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HETEROSIS IN SUNFLOWER

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ABSTRACT

Forty six hybrids of sunflower obtained from 5 cms lines (2A, 5A, 207A, 234A and 821A) and 19 genotypes were evaluated for their days to 50 % flowering, plant height, head diameter and seed yield/plant. The hybrid 207 A x 234 B and 234 A x TNAUSUF 15/1 recorded 142 and 116 per cent as standard heterosis respectively for seed yield per plant. Therefore, these two hybrids could be recommended for large scale evaluation.

Sunflower (*Helianthus annuus* L.) is an important oilseed crop in Tamil Nadu. It occupies 22.5 lakh hectares with the production and productivity as 12.8 lakh ha and 569 kg/ha respectively (Damodaram and Hegde, 2000). About 60 % of the area of sunflower is occupied by the hybrids. Hybrids are high yielding, phenotypically uniform and stable over environments than open pollinated varieties, therefore, to identify a high yielding hybrids, the present study was undertaken.

Five cms lines namely 2A, 5A, 207A, 234A and 821 A and 19 genotypes namely 1B, 2B, 5B, EC 68414/2, EC 68415/1, TNAU SUF 15/1, 1381/7, RHA 272, RHA 274, RHA 6D-1, 234B, FMS 400B, GP 86, GP 93, GP 161, GP 255, GP 270, GP 324 and GP 336 were used to produce 48 hybrids. All hybrids and two checks *viz.*, variety CO 4 and the hybrid TCSH 1 were evaluated in RBD replicated twice at Department of Oilseeds, Tamil Nadu Agricultural University, Coimbatore during *rabi*/summer 2000-01. Each hybrid was sown in a 3m, row with 60 x 30 cm spacing. Normal cultural practices were followed to raise the crop. Observations were recorded on five randomly chosen plants per replication per entry for days to 50 % flowering, plant height (cm), head diameter(cm) and seed yield/plant (g). The analysis of variance was done as per the standard procedure. To assess the standard heterosis, the variety CO 4 and hybrid TCSH 1 was used and expressed as per cent over checks.

The mean and standard heterosis for seed yield and component characters are presented in Table 1. The results are discussed here under.

Days to 50 % flowering: The analysis of variance revealed that all hybrids differed significantly among themselves for days to 50 % flowering. The days to 50 % flowering for hybrids ranged from 55 (2A x FMS 338 B) to 74 days (821A x GP 93). Eleven hybrids *viz.*, 234 A x GP 86, 234 A x GP 255, 234 A x GP 324, 821 A x TNAUSUF 15/1, 821 A x GP 255, 2A x RHA 272, 2A x EC 68414/2, 2A x FMS 338 B, 2A x GP 86, 2A x GP 255 and 2A x GP 324 recorded significantly desirable early flowering than the best check CO 4 (66 dyas).

Plant height (cm): All the hybrids differed significantly from each other. The hybrids recorded between 114 (2A x GP 324) and 168 cm (821A x GP 93) as plant height. Twenty hybrids *viz.*, 234 A x 1 B, 234 A x 5B, 234 A x GP 161, 234 A x GP 270, 5 A x 234 B, 5A x RHA 272, 5A x GP 255, 821 A x 2B, 821 A x 5 B, 821 A x RHA 274, 821 A x TNAUSUF 15/1, 821 A x GP 86, 821 A x GP 255, 2A x EC 68414/2, 2 A x FMS 338 B, 2A x GP 86, 2 A x GP 255, 2 A x GP 324, 207 A x 234 B and 207 A x GP 324 recorded significantly shorter plant height than the best check TCSH 1 (136.3 cm).

