SHORT COMMUNICATION

Correlation Analysis for Seed Yield and its Related Attributes in Genotypes of Sesame (*Sesame indicum* L.)

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Abstract

The present study was conducted to determine the correlation coefficients among the seed yield and yield contributing characters in 65 genotypes of sesame. The seed yield per plant recorded significant and positive association with capsule length (cm), plant height (cm), number of capsules, number of seeds per capsules, 1000- seed weight (g) and oil content (%) at both phenotypic and genotypic levels. As per correlations analysis, it is concluded that, the selection for these characters can be helpful for improving the yield potential of sesame.

Keywords: Correlation, Character association, Sesame, Seed yield.

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Introduction

Sesame (*Sesamum indicum* L.) is one of the world's oldest spice and oilseed crop and it native to tropic and sub-tropic regions. It is known with various names such as Sesamum, til, gingelly, simsim, geralim etc. It belongs to Pedaliaceae family having chromosome number as 2n=26 and is annual, self-pollinated crop. Sesame is grown mainly for its seeds that contain approximately 50% oil and 25% protein. The presence of antioxidants (sesamolin and sesamol) makes the oil is highly resistant to oxidative deterioration even though oleic and linoleic acids are predominant fatty acids (about 80% of its total) of sesame oil. The present research was undertaken to study the correlation analysis in different 65 genotypes of sesame to get information regarding yield contributing characters and to develop a criterion for selection that could be effectively used for selecting the desirable genotypes or lines with high yield potential.

Materials and Methods

The experiment was laid out at oilseed research station, Latur. Total 65 diverse genotypes of sesame were included in present study. Those genotypes were evaluated in Randomized Block Design with two replications. Five randomly tagged plants from each genotype in each replication were selected to recording observation for seed yield and its component traits viz., capsule length (cm), capsule width(cm), plant height(cm), number of branches per plant, number of capsules per plant, number of seeds per capsule, 1000 seed weight (g), oil content (%), seed yield per plant (g). For days to 50% flowering and days to maturity the data was recorded on plot basis. The mean data were subjected to analysis of variance technique based on model proposed by Panse and Sukhatme (1978). Genotypic, phenotypic and environmental correlation coefficients, between pairs of characters were computed by the procedure of Falconer (1964). For this purpose, the data was subjected to covariance analysis.

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Results and Discussion

Breeding for high yield is the major objective in any crop improvement programme. Study of the association of yield components with yield is useful for choosing the characters, which have a definite role in influencing the yield and may aid in selection from the breeding material. The better understanding of the contribution of such traits in building up the genetic makeup of the crop may be obtained through correlation. Genotypic correlations in general were higher than phenotypic correlations. This may be due to the relative stability of genotypes as majority of them were subjected to certain amount of selection (Johnson *et al.,* 1955). The aim of correlation studies is primarily to know the suitability of various characters for indirect selection because selection on any particular trait may bring about undesirable changes in other associated characters. In the present investigation, correlation estimates obtained for total 11 yield and yield component characters of sesame are presented. The correlation between seed yield per plant with different yield and among the attributes themselves are presented in Table 1.

The character, days to 50% flowering had positive significant association with days to maturity and capsule length. This trait shown positive non-significant association with seed yield. The trait, days to maturity had positive significant association with days to 50% flowering, capsule length and plant height and

shown negative significant association with number of capsules per plant. Further seed yield shown negative non-significant association with this trait. Abate and Mekbib (2015) reported similar finding.

The trait, capsule length had positive significant association with days to flowering, days to maturity, capsule width, and number of seeds per capsule. Seed yield had positive significant association with this trait. This trait is an important character contributes for the seed yield and similar findings were reported by Gidey *et al.* (2012). Capsule width has positive significant correlation with capsule length and number of seeds per capsule and also exhibited positive significant association with seed yield. The trait plant height is an important character which majorly contributes for yield, which provides space for more

Table 1: Phenotypic (P) and Genotypic (G) correlation coefficients among yield attributes in 65 Sesame genotypes.

