The Bioscan 8(4): 1373-1377, 2013 (Supplement on Genetics & Plant Breeding)
AN INTERNATIONAL QUARTERLY JOURNAL OF LIFE SCIENCES
www.thebioscan.in

PERFORMANCE OF PARENTS AND HYBRIDS FOR YIELD AND YIELD ATTRIBUTING CHARACTERS IN RIDGE GOURD (*LUFFA ACUTANGULA* (ROXB.) L.)

P. KARTHIK REDDY*, V. S. K. REDDY AND S. S. VIJAYA PADMA.
Department of Vegetable Science, College of Horticulture, Dr Y. S. R. Horticultural University, Rajendranagar, Hyderabad-500 030, Andhra Pradesh, INDIA
e-mail: panyam.karthik@gmail.com

KEYWORDS
Earliness
F_1 hybrids
Mean performance
Ridge gourd
Yield

Received on :
20.09.2013

Accepted on :
13.11.2013

***Corresponding author**

ABSTRACT

The present study was carried out to know the performance of hybrids and their parents for the sixteen quantitative traits attributing for yield in ridge gourd. Among the parents used for investigation T_1, T_3 and L_4 were high yielding of 1.36, 1.09 and 1.07 kg per vine, respectively. The promising hybrids $L_4 \times T_1$, $L_5 \times T_1$ and $L_1 \times T_2$ recorded high yield of 2.27, 2.16 and 1.93 kg per vine, respectively over the two commercial checks. The hybrid $L_4 \times T_1$ was most promising for various traits which contribute to early and highest fruit yield per vine. The best performing parents can be used for further breeding programmes and hybrids could be exploited for cultivation.

INTRODUCTION

Ridge gourd (*Luffa acutangula* (Roxb.) L.) also called Chinese okra is predominantly monoecious in sex expression; cross pollinated and provides an ample scope for utilization of hybrid vigour in view of availability of wide range of genetic variability. It can be profitably utilized for the production of F_1 hybrid seeds at cheaper rates, as the monoecious nature of crop eliminates emasculation and the higher number of hybrid seeds per cross makes it more economical. Further, the crop being cultivated at wider spacing, the hybrid seed rate per hectare for commercial vegetable crop would be low and cost effective. Therefore, ridge gourd offers greater scope for exploitation of hybrid vigour on commercial scale to increase the productivity and production; otherwise it is the least exploited cucurbit vegetable. Abusaleha and Dutta (1994), Kadam *et al.* (1995) and Niyaria and Bhalala (2001) reported that the hybrids were early and gave higher yields in ridge gourd which helps to bridge the gap between the availability and requirement. The possible exploitation of hybrid vigour in ridge gourd has been taken up at several research centers. However, very little systematic attention has been paid by plant breeders to study *per se* performance for earliness, yield and its components. As such, so far there is no public sector or institutional commercial hybrids in ridge gourd in India, though few private hybrids from leading seed companies are being cultivated by growers. Hence, the present investigation was undertaken to its precision and versatility with an objective to select elite parental lines which can be utilized for future hybridization programmes and the best performing hybrids for commercial cultivation.

MATERIALS AND METHODS

The present investigation was undertaken at an experimental farm of Vegetable Research Station, Agricultural Research Institute, Rajendranagar, Dr Y.S.R. Horticultural University, Hyderabad. The experimental farm is situated at an altitude of 542.6 m above MSL. Geographically it lies at latitude of 17.19ºN and longitude of 79.23ºE. The experimental material consists of nine parents *viz;* LA-30 (L_1), RG-152 (L_2), Chitrada (L_3), L4 (L_4), LA-31 (L_5), SRG-41 (L_6) used as lines (females) and Pusa Nasdar (T_1), Jaipur Long (T_2) and Arka Sujat (T_3) as testers (males) and mated as per Line x Tester mating model of Kempthorne (1957). Thus a total of 18 hybrids were synthesized by making crosses between lines and the testers during *kharif* 2010. All the 18 hybrids along with their corresponding nine parents and two commercial check varieties *viz;* Green Beauty and Viva Beauty were evaluated in a randomized block design in three replications during summer 2011. The data was subjected to the analysis of variance for randomized block design as suggested by Panse and Sukhatme (1978). Observations on five randomly selected plants were recorded for various yield attributing traits to see the performance of parents and hybrids over the checks.