Table 1. Mean of sunflower hybrids for various characters

Hybrids	Days to 50% flowering	Plant height (cm)	Head diameter (cm)	Seed yield/plant (g)	Standard heterosis (%)	
					CO 4	TCSH 1
234 A x 1 B	71.5	138.7	9.1	16.0	-4.13	-6.06
234 A x 5 B	68.5	144.5	9.2	22.9	37.01 *	34.24 *
234 A x EC 68414/2	66.0	157.0	10.5	28.4	69.81 **	66.37 **
234 A x TNAUSUF15/1	64.5	159.0	10.9	36.9	120.66 **	116.20 **
234 A x GP 86	62.0	149.0	11.6	5.3	-68.58 **	-69.21 **
234 A x GP 161	65.0	136.0	12.2	9.3	-44.30 *	-45.43 **
234 A x GP 255	63.5	165.3	10.7	14.1	-15.75	-17.46
234 A x GP 270	64.5	144.8	12.1	19.6	17.31	14.94
234 A x GP 324	63.0	149.4	12.2	12.1	-27.47	-28.94
234 A x GP 336	66.0	161.0	12.7	19.9	19.01	16.61
5 A x 234 B	71.5	137.4	9.4	11.2	-32.83	-34.18 *
5 A x RHA 272	66.5	139.3	10.0	9.1	-45.71 **	-46.81 **
5 A x EC 68415/1	71.0	162.8	12.9	23.3	39.43 *	36.61 *
5 A x GP 93	67.5	156.7	11.7	24.2	44.87 *	41.94 *
5 A x GP 255	64.5	142.2	8.7	14.2	-14.83	-16.55
821 A x 2 B	66.0	135.0	9.8	19.6	16.89	14.53
821 A x 5 B	67.0	138.4	10.8	25.6	53.21 **	50.12 **
821 A x RHA 274	68.5	127.2	11.0	14.1	-15.87	-17.57
821 A x 1381/7	67.0	163.9	13.0	22.9	36.62 *	33.86 *
821 A x EC 68414/2	66.5	147.2	11.4	25.9	54.77 **	51.64 **
821 A x TNAUSUF 15/1	63.5	128.1	14.3	14.6	-12.62	-14.38
821 A x FMS400B	71.0	152.5	10.5	31.8	90.13 **	86.29 **
821 A x GP 86	73.0	135.7	10.4	13.5	-19.55	-21.18
821 A x GP 93	74.0	167.8	13.0	12.9	-22.81	-24.37
821 A x GP 161	68.5	150.1	14.5	14.8	-11.51	-13.30
821 A x GP 255	62.5	135.9	11.4	12.5	-25.56	-27.07
821 A x GP 270	69.0	165.2	10.5	14.2	-14.98	-16.70
2 A x RHA 6 D-1	65.0	150.5	9.5	23.8	42.45 *	39.57 *
2 A x RHA 272	63.0	146.0	9.4	13.9	-17.07	-18.75
2 A x EC 68414/2	62.5	142.1	8.7	32.8	96.23 **	92.27 **
2 A x FMS 338 B	55.5	141.9	7.7	3.3	-80.42 **	-80.81 **
2 A x GP 86	63.5	141.7	6.8	13.7	-18.15	-19.80
2 A x GP 255	62.0	138.6	7.1	32.2	92.32 **	88.43 **
2 A x GP 324	64.0	114.1	8.4	21.0	25.71	23.17
207 A x 2 B	70.0	163.1	10.3	14.1	-15.61	-17.31
207 A x 234 B	72.0	123.3	7.7	41.4	147.35 **	142.36 **
207 A x RHA 6 D-1	73.0	149.3	9.0	4.2	-74.65 **	-75.16 **
207 A x RHA 272	72.0	160.0	9.4	7.5	-55.07 **	-55.98 **
207 A x GP 336	72.0	156.4	8.6	5.4	-67.89 **	-68.54 **
207 A x 1381/7	70.5	147.3	8.5	8.6	-48.82 **	-49.85 **
207 A x EC 68414/2	69.0	151.9	9.3	6.4	-61.64 **	-62.42 **
207 A x EC 68415	71.0	158.7	8.8	14.7	-11.93	-13.71
207 A x TNAUSUF 15/1	70.5	158.5	9.6	8.1	-51.45 **	-52.43 **
207 A x GP 161	72.0	162.3	9.5	3.4	-79.82 **	-80.23 **
207 A x GP 255	70.0	147.4	8.3	6.0	-64.13 **	-64.85 **
207 A x GP 324	70.5	130.9	7.3	7.0	-57.91 **	-58.76 **
CO 4 (Check)	66.0	148.5	9.1	16.7	-	-
TCSH 1 (Check)	68.0	136.3	9.2	17.1	-	-
S.E.	0.5	3.3	0.5	2.0	-	-
C.D. (P=0.05)	1.5	9.4	1.4	5.7	-	-
C.D. (P=0.01)	2.0	12.5	1.9	7.6	-	-

*,** significant at 5 and 1 per cent.

Head diameter (cm): All the hybrids recorded significant differences among themselves for head diameter. Both the checks CO 4 and TCSH 1 recorded almost same diameter (9.05 and 9.15 cm respectively). The range for head diameter is from 6.80 (821A x GP 161) to 14.50 cm (2A x GP 86). Seventeen hybrids *viz.*, 234 A x TNAUSUF 15/1, 234 A x GP 86, 234 A x GP 161, 234 A x GP 255, 234 A x GP 270, 234 A x 324, 234 A x 336, 5 A x EC 68415/1, 5 A x GP 93, 821 A x 5 B, 821 A x RHA 274, 821 A x 1381/7, 821 A x EC 68414/2, 821 A x TNAUSUF 15/1, 821 A x GP 93, 821 A x GP 161 and 821 A x GP 255 recorded significantly superior head diameter than the best check TCSH 1 (9.2 cm).

Seed yield/plant (g): All the hybrids recorded significant differences among themselves for seed yield/plant (g). The range for seed yield is between 3.38 g (207 A x TNAU SUF 15/1) and 41.4 g (207 A x 234B). Thirteen hybrids *viz.*, 234 A x 5 B, 234 A x EC 68414/2, 234 A x TNAUSUF 15/1, 5 A x EC 68415/1, 5A x GP 93, 821 A x 5B, 821 A x 1381/7, 821 A x EC 68414/2, 821 A x FMS 400B, 2A x RHA 6 D-1, 2A x EC 68414/2, 2A x GP 255 and 207 A x 234 B recorded significantly superior seed yield than the best check TCSH 1 (17.1 g/plant).

Considering the foregoing discussion, the hybrids 207 A x 234 B (41.1 g) and 234A x TNAU SUF 15/1 (36.9 g) could be considered as superior than check hybrid TCSH 1 (17.0 g). These hybrids recorded more than 100 % heterosis over the check hybrid. Hence this hybrid could be recommended for larger scale evaluation.

REFERENCE

Damodaram, T. and Hegde, D.M. (2000). Oilseeds Situation : A Statistical Compendium 2000. Directorate of Oilseeds Research.