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Short communication

HETEROSIS STUDIES IN OKRA *[ABELMOSCHUS ESCULENTUS (L.)* MOENCH]

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Okra or bhindi [*Abelmoschus esculentus (L.)* Moench] is an annual important vegetable crop propagated from seed in India as well as world. It belongs to Malvacea family having chromosome number 2n=130. The okra is an often cross pollinated crop where natural cross pollination occurs up to extent of 8.75 to 9.61% (Purwal and Randhwa 1947). After harvesting, fruit can be easily transported in bulk and stored for few days without much loss of quality. Okra is more remunerative than the leafy vegetables. The dry fruit shell and stem containing crude fiber are suitable for use in manufacture of paper and cardboard. The success of breeding program depends mainly upon the promising parents from the gene pool. A clear understanding heterosis of the traits under consideration will help the breeding in deciding the appropriate breeding methods to improve the genetic makeup as well as to make a dense in productivity.

Thirty six genotypes of okra were studied in this experiment. Thirty six genotypes consisted of 12 line (female) namely KS-423, KS-440, KS-447, KS-441, KS -453, KS-455, KS-420, BO-2, KS-437, KS-448, KS-439 and KS-427 and three tester (male) namely Prbhani Kranti (P.K.), KS-410 and KS-404. These parents were crossed in a line x tester mating design (Kamptorne, 1957) and resultant thirty six hybrids along with their parents were raised in RBD with three replication. Heterosis was assessed over the mid parental value (relative heterosis) were done for following characters viz. days to flowering, height of plant (cm), number of branches per plant, number of first fruiting node, length of first fruiting node (cm), number of node per plant, length of inter node(cm), length of fruit (cm), width of fruit (cm), tapering length of fruit (cm), number of fruit per plant and yield per plant (g).

