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Performance of different guava (*Psidium guajava* L.) Genotype to qualitative attributes in Chhattisgarh plains

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Abstract
The present investigation was carried out on eighteen genotypes of guava in randomized block design with three replications of each genotype. The results were obtained for the qualitative characters. The result revealed a great variability for various characters i.e. fruit shape, fruit colour, pulp colour, fruit thickness, TSS, acidity, ascorbic acid, total sugar, reducing sugar and non-reducing sugar content were recorded among different guava genotypes. In general, BSPG-1 and RJMG-1 was superior as compared to other genotypes in relation to different qualitative characters of fruit. The other genotypes i.e., BSPG-2 and RJMG-3 were also superior in some of the characters as compared to rest of the genotypes.

Keywords: guava, genotypes, qualitative, evaluation

Introduction
Guava (*Psidium guajava* L.) popularly known as “Apple of Tropics” is a tropical fruit but also grows well under sub-tropical condition. It is one of the most common fruits in India and considered the fifth most important fruit in area and production after mango, citrus, banana and apple. Guava is a hardy, prolific bearer and highly remunerative fruit. It is found favour with the fruit growers due to its wide adaptability and higher return per unit area. Guava is such a fruit which is grown all over the country in the kitchen gardening, near the well and tubewell premises and on a commercial scale. It is believed to be introduced in India early in the 17th century, it belongs to family Myrtaceae and genus *Psidium* contains about 150 species. In the areas having distinct winter, the yield tends to increase as well as quality also improves. Uttar Pradesh is one of the most important states of India where about half of the total area is under guava and the district Allahabad has reputation of growing the best quality guava in the country as well as in the world. Guava is one of the most important commercial fruit crops of India. It excels most of the other fruit crops in productivity, hardiness and adaptability. Guava fruit contains high amounts of Vitamins A, B_1 (Thiamin), B_2 (Riboflavin) and C (70-350 mg/ 100 g of pulp). The vitamin C content of guava fruit is 2–5 times more than citrus. Apart from vitamin C, it is also a rich source of minerals like calcium, phosphorus, iron and pectin which ranges from 0.52 to 2.0 %. Therefore, it is an ideal fruit for the nutritional security. Guava being a cross-pollinated crop has large variability in size of fruit as well as colour of pulp. This natural variability available within the species is often exploited to identify superior genotypes. Chhattisgarh plains has availability of lines of guava and exists in the form of land races, hence there exists a lot of scope to identify best one amongst wild strains available in plenty.

Material and Methods
The details of the experimental material used, methods followed and techniques adopted during the course of investigation entitled "Collection and Evaluation of Guava (*Psidium guajava* L.) Genotypes in Chhattisgarh plains” was undertaken during the year 2016-2017. The survey was conducted in two District viz., Bilaspur and Dhamtari to identify superior guava genotypes in Chhattisgarh plains. Bilaspur district is situated between 22.09° North Latitudes and 82.15° East Longitudes. The district is surrounded by Korea in the North, Anuppur and Dindori Districts of Madhya Pradesh on the west, Kawardha on the South-West and Durg and Raipur on the South and Korba and Janjgir-Champa on the East. The survey work was conducted in village Kodasar of Takhatpur block.

Dhamtari is situated in the central part of Chhattisgarh and lies 20.63° North Latitude and 82.05° East longitude and surrounded by Mahasamund, Raipur and Gariyaband District of Chhattisgarh. The survey work was conducted in village Chandrasur of Magarlod block. The experiment consists of 18 guava genotypes aged about 8- 10 years from two district bilaspur and dhamtari in Chhattisgarh plains. Eighteen genotypes of guava viz., BSPG-1, BSPG-2, BSPG-3, BSPG-4, BSPG-5, BSPG-6, BSPG-7, BSPG-8, BSPG-9, RJMG-1, RJMG-2, RJMG-3, RJMG-4, RJMG-5, RJMG-6, RJMG-7, RJMG-8 and RJMG-9 were selected for the experiment. The experiment was laid out in completely randomized block design with 18 treatments each of which replicated 3 times. The data were taken from selected plants with respect to qualitative attributes. Qualitative study was made in terms of fruit shape, fruit colour, pulp colour, fruit thickness, TSS, acidity, ascorbic acid, total sugar, reducing sugar and non-reducing sugar. The experimental data of all the parameters was subjected to statistical analysis for proper interpretation. The statistical analysis of the data in respect of the yield and quality components of fruit and plant was done according to the statistical procedure. Data recorded on various characters were subjected to statistical analysis of variance technique as given by Gomez (1985) [8].

