



ESTIMATION OF STANDARD HETEROSIS IN BHENDI (*ABELMOSCHUS ESCULENTUS* (L.) MOENCH)

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Abstract

The present study was undertaken to identify potential parents and superior cross combinations for higher yield and its component traits in bhendi. Ten bhendi genotypes were crossed in line × tester fashion in randomized block design. The hybrid Kallakkurichi local × Salkeerthi recorded highest and significant standard heterosis for most of the yield and its component traits.

Key words: Bhendi, line × tester, hybrids, yield.

Introduction

Bhendi is a powerhouse of variable nutrients. It is also known as lady's finger and okra in many parts of the world. It is propagated by seeds. Bhendi is classified as often cross-pollinated crop with somatic chromosome number $2n = 130$. India is a major okra producing country in the world comprising of 72% of total area under okra (FAOSTAT, 2013). The major okra producing states are Uttarpradesh, Chhattisgarh, Andra Pradesh, Haryana, Assam and Tamil nadu. Bhendi has a vast potential as one of the foreign exchange earns and accounts for about 60 percent of the export of fresh vegetables. The bhendi fruit has 88 percent moisture, protein 2.2gm, carotene 58mg, fat 0.2gm, thiamine 0.07mg, fibre 1.2gm, magnesium 43mg, phosphorus 0.08gm, ascorbic acid 16mg, iron 1.5mg, sulphur 54mg and potassium 332mg per 100gm of fruit. It is a good source of folic acid, vitamin B, vitamin C providing 21.1 percent of daily value for a 2000 calorie and has high dietary fibre content. For a well balanced diet 300 g of vegetable is needed (Dwivedi *et al.*, 2003).

The yield potential of bhendi is low, so the productivity of this crop should be increased by improving the genetic architecture through hybridization and recombination. In spite of its importance, no major Break through has been made in this crop and the farmers are still growing their

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own local varieties or open pollinated varieties. Fonseca and Peterson (1968) and Kadambavanasundaram (1982) suggested that estimation of standard heterosis is more relevant from plant breeder's point of view. Jag Paul Sharma and Singh (2012) and Javia (2013) also concluded that heterosis is one the parameter supposed to improve the characters in bhendi. Hence an attempt has been made to study the line × tester analysis to know the standard heterosis of yield and its component traits.

Materials and Methods

The present investigation was carried out at the Breeding Farm, Department of Genetics and Plant Breeding, Faculty of Agriculture, Annamalai University, Annamalainagar during January to April and July to October of 2018. Twenty one F1 hybrids were obtained by crossing 7 lines and 3 testers. The hybrids along with the parents were raised in randomized block design with three replications. Cultural and agronomic practices were followed as per the standard recommendations and need based plant protection measures were taken up to maintain healthy crop stand. The data recorded in five randomly selected plants in each replication for yield and its component traits were subjected to statistical analysis.

Results and Discussion

Higher values are desirable for all the traits under study except for days to 50 percent flowering, plant height

for which lower values are preferred and presented in (Table 1). Fruit yield is a complex trait. It is the end product of several basic yield components. The standard heterosis is more useful in practical point of view.

In this study among 21 hybrids, all 21 hybrids exhibited significant positive standard heterosis for fruit yield per plant. The maximum standard heterosis was recorded in Kallakkurichi local × Salkeerthi (59.51 percent) followed by Trichy local × Salkeerthi (58.09 percent).

Early flowering is an important trait. Out of 21 crosses, 18 hybrids exhibited significant standard heterosis. Highest significant negative standard heterosis was recorded in Kallakkurichi local × Salkeerthi (-6.72 per cent). The maximum significant negative standard heterosis was recorded by Kallakkurichi local × Salkeerthi (-6.46 percent) for plant height.

In number of branches per plant the hybrid Kallakkurichi local × Salkeerthi (64.71 percent) recorded the maximum positive significant standard heterosis. Out of 21 crosses, 16 hybrids recorded positive significant standard heterosis. For internodal length, the hybrid Kallakkurichi local × Salkeerthi (37.26 percent) recorded the maximum positive significant standard heterosis. Out of 21 hybrids, 17 hybrids recorded significant positive standard heterosis.

For fruit length, the hybrid Kallakkurichi local × Salkeerthi (21.10 percent) recorded the maximum positive significant standard heterosis. Out of 21 hybrids, 9 hybrids recorded significant positive standard heterosis. For fruit grith, hybrid Trichy local × Salkeerthi (32.

Table 1: Estimation of standard heterosis for different quantitative characters in Bhendi.