RESULTS AND DISCUSSION

The *per se* performance of hybrids and parents (lines and testers) for different growth, earliness and yield parameters and the top three best performing hybrids are presented in Table 1 and Table 2, respectively. The mean sum of squares due to gca and sca were significant for all characters, indicated the importance of both additive and non-additive genetic components for traits under study. Similar results were reported by Rao *et al.* (1999b) and Niyaria and Bhalala (2001). Tyagi *et al.* (2010) also found significant gca and sca for the traits like fruits per vine, fruit length and fruit girth. The ratio of variance gca to variance sca suggested the preponderance of non-additive gene action for all the characters. These findings were in consonance with Rao *et al.* (1999b), Lin and Lin (2000), Hedau and Sirohi (2003), Purohit *et al.* (2007) and Lodam *et al.* (2009).

Parents and hybrids differed significantly among themselves for vine length and it ranged from 2.67 (L_2) to 4.37 (L_4) among lines with a mean vine length of 3.14 m. In testers, it ranged from 3.47 (T_2) to 4.60 (T_1) with a mean of 4.12 m and among hybrids it varied from 2.73 m (L_2 x T_3) to 5.20 m (L_4 x T_1) with a mean of 3.99 m. Vine length recorded 5.03 m in Green Beauty and 4.98 m in Viva Beauty (Table 1). The parents and hybrids having longer vine length resulted in higher yield per vine and these results are in confirmation with Rao *et al.* (2000).

Genotypes differed significantly among themselves for leaf area and it ranged from 132.14 (L_4) to 151.29 cm^2 (L_2) among the lines with a mean of 143.92 cm^2, 144 (T_2) to 190.73 cm^2 (T_1) among testers with a mean of 173.62 cm^2 and 123.43 (L_3 x T_3) to 206.01 cm^2 (L_4 x T_1) with a mean of 163.85 among the hybrids (Table 1). The highest leaf area was observed in L_4 x T_1 (206.01 cm^2) that might have lead to more assimilation of photosynthates and contributed to highest fruit yield. This finding was for the first time to be reported in the ridge gourd. This was akin with the results of Kore *et al.* (2003) in bitter gourd.

Genotypes differed significantly among themselves for days to first male flower appearance and it varied from 30.27 (L_2) to 40.47 (L_5) with a mean of 35.85 among lines, 32.80 (T2) to 39.53 (T_3) with a mean of 37.22 among testers, and 29.67 (L_4 x T_1) to 38.53 (L_1 x T_1) with a mean of 33.01 among the hybrids. The commercial checks Green Beauty and Viva Beauty recorded 33.40 and 34.87, respectively (Table 1). The hybrids L_4 x T_1 (29.67 days), L_5 x T_3 (29.80 days) recorded early flowering than their parents and commercial checks. Days to first female flower appearance varied from 35.07 (L_1) to 44.67(L_6) with mean of 41.29 among lines, 38.40 (T_2) to 42.80 (T_1) with a mean of 41.31 among testers and 31.67 (L_4 x T_1) to 43.33 (L_1 x T_2) with a mean of 37.18 among hybrids. The checks, Green Beauty and Viva Beauty recorded 44.00 and 41.27 days to first female flower appearance, respectively (Table 1). Days to 50 per cent flowering varied from 34.12 (L_1) to 44.56 (L_6) with a mean of 40.58 among lines, 34.10 (T_2) to 42.22 (T_3) with a mean of 39.37 among testers Among the hybrids, it ranged from 31.67 (L_2 x T_3) to 43.33 (L_1 x T_2) with a mean of 37.29 and the commercial checks Green Beauty and Viva Beauty recorded 42.89 and 40.67, respectively. The hybrids L_2 x T_3 (31.67 days), L_5 x T_1 (32.33 days) L_3 x T_1 (33.33 days) and L_4 x

