



Variability Studies in Sesame (*Sesamum indicum* L.)

G Pavani, S V S Gangadhara Rao, V Saida Naik and G Ramesh

Department of Genetics and Plant Breeding, Agricultural College, Naira 532 185, Andhra Pradesh

ABSTRACT

Fifty sesame germplasm lines were evaluated for genetic variability, heritability and genetic advance as per cent of mean based on 10 characters. In general the genotypic coefficient of variation observed was less than phenotypic coefficient of variation for all 10 quantitative characters, revealing the masking effect of environment. High heritability coupled with high genetic advance as per cent of mean was observed for days to 50% flowering, plant height (cm), number of branches plant⁻¹, number of seeds capsule⁻¹ and seed yield plant⁻¹ (g) indicating the role of additive gene action in governing the inheritance of these traits which can be improved by simple selection. However, high heritability coupled with low genetic advance was observed for capsule length (cm).

Key words : Sesame, Heritability, Variability parameters.

Sesame is one of the important oil seed crops grown in India and world since ancient times. It possess an oil content from 40-54% and protein content at 25%. The oil contains antioxidants *viz.*, *sesamin* and *sesamolin* which prevent the oxidative rancidity and increase the shelf life. The phytosterols present in the oil will give immunity to the body and the vitamin 'E' present is a good source for skin nourishment. In India it is grown in 16.66 lakh ha with a production of 6.75 lakh tonnes. For the improvement of yield and its contributing characters, the presence of genetic variability is quite essential, hence an attempt was made to know the genetic variability in 50 sesame genotypes.

MATERIALS AND METHODS

The present study was carried out with 50 sesame genotypes obtained from different research centres across the country and evaluated in randomized block design with three replications at Agricultural Research Station, Yelamanchili, Visakhapatnam district during *Rabi* 2014-2015. The plot size adapted is three rows each of four meter length in each replication with a spacing of 30 cm between the rows and 15 cm between the plants. The observations were recorded on five randomly selected plants from each genotype in three replications for characters *viz.*, plant height (cm), number of branches plant⁻¹, number of capsules plant⁻¹, capsule length (cm), number of seeds

capsule⁻¹ and seed yield plant⁻¹ (g). Days to 50 % flowering, days to maturity, 1000 seed weight (g) and oil per cent were recorded on plot basis. The oil per cent of the genotypes was estimated by using Nuclear Magnetic Resonance Spectrophotometer (NMR) at Main Agricultural Research Station (MARS), University of Agricultural Sciences (UAS), Raichur, Karnataka. The data was statistically analyzed to estimate phenotypic and genotypic coefficients of variation (PCV and GCV) according to Burton (1952). Heritability in broad sense was estimated as per formula given by Allard (1960) and the genetic advance as per cent of mean as suggested by Johnson *et al.* (1955) and Robinson (1966).

RESULTS AND DISCUSSION

Significant differences were present among the genotypes for all the characters studied. The GCV, PCV, heritability and genetic advance as per cent of mean were given in the Table 1.

Even though, PCV was found to be higher than GCV for all the characters, but a very little difference between PCV and GCV was noticed for characters *viz.*, days to 50% flowering, capsule length (cm), number of seeds capsule⁻¹, 1000 seed weight (g), oil per cent indicating that these characters were less effected by environment and selection could be effective for further improvement of these traits. High PCV and GCV were observed

Table 1. Mean, genetic variability, heritability (broad sense) 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 (at 5% level)
			Minimum	Maximum	PCV (%)	GCV (%)		
1	Days to 50% flowering	41.76	33.67	49.33	13.39	13.25	97.90	27.02
2	Plant height (cm)	70.13	50.47	89.33	16.62	15.03	81.70	27.98
3	Number of branches/plant	4.43	2.00	6.00	21.80	18.22	69.90	31.37
4	Number of capsules /plant	82.64	69.00	119.00	14.23	11.64	66.90	19.61
5	Capsule length (cm)	2.45	2.20	2.73	5.96	5.12	73.70	9.05
6	Number of seeds per capsule	47.29	35.00	62.33	14.18	13.82	94.90	27.73
7	1000 seed weight (g)	2.29	1.78	2.78	8.74	8.10	85.90	15.46
8	Days to maturity	83.56	81.33	87.00	2.38	1.64	47.70	2.34
9	Seed yield / plant (g)	8.08	4.41	14.24	28.17	26.41	87.90	51.01
10	Oil percent	48.05	44.90	49.90	3.08	2.34	57.70	3.66

PCV = Phenotypic coefficient of variation

GCV = Genotypic coefficient of variation

for the character seed yield plant⁻¹ while, low PCV and GCV were observed for capsule length (cm), 1000 seed weight (g), days to maturity and oil per cent. However, high PCV and GCV for seed yield plant⁻¹ was reported by Narayanan and Murugan (2013), but low PCV and GCV for 1000 seed weight (g) and oil per cent was reported by Jhansi Rani and Rama Kumar (2013).

