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RESEARCH ARTICLE

Commercial exploitation of hybrid vigour in cucumber (*Cucumis sativus* L.)

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SUMMARY

The significant heterosis was observed for all the characters but none of these cross combinations exhibited useful heterosis for all the traits. However, the maximum heterosis of 172.38 per cent for yield per vine was observerd in cross EC-43342 x BIHAR -1 and this cross also performed better for other traits like node number of first male and female flower , fruit length and fruit diameter .The significant heterosis for yield per vine was also observed in crosses EC-43342 x C -99 -10 (113.77%) ,PCUC-15-(112.09%) PCUC-15 x 98-6(102.15%) and BIHAR-1 x C-99-10(76.97%) .These crosses had best heterotic effect for yield due to the better performance of characters like fruits length, fruit diameter, fruit weight and number of fruits per vine .Significant and desirable hertersis in aforesaid crosses is due to dominance and dominance type of interaction.

Key Words : Hybrid vigour, Heterosis, Cucumber

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Cucumber (*Cucumis sativus* L.) is an important vegetable crop of tropical and subtropical regions of the world ,grown successful in plains as well hills. The reasonable yield potential in this crop based on various observations is reported to be much more than what has been achieved so for. The plant in probably indigenous to north India. It is widely cultivated though out India and in the tropical and subtropical parts of the word and it is a popular vegetable crop. Numerous varieties are under cultivation, fruits of some of the varieties are 25-38 cm long and 8-10 cm diameter with fairly thick rind, while other yield small, ovoid fruits with thin and smooth rind. They require a warm climate, but not so warm as for melons. They can be grown both in the plains and on the hills, and require a liberals supply of manure. Therefore, it is reported to be much more than what has been extensively expolored and utilized for boosting up yield in a number of economically important species. Cucumber has great scope to utilize hybrid vigour commercially because of its monoecious nature of flowering, more number of seeds per fruit and cultivation around the year throughout the country. Heterosis breeding has come to play a pivot role in crop improvement for high production and productivity .The extent of heterosis over superior/economic parent is a prerequisite for commercial exploitation of hybrid vigour in cucumber.

MATERIALS AND METHODS

The present investigation was conducted with eight genetically diverse genotypes of cucumber *viz.*, PCUC-15, EC-43342, PCUC-15-1, CHC-2, BIHAR-1, C-99-12, C-98-6 and C-99-10, crossed in dialer fashion without reciprocal .The parents along with 28 F_1s were sown in randomized block design with three replications during Zaid, 2002. Observations were recorded on five randomized taken plants in each parents and F_1s in each replication for days to first male and female flower, node number of first male and female flower, fruit length, fruit diameter, fruit weight, no. of fruits per vine, vine length and

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yield per vine .The data were complied and subjected to analysis of hetersis over better parent.

