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CHARACTERS ASSOCIATION STUDIES FOR A NOVEL BREEDING PROGRAM IN SESAME (*SESAMUM INDICUM*)

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ABSTRACT

In the present investigation, an attempt was made to analyze the genetic variability and correlation for 39 sesame genotypes *viz*., Swetha, Madhavi, Thilothama, TC-289, N-32, PKDS-11, JLT-7, Thilathora, TKG-22, RT-103, Punjab Till-1, RT6, G. Till-1, RT-54, Tarun, JLT-26, Uma, Chantana, RT -127, ORM-17, Paiyur 1, ORM-14, VRI-2, DS-5, ORM-7, GBT-2, DSS-9, VRI-11, TMV3, TMV-4, TMV-5, TMV-6, TMV-7, TVS-0603, E-8, TVS-14-1, SVPR-1, GPGT-2 and Prathi. The observations were recorded on various quantitative characters *viz*., days to 50 per cent flowering, days to maturity, plant height, number of branches per plant, number of capsules per plant, no of seeds per capsule, capsule length, capsule breadth, 1000 seed weight and seed yield per plant. The data recorded were subjected to genotypic correlation studies. Handling of genotypes is very important in a breeding programme as it serves as a prime source to understand the genetic variation present in the variable population, fixing desirable characters and to study the nature of relationship between yield and yield component traits in the early generations are of great value for crop improvement.

Key words : Crop improvement, Novel breeding program, sesame, genetic variability.

Introduction

Sesame (*Sesamum indicum* L.), a crop from the family Pedaliaceae is the most ancient oilseed crop dating back to 3500 B.C. Sesame has many species and more wild species are in the genus. Sesame is considered to be a self-pollinating crop, but varying degrees (5 to 60%) of cross pollination occur depending on insect activity, environmental conditions and availability of other vegetation (Yermamos, 1980). Therefore, it is considered as the often cross pollinated crop.

Sesamum is native to sub- Saharan Africa; However, the cultivated sesame originated in India. It is widely cultivated in many parts of the World, primarily in tropical and subtropical areas and recently in semi-arid regions (Elleuch *et al*., 2007). Sesame being drought tolerant crop grows well in well drained soils of various agro climatic regions during *kharif*, *spring*/*summer* seasons in North India and in all seasons in South India. Sesame has been called a survivor crop having varieties well adapted to many soil types. It thrives best on well-drained, fertile soils of medium texture and neutral pH. However, the crop is susceptible to soils with high salt and water-logged conditions.

It had earned a poetic table “Queen of Oilseeds” because seeds possess high quality poly-unsaturated stable fatty acids, which offer resistance to rancidity. In addition, chlorosesamone an active principle derived from root extracts of sesame has been proved to have antifungal properties (Hassan *et al*., 2000).

Sesame seeds are highly nutritive and contain 50 to 60 per cent oil, 25% protein and 15% carbohydrate and also some chemicals like lignans, pinoresinol and lariciresinol. Sesame oil is highly stable due to the presence of antioxidants such as sesamin and sesamolin (Nupur *et al*., 2010). They are used in the preparation of number of food products and confectioneries and are found in many salads and baked snacks. Sesame oil is mainly used as cooking oil. It is also used in salad for marinating meat and vegetables and manufacturing of paints, soaps, perfumes and insecticides (Bedigian, 2003). Refined sesame oil is used in pharmaceuticals and cosmetic products. It is known to be used for massaging, health treatment as laxative and to promote menstruation. De-oiled cake and meal of sesame are used as livestock feed. Owing to high nutritive value, sesame seeds are added as food ingredients in bread, cakes, cookies, margarine and other confectioneries (Iman *et al*., 2011).

In this context, correlation is an important tool to measure the direction and the strength of relationship of different component characters on seed yield. Correlation analysis provides information about yield components and thus helps in the selection of superior genotypes from diverse genetic populations (Dewey and Lu, 1959).

Materials and Methods

The present investigation was carried out in the Department of Plant Breeding and Genetics, Research farm, Adhiparasakthi Agricultural College, Kalavai Vellore District (Tamil Nadu), India with the objective of studying correlation analysis in Sesame. Genotypes for this study were obtained from Regional research station, Virudhachalam and Oil Seed Research Station, Tindivanam. The Experiment was laid out a Randomized Block Design (RBD) with two replications. Each Genotype was sown in two rows with a row to row spacing of 30cm and plant to plant spacing of 10cm. Thirty nine genotypes *viz*., Swetha, Madhavi, Thilothama, TC-289, N-32P KDS-11, JLT 7, Thilathora, TKG-22, RT-103, PunjabTill-1, RT6, Till-1, RT-54, Tarun, JLT26, Uma, Chantana, RT -127, ORM 17, Paiyur1, ORM-14, VRI-2, TMV-5, TMV3, DS-5, ORM-7, GBT-2, DSS-9, VRI-11, TMV-7, TMV-4, TVS 0603, TMV-6, E-8, TVS-14-1, SVPR-1, GPGT-2 and Prathi were tested for correlation studies. The observations were recorded on various quantitative characters *viz*., Days to 50 per cent flowering, Days to Maturity, Plant height, Number of branches per plant, Number of capsules per plant, No of seeds per capsule, Capsule length, Capsule breadth, 1000 seed weight and seed yield per plant. The data recorded were subjected to genotypic correlation studies suggested by Goulden (1952).

