

GENETIC VARIABILITY IN SESAME (SESAMUM INDICUM.L.)^{*}

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ABSTRACT

Sixty seven genotypes of sesame of indigenous and exotic origin were studied for their genetic potentialities. Twelve characters were considered for their genetic variability, heritability and genetic advance. Seed yield, capsules on primaries, capsules on secondaries and number of secondaries recorded high GCV value, heritability estimate and genetic advance. Due importance might be given in selection programme to these characters.

KEY WORDS : Sesame, Variability

A critical estimate of genetic variability is a prerequisite for initiating appropriate breeding procedures in crop improvement programme. Since many characters of economic importance are highly influenced by environmental conditions, the improvement of a crop mainly depends upon the amount, nature and magnitude of genotypic variability present in the population. Hence, an attempt was made to gather information on genetic variability in 67 genotypes of sesame for twelve characters.

MATERIALS AND METHODS

The experiment comprising of 67 genotypes having diverse origin was laid out in randomized block design with three replications at the School of Genetics, Tamil Nadu Agricultural University, Coimbatore during summer, 1981. Each plot consisted of single row with a spacing of 45x30 cm. Data on five randomly selected plants from each row were recorded for twelve characters. Phenotypic variance, genotypic variance, GCV, PCV, heritability, genetic advance and genetic advance as per cent of mean were computed as per standard methods (Panse and Sukhatme, 1961; Lush, 1940; Burton, 1952 and Johnson *et al.* 1955).

RESULTS AND DISCUSSION

The analysis of variance indicated that the difference between the genotypes in respect of all the characters studied were significant. The characters capsules on secondaries, number of secondaries, seed yield and capsules on primaries showed high PCV and GCV estimates. This suggests that the selection based on these characters would facilitate successful isolation of desirable types. Similar findings were earlier reported for number of secondaries, capsule per plant and seed yield by Govindas (1975), for seed yield, branches per plant and capsules per plant by Tilak Raj Gupta (1975) and for number of branches by Kandaswamy (1985).

A comparison of differences between PCV and GCV estimates showed a wide difference in respect of capsules on main stem, seed yield and capsules on secondaries, due to the larger influence of environment on these characters. The estimates of PCV and GCV for days to maturity, days to flowering, 1000-seed weight and capsules on primaries showed very little difference, indicating the greater role of genetic factors influencing the expression of these traits offering ample scope for improvement. A similar trend has

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Table 1. Range, mean, variance, coefficient of variation, heritability, genetic advance and genetic advance as per cent of mean for twelve characters in sesame.

Characters	Range of mean	Grand mean	Phenotypic variance	Genotypic variance	PCV	GCV	PCV-GCV	Heritability (per cent)	Genetic advance	Genetic advance as % of mean
Plant height	56.40-147.07	109.80	200.94	169.28	12.91	11.85	1.06	84.25	24.60	22.40
Number of primaries	2.40-10.53	6.80	3.08	2.74	25.82	24.37	1.45	89.09	3.22	47.35
Number of secondaries	0.87-14.27	6.30	6.46	6.04	40.35	39.01	1.34	93.48	4.89	77.62
First pod bearing node	4.33-10.53	7.36	2.12	1.77	19.80	18.10	1.70	83.59	2.51	34.10
Capsule on stem	14.27-31.73	22.99	26.27	12.23	22.30	15.21	7.09	46.54	4.91	21.35
Capsule on Primaries	16.77-95.33	60.66	337.70	316.36	30.30	29.32	0.98	93.67	35.46	58.46
Capsule on secondaries	7.00-56.93	29.30	155.59	139.31	42.57	40.28	2.29	89.54	23.01	78.53
Capsule length	2.22-3.23	2.69	0.04	0.03	7.88	6.37	1.51	65.39	0.29	10.78
1000-Seed weight	2.55-4.94	3.74	0.22	0.20	12.52	11.91	0.61	90.50	0.87	23.26
Days to flowering	30.00-49.67	39.05	23.49	22.77	12.41	12.22	0.19	96.97	9.68	24.79
Days to maturity	68.00-98.67	86.03	30.03	29.23	6.37	6.28	0.09	97.35	10.99	12.77
Seed yield	4.85-20.42	11.89	17.31	14.93	34.98	32.49	2.49	86.25	7.39	62.15

been reported for capsule number per plant and plant height by Sanjeeviah and Joshi (1974) and for plant height alone by Murugesan *et al.* (1979).

The GCV alone is not sufficient for the determination of amount of heritable variation. Burton (1952) suggested that GCV together with heritability estimates would give the best picture of the extent of advance to be expected by selection. In the present investigation high heritability was observed for all the characters except capsules on main stem and capsule length, which is in consonance with the results of Govindadas (1975). Chaudhary *et al.*,

(1977), Gupta and Gupta (1977) and Kandaswamy (1985). Apart from showing high heritability estimates, the characters capsules on primaries, number of secondaries, capsules on secondaries and seed yield showed high GCV estimates, thereby pointing to the improvement of these characters through simple mass selection.

High heritability indicates that effectiveness of selection for phenotypic performance is good, but it does not necessarily mean a high genetic gain for a particular character. However, high heritability estimates along with high

genetic gain render the selection effective (Johnson *et al*, 1955). The genetic advance as per cent of mean was found to be maximum for capsules on secondaries, number of secondaries, seed yield and capsules on primaries. These characters also recorded high heritability estimates. This situation shows that genotypic variance for these characters is probably owing to high additive gene effect (Johnson *et al.*, 1955). This confirms the findings of Gupta and Gupta (1977), Paramasivam and Prasad (1981) and Kandaswamy (1985). Low heritability combined with low genetic advance as per cent of mean was noted for capsules on main stem and capsule length. It indicates that the scope for improving these characters through selection is very much limited and this may be attributed to the non-additive gene effects on these traits (Johnson *et al.*, 1955). A similar result has been reported for capsule length by Govindadas (1975). The characters, 1000 seed weight, days to flowering and days to maturity showed high heritability estimates but moderate to low genetic advance, rendering them unsuitable for improvement through selection. This confirms that high heritability alone does not signify an increased genetic advance.

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