Results and Discussion

Data showed (Table 1) that genotypes differed significantly with respect to their qualitative attributes. qualitative characters was recorded in terms of fruit shape, fruit colour, pulp colour, fruit thickness, TSS (ºBrix), acidity (%), ascorbic acid (mg/100 g pulp), total sugar (%), reducing sugar (%), non-reducing sugar (%). The data pertaining to fruit shape in different genotypes of guava are presented in Table 1 Among 18 genotypes, 6 genotypes viz., BSPG-1, BSPG-6, BSPG-7, RJMG-2, RJMG-3 and RJMG-9 were having oblong shape, 5 genotypes viz., BSPG-2, BSPG-3, BSPG-6, RJMG-5 and RJMG-8 was rounded shape, 5 genotypes viz., BSPG-4, BSPG-5, RJMG-1, RJMG-4 and RJMG-7 were oval in shape and 2 genotypes viz., BSPG-9 and RJMG-8 were found in pear-shaped. Fruit skin colour showed variation among different genotypes. Out of the 18 genotypes under study for colours of fruits, 9 genotypes viz., BSPG-3, BSPG-4, BSPG-1, BSPG-7, BSPG-9, RJMG-1, RJMG-4, RJMG-6 and RJMG-7 had light-green colour fruits, 6 genotypes viz., BSPG-2, RJMG-2, RJMG-3, RJMG-5, RJMG-8 and RJMG-9 had yellowish-green colour fruits Whereas, dark-green colour observed in 3 genotypes viz., BSPG-5, BSPG-6 and BSPG-8. Pulp colour also showed variation among different guava genotypes. Out of the 18 genotypes under study for pulp colour of fruits, 14 genotypes viz., BSPG-1, BSPG-2, BSPG-5, BSPG-6, BSPG-7, BSPG-9, RJMG-1, RJMG-2, RJMG-3, RJMG-4, RJMG-6, RJMG-7, RJMG-8 and RJMG-9 had creamy-white colour of pulp, 2 genotypes viz., BSPG-3 and BSPG-8 white colour. Whereas, 2 genotypes viz., BSPG-4 and RJMG-5 had light-red colour of pulp. The maximum pulp thickness was observed in genotype RJMG-1 (1.98 cm) which was found to be *at par* with BSPG-1 (1.94 cm) and BSPG-2 (1.89 cm) whereas, minimum pulp thickness was reported in genotype RJMG-4 (1.39 cm). The genotype BSPG-1(12.21 ºBrix) recorded the highest TSS, which was found to be *at par* with BSPG-8 (12.16 °Brix) and RJMG-1 (12.08 °Brix). The lowest TSS recorded in genotype.

Table 1

Genotypes	Fruit Shape	Fruit colour	Pulp colour	Pulp thickness (cm)
BSPG-1	Oblong	Light-green	Creamy-white	1.94
BSPG-2	Round	Yellowish-green	Creamy-white	1.89
BSPG-3	Round	Light-Green	White	1.54
BSPG-4	Oval	Light-Green	Light-red	1.69
BSPG-5	Oval	Dark-green	Creamy-white	1.41
BSPG-6	Oblong	Dark-green	Creamy-white	1.51
BSPG-7	Oblong	Light-Green	Creamy-white	1.63
BSPG-8	Round	Dark-Green	White	1.55
BSPG-9	Pear-shaped	Light-green	Creamy-white	1.56
RJMG-1	Oval	Light-green	Creamy-white	1.98
RJMG-2	Oblong	Yellowish-green	Creamy-white	1.47
RJMG-3	Oblong	Yellowish-green	Creamy-white	1.64
RJMG-4	Oval	Light-green	Creamy-white	1.39
RJMG-5	Round	Yellowish-Green	Light-red	1.59
RJMG-6	Round	Light-Green	Creamy-white	1.42
RJMG-7	Oval	Light-green	Creamy-white	1.66
RJMG-8	Pear-shaped	Yellowish-green	Creamy-white	1.58
RJMG-9	Oblong	Yellowish-green	Creamy-white	1.72
S.E.m ±	-	-	-	0.08
C.D. at 5 %	-	-	-	0.24

