Biological Forum – An International Journal **15(1): 367-372(2023)**

ISSN No. (Print): 0975-1130
ISSN No. (Online): 2249-3239

Combining Ability Studies in Bottle Gourd [*Lagenaria siceraria* (Molina) Standl.] for Yield and its Attributing Traits during February Season

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(Received: 25 November 2022; Revised: 30 December 2022; Accepted: 06 January, 2022; Published: 17 January, 2023)
(Published by Research Trend)

ABSTRACT: The present study was conducted at Vegetable Research Farm, BAU, Sabour, Bhagalpur, with the objective to study the GCA of parents and SCA of hybrids for yield and its attributing traits in bottle gourd. GCA effects of parents and SCA effects of crosses were highly significant for the characters studied. The line × tester analysis was carried out involving 7 lines and 3 testers. Analysis of variance revealed significant difference among the genotypes for the traits under study. The estimates of variance component revealed that variance due to SCA was more pronounced than variance due to GCA for all the characters under study except days to first male flower opening, days to first female flower opening and days to first fruit harvest, indicating the importance of non-additive type of gene action for the expression for those characters. The GCA effect for fruit yield per vine revealed that line BRBG22-1 was the best general combiner. The SCA effect of hybrids for fruit yield per vine revealed that BRBG-23 × Narendra Rashmi and BRBG-65 × Rajendra Chamatkar was the best specific combiner.

Keywords: General combining ability, specific combining ability, bottle gourd, Line × Tester.

INTRODUCTION

The bottle gourd [*Lagenaria siceraria* (Mol.) Standl.] is a common Indian vegetable crop that belongs to the cucurbitaceae family. Diploid chromosome number of bottle gourd is 2n=22. According to De Candolle (1882), bottle gourd has been found in wild form in South Africa and India. However, Cutler and Whitaker (1961) are of the view that probably it is indigenous to tropical Africa on the basis of variability in seeds and fruits. Bottle gourd locally known as Ghiya, Lauki, Kaddu, Surakai, Dudhi and in English name is “Calabash gourd or White flowered gourd”. It may be grown in both the rainy and summer seasons and the fruits of bottle gourd are available all year in the market. It is cost-effective for the generation of hybrids because to the presence of attractive blooms and simply crossable procedures. Currently, breeding of superior cultivars is receiving more focus, with a bigger emphasis on the generation of hybrid seed (Dubey and Maurya 2007). The combining ability studies are important for identifying potential parents. To analyse the genotypes for a variety of quantitative features, combining ability analysis based on progeny test results is very helpful (Feyzian *et al.*, 2009). Kempthorne (1957) was the first to develop line tester (l × t) analysis, which provides information on combining ability and gene action. The effects of general combining ability (GCA) help in selection of superior parents, whereas the effects of specific combining ability (SCA) help to select parental cross combinations (hybrids). The data gathered during the method will be useful in determining the amount of heterosis in F_1 hybrids for commercial purposes. As a result, the current research was carried out to look into the study of combining ability of parents and hybrids for yield and its contributing traits.

MATERIALS AND METHODS

The investigation on combining ability studies in bottle gourd [*Lagenaria siceraria* (Molina) Standl.] for yield and its contributing traits” was undertaken at Vegetable Research Farm of the Department of Horticulture (Vegetable and Floriculture), Bihar Agricultural University, Sabour, Bhagalpur. The experimental material comprised of 07 lines viz., BRBG-23, BRBG-65, BRBG- 21-2, BRBG-42-, BGL-19, BRBG-22-1, BRBG-41-1 and 3 testers (Rajendra Chamatkar, Swarna Sneha and Narendra Rashmi) which were collected from the department itself and their 21 F_1 hybrids. Each of the 07 lines was crossed with each of the 3 testers to derive 21 F_1 hybrids in line × tester fashion. The experiment was conducted in Randomized Block Design with three replications to assess the performance of 21 F_1 hybrids with one check variety and their 10 parental lines (7 lines and 3 testers). All the 32 genotypes (10 parents, 1 check and 21 F_1 hybrids) ware planted in a single row of 4.0 m length with row to row spacing 3.0 m and plant to plant distance of 50 cm. 8 plants were maintained in each plot. All the recommended agronomic package of practices and plant protection measures were followed as per requirement to raise a good crop. Observations on all the characters were recorded on all the randomly selected five plants of a genotype in each replication. To get the mean value, all of the observations made on the five plants were added together and divided by five.