Results

Grain yield is a complex character influenced by a large number of other component characters. A knowledge of the association between grain yield and other biometrical traits and also among the component traits helps in improving the efficiency of selection. This idea about the nature of association will be useful to identify the key characters for which selection can be fruitfully made. Correlation studies provide information on the nature and extent of association between any two metric traits and it would be possible to bring about genetic upgradation in one trait by selection of the other of a pair.

The genotypic correlation coefficients for yield and yield components and inter correlations among yield components were computed for 39 sesame genotypes and the results are presented in Table 1. In the present study, the genotypic correlation coefficient was worked out and results are discussed here under:

Direct correlation of yield with yield components

Positive and significant correlation was observed for capsule breadth (0.776), number of capsules per plant (0.656) and number of branches per plant (0.559). Negative and significant correlation was recorded in days to 50 per cent flowering (-0.631).

Indirect correlation for yield and yield components

Days to 50 per cent flowering had positive inter correlation with capsule breadth (0.686), number of branches per plant (0.616) and number of capsules per plant (0.548). Days to maturity had negative intercorrelation with seed yield (-0.631).

Plant height had positive intercorrelation with number of capsules per plant (0.879), number of branches per plant (0.856) and capsule breadth (0.587).

Number of branches per plant had positive inter correlation with 1000 seed weight (0.586), seed yield per plant (0.559), number of seeds per capsule (0.553) and it had negative intercorrelation with capsule length (-0.630).

Number of capsules per plant had positive inter correlation with capsule breadth had positive inter correlation with seed yield per plant (0.776), seed yield (0.656) and 1000 seed weight (0.590). Number of seeds per capsule had negative intercorrelation with capsule breadth (-0.624).

Discussion

Positive and significant correlation was observed in capsule breadth, number of branches per plant, number of capsules per plant (Parimala and Mathar, 2006; Abdou

Table 1 : Genotypic correlation coefficient for thirty-nine sesame genotypes.

	DFF	DM	PH	NBP	NCP	NSPC	CL	CB	TGW	SPY
DFF	1	-0.044	0.440	0.616*	0.548*	0.017	-0.482	0.686*	0.36	0.486
DM		1	-0.003	-0.05	0.099	0.161	0.164	-0.294	-0.122	-0.631*
PH			1	0.856**	0.879**	-0.158	-0.006	0.587*	0.411	0.385
NBP				1	0.033	0.553*	-0.630*	0.357	0.586*	0.559*
NCP					1	0.102	-0.272	0.301	0.590*	0.656*
NSPC						1	0.215	-0.624*	0.332	-0.152
CL							1	0.313	0.038	-0.345
CB								1	-0.281	0.776**
TGW									1	0.288
SPY										1

Note: * Significant at 5% level, DFF - Days to 50% flowering, PH - Plant height, NBP - Number of branches per plant, NCP - Number of clusters per plant, NPP - Number of pods per plant, PL - Pod length, NSP - Number of seeds per pod, DM - Days to maturity, HSW - Hundred seed weight, and SPY - Single plant yield.

et al., 2015; Iqbal *et al*., 2016; Yol *et al*. 2010; Sumathi and Muralidharan, 2010; Gangadhara *et al*., 2012). Thus, selection of any of these characters would lead to the improvement of seed yield per plant. Negative and significant correlation was recorded in days to 50 percent flowering. Ukaan and Ogbonna *et al*. (2012) and Swapan *et al*. (2016) reported the similar results.

Days to 50 per cent flowering had positive inter correlation with number of branches per plant, number of capsules per plant and capsule breadth. This result was agreed with those results reported by Thiyagu *et al*. (2007).

Days to maturity had negative intercorrelation with seed yield. This was in agreement with the results of Thiyagu *et al*. (2007). Plant height had positive inter correlation with number of branches per plant, number of capsules per plant and capsule breadth. This result was in agreement with those results reported by Ercan *et al*. (2002), Sumathi *et al*. (2007).

Number of branches per plant had positive inter correlation with number of seeds per capsule and 1000 seed weight. Seed yield per plant it had negative intercorrelation with capsule length (Laghari *et al*. (2016) Gangadhara *et al*. (2012). Number of capsules per plant had positive inter correlation with 1000 seed weight and seed yield. Number of seeds per capsule had negative intercorrelation with capsule breadth. Capsule breadth had positive inter correlation with seed yield per plant (Ibrahim and Khidir, 2012).

Conclusion

Positive and significant correlation was observed in Capsule breadth, Number of branches per plant, Number of capsules per plant. Negative and significant correlation was recorded in Days to fifty per cent flowering. Thus the selection of any of these characters would lead to the improvement of seed yield per plant.

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