



Correlation and Path Analysis for Seed Yield and its Components in Sesame (*Sesamum indicum* L.)

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ABSTRACT

Correlation studies involving five lines, three testers and fifteen hybrids obtained by Line x Tester mating design of sesame indicated that number of capsules per plant, number of seeds per capsule, number of primary branches per plant and plant height were significant and positively associated with seed yield per plant. The path analysis revealed that number of capsules per plant had maximum direct effect on seed yield per plant followed by number of seeds per capsule and 1000-seed weight.

Key words : Correlation, Path analysis, Sesame.

The correlation studies are of considerable importance in any selection programme as they provide degree and direction of relationship between two or more component traits. Correlation analysis provides information about relationship between yield and its components. However, direct selection based on correlations may not be effective when there are many characters influencing one another. It is necessary to split the total correlation coefficient into direct and indirect effects on a given character. Correlation in combination with path coefficient analysis gives a better insight into cause and effect relationship between different pairs of characters.

MATERIAL AND METHODS

Five lines and three testers were crossed adopting Line x Tester mating scheme during *kharif* 2011 to obtain fifteen hybrids. These fifteen hybrids along with their parents were evaluated during *rabi*, 2011-2012 at Agricultural College Farm, Bapatla in a Randomised Block Design with three replications. Observations were recorded on 10 randomly chosen plants for nine quantitative characters viz., days to 50% flowering, days to maturity, plant height, number of primary branches per plant, number of capsules per plant, number of seeds per capsule, 1000-seed weight, oil content and seed yield per plant. Correlation (Falconer, 1964) and path analysis (Dewey and Lu, 1957) were worked out.

RESULTS AND DISCUSSION

The estimated phenotypic and genotypic correlations of different characters were presented in Table 1. In general, the genotypic correlation coefficients were higher than the phenotypic correlation coefficients indicating the masking effect of the environment in the total expression of the genotypes. Similar results were reported by Thangavelu and Rajasekaran (1983). Seed yield per plant was significantly and positively correlated with number of capsules per plant, number of seeds per capsule, number of primary branches per plant and plant height. Similar findings were also observed by Renuka *et al.* (2011) and Vanishree *et al.* (2011).

Characters days to 50% flowering, days to maturity and 1000-seed weight were non-significant but positively associated with seed yield per plant, whereas oil content recorded negative, non-significant association with seed yield per plant. Plant height showed significant positive correlation with number of primary branches per plant, Number of capsules per plant, number of seeds per capsule while number of primary branches per plant associated positively and significantly with number of capsules per plant and number of seeds per capsule. Important yield components viz., number of capsules per plant and number of seeds per capsule had positive and significant association among themselves. Number of seeds per capsule was correlated negatively but significantly with 1000-seed weight.

Table 1. Phenotypic and genotypic correlations among yield and yield contributing characters in sesame (*Sesamum indicum* L.).

Character	Correlation	Days to 50% flowering	Days to maturity	Plant height	No. of primary branches per plant	No. of capsules per plant	No. of seeds per capsule	1000-seed weight	Oil content	Seed yield per plant
Days to 50% flowering	P		0.2829*	0.1020	0.1232	0.2554*	0.1001	0.0162	0.0243	0.2107
	G		0.4895**	0.1229	0.1298	0.2826*	0.0999	0.0167	0.1276	0.2192
Days to maturity	P			-0.0255	-0.2790*	-0.2943*	-0.0215	-0.0040	0.3294**	0.0047
	G			0.0584	-0.3127**	-0.3175**	0.0933	-0.0057	0.6364**	-0.0204
Plant height	P				0.5842**	0.4568**	0.4813**	-0.0678	-0.0628	0.5116**
	G				0.6041**	0.5035**	0.5233**	-0.0956	0.0228	0.6062**
No. of Primary branches per plant	P					0.7500**	0.4124**	-0.0100	-0.0652	0.5956**
	G					0.8199**	0.4235**	-0.0046	-0.0369	0.7116**
No. of capsules per plant	P						0.4437**	0.0572	-0.1184	0.7089**
	G						0.4643**	0.0521	-0.1745	0.8741**
No. of seeds per capsule	P							-0.2799*	-0.0837	0.6560**
	G							-0.2724*	-0.1178	0.7616**
1000-seed weight	P								0.1067	0.1213
	G								0.1717	0.1362
Oil content	P									-0.0507
	G									-0.0150

P: Phenotypic correlation

G: Genotypic correlation

* Significant at 5% level

** Significant at 1% level

The estimates of correlation coefficients mostly indicated the interrelationship of different characters but do not furnish information on cause and effect. Under such a situation, path analysis helps the breeder in identifying the ideal index of selection. The results of path coefficients based on correlation coefficients are furnished in Table 2. The maximum direct effect on seed yield per plant was exerted by number of capsules per plant (0.4651). Positive direct effect of number of capsules per plant on seed yield was reported by Renuka *et al.* (2011) and Vanishree *et al.* (2011). The indirect effect of other characters on seed yield via number of capsules per plant was considerable indicating the

importance of number of capsules in the selection programme. Other characters viz., number of seeds per capsule (0.4592), 1000-seed weight (0.2326), days to maturity (0.1990), number of primary branches per plant (0.0884) and plant height (0.0479) exhibited positive direct effects on seed yield per plant.

It may be concluded that number of capsules per plant, number of seeds per capsule, number of primary branches per plant, 1000-seed weight and plant height are the most important characters to be considered for development of high seed yielding genotypes in sesame.

Table 2. Direct and indirect effects of different traits on seed yield per plant in sesame (*Sesamum indicum* L.).

Character	Correlation	Days to 50% flowering	Days to maturity	Plant height	No. of primary branches per plant	No. of capsules per plant	No. of seeds per capsule	1000-seed weight	Oil content	Seed yield per plant
Days to 50% flowering	P		0.2829*	0.1020	0.1232	0.2554*	0.1001	0.0162	0.0243	0.2107
	G		0.4895**	0.1229	0.1298	0.2826*	0.0999	0.0167	0.1276	0.2192
Days to maturity	P			-0.0255	-0.2790*	-0.2943*	-0.0215	-0.0040	0.3294**	0.0047
	G			0.0584	-0.3127**	-0.3175**	0.0933	-0.0057	0.6364**	-0.0204
Plant height	P				0.5842**	0.4568**	0.4813**	-0.0678	-0.0628	0.5116**
	G				0.6041**	0.5035**	0.5233**	-0.0956	0.0228	0.6062**
No. of Primary branches per plant	P					0.7500**	0.4124**	-0.0100	-0.0652	0.5956**
	G					0.8199**	0.4235**	-0.0046	-0.0369	0.7116**
No. of capsules per plant	P						0.4437**	0.0572	-0.1184	0.7089**
	G						0.4643**	0.0521	-0.1745	0.8741**
No. of seeds per capsule	P							-0.2799*	-0.0837	0.6560**
	G							-0.2724*	-0.1178	0.7616**
1000-seed weight	P								0.1067	0.1213
	G								0.1717	0.1362
Oil content	P									-0.0507
	G									-0.0150

* Significant at 5% level

** Significant at 1% level

P: at phenotypic level

G: at genotypic level

Diagonal values indicate direct effects

Residual effect at phenotypic level = 0.5167

Residual effect at genotypic level = SQRT (1-1.0230)

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(Received on 21.08.2013 and revised on 15.10.2013)