J. Cotton Res. Dev. **28** (2) 217-219 (July, 2014)

Heterosis for fibre quality traits in cotton (*Gossypium hirsutum* L)

J. D. DESHMUKH, D. B. DEOSARKAR* AND V.D. DESHMUKH
Department of Agricultural Botany, Marathwada Krishi Vidyapeeth, Parbhani- 431 402
E-mail : dbdeosarkar@gmail.com

ABSTRACT : Line x tester analysis involving 6 diverse lines and 9 testers in upland cotton. Fifty four hybrids (Six females and nine males) were developed during *kharif,* 2006. These hybrids along with parents and three checks PHH 316, NHH 44 and Bunny were planted in *kharif,* 2007 at different three locations. Observations were recorded on seed cotton yield and fibre properties with an objective to estimate heterosis over better parent and three checks. The hybrid KH 121 x PH 348 had shown maximum significant heterosis over better parent (83.52 %), over PHH 316 (100.77 %), NHH 44 (51.75 %) and Bunny (75.33 %). The hybrid KH 120 x Cocker (28.78%) had recorded maximum positive significant heterosis over better parent. However, the cross KH 120 x PH 1024 had exhibited positive significant heterosis over PHH 316 (12.67 %) and over NHH44 (23.18%) for 2.5 per cent span length. The hybrid KH 120 x L 761 had recorded highest positive significant heterosis over better parent (48.91 %) and checks PHH 316 (12.45 %), NHH 44 (34.14 %) and Bunny (0.50%) for fibre length.

Key words : *Gossypium hirsutum,* heterosis, line x tester analysis

Cotton (*Gossypium* spp) is an important fibre yielding crop of global importance, which is grown in tropical and subtropical regions of more than 80 countries of the world over. Cultivated cotton genus *Gossypium* bear spinnable seed coat fibres. It played a triple role by producing lint, oil and protein. Cotton stalk are also used as fuel, for making particle and paper board. India has the largest area in the world. China and India are the major cotton consuming countries in the world (around 58 per cent of world cotton consumption). As regards export, USA and India export around 55 per cent of the world cotton with USA share 3.1 million tons and India share of 1.2 million tons. The present study was planned to estimate heterosis of parents and crosses in respect of yield and fibre properties.

The present investigation was under taken in *hirsutum* cotton involving six lines *viz.*, KH 120, DHY 286-IR, PH 297-7-1, KH 121, NH 572, and L 765 nine testers *viz.*, L 761, PH 348, PH 330, PH 44-1-2, PH 1009, PH 1024, NH 545, Cocker and MCU 5 of cotton genotypes having different characters. Fifty four hybrids using 6 females as lines and 9 males as testers were developed. These lines, testers and hybrids along with three checks PHH 316, NHH 44 and Bunny were grown in randomized block design with two replications. Row to row and plant to plant distances were maintained at 60 cm each. Recommended crop production and protection practices were followed to raise a good crop. Five competitive plants were randomly selected in each treatment/replication for recording the observations. The observations were recorded on 2.5 per cent span length (mm), micronaire value (µg/inch), fibre strength (g/tex), fibre elongation and seed cotton yield/plant (g). The experiment was conducted at three locations under rainfed condition *viz.,* Experimental farm, Department of Agricultural Botany, Parbhani, Cotton Research Station, Nanded and Agricultural Research Station, Badnapur. The data is the mean of three locations.

The highest significant positive heterosis for the character 2.5 per cent span length was observed in the cross KH 120 x Cocker (28.78%) over better parent. The range of heterosis was from -13.06 to -2.78 per cent over better parent. Eighteen, hybrids were significantly superior in terms of heterotic value over better parent.

Heterosis in negative direction is desirable for trait micronaire value. The cross DHY 286-IR x PH 348 was found superior as it showed the highest negative heterosis(-23.27 %) over better parent.