RESULTS AND DISCUSSIONS

Analysis of variance revealed significant difference among the genotypes for the traits under study (Table 1). Thus, suggested the existence of inherent differences between the genotypes studied. The mean square due to replication was non-significant for all traits (Table 1). This indicates that non-significant difference existed in replication and the little difference might be due to genotypic effects. Similar findings were reported by Jayant *et al.* (2019). The variance due to general combining ability (GCA), specific combining ability (SCA) and GCA/SCA ratio for various characters are presented in Table 2. The variance of SCA was higher than the GCA variances for all the traits under study and the GCA/SCA ratios were less than one for all the traits under study except days to first male flower opening, days to first female flower opening and days to first fruit harvest, which indicate that these traits predominantly governed by non-additive type of gene action. Ray *et al*. (2015); Shinde *et al*. (2016); Mishra *et al*. (2019); Khot *et al*. (2021); Patel and Mehta (2021) who found that the presence of both additive and non-additive gene action for almost all characters. General combining ability effects and specific combining ability effects for various traits are presented in Tables 3-6.

For number of primary branches per plant, the estimates of GCA effects of parents (7 lines and 3 testers) were found significant and in positive direction namely BRBG-22-1 (1.93) and Swarna Sneha (0.30) and were grouped as good general combiners for more number of primary branches per plant. Out of 21 F_1 crosses, four hybrids *viz*., BRBG-65 × Rajendra Chamatkar (1.22), BRBG-21-2 × Swarna Sneha (1.43), BGL-19 × Rajendra Chamatkar (0.96) and BRBG-41-1 × Narendra Rashmi (1.22) showed desirable and significant positive SCA effects and they were grouped as good specific combiners for more number of primary branches per plant. Significant effects for this trait were also reported by Ray *et al.* (2015); Dubey and Maurya (2007); Maurya *et al*. (2004).

For the trait number of node to first male flower, among parents (lines & testers), lines BRBG-65 (-0.57), BGL-19 (-0.53) and tester Rajendra Chamatkar (-0.71) showed significant and negative GCA estimates, therefore, they classified as good general combiners for number of node to first male flower. Among the hybrids significant and negative SCA effect expressing lower node number were found in seven hybrids *viz.*, BRBG-23 × R. Chamatkar (-0.75), BRBG-65 × Swarna Sneha (-0.51), BRBG-65 × Narendra Rashmi (-0.62), BRBG-42-1 × Swarna Sneha (-1.22), BRBG-22-1 × Rajendra Chamatkar (-1.25) and BRBG-41-1 × Narendra Rashmi (-0.51) showed for good specific combiner for this characters. Shinde *et al*. (2016) found the same result.

For number of node to first female flower, a genotype bearing first female flower at lower node number is considered to be desirable in bottle gourd. Among parents (lines & testers), line BRBG-65 (-0.93), BRBG-22-1 (-0.8) and tester Rajendra Chamatkar (-0.72) recorded significantly negative GCA effects and were potentially good general combiners. Five crosses showed significantly negative SCA effect *viz.*, BRBG-65 × Swarna Sneha(-0.76), BRBG-65 × Narendra Rashmi (-0.84), BRBG-21-2 × Rajendra Chamatkar (-0.98), BGL-19 × Swarna Sneha (-0.66) and BRBG-22-1 × Rajendra Chamatkar (-0.91)were grouped as good specific combiners for this characters. Shinde *et al.* (2016) observed similar result.