Table 1: *Per se* performance of hybrids, parents (lines and testers) and checks for growth, earliness and yield parameters in ridge gourd

S. no	Hybrids	Vine length (m)	Days to first male flower	Days to first female flower	Node of first male flower	Node of first female flower	Days to 50 % flowering	No. of male flowers/ vine	No. of female flowers/ vine	Sex ratio (M/F)	Fruit set (%)	Fruit length (cm)	Fruit girth (cm)	No. of fruits per vine	Avg. fruit weight (g)	Leaf area (cm^2)	Yield/ vine (kg)
1	$L_1 \times T_1$	3.70	38.53	42.67	6.00	14.87	41.44	95.00	51.53	1.86	13.79	23.90	7.89	7.13	172.93	185.24	0.95
2	$L_1 \times T_2$	3.90	35.93	43.33	4.00	12.00	43.33	104.60	54.93	1.91	12.03	26.20	7.15	13.00	148.53	151.55	1.93
3	$L_1 \times T_3$	4.73	33.87	38.07	5.00	12.40	37.67	94.73	50.53	1.89	16.48	23.33	6.53	8.33	81.33	167.37	0.57
4	$L_2 \times T_1$	4.13	31.80	34.13	5.20	12.53	39.00	104.80	47.80	2.19	14.67	22.73	6.41	14.66	113.80	168.12	1.67
5	$L_2 \times T_2$	3.53	a34.00	41.00	5.00	11.67	40.22	104.00	45.93	2.28	15.49	23.33	7.19	7.00	117.87	160.42	0.86
6	$L_2 \times T_3$	2.73	30.47	32.87	2.99	12.13	31.67	104.87	55.67	1.90	11.30	24.41	6.89	6.33	155.67	135.83	0.97
7	$L_3 \times T_1$	4.17	30.53	33.80	8.00	11.33	33.33	90.27	49.13	1.86	16.51	15.34	7.60	8.07	198.27	135.77	1.54
8	$L_3 \times T_2$	4.07	35.67	35.83	7.93	12.13	35.78	101.07	35.20	2.92	21.06	25.61	8.31	7.33	161.40	190.50	1.48
9	$L_3 \times T_3$	4.53	35.07	41.33	7.80	13.80	41.44	94.73	32.00	2.95	24.92	21.61	7.93	8.00	124.47	123.43	0.99
10	$L_4 \times T_1$	5.20	29.67	31.67	8.00	12.53	37.33	115.80	52.67	2.22	29.26	31.31	8.49	15.17	164.07	206.01	2.27
11	$L_4 \times T_2$	4.50	30.80	34.00	4.33	9.27	33.44	116.00	53.00	2.19	17.59	22.35	6.91	9.33	140.80	159.10	1.30
12	$L_4 \times T_3$	4.10	32.80	42.27	2.93	12.47	43.19	91.80	52.53	1.75	15.74	29.07	8.52	8.33	175.27	189.26	1.39
13	$L_5 \times T_1$	3.73	30.93	32.33	3.33	6.80	32.33	97.20	56.60	1.72	25.90	32.97	10.16	14.67	230.60	198.96	2.16
14	$L_5 \times T_2$	3.53	32.87	37.20	3.01	13.00	36.00	98.77	53.20	1.85	12.52	27.97	7.43	6.67	145.27	176.87	0.97
15	$L_5 \times T_3$	3.80	29.80	32.47	4.07	8.13	34.67	103.33	49.80	2.08	28.75	34.01	8.41	14.33	151.47	154.97	1.09
16	$L_6 \times T_1$	3.20	34.40	39.60	3.40	8.07	37.11	91.47	51.60	1.77	14.86	21.00	7.69	7.67	107.93	148.27	0.85
17	$L_6 \times T_2$	3.90	30.60	35.53	6.47	9.93	33.00	103.33	53.60	1.93	13.68	20.92	8.68	7.33	182.47	133.20	1.35
18	$L_6 \times T_3$	4.43	36.40	41.13	5.00	8.47	40.33	105.67	54.80	1.93	14.60	22.97	6.68	8.00	116.40	164.37	0.97
	Hybrid mean	3.99	33.01	37.18	5.14	11.20	37.29	100.97	50.03	2.07	17.73	24.95	7.72	9.52	149.36	163.85	1.44

Table 1: Cont.............