In respect of fibre strength, high fibre strength is most desirable trait of fibre quality character. The cross KH 120 x L 761 (48.91 %) had recorded highest significantly positive heterosis over better parent. Twenty hybrids exhibited positively significant heterosis over

Table 1. Estimation of heterosis over better parent

Sr. No.	Crosses	2.5 per cent span length (mm)	Micronaire value (g/inch)	Fibre strength (g/tex)	Fibre elongation (%)	Seed cotton yield/plant (g)
		BP	BP	BP	BP	BP
1	KH 120 x L 761	12.44**	-6.81	48.91**	27.41**	54.76**
2	KH 120 x PH 348	9.00**	-14.98	0.10	-5.56	21.65*
3	KH 120 x PH 330	17.61**	-17.18	29.74**	31.38**	-3.75
4	KH 120 x PH 44-1-2	15.78**	-19.76	7.14*	16.17**	65.43**
5	KH 120 x PH 1009	1.92	-14.12	-3.06	17.31**	27.91**
6	KH 120 x PH 1024	14.00**	-11.53	5.92*	29.35**	6.30
7	KH 120 x NH 545	2.07	-0.47	19.97**	30.80**	43.71**
8	KH 120 x Cocker	28.78**	-7.53	11.04**	4.12	20.81*
9	KH 120 x MCU 5	7.85**	-8.94	6.56	11.65*	14.96
10	DHY 286-IR x L 761	0.00	9.15	11.76**	39.05**	28.49**
11	DHY 286-IR x PH 348	11.16**	-23.27	-0.05	4.55	19.29*
12	DHY 286-IR x PH 330	3.07	21.83	11.56**	20.00**	-14.15*
13	DHY 286-IR x PH 44-1-2	15.94**	15.69	12.60**	16.17**	23.99*
14	DHY 286-IR x PH 1009	-11.00**	-12.60	-7.02**	-4.60	44.90**
15	DHY 286-IR x PH 1024	2.08	4.34	-5.78	3.81	25.75**
16	DHY 286-IR x NH 545	-3.12	10.11	12.44**	28.19**	-7.99
17	DHY 286-IR x Cocker	5.60*	-4.06	-0.99	0.69	30.64**
18	DHY 286-IR x MCU 5	-1.21	13.10	-1.05	9.32*	18.74*
19	KH 121 x L 761	4.00	-22.54	-3.64	4.19	15.11
20	KH 121 x PH 348	12.64**	-19.35	6.30*	11.30**	83.52**
21	KH 121 x PH 330	-2.28	-5.66	-4.45	27.05**	18.01**
22	KH 121 x PH 44-1-2	10.28**	-7.86	-8.46**	6.11	10.39
23	KH 121 x PH 1009	-9.51**	7.97	1.48	16.58**	68.54**
24	KH 121 x PH 1024	3.14	16.53	-9.00**	-5.24	74.64**
25	KH 121 x NH 545	1.92	-13.28	-2.20	3.49	0.91
26	KH 121 x Cocker	0.47	-2.15	-1.12	16.12**	-17.24
27	KH 121 x MCU 5	-1.49	6.95	-13.63**	2.44	24.23**
28	NH 572 x L 761	-7.34**	-1.41	-1.09	18.15**	-3.87
29	NH 572 x PH 348	-8.10**	1.38	-10.05**	-8.09	22.77**
30	NH 572 x PH 330	2.82	2.43	1.23	20.66**	-17.27*
31	NH 572 x PH 44-1-2	9.23**	3.83	-0.05	24.06**	-11.95
32	NH 572 x PH 1009	-13.06**	-2.31	-13.27**	-0.18	3.83
33	NH 572 x PH 1024	-0.94	2.98	-7.11**	13.90**	-10.39
34	NH 572 x NH 545	3.80	-9.84	4.08	20.66**	-23.86**
35	NH 572 x Cocker	-7.72**	-6.92	-4.22	-0.86	9.34
36	NH 572 x MCU 5	5.46*	-9.09	4.64	4.30	3.17
37	PH 297-7-1 x L 761	4.36	-10.80	30.17**	2.16	59.22**
38	PH 297-7-1x PH 348	6.86**	-12.44	-13.50**	-10.29*	69.15**
39	PH 297-7-1x PH 330	1.08	-9.31	1.96	-20.72**	-1.02
40	PH 297-7-1x PH 44-1-2	2.46	-6.92	16.88**	-1.44	77.81**
41	PH 297-7-1x PH 1009	-7.38**	-4.53	1.66	7.75	46.45**
42	PH 297-7-1x PH 1024	-4.71*	2.63	-6.55	-2.70	67.34**
43	PH 297-7-1x NH 545	-8.24**	7.40	20.13**	16.76**	18.32
44	PH 297-7-1x Cocker	21.75**	-6.92	14.93**	9.26*	26.96**
45	PH 297-7-1x MCU 5	-2.58	2.63	-1.15	8.96	33.27**
45	PH 297-7-1x MCU 5	-2.58	2.63	-1.15	8.96	33.27**
46	L 765 x L 761	-3.90	-13.15	8.96**	1.85	17.66
47	L 765 x PH 348	-6.92**	-7.83	12.29**	-15.18**	35.76**
48	L 765 x PH 330	-6.92**	7.05	2.13	-5.93	18.06**
49	L 765 x PH 44-1-2	8.21**	-0.78	13.68**	13.52**	10.48
50	L 765 x PH 1009	-4.19*	7.97	-7.65**	21.92**	32.11**
51	L 765 x PH 1024	8.59**	1.83	0.48	12.96**	16.73
52	L 765 x NH 545	1.17	4.44	14.93**	20.00**	25.12**
53	L 765 x Cocker	2.53	-16.47	13.23**	27.27**	17.88*
54	L 765 x MCU 5	-2.76	4.44	-3.78	9.86*	8.91

