

INBREEDING DEPRESSION FOR QUANTITATIVE TRAITS IN SESAME [*Sesamum indicum* L.] OVER ENVIRONMENTS

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ABSTRACT

Nine sesame genotypes and their 36 F_1 diallel hybrids and 36 F_2 s were evaluated in four different environments to study the inbreeding depression for seed yield per plant and its attributes. The analysis of variance pooled over environments revealed significant differences among genotypes, parents, F_1 s and F_2 s for all the characters. The comparison of parents vs. F_2 was found significant for all the characters, except for height to first capsule, length of capsule and width of capsule, which, in general, revealed the existence of inbreeding depression. Mean squares due to F_1 s vs. F_2 s were significant for all the characters, also suggesting presence of considerable amount of inbreeding depression in F_2 generation. Total of 13, 1, 8, 9 and 1 cross combination noted significant and desirable inbreeding depression for height to first capsule, width of capsule, number of capsules per leaf axil, number of seeds per capsule and seed yield per plant, respectively. These crosses had possibilities of desirable segregants in F_2 population.

KEY WORDS: Diallel, Inbreeding depression, Sesame

INTRODUCTION

Sesame (*Sesamum indicum* L. Family: Pedaliaceae) is one of the oldest oilseed crops grown throughout the tropical and sub-tropical regions of the world. Sesame oil is considered as the queen of high quality vegetable oil (44-58% of dry seed weight) for human consumption, as it contains high levels of unsaturated fatty acids and antioxidants e.g., sesamol, sesamin, sesamol and sesaminol (Nupur *et al.*, 2010). India is the second largest producer of sesame in the world but suffers a serious setback in terms of productivity

(368 kg/ha) as compared to world average (489 kg/ha). Low productivity of sesame in India is mainly due to cultivation of varieties with poor yield potential and inconsistent yield performance under varied environmental conditions. Hence, there is a need to augment the productivity of crop through crop improvement programme.

Inbreeding is the basic mechanism for providing the base material for selection. The nature and magnitude of inbreeding depression helps to the efficiency of selection. The present investigation was carried out to study the inbreeding

depression over F_2 segregating generation for seed yield and its related traits in sesame.

MATERIALS AND METHODS

The experimental material comprised of nine sesame genotypes and their 36 F_1 diallel hybrids and 36 F_2 s were evaluated in a Randomized Block Design with three replications in four different environments [two locations, Junagadh and Nana Kandhasar and two dates of sowing, February 20 and March 10, 2016 at Junagadh and February 22 and March 12, 2016 at Nana Kandhasar] during *summer* 2016-2017. Each entry was sown in single row of 3.0 m length with a spacing of 45 cm between row and 15 cm between plants within the row. Five competitive plants per genotype in each replication in each environment were selected randomly for recording observations on different characters viz., days to flowering, days to maturity, plant height (cm), number of branches per plant, number of capsules per plant, height to first capsule (cm), length of capsule (cm), width of capsule (cm), number of capsules per leaf axil, number of seeds per capsule, 1000 seed weight (g), seed yield per plant (g), biological yield per plant (g), harvest index (%) and oil content (%). Inbreeding depression was estimated as per cent decrease in the mean value of F_2 populations by comparing with F_1 hybrid means (Hallauer and Miranda, 1988).

RESULTS AND DISCUSSION

The estimation of inbreeding depression provides information about the nature of gene actions involved in the expression of yield and its component characters. Inbreeding depression points out whether the vigour observed in the F_1 generation can be fixed or not in later generations through selfing. The information of such estimates is essential to plan efficient breeding programmes as well as selection of parents so as to obtain good

segregants for improvement of the crop yields.

Inbreeding depression was obtained as per cent decrease in F_2 over F_1 separately for each of the fifteen characters studied and character-wise results are presented in Table 1. None of the cross showed significant and positive inbreeding depression for days to flowering and days to maturity in pooled over environments, while none of the cross showed significant and negative inbreeding depression for plant height, number of branches per plant, number of capsules per plant, length of capsule, 1000 seed weight, biological yield per plant, harvest index and oil content in pooled over environments.

Total of 13 crosses recorded positive and significant inbreeding depression in pooled over environments, of which AT 164 x GT 10 (42.39%), China x GT 1 (41.85%) and AT 238 x China (31.03%) exhibited the highest inbreeding depression in positive direction for height to first capsule. Out of 36 crosses, 8 crosses in pooled over environments manifested significant and negative inbreeding depression, of which AT 345 x China, China x Nesadi Selection and AT 345 x Nesadi Selection were the three top most crosses manifested significantly the highest inbreeding depression in negative direction in pooled over environments with a value of -116.67, -105.00 and -98.33 per cent in that order. AT 164 x AT 255 (-0.61 %) expressed significant inbreeding depression in negative direction for width of capsule in pooled results. Out of 36 crosses, 9 cross combinations, exhibited significant and negative inbreeding depression for number of seeds per capsule, of which AT 164 x China (-13.45 %), China x GT 10 (-11.05 %) and AT 255 x AT 282 (-9.83 %) noted significantly the highest inbreeding depression in negative direction.

The range of inbreeding depression for seed yield per plant ranged in between -

22.98 per cent (AT 164 x GT 1) to 42.27 per cent (AT 164 x AT 345), -26.20 per cent (AT 164 x GT 1) to 44.83 per cent (AT 164 x China), -26.96 per cent (AT 238 x AT 255) to 47.84 per cent (AT 164 x AT 345), -26.34 per cent (AT 238 x AT 255) to 50.56 per cent (AT 164 x AT 345) and -24.72 per cent (AT 164 x GT 1) to 45.53 per cent (AT 164 x AT 345) in E₁, E₂, E₃, E₄ and pooled over environments respectively (Table 1). Crosses AT 164 x GT 1 (-22.98 %) and AT 238 x AT 255 (-17.08 %) in E₁; AT 164 x GT 1 (-26.20 %) and AT 238 x AT 255 (-23.17 %) in E₂; AT 238 x AT 255 (-26.96 %), AT 164 x GT 1 (-23.30 %) and AT 345 x GT 10 (-14.75 %) in E₃; AT 238 x AT 255 (-26.34 %), AT 164 x GT 1 (-26.11 %) and AT 345 x GT 10 (-14.40 %) in E₄; and AT 164 x GT 1 (-24.72 %), AT 238 x AT 255 (-22.88 %) and AT 345 x GT 10 (-7.92 %) in pooled results expressed significant and negative inbreeding depression for seed yield per plant. Out of 36 crosses, 33 crosses each in E₁, E₂, E₃ and pooled over environments and 32 crosses in E₄ recorded positive and significant inbreeding depression for seed yield per plant, of which AT 164 x AT 345 (42.27 %), AT 164 x China (39.35 %) and AT 164 x AT 282 (35.29 %) in E₁; AT 164 x China (44.83 %), AT 164 x AT 255 (44.42 %) and AT 164 x AT 345 (42.31 %) in E₂; AT 164 x AT 345 (47.84 %), AT 164 x China (47.53 %) and AT 164 x Nesadi Selection (36.00 %) in E₃; AT 164 x AT 345 (50.56 %), AT 164 x China (49.06 %) and AT 164 x AT 282 (44.85 %) in E₄; and AT 164 x AT 345 (45.53 %), AT 164 x China (45.03 %) and AT 164 x AT 255 (38.38 %) in pooled over environments exhibited the highest inbreeding depression in positive direction.

