

Correlation Study of Yield, Flowering Duration and Fruit Physico –chemical Characters of Guava (*Psidium guajava* L.)

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Abstract In guava significant correlations were observed between duration of flowering with their respective seasons and their yield and total yield. Duration of flowering was positively correlated with yield of respective seasons. Fruit weight was positively and significantly correlated with fruit size ($r=0.860^{**}$) and fruit volume ($r=0.981^{**}$). T.S.S. was positively and significantly correlated with reducing sugar ($r=0.586^{**}$) and total sugar ($r=0.683^{**}$). Acidity also positively and significantly correlated with reducing sugar ($r=0.497^{**}$) and total sugar ($r=0.417^*$). Reducing sugar was positively and significantly correlated with total sugar ($r=0.888^{**}$). Yield was significantly and positively correlated with fruit size, weight and fruit volume ($r=0.327^*$).

Keywords: Guava, Correlation, Fruit weight, T.S.S, acidity, reducing sugars, and total sugars

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1. Introduction

Guava (*Psidium guajava* L.), the champion fruit from family Myrtaceae, is one of most important commercial subtropical fruits of India. It is also known as poor-man’s apple due to low fetching prices and one of the most referred and legendary fruits because of its hardy and prolific bearing nature [1]. In the world, guava acquired most important position in developing countries. It is believed to be originated in tropical America stretching from Mexico to Peru. India contributes 45% of world production of guava after China (10%) and Thailand (6%). In India it is cultivated in an area of 219.7 th ha with a total production of 2571 th MT of fruit [3]. Guava is rich source of ascorbic acid and pectin which is suitable for jams and jelly production. Guava seed contains fair amount of iron, calcium and magnesium which helps in digestion of food. Guava is successfully grown over a wide range of climatic conditions due to its greater adaptability. The ease in cultivation and precociousness of guava under Jharkhand condition makes it a suitable option for increasing the paddy equivalent yield of existing agriculture production system in this low soil fertility zone. In this region guava bears three crops in a year viz; rainy, winter and summer season guava. Maintenance of superior genotypes in respect of fruit yield and growth characters for further crop improvement program is essential. Therefore, evaluation of commercial

guava growing season and better performed varieties, seasonal study is required. A study in that direction will provide ample opportunity to the researchers to understand different guava genotypes. Duration of flowering, yield and fruit physico-chemical characters have been taken into consideration for correlation studies in the present experiment at ICAR RCER research Center, Ranchi with joint supervision of Visva Barati University.

2. Materials and Methods

The experiment was conducted at ICAR Research Complex for Eastern Region, Research Center, and Ranchi during 2008-09. This area is situated 620 m above mean sea level (msl) and at 23° 25’ N latitude and 85° 20’ East longitudes experiencing an average annual rainfall of 110-140 cm. Here guava is cultivated under rainfed ecosystem. No irrigation is provided after plant establishment (1-3 years). Giving irrigation of 1-2 spells may be provided during May –June at an one month intervals to established young plants. The climate is sub-humid and subtropical type. High humidity (78.14%-84.14 %) and low evaporation rate is experienced after June and continues up to onset of winter [9]. Soil is acidic and pH ranged from 5.0-6.5, which is ideal for guava cultivation after liming (2-3 Q agricultural lime /ha). For evaluation study each cultivars were grown with four replications in our field germplasm block. Thirty two guava genotypes were studied on their important physic-

chemical parameters and yield. In this climatic regions we observed six varieties for rainy, winter and summer crop whereas rest 26 varieties gave rainy and winter crops. Rainy season flowering occurred during the month of April whereas winter season flowering happened during August. Summer season guava cultivars gave forth flowering during November. Fruit botanical descriptions were measured by standard methods, viz; veneers scalpers' for length and breadth and volume was measured by water displacement methods. Titratable acidity was estimated by titrating the fruit extract with 0.1 N NaOH using phenolphthalein as an indicator and expressed as per cent citric acid equivalent. Reducing and total sugar was estimated by Lane and Eynon method [8]. Correlation studies were done by Karl Pearson's method.

3. Results

3.1. Correlation between Yield and Duration of Flowering

Correlation between season yield and total yield with plant phenophases like duration of flowering is represented in Figure 1. In 2008, significant correlation was observed

between duration of flowering during summer season and yield of summer season crop ($r=0.98^{**}$). Similarly, correlation between duration of flowering during rainy season and yield of rainy season crop was significant ($r=0.95^{**}$). Correlation between duration of flowering during winter season and yield of winter season crop ($r=0.98^{**}$) was also significant. Significant correlation with total yield could be recorded in case of duration of summer flowering ($r=0.42^{**}$), duration of rainy season flowering ($r=0.89^{**}$) and duration of winter season flowering ($r=0.87^{**}$). However, in 2009, significant correlation between yield and duration of flowering of respective seasons could be observed. No significant correlation between summer season flowering and summer yield was observed. Significant correlation between duration of flowering during rainy season and yield of rainy season crop ($r=0.95^{**}$) was observed. Similarly, significant correlation between duration of flowering during winter season and yield of winter season crop ($r=0.94^{**}$) was also observed. Significant correlation with total yield could be recorded in case of duration of rainy season flowering ($r=0.85^{**}$) and duration of winter season flowering ($r=0.81^{**}$).

