



## Character Association and Path Coefficient Analyses in Sesame

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### ABSTRACT

Investigations on extent of character association and path coefficient analysis were conducted in sesamum during *kharif*, 2007. Correlation studies showed that, the seed yield per plant had significant positive association with days to 50% flowering, days to maturity, number of primaries, number of secondaries, capsules per plant, seeds per capsule, 1000-seed weight and oil content. Path coefficient analysis revealed that seeds per capsule, capsules per plant, 1000-seed weight and oil content had high positive direct effect on seed yield per plant.

**Key words :** Correlation, Path Coefficient Analysis, Sesame

Sesame (*Sesamum indicum* L.) is one of the world's oldest oil seed crop and is the 6<sup>th</sup> most important oil seed crop grown in India. Breeding for higher yield is the major objective in sesame crop improvement programme. The practice of selection based on individual traits may not be rewarding always. A better understanding of the contribution of such traits to the genetic makeup of the crop may be obtained through correlation studies. Path analysis is simply a standardized partial regression coefficient and measures the direct influence of one variable upon another and permits the separation of the correlation coefficient into components of direct and indirect effects (Dewey and Lu, 1959). Thus, path analysis measures the direct and indirect effects of independent variables on dependent variables. Hence, the present investigation was carried out to study the extent of character association among yield and yield attributes and path coefficient analysis in sixty sesamum genotypes.

### MATERIAL AND METHODS

The experiment was conducted employing sixty sesamum genotypes at Agricultural College Farm, Bapatla during *kharif* 2007 in randomized block design with three replications. Each genotype was sown in one row of 2 m length with 30x10 cm inter- and intra-row spacing. All agronomic measures were undertaken for good crop growth. Data were recorded on ten randomly selected plants from each genotype or on plot basis per replication for traits *viz.*, days to 50% flowering, plant height (cm), days to maturity, number of primaries, number of secondaries, capsules per plant, seeds per capsule, 1000-seed weight, oil content and seed yield per plant.

Analysis of variance was done by using the standard statistical procedure given by Panse and Sukhatme (1961). The phenotypic and genotypic correlations were worked as suggested by Falconer (1964) and path coefficient analysis as suggested by Dewey and Lu (1959).

### RESULTS AND DISCUSSION

The analysis of variance indicated significant differences among the genotypes for all characters. All the traits showed the higher magnitude of genotypic correlations than phenotypic correlations (Table 1) indicating there was strong inherent association between characters, which was truly reflected in phenotypic expression.

The correlation between seed yield per plant with different yield attributes and among the attributes themselves are presented in Table 1. Seed yield per plant recorded significant and positive association with days to 50% flowering, days to maturity, number of primaries, number of secondaries, capsules per plant, seeds per capsule, 1000-seed weight and oil content at both phenotypic and genotypic levels.

Based on the magnitude of correlation coefficient values capsules per plant, seeds per capsule and number of branches (primaries and secondaries) may be regarded as very closely related characters with seed yield per plant. Hence, higher yield could be obtained by exerting selection pressure over any of these traits. Similar findings were reported by Banerjee and Kole (2006) and Mothilal (2006). The number of capsules per plant had highly significant association with seeds per capsule and seed yield per plant. Therefore, it can be considered as principal yield determining factor.

Table 1. Phenotypic and genotypic correlation coefficients among yield and nine yield components in 60 genotypes of sesame (*Sesamum indicum* L.)

Character		Plant height	Days to maturity	Number of primaries	Number of secondaries	Capsules per plant	Seeds per capsule	1000 seed weight	Oil content	Correlation with seed yield per plant
Days to 50% flowering	P	0.17*	0.75*	0.23**	0.13	0.23**	0.37**	-0.07	0.20**	0.38**
	G	-0.27	1.07	0.27	0.23	0.61	0.98	-0.13	0.61	0.77
Plant height	P		-0.12	0.19*	0.17*	-0.01	-0.04	0.07	-0.02	-0.07
	G		-0.20	0.29	0.22	-0.01	-0.09	0.08	-0.10	-0.09
Days to maturity	P			0.12	0.07	0.20**	0.29**	-0.01	0.13	0.30**
	G			0.16*	0.03	0.45	0.77	-0.00	0.64	0.60
Number of primaries	P				0.40**	0.19**	0.17*	0.10	-0.03	0.23**
	G				0.49	0.28	0.26	0.12	0.03	0.32
Number of secondaries	P					0.28**	0.20**	0.00	-0.04	0.20**
	G					0.32	0.24	-0.00	-0.02	0.23
Capsules per plant	P						0.51**	0.05	0.12	0.67**
	G						0.75	0.06	0.28	0.84
Seeds per capsule	P							-0.04	0.22**	0.63**
	G							-0.04	0.38	0.87
1000 seed weight	P								0.18*	0.34**
	G								0.31	0.37
Oil content	P									0.33**
	G									0.50

\* Significant at 5% level \*\* Significant at 1% level P = Phenotypic correlation coefficient G = Genotypic correlation coefficient

Table 2 . Phenotypic and genotypic path coefficients of yield components in 60 genotypes of sesame (*Sesamum indicum* L.)