In general, it might be inferred that magnitude of inbreeding depression was high for number of branches per plant, height to first capsule, number of capsules per leaf axil, seed yield per plant and harvest

index; moderate for plant height, number of capsules per plant, length of capsule, width of capsule, number of seeds per capsule, 1000 seed weight and biological yield per plant; and low for days to flowering, days to maturity and oil content (Table 2). The results also indicated that, on pooled basis, none of the cross manifested significant and desirable inbreeding depression for days to flowering, days to maturity, plant height, number of branches per plant, number of capsules per plant, length of capsule, 1000 seed weight, biological yield per plant, harvest index and oil content. These results indicating that the performance of F₁ for all the characters due to lack of segregation of desirable gene responsible for dominance effect or it may be due to tight linkage of desirable genes or due to phenomenon of fixing of heterozygosity. Such crosses could be prove useful in diallel selective mating system. However, 13, 1, 8, 9 and 1 cross combination noted significant and desirable inbreeding depression for height to first capsule, width of capsule, number of capsules per leaf axil, number of seeds per capsule and seed yield per plant, respectively. These crosses had possibilities of desirable segregants in F₂ population. Inbreeding depression for yield and its contributing character was also reported by Dixit (1976), Godawat and Gupta (1985), Gaikwad *et al.* (2009), Toprope (2009) and Gaikwad and Lal (2011).

CONCLUSION

The variable number of crosses exhibited significant inbreeding depression for different characters. The magnitude of inbreeding depression was high for number of branches per plant, height to first capsule, number of capsules per leaf axil, seed yield per plant and harvest index; moderate for plant height, number of capsules per plant, length of capsule, width of capsule, number of seeds per capsule, 1000 seed weight and biological yield per plant; and low for days

to flowering, days to maturity and oil content. However, total of 13, 1, 8, 9 and 1 cross combination noted significant and desirable inbreeding depression for height to first capsule, width of capsule, number of capsules per leaf axil, number of seeds per capsule and seed yield per plant, respectively. These crosses had possibilities of desirable segregants in F₂ population.

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Table 1: Estimates of inbreeding depression in individual environments as well as pooled over environments for different characters in sesame

Sr. No	Hybrids	Days to flowering					Days to maturity				
		E ₁	E ₂	E ₃	E ₄	Pooled	E ₁	E ₂	E ₃	E ₄	Pooled
1	AT 164 x AT 238	1.66	1.96	0.56	5.78	2.47	-13.16	-1.97	-2.08	-8.65	-6.39
2	AT 164 x AT 255	2.15	11.83**	2.63	-1.20	3.98	-6.55	-3.96	1.27	-0.50	-2.41
3	AT 164 x AT 282	2.23	-0.61	3.80	-1.23	1.16	-2.56	-1.94	-3.03	-4.90	-3.11
4	AT 164 x AT 345	-8.05	-1.80	-3.45	-1.76	-3.80	-3.68	6.14	-3.44	-1.60	-0.49
5	AT 164 x China	-6.32	5.62	-6.32	4.62	-0.57	3.21	1.67	5.88	1.88	3.17
6	AT 164 x Nesadi Selection	-0.28	1.24	-5.36	-1.86	-1.56	1.78	5.04	9.92	5.38	5.59
7	AT 164 x GT 1	0.00	0.00	2.20	-1.23	0.29	5.04	1.53	8.47	8.27	5.92
8	AT 164 x GT 10	-5.03	-2.30	-4.44	-11.90**	-5.85	-4.09	-0.22	0.00	-3.37	-1.88
9	AT 238 x AT 255	-2.25	-1.19	0.56	-3.66	-1.60	-6.36	-6.80	-3.88	-4.59	-5.40
10	AT 238 x AT 282	-5.32	-7.27*	-1.59	-5.21	-4.75	-0.27	-3.21	0.78	3.70	0.29
11	AT 238 x AT 345	-21.39**	1.18	-3.95	1.75	-5.64	-5.17	-3.04	-6.05	-3.98	-4.54
12	AT 238 x China	-16.00**	1.12	-10.61**	1.65	-5.87	2.76	0.90	7.26	-0.99	2.51
13	AT 238 x Nesadi Selection	-1.72	0.00	-2.98	2.40	-0.59	-7.63	-4.83	-1.80	1.83	-3.06
14	AT 238 x GT 1	-2.72	3.55	-6.40	0.60	-1.30	-6.79	-6.65	-8.85	-5.29	-6.87
15	AT 238 x GT 10	-5.65	-1.71	-5.59	-1.74	-3.70	1.14	4.26	0.46	7.49	3.42
16	AT 255 x AT 282	0.00	0.58	-4.52	-0.58	-1.14	6.12	5.59	5.98	1.18	4.72
17	AT 255 x AT 345	3.70	-3.14	0.54	-0.58	0.23	-5.05	1.19	1.75	3.55	0.44
18	AT 255 x China	-1.63	7.07*	-2.09	-1.73	0.41	-1.47	0.71	4.48	2.38	1.53
19	AT 255 x Nesadi Selection	-8.28	0.00	-5.92	-1.20	-3.87	-10.41	-10.43	-0.25	1.29	-4.81
20	AT 255 x GT 1	-5.03	-1.21	-5.17	-4.82	-4.09	-2.58	0.49	2.22	1.22	0.37
21	AT 255 x GT 10	-3.17	-6.24	-3.14	-4.65	-4.24	4.43	4.16	5.04	-4.82	2.28
22	AT 282 x AT 345	-10.00*	-0.58	-4.57	2.82	-3.03	-8.38	-2.82	1.19	-0.93	-2.63
23	AT 282 x China	-3.45	0.58	-2.75	-4.67	-2.56	-1.72	3.53	-1.48	0.71	0.30
24	AT 282 x Nesadi Selection	2.14	-1.80	-1.13	-1.74	-0.57	-5.36	-0.26	-7.10	-0.26	-3.20
25	AT 282 x GT 1	2.75	-1.20	0.56	1.16	0.86	4.84	4.48	6.71	6.13	5.55
26	AT 282 x GT 10	9.00*	0.56	-1.60	0.57	2.30	6.00	5.27	4.46	1.94	4.39
27	AT 345 x China	10.55*	2.89	4.64	-0.58	4.61	-0.25	1.63	2.35	-1.94	0.48
28	AT 345 x Nesadi Selection	9.66*	2.89	3.80	3.53	5.18	0.25	2.85	1.01	-3.77	0.09
29	AT 345 x GT 1	4.40	3.57	3.74	4.05	3.95	1.20	2.08	-2.64	-0.23	0.12
30	AT 345 x GT 10	-7.82	0.29	-1.57	-0.60	-2.47	-3.02	-0.88	-7.69	-4.24	-3.89
31	China x Nesadi Selection	-1.49	6.42	1.01	6.35	2.96	-2.79	-1.72	3.69	-17.66	-4.32
32	China x GT 1	-2.04	6.74	4.36	9.74**	4.69	-1.24	0.97	4.88	-0.95	0.91
33	China x GT 10	3.48	6.81	-1.02	5.67	3.71	7.13	2.12	9.26	2.50	5.22
34	Nesadi Selection x GT 1	-6.52	12.64**	-4.08	9.34**	2.80	7.79	5.98	10.56	4.97	7.31
35	Nesadi Selection x GT 10	4.30	7.61*	-0.53	5.59	4.20	2.16	-1.70	2.75	4.49	1.95
36	GT 1 x GT 10	-4.89	-1.76	-0.26	-1.16	-2.02	-4.98	-4.89	-4.12	2.81	-2.70
	Range of ID	-21.39 to 10.55	-7.27 to 12.64	-10.61 to 4.64	-11.90 to 9.74	-5.87 to 5.18	-13.16 to 7.79	-10.43 to 6.14	-8.85 to 10.56	-17.66 to 8.27	-6.87 to 7.31
	S.Em.±	4.46	3.48	3.72	3.46	3.58	9.85	11.15	10.98	11.30	11.65

