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EVALUATION OF INBRED LINES OF BABY CORN THROUGH LINE × TESTER METHOD

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Abstract

Seven lines of baby corn were crossed with 3 testers in a Line × Tester (L × T) mating design and the resulting 21 crosses along with parents and standard check 'Baby Star' were evaluated to develop high yielding baby corn hybrids during *rabi*, 2014-15. Variance due to sca was larger than gca variance for all the characters indicating the preponderance of non additive gene action in the expression of various traits. Among the parents, BCP/S_4-29, BCP/S_4-31 and tester VS/S_3-1 and VS/S_3-26 were found as good general combiners for baby corn yield and important yield contributing characters. Considering baby corn yield, number of cobs/plant and other performances, the crosses BCP/S_4-2×VS/S_3-1, BCP/S_4-5×VS/S_3-8, BCP/S_4-10×VS/S_3-8, BCP/S_4-22×VS/S_3-26 and BCP/S_4-29×VS/S_3-1 were selected as promising baby corn hybrids.

Keywords: Baby Corn, inbred lines, SCA, GCA and line × tester method.

Introduction

Maize is unique among the cereals on account of its amenability to diverse uses and it has huge potential in the present era of crop diversification. Baby corn is a young finger like unfertilized cob of maize harvested between two days before silking and three days after silking, depending upon the developmental conditions of the plant and the ear shoot size, denominated cob (Bar-Zur and Saadi, 1990). It is a new product that can be consumed fresh or in cans. It adds a special, gourmet touch to many dishes and salads. Its miniature size is appealing, as is the taste, color and crunch. Most people like to steam baby corn for 5 minutes or until tender before using in other dishes.

Another important feature of baby corn is safe vegetable to eat as it is almost free from residual effects of pesticides as the young cob is wrapped with husk and well protected from insect and diseases and its nutritional value is comparable to cauliflower, cabbage, tomato, eggplant and cucumber. Its by-products, such as tassel, young husk, silk and green stalk provide good cattle feed. These trends underline the value of baby corn as a cash crop for intensive agro-ecosystems in South Asia where small farmers grow three or more crops in highly diverse cropping systems (Sharma, 2009). Farmers can grow four to five crops a year and

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thus it can generate employment among the rural poor of all ages. Major baby corn markets are U.K., U.S.A., Malaysia, Taiwan, Japan and Australia. The majority of the industrialized baby-corn products are imported from Thailand (Pereira Filho *et al.*, 1998).

Despite manifold uses of baby corn, very little information on breeding strategies followed for improvement in baby corn (Chauhan and Mohan, 2010). It is a fact that selection of parents on the basis of their mean performance does not necessarily lead to desired results (Rai and Asati, 2011). Therefore, devising a sound breeding strategy to improve the yield of this crop is of paramount importance. Early ripening, low height, flowering uniformity and prolificity are considered the most important traits for the production of baby corn (Thakur *et al.*, 2000). In addition, agronomic practices such as population densities, nitrogen fertilization and detasseling can increase baby corn yield considerably. Farmers can also grow under either high population density, for baby corn only, or lower population density where the first ear is picked for baby corn and the second ear is left intact for further development as sweet or field corn. Information regarding general and specific combining ability and gene action in a breeding material is a prerequisite to launch effective corn breeding. The success of a hybridization program primarily depends upon the judicious choice of parents for producing the hybrids with high yield. Combining ability analysis is an important tool in the choice of suitable parent together with the information regarding nature and magnitude of gene effects controlling quantitative traits (Basbag *et al.*, 2007). The present investigation was accomplished to get **i**nformation regarding general and specific combining ability and gene action in the heritance of different yield contributing traits of baby corn.