For days to first female flower opening, among the parents (lines & testers), line BRBG-65 (-2.47) and tester Rajendra Chamatkar (-1.63) were found significant negative GCA effect and were classified as good general combiners. None of the crosses showed good combiner for SCA effect. Similar result of GCA effect was found by Doloi *et al.* (2017); Vegad *et al.* (2011).

For days to first fruit harvest, among the parents (lines & testers), no any parents were found significant negative GCA effect and they were grouped as good general combinations for this traits. None of the crosses showed good combiner for SCA effect. Quamruzzaman *et al.* (2020); Mishra *et al.* (2019); Doloi *et al*. (2017) observed similar result of GCA effect.

For vine length at the time of final harvesting, among the parents (lines & testers), line BRBG-22-1 (1.82) and tester Narendra Rashmi (0.26) were found significant positive GCA effect and they were grouped as good general combinations for this trait. Out of 21 F_1 crosses, five hybrids *i.e*., BRBG-23 × Narendra Rashmi (1.36), BRBG-65 × Rajendra Chamatkar (0.84), BRBG-21-2 × Swarna Sneha (1.46), BRBG-42-1 × Rajendra Chamatkar (0.87) and BRBG-41-1 × Narendra Rashmi (1.02) showed desirable significant positive SCA effects and they were grouped as good specific combiners for this character. Similar results were also made by Khot *et al.* (2021); Gayakawad (2014); Vegad *et al*. (2011).

For length of fruit, among the parents (lines and testers), lines BRBG-65 (4.66), BRBG-21-2 (2.71), BGL-19 (3.30), BRBG-41-1 (2.95) and tester Rajendra Chamatkar (6.17) were found significant positive GCA effect and they were grouped as good general combiner for length of fruit. Out of 21 F_1 crosses, BRBG-23 × Swarna Sneha (5.62), BRBG-21-2 × Narendra Rashmi (9.96), BGL-19 × Swarna Sneha (6.28), BRBG-22-1 × Rajendra Chamatkar (5.64) and BRBG-41-1 × Rajendra Chamatkar (7.61) showed desirable significant positive SCA effects and they were grouped as good specific combiners for this character. Significant positive combining ability effect was also found by Quamruzzaman *et al*. (2020); Mishra *et al.* (2019); Wani *et al*. (2009).

For diameter of fruit, among the parents (lines & testers), line BGL-19 (0.63) was found significant positive GCA effect and they were grouped as good general combiner for diameter of fruit. Out of 21 F_1 crosses, none of the hybrid showed desirable significant positive SCA effects. Significant GCA effect for this character was reported by Quamruzzaman *et al*. (2020); Wani *et al.* (2009).

For number of fruit per vine, among the parents (lines & testers), line BRBG-22-1 (1.13) and tester Swarna Sneha (0.24) exhibited in positive direction for this character were identified as good general combiners. Among the 21 crosses for this trait, SCA effect for two hybrids *viz.*, BRBG-65 × Rajendra Chamatkar (0.70) and BRBG-21-2 × Swarna Sneha (0.84) had significant positive SCA effects and they were grouped as good specific combiner. Similar result was also noticed by Masud *et al.* (2021); Quamruzzaman *et al.* (2020); Singh *et al.* (1999).

For weight of fruit, among the parents (lines & testers) line BRBG-41-1 (70.64) and tester Rajendra Chamatkar (56.27) were found good general combiner as revealed by positive and significant GCA effect. Out of 21 hybrids, BRBG-21-2 × Rajendra Chamatkar (108.17) showed significant and positive SCA effects for this trait. Quamruzzaman *et al.* (2020); Shinde *et al.* (2016) also found significant result in desirable direction.

For fruit yield per vine the estimate of GCA effects of the parents (lines & testers) BRBG-22-1 (2.30) was showed positive and significant effects of general combiner for fruit yield per plant. For this character, out of twenty one hybrids, BRBG-23 × Narendra Rashmi (0.94), BRBG-65 × Rajendra Chamatkar (1.01) and BRBG-41-1 × Narendra Rashmi (0.84) were showed significant and positive SCA effects and were grouped under good specific combiner. This result is in conformity with findings of Balat *et al*. (2021); Khot *et al.* (2021); Masud *et al.* (2021); Patel and Mehta (2021); Quamruzzaman *et al*. (2020); Singh *et al.* (1995).

