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Heterosis for seed cotton yield and fibre quality characters in desicotton (*Gossypium arboreum* L.)

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Abstract
The experiment was conducted by using five male and five female lines in line x testé design. In the present investigation most of the crosses reported positively significant heterosis for seed cotton yield per plant. The extent of hoterosis depends primarily on the magnitude of non additive gave effects as parent possesses wide genetic diversity for seed cotton yield. Out of 25 crosses, 12 cross combinations showed positively significant hererosis over MP, BP and SC for fibre staplelength. In case of boll weight crosses showed positive and significant hétérosis over mid parent, better parent and standard check. The extent of heterosis for boll weight was 14.55 per cent over mid parent, 19.93 per cent over better parent and 23.80 per cent over standard check PKVDH 1. The crosses PA 686 x AKA 9703 and PA 686 x JLA 794 exhibited significant positive heterosis over mid parent, better parent and standard check for seed cotton yield.

Keywords: Heterosis, line X tester, standard check, fibre length

Introduction

Cotton (*Gossypium* spp.)is an important commercial and industrial crop cultivated in India. It provides essential raw material for textile industries and handlooms. Indiais one of the major cotton growing countries and it occupies. Prominant place in Indian agriculture. Heterosis plays a dominant role in accelerating agriculture production there fore information regarding magnitude of heterosis is desirable since hybrid cotton occupies major area under cotton cultivation. On the global level, Indiais the first country to make pioneering efforts to exploit the phenomenon of heterosis in cotton which is avaliable both in the intra specific and inter specifichybridsat commercial level. This has enhanced the lint production and productivity considerably. The present inviestigation aims at establishing the extent of relative heterosis, better parent heterosis and economic heterosis for seed cotton yield and fibre characters in cotton through line x tester analysis.

Materials and Methods

The present investigation was under taken to study ‘Heterosis studies in cotton *(Gossypium arboreum*) at Cotton Reserach Station, Mahboob Baugh Farm, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani. The expérimental material consists of 25 crosses along with parents and two checks viz. PKVDH 1 and PKV Survarna. The 25 crosses, 10 parents and 2 checks weregrown in a randomized block design with two replications. Each treatment in each replication consists of two rows of 6 meterleng that spacing of 60 x 30 cm. The observation were recorded on 5 randomly selected plants for the characters viz. days 50 % flowering, days to maturity, number of monopodia, number of sympodid, plantheight (cm), number of bolls per plant, 100 seed weight (g), seed cotton yield per plant (g), ginningouttum (%) and fibre staplelength. All the recommended agronomical and plant protection practices were followed regularly. The analysis was carried our for line x tester mating design as suggested by Kempthorne (1957).

Results and Discussion

The value of heterosis for seed cotton yield and yield contributing characters were presented in table. All the crosses showed negative significant heterosis for days to 50 per cent flowering over mid parent, better parent and standard check indicating that earliness could be induced in these crosses. Out of 25 crossess, 5 crosses showed negative significant heterosis for early maturity over mid parent, better parent and standard check. In case of number of monopodia, 9 crosses exhibited positive heterosis over standard check. For number of sympodia, 6 crosses showed positive heterosis over standard check viz. PA 774 x PA 255 (1.79 %), PA 686 x AKA 9703 (7.78%), PAIG 332 x PA 255 (3.79) and PA 713 x PA 255 (2.79%). Seven crosses

Exhibited significant positive heterosis over standard check for plant height. Out of 25 cross combinations, five crosses displayed positive significant heterosis over mid parent, better parent and standard check. Significant positive heterosis over mid parent, better parent for 100 seed weight was found in the crossess PA 774 x PA 255 (18.25%), PA 686 x AKA 9703 (23.89 %), PA 710 x RAC 024 (15.70 %), PA 710 x JLA 794 (14.34%), PA 710 x AKA 9703 (15.08 %) and PAIG 332 x PA 255 (1.78 %). However the cross PA 686 x AKA 9703 recorded maximum economic heterosis followed by PAIG 332 x PA 255 and PA 710 x RAC 024. The extent of heterosis depend sprimarily on the magnitude of non additive gene effect as parent possesses wide genetic diversity for seed cotton yield. In case of ginningoutturn (%) the trend of heterosis was mostly negative over better parent and standard check in the cross PA 774 x AKA 9703, PA 686 x AKA 9703, PA 710 x JLA 794, PA 710 x AKA 9703 and PAIG 332 x AKA 9703. Staplelength of fibre is one of the important component character which determines the quality of cotton. Out of 25 crosses studied 12 cross combinations showed positively significant heterosis over mid parent, better parent and standard check for staplelength.