Materials and Method

Seven S_4 lines of baby corn variety 'BCP271' were used as female lines and three S_3 lines of baby corn hybrid 'Victory Super' were used as tester to produce 21 baby corn hybrids in 2013-14. The resulted 21 F_1's along with their parents and one check variety 'Baby Star' were evaluated in a Randomized Block Design with two replications during *rabi* 2014-2015 at Bangladesh Agricultural Research Institute, Joydebpur, Gazipur. Unit plot size was single row 4m long maintaining spacing 60 cm from row to row and 20 cm from plant to plant. All the recommended cultural practices were followed to raise a healthy crop per hill. Data were recorded on 10 randomly selected plants in each replication with respect of plant height (cm), upper ear height (cm), lower ear height (cm), days to first cob picking, days to second cob picking, days to third cob picking, days to fourth cob picking, ear length (cm), ear diameter (cm), harvest duration, number of cobs/plant, fodder yield/plant, baby corn yield with husk/plant (g) and baby corn yield/plant (g). Mean values were subjected to statistical analysis as per model suggested by Kempthorne (1957) and procedure of Singh and Chaudhary (1985).

Results and Discussion

Analysis of variance for combining ability was carried out for yield and yield contributing characters and the mean sum of squares are presented in Table 1. The analysis of variance revealed that genotypes exhibited highly significant differences among themselves for all the traits studied. The crosses exhibited significant differences, indicating varying performance of cross combinations. When the effects of crosses partitioned into lines, testers and line × tester effects, the interaction effects (line × testers) were found to be significant for all the traits under study indicating that hybrids differed significantly in their *sca* effects. Except ear length, all the traits showed significant variations among lines and mean sum of squares due to tester were larger than due to lines, indicating greater diversity among testers for lower ear height, harvest duration, number of cobs/plant, cob yield with husk per plant, baby corn yield per plant, ear length and ear diameter. The parents exhibited significant differences for all the traits indicating greater diversity in the parental lines. The parents vs. crosses which indicates average heterosis, was also significant for all traits, thus considerable amount of average heterosis was reflected in hybrids. Highly significant differences were observed for line x tester interaction for all traits which implies the role of dominance and non-additive effects in all traits. Therefore, both additive and non-additive effects were responsible for controlling these traits. Tucak *et al*. (2012) and Atif *et al.* (2012) observed highly significant differences for testers, lines and line x tester interaction. The ratio of σ^2gca to σ^2sca was less than one for all of the characters (Table 1) which indicates the predominant role of non-additive type of gene action in the inheritance of those characters. Similar findings were also reported by Ceyhan *et al.* (2008), Kanagarasu *et al.* (2010) and Motamedi *et al.* (2014).

The proportional contribution of lines was higher for plant height, upper ear height, lower ear height, days to first cob picking, days to second cob picking, days to third cob picking, days to fourth cob picking, harvest duration and cob yield with husk per plant, indicating their predominant maternal influence (Table 2). Testers showed less influence to be contributed for all the traits except ear length. The relative contribution of line × tester interaction was more important for fodder yield per plant, number of cobs/plant, cob yield without husk per plant, ear length and ear diameter. Motamedi *et al.,* (2014) found less influence of testers for kernel yield. The higher contribution of interactions of the line × tester than lines and testers, indicating higher estimates of variances due to non-additive genetic effects and the importance of specific combining ability. Shams *et al.,* (2010) observed higher estimates of SCA variance due to line × tester interaction in corn for different characters.

Table 1. Mean squares and estimates of variance for grain yield and yield contributing characters in baby corn

