

Original Research Article

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Comparative Evaluation of Heritability and Correlation Coefficients on Quality of Brinjal (*Solanum melongena* L.)

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ABSTRACT

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The present investigation entitled, “Comparative evaluation of heritability and correlation coefficients on quality of brinjal (*Solanum melongena* L.)” was conducted at vegetable Research Farm, Department of Horticulture, Naini Agricultural Institute, SHUATS, Allahabad (Uttar Pradesh) during 2016 - 2017. Eighteen genotypes were used to study the heritability and correlation coefficient analysis for quality characters in brinjal with various different characters viz., TSS (⁰Brix) and ascorbic acid (mg /100g) were taken into consideration parameter studied. Analysis of variance in the present investigation shows that the genotypes evaluated differed significantly among all the 02 traits. The results revealed that among the all genotypes Punjab barsati also produced qualitative fruit in highest T.S.S content and highest value for the ascorbic acid content.

Introduction

Brinjal (*Solanum melongena* L.) is one of the most common and popular vegetable grown in India and other parts of the world. It belongs to family Solanaceae. The primary center of origin is India (Thompson and Kelly. 1957). Egg plant is usually self-pollinated but the extent of cross-pollination has been reported as high as 29 % and hence it is classified as

often cross-pollinated or facultative cross-pollinated. Flower generally emerges 40-45 days after transplanting. Anthesis occurs at about 6-8 a.m. in August-September and usually between 9.30-11.15 a.m. during winter (December-January). Stigma receptivity is highest during anthesis i.e. flower opening. Anthers usually dehisce 15-20 minutes after the anthesis. Heritability to refer to that portion of the observed variance for which

heredity is responsible. Heritability is greatly influenced by the environment. Heritability classified into of two types: broad sense heritability, which is ratio total genetic variance to phenotypic variance (Lush, 1940) and narrow sense heritability, which is the ratio of additive variance to phenotypic variance. The genetic advance is also affected by the environment. Several methods of estimation of heritability have been given by different workers, such as parent offspring-regression (Lush, 1940). Genetic advance is a product of heritable and infers the potentiality of selection intensity; genetic advance when considered along with heritability gives resemblance assessment of the resultant effects of selection in breeding population (Johnson *et al.* 1955). Correlation coefficient is a statistical measure which is used to find out the degree (strength) and direction of relationship between two or more variable. In plant breeding, Correlation coefficient measure the mutual relationship between various plant characters and determines the component characters on which selection can be used for genetic improvement in yield.

Materials and Methods

The details of materials to be used and methodology to be adopted during the course of study are mentioned are as under - the present experiment was conducted in Randomized Block Design having 18 treatments which were replicated three times and total number of genotypes -18, replication – 3, total number of plots - 54, spacing - 60 x

60cm, plot size - 1.80 x 1.80m, No. of plant / plot -09, width of plot - 8.2 m, length of field - 39.1 m, gross experimental area - 320.62 m² and net experimental area - 174.96 m² etc.

Results and Discussion

The results of the heritability and correlation coefficient studies on different genotypes have been critically studied. Some characters are also illustrated wherever felt essential to clarify the results (Table 1).

(I)Total soluble solids (⁰ Brix): Total soluble solids (⁰Brix) ranged from 8.83⁰Brix (Punjab Barsati) to 4.73⁰ Brix (J. B-7) with an overall mean of 5.48. The highest Total soluble solid (⁰ Brix) was recorded in genotype, 8.83⁰Brix (Punjab Barsati) which was statistically at par with genotype *viz* Kashi Prakash (6.20⁰Brix), J. B. Round (5.96⁰Brix) and Utkal Tarni (5.80⁰Brix). However, lowest TSS (⁰ Brix) was recorded in genotype 4.73⁰ Brix (J. B-7).

