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CORRELATION AND GENETIC VARIATION OF TWENTY DIFFERENT GENOTYPES OF LABLAB BEAN, *LABLAB PERPUREUS* (L.) SWEET

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Abstract

Analysis of variance indicated highly significant differences among the genotypes in most of the characters. Phenotypic variation was greater than that of genotypic and environment variations for all the characters. The greater portion of total phenotypic variation was due to the genotypic variation. Heritability values were higher for number of inflorescence per plant followed by pod weight and number of pods per inflorescence. Maximum genetic advance expressed as percentage of mean was recorded for number of pod per inflorescence. Phenotypic and genotypic correlation coefficients were calculated for six yield contributing traits. Significant and positive genotypic correlation was noted between pod weight at harvest and pod diameter, and yield per plant; and pod weight at harvest, pod length, number of inflorescence per plant showed significant positive genotypic correlation. Yield per plant exhibited significant positive phenotypic correlation with pod length and number of inflorescence per plant.

Lablab bean, *Lablab purpureus* (L.) Sweet is used both as a green vegetable and as pulse crop. In developing countries like Bangladesh, leguminous crops *e.g*., pulses and beans have an important role to play for protein nourishment. Pulse and bean contain 20-30% protein on a dry matter basis (Ramanajam 1979). The present investigation was carried out to study the variability, heritability, genetic advance expressed as percentage, correlation coefficient among six agronomic characters in 20 different genotypes of bean.

The materials comprised 20 genotypes of lablab bean which were collected from different regions of Bangladesh. Those were grown during rabi season of 2000 - 2001 in the experiment field of Rajshahi University with complete randomized block design and three replications. Data on six agronomical traits *viz*., pod weight at harvest, pod length, pod diameter, number of flowers per inflorescence, number of pods per inflorescence and yield per plant were recorded.

The range of phenotypic coefficient of variation (PCV) was from 9.24 (pod diameter) to 166.78 (number of pod per inflorescence). The value for pod length, number of flowers per inflorescence and yield per plant were 145.37, 137.92 and 77.32, respectively. The genotypic coefficient of variation (GCA) ranged from 6.15 (pod diameter) to 151.92 (number of pod per inflorescence). Like phenotypic coefficient of variation, pod length, number of flowers per inflorescence, yield per plant, and pod weight showed high genotypic coefficient of variation (GCA) *i.e*., 142.96, 132.71, 68.56 and 63.56, respectively. The result show there was a pronounced variation in all phenotypic, genotypic and environmental coefficient of variability for most of the characters. For all characters the difference between phenotypic and genotypic coefficient of variability was found low. These indicate pronounced genetic control on these characters. The number of pod per inflorescence, pod length, number of flowers per inflorescence, and yield per plants showed higher genetic coefficient of variation which offered scope for their improvement as they were less affected by the environment. Majid *et al*. (1982) reported in black gram that the phenotypic variance was larger than the genotypic variance for all

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the characters studied. In general, the phenotypic coefficient of variation was higher than the corresponding genotypic coefficient values as also reported by Alam *et al.* (1982, 1987 and 1988), Begum *et al.* (1988), Mirza *et al.* (1994 and 1995) and Nandpuri *et al.* (1973).

The highest heritability in the broad sense was obtained for number of flowers per inflorescence (96.21) followed by pod weight (92.03), number of pod per inflorescence (91.08), yield per plant (88.67) and pod diameter (66.57). The highest genetic gain with heritability observed for yield per hectare, yield per plant, days to maturity plant height and number of pods per plant was reported by Rahman *et al*. (1982) in mungbean (*Phaseolus aureus*). Majid *et al*. (1982) also reported that heritability values were high for number of pod per plant in blackgram followed by number of inflorescence per plant. Alam *et al*. (1987) and Hoque *et al.* (1993) reported high heritability values for yield in sunflower. High heritability for pod length and pods per plant, highest genetic gain for the number of pods per plant and lowest for pod length were reported by Singh *et al.* (1985) in bean.

Table 2. Phenotypic (r_p) and genotypic (r_g) correlation coefficient among six different characters of lablab bean.

r_g \ r_p	PdW	PdL	PdD	NIP	NPI	YP
PdW		0.1031	0.5051*	– 0.5001*	– 0.5865*	0.7910*
PdL	0.1965		0.1454	0.0169	0.0031	0.6165*
PdD	0.7836*	0.7214*		– 0.0133	– 0.0028	0.0040
NIP	– 0.5147*	– 0.2865	– 0.5455*		– 0.0013	0.5331*
NPI	– 0.5921*	– 0.0366	– 0.0166	– 0.1488		0.0272
YP	0.7980*	0.7151*	0.1011	0.7819*	0.0998	

PdW = pod weight, PdL = pod length, PdD = pod diameter, NIP = number of inflorescence per plant, NPI = number of pod per inflorescence and YP = yield per plant.

The expected genetic advanced expressed as percentage of mean was very high for number of pod per inflorescence (115.72), followed by yield per plant (52.56), pod weight (51.81) and number of flowers per inflorescence (48.58). Highest genetic advance expressed as percentage of mean was obtained for number of pod per plant followed by 500 seed weight and yield per plant was reported by Majid *et al*. (1982) in mungbean.