Source	df	Plant height	Upper ear height	Lower ear height	1st cob picking	2nd cob picking	3rd cob picking	4th cob picking	Ear length	Ear diameter	Harvest duration	No. of cobs/ plant	Fodder yield/ plant	Baby corn yield with husk/ plant	Baby corn yield/ plant
Replication	1	0.14	0.15	1.03	0.02	0.06	0.06	0.06	0.19	0.02	0.79	0.02	32.66	2.94	1.11
Genotype	30	2123.6**	450.6**	108.6**	46.9**	47.4**	711.7**	5777.1**	1.3**	0.02**	40.5**	0.6**	34520.4**	4281.4**	104.15**
Cross	20	245.9**	100.7**	64.9**	14.6**	15.8**	31.5**	5269.0**	0.2**	0.02**	31.2**	0.4**	4376.0**	3048.2**	66.40**
Line©	6	590.8**	268.5**	135.3**	32.8**	33.2**	66.3**	7640.4**	0.1	0.02**	39.8**	0.5**	5318.5**	5174.7**	70.43**
Tester©	2	272.3**	24.7**	161.8**	3.2**	10.7**	2.5**	7495.1**	0.3*	0.03**	79.5**	0.7**	4248.5**	7496.7**	186.98**
L X T ©	12	69.1**	29.4**	13.5**	7.4**	7.9**	18.9**	3712.3**	0.3**	0.01*	18.7**	0.2**	3926.0**	1243.5**	44.29**
Parent	9	908.9**	70.5**	28.2**	15.7**	12.0**	2285**	0	1.1**	0.01**	21.8**	0.5**	5413.2**	3749.0**	20.62**
Cross vs Par	1	50610**	10869**	1706**	975**	998**	149**	67931**	23.7**	0.07**	394**	4.7**	899373**	33737**	1610**
Error	30	2.51	1.31	0.7	0.22	0.13	0.06	0.03	0.09	0.01	0.49	0.05	490.22	89.87	1.89
Estimation of component of variances															
σ^2g (Line)		86.96	39.84	20.29	4.22	4.22	7.91	654.67	-0.03	0.001	3.51	0.05	232.08	655.19	4.36
σ^2g(Tester)		14.52	-0.34	10.59	-0.31	0.2	-1.17	270.2	0.01	0.001	4.34	0.03	23.04	446.66	10.19
σ^2gca		6.91	2.78	2.01	0.28	0.31	0.49	60.81	-0.01	0.001	0.48	0.01	17.58	70.49	0.86
σ^2sca		33.33	14.11	6.48	3.61	3.88	9.42	1856.17	0.1	0.004	9.3	0.15	1802.45	578.27	21.09
σ^2gca/ σ^2sca		0.21	0.2	0.31	0.08	0.08	0.05	0.03	-0.02	0.05	0.05	0.04	0.01	0.12	0.04

* Significant at 5% percent level; ** Significant at 1% percent level.

Table 2. Proportional contribution (%) of lines, testers and their interactions to total variance in baby corn

Source	Plant height	Upper ear height	Lower ear height	1st cob picking	2nd cob picking	3rd Cob picking	4th Cob picking	Ear length	Ear diameter	Harvest duration	No. of cobs/ plant	Fodder yield/ plant	Baby corn yield with husk/ plant	Baby corn yield/ plant
Due to Lines	72.07	80	62.52	67.27	63.04	63.15	43.5	12	40.73	38.35	41.01	36.46	50.93	31.82
Due to Testers	11.07	2.45	24.93	2.17	6.81	0.82	14.22	15.72	16.35	25.52	17.42	9.71	24.59	28.16
Due to Line x Tester	16.85	17.55	12.55	30.56	30.14	36.03	42.27	72.28	42.92	36.14	41.57	53.83	24.48	40.02

General combining ability (GCA) effects

The GCA effects of the parents are presented in Table 3. Lines BCP/S_4-29 and BCP/S_4-31 exhibited positively significant GCA effects for baby corn yield. As BCP/S_4-31 had desirable GCA effects for plant height, upper ear height, lower ear height, number of cobs/plant, baby corn yield, it was the best general combiner. However, testers VS/S_3-1 showed desirable GCA effects for days to first picking, days to second picking, cob yield with husk per plant, baby corn yield. So these parents could be used extensively in hybrid breeding program to improve baby corn yield and its quality.

Dhasarathan *et al.* (2015) and Rodrigues and da Silva (2002) also observed and verified significant positive number of baby corns per plant, baby corn length, baby corn weight and baby corn yield per plot. None of the parents showed significant positive GCA effects for ear length, which is supported by Rodrigues and da Silva (2002) and opposed by Dhasarathan *et al*. (2015).