S. no	Parents	Vine length (m)	Days to first male flower	Days to first female flower	Node of first male flower	Node of first female flower	Days to 50 % flowering	No. of male flowers /vine	No. of female flowers /vine	Sex ratio (M/F)	Fruit set (%)	Fruit length (cm)	Fruit girth (cm)	No.of fruitsper vine	Avg. fruit weight (g)	Leaf area (cm²)	Yield per vine (kg)
	Lines																
19	L_1	2.80	31.80	35.07	5.93	6.80	34.12	85.53	23.53	3.63	29.68	28.72	7.27	7.00	105.00	150.26	0.73
20	L_2	2.67	30.27	39.13	6.20	11.73	38.67	94.40	32.20	2.94	24.80	21.27	7.15	8.00	93.60	151.29	0.66
21	L_3	2.70	35.80	42.40	6.50	16.13	41.22	94.53	29.00	3.26	17.19	18.50	9.15	5.00	118.33	138.92	0.61
22	L_4	4.37	39.73	43.40	4.27	14.47	42.56	91.07	26.20	3.47	30.55	30.70	7.81	8.00	127.87	132.14	1.07
23	L_5	2.70	40.47	43.07	3.80	6.73	42.33	90.40	31.40	2.88	23.93	35.47	6.19	7.50	108.60	150.60	0.82
24	L_6	3.60	37.00	44.67	4.93	10.33	44.56	94.27	31.00	3.05	20.28	25.63	7.91	6.33	115.47	140.29	0.64
	Lines mean	3.14	35.85	41.29	5.27	11.03	40.58	91.70	28.89	3.21	24.41	26.72	7.58	6.97	111.48	143.92	0.77
	Testers																
25	T_1	4.60	39.33	42.80	4.80	13.20	41.78	95.53	25.60	3.73	36.44	24.34	8.81	9.33	145.27	190.73	1.36
26	T_2	3.47	32.80	38.40	4.33	8.20	34.10	110.87	29.20	3.80	26.23	26.83	7.39	7.67	136.27	144.00	1.05
27	T_3	4.30	39.53	42.73	7.87	14.93	42.22	103.60	38.40	2.70	20.00	25.76	7.88	7.67	135.40	186.13	1.09
	Tester mean	4.12	37.22	41.31	5.67	12.11	39.37	103.33	31.07	3.41	27.56	25.64	8.03	8.22	138.98	173.62	1.15
	Checks																
28	Green Beauty	5.03	33.40	44.00	3.07	15.07	42.89	113.00	57.67	1.96	18.46	30.40	9.12	10.67	160.73	194.04	1.85
29	Viva Beauty	4.98	34.87	41.27	3.27	15.20	40.67	110.07	56.00	1.97	17.87	26.53	8.58	10.00	156.93	170.41	1.56
	Mean	3.82	34.00	38.88	5.23	11.26	38.25	99.17	43.22	2.47	20.31	25.42	7.72	8.81	139.79	160.50	1.26
	S.E.	0.34	1.36	1.21	0.37	0.53	2.00	4.81	1.53	0.14	2.11	0.82	0.13	0.80	12.92	7.12	0.11
	C.D@ 5%	0.98	3.85	3.44	1.05	1.50	5.70	13.85	4.35	0.40	6.00	2.33	0.37	2.26	36.70	20.22	0.32

T_2 (33.44) recorded early flowering than their parents and commercial checks (Table 1). Early appearance of male and female flowers on the vine is an indication of higher yield per vine. Similar findings were reported by Rao *et al*. (1999a) and Rao *et al*. (2000).

