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Perse the estimate correlation co-efficient among the important economics traits in brinjal or egg plant (*Solanum melongena* L.)

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Abstract
The analysis of variance for the design of experiment indicated highly significant differences among the genotypes for all the traits. Based on mean performance of genotypes NDB-5 followed by NDB-5 followed by NDB-15, NDB-6, NDB-4, NDB-7 and NDB-16 were found as most promising genotypes for fruit yield per plant. Yield per plant had exhibited highly significant and positive association with fruits per plant and early yield while primary branches showed negative and significant association with yield per plant. Fruits per plant, fruit weight and plant height were identified as most important traits which has direct effect on yield per plant while negative direct effect on yield showed by fruit circumference followed by plant height and days to 50% flowering on yield.

Keywords: Egg plant, correlation coefficient, economic traits, phenotype, genotype

Introduction
Brinjal or egg plant (*Solanum melongena* L.) is one of the most important solanaceous vegetable crop having diploid chromosome number 2n=2x=24. Due to high productivity and wife adoptability, usually finds its place as the poor man's crop. In India it is cultivated in West Bengalm Orissa, Bihar, Andhra Pradeh, Gujarat, Maharastra, Karnataka and Utter Pradesh. It is grown in India on an area of 600.3(000ha.) with the production of 10377.6(000 metric tones) and productivity of 17.3 mt/ha. (N.H.B. 2009)

Brinjal being most important to growers and consumer, there is pressing need to increase its productivity to fulfill the increasing demands throughout the year. Evaluation of germplasm is the basic tool for identification of important genotypes. The great extent of natural variation present in various characters among the genotypes suggests good scope of improvement. Variability parameters like genotypic and phenotypic coefficient of variation, heritability and genetic diversity, besides degree of association between the various characters and direct effect of yield contributing characters on total yield, is of paramount significance in formulating an appropriate breeding strategy aimed at exploiting the inherent variability of the original population.

Phenotypic variability changes under different environmental conditions while genetic variability remains unchanged and more useful to a plant breeder for exploitation in selection or hybridization. Yield is very complex characteristics controlled by several yield contributing components and it is highly influenced by environmental factors, consequently estimation of heritability and genetic advance are useful for selection. Estimation of correlation co-efficient among the yield contributing characters is necessary to understand the direction of selection and maximize yield in the shortest period. Path co-efficient provides an effective means of entangling direct and indirect causes of association of selection and measures the relative importance of each causal factor.

Materials and Methods
The present investigation entitled "Variability, character association and genetic divergence in egg plant (*Solanum melongena* L.)" was executed at Main Experiment, Station of Department of Vegetable Science, Narendra Deva University of Agriculture and Technology, Narendra Nagar (Kumarganj), Faizabad, during *Kharif* 2010, the estimate correlation coefficient among the important economic traits. The experimental field had sandy loam soil, low in organic carbon, nitrogen, medium in phosphorus, potash, and slightly alkaline in nature with pH 8.5. The mechanical composition of soil was 60.9 percent, 27.8 percent silt and 11.3 percent clay. Experimental material for the study consisted of 30 genotypes including six checks (Arka

Nidhi, NDB-2, SM 6-6, Pant Rituraj, KS-224 and S. Mani). The experiment was conducted in Randomized Complete Block Design with three replications. Each treatment consisted 20 plant in two row, having spacing of 60 × 45 cm with net plot size of 4.5 × 1.2 m^2. Observations were recorded on 9 quantitative characters *viz.*, days to 50% flowering, primary branches per plant, plant height (cm), Fruit weight (g), fruit circumference (cm), polar length of fruit (cm), fruits per plant, early yield per plant (g) and yield per plant.

The combining ability analysis for different characters was carried out following the method 2 model 1 of Griffing (1956 b), where parents and F1's were included but not the reciprocals. Thus the experimental material for this method comprises of n (n+1)/2 genotypes.

The genetic components of variation were calculated for the analysis of numerical approach followed the method given by Jinks and Hayman (1953), Hayman (1954a) and Askel and Johnson (1963).

Results and Discussion

Coefficient of variation

The estimate of genotypic coefficient of variation is of prime importance to breeder because genetic variance alone, does not allow a decision as to which characters were showing the highest degree of variability. Therefore, accurate relative comparison can be made with the help of phenotypic and genotypic coefficient of variation. In general, the phenotypic coefficient of variability was higher than the genotypic coefficient of variability for all the characters under study which indicates that environment played very little role in the expression of the traits.

