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Estimation of Variability Parameters For Some Quantitative Characters in Sesame (*Sesamum Indicum* L.)

Key words : Estimation, Parameters and Variability.

Crop improvement in sesamum has been practiced for a long time. Yet, a major breakthrough could not be made in realizing high yields in sesame varieties. One of the reasons attributed has been that there is limited genetic variability in the source material, which is a pre-requisite for initiating any breeding programme. Knowledge on variability is important in the selection of superior plant types. Information on nature and magnitude of genetic variability present in a population due to genetic and non-genetic causes is an important pre-requisite for a systematic breeding programme to improve the potential of genotypes.

The study included fourteen diverse sesame genotypes crossed in half-diallel fashion to generate 91 F_1s. The parents along with the crosses were evaluated in four environments Bapatla (*kharif*), Bapatla (*rabi*), Peddapuram (*kharif*) and Peddapuram (*rabi*). Each parent and hybrids were raised in two rows of 2 meters length with an inter row spacing of 20 cm and 10 cm between plants adopting Randomized Block Design (RBD) with three replications. A future dose of 20 Kg N, 40 Kg P_2O_5 and 20 Kg K_2O ha^{-1} was applied. Irrigation, weeding and plant protection operations were taken up as and when needed during the crop growth uniformly in all the replications. Observations were recorded on ten randomly selected plants of each genotype of each replication for nine quantitative characters *viz.,* days to 50% flowering, plant height, number of primary branches, number of secondary branches, number of seeds/capsule, 1000 seed weight, oil content and seed yield per plant. Percentage of oil content in the genotypes was estimated by NMR (Nuclear Magnetic Resonance). Genotypic and phenotypic coefficients of variation were calculated according to the method suggested by Burton (1952). Heritability estimates were obtained following the method of Lush (1940) and the genetic advance was calculated by the formula given by Allard (1960).

Analysis of variance indicated highly significant mean sum of squares for all the traits studied in pooled environments. This implies that characters under study vary significantly indicating the genetic differences between the genotypes.

Phenotypic coefficient of variation ranged from 3.85 to 51.82% (Table1). Highest PCV was recorded by number of secondary branches followed by seed yield per plant. The lowest was recorded by oil content. Genotypic coefficient of variation ranged from 3.80 to 51.08%. Highest GCV was recorded by number of secondary branches followed by seed yield per plant while the lowest was recorded by oil content. High variability for seed yield per plant was also corroborated by Chandra Mohan (2011) and Gangadhara Rao (2011). The presence of a narrow gap between phenotypic coefficient of variation and genotypic coefficient of variation for all the traits under study except 1000 seed weight implicated that expression of these characters had low environmental influence and are amenable for simple selection in crop improvement programmes.

All the nine characters had exhibited high heritability. The maximum value was recorded by oil content (97.35%) (Table1). High heritability for all the characters was also reported by Senthil Kumar and Sasivannan (2006), while high heritability for number of secondary branches was affirmed by Singh *et al.* (2000). Genetic advance was high for number of capsules/plant (66.26%), seed yield per plant (56.75%), number of primary branches (54.84%), number of seeds/capsule (49.42%) and plant height (38.52%). Moderate genetic advance as per cent of mean was recorded by number of secondary branches (10.37%) while

low genetic advance as per cent of mean was recorded by days to 50% flowering (6.75%) and oil content (7.73%).

Heritability is a measure of genetic relationship between parents and progeny. High heritability alone is not sufficient enough to exercise selection unless the information is accompanied with substantial amount of genetic advance. Thus genetic advance is another important selection parameter. Johanson *et al.* (1955) pointed out that without genetic advance the estimate of heritability would not be of practical importance in selection based on phenotypic appearance. They further emphasized that the genetic gain should be considered along with heritability in streamlining coherent selection breeding programme.

High heritability coupled with high genetic advance in percentage of mean was recorded for plant height, number of primary branches, number of capsules/plant, number of seeds/capsule and seed yield per plant. This indicated the major role of additive gene action in inheritance of these characters. High heritability and modern genetic advance as per cent of mean was recorded for number of secondary branches while high heritability coupled with low genetic advance as per cent of mean was recorded for days to 50% flowering and oil content, revealing the role of non-additive gene action in the transmission of these characters from parents to off-springs. Panse (1957) viewed that if a character was governed by non-additive genec action, it may give high heritability and low genetic advance, whereas if it is governed by additive gene action, heritability and genetic advance both would be high. High estimates of heritability along with high genetic advance provides good scope for further improvement in advanced gene ractions if these characters one subjected to mass progeny or family selection.

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Table 1. Pooled estimates of mean, variability, heritability and genetic advance as per cent of mean for yield and yield components in sesame (*Sesamum indicum* L.)

Character	Mean	PCV	GCV	Heritability	GA as % of mean
Days to 50 % flowering	40.92	4.85	3.99	67.50	6.75
Plant height (cm)	99.50	22.11	20.33	84.56	38.52
No. primary branches	3.26	28.44	27.51	93.61	54.84
No. secondary branches	1.99	51.82	51.08	97.18	103.75
No. capsules/ plant	63.35	34.39	33.26	93.52	66.26
No. seeds/capsule	44.44	26.56	25.24	90.32	49.42
1000 seed weight (g)	2.90	21.17	15.10	51.00	22.19
Oil content (%)	45.73	3.85	3.80	97.35	7.73
Seed yield/plant (g)	40.92	34.85	33.99	67.50	56.75

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