Sl. No.	Characters Treatments	Days to 50 percent flowering	Plant height, cm	Number of branches per plant	Internodal length, cm	Fruit length, cm	Fruit grith, cm	Fruit weight, g	Number of fruits per plant	Number of seeds per fruit	100 seed Weight, g	Fruit yield per plant, g
1.	Thalaivasal local × Salkeerthi	40.78**	17.63**	8.92**	12.33**	4.38	1.34	-5.67*	14.77**	11.21**	18.78**	25.16**
2.	Thalaivasal local × Ankur40	22.73**	26.61**	2.94	19.42**	-8.22**	-0.81	-9.94**	20.43**	17.05**	12.70**	11.63**
3.	Thalaivasal local×Arka Anamika	32.53**	39.24**	35.29**	22.09**	-0.25	1.34	11.29**	18.34**	-7.01**	7.28**	20.37**
4.	Kallakkurichi local × Salkeerthi	-6.72**	-6.46*	64.71**	37.26**	21.10**	23.66**	11.60**	25.13**	53.29**	39.66**	59.51**
5.	Kallakkurichi local×Ankur40	-3.80**	23.84**	50.1**	12.93**	-2.03	13.91**	11.46**	19.71**	3.09	12.55**	19.18**
6.	Kallakkurichi local×Arka Anamika	7.33**	24.26**	22.65**	2.78	12.91**	22.85**	10.00**	-9.96**	12.40**	28.91**	56.21**
7.	Bhuvanagiri local×Salkeerthi	27.44**	22.52**	5.98*	16.20**	6.59**	-1.01	7.00**	13.05**	11.50**	18.12**	31.97**
8.	Bhuvanagiri local×Ankur40	29.13**	34.34**	3.82	18.82**	-9.01**	-9.68**	4.09	24.50**	-3.88	4.56*	9.31**
9.	Bhuvanagiri local×Arka Anamika	33.98**	43.23**	0.98	5.89**	-1.01	-6.25**	-4.11	18.92**	-7.2**	6.56**	22.19**
10.	Chinnasalem local×Salkeerthi	16.17**	3.64	41.18**	1.31	9.7**	13.64**	9.01**	10.63**	25.45**	30.53**	44.08**
11.	Chinnasalem local×Ankur40	14.28**	30.35**	12.55**	35.79**	-2.47	12.50**	-5.58*	20.08**	12.05**	7.56**	16.72**
12.	Chinnasalem local×Arka Anamika	3.76	30.16**	27.06**	19.97**	13.48**	13.10**	-9.03**	-7.72**	25.45**	22.54**	52.87**
13.	Madurai local×Salkeerthi	34.00**	5.56*	28.53**	0.16	20.12**	2.35	4.09	11.68**	20.51**	20.21**	33.25**
14.	Madurai local×Ankur40	15.80**	36.52**	8.73**	18.00**	-3.09	3.97	4.84*	20.55**	-3.88	6.28**	51.84**
15.	Madurai local×Arka Anami ka	8.06**	34.56**	5.88*	25.37**	8.07**	0.40	9.81**	11.89**	0.10	9.99**	30.23**
16.	Trichy local×Salkeerthi	-6.58**	4.43	50.88**	5.18**	20.36**	32.66**	22.73**	1.03*	33.26**	32.14**	58.09**
17.	Trichy local×Ankur40	14.11**	21.8**	30.29**	17.51**	3.93	31.85**	1.99	21.21**	1.91	12.98**	18.24**
18.	Trichy local×Arka Anami ka	-1.88	26.61**	30.1**	0.16	11.35**	17.54**	-4.11	-9.35**	11.52**	24.39**	50.17**
19.	Chidambaram local ×Salkeerthi	27.43*	8.34**	19.61**	10.31**	-7.14**	27.49**	6.12**	14.87**	16.89**	19.4**	42.12**
20.	Chidambaram local×Ankur40	19.22**	24.48**	-2.84	18.99**	-3.32	0.20	0.82	20.72**	12.05**	5.85**	7.25**
21.	Chidambaram local×Arka Anamika	9.20**	37.4**	4.61	21.00**	7.16**	-4.64*	11.29**	16.80**	-4.37	8.75**	13.52**

*** Significant at 5 and 1 percent respectively

Percent) recorded maximum positive standard heterosis. Out 21 hybrids recorded hybrids, positive significant standard heterosis.

Fruit weight is also an another important character. The hybrid Kallakkurichi local \times Salkeerthi (22.73 percent) recorded the maximum highest positive significant standard heterosis. Out 21 hybrids, 11 hybrids recorded positive significant standard heterosis. For number of fruits per plant, the hybrid Kallakkurichi local \times Salkeerthi (25.13 percent) recorded the maximum positive significant standard heterosis.

Out 21 hybrids, 17 hybrids recorded positive significant standard heterosis for Number of seeds per fruits. The hybrid Kallakkurichi local \times Salkeerthi (53.29 percent) recorded the maximum positive significant standard heterosis. Out 21 hybrids, 13 hybrids recorded positive significant standard heterosis.

For 100 seed weight, the hybrid Kallakkurichi local \times Salkeerthi (39.66 per cent) recorded the maximum positive significant standard heterosis. All the 21 hybrids recorded positive significant standard heterosis for this trait.

Conclusion

From the above discussion it is identified that the

hybrid Kallakkurichi local \times Salkeerthi recorded the maximum and significant positive standard heterosis for most of the yield and its component traits except for fruit grith. The hybrid Kallakkurichi local \times Salkerhi can be further exploited for the heterosis breeding programme.

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