The Andhra Agric. J 57(2):207-209, 2010

Standard Heterosis for Seed Cotton Yield and Component Traits in Upland Cotton (*Gossypium hirsutum* L.)

Key words : Cotton, Standard Heterosis

Cotton being an often cross pollinated crop is amenable for heterosis breeding. In cotton, there are two main pre-requisites for commercial exploitation of heterosis *viz.,* identification of parents which show high magnitude of heterosis on crossing and production of hybrid seed with minimum cost. Hence, the present investigation was planned to study standard heterosis in 52 cotton hybrids.

The experimental material comprised 48 hybrids along with four checks (RCH-2, RAHH-95, Bunny Bt and DHH-11). The hybrids were produced by crossing 14 new intra-hirsutum lines (8 lines × 6 testers) which were isolated from new heterotic pools of segregating generations of multiple crosses in line × tester fashion during *kharif* 2007-08. These hybrids were grown in randomized block design with two replications during *kharif 2008*-09 at Agricultural College Farm, Bapatla. Each genotype was sown in three rows of 4.2 m length with inter- and intra-row spacing of 120cm × 60cm in each replication. Data on plot basis or 10 randomly selected plants in each hybrid per replication were collected for plant height, days to 50% flowering, number of monopodia plant^{-1}, number of sympodia plant^{-1}, number of bolls plant^{-1}, boll weight, seed index, lint index, ginning out-turn, 2.5% span length, micronaire value, bundle strength, uniformity ratio, fibre elongation, lint yield plant^{-1} and seed cotton yield plant^{-1}. The standard heterosis was calculated as per cent increase or decrease observed in F_1 over standard check as per Liang *et al.* (1972).

The analysis of variance revealed highly significant differences among 52 hybrids (48 hybrids + 4 checks) for all the characters studied. The standard heterosis was estimated against check hybrid Bunny Bt. The range of standard heterosis in percentage for different characters in cotton along with standard heterosis (%) over standard check (Bunny BT) of promising crosses for different characters in cotton are presented in the Table except for number of sympodia, number of bolls plant^{-1}, seed index and fibre elongation as none of the crosses exhibited significant positive standard heterosis over check for these traits.

For seed cotton yield cross RAH 63 × RAH 141 showed highest percentage of standard heterosis 21.3 over check Bunny Bt in agreement with Pole *et al.* (2008) and Deosarkard and Jadhavs (2009).

For plant height, RAH 44 × RAH 143 (17.9) recorded highest significant standard heterosis over check Bunny Bt. In case of days to 50% flowering the hybrids, RAH 36 × RAH 162, RAH 36 × RAH 141 and RAH 63 × RAH 112 exhibited highest negative standard heterosis which is desirable for this trait.

Boll weight is an important component of seed cotton yield. The hybrid RAH 63 × RAH 116 (16.4) showed highest percentage of standard heterosis over Bunny Bt in accordance with Deosarkard and Jadhavs (2009) and Babar *et al.* (2001). For lint index highly significant standard heterosis over Bunny Bt was expressed by RAH 15 × RAH 183 (13.6). Whereas, RAH 15 × RAH 116 (17.1) for ginning out-turn, RAH 63 × RAH 116 (10.6) for 2.5% span length and RAH 15 × RAH 162 (36.2) for micronaire value recorded highest significant positive standard heterosis over Bunny Bt.

RAH 63 × RAH 116 (7.7) identified as best heterosis combiner for bundle strength also reported by Gaurav *et al.* (2007). For uniformity ratio the hybrid RAH 22 × RAH 143 (14.9) recorded highest positive standard heterosis over Bunny Bt in accordance with Gaurav *et al.* (2007). In case of lint yield per plant, highest positive standard heterosis was shown by RAH 52 × RAH 143 (26.4) in accordance with Pole *et al.* (2008) and Deosarkard and Jadhavs (2009).

