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Study on character association in brinjal (*Solanum Melongena* L.)

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Abstract
Correlation coefficient analysis in 180 genotypes of brinjal was carried out at Vegetable Research Station, Junagadh Agricultural University, and Junagadh during late *kharif* 2017-18. The results revealed that the association of fruit length, number of fruits per plant, plant height, fruit girth and total soluble solids with fruit yield among themselves was positive and significant while these traits were identified as yield components. The genetic improvement of fruit yield thus can be obtained by direct selection of these yield components.

Keywords: Genotypic correlation (rg), phenotypic correlation (rp), brinjal

Introduction
Brinjal is an autogamous diploid with 12 chromosomes (2n=24), is one of the most widely grown vegetable in India. Brinjal has wide variability in its morphological characters (colour, shape size) physiological attributes and biochemical features. Interspecific crosses between plant species are an ideal way for introducing desirable genetic traits in breeding programs. Yield being a complex character, is dependent upon a number of components traits.
Before initiating an effective selection programme, it is necessary to know the importance and association of various components with yield and among each other, hence the necessity of coefficient of correlation to describe the degree of association between independent and dependent variables. Since the component traits themselves are inter-dependent, they often affect their direct relationship with yield and consequently restrict the reliability of selection indices based upon correlation coefficients (Thangamani and Jansirani, 2012) [9]. Genotypes carries specific characters, these characters which are associated with yield are bases upon which selection is based. Hence this research work was carried out to investigate the association of some yield characters with yield of brinjal in the said location.

Materials and Methods
The field experiment was laid out in Augmented Randomized Block Design (ARBD) with 180 genotypes in nine blocks during late kharif 2017-18 at Vegetable Research Station, Junagadh Agricultural University, Junagadh. The genotypes collected from Vegetable research station, Junagadh Agricultural University, Junagadh. Each block contain 20 genotypes with 3 checks. Thirty days old seedlings were transplanted on the ridges adopting a spacing of 90 x 60 cm^2. Standard agronomical practices and plant protection measures recommended for brinjal were adopted uniformly. Observations were recorded for plant height, plant spread (EW), plant spread (NS), number of branches per plant at final harvest, days to first picking and days to last picking from the time of sowing. The phenotypic and genotypic correlation coefficients of all the characters were worked out as per Al-jibouri *et al.* (1958) [2].

Results and Discussion
It was observed that the genotypic correlation coefficients were higher than the respective phenotypic correlation coefficients. This could be interpreted that there was a strong inherent genotypic relationship between the characters studied, but their phenotypic expression was impeded of environmental factors.
In present study, fruit yield per plant was found to be significantly and positively correlated at both genotypic and phenotypic levels with fruit length (rg= 0.2601, rp= 0.1815), number of

fruits per plant (rg= 0.9118, rp= 0.9381) and plant height (rg= 0.1708, rp= 0.1679) (Table 1). This indicated that these attributes were more influencing the fruit yield in brinjal and therefore, more important to bringing improvement in fruit yield. Such positive interrelationships present between fruit yield with fruit length, plant height, number of fruits per plant were reported by Prabhu and Natarajan (2008) [5], Rekha and Celine (2013) [6] and Tanko and Yusuf (2015) [8] which provide conformation to our findings. It had significant and positive correlation at genotypic level only with total soluble solid (rg= 0.2034) and fruit girth (rg= 0.1922). Fruit yield per plant had significant but negative correlation at genotypic level with fruit weight (rg= -0.2123) only.

Plant height was found to be significantly and positively associated at genotypic and phenotypic levels with days to last picking (rg= 0.3619, rp= 0.1906), plant spread - EW (rg= 0.3297, rp= 0.2999), plant spread - NS (rg= 0.3351, rp= 0.3179), fruit length (rg= 0.3020, rp= 0.2944) and fruit yield per plant (rg= 0.1708, rp= 0.1679). Hence, improving these characters will lead to the improvement of plant height which in turn helps in improving fruit yield. Positive association of plant height with plant spread and fruit length was reported by Prabhu and Natarajan (2008) [5] and Ahmed *et al.* (2013) [1].

The correlations of fruit length observed significant and positive at genotypic and phenotypic levels with fruit yield per plant (rg= 0.2601, rp= 0.1815), fruit weight (rg= 0.2524, rp= 0.2432) and total soluble solids (rg= 0.2256, rp= 0.2166) at both genotypic and phenotypic levels, while significant and positive correlation with fruit girth (rg= 0.1530) only at genotypic level indicating that selection for these characters will help in increasing the fruit length. The results are in close conformity with Prabhu and Natarajan (2008) [5] and Gupta *et al.* (2017) [3].

Total soluble solids had significant but negative association with days to first picking (rg = -0.2611, rp = -0.2185) which showed the negative relationship between these two characters and improvement of one character had the negative effect on the other character while significant and positive correlation with fruit yield per plant at genotypic level only.

