catkin was reduced considerably. At room temperature after 12 hours the germination percentage was reduced to 18.98 per cent and after 24 hours the pollen grains were completely nonviable. Pollen grains stored in galss vials in a refrigerator at $4^{o}C$ gave only 19.76 per cent germination after 12 hours and 8.83 per cent after 24 hours of storage. Of all the treatments pollen grains along with the catkin at $4^{o}C$ gave the best results i.e., 55.35 per cent germination after 12 hours and this gradually decreased to 5.55 per cent after 48 hours of storage. Among the organic solvents tried petroleum ether gave the best result with 42.8 per cent germination after 12 hours and 27.9 per cent after 48 hours of storage.

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GENETICS OF QUANTITATIVE CHARACTERS ASSOCIATED WITH CAPSULES IN *SESAMUM INDICUM* L.

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ABSTRACT

The gene effects for four quantitative characters were studied in ten crosses of sesame. The additive component was significant and present in sizable proportions for the characters studied. Dominance was higher in magnitude than additivity. Epistatic effects were negligible for first capsule bearing node while dominance x dominance effect was in higher magnitude for capsules per plant and additive x additive effect was predominant for capsule bearing nodes to total nodes per plant. For volume of the capsule, additive x additive and additive x dominance interactions were observed. To exploit all these genetic effects characters associated with capsules can be improved through the use of recurrent selection to ultimately improve seed yield in sesame.

Yield is a complex character but its component traits are relatively less complex, therefore an estimation of the components of genetic variance is essential to formulate effective breeding procedure for the improvement of desired attributes. It depends mostly upon the nature and relative magnitude of the components of genetic variances and gene action involved. So the present investigation was undertaken to study the genetics of attributes relating to capsules in sesame.

MATERIALS AND METHODS

The meterial consisted of ten crosses generated by crossing five morphologically and genetically diverse varieties of sesame viz., CO 1, TSS 4, Si 1484, Si 1003 and Si 1125 in all possible intermatings excluding reciprocals. In each cross, six generations viz., P_1, P_2, F_1, F_2, B_1 and B_2 were developed. The material was raised in a randomized block design with three replications adopting a spacing of 45 x 30 cm during kharif season of 1988 at Tamil Nadu Agricultural University, Coimbatore. The data were recorded on 15 random plants in F_1s as well as parents and 60 plants in F_2s and backcrosses. For capsule volume, five capsules per plant was selected and length, breadth and thickness were measured. Scaling tests were performed to detect deviation due to non-allelic interactions. The gene effects (m,d,h) were estimated according to the weighted least squares of Cavalli (1952). The genetic parameters on digenic model m, (d), (h), (i), (j) and (l) were obtained by the perfect fit method from the equations formulated by Mather and Jinks (1971).

RESULTS AND DISCUSSION

The scaling tests and components of generation means for four characters of ten crosses are presented in the Table.1. Simple additive dominance model was adequate in four crosses for first capsule bearing node, one crorss viz., Si 1484 x Si 1003 for capsules per plant and CO 1 x TSS 4 for volume of the capsule.

Table 1. Scaling tests and components of generation means.

Cross name	Scaling tests			Genetic effects					
	A	B	C	m	(d)	(h)	(i)	(j)	(l)
First capsule bearing node									
CO 1 x TSS 4	-	x	-	1.82	-0.37	9.09	3.88	-1.74*	-5.18
CO 1 x Si 1484	-	-	-	5.25**	-0.91**	0.27	-	-	-
CO 1 x Si 1003	x	-	-	2.28	-1.07**	10.07	3.12	2.50	-7.82
CO 1 x Si 1125	x	-	-	3.15	-0.64**	4.77	1.82	1.77**	-3.11
TSS 4 x Si 1484	-	-	-	5.54**	-0.49	0.62	-	-	-
TSS 4 x Si 1003	-	-	-	6.17**	-0.31	-1.18**	-	-	-
TSS 4 x Si 1125	x	x	-	1.80	-0.26	20.15**	7.14**	0.19	-13.47**
Si 1484 x Si 1003	x	-	-	3.28	-0.17	5.56	3.02	-4.56	-3.64
Si 1484 x Si 1125	-	-	-	5.80**	0.26	-1.22**	-	-	-
Si 1003 x Si 1125	x	-	-	3.13	0.44**	8.15	2.90	0.43	-5.95
Number of capsules/plant									
CO 1 x TSS 4	x	x	x	155.86**	-7.04**	-243.99**	-63.74**	31.05*	166.09**
CO 1 x Si 1484	x	x	-	42.67**	17.74**	47.63	24.68	-51.79**	-31.77
CO 1 x Si 1003	x	x	x	64.00**	7.12**	-0.86	13.96	-3.48	17.24
CO 1 x Si 1125	-	-	x	42.74**	15.46**	55.14	36.88	-23.12**	-23.08
TSS 4 x Si 1484	x	x	x	14.82	24.77**	114.94*	59.56**	-17.34**	-80.38*
TSS 4 x Si 1003	x	x	x	111.46**	14.16**	-165.07**	-26.46	-36.65**	123.31*
TSS 4 x Si 1125	x	x	-	168.74**	22.50**	-279.60**	-92.08**	-59.23**	201.51
Si 1484 x Si 1003	-	-	-	61.66**	-9.10**	-10.51**	-	-	-
Si 1484 x Si 1125	-	-	x	38.89**	-2.38	5.63	13.00	11.55	3.37
Si 1003 x Si 1125	x	x	x	35.84*	8.34**	-19.35	26.66	12.30	28.86
Capsule bearing nodes to total nodes per plant									
CO 1 x TSS 4	-	-	x	92.99**	-1.68	-44.37	-25.38**	9.93	30.37
CO 1 x Si 1484	-	-	x	44.01*	3.96**	38.29	17.96	-4.88	-13.62
CO 1 x Si 1003	x	-	-	34.31**	6.24**	22.12	35.39**	-42.82**	25.48
CO 1 x Si 1125	x	-	-	58.22**	6.64**	-36.43	1.08	-52.67**	46.15*
TSS 4 x Si 1484	x	-	-	79.02**	5.64**	-46.70	-15.38	-20.29**	38.65
TSS 4 x Si 1003	-	-	x	6.77	7.91**	114.32**	54.60**	-0.22	-62.96**
TSS 4 x Si 1125	-	-	x	1.65	8.31**	129.62**	59.32**	3.82	-60.24
Si 1484 x Si 1003	-	-	-	86.35**	3.38**	-50.54*	-30.62**	-24.29**	32.21
Si 1484 x Si 1125	-	x	x	138.46**	2.67	-176.66**	-83.12**	6.13	102.97**
Si 1003 x Si 1125	x	x	-	95.92**	0.40	-119.73**	-42.86**	-5.22	79.06**
Volume of the capsule									
CO 1 x TSS 4	-	-	-	1.17**	0.03	0.13	-	-	-
CO 1 x Si 1484	x	x	x	0.20	0.05	3.39**	0.94**	0.01	-3.38**
CO 1 x Si 1003	x	x	x	1.53**	-0.004	0.45	-0.30	-0.74*	-0.54
CO 1 x Si 1125	-	x	x	1.76**	0.13**	-0.70	-0.70	-1.00**	-0.38
TSS 4 x Si 1484	-	-	x	2.85**	0.06	-3.32**	-1.70**	-0.34	1.76**
TSS 4 x Si 1003	x	x	-	0.99**	0.14**	0.15	0.08	-1.68**	0.30
TSS 4 x Si 1125	x	x	x	0.92*	-0.14	0.78	0.32	1.46**	-0.16
Si 1484 x Si 1003	x	x	x	1.73**	0.08**	-0.89	-0.72*	-1.20**	0.34
Si 1484 x Si 1125	-	-	x	0.02	-0.09**	2.74**	1.16**	-0.06	-1.44**
Si 1003 x Si 1125	x	x	x	-1.02**	-0.17**	5.44**	3.12**	0.26	-3.08**