The highest phenotypic and genotypic coefficient of variation was observed for fruit per plant followed by early yield per plant, yield per plant and fruit weight. Dubi *et al.* (1983); Mohanty (1999) [18]: Kumar *et al.* (2000) [14] and Islameuddin (2009) also reported similar result in there and primary branches per plant. The phenotypic and genotypic coefficients of variations were lower for Days to 50% flowering, plant height and polar length of fruit. It may be due to the fact that the environment influenced the observed variance. Such influences were also evident for genotypic coefficient of variation. Genotypic coefficient of variation ranged from 10.26 (days to 50% flowering) to 68.49 (fruits per plant). Similar result was also reported by Ambarus (1998) [1].

Correlation coefficient

The nature and magnitude of association between yield and ots components traits is necessary for effective selection in advance generations. Nature of population under consideration and the magnitude of correlation coefficient could often be influenced by the choice of the individuals upon which the observations are made.

Correlations between character pairs are due to linkage of genes or pleiotrophy of genes. Therefore, selection of one traits influence the other liked or pleiotrophically affected traits. Considerable importance has been attached to correlation studies in the plant improvement because they are helpful in making effective selection.

In the present study, correlations between nine characters were worked out in all possible combinations at phenotypic and genotypic levels are presented in table 1-2. In general, the magnitude of genotypic correlation coefficient was higher than the corresponding values of the phenotypic correlation coefficient. This indicated a strong genetic association between the traits and the phenotypic expression which was suppressed due to environmental influence. The present study also suggested that both genotypic and phenotypic correlation were similar in direction. Sharma *et al.* (2000) [28] and Goto *el al.* (1953) [11] also reported higher estimates of genotypic correlations than the corresponding phenotypic correlations between yield and yield components.

A perusal of data (table 1 and 2) revealed that most important traits fruits yield per plant has highly significant and positive association with fruits per plant and early yield per plant at both phenotypic and genotypic level. Thus these characters emerged as most important associates of fruit yield in egg plant. The available literature has also indicated positive correlation between fruit yield per plant and character mentioned above in egg plant.

Fruits per plant and early were found significantly and positively correlated themselves. Thus selection for early yield and fruits per plant or either of it may automatically improve the fruit yield per plant. The data also revealed that days to 50 percent flowering had significant and negative association with early yield and negative association with yield per plant suggesting therefore, selection for earliness will be objective for yield improvement. Association of earliness with yield has also been reported by Singh and NandPuri (1974); Mishra and Mishra (1990); Vdivel and Bapu (1990); Ahmed (1987) and Bhutani and Kalloo (1998).

Table 1: Estimates of phenotypic correlation coefficients among ten characters in brinjal germplasm

S. No.	Characters	No. of primary branches per plant	Plant height (cm)	Fruit weight (cm)	Fruit circumference (cm)	Polar length of fruit (cm)	Fruits per plant	Early yield per plant (kg))	Yield per plant (kg)
1.	Days to 50% flowering	-0.0063	0.0552	0.2178*	0.1704	-0.1484	-0.3141**	-0.2682*	-0.1465
2.	Days to first fruit harvest		-0.6379**	-0.0308	0.0801	-0.0628	-0.1673	-0.0343	-0.2363*
3.	Plant height (cm)			0.3754**	0.2606*	-0.0019	-0.2699**	-0.0971	0.1226
4.	Fruit weight (cm)				0.8781**	-0.3043*	-0.5565**	0.2541*	0.0495
5.	Fruit circumference (cm)					-0.4539**	-0.6022**	0.2182*	-0.0826
6.	Polar length of fruit (cm)						0.1697	-0.0586	0.0043
7.	Fruits per plant							0.2823**	0.5566**
8.	Early yield per plant (kg)								0.4163**

*, **- Significant at 5% and 1% probability level, respectively

Table 2: Estimates of genotypic correlation coefficients among ten characters in brinjal germplasm.

S. No.	Characters	Primary branches per plant	Plant height (cm)	Fruit weight (cm)	Fruit circumference (cm)	Polar length of fruit (cm)	Fruits per plant	Early yield per plant (kg))	Yield per plant (kg)
1.	Days to 50% flowering	-0.0214	0.0851	0.2590	0.2088	-0.1734	-0.3656	-0.3242	-0.2082
2.	Days to first fruit harvest		-0.6691	-0.0307	0.0866	0.0531	-0.1817	-0.0165	-0.3222
3.	Plant height (cm)			0.3848	0.2761	-0.0047	-0.2776	0.1154	0.1407
4.	Fruit weight (cm)				0.9106	-0.3191	-0.5712	0.2797	0.0623
5.	Fruit circumference (cm)					-0.4926	-0.6258	0.2599	-0.0991
6.	Polar length of fruit (cm)						0.1783	-0.0712	-0.0039
7.	Fruits per plant							0.3125	0.7010
8.	Early yield per plant (kg)								0.6007

Conclusion

Since yield is a complex trait and governed by polygenes. The knowledge of correlation between yield and its components ius very useful for developing efficient breesing strategy for evolving high yielding varieties.

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