Correlation and Path Coefficient Analysis in Peas (*Pisum sativum,* L.)

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Correlations and path coefficient between pod yield and yield components were estimated in twenty cultivars of peas. The phenotypic and genotypic correlations were comparable although the genotypic correlations were slightly higher. First flower node, plant height, number of pods per plant. length and breadth of pod and number and weight of seeds per pod showed highly significant positive correlations with yield of pods. Path coefficient analysis revealed that the weight of seeds had the maximum direct effect on yield followed by number of pods and would serve as better index for selection. Although direct effects of the length and breadth of pod and number of seeds were low. their contibutions through weight of seeds were considerable.

Yield, being a complex polygenic character, is dependent on a number of quantitative attributes. A knowledge of the association of quantitative characters, especially of yield and its attributes, will be of immense practical interest in the field of plant breeding. Path coefficient analysis is a standardised partial regression coefficient and as such measures the direct influence of one variable upon another and permits the separation of correlation coefficient into components of direct and indirect effects (Dewey and Lu, 1959). The present study was undertaken to determine the characters associated with yield and their degree of association in peas.

MATERIAL AND METHODS

Twenty cultivars of peas with widely diversified origin were selected from the germplasm maintained at the Horticultural Research Station; Kodai-

kanal and were utilized for the study. The cultivars were sown on 28-12-78 in randomised block design with four replications. The plot-size was 10 m² with inter-and intra-row spacings of 30 and 10 cm, respectively. Five plants wera selected at random from each plot for recording biometric observations. Data were gathered first pertaining to flower node, plant height, number of pods per plant, length of pod, breadth of pod, number and weight of seeds per pod and yield of green pods per plant. The data were subjected to statistical analysis. Phenottypic and genotypic correlation coefficients and path coefficient analysis were worked out following the procedure of Goulden (1959).

RESULTS AND DISCUSSION

It is evident from the phenotypic and genotypic correlation coefficients between yield and its components (Table I) that yield of green pods per

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plant exhibited significant positive correlation with all the components of yield studied. Yield had a strong positive true relationship with number and weight of seeds per pod in this study as reported by Sancha and Singh (1973) in peas. The first flower node showed significant positive correlation with plant height and number of pods and significant negative correlation with breadth of pod and weight of seeds, while it did not show the degree of significance with length of pod and number of seeds per pod. Plant height showed significant positive correlation with number of pods. Number of pods showed significant negative association with length and breadth of pod and weight of seeds, while the association was not significant with number of seeds. The length of pod showed significant positive correlation with breadth of pod and number and weight of seeds. Similarly, the association of breadth of pod with weight of seeds was significant.

The path coefficient analysis (Table II), worked out to determine the true components of yield, revealed high positive direct effects of weight of seeds, though the correlation between number of pods and first flower node was slightly higher than the correlation between yield and weight of seeds. The other character which exerted high direct effect was number of pods. It is evident that the weight of seeds per pod had high direct positive effect as well as indirect effect through the length of pod with the highest correlation coefficient with yield, offering a good scope of improvement for selection. This

was also noticed by Singh and Singh (1969) in field pea. First flower node also had indirect positive effect through number of pods and negative effect through weight of seeds. Though plant height had lesser direct effect, it had positive indirect effect through number of pods and first flower node. The number of pods had direct effect only, the indirect positive effect through first flower node being almost nullified by the negative effect through weight of seeds. The length and breadth of pod and number of seeds had positive indirect effect of high magnitude through weight of seeds.

The residual effect was 0.2579 indicating that about 75% of the variability in yield of green pods was contributed by the seven characters involved in this study. Thus, if selection is designed to improve the seed weight and number of pods, the yield of green pods will be maximised.

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TABLE I. Phenotypic (P) and Genotypic (G) correlation coefficients between yield and other characters in peas.

Characters		First flower node	Plant height	Number of pods	Length of pod	Breadth of pod	Number of seeds	Weight of seeds.
Yield	P	0.2959**	0.4885**	0.4671**	0.4318**	0.2884**	0.5402**	0.6286**
	G	0.3369**	0.5060**	0.3848**	0.4982**	0.3435**	0.6045**	0.7002**
First flower node	P		0.5833**	0.6728**	-0.1099	-0.3574**	0.1870	-0.3343**
	G		0.6130**	0.7800**	-0.1258	-0.4068**	0.1984	-0.3591**
Plant height	P			0.5911**	-0.0825	0.0961	0.2120	0.0007
	G			0.6221**	-0.0828	0.0982	0.2273*	0.0042
Number of pods	P				-0.3773**	-0.4144**	0.1051	-0.2467*
	G				-0.4292**	-0.4813**	0.1245	-0.2602*
Length of pod	P					0.6601**	0.5169**	0.6403**
	G					0.6561**	0.5464**	0.6716**
Breadth of pod	P						0.1252	0.5840**
	G						0.1406	0.6235**
Number of seeds	P							0.5434**
	G							0.5435**

* Significant at 5% level
** Significant at 1% level,

TABLE II. Peth analysis showing direct and indirect effects of components on yield in peas.

Character	First flower node	Plant height	Number of pods	Length of pod	Breadth of pod	Number of seeds	Weight of seeds	Correlation on with yield
First flower node	0.2872	0.0581	0.3321	—0.0271	—0.0127	—0.0159	—0.2847	0.3370
Plant height	0.1760	0.0948	0.2648	—0.0179	—0.0031	—0.0182	—0.0033	0.5059
Number of pods	0.2240	0.0590	0.4257	—0.0926	—0.0150	—0.0100	—0.2063	0.5848
Length of pod	—0.0361	—0.0079	—0.1827	0.2157	0.0204	—0.0438	0.5326	0.4982
Breadth of pod	—0.1168	0.0093	—0.2049	0.1415	0.0312	—0.0113	0.4945	0.3435
Number of seeds	0.0570	0.0216	0.0530	0.1178	0.0044	—0.0802	0.4310	0.6046
Weight of seeds	—0.1031	0.0004	—0.1108	0.1449	0.0194	—0.0436	0.7930	0.7002

Residual factor = 0.2579

Bold figurer refer to direct effects.