Phenotypic and genotypic correlation of six characters in all possible combinations were calculated to know of relationships among them. In general, the genotypic correlation coefficients were higher than corresponding phenotypic correlation coefficients. Pod weight at harvest showed significant positive correlation both at phenotypic and genotypic levels with pod diameter (r_p = 0.5051, r_g = 0.7836) and with yield per plant (r_p = 0.791, r_g = 0.798). Pod weight at harvest showed negative but significant correlation both at phenotypic and genotypic levels with flowers per inflorescence (r_p = – 0.5001, r_g = – 0.5147) and with number of pod per inflorescence (r_p = – 0.5865, r_g = – 05921). The number of flowers per inflorescence with yield per plant also showed positive significant correlation (r_p = 0.5331, r_g = 0.7819). Pod length displayed positive significant phenotypic and genotypic correlation with the yield per plant (r_p = 0.6165, r_g =

0.7151). Singh and Malhotra (1970) noted a positive correlation between seed yield and plant height in mungbean. Similar results also reported by Ahmed *et al*. (1981) in mungbean, Singh and Mehndiratta (1969) in cowpea and Singh and Singh (1986) in lentil.

The estimate of heritability, phenotypic and genotypic coefficient of variation, genetic advance as percentage of mean were found to be higher for number of pods per inflorescence and number of inflorescence per plant suggested that the direct selection for the traits would be effective for the improvement of yield in lablab bean.

References

Ahmed, Z.U., M.A.Q. Shaikh, M.A. Majid and S. Begum. 1981. Correlation studies in agronomic characters of mungbean (*Vigna radiata*). Bangladesh J. Agric. Sci. **8**: 31-36.

Alam, M.S., D.K. Path and M.Z.I. Talukder. 1988. Correlation and path analysis in sunflower(*Helianthus annus* L.). Bangladesh J. Agric. **12**(3): 147-150.

Alam, M.S., M.N. Hossain, A.B.M.A. Khair and M.S. Khan. 1987. Genetic parameters and relationship among somagronomic characters in sunflower (*Helianthus annus* L.). Bangladesh J. Agric. **12**(3): 89-93.

Alam, M.S., M.N. Islam and M. Khaleque. 1982. Variability and correlation in sunflower (*Helianthus* L.) in Bangladesh. Bangladesh J. Agril. Res. **7**(1): 13-19.

Begum, D., M.S. Khan and M.A. Bari. 1988. Genetic and environmental variability in sunflower (*Helianthus annus* L.). Bangladesh J. Agric. **13**(1): 11-15.

Hoque, M.M.S., D.N. Chowdhury, M. Azimuddin, H.M.A Alwal and H.Q. Ahmed. 1993. Variability and path analysis in sunflower (*Helianthus annus* L.). Bangladesh J. Plant Breed. & Genet. **6**(2): 29-33

Majid, M.A., S. Khanum, M.A.Q. Shaih and A.D. Bhuiya. 1982. Genetic variability and correlation studies in blackgram. Bangladesh J. Agric. **7**: 98-102.

Mirza, M.S.H., D. Nessa and M. Azimuddin. 1994. Genetic parameters and character association in sunflower (*Helianthus annus* L.). Bangladesh J. Bot. **23**(2): 175-180.

Mirza, M.S.H., D.N. Chowdhury, M.S. Hassan and S.Z.K.M. Shamsad. 1995. Variability and character association in sunflowers (*Helianthus annus* L.). Dhaka Univ. J. Biol. Sci. **4**(2): 133-138.

Nandpuri, K.S. and J.C. Kumar. 1973. Heritability and interrelationships of some quantitative characters in pea (*Pisum sativum* L.). Journal of Res. Punjab. Agric. Univ. **10**(3): 309-315.

Rahman, A.R.M.S., M.A. Islam and M.S. Shaheed. 1982. Selection through combination effect of ANOVA, Genetic parameters and score index and their relative efficiency in mungbean (*Phaeolus aureus*). Bangladesh J. Agriculture. **7**: 3-4.

Ramanajam, S. 1979. Genetic analysis of yield protein and other characters in pulse crops. Ph. D. thesis Dept. of Bot. R. B. S Collage, Agra, India.

Sing, K.B. and Mehndiratta. 1969. Genetic variability and correlation studies in cowpeas (*Vigna sinensis* L.). Indian j. Genet Pl. Breed. **29**(1): 104-113.

Singh, A.K., N.C. Geeutam and K. Singh. 1985. Genetic variabilitly and correlation studies in bean (*Lablab purpureus*). Indian J. of Hort. **42**: 252-257.

Singh, K.B. and S. Singh. 1969. Genetic variability and correlation studies on yield and other quantitative characters in lentil (*Lens culinaris* Medic). J. Agric. Sci. **39**: 737-741.

Singh, K.B. and R.S. Malhotra. 1970. Interrelationship between yield components in mungbean. Ind. J. Genet. Plant Breeding. **30**: 244-250.

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