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PATH ANALYSIS IN BLACK GRAM

A.NIRMALA KUMARI and M. SUBRAMANIAN*

ABSTRACT

A study was undertaken with 183 germplasm collections. Quantitative characters such as days to 50 per cent flowering, days from flowering to maturity, days to maturity, plant height, number of pods per plant, pod length, number of seeds per pod, 100 seeds weight, harvest index, biological yield per plant and seed yield per plant were taken to understand the relationship between them. All the characters showed positive correlation with seed yield per plant. The number of seeds per pod showed the highest correlation followed by pod length and number of pods per plant with the seed yield per plant. In path analysis, biological yield per plant, harvest index and pod length showed high positive direct effect on yield and thus could be inferred as the important yield components. The residual effect was in low magnitude.

Yield is a complex factor and depends upon the action and interaction of a number of factors. For an adequate evaluation at an early stege of growth, a direct phenotypic selection for yield may not be may effective since involves genotypic differences. Hazel and Lush (1942) reported that index score technique based on more than one criteria was most efficient especially when some of the component characters are negatively correlated still being importance. Hence the objective of the present investigation was to screen the available varieties for yield and to work out its relationship with other important traits in blackgram which can prove highly useful in an objective selection of characters.

MATERIALS AND METHODS

One hundred and eighty three germplasm collections of different georaphical origins were received from National Pulses Research Centre, Vamban and were grown in a trial during Kharif and Summer seasons (1988-89). The material chosen represented some of the promising high yielding types and exhibiting a range of plant types. The layout was a randomised complete block design with three replications in 3 m. length rows with 30 x 10 cm spacing. The crop was grown under irrigated conditions with normal recommeded cultivation practices. The observations were recorded on eleven quantitative characters viz., days to 50 per cent flowering, days from flowering to maturity, plant height, number of pods per plant, pod length, number of seeds per pod, 1000 seeds weight, biological yield per plant, harvest index and seed yeild per plant from 10 randomly selected plants in each replication. The biological yield per plant was calculated by pulling out the plants along with the roots and drying the plants in sunlight. The path analysis developed by Wright (1921) was applied to the data and the estimates were obtained by the method adopted by Dewey and Lu (1959).

* Centre for Plant Molecular Biology, Tamil Nadu Agrl. University, Coimbatore.

able 1. Path co-efficient (genotypic) showing direct and indirect effect on different characters contributing toward seed yield / plant (g.)

Character	Days to 50 per cent flowering	Days from flowring to maturity	Days of maturity	Pl.ht(cm)	Pod No./ plant	Pod length (cm)	Seeds/ pod	1000 seed weight (g)	Biological yd./ pl.(g)	Harvest index	Correlation with seed yield
Days to 50 per cent flowering	0.0978	0.0009	0.0096	-0.0256	-0.0054	0.0018	-0.0024	-0.0243	0.0917	-0.0405	0.0869
Days from flowering to maturity	-0.0868	0.0377	0.0092	-0.0032	0.0097	0.0022	0.0036	0.0563	-0.0046	0.0013	0.1931
Days to maturity	0.0672	-0.0368	0.0089	-0.0228	-0.0084	0.0341	-0.0021	0.0117	0.0014	0.0008	0.0542
Plant height (cm)	0.0333	-0.0097	0.0078	0.0048	0.0532	-0.0048	-0.0049	0.0025	0.2763	0.0072	0.3605
No. of pods/plant	-0.0052	0.0032	-0.0052	0.0013	0.1348	-0.0778	-0.0001	-0.0228	0.1937	0.0034	0.5673
Pod length (cm)	0.0317	0.0026	0.0006	0.0034	-0.0112	0.5019	0.0176	0.2799	-0.0083	-0.0239	0.8790
No. of seeds/pod	-0.0082	0.0283	-0.0064	0.0075	-0.0034	0.5813	0.0276	0.3616	0.2151	-0.0847	0.9087
1000 seed weight (g)	0.0378	0.0346	-0.0057	-0.0017	-0.0063	0.0871	0.0208	0.1987	0.1382	0.0046	0.0798
Biological yield/plant (g.)	0.0307	-0.0081	-0.0072	0.0062	0.0732	0.0935	-0.0017	-0.0072	0.5883	-0.1778	0.5661
Harvest index	-0.0165	0.0216	-0.0120	-0.0004	0.0652	-0.0766	-0.0023	-0.0470	-0.2346	0.5452	0.3912