Character		Days to 50% flower- ing	Plant height	Days to maturity	Number of primaries	Number of secondaries	Capsules per plant	Seeds per capsule	1000 seed weight	Oil content
Days to 50% flowering	P	<b>0.1501</b>	-0.0256	0.1126	0.0352	0.0208	0.0359	0.0558	-0.0109	0.0309
	G	<b>-0.1043</b>	0.0283	-0.1124	-0.0289	-0.0250	-0.0641	-0.1023	0.0145	-0.0645
Plant height	P	0.1000	<b>-0.0587</b>	0.0071	-0.0112	-0.0105	0.0010	0.0028	-0.0043	0.0016
	G	0.0229	<b>-0.1102</b>	0.0229	-0.0320	-0.0243	0.0016	-0.0102	-0.0092	0.0112
Days to maturity	P	-0.0130	0.0021	<b>-0.0173</b>	-0.0022	-0.0014	-0.0036	-0.0052	0.0003	-0.0024
	G	-0.3024	0.0582	<b>-0.2806</b>	-0.0472	-0.0101	-0.1272	-0.2181	0.0012	-0.1808
Number of primaries	P	0.0111	0.0090	0.0059	<b>0.0472</b>	0.0193	0.0092	0.0084	0.0049	-0.0017
	G	0.0273	0.0286	0.0165	<b>0.0983</b>	0.0489	0.0282	0.0260	0.0125	0.0036
Number of secondaries	P	-0.0013	-0.0017	-0.0008	-0.0039	<b>-0.0094</b>	-0.0027	-0.0019	-0.0001	0.0004
	G	-0.0144	-0.0133	-0.0022	-0.0299	<b>-0.0602</b>	-0.0193	-0.0149	0.0001	0.0018
Capsules per plant	P	0.1021	-0.0074	0.0886	0.0830	0.1204	<b>0.4269</b>	0.2179	0.0239	0.0536
	G	0.1548	-0.0038	0.1142	0.0722	0.0808	<b>0.2520</b>	0.1912	0.0157	0.0713
Seeds per capsule	P	0.1285	-0.0165	0.1033	0.0616	0.0704	0.1763	<b>0.3454</b>	-0.0152	0.0785
	G	0.9057	-0.0858	0.7175	0.2447	-0.2288	0.7003	<b>0.9232</b>	-0.0399	0.3587
1000 seed weight	P	-0.0230	0.0235	-0.0060	0.0335	0.0028	0.0182	-0.0142	<b>0.3240</b>	0.0595
	G	-0.0441	0.0264	-0.0014	0.0402	-0.0005	0.0197	-0.0137	<b>0.3166</b>	0.0995
Oil content	P	0.0229	-0.0030	0.0152	-0.0041	-0.0051	0.0140	0.0254	0.0205	<b>0.1119</b>
	G	0.1238	-0.0203	0.1288	0.0073	-0.0058	0.0566	0.0777	0.0629	<b>0.1999</b>
Correlation with seed yield per plant	P	0.3869**	-0.0782	0.3087**	0.2391**	0.2073**	0.6752**	0.6752**	0.3432**	0.3322**
	G	0.7762**	-0.0918	0.6034**	0.3246**	0.2325**	0.8479**	0.8479**	0.3744**	0.5006**

\*\* Significant at 1% level

P = Phenotypic path coefficient

Bold and diagonal values indicate direct effects

G = Genotypic path coefficient

In path coefficient analysis it was observed that seeds per capsule exhibited highest direct positive effect and indirect effect through other characters *viz.*, capsules per plant and number of primaries. Since this trait showed high correlation and high direct effect on seed yield per plant, yield can be improved by making selection for this character during yield improvement programme. Babu *et al.* (2004) and Banerjee and Kole (2006) also reported the same findings. Thus, in the present investigation days to 50% flowering and days to maturity were found to have high significant positive association with seed yield in correlation analysis and seeds per capsule showed high positive direct effect on seed yield in path analysis. Therefore, simultaneous selection for these traits is suggested for improvement of seed yield in sesame.

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