Table 1: Analysis of variance for RBD analysis of various traits in bottle gourd.

Source of variations	**df**	NPBPP	NNFMF	NNFFF	DFMFO	DFFFO	DFFr.H
Replicates	2	0.24	0.23	0.06	2.70	3.73	8.46
Treatments	31	4.57**	2.33**	3.35**	41.59**	37.17	3.35*
Error	62	0.38	0.18	0.29	10.24	10.08	0.29
Source of variations	**df**	VLFH	LF	DF	NFPV	WFr.	Fr.YPV
Replicates	2	0.14	6.97	0.30	0.07	4199.97	0.41
Treatments	31	3.74**	183.51**	1.04**	2.11**	19464.10**	7.61**
Error	62	0.24	11.36	0.26	0.18	7226.91	0.51

*, **: level of significance at 5 % and 1 %, respectively; NPBPP- Number of primary branches per plant, NNFMF- Number of node to first male flower, NNFFF- Number of node to first female flower, DFMFO- Day to first male flower opening, DFFFO- Day to first female flower opening, DFFr.H- Day to first fruit harvest, VLFH- Vine length at the time of final harvesting, LF- Length of fruit, DF- Diameter of fruit, NFPV- Number of fruits per vine, WFr.- Weight of fruit, Fr.YPV- Fruit yield per vine.

Table 2: Variance due to general combining ability and specific combining ability for various traits in bottle gourd.

Sr. No.	**Chrs.**	**σ^2GCA**	**σ^2SCA**	**σ^2GCA/ σ^2SCA**
1.	NPBPP	0.30*	0.88**	0.34
2.	NNFMF	0.34*	0.72**	0.48
3.	NNFFF	0.42**	0.75**	0.56
4.	DFMFO	0.74*	-0.43	-1.73
5.	DFFFO	1.44**	0.12	12.50
6.	DFFr.H	0.53**	-4.57	-0.12
7.	VLFH	0.31*	0.80**	0.39
8.	LF	25.06*	39.74**	0.63
9.	DF	0.02	0.11*	0.22
10.	NFPV	0.15**	0.19**	0.79
11.	WFr.	2436.80*	3927.62*	0.62
12.	Fr.YPV	0.47**	0.83**	0.57

*, **: level of significance at 5 % and 1 %, respectively; Chrs.- Characters, NPBPP- Number of primary branches per plant, NNFMF- Number of node to first male flower, NNFFF- Number of node to first female flower, DFMFO- Day to first male flower opening, DFFFO- Day to first female flower opening, DFFr. H- Day to first fruit harvest, VLFH- Vine length at the time of final harvesting, LF- Length of fruit, DF- Diameter of fruit, NFPV- Number of fruits per vine, WFr.- Weight of fruit, Fr.YPV- Fruit yield per vine.

Table 3: General combining ability effects for yield and yield attributing traits in bottle gourd.