(II)Vitamin ‘C’ (mg /100g): Vitamin ‘C’ (mg /100g) ranged from 9.03 mg (Punjab Barsati) to 4.94mg (Arka Nidhi) with an overall mean of 6.25. The highest Ascorbic acid (mg /100g) was recorded in genotype, 9.03mg (Punjab Barsati) which was statistically at parwith genotype *viz.* J. B-7 (7.13 mg), kashi Prakash (7.04 mg), and Pusa Ankur (6.94 mg). However, lowest Ascorbic acid (mg /100g) was recorded in genotype 4.94 mg (Arka Nidhi). A very wide range of variation in mean performance of genotypes was observed for all the characters under study.

Table.1 Estimate of coefficient of variances and heritability as percent of mean for 02 characters of Brinjal genotypes

S. No.	Characters	Coefficient of variance		h ² (b.s.) (%)
		GCV	PCV	
1.	TSS (⁰ Brix)	16.03	18.86	72.27
2.	Vitamin ‘C’ (mg /100gm)	14.89	16.71	79.38

Table.2 Correlation Coefficient components in brinjal

		TSS (⁰ Brix)	Vitamin 'C'(mg/100gm)
TSS (⁰ Brix)	P	1.000	0.558*
	G	1.000	0.760**
Vitamin 'c' (mg/100gm)	P	1.000	1.000
	G	1.000	1.000

*Significant at 5%, ** Significant at 1%, P = Phenotypic, G = Genotypic, E = Environmental.

The comparison of mean performance of 18 genotypes for two traits using critical differences revealed existence of very high level of variability in the used genotypes.

Genetic parameters of variation; Heritability (h²)

Heritability and genetic advance are the important genetic parameters for selecting a genotype that permit greater effectiveness of selection by separating out environmental influence from the total variability. Heritability governed the resemblance between parents and their progeny whereas, the genetic advance provide the knowledge about expected gain for a particular character after selection. However it is not necessary that a character showing high heritability will also exhibit high genetic advance (Johnson *et al.* 1955). An attempt has been made in present investigation to estimate heritability in broad sense and categorized as low (<50%), moderate (50-70%) and high (>70%) as suggested by Robinson (1966). The heritability were recorded for vitamin 'C' (79.38 %), and TSS (72.27 %), Similar results were reported by Negi *et al.* (2000), Prasad *et al.* (2004), Singh and Kumar (2005), Tripathi (2009), Muniappan *et al.* (2010), and Singh *et al.* (2013).

(II)Correlation coefficient analysis

The assessment of genetic potentiality of quality contributing traits and their association

is important to carry out the effective selection for isolating productive genotypes. In general, the genotypes correlation were observed to be higher the corresponding phenotypic correlations for all the characters combinations in present investigation, thus indication the suppression of phenotypic expression under the influence of environment factors. The inherent or heritability associated between two variables is known as genotypic correlation. This type of correlation is more stable and is important for the plant breeding to bring about genetic improvement in one character by selecting the other character. The association between two variables which can be directly observed is termed as phenotypic correlation. It includes both genotypic and environmental effect and therefore, differs under different environmental conditions. Association among fruit yield and its components were estimated at phenotypic, genotypic and environmental levels and have been presented in table 2 only significant correlation and describe as under. Whereas, TSS had positive and significant correlation with vitamin 'C' (0.558 and 0.760) at both phenotypic and genotypic level. Vitamin 'C' (1.000 and 1.000), Similar results has been also reported by Bansal and Mehta (2008), Ansari (2011). Fruit weight positive direct effect expressed a fruit yield per plant by primary branches, plant height and single fruit height.

Summary and conclusion of the study are as follows:

The present investigation entitled Comparative evaluation of heritability and correlation coefficients on quality of brinjal (*Solanum melongena* L.). During the Kharif season of the year 2016-17 at Horticulture Experiment Field, Department of Horticulture, Allahabad School of Agriculture, Sam Higginbottom Institute of Agriculture, Technology and Sciences Allahabad (U.P.) All the genotype were grown in a Randomized Block Design with 3 replication. The observations were recorded on Ascorbic acid content (Vit. C), Total soluble solid (TSS). The analysis of variation for eighteen genotypes indicated that the mean sum of square due to genotype were highly significant for all the characters revealed existence of considerable amount of the heritability in studies for important of various traits. The estimate of phenotypic coefficient of variation was higher than the genotypic coefficient of variation for all the characters.

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