GAU Res. J. 1999. 24 (2) : 27-30

Genetic Variability for Yield, Fruit Borer Infestation, Little Leaf Incidence and Quality Characters in Brinjal

K. M. Doshi, M. K. Bhalala and K. B. Kathiria

Vegetable Research Station, Gujarat Agricultural University, Anand Campus, Anand-388 110

ABSTRACT

Information on genetic variance, coefficient of variation, broad sense heritability and genetic advance for yield and quality characters were workedout using data from 41 genotypes of brinjal (*Solanum melongena* L.). The highest genetic coefficient of variation was observed for anthocyanin content followed by glycoalkloid content. High heritability was observed for all the characters studied for brinjal. Further, anthocyanin content, total phenols, polyphenoloxidase activity, total soluble sugars and reducing sugars had high genetic advance coupled with high heritability, which suggested that these traits are under the control of additive gene action and can be improved through simple selection procedures.

(Received on 13th Janu., 1998)

INTRODUCTION

Fruit yield is the most economical trait n brinjal (*Solanum melongena* L.). However, letailed information on biotic stress and uality characters in brinjal is scanty. The xtent of variability available for yield alone ith important economic traits and their eritability will be helpful to the breeders to rmulate sound breeding programme. Hence, resent attempt was made with these bjectives in the brinjal crop.

MATERIALS AND METHODS

The experiment comprising 41 diverse enotypes of brinjal was laid out in andomised block design with four replications t Plant Breeding Farm, Gujarat Agricultural niversity, Anand during *rabi* 1995-96. Each lot had two rows and each row consisted of 10 plants. The inter and intra row spacing was 90 and 60 cm, respectively. Five random plants were selected from each plot for recording the observations on fruit yield per plant (g), fruit borer infested fruits (%) and little leaf incidence (%). Uniformly ripen fruits were collected at random from each plot to determine the chemical composition. The fruits were cut and dry matter was obtained by drying to a constant weight at 105°C for 6 hours. The quality determining traits like polyphenoloxidase activity (Taneja and Sachar, 1974), total phenols (Malik and Singh, 1980), glycoalkloid content (Currie and Kuc, 1975) and total soluble as well as reducing sugars (Sadasivam and Manickam, 1992) were estimated by using the standard procedures given by various scientists. Anthocyanin content was determined from the peel of the fresh fruit (Ranganna, 1976).

TABLE 1

The estimates of genotypic ($\hat{o}^2_g$) and phenotypic ($\hat{o}^2_p$) variances and other genetic parameters for different characters in brinjal.

Characters	*Range*	*Mean ± S. Em.*	$\hat{o}^2_g$	$\hat{o}^2_p$	*GCV (%)*	*PCV (%)*	H^2 *(%)*	*GA (% mean)*
Fruit yield/plant (g)	112.66–386.07	253.14 ± 12.77	4850.62	5503.81	27.51	29.31	88.13	53.21
Fruit borer (%) infestation	13.64 – 32.840	20.36 ± 0.500	19.03	200.03	21.42	21.97	95.02	43.02
Little leaf (%) incidence	19.55 – 56.070	34.14 ± 1.150	95.24	100.37	28.58	29.34	94.88	57.35
Dry matter (%)	6.11 – 11.210	7.340 ± 0.112	0.65	0.71	11.00	11.42	92.89	21.84
Anthocyanin content (mg/100g)	0.00 – 112.16	21.640 ± 1.580	423.11	433.13	95.67	96.77	97.68	194.78
Polyphenol oxidase acticity (D.O.O./min.)	0.345 – 3.468	2.035 ± 0.145	0.73	0.82	41.62	43.97	89.59	81.15
Total phenols (mg/100 mg drywt.)	0.898 – 4.615	2.026 ± 0.145	0.85	0.93	44.17	46.30	90.98	86.77
Glycoalkaloid content (O.D.)	0.132 – 1.907	0.781 ± 0.050	0.18	0.19	54.70	56.18	94.81	109.72
Total soluble sugars (mg/100 mg dry wt.)	10.282 – 61.095	31.980 ± 1.360	153.67	161.06	38.76	39.12	95.41	77.99
Reducing sugars (mg/100 mg dry wt.)	2.173 – 14.180	7.260 ± 0.500	8.34	9.34	39.79	42.12	89.24	77.44

The coefficient of variations were estimated according to Burton and Devane (1953). Heritability in broad sense and expected genetic advance were estimated by the methods given by Hanson *et al.* (1956).