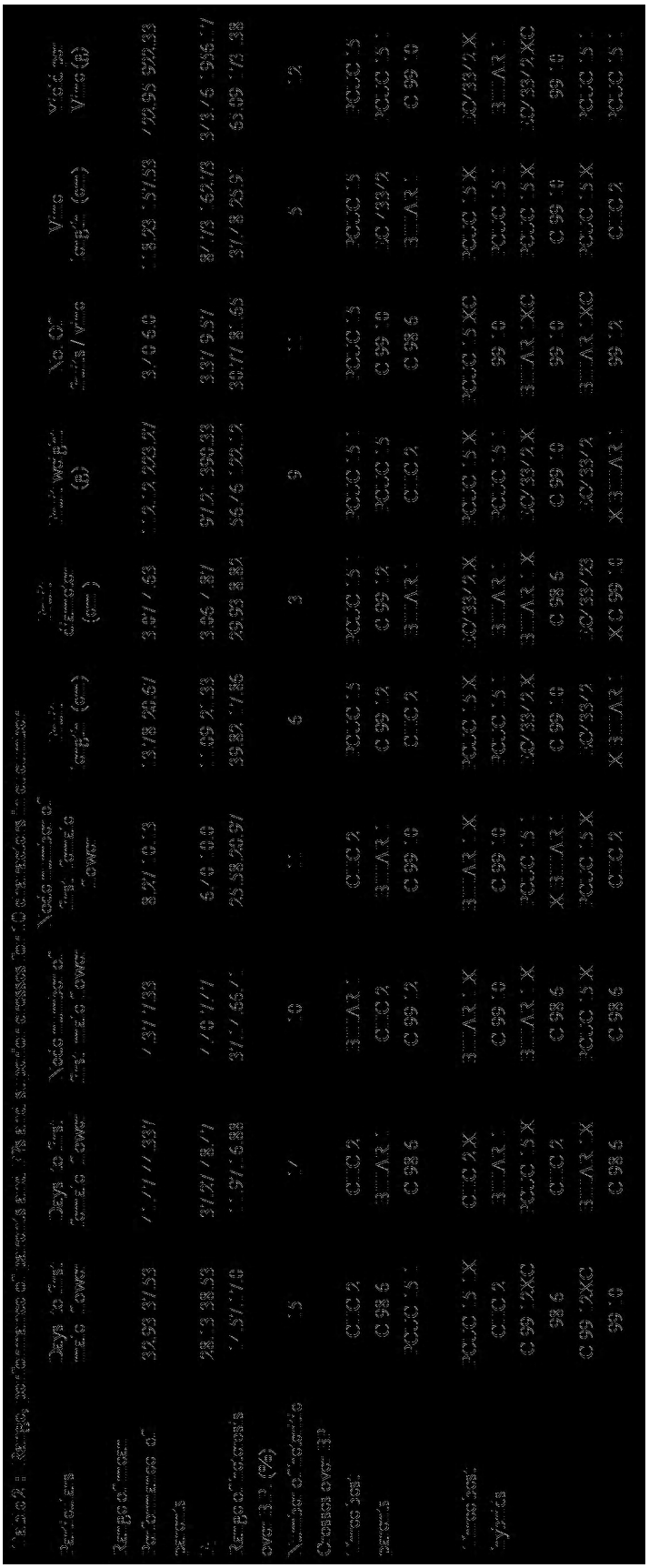
RESULTS AND DISCUSSION

The result revealed that the significant amount of desirable heterosis was recorded for all the traits (Table 1) .The heterosis for days to first male flower ranged from -14.57 to 17.0 per cent ,the most promising crosses were PCUC-15 XCHC-2,C-99-12XC-98-6, C-99-12XC-99-10 and CHC-2XC -99-10; for days to female flower were CHC-X BIHAR-1, PCUC-15-1 XCHC-2 BIHAR-1 XC -98-6 ,PCUC-15 XPCUC-15-1 AND PCUC-15-1 XC -98-6; for node number first male flower the desirable hybeids in order of merit were BIHAR -1 XC -99-10 , BIHAR-1X-98-6 ,PCUC-15XC-98-6 and PCUC -15XC -99-12; for node number of first female flower the most promising crosses were BIHAR-1XC-99-10, PCUC-15-1 X BIHAR -1, PUCU-15-1XCHC-2, CHC-2XC-99-10, and BIHAR-1 XC-98-6. The magnitude of heterosis for fruit length was highest in hybrid PCUC-15X PCUC-15-1 while maximum heterosis for fruit diameter was observed in the crosses EC-43342X BIHAR -1,

Table 1: Estimates of heterosis over better parent in per cent for 10 character in cucumber