Ten cross combinations showed positive significant heterosis over better parent for seed cotton yield. The top yield cross were PAIG 332 x PA 255 (*200*.08 %), PA 774 x A kA 9703 (136.67 %) and PA 710 x RAC 024 (113.17 %).

The above results are in agreement with Deosarkar*et al.* (2009) [3], Patel *etal.* (2010) [6], Patil *et al.* (2011) [7], Reddy *et al.* (2011) [10], Sekhar *et al.* (2012) [11], Kumar *et al.* (2013) [5], Ranganatha *et al.* (2013) [9], Abro *et al.* (2014) [1], Kumar (2014) [4], Badhe *et al.* (2015) [2] and Patil *et al.* (2015) [8].

Table 1: Estimation of heterosis over mid parent, better parent and standard check for different characters

Genotypes	Days to 50% flowering			Days to maturity			No.of monopodia/ plant			No. of sympodia/ plant			Plant height (cm)			No. of bolls / plant		
	MP	BP	SC	MP	BP	SC	MP	BP	SC	MP	BP	SC	MP	BP	SC	MP	BP	SC
PA 774 x PA 255	-8..82**	-9.27**	-1.08	0.84	-2.27	6.17	-2.65**	1.85**	-8.33	7.37**	7.37**	1.79	6.32*	-1.58	17.67**	3.93**	14.06**	7.57*
PA 774x AKA 9703	-16.33**	-16.89 **	-9.38	0.000	-0.85	2.85	6.42**	16.00 **	-3.33	-34.72**	-25.79**	-29.64	11.03**	9.48**	14.65**	13.98**	39.09**	-8.90**
PA 686 x PA 255	-5.49**	-10.70**	-3.61	-4.64	-6.66**	1.44	25.56**	31.48**	18.33	-15.07**	-11.43**	-22.85	-15.93**	-21.65**	-6.31	-15.62**	0.30	-17.95**
PA 686 x AKA 9703	-8.87**	-13.76 **	-7.22	1.36	1.19	5.25	21.09**	33.20**	11.00	3.60**	23.43**	7.78	5.00	4.29	9.16**	99.87**	124.71**	42.27**
PA 710 x RAC 024	-7.22**	-8.87**	-7.22	-16.25**	-16.94**	-10.97	26.98**	37.93**	33.33	-12.50**	-10.91**	-2.19	9.86**	9.76**	16.44**	1.90	4.90*	1.32
PA 710 x JLA 794	-4.62**	-6.31**	-4.62	-17.22**	-17.22**	-12.66	14.29**	24.14**	20.00	-11.83**	-10.90**	-4.19	0.90	0.04	6.04*	3.20	23.50**	-14.39**
PA 710 x AKA 9703	-6.32 **	-10.40**	-3.61	-11.47**	-12.21**	-7.44	1.69**	20.00**	0.00	-10.82**	-6.36**	2.79	-4.48	-5.08	0.66	14.49**	41.62**	-7.19**
PA 710 x AKA 8	-3.19 **	-6. 51**	-1.44	-9.66**	-10.87**	-6.03	36.13**	58.82**	35.00	-0.90	0.00	9.78	-9.52**	-14.66**	2.07	8.73**	17.25**	13.25**
PAIG 332 x PA 255	-5.49**	-10.70**	-3.61	-8.84**	-9.58**	-1.79	1.54**	22.22**	10.00	2.09**	9.47**	3.79	-0.74	-4.11	14.65**	6.50**	13.26**	13.25*
PAIG 332 x AKA 9703	-6.79**	-11.74**	-5.05	-1.68	-3.14	-3.56	30.19**	64.00**	36.66	-19.48**	-14.94**	-7.68	14.08**	10.64**	23.25**	24.71**	57.51**	3.22
PA 713 x PA 255	-7.99**	-13.38**	-6.49	-4.26	-5.03	-3.13	22.81**	29.63**	16.66	3.39**	8.92**	2.79	-7.51*	-9.96**	7.65	-7.72**	-4.66	0.72**
PA 713 x AKA 9703	-7.12**	-12.42**	-5.77	-4.36	-5.78	-0.79	23.64**	36.00**	13.33	-12.99 **	-6.00**	-2.19	-3.49	-7.12*	5.19	-16.48**	9.10**	-28.98**