RESULTS AND DISCUSSION

The analysis of variance revealed highly significant differences among the genotypes for all the characters studied. The range of variation was substantially high for all the characters under study and it was particularly pronounced in anthocyanin content and glycoalkloid content (Table 1). These traits also showed large genotypic variability.

Among all the characters studied, glycoalkloid content was least affected by environmental factors followed by dry matter, total phenols, polyphenoloxidase activity, reducing sugars, total soluble sugars and anthocyanin content. On the other hand, fruit yield per plant, little leaf incidence and fruit borer infested fruits were comparatively more influenced by external factors as evident by their respective estimates of phenotypic and genotypic variances. The estimates of phenotypic coefficient of variation (PCV) were higher than their respective genotypic coefficient of variation (GCV) for all the traits. The GCV was maximum for anthocyanin content followed by glycoalkloid content. It was comparatively low for dry matter, fruit borer infested fruits, little leaf incidence, fruit yield per plant and moderate for total phenols, polyphenoloxidase activity, total soluble sugars and reducing sugars. Same trend was observed for PCV. Dhankar and Sharma (1986) and Malik *et al.* (1986) reported low GCV for fruit yield per plant and fruit borer infested fruits. The heritability estimates help breeders in selection based on the phenotypic performance . In the present study, high heritability was observed for all the characters, which indicates that selection is effective. But this selection is misleading because Johnson *et al.* (1955) reported that heritability estimate alongwith genetic advance is more useful than the heritability value alone for improving a particular trait. The high heritability combined with genetic advance as per cent of mean was observed for the characters like anthocyanin content, glycoalkloid content, total phenols, polyphenoloxidase activity, total soluble sugars and reducing sugars. This indicated that these characters are under the control of additive gene action (Panse, 1957) and would respond very well to continuous selection. These results are in agreement with the findings of Chadha and Paul (1984), Singh and Kalda (1984), Gautam and Srinavas (1992) and Kapadia (1995).

REFERENCES

Burton, G. W. and E. H. Devane (1953). Estimating heritability in tall fescue (*Festuce arundinacua*) from replicated clonal material. *Agron. J.*, **45** : 478-81.

Chadha, M. L. and B. Paul (1984). Genetic variability and correlation studies in eggplant (*S. melongena* L.). *Indian J. Hort.*, **41** (1-2) : 102-107.

Currie and Kuc (1975). Effect of temperature on rishitin and steroid glycoakaloid accumulation in potato tuber, *Phytopathology*, **65** : 1195-1197.

Dhankhar, B. S. and N. K. Sharma (1986). Variability in relation to shoot and fruit borer (*Leucinodes orbonalis* G.) infestation in brinjal (*S. melongena* L.), *Haryana J. Hort..Sci.* **15** (3-4) : 243-248.

Dhankhar, B. S. and V. P. Gupta (1977). Screening and variability studies for relative susceptibility to shoot and fruit borer in brinjal. *Haryana J. Hort. Sci.*, **6** (1-2) : 50-58.

Gautam, B. and T. Srinavas (1992). Studies on heritability, genetic advance and character association in brinjal (*S. melongena* L.). *South Indian Hort.*, **40** (6) : 316-318.

Hanson, G. H.; Robinson, H. E. and R. E. Comstock (1956). Biometrical studies on yield in segregating population of Korean lespedza, *Agron. J.*, 48 : 268-272.

Johnson, H. W., Robinson, H. E. and R. E. Comsotck (1955). Estimation of genetic and environmental variability in soybean. *Agron., J.*, 47 : 314 -318.

Kapadia, S. T. (1995). Generation mean analysis in brinjal (*S. melongena* L.). M.Sc. (Agri.) thesis submitted to Gujarat Agricultural University, Sardar Krushinagar.

Malik, A. S., B. S. Dhankhar and N. K. Sharma (1986). Variability and correlation among certain characters in relation to shoot and fruit borer (*Leucinodes orbonalis* G.) infestation in brinjal. *Haryana Agril. Univ., J. Res.*, 16 (3) 259-265.

Malik, C. P. and M. B. Singh (1980). Extraction and estimation of total phenols. In Plant Enzymology and Histoenzymology. Kalyani Publishers, New Delhi, p. 286.

Panse, V. G. (1957). Genetic of quantitative characters in relation to plant breeding. *Indian J. Genet.*, 17 : 318-328.