Specific combining ability (SCA) effects

High positive estimates of SCA in absolute values indicate that hybrid performance was relatively superior or inferior to parent lines general combining ability, showing the importance of non-additive interactions resulting from the complementation degree among parent lines in relation to frequency of alleles in loci with some dominance, while low estimates of specific combining ability in absolute value indicated that hybrids behave as expected in relation to general combining ability of parent lines (Dhasarathan *et al*., 2015). In the selection of parent lines used to produce hybrids, the effect of a specific combining ability analyzed in an isolated way had a limiting value. Thus, other parameters should be considered such as the average of hybrids and general combining ability of the respective parent lines (Oliveira *et al*., 1998). Therefore, superior hybrid combinations, which are important for breeding, are involved with at least one parental line which has the most favorable effects of general combining ability (Cruz and Regazzi, 1997).

The highly desirable negative significant SCA effects of plant height, upper ear height, lower ear height, 1^{st} and 2^{nd} cob picking and harvest duration were observed in BCP/S_4-31×VS/S_3-26, BCP/S_4-14×VS/S_3-1, BCP/S_4-22×VS/S_3-1, BCP/S_4-2×VS/S_3-8 and BCP/S_4-14×VS/S_3-26, respectively. However, hybrids BCP/S_4-22×VS/S_3-26, BCP/S_4-2×VS/S_3-1 and BCP/S_4-29×VS/S_3-1 showed the highest positive significant SCA effects for number of cobs/plant, fodder yield, baby corn yield with husk per plant. Six crosses viz. BCP/S_4-2×VS/S_3-1, BCP/S_4-5×VS/S_3-8, BCP/S_4-10×VS/S_3-8, BCP/S_4-10×VS/S_3-26, BCP/S_4-22×VS/S_3-26 and BCP/S_4-29×VS/S_3-1 exhibited significant positive SCA effects for baby corn yield of which BCP/S_4-29×VS/S_3-1 was the highest. These results were in agreement with the findings of Dhasarathan *et al.* (2015) who also got significant positive SCA effects for some of the characters of baby corn.

Table 3. General combining ability (GCA) effects and mean of parents for different characters in baby corn.

Parents	Plant height		Upper ear height		Lower ear height		1st cob picking (days)		2nd cob picking (days)		3rd Cob picking (days)		4th Cob picking (days)	
	GCA	Mean	GCA	Mean	GCA	Mean	GCA	Mean	GCA	Mean	GCA	Mean	GCA	Mean
Lines :														
1. BCP/ S_4-2	10.4**	119	5.9**	56	7.1**	25	-4.2**	97	-4.2**	100	-5.02**	108	-	0
2. BCP/ S_4-5	10.2**	109	11.9**	55	3.6**	24	-1.3**	98	-1.4**	102	-3.02**	107	-	0
3. BCP/ S_4-10	6.6**	98	-5.4**	48	-3.7**	22	-0.8**	100	0.3	104	1.5**	108	-	0
4. BCP/ S_4-14	-6.3**	116	-4.7**	55	1.1**	25	2.3**	102	1.6**	105	2.2**	108	-	0
5. BCP/ S_4-22	-12.8**	85	-4.4**	41	1.9**	21	0.5*	105	0.1	106	0.8**	108	-	0
6. BCP/ S_4-29	3.1**	86	0.8	57	-5.0**	25	1.0**	103	0.3	105	-1.2**	109	-	0
7. BCP/ S_4-31	-11.1**	130	-4.4**	63	-5.2**	34	2.5**	102	3.3**	106	4.8**	108	-	0
SE (gi)	0.64		0.45		0.3		0.3		0.2		0.1			
SE (gi-gj)	0.89		0.64		0.5		0.3		0.2		0.2			
Testers :														
1. VS/S_3-1	0.4	150	0.9**	58	3.9**	29	-0.3*	98	-0.6**	102	0	108	-	0
2. VS/S_3-8	4.2**	138	0.6	54	-1.6**	26	0.2	98	-0.4**	104	0.4**	107	-	0
3. VS/S_3-26	-4.6**	117	-1.5**	56	-2.3**	30	0.5**	97	1.0**	99	-0.4**	0	-	0
SE (gi)	0.42		0.29		0.21		0.12		0.12		0.08			
SE (gi-gj)	0.59		0.42		0.29		0.18		0.17		0.12			

* Significant at 5% level; ** Significant at 1% level.

Table 3. Cont'd.