Residual effect : 0.0058

RESULTS AND DISCUSSION

It was observed that genotypic correlations were generally higher than the phenotypic correlations. Johnson *et al.* (1955) also obseved higher genotypic correlation than phenotypic correlation coefficient between various pairs of characters in soybean. The seed yield had very high and positive correlation with its main contributing characters viz., number of seeds per pod, pod length, biological yield, number of pods per plant, harvest index and plant height. The correlation bewtween the characters may not give correct picture of the association. Path analysis has, therefore, been suggested by various plant breeders to study the direct influence of different characters on the yield and also the indirect effects through various characters. Path analysis (Table- 1) showed that biological yield per plant had the highest positive direct effect on seed yield followed by harvest index and pod length. The number of pods per plant and 1000 seed weight also had positive direct effect on seed yield. Though, plant height and number of pods per plant had positive association with the biological yield, the seed yield per plant had the highest positive direct effect on biological yield followed by number of pods per plant, days to maturity, seeds per pod and plant height (Singh *et al.*, 1988). Plant height had a very high magnitude of indirect effect on biological yield followed by number of pods per plant, days to maturity, seeds per pod and plant height. Plant height had a very high magnitude of indirect effect on biological yield and pods per plant. Pod length had high positive effect on seed yield and indirect effects on number of seeds per pod and 1000 seed weight. The 1000 seed weight had a positive association with seed yield and it also had positive direct effect on seed yield. Patil and Deshmukh (1988) also observed that 100 seed weight had the greatest positive direct effects on seed yield in greengram.

The seed yield per plant had a substantial contributions towards biological yield and harvest index. But harvest index had negative indirect effect of biological yield. Hence, the breeding objective of blackgram should be to isolate high yielding genotypes with more biological yield rather than high harvest index and biological yield. Reddy (1981) while analysing the factors influencing the biological yield, harvest index and seed yield, in blackgram, observed that pods per plant, pod length, 100 seed weight, plant height and days to flowering had positive direct effects on harvest index. It could be concluded from present study that the pod length, the number of pods per plant, seeds per pod and 1000 seed weight are the most important yield components along with yield (Rao and Suryawanshi, 1988).

REFERENCES

DEWEY, D.R. and LU,K.H. (1959) Correlation and path coefficient analysis of components of crested wheat grass and seed production. Agron.J., 5: 515- 518.

HAZEL, L.N. and LUCH, J.L. (1942). The efficiency of three methods of selection. J. Hered., 33: 393-399.

JOHNSON, H.W. ROBINSON, H.F. and COMSTOCK, R.F. 1955. Estimation of genetic and environmental variability in soybean. Agron.J. 47: 314-318.

PATIL, H.S. and DESHMUKH,R.K. 1988. Correlation and path coeficent analysis in mungbean. J. Of Maharashtra Agrl. Universities 13(2): 183-185.

RAO, S.K. and SURYAWANSHI. R.K. 1988. Analysis of yield factors in Urd bean (Vigna mungo) Legume Research 11(3): 134-138.

RADDY, T.D. (1981). Analysis of component factors influencing economic yield, biological yield and harvest index in mung bean (Vigna radiata) M.Sc., (Ag.) Thesis submitted to INKVV, Jabalpur (M.P).

SINGH, I.S. SING, B.G., SINGH, R.P. and SINGH, K.K. 1988. Inter-relationships of yield and the components in F_3 progenies of a crosses in mungbean. Crop Improvement. 15(2): 146- 150.