Table 1: Contd....

Sr. No	Hybrids	Plant height (cm)					Number of branches per plant				
		E ₁	E ₂	E ₃	E ₄	Pooled	E ₁	E ₂	E ₃	E ₄	Pooled
1	AT 164 x AT 238	7.02	7.04	9.18	9.34	8.13	64.19**	65.13**	58.87**	16.13**	57.09**
2	AT 164 x AT 255	7.24	3.07	14.78	3.00	6.98	25.71**	17.48**	1.69	17.86**	16.16**
3	AT 164 x AT 282	12.30	4.45	10.36	12.04	9.74	8.57**	11.39**	5.71**	-4.29**	5.43**
4	AT 164 x AT 345	-0.16	6.07	3.58	10.82	5.16	32.63**	29.01**	10.47**	0.00	19.38**
5	AT 164 x China	17.14	11.71	17.29	16.11	15.51	14.75**	10.49**	10.00**	11.11**	11.58**
6	AT 164 x Nesadi Selection	0.29	3.44	-1.47	-0.17	0.59	22.08**	9.66**	2.82*	1.67	9.63**
7	AT 164 x GT 1	9.83	7.70	12.07	17.31	11.76	48.72**	44.29**	14.06**	0.00	29.10**
8	AT 164 x GT 10	16.28	12.42	6.11	12.21	11.91	25.93**	-57.72**	23.47**	13.41**	5.33**
9	AT 238 x AT 255	20.78	5.80	4.60	-1.46	7.84	34.88**	31.28**	12.82**	0.00	21.06**
10	AT 238 x AT 282	10.30	12.44	8.07	7.09	9.54	35.90**	20.16**	20.00**	7.89**	21.12**
11	AT 238 x AT 345	-0.97	0.94	-0.36	6.33	1.60	49.02**	39.46**	17.07**	42.31**	38.01**
12	AT 238 x China	11.58	10.68	12.08	9.65	10.98	16.36**	21.82**	3.85**	8.77**	12.79**
13	AT 238 x Nesadi Selection	2.82	-1.21	1.15	9.22	3.05	13.92**	4.97**	6.25**	5.48**	7.87**
14	AT 238 x GT 1	0.32	-1.46	1.72	24.85*	6.73	0.00	5.33**	5.26**	6.76**	4.38**
15	AT 238 x GT 10	27.51*	4.89	24.33*	21.74	19.80	4.00**	9.90**	5.32**	2.11	5.38**
16	AT 255 x AT 282	1.37	11.86	-2.14	10.99	5.74	12.86**	6.93**	10.45**	-1.52	7.28**
17	AT 255 x AT 345	15.15	8.11	10.77	28.39*	15.73	-33.33**	32.01**	13.33**	7.61**	7.90**
18	AT 255 x China	11.88	11.75	10.41	17.67	12.98	11.39**	16.18**	4.00**	7.06**	9.76**
19	AT 255 x Nesadi Selection	23.62*	19.77*	17.43	1.01	15.90	4.76**	2.91	5.08**	6.45**	4.82**
20	AT 255 x GT 1	-5.69	-0.60	4.64	0.64	-0.09	12.50**	15.42**	6.78**	3.23*	9.56**
21	AT 255 x GT 10	16.60	14.72	11.38	4.14	11.81	3.30*	6.65**	9.30**	3.41**	5.66**
22	AT 282 x AT 345	27.46*	-0.93	18.91	-2.41	10.75	5.41**	5.64**	5.41**	5.33**	5.45**
23	AT 282 x China	13.72	19.96*	21.60	19.90	18.96	31.94**	7.42**	23.61**	13.33**	19.17**
24	AT 282 x Nesadi Selection	20.58	11.89	12.30	7.59	13.14	1.47	10.16**	0.00	1.56	3.37*
25	AT 282 x GT 1	-6.05	-2.76	-22.17	-12.85	-10.32	16.67**	16.55**	15.38**	7.32**	13.98**
26	AT 282 x GT 10	-7.15	2.06	-0.79	-6.16	-2.91	25.93**	10.53**	20.00**	27.27**	20.83**
27	AT 345 x China	10.33	8.78	10.86	10.03	9.99	8.93**	31.67**	10.00**	3.92**	14.49**
28	AT 345 x Nesadi Selection	8.52	7.55	5.02	21.68	10.6	22.58**	15.67**	28.33**	28.33**	23.67**
29	AT 345 x GT 1	3.06	1.68	9.91	-0.27	3.57	21.43**	8.10**	26.14**	27.27**	20.72**
30	AT 345 x GT 10	27.38*	9.24	25.99*	13.01	18.71	11.32**	7.59**	7.84**	10.19**	9.24**
31	China x Nesadi Selection	-5.78	-5.10	-2.33	10.91	-0.43	-13.33**	37.32**	-20.00**	-23.53**	0.20
32	China x GT 1	-0.56	3.09	-7.24	-10.47	-3.22	20.97**	3.51*	8.93**	8.62**	10.73**
33	China x GT 10	30.71**	21.64*	28.38*	22.07	25.57*	2.13	10.23**	6.74**	5.62**	6.11**
34	Nesadi Selection x GT 1	-4.73	6.56	-0.80	-0.06	0.45	7.58**	3.57*	-1.69	6.15**	4.04**
35	Nesadi Selection x GT 10	10.02	7.24	6.04	8.38	7.94	17.05**	3.14	17.78**	5.00**	10.85**
36	GT 1 x GT 10	7.31	3.59	10.25	10.84	8.04	18.00**	0.72	10.23**	9.30**	9.57**
	Range of ID	-7.15 to 30.71	-5.10 to 21.64	-22.17 to 28.38	-12.85 to 28.39	-10.32 to 25.57	-33.33 to 64.19	-57.72 to 65.13	-20.00 to 58.87	-23.53 to 42.31	0.20 to 57.09
	S.Em.±	11.82	8.48	11.36	11.79	10.28	1.51	1.65	1.33	1.25	1.54

Table 1: Contd....