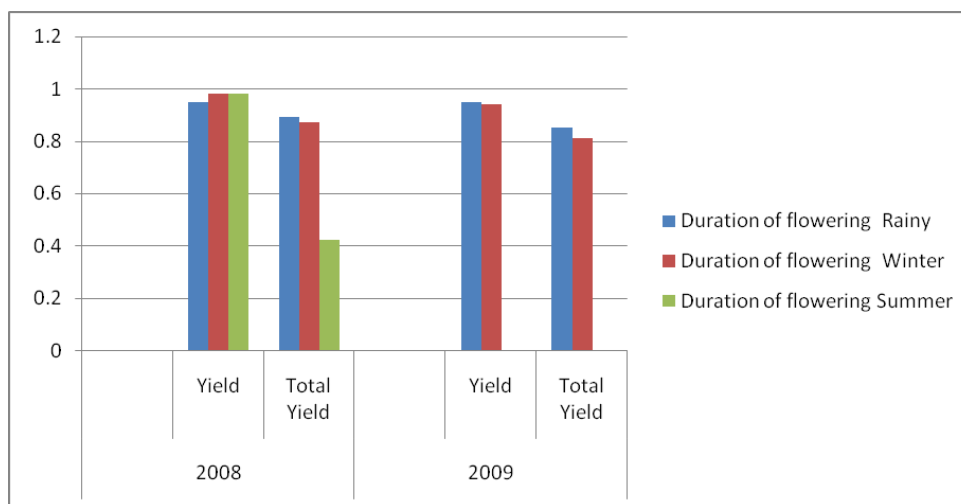


Figure 1. Correlation between Yield and plant pheno-phases (duration of flowering). (Base significant value:0.26)

Table 1. Correlation studies among physico-chemical characters and yield of guava

	Fruit Size(cm ²)	Fruit Weight(g)	Fruit Volume (c.c.)	T.S.S. (OB)	Acidity (%)	Reducing Sugar(%)	Total Sugar (%)	Ascorbic Acid mg/100g pulp	Yield
Fruit Size (cm ²)	1								
Fruit weight(g)	0.860**	1							
Fruit Volume c.c.)	0.823*	0.981*	1						
T.S.S. (OB)	-0.115	-0.021	-0.031	1					
Acidity (%)	-0.129	-0.097	-0.175	0.335*	1				
Reducing sugar (%)	-0.071	0.239	0.173	0.586**	0.497**	1			
Toal sugar	-0.013	0.226	0.182	0.683**	0.417*	0.888*	1		
Ascoric acid mg/100g pulp	0.233	0.216	0.195	0.181	0.244	0.049	0.078	1	
Yield	0.387*	0.310*	0.327*	0.035	-0.068	-0.046	-0.048	0.098	1

3.2. Correlation Study between Yield and Fruit Physicochemical Characters

Data on correlation studies among physicochemical characters and yield of guava has been presented in Table 1. Close perusal of the table revealed that fruit weight was

positively and significantly correlated with fruit size ($r=0.860^{**}$) and fruit volume ($r=0.981^{**}$). T.S.S. was positively and significantly correlated with reducing sugar ($r=0.586^{**}$) and total sugar ($r=0.683^{**}$). Acidity also positively and significantly correlated with reducing sugar ($r=0.497^{**}$) and total sugar ($r=0.417^*$). Reducing sugar was positively and significantly correlated with total sugar

($r=0.888^{**}$). Yield was significantly and positively correlated with fruit size ($r=0.387^*$), fruit weight ($r=0.310^*$) and fruit volume ($r=0.327^*$). Yield was not significantly correlated with titratable acidity, content of reducing sugar and total sugar in the fruit.

4. Discussion

During summer season the maximum duration of flowering was found in genotype CHG-1 in both the years. Duration of flowering during rainy season was more than that of winter and summer season. Similar results on flowering seasons rainy and winter for guava and its duration were obtained by Ojha *et al.*, (1985). During rainy season, the maximum duration of flowering was observed in genotype Allahabad Safeda in both the years. The genotypes like Allahabad Safeda (18.75 days), Sardar (14.77 days) and White Fleshed (29 days) accounted for the maximum flowering duration in winter season of both the years (2008-09). With regard to total duration of flowering (104 days), the maximum flowering duration (51 days) was observed in genotype CHG-1. Teotia *et al.*, (1970) stated that duration of flowering varied due to different climatic condition. Kundu and Mitra (1994) reported that duration of flowering in autumn for winter crop was longer than summer season flowering for rainy season crop. The discrepancy may be due to change in environmental condition. However, a positive and significant correlation between total duration of flowering and total yield has been observed.

In present study, it is clear that fruit size, fruit weight and fruit volume were positively and significantly correlated among them as well as yield. Acidity, reducing sugar and total sugar had weak negative correlation with yield. Similar results on fruit size weight and volume and

their correlations were obtained by Pandey *et al.*, [6], [5] [10] and [7]. But acidity, reducing sugar, and total sugar and their correlations were in conformity with correlations obtained by Padilla-Ramirez [5] and [10].

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