Fruit weight and fruit girth were also found to have significant and positive association with each other, while both had significant and positive association with number of branches per plant while fruit weight had significant and positive association with fruit length at both the levels. Significant and negative correlation with fruit yield at genotypic level was reported by Kumar *et al.* (2002) [4]. Fruit girth had significant and positive association with fruit yield per plant and fruit length (rg= 0.3120, rp= 0.2974) at genotypic level. Similar results were reported by Ahmed *et al.* (2013) [1] for fruit girth with fruit yield. Significant association between fruit weight and fruit girth was reported by Shende *et al.* (2014) [7], Ahmed *et al.* (2013) [1], Gupta *et al.* (2017) [3], and Tripathy *et al.* (2018) [10], which confirm our findings.

Conclusion

It can be concluded fruit length, number of fruits per plant, plant height, fruit girth and total soluble solids with fruit yield among themselves were positive and significant while these traits were identified as yield components. So, improvement of fruit yield can be obtained by direct selection of these yield components.

Table 1: Genotypic (G) and phenotypic (P) correlation coefficients among thirteen characters in brinjal

Characters		Days to 50% flowering	Plant height (cm)	Plant spread - EW (cm)	Plant spread - NS (cm)	Days to first picking	Days to last picking	Number of branches per plant	Fruit length (cm)	Fruit girth (cm)	Fruit weight (g)	Number of fruits per plant	Total Soluble Solids (^{0}Brix)	Fruit yield per plant (kg)
Days to 50% flowering	G	1.0000	-0.0155	-0.0637	-0.0508	0.5524**	-0.2854**	-0.2749**	0.0141	-0.0620	0.0482	0.0644	-0.0266	0.0860
	P	1.0000	-0.0150	-0.0429	-0.0327	0.5094**	-0.2279**	-0.2404**	0.0179	-0.0551	0.0060	-0.0389	0.0011	-0.0381
Plant height (cm)	G		1.0000	0.3297**	0.3351**	-0.0914	0.3619**	0.0866	0.3020**	0.1211	0.0487	0.1352	0.0692	0.1708*
	P		1.0000	0.2999**	0.3179**	-0.0760	0.1906*	0.0868	0.2944**	0.0982	0.0528	0.1465	0.0610	0.1679*
Plant spread - EW (cm)	G			1.0000	0.3730**	-0.0324	0.0536	0.2050**	0.2125**	0.1330	0.1780*	-0.1567*	0.0890	-0.1057
	P			1.0000	0.3536**	-0.0432	0.1017	0.1880*	0.1969**	0.1394	0.1462	-0.1368	0.0816	-0.1019
Plant spread - NS (cm)	G				1.0000	-0.1017	0.3924**	0.0714	0.3367**	0.1283	0.1443	0.0102	0.2130**	0.0852
	P				1.0000	-0.0660	0.2675**	0.0501	0.2943**	0.1183	0.1240	0.0516	0.1620*	0.0966
Days to first picking	G					1.0000	-0.4505**	-0.0263	0.0133	-0.2222**	-0.0360	-0.0018	-0.2611**	-0.0232
	P					1.0000	-0.1848*	-0.0104	0.0048	-0.1769*	-0.0580	-0.0518	-0.2185**	-0.0693
Days to last picking	G						1.0000	-0.0601	0.1924*	-0.0431	-0.0984	-0.0664	0.4223**	-0.1355
	P						1.0000	-0.0579	0.0623	0.0456	-0.0190	0.0389	0.2518**	0.0390
Number of branches per plant	G							1.0000	0.1251	0.3097**	0.2204**	-0.0339	0.0645	0.0340
	P							1.0000	0.1280	0.2929**	0.2003**	-0.0550	0.0711	-0.0048
Fruit length (cm)	G								1.0000	0.1530*	0.2524**	0.1457	0.2256**	0.2601**
	P								1.0000	0.1349	0.2432**	0.1008	0.2166**	0.1815*
Fruit girth (cm)	G									1.0000	0.3120**	0.0688	0.3754**	0.1922*
	P									1.0000	0.2974**	0.0187	0.3274**	0.1165
Fruit weight (g)	G										1.0000	-0.5899**	0.2251**	-0.2123**
	P										1.0000	-0.3455**	0.1768*	-0.0197
Number of fruits per plant	G											1.0000	0.1156	0.9118**
	P											1.0000	0.0116	0.9397**
Total Soluble Solids (^{0}Brix)	G												1.0000	0.2034**
	P												1.0000	0.0631
Fruit yield per plant (kg)	G													1.0000
	P													1.0000

*Significant at p = 0.05 or at 5% r => 0.1485 and **Significant at p = 0.01 or at 1%, r => 0.19

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