x - indicates significance of scale * - significant at 5 per cent level **-Significant at 1 per cent level

For first capsule bearing node, the mid parental effect was significant in only four crosses. Additivity was significant in four cases, while it was positive only in Si 1003 x Si 1125. Dominance effect was significant in three combinations. In all the cases, dominance was greater than additivity. In TSS 4 x Si 1125 alone, additive x additive effect was significant. Additive x dominance was significant in CO 1 x TSS 4 and CO 1 x Si 1125. Dominance x dominance effect was negatively significant in TSS 4 x Si 1125. In the cross Si 1484 x Si 1003, none of the genetic parameters were significant, perhaps due to complex interactions or linkage effects. Duplicate epistasis plays a role for inheritance of this trait.

For number of capsules per plant, the effect m was significant in nine cases. Additivity was significant in nine crosses. Additivity alone was observed in CO 1 x Si 1003 and Si 1003 x Si 1125. Five crosses registered significant (h) effects. Considering epistasis, additive x additive effect was positively significant in TSS 4 x Si 1484 and negatively significant in two other crosses. Effect (j) was significant in six combinations and (1) effect in four crosses. Duplicate epistasis was observed for inheritance of this character also. Higher magnitude of dominance with epistatic interactions was reported by Dixit (1976).

Considering capsule bearing nodes to total nodes per plant m effect was significant in most of the cases. Additive effect was positively significant in seven crosses. Dominance was significant in four crosses. Additive x additive effect was signficant in seven crosses and of them it was positive in three crosses. In four combinations, additive x dominance was significant. The cross CO 1 x Si 1003 recorded complementary epistasis while others registered duplicate epistasis. Additive x additive effect was preponderant as compared to other epistatic effects.

For volume of capsules m effect was significant in eight combinations. Additivity was significant in four crosses, and it was positive in CO 1 x Si 1125, TSS 4 x Si 1003 and Si 1484 x Si 1003. In four crosses, significant dominance effects were observed. The (i) effect was positively significant in three crosses while additive x dominace was negatively signficnant in four crosses and positively significant in TSS 4 x Si 1125. Dominance x dominance effect was signficnant in four combinations. The (i) and (j) type effects were predominant over dominance x dominance epistatic effects. Complementary epistasis was observed in CO.1 x Si 1125 and TSS 4 x Si 1003, while in eight other crosses duplicate epistasis was observed. The results revealed that major proportion of dominance, sizeable amounts of additivity along with epistasis were important for the inheritance of these capsule characters.

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EFFECT OF DIFFERENT TEMPERATURE REGIMES AND LOW LIGHT STRESS DURING RIPENING ON YIELD OF RICE

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ABSTRACT

Effect of high (37°/27°), medium (29°/21°) and low (23°/20°C, day/night) temperature regimes and low light stress (40 and 60% shading) from flowering to harvest on grain yield and its components were studied using rice cv. IR 44. The control plants gave the highest yield. High temperature reduced the percentage of filled spikelets, 1000 grain weight and consequently the grain yield. Low temperature decreased the number of filled spikelets but there was slight increase in 1000 grain weight. The medium temperature regime caused significant reduction in 1000-grain weight only. The percentage of filled spikelets and the grain yield per plant were signficantly reduced under shaded treatments.