High PCV and moderate GCV was observed for the character number of branches plant⁻¹ while, moderate PCV and moderate GCV were observed for days to 50% flowering, plant height (cm), number of capsules plant⁻¹ and number of seeds capsule⁻¹. Moderate PCV and moderate GCV for number of seeds capsule⁻¹ was also reported by Bhavya and Gangadhara Rao (2014).

High heritability coupled with high genetic advance as per cent of mean was observed for days to 50% flowering, plant height (cm), number of branches plant⁻¹, number of seeds capsule⁻¹ and seed yield plant⁻¹ (g) indicating the role of additive gene action in governing the inheritance of these traits which can be improved by simple selection. However, high heritability coupled with low genetic advance as per cent of mean was observed for capsule length (cm) indicating non additive gene

action and thus, hybridization followed by selection is useful, for this trait improvement.

High heritability coupled with high genetic advance as per cent of mean for number of branches plant⁻¹, number of seeds capsule⁻¹ and seed yield plant⁻¹ (g) was also reported by Bhavya and Gangadhara Rao (2014). Shekhawat *et al.* (2013) and Jadhav and Mohrir (2012) also reported high heritability coupled with high genetic advance as per cent of mean for plant height (cm) and seed yield plant⁻¹ (g). High heritability coupled with high genetic advance as per cent of mean for number of branches plant⁻¹ and seed yield plant⁻¹ (g) was also reported by Narayanan and Murugan (2013).

High heritability coupled with moderate genetic advance as percent of mean was recorded for number of capsules plant⁻¹ and 1000 seed weight (g) while moderate heritability coupled with low genetic advance was observed for days to maturity and oil per cent. High heritability coupled with moderate genetic advance as per cent of mean for 1000 seed weight (g) was also reported by Bhavya and Gangadhara Rao (2014). Moderate heritability coupled with low genetic advance for days to maturity and oil per cent was also reported by Vijaya Durga *et al.* (2014).

LITERATURE CITED

- Allard R W 1960** *Principles of Plant Breeding*. John Wiley and Sons Inc., New York. 145-147.
- Bhavya K and Gangadhara Rao S V S 2014** Variability studies in sesame (*Sesamum indicum* L.). *The Andhra Agricultural Journal*, 61(1): 67-69.
- Burton G W 1952** Quantitative inheritance in grasses. Proceedings of 6th International Grassland Congress. 1: 277-283.
- Jadhav R S and Mohir M N 2012** Genetic variability studies for quantitative traits in sesame (*Sesamum indicum* L.). *Electronic Journal of Plant Breeding*, 3 (4): 1009-1011.
- Jhansi Rani P and Rama Kumar P V 2013** Genetic parameters of yield and yield components pooled over environments in sesame (*Sesamum indicum* L.). *Biolife*, 1(4): 231-234.
- Johnson H W, Robinson H F and Comstock R E 1955** Estimates of genetic and environmental variability in soybean. *Agronomy Journal*, 47: 314-318.
- Narayanan R and Murugan S 2013** Studies on variability and heritability in sesame (*Sesamum indicum* L.). *International Journal of Current Agricultural Research*, 2(11): 52-55.
- Robinson H H 1966** Quantitative genetics in relation to breeding on the centennial of medalism. *Indian Journal of Genetics*, 26: 171-187.
- Shekhawat R S, Meena S K and Bhuri Singh 2013** Genetic divergence analysis in sesame. *Indian Research Journal of Genetics and Biotechnology*. 5(2): 105-110.
- Vijaya Durga G., Ratna Babu D, Lal Ahamed M and Srinivasa Rao V 2014** Genetic variability, heritability and genetic advance for seed yield and its components in sesame (*Sesamum indicum* L.). *The Andhra Agricultural Journal*, 61(2): 301-303.

(Received on 30.06.2015 and revised on 01.02.2016)