Genotypes	100 seed weight (g)			Seed cotton yield / plant (g)			Ginning outturn (%)			Staple length of fibre (mm)		
	MP	BP	SC	MP	BP	SC	MP	BP	SC	MP	BP	SC
PA 774 x PA 255	-8..08**	18.25**	0.12	-20.08**	39.62**	28.07**	5.14**	8.38**	-29.43	11.84**	15.62**	5.98
PA 774x AKA 9703	-0.07	5.67 **	10.33**	112.45**	136.67**	76.82**	-5.12**	-4.26**	-34.99	14.22**	22.50**	4.70
PA 686 x PA 255	-7.28**	-2.17**	11.33**	-36.78**	-14.54*	1476**	6.85**	8.92**	-31.73	15.48**	15.15**	5.55
PA 686 x AKA 9703	-17.74**	-16.03 **	23.89**	297.84**	456.51**	315.74**	-14.87**	-11.33-**	-44.42	11.75**	16.50**	-0.42
PA 710 x RAC 024	-7.53**	-1.79**	15.70**	91.99**	113.17**	130.81**	8.31**	16.03**	-31.29	22.71**	23.25**	20.08
PA 710 x JLA 794	-8.55**	-5.69**	14.3**	48.38**	52.36**	64.96**	-3.35**	-1.37	-35.86	10.72**	10.96**	8.12
PA 710 x AKA 9703	-11.03**	-10.05**	15.08**	32.56**	62.33**	21.28**	-3.91**	-3.74**	-34.87	14.93**	23.00**	5.12
PA 710 x AKA 8	-2.73**	4.49**	-2.52**	52.36**	105.93**	122.96**	0.81	1.96	-31.01	10.99**	12.94**	10.04
PAIG 332 x PA 255	0.30	1.16	1.78**	63.22**	200.08**	156.38**	-6.08**	-5.39**	-38.37	15.69**	17.72**	7.90
PAIG 332 x AKA 9703	-15.49**	-11.94**	-16.87**	76.44**	89.15**	41.32**	-4.91**	-3.59**	-36.30	18.72**	25.25**	7.05
PA 713 x PA 255	-4.60**	-3.00**	-2.40**	-29.44**	-2.98	27.39**	8.67**	11.62**	-31.06	15.27**	17.02**	7.26
PA 713 x AKA 9703	-1.30**	-11.87**	-16.81**	-5.82	29.86**	-2.97	1.17	6.76**	-34.07	17.34**	23.50**	5.55

Referances

1. Abro S, Laghari S, Deho ZA, Manjh MA. Estimation of heterosis and heterobeltiosis of yield and quality traits in up land cotton. Journal of Biology Agriculture and Helthcare. 2014; 4(6):19-22.
2. Badhe PL, Borole DN, Bhosale VA. Heterosis studies in cotton. (*Gossypium arboreum* L.). Bioinfolet. 2015; 12(4B):983-987.
3. Deosarkar DB, Jadhav DS, Patil SG. Combining ability studies for yield and quality traits in cotton (*Gossypium hirsutum* L.) J. Cotton Res. Dev. 2009; 23(2):183-187.
4. Kumar A. Heterosis and combining ability for yield and fibre quality in desicotton (*Gossypium arboreum* L.). M.Sc. Thesis submitted to V.N.M.K.V. Parbhani, 2014.
5. Kumar ST, Salimath PM, Patil Malagouda. Heterosis and inbreeding depression for economic traits in desicotton. Electro. J. Plant Breed, 2013; 1(1):47-51.
6. Patel JP, Fougat RS, RS Jadeja, Patel GC, Suthar KP. Heterosis yield attributing characters in inter specificasiatic cotton hybrids. International J. Agri. Sci. 2010; 6(1):78-83.
7. Patil SA, Naik MR, Patil AB, Chaugule GR. Heterosis for seed cotton yield and its contributing characters in cotton. International J. Agri. Sci. 2011; 6(1):78-83. (*Gossypium hirsutum* L.). International J. plant Sci. 2011; 6(2):262-266.
8. Patil SS, Magar NM, Sonawane HS, Shinde PY, Pawar VY. Heterosis and combining ability for seed cotton yield and its component traits of diploid cotton (*Gossypium arboreum* L.) J. Cotton Res. Dev. 2015; 29(1):23-25.
9. Ranganatha HM, Patil Shreekant S, Rajeev P, Swathi P. Heterosis studies for seed cotton yields and its component trits in up land cotton (*Gossypium hirsutum* L.). Bioinfolet. 2013; 10(4C):1549-1553.
10. Reddy CVCM, Reddy YR. Genetic parameters for yield and fibre quality traits in desicotton (*Gossypium arboreum* L.). J. Cotton Res. Dev. 2011; 25: 168-70.
11. Sekhar L, Khadi BM, Patil RS, Katageri IS, Vamadevaiah HM, Chetti MB, *et al.* Study of heterosis in thermo sensitive genetic male sterility (TGMS) baseddiploidcottonhybrids for yield, yield component and fibre quality characters. Karnataka J. Agri. Sci. 2012; 25:313-21.