Characters		*DF 50%*	*DM*	*CL (cm)*	*CW (cm)*	*PH (cm)*	*NBP*	*NCP*	*NSC*	*1000 SW (g)*	*OC (%)*	*SYP (g)*
DF 50%	G	1.0000	0.6479**	0.2029*	0.0434	0.1708	-0.1128	0.0247	0.1629	-0.0217	0.1433	0.0434
	P	1.0000	0.6305**	0.1769*	0.0504	0.1373	-0.0870	-0.0393	0.1538	-0.0054	0.0979	0.0350
DM	G		1.0000	0.2204*	0.1203	0.3166**	0.0815	-0.2138	0.1353	-0.0039	0.0838	-0.1226
	P		1.0000	0.1995*	0.1160	0.2751**	0.0783	-0.2076	0.1160	-0.0120	0.0643	-0.1308
CL (cm)	G			1.0000	0.2720**	0.0597	-0.1412	-0.0835	0.6020**	0.1575	0.1127	0.2378**
	P			1.0000	0.2277**	0.548	-0.1300	-0.0640	0.5319**	0.1322	0.1025	0.2189*
CW (cm)	G				1.0000	-0.0043	-0.0646	-0.1538	0.4830**	0.0640	0.0372	0.0864
	P				1.0000	-0.0338	-0.0612	-0.0961	0.3685**	0.0508	0.0340	0.0843
PH (cm)	G					1.0000	0.5133**	0.3128**	0.0030	0.0273	0.1320	0.2225*
	P					1.0000	0.4726**	0.2832**	-0.0233	0.233	0.1241	0.1986*
NBP	G						1.0000	0.2232*	0.2762**	-0.0861	-0.0914	0.04111
	P						1.0000	0.2162	-0.2501**	-0.0678	-0.0884	0.0262
NCP	G							1.0000	-0.0875	0.2780**	0.3070**	0.8065**
	P							1.0000	-0.0975	0.2378**	0.2739**	0.7935**
NSC	G								1.0000	0.2548**	0.2412**	0.3726**
	P								1.0000	0.2864**	0.2164*	0.3812**
1000 SW (g)	G									1.0000	0.5885**	0.6578**
	P									1.0000	0.5512**	0.6437**
OC (%)	G	w									1.0000	0.5325**
	P										1.0000	0.4941**
SYP (g)	G											1.0000
	P											1.0000

* and ** Significant at 5 % and 1 % levels, respectively.
DF 50%= Days to 50% flowering, DM= Days to maturity, CL (cm) = Capsule length, CW (cm) = Capsule width, PH (cm) = Plant height, NBP = Number of branches per plant, NCP = Number of capsules per plant, NSC = Number of seeds per capsule, 1000 SW (g) = 1000 seed weight, OC (%) = Oil content, SYP (g) = Seed yield per plant.

number of capsules and this is an additive character. This trait shown positive significant association with days to maturity, number of branches, number of capsules and seed yield. The similar result reported by Vanishree *et al.* (2013) and Bharathi *et al.* (2015).

The trait, No. of branches per plant shown positive significant association with plant height, number of capsules and exhibited negative significant association with number of seeds per capsules. For seed yield per plant this trait exhibited non-significant association. These results are in harmony with Shekawat *et al.* (2013). The trait, number of capsules per plant showed positive significant association with plant height, number of branches, 1000-seed weight, oil content and seed yield. Number of capsules directly contributes for seed yield. Similar track of results is reported by Vanishree *et al.* (2013) and Bharathi *et al.* (2015). This trait directly contributes towards the seed yield and this trait shown positive significant association with capsule length, capsule width, 1000-seed weight, oil content and seed yield. These results are in accordance with Tripathy *et al.* (2016). The 1000-seed weight exhibited high positive significant association with seed yield, oil content, number of seeds per capsule and number of capsules per plant. The oil content important economic character in sesame. This trait shown high positive significant association with 1000-seed weight, number of seeds per capsule, number of capsules per plant and seed yield. The similar results are reported by Pawar *et al.* (2002) and Babu *et al.* (2004).

The seed yield exhibited positive significant correlation with capsule length, plant height, number of capsules per plant, number of seed per capsule, 1000 seed weight and oil content at both genotypic and phenotypic levels. According to Newall and Eberhart (1961) when two characters show negative phenotypic and genotypic correlation it would be difficult to exercise simultaneous selection for these characters in the development of a variety. Hence, under such situations, judicious selection programme might be formulated for simultaneous improvement of such important developmental and component characters. Similar findings were observed by Thirumala Rao *et al.* (2013) and Bharathi *et al.* (2015) for number of capsules, number of seeds and 1000- seed weight, Abate and Mekbib (2015) and Bharathi *et al.* (2015) for capsule length and plant height and Pawar *et al,* (2002) for oil content.

Character association between the characters show phenomenon of correlated response. The genetic factors responsible for correlated response are linkage and pleiotropy. Magnitude of correlation due to pleiotropy depends upon the direction of their effects. The present investigation shows that 1000-seed weight (g) and oil content are positively correlated with each other and correlated with seed yield, this may be due to pleiotropy. But for some correlations one character was correlated with yield and other was not correlated with yield. This led to the association among the different characters mostly due to linkage and not due to pleiotropy. These were supported by the fact that the genetic variability parameters for some of the characters correlated with yield were not of same magnitude as that of yield (Mallikarjun *et al.,* 2003). Capsule width is not significantly correlated with yield, but this trait recorded positive association with capsule length and number of seed per capsule. Association of these characters may be due to linkage. If genes controlling different traits are tightly linked, selection of one trait may automatically favour the other linked traits, and correlated response is inevitable. However, unfavourable negative correlations can be broken by repeated hybridization between random individuals or more preferably selected ones. Bi-parental mating in selected segregants tends to achieve this goal with remarkable rapidity.

Conclusion

The presented investigation revealed that, the seed yield per plant recorded significant and positive association with capsule length (cm), plant height (cm), number of capsules, number of seeds per capsules, 1000- seed weight (g) and oil content (%) at both phenotypic and genotypic levels. Based on the magnitude of correlation coefficient values, capsules per plant, seeds per capsule and 1000-seed weight may be regarded as very closely related characters with respect to seed yield per plant. Hence, higher yield could be obtained by exerting selection pressure over any of these traits.

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