Lines, testers and hybrid combinations used in investigation differed significantly among themselves for node of first male flower appearance as it varied from 3.80 (L_5) to 6.50 (L_3) with mean of 5.27 among lines, 4.33 (T_2) to 7.87 (T_3) with a mean of 5.67 among testers and among hybrids it ranged from 2.93 (L_4 x T_3) to 8.00 (L_3 x T_1 and L_4 x T_1) with a mean of 5.14. The checks Green Beauty and Viva Beauty recorded 3.07 and 3.27 node of first male flower appearance, respectively (Table 2). For node of first female flower appearance it varied from 6.73 (L_5) to 16.13 (L_3) with mean of 11.03 among lines, 8.20 (T_2) to 14.93 (T_3) with a mean of 12.11 among testers (Table 1) and 6.80 (L_5 x T_1) to 14.87 (L_1 x T_1) with a mean of 11.20 among hybrids. The checks, Green Beauty and Viva Beauty recorded 15.07 and 15.20 node of first female flower appearance, respectively (Table 1). Some hybrids recorded lesser values than those of checks in days to first male and female flower appearance, node number of first male and female flowers and days to 50 per cent flowering where, negative values shows early maturity. These findings were in consonance with Rao and Rao (2002). Genotypes differed significantly among themselves for the number of male flowers per vine varied from 85.53 (L_1) to 94.53 (L_3) among lines, 95.53 (T_1) to 103.60 (T_3) among testers (Table 1) and it varied from 90.27 (L_3 x T_1) to 116.00 (L_4 x T_2) among hybrids. The mean for number of male flowers per vine was higher in hybrids (100.97) compared to lines (91.70), testers (103.33).The number of female flowers per vine varied from 23.53 (L_1) to 32.20 (L_2) among lines, 25.60 (T_1) to 38.40 (T_3) among testers (Table 1) and it varied from 32.00 (L_3 x T_3) to 56.60 (L_5 x T_1) among hybrids. The mean for number of female flowers per vine was higher in hybrids (50.03) compared to lines (28.88), testers (31.07) and Green Beauty and Viva Beauty recorded 57.67 and 56.00 number of female flowers per vine, respectively (Table 2). Sex ratio varied from 2.88 (L_5) to 3.63(L_1) with mean of 3.21 among lines, 2.70 (T_3) to 3.80 (T_2) with a mean of 3.41 among testers (Table 1). Among hybrids 1.72 (L_5 x T_1) to 2.95 (L_3 x T_3) with a mean of 2.07 and the checks Green Beauty and Viva Beauty recorded 1.96 and 1.97 sex ratio, respectively (Table 2). Similar results were reported by Shinde *et al*. (2003) in ridge gourd.

Lines, testers and hybrid combinations used in investigation differed significantly among themselves for per cent fruit set and it ranged from 17.19 (L_3) to 30.55 % (L_4) with mean of 24.41 among lines, 20.00 (T_3) to 36.44% (T_1) with a mean of 27.56 among testers and 11.30 (L_2 x T_3) to 29.26 % (L_4 x T_1) with a mean of 17.73% among hybrids. The checks Green Beauty and Viva Beauty recorded 18.46 and 17.87% fruit set, respectively (Table 1). There was significant difference in genotypes for fruit length and fruit girth. Fruit length ranged from 18.50 (L_3) to 35.47cm (L_5) with an average of 26.71 cm among lines, 24.34 (T_1) to 26.83 cm (T_2) with mean of 25.64 cm among testers and it varied from 15.34 (L_3 x T_1) to 34.01 cm (L_5 x T_3) with a mean of 24.95 cm among hybrids. The checks Green Beauty and Viva Beauty recorded 30.40 and

Table 2: The best performing top three parents and hybrids of ridge gourd for growth, earliness and yield parameters