Parents (lines and testers)	NPBPP	NNFMF	NNFFF	DFMFO	DFFFO	DFFr.H
Lines						
BRBG-23 (L_1)	-0.20	0.06	0.25	1.14	0.80	0.85
BRBG-65 (L_2)	-0.41	-0.57**	-0.93**	-1.90	-2.47*	-2.53
BRBG-21-2 (L_3)	0.12	0.05	-0.34	-0.67	-0.29	-0.14
BRBG-42-1 (L_4)	-0.26	0.11	0.64**	0.99	1.26	1.28
BGL-19 (L_5)	-1.13**	0.53**	1.10**	1.53	1.78	1.84
BRBG-22-1 (L_6)	1.93**	-0.59**	-0.80**	-1.38	-1.47	-1.46
BRBG-41-1 (L_7)	-0.05	0.41**	0.07	0.29	0.40	0.17
Rajendra Chamatkar (T_1)	-0.29*	-0.71**	-0.72**	-1.30	-1.63*	-1.61
Swarna Sneha (T_2)	0.30*	0.14	0.38**	0.49	0.63	0.52
Narendra Rashmi (T_3)	-0.01	0.57**	0.35**	0.81	1.00	1.09
SE ± (Line)	0.21	0.14	0.18	1.08	1.06	1.64
SE ± (Tester)	0.14	0.09	0.12	0.70	0.69	1.07
Gi- Gj ± (Line)	0.29	0.20	0.26	1.52	1.50	2.31
Gi – Gj ± (Tester)	0.19	0.13	0.17	1.00	0.98	1.52
C.D at 5% (line)	0.42	0.29	0.37	2.17	2.14	3.31
C.D at 5% (tester)	0.27	0.19	0.24	1.42	1.40	2.17
C.D at 1% (line)	0.56	0.39	0.49	2.91	2.86	4.43
C.D at 1% (tester)	0.37	0.25	0.32	1.90	1.87	2.90

*, **: level of significance at 5 % and 1 %, respectively; NPBPP- Number of primary branches per plant, NNFMF- Number of node to first male flower, NNFFF- Number of node to first female flower, DFMFO- Day to first male flower opening, DFFFO- Day to first female flower opening, DFFr. H- Day to first fruit harvest.

Table 4: General combining ability effects for yield and yield attributing traits in bottle gourd.

Parents (lines and testers)	VLFH	LF	DF	NFPV	WFr.	Fr.YPV
Lines						
BRBG-23 (L_1)	-0.45**	-3.76**	-0.14	-0.02	7.67	0.33
BRBG-65 (L_2)	-0.35*	4.66**	0.38*	-0.24	49.45	-0.69**
BRBG-21-2 (L_3)	-0.18	2.71*	-0.16	0.09	-33.25	0.01
BRBG-42-1 (L_4)	0.26	-4.69**	-0.07	0.06	-63.25*	-0.27
BGL-19 (L_5)	-0.76**	3.30**	0.63**	-0.68**	56.75	-0.97**
BRBG-22-1 (L_6)	1.82**	-5.14**	-0.30	1.13**	-88.00**	2.29**
BRBG-41-1 (L_7)	-0.35*	2.92*	-0.34	-0.35*	70.64*	-0.70**
Rajendra Chamatkar (T_1)	-0.45**	6.17**	0.04	-0.34**	56.27**	-0.52**
Swarna Sneha (T_2)	0.19	-3.73**	0.02	0.24*	-38.27*	0.27
Narendra Rashmi (T_3)	0.26*	-2.45**	-0.06	0.10	-18.00	0.25
SE ± (Line)	0.16	1.13	0.17	0.14	28.16	0.24
SE ± (Tester)	0.11	0.74	0.11	0.09	18.43	0.16
Gi- Gj ± (Line)	0.23	1.60	0.24	0.20	39.82	0.34
Gi – Gj ± (Tester)	0.15	1.05	0.16	0.13	26.07	0.22
C.D at 5% (line)	0.33	2.29	0.35	0.29	56.91	0.48
C.D at 5% (tester)	0.22	1.50	0.23	0.19	37.25	0.32
C.D at 1% (line)	0.44	3.07	0.46	0.38	76.15	0.64
C.D at 1% (tester)	0.29	2.01	0.30	0.25	49.85	0.42

*, **: level of significance at 5 % and 1 %, respectively; VLFH- Vine length at the time of final harvesting, LF- Length of fruit, DF- Diameter of fruit, NFPV- Number of fruits per vine, WFr.- Weight of fruit, Fr.YPV- Fruit yield per vine.

Table 5: Specific combining ability effects for yield and yield attributing traits in bottle gourd.

