	0.13	0.06	0.09

to 2.03 m and 1.50 m to 1.90 m. The maximum average spread across of 2.03 m was recorded in RCGH-7 and this was followed by 1.77 m in RCGH-1. Across E-W, the average maximum spread of 1.90 m was recorded in RCGH-7. However, three genotypes namely Arka Kiran, SRD H-4 and RCGH-4 recorded minimum average tree spread of 1.50 m across E-W. In, this way, genotype RCGH-4 was observed with maximum average tree spread across both N-S and E-W directions. However, maximum plant height was recorded in MPUAT S-1 followed by RCGH-7. The results pertaining to crop canopy and plant height of all the 11 genotypes has been given in Table 1. The similar finding was also reported earlier Singh [5] in guava cv L-49 under Tripura condition.

In view of the yield parameters, the total no. of fruits/plant, average fruit weight (g) and yield (q/plant) was recorded for two consecutive years and pooled data revealed that maximum no. of average fruits per plant of 50.26 was recorded in SRD H-4 and this was followed by Allahabad Safeda where 47.78 average fruits per plant were recorded. However, minimum average fruits per plant of 26.59 were recorded in RCGH-11. Regarding average fruit weight, the maximum average fruit weight of 99.47 g was recorded in Allahabad Safeda, followed by MPUAT S-2 (89.8 g). However, minimum average fruit weight of 56.16 g was recorded in SRD H-4. Pooled analysis of yield per plant showed that maximum average yield/plant of 4.77 q/plant was recorded in Allahabad Safeda followed by Areka Kiran (3.38 q/plant). However, mini-

mum average yield/plant of 1.66 q/plant was recorded in RCGH-7. The detailed data for yield parameters has been given in Table 2. The results with respect to yield parameter, obtained in the present investigation are analogous to the results reported by Patel et al. [4] in guava cv Hybrid-11.

The chemical analysis of fruit (Table 3) in terms of TSS, acidity and 100 seed weight (g) revealed that the highest average TSS was recorded in Allahabad Safeda (10.44 °B) followed by RCGH-1 (9.45 °B) and SRD-4 (9.38 °B). However, minimum average TSS was recorded in SRDH-1 (8.63 °B). The maximum average acidity of 1.55% was recorded in CISHG-35 followed by RCGH-11 (1.37%). However minimum average acidity of 0.89% was recorded in RCGH-7. The results obtained in the present investigation are in tune with earlier reports who found highest TSS content in RCGH-11. The maximum average 100 seed weight of 1.2 g was recorded in Allahaba Safeda followed by MPUATS-2 (0.78 g). However, minimum average 11 seed weight of 0.24 g was recorded in SRD H-1. The present investigation revealed that physico- chemical characteristics of fruits differed due to varied climatic condition of Madhya Pradesh as compared to other part of the country.

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