Sr. No.	Hybrid/ cross combinations	Days to first male flower	Days to first female flower	Node no. of first male flower	Node no. of first female flower	Fruit length	Fruit diameter	Fruit weight	Number of fruits per vine	Vine length	yield per vine
		BP	BP	BP	BP	BP	BP	BP	BP	BP	BP
1.	PCUC-15 X EC -43342	17.0**	1.09	41.98**	-3.91	31.73**	-11.57**	-18.86**	-5.00	-7.32**	-16.57**
2.	PCUC-15 X PCUC-15-1	-7.69**	-5.17**	-10.45	-4.07	17.86**	5.04*	122.12**	-15.73**	25.91**	112.09**
3.	PCUC-15 X CHC-2	-14.57**	-0.94	16.05**	3.23	-5.00**	-11.6**4	-31.76**	5.70	9.69**	-17.72**
4.	PCUC-15X BIHAR-1	11.13**	4.10**	-7.46	-4.29	-14.36**	-29.93**	-26.12**	16.46**	-3.48**	-13.49**
5.	PCUC-15 X C-99-12	15.18**	3.86**	-29.35**	-7.41*	-25.78**	-11.94**	-34.48**	2.93	-0.87	-23.87**
6.	PCUC-15 X C-98-6	-5.87**	-3.22*	-34.33**	-11.85**	2.67	-6.72*	32.59**	5.90**	-7.77**	102.15**
7.	PCUC-15 XC-99-10	3.04	-3.79**	-5.47	13.18**	-13.44**	-27.46**	-31.44**	81.65**	21.26**	20.13**
8.	EC-43342 X PCUC-5-1	3.05**	9.56**	41.98**	-2.34	4.40**	-10.86**	3.34	-11.11**	-28.48**	-6.15
9.	EC-43342 X CHC-2	-7.74**	4.88**	66.41**	20.97**	-16.76**	-13.78**	-39.27**	-13.33**	-30.13**	-28.35**
10.	EC-43342 X BIHAR-1	-5.01*	-3.63**	5.34	1.56	9.48**	8.82**	54.46**	32.22**	-4.36**	173.38**
11.	EC-43342 X C-99-12	0.00	-3.09*	45.04**	-1.56	-12.36**	-8.80**	-19.39**	-13.33**	-30.17**	9.65
12.	EC-43342 X C-98-6	5.89**	16.88**	60.31**	8.59**	5.98**	-7.69*	-11.67**	-28.89**	-9.65**	-28.10**
13.	EC-43342 X C-99-10	-2.86	-2.79*	70.99**	20.31**	10.35**	-5.97*	66.50**	12.22**	-28.48**	113.77**
14.	PCUC-15-1 X CHC-2	1.55	-10.39**	-14.81	-16.94**	1.46	-2.16	-7.42**	-15.73**	14.66**	21.91**
15.	PCUC-15-1 X BIHAR-1	3.61	9.62**	-25.0**	-24.29**	-1.71	-29.55**	-3.81**	1.12	-23.81**	0.20
16.	PCUC-15-1 XC -99-12	-9.61**	-4.39**	-1.48	1.40	-31.11**	-14.24**	-25.45**	-14.04**	-33.44**	12.04
17.	PCUC-15-1 XC-98-6	-5.49**	-4.55	-0.92	-6.16*	-26.14**	-32.30**	-26.57**	-5.62	-19.13**	-30.84**
18.	PCUC-15-1 XC-99-10	-5.46**	0.91**	-18.10**	8.53*	-1.57	-23.24**	11.07**	-12.36**	-15.60	-1.69
19.	CHC-2 X BIHAR-1	-2.00	-11.97**	12.35**	0.00	-39.82**	-27.64**	-56.46**	-25.74**	34.41*	-65.09**
20.	CHC-2 X C-99-12	-5.42**	-3.62**	3.70	8.87**	-2.26**	1.73	3.73*	20.59**	-0.33	28.49**
21.	CHC-2 XC-98-6	-9.49**	-0.48	19.75**	7.26*	-22.03**	-24.65**	-45.57**	7.69	-37.48**	-32.45**
22.	CHC-2XC -99-10	-10.25**	4.57**	-2.47**	-13.71**	-7.38**	-18.35**	-32.59**	35.29**	-26.32**	-5.16
23.	BIHAR -1 XC -99-12	-5.01*	-3.79**	-11.33**	10.00**	-27.06**	-25.34**	2.12**	57.89**	-27.47**	19.58**
24.	BIHAR-1XC-98-6	-7.41	-5.95	-37.04	-12.86**	-4.12	8.65	25.87**	-30.77**	-14.47**	-2.21
25.	BIHAR-1 XC-99-10	-1.13	-1.42	-37.14	-25.58	-6.21	11.59	-3.03**	76.47**	-14.15**	76.97**
26.	C-99-12-XC-98-6	-14.49	-1.77	-11.33	-12.59	-26.44	-8.35	-18.07**	53.85**	-34.9**	72.84**
27.	C-99-12 XC-99-10	-12.43	-3.4	-1.48	-1.4	-29.27	-10.15	-25.74**	57.89**	-23.24**	16.51**
28.	C-98-6 XC -99-10	8.69	1.29	-19.05	10.08	-0.04	3.23	11.46**	24.36	22.88**	37.49**
	SE (sij)±	0.63	0.55	0.29	0.29	0.44	0.13	3.99	0.30	2.17	50.20

*and ** indicate significance of values at P=0.05 and 0.01, respectively



BIHAR-1XC -98-6,EC-43342XC-99-10 and PCUC-15X PCUC -15-1. Heterosis for fruit weight was maximum in hybrid PCUC-15X PCUC-15-1 ; for number of fruits per vine hybrids in order of merit were PCUC-15XC -99-10, BIHAR-1XC -99-10, BIHAR -1XC -99-12 and C-99-12XC -98-6; for vine length maximum heterosis was observed in cross PCUC -15X PCUC-15-1 and for yield per vine , the magnitude of heterosis varied from-65.09 to 173.38 per cent.The most promising cross combinations in order of merit were EC-43342X BIHAR-1 ,EC-43342XC-99-10.PCUC-15X PCUC -15XC-98-6 and BIHAR-1XC -99-10. Solanki *et al.* (1982), Qi and Chui (1991), Vijaykumari *et al.* (1993), Cramer and Wehner (1991) and Bairagi *et al.* (2002) had also reported similar finding in cucumber.

Out of 28 F_1s, the three best hybrids are identified for each character listed in Table 2. Beside, the three best combination were also selected for all the ten characters. Among them, the parent CHC-2 for six character, PCUC-15 and BIHAR -1 each for five characters and PCUC-15-1 for four character were identified as a better combiners. For yield , the best three hybrids were EC-43342X BIHAR -1 , EC- 43342 XC -99-10 and PCUC-15X PCUC-15-1 . These crosses had best heterotic effect for yield due to better performance of characters like fruit length , fruit diameter hetersis in aforesaid crosses is due to dominance and dominance X dominance type of interaction . Thus , from the above study it is apparent that the commercial exploitation of hybrids may be achieved through heterosis breeding.

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