Table 2

Genotypes	TSS (°Brix)	Titrable acidity (%)	Ascorbic acid (mg/100gm)
BSPG-1	12.21	0.32	201.07
BSPG-2	10.46	0.34	220.12
BSPG-3	10.87	0.65	166.15
BSPG-4	9.24	0.36	139.37
BSPG-5	8.75	0.71	254.24
BSPG-6	9.42	0.55	195.32
BSPG-7	9.86	0.52	189.24
BSPG-8	12.16	0.38	247.64
BSPG-9	9.55	0.33	206.54

RJMG-1	12.08	0.37	215.56
RJMG-2	9.93	0.26	270.10
RJMG-3	11.22	0.40	241.10
RJMG-4	10.63	0.63	191.15
RJMG-5	9.87	0.55	271.45
RJMG-6	8.97	0.29	263.45
RJMG-7	10.87	0.52	219.63
RJMG-8	10.55	0.74	245.14
RJMG-9	8.86	0.61	230.23
S.E.m ±	0.38	0.003	7.84
C.D. at 5 %	0.89	0.008	22.64

Table 3

Genotypes	Total sugar (%)	Reducing sugar (%)	Non-reducing sugar (%)
BSPG-1	8.91	6.26	2.64
BSPG-2	7.41	5.50	1.91
BSPG-3	7.51	5.61	1.91
BSPG-4	6.83	4.62	2.21
BSPG-5	6.31	4.23	2.08
BSPG-6	6.86	4.63	2.24
BSPG-7	6.92	4.70	2.22
BSPG-8	8.86	6.55	2.31
BSPG-9	6.90	4.74	2.16
RJMG-1	8.90	6.85	2.06
RJMG-2	6.94	4.87	2.08
RJMG-3	7.44	5.82	1.61
RJMG-4	7.92	5.86	2.07
RJMG-5	6.91	4.77	2.14
RJMG-6	6.42	4.46	1.96
RJMG-7	7.42	5.81	1.62
RJMG-8	7.23	5.60	1.63
RJMG-9	6.62	4.83	1.78
S.E.m ±	0.27	0.19	0.07
C.D. at 5 %	0.76	0.57	0.20

BSPG-5 (8.75 °Brix). The genotype recorded the lowest acidity content in genotype RJMG-2 (0.26 %). The genotype RJMG-5 was recorded maximum (271.45 mg/100 g pulp) ascorbic acid, wich was found to be *at par* with RJMG-2 (270.10 mg/100 g pulp), RJMG-6 (263.45 mg/100 g pulp) and BSPG-5 (254.24 mg/100 g pulp). Whereas, the minimum ascorbic acid was found in BSPG-4 (139.37 mg/100 g pulp). The genotype BSPG-1 recorded the highest total sugar (8.91%) which was found to be *at par* with RJMG-1 (8.90%) and BSPG-8 (8.86%). The lowest total sugar was recorded in genotype BSPG-5 (6.31%). the genotype RJMG-1 recorded maximum reducing sugar (6.85%) which was found to be *at par* with genotype BSPG-8 (6.55%) whereas, the minimum reducing sugar was recorded in genotype BSPG-5 (4.23%). The genotype BSPG-1 recorded significantly highest non-reducing sugar (2.64%) followed by BSPG-8 (2.31%) and BSPG-6 (2.24%). Whereas, the lowest non-reducing sugar recorded in genotype RJMG-3 (1.61%).

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