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Correlation studies in a guava (*Psidium guajava* L.)

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The knowledge on association of characters among themselves and with fruit yield is important for selection, genetic improvement programme in guava. It is influenced by diverse environment, seasonal characteristics and spatial heterogeneity over that, in turn, interacts with the cultivars chosen and cultural practices adapted. Improvement of fruit yield of the best quality is the foremost goal of varietal improvement programme. In order to incorporate desirable characters to maximize qualitative and economic yield, the information on the nature and extent of genetic variability attained in guava varieties for desirable characters, their association and relative contribution to yield constitute the basic requirements. Looking to the these facts, the correlation study was taken up in case of guava.

The soil of the experimental site was mixed red – black with clay–loam having 4 metres depth. The soil pH was 7.2, organic carbon 0.56%, electrical conductivity 0.32 dS/m, available N,P_2O_5 and K_2O 234, 8.8 and 277 kg/ha, respectively, and water–holding capacity 11%. The total rainfall received during July, 1997 to March, 1998 was 1214.6 mm distributed in 67 rainy days.

The present investigation was carried out at Fruit Research Station, Kuthulia, College of Agriculture, Rewa (M.P.) during 1997-98. This study was limited to nine guava varieties collected from different parts of India and maintained under AICRP on subtropical fruits. The varieties *viz*. Allahabad safeda, Sardar, Chittidar, Red- fleshed, Seedless, Apple coloured, Dhareedar, Gwalior- 27 and Rewa-72 were planted in the month of September 1988. Total eight plants of each varieties were planted comprising of four replications *i.e.* two plants under each replication, were tested under R.B.D. These varieties were evaluated during the year 1997-98. The age of the trees under study was 9 years.

An uniform dose of 640 g N, 460 g P_2O_5 and 300 g K_2O per tree was applied in the form of urea, DAP and MOP, respectively, by the end of June after onset of monsoon. Recommended cultural practices were given to all the plants uniformly as and when required.

The data in Table 1 reveal that the plant height showed significant positive association with canopy height and volume, which revealed that if the height of a particular plant is more than the canopy height and volume of that plant will also be higher. This positive correlation might be due to increased area of aerial parts, which helped in the productions of more photosynthates and photo hormones in the plants. Circumference of rootstock showed significant positive association with circumference of scion, E-W and N-S spread and volume. Circumference of scion was positively correlated with N-S and E-W spreads and volume. Spread N-S and E-W had significant positive association with volume. The volume of tree was calculated from the spreads and canopy height, due to which spread had got highly positive association with the volume. Volume of plant was not associated with the other attributes. Highly significant positive correlation was observed among number of fruits per plant, yield per plant and weight of fruit. Weight of the fruit also showed significant positive correlation with yield per plant. Association between growth and yield parameters was also reported by Chakrawar and Jature (1980) in Kagzilime, Prasad (1987) in mango and Pandey *et al*. (1997) in guava.

Table 1 : Simple correlation coefficient between growth and yield parameters

Characters	Canopy height (m)	Circumference of root stock (cm)	Circumference of scion (cm)	Spread N-S (m)	Spread E-W (m)	Volume M^3	No of fruits per plant	Yield per plant (Kg)	Weight of fruits (g)
Plant	0.984**	0.631	0.586	0.444	0.540	0.780*	-0.368	-0.348	-0.457
Canopy height (M)		0.630	0.585	0.459	0.559	0.801**	-0.299	-0.288	-0.399
Circumference of root stock (CM)			0.987**	0.867**	0.825**	0.909**	-0.308	-0.332	-0.507
Circumference of scion (CM)				0.868**	0.829**	0.894**	-0.312	-0.344	-0.471
Spread N-S(M)					0.951**	0.891**	0.062	-0.010	-0.136
Spread E-W (M)						0.923**	-0.023	-0.058	-0.195
Volume M3							-0.171	-0.190	-0.351
No. of fruits per plant								0.995**	0.728**
Yield per plant (Kg)									0.921**

* and ** indicate of significance of values at P = 0.05 and 0.01, respectively,

The data in Table 2 and 3 indicated that the weight of fruit had significant positive correlation with length of fruit, diameters of seed ball and seed percentage, but there was significant negative association with pulp percentage and thickness of pulp. It reveals that the length and width of fruit, diameter of seed ball and seed percentage are the important characters for deciding the weight of fruit. The thickness of pulp and pulp percentage did not contribute positively towards the test weight of the seed.

The specific gravity of fruit showed a positive significant correlation with seed percentage whereas it showed significant negative correlation with pulp percentage. The pulp percentage had negative correlation with diameter of Seed ball and highly significant negative correlation with seed percentage. Similarly seed percentage showed significant negative correlation with pulp thickness and non significant positive association with diameter of seed ball. The correlation study clearly shows if the seed percentage and diameter of seed ball increases, the pulp percentage and thickness of pulp decreases in guava fruits. Hence, for increasing the pulp quality there must be some method to reduce the seed percentage and diameter of seed ball for production of quality table fruits. Similar association between above characters have also been reported by Thamburaj *et al.*(1980) in guava, Chakrawar and Solanki (1981) in ber, Thamburaj *et al.* (1981) in guava, Suman *et al.* (1985) in mango, Thimmappaiah and Suman (1986), Kurmi (1992) and Pandey *et al.*(1997) in guava.

