Indian J. Pl. Genet. Resources 5(1): 79-82, 1992

VARIABILITY AND CORRELATED RESPONSE IN MUNGBEAN

B.R. Choudhary and P. Joshi

Agricultural Research Station,
Rajasthan Agricultural University, Mandor, Jodhpur - 342 304

Analysis of variance for nine quantitative characters in 45 genotypes of mungbean showed significant variability. Primary branches per plant, pods per plant and seeds per pod had high genotypic coefficient of variation (GCV) coupled with moderate to high estimates of heritability, expected genetic advance and maximum correlated response in yield. This shows that effective selection for improvement of these characters is possible and are important for mung bean improvement.

Mung bean (*Vigna radiata* L. Wilczek) is an important source of protein in vegetarian diet of Indian population and is particularly preferred for invalids and infants for its easy digestibility and non-flatulence properties. Though, much work has been reported on variability aspects but information on correlated response in yield (CRy) and relative selection efficiency (RSE) of different traits in this crop is lacking. Thus present studies were undertaken to assess the genetic variation in the available germplasm of mungbean alongwith the correlated response in yield and relative selection efficiency to test the suitability of various traits for making their use in improvement of this crop.

MATERIALS AND METHODS

Forty five strains of mung bean were grown at Agricultural Research Station, Mandor, Jodhpur during *kharif* rainy season of 1990 using randomized block design with three replications. The plot size was 5.0m x 1.5m with the crop geometry of 30cm x 10cm. Ten randomly selected plants from each plot of each replication were used to record observations on nine quantitative characters,

viz., days to flowering, days to maturity, plant height (cm), number of primary branches per plant, number of secondary branches per plant, number of pods per plant, number of seeds per pod, 1000 seed weight (g), and seed yield per plant (g). Variability parameters such as genotypic variance (Vg), phenotypic variance (Vph), genotyptic coefficient of variation (GCV), phenotypic coefficient of variation (PCV) and heritability in broad sense (H), were calculated by the method proposed by Johnson *et al.*, (1955). Expected genetic gain expressed as per cent of mean, (ΔG), correlated response in yield (CRy) and relative selection efficiency (RSE) were computed assuming 5 per cent selection intensity using the procedure suggested by Searle (1965).

RESULTS AND DISCUSSION

The statistical analysis revealed highly significant differences among the genotypes for all the attributes. Plant height and pods/plant showed wide variation (Table 1). Plant height recorded maximum phenotypic variance whereas, primary branches per plant showed minimum variation both at the genotypic and phenotypic levels. The GCV and PCV were the highest for secondary branches per plant (23.12, 35.64). The characters like pods per plant, seed yield per plant and plant height also showed comparatively higher GCV and PCV. These results are in agreement with those reported by Singh and Malhotra (1970) and Veeraswamy *et al.*, (1973). There was closeness between the GCV and PCV of 1000-seed weight, showing higher resistance to environmental influence as compared to other traits. But, seed yield per plant revealed a high degree of disparity and indicated that the yield was highly influenced by the environment. Further, the lowest values of coefficients of variation (GCV and PCV) for days to maturity indicated lesser scope of its selection.

The heritability estimates were high for 1000 seed weight and plant height suggesting the possibility of selection response based on their phenotypic expression, while heritability of seed yield and secondary branches per plant were low suggesting that these traits were highly influenced by environment. Days to flowering, days to maturity, primary branches per plant, pods per plant and seeds per pod exhibited moderate to high values of heritability. High heritability estimates were reported for plant height and pods per plant (Chowdhry *et al.*, 1971) and for days to 50 per cent flowering, plant height, branches per plant, pods per plant and 1000 seed weight (Reddy *et al.*, 1991).

Table 1 : Range, mean, variability components, correlated response and relative selection efficiency for various characters in mungbean

Characters	Range	Mean ± SE	V_g	V_{ph}	GCV (%)	PCV (%)	H (%)	(G)	CRy	RSE
Days to flowering	37.7–54.7	46.5 ± 2.16	11.53	18.55	7.30	9.26	62.15	4.48	–74.63	–0.36
Days to maturity	86.7–98.3	94.4 ± 1.45	4.51	7.67	2.25	2.93	58.83	1.70	–51.40	–0.26
Plant height (cm)	38.3–77.0	52.2 ± 2.87	18.61	93.94	17.31	18.57	86.88	7.70	8.84	0.03
Primary brahches/plant	6.0–9.0	7.5 ± 0.52	0.49	0.90	9.33	12.60	54.80	11.81	16.88	0.09
Secondary branches/plant	1.3–5.0	3.8 ± 0.75	0.61	1.45	23.12	35.64	42.10	24.34	0.52	0.01
Pods/plant	17.3–45.7	30.2 ± 3.38	40.96	58.07	21.18	25.22	70.54	10.09	40.52	0.17
Seeds/pod	8.3–13.6	10.4 ± 0.53	0.80	1.22	8.54	10.60	65.03	10.47	68.53	0.33
1000-seed weight (g)	29.4–47.2	34.6 ± 0.74	11.99	12.80	9.97	10.32	93.64	7.46	31.64	0.10
Seed yield/plant (g)	3.2–8.5	5.2 ± 1.05	0.95	2.62	18.77	31.14	36.35	14.05	—	—

The suitability of characters for direct and indirect selection may be judged by the expected genetic gain (G) and correlated response in yield (CRy), respectively (Table 1). The expected genetic gain (G) was the maximum for secondary branches per plant (24.34%) followed by seed yield per plant, primary branches per plant, seeds per pod and pods per plant; and it was the lowest for days to maturity. Maximum correlated responses in yield were expected through selection on seeds per pod (68.53%). This character also had comparatively higher value of the expected relative selection efficiency.

Primary branches per plant, pods per plant and seeds per pod had high GCV coupled with moderate to high estimates of heritability, expected genetic advance as per cent of mean and maximum correlated response in yield. It indicates that selection may effectively be based on these characters and their phenotypic expression would be good indicator of the genotypic potentiality. Therefore, these traits would deserve weightage while formulating selection programme in mungbean.

REFERENCES

Chowdhary, J.V., R.K. Chowdhary and S.N. Kakar. 1971. Studies on genetic variability in mungbean. *J. Res. Punjab Agril. Univ.* **8**: 169-172

Johnson, H.W., H.F. Robinson and R.E. Comstock. 1955. Estimate of genetic and environmental variability in soybean. *Agron. J.* **46**: 314-318

Reddy, T.D., R.K. Mishra and R.K. Yadav. 1991. Genetic variability and correlation coefficients related to yield and other quantitative characters and use of path coefficient in mungbean. *Indian J. Pulses Res.* **4** (1): 100-104

Searle, S.R. 1965. The value of indirect selection. I. Mass selection. *Biometrics* **21**: 682-707

Singh, K.B. and R.S. Malhotra. 1970. Estimation of genetic and environmental variability in mung (*Phaseolus aureus* Roxb.) *Madras Agric. J.* **57**: 155-159

Veeraswamy, R., R. Rathnaswamy and G.A. Palaniswamy. 1973. Genetic variability in some quantitative characters of *Phaseolus aureus. Madras Agric. J.* **6**: 1320-1322