Table 1: Estimates of heterosis over mid parent for different characters in okra

Cross combination	Day to flowering	Height of plant	No. of branches per plant	No. of first fruiting node	Length of first fruiting node	No. of nodes per plant	Length of inter node	Length of fruit	Width of fruit	Tapering length of fruit	No. of fruits per plant	Yield per plant
KS 423 XP.K	-5.23**	0.90*	16.20**	-10.40**	-11.78**	4.62**	-6.70**	0.33*	-3.11**	-2.35**	6.75**	4.38**
K S 440XP.K	-7.61**	-10.09**	-9.06**	-10.42**	-1.18**	-11.77**	-18.53**	-9.51**	-12.08**	-10.95**	-10.42**	-20.53**
KS447XP.K	-7.94**	-16.21**	-0.50	-3.38**	-8.39**	.20.90**	8.38**	-12.13**	-12.51**	-10.81**	-23.81**	-25.90**
KS 441XP.K	-3.31**	-1.67**	24.55**	-11.61**	-4.61**	10.97**	33.60**	0.70**	-8.63**	-7.11**	-18.37**	-1.14**
KS453XP.K	4.47**	14.18**	56.24**	-2.68**	5.43**	27.59**	0.60	11.26**	10.75**	11.99**	54.65**	23.69**
KS-455X P.K	-0.41	14.43**	73.25**	-4.96**	5.58**	32.60**	-11.60**	18.16**	20.35**	20.77**	57.91**	36.85**
KS-420X P.K	-0.58	8.45**	44.46**	-9.73**	1.91**	10.12**	-14.69**	15.22**	9.74**	8.77**	16.59**	30.49**
BO-2 X P.K	5.53**	10.72**	50.30**	-12.32**	-0.59	21.28**	-13.71**	12.52**	17.66**	17.83**	38.73**	18.63**
KS-437X P.K	4.52**	2.17**	23.05**	-2.35**	0.31	4.89**	-10.26**	-4.94**	9.41**	9.33**	1.27**	-11.67**
KS-448X P.K	-2.03**	-0.66	21.99**	-13.95**	-3.68**	2.81**	-9.12**	9.21**	4.65**	4.26**	16.43**	16.02**
KS439XP.K	1.22**	1.72**	37.48**	-17.69**	8.99**	11.65**	-2.88**	7.03**	13.86**	13.93**	39.21**	5.81**
KS427XP.K	2.58**	5.94**	49.01**	-9.25**	7.02**	12.81**	-10.67**	4.17**	15.27**	13.12**	27.53**	6.55**
KS423XKS410	-14.48**	-1.89**	143**	-11.08**	-8.91**	10.14**	-2.55**	5.3**	-5.50**	-5.17**	24.81**	9.07**
KS440 XKS410	13.65**	-11.42**	15.19**	-14.74**	0.36	-14.32**	-28.01**	-10.27**	-1154**	-10.86**	-15.65**	-21.04**
KS447 XKS410	-11.58	-17.35**	-7.21**	-10.34**	-8.24**	-24.17**	4.82**	-14.20**	-12.61**	-12.22**	-31.03**	-27.62**
KS441 XKS410	-11.79**	-8.85**	17.32**	-25.40**	-5.05**	0.06	-16.61**	-11.67**	2.13**	2.07**	10.02**	-17.60**
KS453 XKS410	-6.30**	2.41**	14.54**	-16.94**	12.91**	0.35	-12.44**	3.81**	9.88**	9.93**	9.96**	2.47**
KS455 XKS410	-10.85**	5.24**	35.49**	-6.88**	-0.21	18.05**	1.85**	4.41**	9.93**	9.95**	37.05**	9.46**
KS420 XKS410	-11.21**	-1.17**	-17.39**	-15.62**	-5.64**	2.90**	-11.92**	4.96**	-1.37**	-0.77**	10.19**	12.01**
BO2 XKS410	-7.91**	-4.16**	28.24**	-14.01**	-8.06**	9.34**	-3.01**	-8.29**	-123.96**	-15.54**	26.92**	-15.41**
KS437 XKS410	-12.07**	-7.19**	0.97**	-6.78**	5.76**	-9.45**	-25.31**	-12.37**	-13.11**	-12.42**	-8.09**	-23.28**
KS448 XKS410	-13.86**	-1.44**	25.37**	-21.02**	4.57**	0.14	-10.19**	-0.70**	6.56**	6.35**	11.14**	-2.10**
KS 439 X KS 410	-7.87**	3.23**	27.25**	-23.62**	17.35**	7.03**	-7.55**	3.24**	7.57**	6.39**	31.12**	2.50**
KS 427 XKS 410	-10.598**	6.44**	33.33**	-15.44**	17.02**	5.81**	-19.20**	11.09**	13.98**	10.79**	21.07**	25.88**
KS 423XKS 404	-13.49**	3.05**	7.87**	-18.44**	-10.62**	-7.53**	-24.67**	5.31**	10.98**	11.69**	-11.78**	8.53**
KS440 XKS 404	-8.20**	-3.19**	24.30**	-2.85**	2.75**	-2.77**	-33.50**	5.55**	-7.02**	-4.43**	-1.36**	7.63**
KS447 XKS 404	-11.54**	-10.52**	25.12**	-9.43**	-5.52**	-16.53**	4.01**	-9.25**	-8.62**	-9.04**	-18.89**	-17.53**
KS441 XKS 404	14.52**	-5.92**	24.57**	-22.63**	3.18**	1.12**	-16.09**	-3.28**	-11.15**	-14.10**	18.75**	-3.43**
KS 453 XKS 404	-9.89**	8.00**	35.57**	-8.26**	8.34**	10.77**	-1.00**	5.09**	10.89**	11.04**	42.02**	13.28**
KS 455 XKS 404	-14.22**	10.32**	48.49**	-1.82**	4.07**	18.90**	-8.05**	11.79**	24.14**	24.91**	48.41**	23.90**
KS 420 XKS 404	-14.11**	-0.55	28.56**/	-15.53**	-6.07**	24.48**	9.04**	-1.34**	1.45**	11.84**	14.63**	-2.68**
BO 2 XKS 404	-7.38**	2.82**	36.17**	-19.80**	9.42**	8.40**	-12.26**	-7.00**	-7.77**	-6.84**	34.03**	-13.97**
KS 437 XKS 404	-10.60**	11.10**	10.01**	-6.43**	5.21**	-5.08/**	-6.89**	-1795**	-14.06**	-12.27**	-6.92**	-33.59**
KS 448 XKS 404	-16.82**	-1.43**	15.53**	-11.92**	-0..69	0.29	-14.12**	2.97**	-5.29**	-4.84**	11.40**	-3.54**
KS 439 XKS 404	-11.40**	2.64**	20.27**-	-13.91**	12.60**	5.49**	-8.95**	-4.77**	-1.67**	4.27**	20.53**	-13.23**
KS 427 XKS 404	-11.15**	8.16**	36.87**	1.17**	3.44**	17.07**	-3.87**	15.40**	22.22**	25.26**	47.35**	28.69**
SE(H+Mp)±	0.49	0.43	0.27	0.26	0.42	0.37	0.31	0.13	0.11	0.11	0.265	0.49