Parents	Baby cobs ear length		Baby cobs ear diameter		Baby cobs harvest duration		Fodder yield/plant (g)		Baby corn yield (g)				No. of baby cobs/plant	
									With husk/plant		Yield/ plant			
	GCA	Mean	GCA	Mean	GCA	Mean	GCA	Mean	GCA	Mean	GCA	Mean	GCA	Mean
Lines :														
1. BCP/S_4-2	0.2	7.9	-0.07*	1	-1.5**	11	3.6	311	-17.1**	200	-3.3**	28	-0.4**	3
2. BCP/S_4-5	-0.1	7.1	-0.1**	0.8	2.6**	9	-2.2	336	-15.5**	150	-0.3	19	0.3**	3
3. BCP/S_4-10	-0.8	7.6	0.03	0.9	3.1**	13	-34.4**	263	53.7**	250	0.9	22	0.3**	4
4. BCP/S_4-14	0.1	6.6	0.01	0.8	-2.4**	6	-20.7*	320	-10.6*	132	-2.0**	17	-0.2**	3
5. BCP/S_4-22	0.1	6.1	0.01	0.8	-1.9**	4	0.8	308	-33.7**	198	-3.5**	22	-0.4**	3
6. BCP/S_4-29	-0.4	6.1	0.1**	0.9	-2.4**	8	60.3**	385	22.5**	212	1.8**	21	-0.02	3
7. BCP/S_4-31	0.1	7.4	0.04	0.8	2.4**	6	-7.4	356	0.8	148	6.3**	20	0.3**	3
SE (gi)	0.13	-	0.02	-	0.2	-	7.35	-	3.81	-	0.59	-	0.06	-
SE (gi-gj)	0.19	-	0.04	-	0.2	-	10.3	-	5.40	-	0.84	-	0.09	-
Testers :														
1. VS/S_3-1	0.1	6.8	0.1*	0.8	2.7**	10	8.7	334	25.0**	156	2.9**	21	0.2**	3
2. VS/S_3-8	-0.3	7.3	-0.1*	0.8	-1.6**	9	-20.0**	432	-21.0**	203	-4.1**	22	-0.3**	3
3. VS/S_3-26	0.2	5.5	0.01	0.7	-1.1**	2	11.4*	261	-4	109	1.2**	17	0.1*	2
SE (gi)	0.09 -		0.02	-	0.11	-	4.79	-	2.49	-	0.39	-	0.04	-
SE (gi-gj)	0.12 -		0.02 -		0.16	-	6.77	-	3.52	-	0.55	-	0.06	-

* Significant at 5% level; ** Significant at 1% level.

Table 4. Specific combining ability (SCA) and mean of the crosses for grain yield and yield contributing characters in baby corn

