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CORRELATION AND PATH ANALYSIS IN YARD-LONG BEAN

Yield is a complex character determined by several component characters. So selection for yield should take into account related characters as well. Hence the knowledge of correlation between yield and its component characters and among the component characters is essential for yield improvement through selection programmes. Path coefficient analysis provides an effective means of partitioning the genotypic correlation coefficients into direct and indirect effects of the component characters on yield on the basis of which crop improvement programmes can be logically devised. Hence a research programme was undertaken to study the correlation and path coefficients among vegetable pod yield and its component characters in yard-long bean (*Vigna unguiculata* subsp. *sesquipedalis* (L.) Verdc.).

The material for the study comprised of 50 varieties of yard-long bean. The data were collected from a field experiment in randomized block design with three replications conducted at the College of Agriculture, Trivandrum during September to December 1999. Plot size was 3.0 x 2.1 m. Spacing of 1.0 m between rows and 0.3 m between plants in a row was provided. Plants were trailed on coir ropes tied between wooden standards erected 1 m apart along the rows of plants. The crop was raised following the package of practices recommendations of the Kerala Agricultural University (KAU, 1996).

Observations were recorded on five randomly selected plants in each plot on 10 quantitative characters. Genotypic correlation between vegetable pod yield per plant and other characters viz., days to first flowering, length of harvesting period (number of days from first to last harvest), number of pods per plant, number of inflorescences per plant, number of pods per inflorescence, number of primary branches per plant, pod length, pod girth and pod weight. Path analysis as suggested by Dewey and Lu (1959) was used to partition the genotypic correlation coefficients of pod yield into direct and indirect effects.

The genotypic correlation coefficients among the 10 quantitative characters are presented in Table 1. Genotypic correlation of pod yield per plant was found to be highly significant and positive for number of pods per plant, number of pods per inflorescence, pod weight, length of harvesting period, pod girth and pod length. Number of primary branches also recorded positive correlation with yield. The positive association of pod yield with number of pods per plant, pod weight and pod length was in line with the results reported by Sobha (1994), Sreekumar *et al.* (1996), Resmi (1998) and Vardhan and Savithramma (1998a). Significant positive correlation of pod yield with number of pods per plant, number of pods per inflorescence, pod weight and length of harvesting period imply that selection for these characters would lead to simultaneous improvement of pod yield in yard-long bean.

Days to first flowering recorded significant negative genotypic correlation with length of harvesting period followed by number of pods per plant and number of pods per inflorescence. Corroborative reports of significant negative correlation of days to first flowering with number of pods per plant (Sreekumar *et al.*, 1996; Resmi, 1998) and number of pods per inflorescence (Resmi, 1998) support these findings. Number of pods per plant showed highly significant positive genotypic correlation with number of pods per inflorescence, length of harvesting period and number of primary branches. Pod length was significantly and positively associated with pod weight, pod girth and number of inflorescences per plant while pod weight showed significant positive correlation with pod girth at genotypic level. Similar results were obtained by Resmi (1998).

The genotypic correlation coefficients of vegetable pod yield with six characters which showed high positive genotypic correlation were further partitioned into direct and indirect effects and the results are presented in Table 2. The characters considered in path coefficient analysis were length of harvesting period, number of pods per plant, number of pods per inflorescence, pod length, pod girth and pod weight. The maximum direct effect on yield was shown by number of pods per plant followed by pod weight and number of pods per inflorescence. Number of pods per plant also exerted positive indirect effect through length of harvesting period and number of pods per

Table 1. Genotypic correlation coefficients among 10 characters in yard-long bean

Characters	Length of harvesting period	Pods/ plant	Inflore-scences/ plant	Pods/ inflore-scence	Primary branches/ plant	Pod length	Pod girth	Pod weight	Veg. pod yield/ plant
Days to first flowering	-0.487**	-0.431**	-0.016	-0.360**	0.130	0.215*	0.193	0.231*	-0.205
Length of harvesting period		0.366**	0.315**	0.200	0.044	-0.038	-0.035	0.043	0.340**
Pods / plant			-0.017	0.881**	0.352**	-0.049	-0.094	-0.157	0.765**
Inflorescence / plant				-0.455**	-0.070	0.317**	0.278**	0.159	0.062
Pods / inflorescence					0.321**	-0.178	-0.232**	-0.195	0.650**
Primary branches/ plant						-0.210*	-0.055	-0.085	0.259*
Pod length							0.445**	0.468**	0.274**
Pod girth								0.524**	0.286**
Pod weight									0.494**

**Significant at 1% level; *Significant at 5% level

Table 2. Direct and indirect effects of yield components on pod yield in yard-long bean

Characters	Length of harvesting period	Pods / plant	Pods / inflorescence	Pod length	Pod girth	Pod weight	Total genotypic correlation
Length of harvesting period	0.0173	0.2783	0.0221	-0.0011	-0.0022	0.0254	0.3398
Pods / plant	0.0063	0.7613	0.0974	-0.0015	-0.0058	-0.0924	0.7654
Pods / inflorescence	0.0035	0.6706	0.1105	-0.0052	-0.0143	-0.1146	0.6504
Pod length	-0.0007	-0.0376	-0.0197	0.0294	0.0274	0.2751	0.2740
Pod girth	-0.0006	-0.0714	-0.0257	0.0131	0,0617	0.3084	0.2855
Pod weight	0.0007	-0.1195	-0.0215	0.0138	0.0323	0.5884	0.4942

R= 0.023; Bold figures are direct effects

inflorescence while pod weight exerted positive indirect effect via pod length and pod girth and negative indirect effect via number of pods per plant.

Both pod weight and number of pods per plant had high direct effect along with high genotypic correlation. The contribution of other characters viz., length of harvesting period, pod length and pod girth via number of pods per plant and pod weight was negligible. A low residual effect was also noticed in the present study. High direct effect of number of pods per plant was earlier reported by Jana *et al.* (1983), Chattopadhyay *et al* (1997), Resmi (1998) and Vardhan and Savithramma (1998b). Several studies identified pod weight as one of the major contributors to pod yield (Sobha, 1994; Chattopadhyay *et al.*, 1997 and Resmi, 1998). The present study indicated that number of pods per plant and pod weight should be given due importance in selection programmes for yield improvement in yard-long bean since these characters recorded significant genotypic correlation with high direct effect on pod yield.

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