Sr. No	Hybrids	Number of capsules per plant					Height to first capsule (cm)				
		E ₁	E ₂	E ₃	E ₄	Pooled	E ₁	E ₂	E ₃	E ₄	Pooled
1	AT 164 x AT 238	14.84	35.49	28.61	4.99	24.71	-27.11**	-11.06	7.20	-16.36*	-14.03
2	AT 164 x AT 255	12.34	10.45	26.73	19.36	16.85	-50.93**	-42.80**	12.62**	-52.19**	-33.01**
3	AT 164 x AT 282	9.73	7.62	7.28	15.77	10.12	-127.06**	-119.42**	10.55**	-18.77*	-54.94**
4	AT 164 x AT 345	13.68	16.77	13.90	1.40	12.06	-13.60	-7.53	4.90	-14.87*	-8.67
5	AT 164 x China	8.12	10.23	10.36	14.44	10.81	5.73	21.05*	1.03	17.09*	12.75
6	AT 164 x Nesadi Selection	2.48	14.55	20.30	3.76	9.97	-16.89	-18.72*	-21.23**	-32.21**	-21.91**
7	AT 164 x GT 1	-6.17	-15.20	-10.31	-10.89	-11.00	13.12	18.43*	9.79*	18.92*	15.61*
8	AT 164 x GT 10	9.75	15.19	9.80	20.73	13.82	48.16**	50.83**	29.54**	33.36**	42.39**
9	AT 238 x AT 255	-24.25	-18.65	-19.93	-3.45	-16.47	-55.66**	-53.65**	-18.68**	-45.49**	-44.84**
10	AT 238 x AT 282	10.98	11.16	6.02	9.00	9.39	-53.88**	-46.82**	4.45	-41.89**	-36.38**
11	AT 238 x AT 345	14.07	22.88	18.56	30.60	21.63	-0.15	1.49	-19.71**	-0.97	-4.19
12	AT 238 x China	10.42	20.96	12.70	-18.89	6.44	42.99**	47.39**	20.58**	8.77	31.03**
13	AT 238 x Nesadi Selection	2.45	6.09	6.27	29.73	12.41	3.44	5.58	-8.46*	6.99	2.95
14	AT 238 x GT 1	9.84	18.87	21.84	4.03	13.96	-9.59	-11.09	-9.63*	-10.85	-10.37
15	AT 238 x GT 10	2.28	16.01	13.20	6.04	10.32	26.21**	28.23**	35.24**	24.66**	27.95**
16	AT 255 x AT 282	2.30	16.09	10.41	2.12	8.48	7.29	3.88	1.27	4.59	4.62
17	AT 255 x AT 345	12.46	9.57	24.17	14.71	14.83	-24.03**	-26.28**	-49.35**	-21.19**	-27.27**
18	AT 255 x China	5.11	12.41	8.14	11.48	9.45	21.63*	21.88*	-31.60**	7.16	10.53
19	AT 255 x Nesadi Selection	9.95	8.00	12.47	9.76	10.03	29.26**	26.64**	-7.76*	33.30**	24.10**
20	AT 255 x GT 1	15.63	16.88	7.35	4.83	11.36	30.07**	27.37**	20.26**	33.54**	28.38**
21	AT 255 x GT 10	15.90	10.06	6.83	13.01	11.49	22.95*	21.50*	-7.44	19.07*	16.74*
22	AT 282 x AT 345	28.16	37.84	28.25	7.52	27.36	31.38**	29.14**	32.34**	21.10**	28.38**
23	AT 282 x China	4.48	10.20	6.65	7.50	7.30	-96.48**	-85.77**	-25.74**	-77.97**	-74.63**
24	AT 282 x Nesadi Selection	0.83	2.89	4.92	6.10	3.90	-37.97**	-40.00**	-54.55**	-45.38**	-43.11**
25	AT 282 x GT 1	1.63	2.65	3.32	5.99	3.50	9.80	8.85	1.01	8.58	7.87
26	AT 282 x GT 10	11.62	19.07	9.98	13.20	13.69	20.14*	19.10*	21.44**	12.68	17.99*
27	AT 345 x China	12.61	7.40	6.75	5.18	8.10	-4.03	-3.42	-24.05**	-55.74**	-17.02*
28	AT 345 x Nesadi Selection	12.15	14.82	9.03	-20.66	3.44	10.29	9.51	-3.61	-3.60	4.47
29	AT 345 x GT 1	20.96	9.30	3.43	-6.71	8.86	28.30**	26.93**	6.13	1.25	17.95*
30	AT 345 x GT 10	6.02	5.40	6.04	-57.88**	-4.39	-2.38	2.50	2.68	-12.73	-2.70
31	China x Nesadi Selection	2.27	16.12	2.81	6.24	7.67	-30.51**	-23.50**	-16.71**	-30.52**	-25.89**
32	China x GT 1	11.76	19.65	5.16	14.50	13.38	47.05**	46.17**	30.82**	38.29**	41.85**
33	China x GT 10	11.77	17.1	-2.81	-43.89*	-1.03	27.03**	28.21**	30.21**	37.25**	30.88**
34	Nesadi Selection x GT 1	29.60	26.61	1.52	-9.09	15.59	35.71**	27.56**	26.66**	13.89	26.74**
35	Nesadi Selection x GT 10	32.76	17.65	8.94	1.94	16.67	-51.56**	-48.96**	-12.39**	-37.39**	-39.64**
36	GT 1 x GT 10	-14.29	4.14	8.15	-15.69	-2.76	-14.95	-15.60	28.31**	13.19	-0.07
	Range of ID	-24.25 to 32.76	-18.65 to 37.84	-19.93 to 28.61	-57.88 to 30.60	-16.47 to 27.36	-127.06 to 48.16	-119.42 to 50.83	-54.55 to 35.24	-77.97 to 38.29	-74.63 to 42.39
	S.Em.±	22.20	23.97	18.77	17.21	19.99	9.08	8.64	3.87	7.46	7.80

Table 1: Contd....