**, ** Significant at 1 % and 5 % level of significance*

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The analysis of variance for all the yield and yield components traits studied are presented in Table 1. Variance due to hybrids was also highly significant for all the traits. The present study revealed the distribution of heterosis in both positive and negative directions for all the traits.The hybrid KS-455 x P.K. recorded superior heterotic expression of the relative heterosis (over the mid parental) for eight traits viz. height of plant (cm), number of branches per plant, number of node per plant, length of fruit (cm), width of fruit (cm), tapering length of fruit (cm), number of fruit per plant and yield per plant (g). The two hybrids KS-227 x KS-404 and KS-455 x KS-404 recorded maximum relative heterosis (over the mid parental) for five traits. Similar results were reported by Singh and Syamal (2006).

In term of fruit yield per plant and other yield traits described for number of branches per plant, hybrids namely, KS-423 x KS-410, KS-455 x P.K. and KS-453 x P.K. recorded significant higher positive heterosis. For length and width of fruit, hybrids namely, KS-455 x P.K. and BO-2 x P.K. significantly recorded higher heterosis. Number of fruit per plant and yield per plant, hybrids KS-455 x P.K., KS-455 x KS-404 and KS-427 x KS-404 recorded maximum significantly positive heterosis. The preponderance of heterosis over mid parent in okra for yield and yield contributing characters were also reported by Yadav *et al*. (2007), Desai *et al.* (2007) and Dahake e*t al*. (2007). The performance of testers with the lines was considerably good and exhibited significat levels of heterosis for most of the characters that contributes to fruit yield. The results indicated that exploitation of the heterosis or hybrid vigour might be one of the promising methods to affect crop improvement in okra for fruit yield purpose. The result also indicated that the heterosis for fruit yield can be exploited commercially.

It is concluded that KS-455xP.K. followed by KS-455 x KS-404 and KS-427 x KS-404 were found to be the best combination for fruit yield and yield attributing traits on the basis of significant increase heterosis over mid parent. The preponderant role of dominance in the magnitude of over dominance in these traits could be the reason for maximum heterosis for yield per plant. Therefore these hybrids may be advanced and exploited in future breeding programmes for improving yield and its components in okra.

REFERENCES

Dahake, K.D., Bangar, N.D., Lad, D.B. and patil, H.E., (2007) Heterosis studies for fruit yield and its contributing characters in okra[*Abelmoschusesculentus* (L.) Moench]. *International Journal of Plant Science* 2: 137-140.

Desai, S.S., Bendale, V.W. Bhave, S.G. and Jadhav, B.B., (2007) Heterosis for yield and yield components in okra [*Abelmoschus esculentus* (L.) Moench]. *Journal of Maharashtra Agricultural University* 32 (1):41-44.

Kamptorne, O., (1957) “An introduction to genetical statistics.” The IOWA State University Press, Amer. IOWA, USA.

Purwal, S.S and Randhwa, G.S., (1947) Chromosome and Pollination in Okra [*Abelmoschus esculentus (L.)* Moench*]*. *Indian Journal of Agriculture Science* 17:**129 -136.**

Singh, D.R. and Syamal, M.M., (2006) Heterosis in okra [*Abelmoschus esculentus* (L.) Moench] Orissa. *Journal of Horticulture* 34(2):124-127.

Yadav, J. R., Bhargav, L. Kumar, S., Mishra, G, Yadav, A., Parihar, N .S. and Sing, S.P., (2007) Useful heterosis for yield and its components in okra [*Abelmoschus esculentus* (L.) Moench]. *Progressive Agriculture* 7(1-2): 5-7.