Hybrids/Crosses	NPBPP	NNFMF	NNFFF	DFMFO	DFFFO	DFFr.H
BRBG-23 × R.C.	-0.85*	-0.85*	-0.40	-0.41	-0.86	-0.88
BRBG-23 × S.S.	0.56	0.56	0.99**	2.22	2.41	2.55
BRBG-23 × N. R.	0.29	0.29	-0.59	-1.82	-1.55	-1.66
BRBG-65 × R.C.	1.22**	1.22**	1.60**	1.70	2.08	1.99
BRBG-65 × S.S.	-0.13	-0.13	-0.76*	-1.23	-1.06	-0.97
BRBG-65 × N.R.	-1.09**	-1.09**	-0.84*	-0.47	-1.02	-1.02
BRBG-21-2 × R. C.	-1.36**	-1.36**	-0.98**	-2.04	-2.10	-2.00
BRBG-21-2 × S. S.	1.43**	1.43**	0.21	0.89	0.50	0.54
BRBG-21-2 × N.R.	-0.07	-0.07	0.77*	1.15	1.60	1.46
BRBG-42-1 × R. C.	0.31	0.31	-0.36	-0.18	-0.64	-0.74
BRBG-42-1 × S. S.	0.03	0.03	-0.03	-0.41	0.02	0.16
BRBG-42-1 × N.R.	-0.34	-0.34	0.39	0.60	0.62	0.58
BGL-19 × R.C.	0.96*	0.96*	0.97**	2.28	2.44	2.44
BGL-19 × S.S.	-0.82*	-0.82*	-0.66*	-2.16	-2.30	-2.30
BGL-19 × N. R.	-0.14	-0.14	-0.32	-0.12	-0.14	-0.14
BRBG-22-1 × R.C.	-0.03	-0.03	-0.91**	-1.92	-1.52	-1.66
BRBG-22-1 × S. S.	-0.10	-0.10	0.16	0.53	-0.12	0.00
BRBG-22-1 × N.R.	0.13	0.13	0.76*	1.39	1.65	1.66
BRBG-41-1 × R.C.	-0.25	-0.25	0.08	0.58	0.61	0.86
BRBG-41-1 × S. S.	-0.97**	-0.97**	0.10	0.150	0.55	0.01
BRBG-41-1 × N.R.	1.22**	1.22**	-0.18	-0.73	-1.16	-0.87
SE (±)	0.36	0.36	0.31	1.86	1.83	2.83
Sij – Skl (±)	0.51	0.51	0.44	2.64	2.59	4.01
Sij – Sik (±)	0.82	0.82	0.72	4.30	4.23	6.55
CD (5%)	0.72	0.72	0.63	3.77	3.71	5.73
CD (1%)	0.97	0.67	0.85	5.04	4.96	7.67

*, **: level of significance at 5 % and 1 %, respectively; R.C.- Rajendra Chamatkar, S.S.- Swarna Sneha, N.R.- Narendra Rashmi; NPBPP- Number of primary branches per plant, NNFMF- Number of node to first male flower, NNFFF- Number of node to first female flower, DFMFO- Day to first male flower opening, DFFFO- Day to first female flower opening, DFFr.H- Day to first fruit harvest.

Table 6: Specific combining ability effects for yield and yield attributing traits in bottle gourd.