Sr. No	Hybrids	Length of capsule (cm)					Width of capsule (cm)				
		E ₁	E ₂	E ₃	E ₄	Pooled	E ₁	E ₂	E ₃	E ₄	Pooled
1	AT 164 x AT 238	14.13**	13.88**	3.35**	1.59*	8.78**	10.39**	6.16**	0.00	3.01**	5.15**
2	AT 164 x AT 255	3.01**	7.14**	10.27**	-8.60**	3.66**	0.75**	5.30**	15.08**	-30.61**	-0.61**
3	AT 164 x AT 282	2.60**	6.04**	11.35**	14.41**	8.53**	13.38**	-1.64**	8.87**	20.49**	10.39**
4	AT 164 x AT 345	23.39**	20.04**	9.89**	14.77**	17.30**	3.15**	2.40**	-4.24**	11.63**	3.41**
5	AT 164 x China	-0.75	-3.87**	20.20**	20.12**	8.81**	6.92**	8.46**	12.30**	11.86**	9.80**
6	AT 164 x Nesadi Selection	17.46**	21.18**	8.24**	7.10**	13.67**	6.56**	6.40**	8.82**	15.09**	9.01**
7	AT 164 x GT 1	20.36**	26.45**	13.99**	10.55**	18.30**	0.85**	6.56**	7.55**	15.18**	7.42**
8	AT 164 x GT 10	12.70**	-0.68	1.76**	4.13**	4.56**	0.87**	3.54**	7.84**	11.65**	5.77**
9	AT 238 x AT 255	13.45**	17.45**	10.56**	8.50**	12.81**	1.47**	7.52**	3.96**	0.00	3.43**
10	AT 238 x AT 282	4.48**	-2.51**	2.27**	-6.09**	-0.31	5.04**	0.00	7.69**	-8.40**	1.35**
11	AT 238 x AT 345	17.27**	13.52**	0.82	6.77**	9.80**	14.08**	11.59**	6.50**	6.50**	9.89**
12	AT 238 x China	8.25**	6.58**	20.45**	6.43**	10.32**	6.80**	7.80**	1.57**	4.69**	5.34**
13	AT 238 x Nesadi Selection	11.66**	13.30**	3.78**	1.80**	8.08**	3.31**	3.36**	10.19**	14.95**	7.69**
14	AT 238 x GT 1	17.21**	18.35**	6.75**	15.06**	14.62**	0.00	-0.85**	14.55**	17.59**	7.52**
15	AT 238 x GT 10	4.16**	7.42**	5.07**	11.52**	7.07**	11.02**	10.00**	0.96**	2.80**	6.55**
16	AT 255 x AT 282	14.86**	12.93**	6.99**	9.34**	11.35**	5.67**	3.01**	1.11**	1.14**	3.10**
17	AT 255 x AT 345	8.58**	-4.19**	0.64	0.84	1.50**	14.69**	9.02**	16.52**	18.64**	14.54**
18	AT 255 x China	15.69**	12.04**	17.37**	2.33**	11.99**	6.16**	4.86**	10.48**	14.63**	8.75**
19	AT 255 x Nesadi Selection	17.57**	17.09**	2.92**	13.22**	13.41**	0.00	4.35**	7.07**	5.26**	4.03**
20	AT 255 x GT 1	16.94**	14.71**	0.51	8.69**	11.06**	5.56**	1.67**	9.09**	6.25**	5.56**
21	AT 255 x GT 10	0.48	0.24	1.97**	2.32**	1.26*	5.88**	0.91**	2.02**	2.00**	2.80**
22	AT 282 x AT 345	14.64**	13.24**	-4.04**	0.00	6.73**	3.01**	1.56**	2.38**	1.63**	2.16**
23	AT 282 x China	19.48**	13.83**	14.8**	21.76**	17.48**	7.04**	1.32**	7.92**	7.22**	5.66**
24	AT 282 x Nesadi Selection	3.63**	1.64**	6.25**	17.26**	7.43**	4.42**	7.14**	1.92**	1.92**	3.93**
25	AT 282 x GT 1	18.30**	4.83**	9.66**	6.49**	10.22**	14.60**	9.16**	2.70**	4.46**	8.15**
26	AT 282 x GT 10	9.72**	19.11**	6.33**	1.79**	9.96**	4.20**	2.59**	3.88**	5.88**	4.09**
27	AT 345 x China	3.87**	7.89**	20.45**	-4.52**	7.13**	7.59**	-9.84**	12.90**	18.25**	7.35**
28	AT 345 x Nesadi Selection	8.46**	3.66**	0.97	0.99	3.70**	10.94**	12.00**	6.80**	11.21**	10.37**
29	AT 345 x GT 1	10.07**	10.08**	5.64**	0.25	6.75**	10.00**	4.84**	-7.69**	-4.63**	1.29**
30	AT 345 x GT 10	11.05**	8.47**	13.66**	0.53	8.66**	7.56**	5.26**	8.33**	11.11**	7.94**
31	China x Nesadi Selection	2.67**	-2.60**	0.10	5.14**	1.38*	6.77**	6.33**	10.26**	11.57**	8.63**
32	China x GT 1	14.12**	3.59**	5.14**	4.41**	7.01**	9.02**	7.75**	5.31**	10.08**	8.10**
33	China x GT 10	12.21**	11.49**	12.42**	1.54*	9.48**	7.46**	6.03**	12.15**	16.22**	10.26**
34	Nesadi Selection x GT 1	9.56**	11.97**	-0.52	20.82**	10.55**	9.76**	8.06**	8.65**	12.50**	9.67**
35	Nesadi Selection x GT 10	0.37	7.82**	0.25	9.29**	4.54**	9.02**	6.78**	0.00	3.77**	5.18**
36	GT 1 x GT 10	3.35**	1.70**	7.60**	0.75	3.43**	17.14**	18.05**	9.43**	10.43**	14.17**
	Range of ID	-0.75 to 23.39	-4.19 to 26.45	-4.04 to 20.45	-8.60 to 21.76	-0.31 to 18.30	0.00 to 17.14	-9.84 to 18.05	-7.69 to 16.52	-30.61 to 20.49	-0.41 to 14.54
	S.Em.±	0.62	0.63	0.56	0.66	0.56	0.16	0.15	0.18	0.19	0.17

Table 1: Contd....