S. no	Characters	Parents			Hybrids		
		I	II	III	I	II	III
1	Vine length (m)	T_1 (4.60)	L_4 (4.37)	T_3 (4.30)	$L_4 \times T_1$ (5.20)	$L_1 \times T_3$ (4.73)	$L_3 \times T_3$ (4.53)
2	Days to first male flower	L_2 (30.27)	L_1 (31.80)	T_2 (32.80)	$L_4 \times T_1$ (29.67)	$L_5 \times T_3$ (29.80)	$L_2 \times T_3$ (30.47)
3	Days to first female flower	L_1 (35.07)	T_2 (38.40)	L_2 (39.13)	$L_4 \times T_1$ (31.67)	$L_5 \times T_1$ (32.33)	$L_5 \times T_3$ (32.47)
4	Node of first male flower	L_5 (3.80)	L_4 (4.27)	T_2 (4.33)	$L_4 \times T_3$ (2.93)	$L_2 \times T_3$ (2.99)	$L_5 \times T_2$ (3.01)
5	Node of first female flower	L_5 (6.73)	L_1 (6.80)	T_2 (8.20)	$L_5 \times T_1$ (6.80)	$L_6 \times T_1$ (8.07)	$L_5 \times T_3$ (8.13)
6	Days to 50 % flowering	T_2 (34.10)	L_1 (34.12)	L_2 (38.67)	$L_2 \times T_3$ (31.67)	$L_5 \times T_1$ (32.33)	$L_6 \times T_2$ (33.00)
7	No. of male flowers/vine	T_2 (110.87)	T_3 (103.60)	T_1 (95.53)	$L_4 \times T_2$ (116.00)	$L_4 \times T_1$ (115.80)	$L_6 \times T_3$ (105.67)
8	No. of female flowers/vine	T_3 (38.40)	L_2 (32.20)	T_2 (29.20)	$L_5 \times T_1$ (56.60)	$L_2 \times T_3$ (55.67)	$L_1 \times T_2$ (54.93)
9	Sex ratio (M/F)	T_3 (2.70)	L_5 (2.88)	L_2 (2.94)	$L_5 \times T_1$ (1.72)	$L_4 \times T_3$ (1.75)	$L_6 \times T_1$ (1.77)
10	Fruit set (%)	T_1 (36.44)	L_4 (30.55)	L_1 (29.68)	$L_4 \times T_1$ (29.26)	$L_5 \times T_3$ (28.75)	$L_5 \times T_1$ (25.90)
11	Fruit length (cm)	L_5 (35.47)	L_4 (30.70)	L_1 (28.72)	$L_5 \times T_3$ (34.01)	$L_5 \times T_1$ (32.97)	$L_4 \times T_1$ (31.31)
12	Fruit girth (cm)	L_3 (9.15)	T_1 (8.81)	L_6 (7.91)	$L_5 \times T_1$ (10.16)	$L_6 \times T_2$ (8.68)	$L_4 \times T_3$ (8.52)
13	No. of fruits/vine	T_1 (9.33)	L_2 & L_4 (8.00)	T_2 & T_3 (7.67)	$L_4 \times T_1$ (15.17)	$L_5 \times T_1$ (14.67)	$L_2 \times T_1$ (14.66)
14	Avg. fruit weight (g)	T_1 (145.27)	T_2 (136.27)	T_3 (135.40)	$L_5 \times T_1$ (230.60)	$L_3 \times T_1$ (198.27)	$L_6 \times T_2$ (182.47)
15	Leaf area (cm^2)	T_1 (190.73)	T_3 (186.13)	L_2 (151.29)	$L_4 \times T_1$ (206.01)	$L_5 \times T_1$ (198.96)	$L_3 \times T_2$ (190.50)
16	Yield/vine (kg)	T_1 (1.36)	T_3 (1.09)	L_4 (1.07)	$L_4 \times T_1$ (2.27)	$L_5 \times T_1$ (2.16)	$L_1 \times T_2$ (1.93)