It can be inferred from the Table 3 that significant negative correlations exist between weight of fruit and T.S.S.

The total soluble–solids showed positive correlation with reducing, non-reducing and total sugars, it reveals

Table 2 : Simple correlation coefficient between weight of fruit and physical characters

Characters	Length of fruit (cm)	Width of fruit (cm)	Specific gravity	Pulp percentage	Seed percentage	Thickness of pulp (cm)	Diameter of seed ball
Weight of fruit (g)	0.863**	0.804**	0.541	-0.724*	0.725*	-0.992**	0.980**
Length of fruit (cm)		0.858**	0.237	-0.390	0.389	-0.838**	0.913**
Width of fruit (cm)			0.280	-0.343	0.346	-0.751*	0.843**
Specific gravity				-0.916**	0.916**	-0.557	0.448
Pulp percentage					-0.999**	0.758*	-0.635
Seed percentage						-0.713*	0.627
Thickness of pulp (cm)							-0.980**

* and ** indicate significance of values at P = 0.05 and 0.01, respectively,

Table 3 : Simple correlation coefficient between weight of fruit and chemical characters

Characters	T.S.S. (^{0}Brix)	Reducing sugar (%)	Non-reducing sugar (%)	Total sugar (%)	Acidity (%)	Sugar/acid ratio
Weight of fruit (g)	-0.676*	-0473	-0.441	-0.460	-0.151	0.280
T.S.S. (0Brix)		0.942**	0.932**	0.949**	0.508	0.458
Reducing sugar (%)			0.943**	0.978**	0.509	0.484
Non- reducing sugar (%)				0.991**	0.527	0.512
Total sugar (%)					0.527	0.508
Acidity (%)						-0.451

* and ** indicate significance of values at P = 0.05 and 0.01, respectively,

that in guava, sugars are major constituents in T.S.S. of the fruits. The total sugars showed a positive significant correlation with reducing and non –reducing sugar. Reducing and non-reducing had also significant positive correlation. Thus it is clear from the study that there was inter-relationship between the chemical characters *viz*., T.S.S., reducing sugar, non-reducing sugar and total sugars in increasing or decreasing the quantity of the fruits. These are in accordance with the findings of Tripathi and Gangwar (1971) in guava, Chakrawar and Solanki (1981) in ber, Singh *et al.* (1985) In mango, Kurmi (1992) and Pandey *et al.*(1997) in guava.

REFERENCES

Chakrawar, V.R. and Solanki, S.P. (1981). Correlation studies on ber strains. *Punjab Hort. J.,* **21** (1&2):39-40.

Chakrawar, V.R. and Jature, S.D. (1980). Correlation studies on kagilie strains. *Punjab Hort. J.,* **20** : 39-40.

Kurmi, S.P. (1992). Studies on physical and chemical characteristics of guava (*Psidium guajava* L.) cultivar grown in Rewa. M.Sc. (Ag.) Thesis, J.N.K.V.V., Jabalpur.

Pandey, K.K., Sharma, A.B. an Patel, M.P. (1997). The varietal evaluation of guava (*Psidium guajava* L.) *Ad. Plant Sci.,* **10** (1) : 157-163.

Singh, A.K., Singh, Sharma, B.P. and Singh, R.N. (1985). Chemical constiturents of the riped fruits and inter-relationships in mango. *Punjab Hort. J.,* **25** (1&4):1-4.

Suman, C.L., Yadav, J.S., Thimppaiah and Sinha, G.C. (1985). Association analysis of fruit characters in mango. *Prog. Hort.,* **17** (4) : 331-335.

Thamburaj, S., Shanmugasubramanium, A. and Suresh, M. (1981). Path analysis of fruit characters in guava cultivar Lucknow-49. *South Indian Hort. J.,* **29** (4) : 220.

Thamburaj, S., Jayapal, R., Shanmugasubramanium, A. and Pillai, O.A. (1980). Correlation studies in fruit characters of guava (*Psidium guajava* L.) cv. LUCKNOW-49. *South Indian Hort. J.,* **28** (2) :58-59.

Thimmappaiah and Suman, C.L. (1986). Seasonal effect on fruit quality in guava (*Psidium guajava* L.) *South Indian Hort. J.,* **34** (2) : 64-69.

Tripathi, R.S. and Gangwar, B.M. (1971). Bio-chemical changes as indices of maturity in guava (*Psidium guajava* L.) *Prog. Hort.,* **3** (1) : 17-23.

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