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Genetic Variability, Heritability and Genetic Advance for Seed Yield and its Components in Sesame (*Sesamum Indicum* L.)

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ABSTRACT

An Investigation Was Carried Out To Assess The Variability, Heritability And Genetic Advance For Nine 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 In 23 Genotypes (Five Lines, Three Testers And Fifteen Hybrids). The Results Revealed That High PCV And GCV Were Observed For The Character Seed Yield Per Plant. High Heritability Accompanied With High Genetic Advance Had Shown By The Characters Viz., Number Of Primary Branches Per Plant, Number Of Capsules Per Plant, Number Of Seeds Per Capsule, 1000-Seed Weight And Seed Yield Per Plant Indicating The Preponderance Of Additive Gene Action Which May Be Exploited Through Simple Selection Procedures.

Key words : Genetic Advance, Heritability, Sesame, Variability.

The success of any breeding programme depends upon the quantum of genetic variability present in the population. Wider range of genetic variability helps in selecting desired genotypes. In addition to the genetic variability, knowledge on heritability and genetic advance helps the breeder to employ the suitable breeding strategy. Th erefore, it is necessary to have knowledge of genetic variability, heritability and genetic advance present in the available genetic material.

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 randomized block design with three replications. Observations were recorded on ten 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. The data were subjected to statistical analysis and various genetic parameters such as pcv, gcv, heritability and genetic advance were worked out as per johnson *et al.* (1955) and hanson (1963).

RESULTS AND DISCUSSION

The analysis of variance revealed significant differences among all the 23 genotypes for all the characters studied, indicating a high degree of variability in the material (Table 1). In the present study, the variation among genotypes was estimated as coefficient of variation (Table 2). The phenotypic coefficient of variance (pcv) was slightly higher in magnitude than genotypic coefficient of variance (gcv) for all the characters studied indicating the influence of environment on expression of these traits. Highest pcv and gcv (27.34 and 23.85) was exhibited by seed yield per plant, whereas lowest pcv and gcv (2.46 and 1.85) was recorded by days to maturity. These results were in accordance with the findings of sumathi and muralidharan (2010) and nayak *et al.* (2011). Moderate pcv and gcv was recorded for number of primary branches per plant, number of seeds per capsule, number of capsules per plant and 1000-seed weight. While plant height, days to 50% flowering and oil content exhibited low pcv and gcv. This indicate that there is considerable amount of variability for majority of the characters studied.

Heritability estimates were high for days to 50% flowering, plant height, number of primary branches per plant, number of capsules per plant, number of seeds per capsule, 1000-seed weight

Table 1. Analysis Of Variance For Yield And Yield Component Characters In Sesame (*Sesamum Indicum* L.).

Source Of Variations	D.F.	Days to 50% Flowering	Days to Maturity	Plant Height (cm)	No. of Primary Branches Per Plant	No. of Capsules Per Plant	No. of Seeds Per Capsule	1000-Seed Weight (g)	Oil Content (%)	Seed Yield Per Plant (g)
Replications	2	4.710	2.840	18.648	0.055	10.453	7.468	0.021	4.771	1.684
Entries	22	37.447**	8.838**	231.194**	1.240**	339.217**	519.30	0.297**	9.824**	28.177**
Error	44	2.589	1.810	11.556	0.025	9.295	10.593	0.008	2.877	2.668

* Significant At 5% Level ** Significant At 1% Level

Table 2. Estimates Of Variability, Heritability And Genetic Advance As Per Cent Of Mean For Seed Yield And Yield Components In Sesame (*Sesamum Indicum* L.)

S. No.	Character	Mean	Range		Coefficient of Variation		Heritability (Broad Sense)	Genetic Advance As Per Cent Of Mean
			Minimum	Maximum	PCV (%)	GCV (%)		
1.	Days to 50% Flowering	40.80	34.67	46.67	9.24	8.36	81.78	15.56
2.	Days to Maturity	82.94	81.00	88.67	2.46	1.85	56.41	2.86
3.	Plant Height (cm)	93.66	77.17	108.23	9.83	9.14	86.37	17.49
4.	No. of Primary Branches Per Plant	3.29	2.57	4.70	19.93	19.35	94.27	38.70
5.	No. of Capsules Per Plant	65.89	50.70	91.67	16.58	15.92	92.21	31.49
6.	No. of Seeds Per Capsule	76.98	54.03	92.60	17.44	16.92	94.12	33.81
7.	1000-Seed Weight (g)	2.79	2.33	3.21	11.57	11.15	92.77	22.11
8.	Oil Content (%)	45.01	41.85	48.24	5.06	3.38	44.60	4.65
9.	Seed Yield Per Plant (g)	12.23	7.41	17.68	27.34	23.85	76.11	42.87

PCV = Phenotypic Coefficient of Variation GCV = Genotypic Coefficient of Variation

and seed yield per plant. Similar results were obtained by sumathi and muralidharan (2010). The maximum value for heritability was recorded by number of primary branches per plant (94.27%) and minimum was recorded by oil content (44.60%).

Heritability estimates along with genetic advance are more helpful in predicting the gain under selection than heritability estimates alone. The estimates of heritability and genetic advance as per cent of mean were high for number primary branches per plant, number of capsules per plant, number of seeds per capsule, 1000-seed weight and seed yield per plant indicating that these characters were less influenced by environment and governed by additive gene action which may be exploited through simple selection procedures. These findings were in agreement with sudhakar *et al.* (2007).

High heritability coupled with moderate genetic advance as per cent of mean was observed for plant height and days to 50% flowering indicating the role of both additive and non-additive gene actions in the inheritance of these traits and improvement can be brought about using breeding methods like diallel selective mating or bi-parental mating followed by selection in advanced generation. Whereas days to maturity and oil

content expressed moderate heritability accompanied with low genetic advance indicating these traits are governed by non-additive gene action with little influence of environment in its inheritance. The traits controlled by non-additive gene action can be improved by selection and intermating among selected ones in early generation followed by reselection.

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