26.53 cm fruit length, respectively (Table 1). Fruit girth varied from 6.19 (L_5) to 9.15 cm (L_3) with mean of 7.58 cm among lines, 7.39 (T_2) to 8.81 cm (T_1) with a mean of 8.03 cm among testers and 6.41 ($L_2 \times T_1$) to 10.16 cm ($L_5 \times T_1$) with a mean of 7.72 cm among hybrids. The checks, Green Beauty and Viva Beauty recorded 9.12 and 8.58 cm fruit girth, respectively. Number of fruits per vine ranged from 5.00 (L_3) to 8.00 (L_2 and L_4) among lines, 7.67 (T_2 and T_3) to 9.33 (T_1) among testers and it ranged from 6.33 ($L_2 \times T_3$) to 15.17 ($L_4 \times T_1$) among hybrids. The mean number of fruits per vine was higher in hybrids (9.52) compared to lines (6.97) and testers (8.22). However, the hybrid $L_4 \times T_1$ recorded highest number of fruits per vine and fruit girth over both the checks Green Beauty and Viva Beauty. Tyagi *et al*. (2010) also reported that number of fruits per vine had a high relationship to the total yield. Genotypes differed significantly among themselves for average fruit weight and it varied from 93.60 (L_2) to 127.87 g (L_4) with a mean of 111.48 g among lines, 135.40 (T_3) to 145.27 g (T_1) with a mean of 138.98 g among testers and 81.33 ($L_1 \times T_3$) to 230.60 g ($L_5 \times T_1$) with a mean of 149.36 g among hybrids. The checks Green Beauty and Viva Beauty recorded 160.73 and 153.93 g of average fruit weight, respectively (Table 1). The parameters like per cent fruit set, fruit length, fruit girth, number of fruits per vine and average fruit weight are important for contributing to the total yield. For yield per vine, genotypes differed significantly and it varied from 0.61 (L_3) to 1.07 kg (L_4) among the lines, 1.05 (T_2) to 1.36 kg (T_1) among testers (Table 1) and 0.57 ($L_1 \times T_3$) to 2.27 kg ($L_4 \times T_1$) among the hybrids. The hybrid $L_4 \times T_1$ showed maximum fruit set per cent, number of fruits per plant and leaf area might have contributed to highest yield per vine (2.27 kg) The hybrid $L_5 \times T_1$ also showed significantly superior performance for yield per vine (2.16 kg) which might due to highest number of female flowers, fruit girth, average fruit weight and least sex ratio. The mean yield per vine was highest (1.44 kg) in hybrids compared to parents (Table 1). The high yielding hybrids in the order of merit are $L_4 \times T_1$, $L_5 \times T_1$ and $L_1 \times T_2$ has surpassed the yield of parents and both the commercial checks. The high yield in these F_1 hybrids has been attributed due to early maturity, increased number of fruits per vine and increase in fruit length and fruit weight. These results were in confirmation with Kadam *et al*. (1995), Chen *et al*. (1996), Luo *et al*. (2000) and Hedau and Sirohi (2004).

Most of the hybrids exhibited superior *per se* performance than the parents involved with respect to vine length, days to first female flower appearance, node of first male flower appearance, days to 50 per cent flowering, number of female flowers per vine, sex ratio, fruit girth, number of fruits per vine, average fruit weight, leaf area and yield per vine. The best three performing parents (Lines and Testers) and hybrids are presented in (Table 2) for different traits studied. In this study the parents L_1, L_4, T_1 and T_3 were good performers for various characters taken under study, in this perspective they could be exploited further in different breeding programmes. The promising hybrids like $L_4 \times T_1$, $L_5 \times T_1$ and $L_1 \times T_2$ which are superior yielders than the checks can be further subjected to selection to isolate desirable transgressive segregants.

REFERENCES

Abusaleha and Dutta, O. P. 1994. Manifestation of heterosis in ridge gourd. *Indian J. Hort.* **51(4):** 389-392.

Chen, Q. H., Huang, T., Zhuo, Q. Y., He, X. Z. and Lin, Y. E. 1996. Breeding of new hybrid Feng Kang of *Luffa acutangula* Roxb. *China Veg*. **2:** 7-8.

Hedau, N. K. and Sirohi, P. S. 2003. Genetics of earliness and vine length in ridge gourd *[Luffa acutangula* (Roxb.) L.]. *Veg. Sci*. **30(1):** 91 -92.

Hedau, N. K. and Sirohi, P. S. 2004. Heterosis studies in ridge gourd. *Indian J. Hort.* **61(3):** 236-239.

Kadam, P. Y., Desai, U. T. and Kale, P. N. 1995. Heterosis studies in ridge gourd. *J. Maharastra Agril. Univ*. **20(1):** 119-120.