Sr. No	Hybrids	Number of capsules per leaf axil					Number of seeds per capsule				
		E ₁	E ₂	E ₃	E ₄	Pooled	E ₁	E ₂	E ₃	E ₄	Pooled
1	AT 164 x AT 238	0.00	0.00	0.00	0.00	0.00	11.84**	13.27**	10.24**	12.40**	11.96**
2	AT 164 x AT 255	0.00	0.00	0.00	0.00	0.00	1.57**	0.78	2.30**	3.70**	2.08**
3	AT 164 x AT 282	0.00	0.00	0.00	0.00	0.00	-0.17	1.22*	2.34**	0.67	1.00
4	AT 164 x AT 345	0.00	0.00	0.00	0.00	0.00	13.15**	13.83**	15.27**	18.22**	15.09**
5	AT 164 x China	0.00	0.00	0.00	0.00	0.00	-9.72**	-16.46**	-14.96**	-12.84**	-13.45**
6	AT 164 x Nesadi Selection	0.00	0.00	0.00	0.00	0.00	6.58**	6.91**	10.33**	4.06**	6.96**
7	AT 164 x GT 1	0.00	0.00	0.00	0.00	0.00	13.68**	15.93**	15.13**	15.02**	14.95**
8	AT 164 x GT 10	0.00	0.00	0.00	0.00	0.00	-0.68	-5.43**	-0.51	-4.41**	-2.76**
9	AT 238 x AT 255	46.43**	46.43**	42.31**	44.44**	44.95**	7.68**	5.79**	14.79**	6.19**	8.63**
10	AT 238 x AT 282	0.00	0.00	0.00	0.00	0.00	-5.72**	-6.10**	-5.27**	-3.86**	-5.24**
11	AT 238 x AT 345	-73.33**	-73.33**	-86.67**	-86.67**	-80.00**	11.63**	15.28**	15.06**	12.58**	13.65**
12	AT 238 x China	-19.23**	-33.33**	-33.33**	-28.00**	-28.28**	-0.15	0.32	0.37	2.10**	0.66
13	AT 238 x Nesadi Selection	-66.67**	-53.33**	-60.00**	-60.00**	-60.00**	5.03**	5.07**	3.57**	1.02*	3.69**
14	AT 238 x GT 1	44.44**	44.44**	46.43**	39.29**	43.64**	4.03**	4.33**	-1.04	1.59**	2.28**
15	AT 238 x GT 10	0.00	0.00	0.00	0.00	0.00	6.50**	7.20**	7.73**	6.39**	6.95**
16	AT 255 x AT 282	0.00	0.00	0.00	0.00	0.00	-10.76**	-8.39**	-8.38**	-11.80**	-9.83**
17	AT 255 x AT 345	53.13**	53.13**	53.13**	50.00**	52.38**	16.24**	17.98**	14.24**	13.70**	15.57**
18	AT 255 x China	61.54**	61.54**	60.53**	57.14**	60.26**	-10.41**	-9.52**	-9.16**	-10.13**	-9.80**
19	AT 255 x Nesadi Selection	50.00**	50.00**	48.28**	48.28**	49.15**	12.55**	16.77**	10.39**	13.80**	13.42**
20	AT 255 x GT 1	0.00	0.00	11.76**	21.05**	9.09**	-0.38	-2.55**	-11.62**	-2.35**	-4.18**
21	AT 255 x GT 10	0.00	0.00	0.00	0.00	0.00	9.66**	11.75**	9.92**	10.58**	10.48**
22	AT 282 x AT 345	0.00	0.00	0.00	0.00	0.00	13.12**	14.29**	11.51**	15.11**	13.52**
23	AT 282 x China	0.00	0.00	0.00	0.00	0.00	9.49**	10.91**	12.98**	9.89**	10.81**
24	AT 282 x Nesadi Selection	0.00	0.00	0.00	0.00	0.00	4.46**	6.13**	7.08**	4.00**	5.41**
25	AT 282 x GT 1	0.00	0.00	0.00	0.00	0.00	0.96	6.53**	4.37**	0.55	3.11**
26	AT 282 x GT 10	0.00	0.00	0.00	0.00	0.00	1.45**	3.72**	1.00	4.62**	2.72**
27	AT 345 x China	-100.00**	-113.33**	-126.67**	-126.67**	-116.67**	-2.16**	-4.98**	-10.38**	-7.61**	-6.20**
28	AT 345 x Nesadi Selection	-86.67**	-100.00**	-93.33**	-113.33**	-98.33**	3.68**	2.85**	-4.31**	-3.02**	-0.13
29	AT 345 x GT 1	0.00	0.00	0.00	0.00	0.00	9.93**	16.33**	12.26**	8.94**	11.89**
30	AT 345 x GT 10	0.00	0.00	0.00	0.00	0.00	8.30**	14.30**	9.85**	7.76**	10.08**
31	China x Nesadi Selection	-93.33**	-93.33**	-113.33**	-120.00**	-105.00**	-0.37	4.33**	-5.65**	2.64**	0.34
32	China x GT 1	-3.70**	-11.11**	-7.14**	-6.67**	-7.14**	-0.05	6.63**	6.72**	0.27	3.41**
33	China x GT 10	0.00	0.00	0.00	0.00	0.00	-7.77**	-4.55**	-14.42**	-17.94**	-11.05**
34	Nesadi Selection x GT 1	-73.33**	-80.00**	-73.33**	-66.67**	-73.33**	18.35**	10.31**	8.52**	11.02**	12.10**
35	Nesadi Selection x GT 10	0.00	0.00	0.00	-6.67**	-1.67	-4.74**	-3.65**	-2.75**	-5.97**	-4.28**
36	GT 1 x GT 10	0.00	0.00	0.00	0.00	0.00	6.94**	5.22**	4.03**	1.86**	4.52**
	Range of ID	-100.00 to 61.54	-113.33 to 61.54	-126.67 to 60.53	-126.67 to 57.14	-116.67 to 60.26	-10.76 to 18.35	-16.46 to 17.98	-14.96 to 15.27	-17.94 to 18.22	-13.45 to 15.57
	S.Em ±	0.96	0.99	1.00	1.01	1.14	0.50	0.57	0.54	0.61	0.59

Table 1: Contd....