The present study of standard heterosis indicated that the heterosis percentage for micronaire value (36.2) was highest followed by lint yield plant^{-1} (26.4) and seed cotton yield plant^{-1} (21.3). Most of the hybrids exhibited high positive standard heterosis for most of the quality parameters *viz.,* ginning out-turn, 2.5% span length, micronaire value and

Table. Significant positive heterosis (%) over standard check (Bunny BT) of promising crosses and range of standard heterosis (%) for different characters in cotton (*Gossypium hirsutum* L.)

Promising Crosses											
Plant height	Days to 50% flowering	No. of monopo-dia plant^{-1}	Boll weight	Lint index	Ginning out-turn	2.5% span length	Micronaire value	Bundle strength	Uniformity ratio	Lint yield plant^{-1}	Seed cotton yield plant^{-1}
4XD (17.9**)	2XA (-5.0*) 3XC (-7.0**) 3XF (-7.0**) 7XA (-7.0**)	6XC (39.5**) 6XD (45.8**) 8XD (29.1**)	1XC (13.9**) 1XD (13.9**) 5XC (13.9*) 7XB (16.4**) 7XD (13.9*)	5XD (11.8*) 5XE (13.6*)	2XD (12.6**) 3XF (15.9**) 5XB (17.1**) 5XE (14.5**) 6XB (15.0**)	1XC (6.5*) 7XB (10.6**)	1XE (34.7**) 2XC (31.8**) 2XF (34.7**) 3XD (33.3**) 5XC (36.2**)	7xB (7.7*)	1XD (14.9**) 4XA (13.4**) 5XD (14.2**) 6XB (12.3**) 6XE (12.7**)	2XD (23.2*) 4XD (21.4*) 4XF (25.4*) 7XF (25.2*) 8XD (26.4*)	7XF (21.3*)
Range of standard heterosis (%)											
-32.2 to 17.9	-7.0 to 9.0	-68.7 to 45.8	10.13 to 16.4	-35.4 to 13.6	-1.4 to 17.1	-19.7 to 10.6	-10.1 to 36.2	-12.0 to 7.7	-13.3 to 14.9	-32.8 to 26.4	-38.3 to 21.3

1=RAH 22, 2= RAH 19, 3=RAH 36, 4= RAH 44, 5=RAH 15, 6= RAH 24, 7= RAH 63 and 8=RAH 52 are lines whereas, A=RAH 112, B=RAH 116, C=RAH162, D=RAH 143, E=RAH 183 and F=RAH 141are testers respectively.

*, ** = Significant at 5% and 1% level, respectively.

uniformity ratio than yield contributing parameters. Performance of the cross, RAH 63 X RAH 141 was promising over the highest yielding check for seed cotton yield plant^{-1}. This may be further tested over larger environments to establish its superiority and stability.

LITERATURE CITED

Babar Saira Bano, Soomro A R, Rehana Anjum and Muhammad Shahban Kalwar 2001. Estimation of heterosis, heterobeltiosis and economic heterosis in upland cotton (*Gossypium hirsutum* L.). Pakistan Journal of Biological Sciences 4(5): 518-520.

Deosarkard D B and Jadhavs G Patil 2009. Heterosis study in cotton (*Gossypium hirsutum* L.) under rainfed conditions. Journal of Cotton Research and Development 23(1): 26-34.

Gaurav Khosla, Gillbs and Sohu R S 2007. Heterosis and combining ability analysis for plant and seed characters in upland cotton. Journal of Cotton Research and Development 21(1): 12-15.

Liang G H, Reddy C R and Dayton A D 1972. Heterosis, inbreeding depression and heritability estimates in a systematic series of grain sorghum genotypes. Crop Science 12: 409-411.

Pole S P, Sudewad S M, Kamble S K and Borgaonkar S B 2008. Heterosis for seed cotton yield and yield components in upland cotton (*Gossypium hirsutum* L.). Journal of Cotton Research and Development 22(2): 139-142.

Department of Genetics and Plant Breeding
Agricultural College,
Bapatla 522 101
Andhra Pradesh

Mahantesh
M Lal Ahamed
C Panduranga Rao
J S V Samba Murthy

(Received on 27.08.2009 and revised on 05.10.2009)