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CORRELATION STUDIES IN GRAM (CICER ARIETINUM L)

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Genotypic and phenotypic correlation coefficients were worked out among yield, number of pods per plant, 100 seed weight, number of seeds per 10 pods and secondary branches per plant. Significant positive correlation coefficients were obtained for association between yield and all other characters studied. In other cases, 100 seed weight was found to be positively correlated with seed number per 10 pods and secondary branches with pod number per plant.

INTRODUCTION

Information about association of different plant characters provides the breeder with a reliable basis to select an appropriate breeding procedure. Very little information of this kind is available on gram crop. Khan (1949), Khan (1950) and Mirza (1962) reported positive correlations between plant height, number of primary and secondary branches, pods per plant, grains per pod, grain size and yield. Their findings however, were related only to phenotypic association of these characters. These and subsequent researches conducted locally, however, shed no light on the genotypic association of these characters, without which phenotypic correlation coefficients are of little use. Consequently an experiment was designed to study phenotypic and genotypic correlation among various plant characters in gram.

MATERIALS AND METHODS

The material comprised 30 varieties of gram providing for a wide genetic diversity. The varieties were sown during the first week of October 1973, at the University of Agriculture research farm using randomized complete block design with three replications. Each plot consisted of three, 10 ft. long rows spaced one foot apart with a plant to plant distanee of six inches within the row Ten plants in the central row of each plot were

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selected at random for recording data on secondary branches, number of pods per plant, number of grains per 10 pod, 100 seed weight and yield. Averages of 10 selected plants were used for all statistical analyses.

Phenotypic and genotypic correlation coefficients were computed using the following formulae.

1. Phenotypic correlation.

$$\frac{(\sigma gxy + \sigma exy)}{\sqrt{(\sigma^2 gx + \sigma^2 ex)\ (\sigma^2 gy + \sigma^2 ey)}}$$

2. Genotypic correlation.

$$\frac{(\sigma gxy)}{\sqrt{(\sigma^2 gx)\ (\sigma^2 gy)}}$$

where

$\sigma^2 gx$ = Variety component of variance for trait 'x'
$\sigma^2 gy$ = Variety component of variance for rrait 'y'
$\sigma^2 ex$ = Error component of variance associated with trait 'x'
$\sigma^2 ey$ = Error component of variance associated with trait 'y'
σgxy = Variety component of covariance for traits x and y.
σexy = Error component of covariance associated with traits x and y.

RESULTS AND DISCUSSION

Phenotypic and genotypic correlation coefficients obtained are given in Table 1.

TABLE 1. *Phenotypic (P) and Genotypic (G) Correlation coefficients among yield and four other characters in Gram* (Cicer arietinum *L*)

Character		100 seed weight	Seed number per 10 pods	Secondary Branches per plant	Pod number per plant
Yield	P	0.409*	0.466**	0.585**	0.649
	G	0.586	0.696	0.727	0.815
100 seed weight	P		0.623**	-0.062	-0.013
	G		0.701	-0.072	-0.017
Seed number per 10 pods	P			0.044	0.088
	G			0.108	0.218
Secondary Branches per plant	P				0.855**
	G				0.988

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

The yield was significantly correlated with all the characters studied. The coefficients of both phenotypic and genotypic correlation between yield and secondary branches, number of grains per 10 pods and number of pods per plant were all highly significant. In all cases, the coefficients of genotypic correlation were higher in magnitudes as compare to the coefficients of phenotypic correlation. As regards associations among characters other than yield, number of seeds per 10 pods was found to be highly significantly correlated with 100 - seed weight and a similar association was observed for number of secondary branches with number of pods per plant. All other associations among these characters were non significant. Small negative correlation coefficients were obtained for association of 100 - seed weight with secondary branches and pod number per plant. The coefficients in both these cases, however, were not significant. The results obtained in these studies agreed with those reported by Khan (1949), Khan (1950) and Mirza (1962), who had reported positive phenotypic correlation between height, number of primary and secondary branches, pods per plant, grains per 10 pods, grains size and yield.

Highly significant genotypic correlations of the characters with yield suggest that all of them are important components in determining the final yield per plant. The use of any one or all of these as criteria for selection should be expected to result in improvement of yield. Greater emphasis on secondary branches and pod number per plant which have yielded coefficients of relatively higher magnitude for correlation with yield, seems appropriate.

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