Sr. No	Hybrids	1000 seed weight (g)					Seed yield per plant (g)				
		E ₁	E ₂	E ₃	E ₄	Pooled	E ₁	E ₂	E ₃	E ₄	Pooled
1	AT 164 x AT 238	0.32	0.69	2.58	2.97	1.61	24.55**	22.75**	34.34**	22.72**	25.58**
2	AT 164 x AT 255	-6.84	0.63	2.15	3.4	-0.21	33.49**	44.42**	35.44**	39.31**	38.38**
3	AT 164 x AT 282	-3.32	2.23	4.17	0.71	0.90	35.29**	36.12**	33.18**	44.85**	37.41**
4	AT 164 x AT 345	5.72	3.59	0.19	6.29	4.03	42.27**	42.31**	47.84**	50.56**	45.53**
5	AT 164 x China	-2.06	3.32	3.77	4.91	2.46	39.35**	44.83**	47.53**	49.06**	45.03**
6	AT 164 x Nesadi Selection	10.19	7.84	1.46	2.72	5.79	34.01**	30.65**	36.00**	26.50**	31.71**
7	AT 164 x GT 1	-3.91	1.13	5.13	-7.94	-1.38	-22.98**	-26.20**	-23.30**	-26.11**	-24.72**
8	AT 164 x GT 10	-2.60	10.73	1.19	-1.32	2.42	13.15**	14.51**	19.79**	18.52**	16.02**
9	AT 238 x AT 255	0.21	3.64	0.53	1.01	1.37	-17.08**	-23.17**	-26.96**	-26.34**	-22.88**
10	AT 238 x AT 282	9.34	5.73	7.68	5.17	6.98	15.51**	17.64**	22.75**	13.02**	16.77**
11	AT 238 x AT 345	3.97	3.15	0.18	2.21	2.42	27.85**	20.94**	23.54**	26.49**	24.51**
12	AT 238 x China	6.44	4.17	2.04	1.85	3.68	30.09**	37.26**	26.12**	40.38**	33.75**
13	AT 238 x Nesadi Selection	5.56	2.38	0.37	0.30	2.23	15.61**	19.44**	16.01**	17.85**	17.31**
14	AT 238 x GT 1	0.32	0.18	0.10	0.02	0.16	22.02**	16.58**	23.27**	20.49**	20.31**
15	AT 238 x GT 10	-0.56	-3.80	0.72	-6.14	-2.43	24.97**	21.84**	24.38**	20.93**	23.00**
16	AT 255 x AT 282	8.31	9.07	28.86**	2.61	11.70	14.73**	16.95**	21.72**	17.37**	17.42**
17	AT 255 x AT 345	2.04	0.41	4.46	-5.78	0.20	20.63**	13.59**	28.15**	21.53**	20.25**
18	AT 255 x China	5.38	2.83	3.56	-0.55	2.81	9.94**	15.36**	10.66**	17.11**	13.39**
19	AT 255 x Nesadi Selection	3.80	10.52	0.80	3.88	4.86	16.41**	19.82**	21.65**	16.08**	18.47**
20	AT 255 x GT 1	2.44	1.82	1.03	5.46	2.76	18.89**	19.38**	22.93**	15.21**	18.88**
21	AT 255 x GT 10	3.27	2.97	0.62	7.85	3.84	22.41**	14.25**	16.92**	15.56**	17.26**
22	AT 282 x AT 345	4.01	2.04	0.70	-7.27	-0.01	19.25**	12.37**	10.85**	11.39**	13.74**
23	AT 282 x China	17.45	5.13	5.40	4.42	8.31	13.41**	17.04**	23.34**	32.15**	21.20**
24	AT 282 x Nesadi Selection	3.37	1.58	2.94	0.40	2.08	16.60**	17.55**	17.31**	27.74**	19.95**
25	AT 282 x GT 1	22.06	14.68	11.79	13.65	15.63	16.03**	18.71**	24.07**	24.62**	20.46**
26	AT 282 x GT 10	6.11	-6.71	-4.09	-4.93	-2.26	21.89**	20.62**	24.36**	20.84**	21.78**
27	AT 345 x China	20.52	-2.56	0.58	0.52	5.08	22.71**	23.94**	35.07**	22.87**	25.65**
28	AT 345 x Nesadi Selection	9.17	9.32	4.03	5.40	7.12	12.54**	21.23**	7.51**	11.77**	14.16**
29	AT 345 x GT 1	6.08	0.14	0.75	0.29	1.88	10.92**	12.78**	13.93**	15.69**	13.25**
30	AT 345 x GT 10	3.75	-1.57	-7.73	0.73	-1.01	-5.36	-0.57	-14.75**	-14.40**	-7.92*
31	China x Nesadi Selection	11.96	12.86	5.25	0.97	7.81	21.81**	30.30**	35.22**	28.53**	28.83**
32	China x GT 1	9.91	-11.41	8.91	0.90	2.30	23.72**	20.87**	35.86**	29.07**	26.51**
33	China x GT 10	12.17	32.85*	1.72	1.03	12.60	17.52**	-1.33	34.67**	4.59	13.55**
34	Nesadi Selection x GT 1	14.67	15.15	0.77	7.38	9.80	20.36**	18.95**	26.31**	20.49**	21.20**
35	Nesadi Selection x GT 10	30.99*	26.88*	0.66	-1.26	14.93	9.58**	15.82**	19.95**	23.59**	16.91**
36	GT 1 x GT 10	18.94	17.20	-0.53	1.57	9.89	14.32**	11.52**	18.32**	14.45**	14.43**
	Range of ID	-6.84 to 30.99	-11.41 to 32.85	-7.73 to 28.86	-7.94 to 13.65	-2.43 to 15.63	-22.98 to 42.27	-26.20 to 44.83	-26.96 to 47.84	-26.34 to 50.56	-24.72 to 45.53
	S.Em.±	13.45	13.59	9.89	11.48	12.08	3.08	4.19	2.71	2.88	3.61

Table 1: Contd....

Sr. No	Hybrids	Biological yield per plant (g)					Harvest index (%)				
		E ₁	E ₂	E ₃	E ₄	Pooled	E ₁	E ₂	E ₃	E ₄	Pooled
1	AT 164 x AT 238	28.06**	25.39**	-6.48	11.02	16.89*	-5.39	-3.72	37.40*	12.67	11.14
2	AT 164 x AT 255	13.75	30.16**	-10.31	17.30**	14.53	22.73	20.69	41.01*	24.91	27.63
3	AT 164 x AT 282	26.95**	22.20**	-10.28	20.61**	16.52*	11.48	16.87	39.12*	29.96	24.71
4	AT 164 x AT 345	0.36	0.63	-0.12	-12.49	-2.78	42.07**	41.20*	47.31**	55.58**	46.59*
5	AT 164 x China	-2.69	4.99	-19.12**	2.54	-2.99	40.94**	41.47*	56.08**	48.20**	46.51*
6	AT 164 x Nesadi Selection	-2.17	-3.49	-6.38	-5.01	-4.22	35.21*	32.98	38.86*	29.38	33.95
7	AT 164 x GT 1	-2.62	2.39	-2.53	0.52	-0.58	-19.77	-28.58	-20.18	-26.59	-24.02
8	AT 164 x GT 10	-2.05	10.36	-13.20*	-5.02	-1.62	14.07	4.06	28.20	22.38	16.49
9	AT 238 x AT 255	-2.91	9.66	-7.91	6.25	1.64	-14.28	-37.42*	-18.06	-35.58*	-26.77
10	AT 238 x AT 282	-2.94	19.68*	1.61	-0.04	5.18	15.80	-3.91	20.91	13.21	10.91
11	AT 238 x AT 345	2.39	22.83**	-10.03	-1.84	5.49	25.64	-2.44	30.01	27.54	20.26
12	AT 238 x China	0.25	5.30	-12.59*	-1.39	-1.83	29.36	33.32*	33.70*	40.91*	34.39
13	AT 238 x Nesadi Selection	0.47	5.29	-17.22**	-2.99	-3.21	14.52	12.49	26.99	19.64	17.92
14	AT 238 x GT 1	23.64**	11.43	2.62	14.53*	13.67	-1.93	6.20	20.74	6.19	7.76
15	AT 238 x GT 10	20.47**	19.95*	-9.52	9.95	12.32	5.49	2.10	30.66	11.95	12.86
16	AT 255 x AT 282	9.61	4.03	-12.46*	19.58**	6.26	5.87	13.78	30.15	-2.50	11.70
17	AT 255 x AT 345	16.62*	16.15	-14.40*	11.56	9.23	4.58	-3.47	37.37*	10.55	12.17
18	AT 255 x China	-0.19	2.99	-7.24	0.83	-0.66	9.89	12.48	16.79	16.01	13.68
19	AT 255 x Nesadi Selection	16.21*	22.11**	0.89	10.64	13.36	0.86	-3.05	20.58	4.91	6.07
20	AT 255 x GT 1	3.48	17.93*	-3.99	17.97**	9.51	16.36	1.25	24.97	-3.39	9.48
21	AT 255 x GT 10	0.30	20.62*	-12.02	13.79*	6.76	22.31	-7.73	25.53	1.96	10.40
22	AT 282 x AT 345	10.41	19.26*	-4.59	9.83	9.61	9.81	-8.60	14.39	0.44	3.98
23	AT 282 x China	1.00	16.27	-13.41*	-4.43	0.73	12.00	0.55	31.47	34.74*	19.60
24	AT 282 x Nesadi Selection	-0.75	8.13	-1.56	0.95	1.82	17.00	9.17	18.44	26.77	18.10
25	AT 282 x GT 1	20.88**	15.67	-15.72*	14.01*	10.67	-5.79	3.38	32.86*	11.97	10.69
26	AT 282 x GT 10	4.83	17.51*	-8.77	-1.74	3.76	17.83	3.74	30.22	21.94	17.96
27	AT 345 x China	-1.43	3.55	-11.21	4.15	-0.97	23.50	21.28	41.28*	18.76	25.73
28	AT 345 x Nesadi Selection	-0.46	8.96	-1.06	-3.10	1.34	12.77	12.72	8.34	13.82	12.15
29	AT 345 x GT 1	-1.44	1.58	-7.18	5.17	-0.35	12.02	11.34	18.91	10.78	12.96
30	AT 345 x GT 10	3.88	5.65	-9.42	-4.51	-0.55	-9.93	-6.83	-5.38	-10.37	-8.16
31	China x Nesadi Selection	-2.28	-9.88	-8.88	7.03	-3.31	23.02	36.88*	39.99*	22.44	30.40
32	China x GT 1	2.80	12.23	-10.75	3.86	2.82	20.94	8.82	41.89*	26.29	23.82
33	China x GT 10	9.83	11.45	-8.51	-0.90	3.70	8.11	-15.75	39.99*	5.95	10.13
34	Nesadi Selection x GT 1	19.65**	21.92**	-11.47	14.38*	12.97	1.18	-3.91	33.66*	6.42	9.70
35	Nesadi Selection x GT 10	4.52	1.72	-11.45	0.79	-0.66	4.37	14.34	27.22	22.07	16.71
36	GT 1 x GT 10	-0.54	-3.46	-4.14	1.62	-1.56	13.87	13.12	20.98	13.06	15.08
	Range of ID	-2.94 to 28.06	-9.88 to 30.16	-19.12 to 2.62	-12.49 to 20.61	-4.22 to 16.89	-19.77 to 42.07	-37.42 to 41.47	-20.18 to 56.08	-35.58 to 55.58	-26.77 to 46.59
	S.Em.±	7.32	8.39	6.16	6.58	7.94	15.32	16.83	16.69	17.60	18.11