Crosses	Plant height		Upper ear height		Lower ear height		1st cob picking (days)		2nd cob picking (days)		3rd Cob picking(days)		4th Cob picking(days)	
	SCA	Mean	SCA	Mean	SCA	Mean	SCA	Mean	SCA	Mean	SCA	Mean	SCA	Mean
1. BCP/S_4-2×VS/S_3-1	-2.9*	184	0.1	90	1.4*	50	0.3	87	0.6	90	0	95	49.4**	106
2. BCP/S_4-2×VS/S_3-8	-6.2**	184	-0.6	89	1.9**	45	-2.8**	84	-2.1**	88	-2.4**	93	-10.0**	0
3. BCP/S_4-2×VS/S_3-26	9.1**	191	0.5	88	-3.3**	39	2.4**	90	1.5**	93	2.4**	97	-39.4**	0
4. BCP/S_4-5×VS/S_3-1	-0.3	186	5.1**	101	1.4*	46	0.5	90	1.8**	94	0.9**	98	-19.6**	107
5. BCP/S_4-5×VS/S_3-8	1.5	192	-0.6	95	-2.1**	37	0.4	90	-0.5	92	1.1**	99	25.5**	106
6. BCP/S_4-5×VS/S_3-26	-1.2	180	-4.5**	89	0.6	39	-0.9*	90	-1.3**	93	-2.0**	95	-5.9**	104
7. BCP/S_4-10×VS/S_3-1	-1.1	182	1.4	80	0.7	38	-0.5	90	-1.4**	93	-3.0**	99	-20.6**	107
8. BCP/S_4-10×VS/S_3-8	0.2	187	0.7	79	-0.7	31	1.4**	92	0.4	95	2.6**	105	25.0**	107
9. BCP/S_4-10×VS/S_3-26	0.9	179	-2.1*	74	-0.02	31	-0.9*	90	1.0**	97	0.4	102	-4.4**	107
10.BCP/S_4-14×VS/S_3-1	0.7	171	-4.7**	74	-2.1**	40	-1.2**	92	-1.7**	94	-0.7**	102	50.7**	108
11.BCP/S_4-14×VS/S_3-8	0.1	174	0.1	79	1.4*	38	1.2**	95	2.0**	98	2.9**	106	-10.6**	0
12.BCP/S_4-14×VS/S_3-26	-0.7	164	4.7**	81	0.6	37	0	94	-0.3	97	-2.2**	100	-40.1**	0
13.BCP/S_4-22×VS/S_3-1	0.2	164	-4.6**	75	-3.4**	40	1.6**	93	1.3**	95	2.6**	104	-55.6**	0
14.BCP/S_4-22×VS/S_3-8	1.5	169	0.7	80	-0.4	37	-1.9**	90	-1.5**	93	-1.7**	100	-1**	0
15.BCP/S_4-22×VS/S_3-26	-1.7	157	3.8**	81	3.8**	41	0.2	93	0.2	96	-0.9**	100	65.6**	106
16.BCP/S_4-29×VS/S_3-1	-0.6	179	-0.2	84	-1.4*	35	0.6	93	0.6	95	-2.4**	97	14.0**	106
17.BCP/S_4-29×VS/S_3-8	-4.8**	178	-1.9*	82	0.1	31	-1.4**	91	-1.6**	93	-2.7**	97	-45.3**	0
18.BCP/S_4-29×VS/S_3-26	5.4**	180	2.2*	84	1.3*	31	0.8*	94	1.0**	97	5.1**	104	31.3**	107
19.BCP/ S_4-31×VS/ S_3-1	4.1**	169	2.9**	82	3.3**	39	-1.4**	92	-1.4**	96	2.6**	108	-18.3**	112
20.BCP/S_4-31×VS/ S_3-8	7.8**	177	1.7*	81	-0.2	30	3.1**	97	3.4**	101	0.3	106	25.4**	110
21.BCP/S_4-31×VS/S_3-26	-11.9**	148	-4.6**	72	-3.0**	27	-1.7**	93	-2.0**	97	-2.9**	102	-7.1**	107
SE (Sij)	1.1		0.78		0.56		0.34		0.31		0.22		0.15	
SE (Sij-Skl)	1.55		1.11		0.79		0.48		0.44		0.31		0.21	

* Significant at 5 percent level; ** Significant at 1 percent level.

Table 4. Cont'd.