Kempthorne, O. 1957. *An Introduction to genetic Statistic. J. Wiley and Sons, Inc. New York.* pp. 208-223.

Kore, V. N., Dhanawate, K. P., Bendale, V. W., Patil, R. S. and Mane, A. V. 2003. Genetic variation in leaf area production and yield potential of bitter gourd (*Momordica charantia* L.) cultivars. *Res. Crops*. **4(2):** 284-286.

Lin, M. B. and Lin, S. S. 2000. Preliminary study on the heredity of fruit length of angular sponge gourd. *J. South China Agril. Univ*. **21(2):** 8-9.

Lodam, V. A., Desai, D. T., Khandelwal, V. and Patil, P. P. 2009.

Combining ability analysis in ridge gourd. *Veg. Sci.* **36(1):** 113-115.

Luo, J., Luo, S. and Gong, H. 2000. Breeding of new F_1 hybrid 'Yalu No.1' of *Luffa acutangula* Roxb. *China Veg.* **3:** 26-28

Niyaria, R. and Bhalala, M. K. 2001. Heterosis and combining ability in ridge gourd. *Indian J. Genet. Resour.* **14:** 101-102.

Panse, V. G. and Sukhatme, P. V. 1978. Statistical methods for Agricultural Workers. I.C.A.R., New Delhi.

Purohit, V. L., Mehta, D. R., Dhaduk, L. K. and Gajipara, N. N. 2007. Combining ability for fruit yield and its attributes in ridge gourd (*Luffa acutangula,* Roxb L.). *Veg. Sci.* **34(1):** 84-85.

Rao, B. N., Rao, P. V. and Reddy, T. B. 1999a. Correlation and path-coefficient studies in ridge gourd (*Luffa acutangula* (Roxb.) L.). *Int. J. of Tropical Agri.* **17(1-4):** 119-124.

Rao, B. N., Rao, P. V. and Reddy, Y. N. 1999b. Combining ability in ridge gourd (Luffa acutangula (Roxb.) L.). *J. Applied Hort.* **5(1&2):** 70-75.

Rao, B. N., Rao, P. V. and Reddy, B. M. M. 2000. Correlation and path analysis in the segregating population of ridge gourd (*L. acutangula* (Roxb.) L.). *Crop Res.* **20(2):** 338-342.

Rao, B. N. and Rao, P. V. 2002. Heterosis in ridge gourd. *J. Res. ANGRAU*. **30(1):** 11-18.

Shinde, S. J., Nilangekar, R. G., Barkule, S. R., Hingole, D. G., Kadam, R. P. and Keshbhat, S. S. 2003. Growth performance and yield of different ridge gourd (*Luffa acutangula* Roxb.) genotypes. *J. Soils. Crops*. **13(1):** 65-68.

Tyagi, S. V. S., Sharma, P., Siddiqui, S. A. and Khandelwal, R. C. 2010. Combining Ability for Yield and Fruit Quality in *Luffa*. *Int. J. Veg. Sci.* **16:** 267-277.

APPLICATION FORM

NATIONAL ENVIRONMENTALISTS ASSOCIATION (N.E.A.)

To,
The Secretary,
National Environmentalists Association,
D-13, H.H.Colony,
Ranchi - 834 002, Jharkhand, India

Sir,
I wish to become an Annual / Life member and Fellow* of the association and will abide by the rules and regulations of the association

Name _____

Mailing Address _____

_____

Official Address _____

_____

E-mail _____Ph. No._____(R)_____(O)

Date of Birth _____ Mobile No. _____

Qualification _____

Field of specialization & research _____

Extension work (if done) _____

_____

Please find enclosed a D/D of Rs..... No. ..... Dated ..... as an *Annual / Life membership fee*.

*Attach **Bio-data and some recent publications along with the application form when applying for the Fellowship of the association.**

Correspondance for membership and/ or Fellowship should be done on the following address :

SECRETARY,
National Environmentalists Association,
D-13, H.H.Colony,
Ranchi - 834002
Jharkhand, India
E-mails : m_psinha@yahoo.com Cell : 9431360645
dr.mp.sinha@gmail.com Ph. : 0651-2244071