*, ** - Significant at 5 per cent and 1 per cent level, respectively

better parent.

For the character fibre elongation, twenty nine hybrids exhibited significant positive heterosis over better parent. The hybrid expressing significantly positive heterosis over better parent was DHY 286-IR x L 761 (39.05%).

Considering the mean performance over three environments, the cross KH 121 x PH 348 showed maximum significant heterosis over better parent (83.52 %). Thirty one crosses exhibited significant positive heterobeltiosis for seed cotton yield/plant (Table 1).

Several workers have also reported high heterosis for seed cotton yield and fibre characters. Result of Tuteja *et al.,* (2006), Giri *et al.,* (2006), Ganapathy and Nadarajan (2008), Dukre *et al.,* (2009) and Deosarkar *et al.,* (2009) are in agreement with present findings.

REFERENCES

Deosarkar, D.B., Jadhav, D.S. and Patil, S.G. 2009. Combining ability studies for yield and quality traits in cotton (*Gossypium hirsutum*) *J. Cotton Res. Dev.* **23** : 183-87.

Dukre, V.B., Burghate, S.K. and Patil, S.P. 2009. Diallel analysis for heterosis studies in upland cotton. *J. Cotton Res. Dev.* **23** : 217-21.

Ganapathy, S. and Nadarajan N. 2008. Heterosis studies for oil content, seed cotton yield and other economic traits in cotton *(Gossypium hirsutum* L.) *Madras Agric. J.* **95**: 306-10.

Giri, R.K., Nirania, K.S., Dutt, Y., Sangwan, R.S. and Jain, P.P. 2006. Heterosis for seed cotton yield and its contributing traits in upland cotton (*Gossypium hirsutum* L.) *J. Cotton Res. Dev.* **20** : 39-47.

Tuteja, O.P., Kumar, S., Singh, M. and Luthra, P. 2006. Heterosis for seed cotton yield and fibre quality characters in cotton (*Gossypium hirsutum* L.) *J. Cotton Res. Dev.* **20** : 48-50.

Received for publication : July 31, 2012
Accepted for publication : April 17, 2013