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Research article

ASSOCIATION ANALYSIS IN SESAME (*Sesamum indicum* L.)

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ABSTRACT: Character association and path analysis between yield and its contributing traits were studied in 54 sesame genotypes. Analysis of variance revealed the existence of significant differences among genotypes for all characters studied. Seed yield was significant positively correlated with number of capsules per plant, number of seeds per capsule, test weight and plant height. Path coefficient analysis indicated that number of seeds per capsule, number of capsules per plant was important traits to be considered for realizing the improvement in yield.
Key words: Correlation, path analysis and sesame

INTRODUCTION

Sesame, an ancient traditional oilseed crop, better known as “Queen of oil seed crops” by virtue of its edible quality oil (50%), believed to be a native to Africa. Sesame seed is a rich source of protein (20%), minerals; contains about 47% oleic acid and 39% linolenic acid (Shyu and Hwang, 2002). Sesame seed is highly nutritive (oil 50%, protein 25%) and its oil contains an anti-oxidant called sesamol which imparts to it a high degree of resistance against oxidative rancidity (Ashri, 1989). India holds a premier position in the global oilseeds scenario accounting for 29 per cent of the total area and 26 per cent of production. Globally, China and India are the major sesame producers. Rajasthan, Gujarat, Madhya Pradesh, Andhra Pradesh, West Bengal and Tamil Nadu put together constitutes nearly 72 per cent of total area and 58 per cent of total production of sesame in the country. The average productivity is very low as compare to other sesame growing countries and almost stagnant during last few years. Genetic improvement of seed yield, alone, is not possible through phenotypic selection because of polygenic nature and low heritability. Hence, resorting to selection through correlated response entailing several contributing factors which influence seed production both directly and indirectly shall be most appropriate. Therefore, understanding of relationship between yield and its components is fundamental for selection process and its relationship can be explained by means of correlation and path coefficient analysis. Correlation studies enable breeders to know the strength of the relationship between various characters as well as direction of changes expected during selection. The path coefficient analysis provides a more realistic picture of the relationship as it considers direct as well as indirect effects of the variables by partitioning the correlation coefficients.

MATERIALS AND METHODS

The experiment consists of 54 genotypes were sown in randomized complete block design (RBD) with two replications at Professor Jayashankar Telangana State Agricultural University, Regional Agricultural Research Station, Jagtial during *Rabi-summer*, 2009-10. Each genotype was raised in 5m length with spacing of 30 X 10 cm. Recommended agronomic practices were followed to raise a good crop. Observations were recorded on days to 50% flowering, days to maturity, plant height (cm), number of branches per plant, number of capsules per plant, capsule length(cm), test weight(g) seed yield (g). The data were recorded on five randomly selected plants in each entry in each replication. The mean values were used for analysis of variance. The correlation coefficients and path analysis were carried out following the methods of Al-Jibouri *et al.*, (1958) and Dewey and Lu (1959) respectively.

RESULTS AND DISCUSSION

The analysis of variation revealed highly significant differences among the genotypes for all the characters studied *viz.*, days to 50% flowering, days to maturity, plant height (cm), number of branches per plant, number of capsules per plant, capsule length (cm), test weight (g) and seed yield (g) indicating the existence of considerable genetic variation in the experimental material.

Seed yield is a complex character governed by several contributing traits. Hence, it is important to understand the association of different characters with seed yield for enhancing the usefulness of selection criterion to be followed while developing varieties. In the present investigation the genotypic and phenotypic correlations are on par with each other suggesting the less influence of environment. Hence, in this paper the genotypic correlations only discussed (Table 1). Invariably seed yield was significant positively correlated with number of capsules per plant, number of seeds per capsule, test weight and plant height. These results are in concurrence with earlier findings (Solanki and gupta 2003; Mukhekar *et al*., 2003 and Thirumala Rao *et al*., 2013). Among inter correlations days to 50% flowering has significant positive association with Plant height, days to maturity, number of branches per plant and significant negative association with capsule length. Days to maturity has significant positive association with plant height. Plant height has significant positive association with number of seeds per capsule and number of capsules per plant. Number of capsules per plant has significant positive association with number seeds per capsule and test weight. Capsule length has significant positive association with number of seeds per capsule. Path coefficient analysis (Table 2) revealed that number of seeds per capsule, number of capsules per plant to be considered for realizing the improvement in yield. This indicates that, if other characters are held constant, improvement in these characters shall reflect in an increased seed yield. This is in accordance with the findings of Patil and Sheriff (1996); Tomar *et al*., (1999) and Thirumala Rao *et al*., (2013).

From the result of study it is concluded that effective selection for superior genotypes is possible by considering the characters *viz*, nnumber of capsules per plant, number of seeds per capsule and testweight.

Table 1: Genotypic correlation coefficients between different traits in Sesame

Traits	DF	DM	PH	NB	NCP	CL	NSC	TW	Grain Yield
Days to 50% flowering(DF)	1.0000	0.5067**	0.5444**	0.2849*	0.1206	-0.5164**	0.0679	-0.1820	0.1038
Days to maturity (DM)		1.0000	0.4122**	0.1205	0.0416	0.0997	0.0628	0.0622	0.0839
Plant height(PH)			1.0000	0.2451	0.3478*	-0.0685	0.5282**	-0.0120	0.3917**
Number of branches(NB)				1.0000	0.2484	0.0932	-0.0082	-0.2946*	0.2184
Number of capsules per plant(NCP)					1.0000	0.0130	0.3053*	0.3653**	0.9298**
Capsule length(CL)						1.0000	0.3423*	0.2407	0.0407
Number of seeds per capsule							1.0000	0.4156**	0.4309**
Test weight(TW)								1.0000	0.4137**

*, ** Significant at P=0.05 and P = 0.01 level respectively

Table 2. Direct (diagnol) and indirect effects of yield contributing characters in Sesame

Traits	DF	DM	PH	NB	NCP	CL	NSC	TW	Grain Yield
Days to 50% flowering(DF)	**-0.1777**	-0.0900	-0.0967	-0.0506	-0.0214	0.0918	-0.0121	0.0323	0.1038
Days to maturity(DM)	0.0692	**0.1365**	0.0563	0.0165	0.0057	0.0136	0.0086	0.0085	0.0839
Plant height(PH)	-0.0074	-0.0056	**-0.0136**	-0.0033	-0.0047	0.0009	-0.0072	0.0002	0.3917**
Number of branches(NB)	0.0194	0.0082	0.0167	**0.0679**	0.0169	0.0063	-0.0006	-0.0200	0.2184
Number of capsules per plant(NCP)	0.1034	0.0356	0.2980	0.2128	**0.8570**	0.0111	0.2616	0.3131	0.9298**
Capsule length(CL)	0.0862	-0.0166	0.0114	-0.0156	-0.0022	**-0.1670**	-0.0572	-0.0402	0.0407
Number of seeds per capsule	0.0154	0.0143	0.1200	-0.0019	0.0693	0.0778	**0.2271**	0.0944	0.4309**
Test weight(TW)	-0.0046	0.0016	-0.0003	-0.0075	0.0093	0.0061	0.0106	**0.0254**	0.4137**

Residual effect (G) = 0.3148 G=Genotypic

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