Crosses	Ear length		Ear diameter		Harvest duration		Fodder yield/plant		Baby corn yield (g)				No. of baby cobs/plant	
									With husk/plant		Yield/ plant			
	SCA	Mean	SCA	Mean	SCA	Mean	SCA	Mean	SCA	Mean	SCA	Mean	SCA	Mean
1. BCP/S_4-2×VS/S_3-1	0.1	8.5	0.05	0.9	4.3**	18	11.7	612	30.2**	264	5.4**	37	0.5**	4
2. BCP/S_4-2×VS/S_3-8	0.1	8.2	-0.01	0.8	-0.9**	9	41.4**	613	-17.1*	171	-1.8	23	0	3
3. BCP/S_4-2×VS/S_3-26	0.1	8.5	-0.04	0.8	-3.4**	7	-53.1**	550	-13	191	-3.6**	26	-0.4**	3
4. BCP/S_4-5×VS/S_3-1	-0.3	7.7	0.07	0.9	-1.9**	17	27.1*	622	-3.1	231	-1.7	33	-0.2	4
5. BCP/S_4-5×VS/S_3-8	0.8	7.9	0.01	0.8	1.9**	16	-27.8*	538	16.2*	206	2.9**	30	0.3*	4
6. BCP/S_4-5×VS/S_3-26	0.3	8.5	-0.07	0.7	0	14	0.7	598	-12.2	194	-1.9	31	-0.1	4
7. BCP/S_4-10×VS/S_3-1	-0.3	7.8	-0.06	0.9	-1.9**	17	-23.3	539	-26.6**	278	-6.8**	29	-0.2	4
8. BCP/S_4-10×VS/S_3-8	0.2	8.1	-0.06	0.8	0.4	15	-4.1	530	4.5	263	4.2**	33	0.3*	4
9. BCP/S_4-10×VS/S_3-26	0.1	8.4	0.11*	1	1.4**	17	27.4*	593	22.1**	297	2.6*	37	-0.1	4
10.BCP/S_4-14×VS/S_3-1	-0.3	8	-0.08	0.9	2.1**	16	-58.9**	517	7.7	248	1.1	34	0.3**	4
11.BCP/S_4-14×VS/S_3-8	-0.3	7.9	0.05	0.9	1.9**	11	10.2	558	6.1	201	-0.4	25	-0.2*	3
12.BCP/S_4-14×VS/S_3-26	0.3	8.7	0.03	0.9	-4.0**	6	48.7**	628	-13.8*	197	-0.7	30	-0.1	3
13.BCP/S_4-22×VS/S_3-1	0.2	8.4	-0.03	0.9	-3.4**	11	-34.9*	563	-28.2**	189	-4.4**	27	-0.5**	3
14.BCP/S_4-22×VS/S_3-8	0.4	8.5	0.05	0.9	0.4	10	47.2**	616	27.2**	199	1.6	26	-0.1	3
15.BCP/S_4-22×VS/S_3-26	-0.6*	7.8	-0.02	0.9	2.9**	13	-12.3	588	1	189	2.8*	32	0.6**	4
16.BCP/S_4-29×VS/S_3-1	0.6*	8.7	0.10*	1.1	-0.4	13	19.6	677	33.5**	307	6.9**	43	0.2	4
17.BCP/S_4-29×VS/S_3-8	-0.4	7.5	-0.06	0.9	-3.0**	6	-24.3	604	-29.3**	198	-7.4**	22	-0.4**	3
18.BCP/S_4-29×VS/S_3-26	-0.3	7.9	-0.04	0.9	3.4**	13	4.7	665	-4.2	240	0.5	35	0.2*	4
19.BCP/ S_4-31×VS/ S_3-1	-0.7	8.1	-0.06	0.9	1.3**	20	58.7**	648	-12.5	239	-1.1	40	-0.2	4
20.BCP/S_4-31×VS/ S_3-8	-0.1	7.9	0.02	0.9	-0.9**	13	-42.6**	518	-7.6	198	0.9	35	0.3*	4
21.BCP/S_4-31×VS/S_3-26	0.2	8.5	0.04	1	-0.4	14	-16.1	576	20.0**	242	0.3	40	-0.1	4
SE (Sij)	0.23		0.05		0.3		12.67		6.59		1.03		0.11	
SE (Sij-Skl)	0.33		0.06		0.42		17.92		9.33		1.45		0.15	

* Significant at 5% level; ** Significant at 1% level.

Conclusion

The lines BCP/S_4-29 and BCP/S_4-31 were the best among the parents and VS/S_3-1 among the 3 testers as it showed desirable mean and GCA effects for most of yield and its contributing traits. Therefore, these parents could be used extensively in hybrid breeding program with a view to increasing baby corn yield with quality. Furthermore, based on mean and SCA effects of baby corn yield and number of cobs/plant 4 hybrids viz. BCP/S_4-2×VS/S_3-1, BCP/S_4-5×VS/S_3-8 , BCP/S_4-10×VS/S_3-8 and BCP/S_4-22×VS/S_3-26 were proved to be the best to increase the baby corn yield. For varietal improvement, these crosses could also be utilized for exploiting promising recombinants and it could be useful towards enhancing babycorn yield.

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