Table 1: Contd....

Sr. No.	Hybrids	Oil Content (g)				
		E ₁	E ₂	E ₃	E ₄	Pooled
1	AT 164 x AT 238	-0.17	0.64	0.29	0.45	0.30
2	AT 164 x AT 255	-0.23	-0.98	-0.65	-0.93	-0.70
3	AT 164 x AT 282	-0.04	1.41	0.01	1.25	0.66
4	AT 164 x AT 345	-0.45	-0.32	-1.18	-1.61	-0.89
5	AT 164 x China	-0.42	-0.35	-0.88	-0.74	-0.60
6	AT 164 x Nesadi Selection	-0.52	1.06	0.10	0.79	0.36
7	AT 164 x GT 1	-0.55	-0.20	-0.48	-0.89	-0.53
8	AT 164 x GT 10	0.91	1.49	1.22	0.69	1.08
9	AT 238 x AT 255	4.27*	3.67*	3.22	3.76*	3.73
10	AT 238 x AT 282	5.35**	5.60**	5.32**	5.32**	5.40**
11	AT 238 x AT 345	1.74	1.91	1.91	1.93	1.87
12	AT 238 x China	0.36	0.10	-0.30	-0.46	-0.08
13	AT 238 x Nesadi Selection	1.22	1.26	1.22	1.56	1.32
14	AT 238 x GT 1	1.07	1.90	1.37	0.93	1.32
15	AT 238 x GT 10	0.32	-0.82	-0.45	-1.16	-0.53
16	AT 255 x AT 282	0.81	0.53	0.38	0.61	0.58
17	AT 255 x AT 345	-0.33	1.11	1.32	1.23	0.84
18	AT 255 x China	-0.08	0.17	0.25	-0.22	0.03
19	AT 255 x Nesadi Selection	1.96	0.85	0.44	0.66	0.98
20	AT 255 x GT 1	2.07	1.44	1.25	1.78	1.64
21	AT 255 x GT 10	2.50	2.86	2.79	2.35	2.63
22	AT 282 x AT 345	0.04	0.76	1.91	-0.16	0.64
23	AT 282 x China	9.14**	8.46**	8.84**	8.53**	8.74**
24	AT 282 x Nesadi Selection	0.04	-0.30	-1.51	-1.49	-0.81
25	AT 282 x GT 1	1.10	1.15	0.90	0.60	0.94
26	AT 282 x GT 10	2.44	2.71	2.64	1.81	2.40
27	AT 345 x China	0.28	1.40	1.10	0.78	0.89
28	AT 345 x Nesadi Selection	1.54	2.19	1.96	2.19	1.97
29	AT 345 x GT 1	1.97	1.53	1.68	1.09	1.57
30	AT 345 x GT 10	1.43	1.05	1.48	0.80	1.19
31	China x Nesadi Selection	1.71	0.53	1.18	1.45	1.22
32	China x GT 1	1.36	1.39	0.71	0.15	0.91
33	China x GT 10	3.54*	3.78*	3.51*	4.01*	3.71
34	Nesadi Selection x GT 1	2.43	0.51	0.68	0.25	0.98
35	Nesadi Selection x GT 10	1.61	2.02	1.85	1.84	1.83
36	GT 1 x GT 10	2.27	2.54	2.24	1.82	2.22
	Range of ID	-0.55 to 9.14	-0.98 to 8.46	-1.51 to 8.84	-1.61 to 8.53	-0.89 to 8.74
	S.Em.±	1.68	1.75	1.73	1.76	1.96

Table 2: Magnitude of inbreeding depression on pooled basis in sesame

Sr. No.	Characters	Range of inbreeding depression (%)		Number of crosses with significant inbreeding depression	
		From	To	+ve	-ve
1	Days to flowering	-5.87	5.18	0	0
2	Days to maturity	-6.87	7.31	0	0
3	Plant height (cm)	-10.32	25.57	1	0
4	Number of branches per plant	0.20	57.09	35	0
5	Number of capsules per plant	-16.47	27.36	0	0
6	Height to first capsule (cm)	-74.63	42.39	13	11
7	Length of capsule (cm)	-0.31	18.30	35	0
8	Width of capsule (cm)	-0.61	14.54	35	1
9	Number of capsules per leaf axil	-116.67	60.26	6	8
10	Number of seeds per capsule	-13.45	15.57	23	9
11	1000 seed weight (g)	-2.43	15.63	0	0
12	Seed yield per plant (g)	-24.72	45.53	33	1
13	Biological yield per plant (g)	-4.22	16.89	2	0
14	Harvest index (%)	-26.77	46.59	2	0
15	Oil index (%)	-0.89	8.74	2	0

[MS received : September 11 , 2018]

[MS accepted : September 14, 2018]