Hybrids/Crosses	VLFH	LF	DF	NFPV	WFr.	Fr.YPV
BRBG-23 × R.C.	-0.75*	-1.95	0.18	-0.06	-11.09	-0.02
BRBG-23 × S.S.	-0.62*	5.62**	-0.70*	-0.27	46.12	-0.92*
BRBG-23 × N. R.	1.36**	-3.66	0.52	0.33	-35.04	0.94*
BRBG-65 × R.C.	0.84**	-0.97	-0.21	0.70**	-107.86*	1.01*
BRBG-65 × S.S.	-0.22	-1.48	0.01	-0.17	14.46	-0.05
BRBG-65 × N.R.	-0.63*	2.44	0.20	-0.53*	93.41	-0.96*
BRBG-21-2 × R. C.	-0.79**	-0.43	0.40	-0.42	108.17*	-0.97*
BRBG-21-2 × S. S.	1.46**	-9.53**	-0.12	0.84**	-7.29	1.96**
BRBG-21-2 × N.R.	-0.68*	9.96**	-0.28	-0.42	-100.89*	-1.00 *
BRBG-42-1 × R. C.	0.87**	-2.69	-0.54	0.13	24.840	0.37
BRBG-42-1 × S. S.	-0.30	0.93	0.40	-0.09	-53.95	-0.11
BRBG-42-1 × N.R.	-0.57	1.76	0.14	-0.04	29.11	-0.26
BGL-19 × R.C.	0.51	-7.22**	0.01	0.40	-28.49	0.21
BGL-19 × S.S.	-0.35	6.28**	-0.20	-0.43	-37.29	-0.83
BGL-19 × N. R.	-0.16	0.94	0.20	0.03	65.78	0.61
BRBG-22-1 × R.C.	0.02	5.64**	0.24	-0.33	-64.86	0.11
BRBG-22-1 × S. S.	0.34	-2.28	0.02	0.18	39.12	0.06
BRBG-22-1 × N.R.	-0.35	-3.36	-0.26	0.15	25.74	-0.17
BRBG-41-1 × R.C.	-0.71*	7.61**	-0.07	-0.41	79.29	-0.71
BRBG-41-1 × S. S.	-0.31	0.47	0.58	-0.07	-1.18	-0.12
BRBG-41-1 × N.R.	1.02**	-8.07**	-0.51	0.48	-78.11	0.84*
SE (±)	0.28	1.96	0.30	0.25	48.77	0.41
Sij – Skl(±)	0.40	2.78	0.42	0.35	68.97	0.58
Sij – Sik(±)	0.66	4.54	0.69	0.57	112.63	0.95
CD (5%)	0.57	3.97	0.60	0.50	98.57	0.83
CD (1%)	0.77	5.31	0.81	0.66	131.89	1.12

*, **: level of significance at 5 % and 1 %, respectively; R.C.- Rajendra Chamatkar, S.S.- Swarna Sneha, N.R.- Narendra Rashmi; VLFH- Vine length at the time of final harvesting, LF- Length of fruit, DF- Diameter of fruit, NFPV- Number of fruits per vine, WFr.- Weight of fruit, Fr.YPV- Fruit yield per vine.

CONCLUSION

The estimates of variance component revealed that variance due to SCA was more pronounced than variance due to GCA for all the characters under study except length of fruit, indicating the importance of non-additive type of gene action for the expression for these characters and heterosis breeding or recurrent selection can be employed for improvement of these characters. The parents BRBG-22-1and BRBG-41-1were the good general combiners for fruit yield per vine. These can be used for identifying superior heterotic combinations. Out of twenty one hybrids, BRBG-23 × Rajendra Chamatkar (0.92), BRBG-41-1 × Narendra Rashmi (1.07) and BRBG-21-2 × Swarna Sneha (1.30) were showed significant and positive SCA effects and were grouped under good specific combiner and these can be subjected to recurrent selection for improvement of genetic stock.

FUTURE SCOPE

Line BRBG22-1 can use as the best general combiner. Hybrid BRBG-23 × Narendra Rashmi and BRBG-65 × Rajendra Chamatkar can use as the best specific combiner.

In this study, preponderance of both additive and non-additive type of gene action therefore progeny selection will be effective for genetic improvement of such characters as well as heterosis breeding may also be rewarding.

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How to cite this article: Pushpam Patel, Ramesh Kumar Sharma, Ajay Bhardwaj, Randhir Kumar, Sanjay Sahay, Anand Kumar, Ritu Kumari and Amresh Bahadur Singh (2023). Combining Ability Studies in Bottle Gourd [*Lagenaria siceraria* (Molina) Standl.] for Yield and its Attributing Traits during February Season. *Biological Forum – An International Journal, 15*(1): 367-372.