

Evaluation of Hybrids for Growth, Yield and Yield Attributes in Okra (*Abelmoschus esculentus* L. Moench)

D. Venkatesh^{1*}, J. Srinivas², D. Lakshminarayana³, K. Nagaraju², B. Sai Krishna Nikhil⁴ and G. Sathish⁵

¹M.Sc. Scholar, Department of Vegetable Science, College of Horticulture, SKLTSHU, Mojerla (Telangana), India.

²Assistant Professor, Department of Vegetable Science, College of Horticulture, SKLTSHU, Mojerla (Telangana), India.

³Professor and Incharge PGIHS, Department of Horticulture, SKLTSHU, Mulugu (Telangana), India.

⁴Assistant Professor, Department of Genetics and Plant Breeding, College of Horticulture, SKLTSHU, Rajendranagar, Hyderabad (Telangana), India.

⁵Assistant Professor, Department of Agricultural Statistics, PGIHS, SKLTSHU, Mulugu (Telangana), India.

(Corresponding author: D. Venkatesh*)

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ABSTRACT: The present investigation entitled “Evaluation of hybrids for growth, yield and yield attributes in Okra (*Abelmoschus esculentus* L.)” was undertaken in P.G. research block at College of Horticulture, Mojerla, Wanaparthy District from *kharif*, 2022 to *rabi*, 2023. The experimental design laid out in Randomized Block Design with three replications, thirteen parents thus identified based on *per se* performance and genetic investigation methods were crossed in Line × Tester during *rabi* 2022-23. The resultant thirty direct crosses along with ten lines, three tester parents and two checks (Arka Anamika and PDKV Pragati) were evaluated in *rabi* 2022-23 for combining ability, heterosis so as to identify promising F₁ hybrids with high productivity, good fruit quality for commercial exploitation. Among 30 hybrids two crosses *viz.*, IC42456 × Kashi Lalima and IC42456 × Parbhani Kranti showed best mean performance for yield and yield contributing traits like number of fruits per plant, fruit yield per plant (kg) and fruit yield per hectare (tonn). Identified promising hybrids *viz.*, IC42456 × Kashi Lalima and IC42456 × Parbhani Kranti can be examined in multi-location experiments to confirm their efficacy and stability in a various of agroclimatic locations.

Keywords: Okra, Hybrids, Parents, Yield and YVMV resistance.

INTRODUCTION

Okra (*Abelmoschus esculentus* (L.) Moench) fruits are important and used as a vegetable in India crop belongs to the family Malvaceae and native to Tropical Africa, but can be grown in tropical and subtropical regions of the world (Ali *et al.*, 2012). It is the most popular and edible vegetable because of its soft greens grown throughout India during the summer and rainy season (Solankey *et al.*, 2013).

India is the world's largest producer of okra, India accounts for around 72.9% of global production. Okra is grown over an area of 550 thousand hectares in India, where it contributes 3.9% of the nation's total vegetable production. Its annual production is 6,873 thousand metric tonnes (MoA and FW, 2021-2022) and its productivity is 11.90 metric tonnes per hectare. Okra is grown on 4.01 thousand hectares in Telangana, with an output of 83.45 thousand tonnes per year. Andhra Pradesh, West Bengal, Bihar, Orissa, Gujarat,

Jharkhand, Karnataka, and Tamil Nadu are the states that produce the most okra (MoA and FW, 2021-2022). There are many different ways to prepare okra fruits in the kitchen. It can be cooked with the essential ingredients and fried in butter or butter oil. They can be boiled, served as a salad, sliced into pieces, and served with soup. Okra stem and root are used to strain the cane juice required to make gur or brown sugar (Chauhan, 1972).

Therefore, creating high-quality F₁ hybrids that are abundant in significant antioxidant and phytochemical compounds with high productivity, adaptability and yield is the primary goal of any vegetable improvement programme around the world. Very little is known about the antioxidant components of okra, despite claims that the fruit provides a major source of protein (1.9%), crude fibre (1.2%), mucilage (4%) and several minerals (Kumar *et al.*, 2017).

MATERIAL AND METHODS

The present investigation was undertaken with a view to estimating the “Mean performance of parents and hybrids in okra (*Abelmoschus esculentus* L.)” by adopting Line x Tester design in certain okra varieties. The selection of lines and testers was done based on divergence studies carried out by earlier workers and the material required for the study was generated by effecting the crosses during *khariif*, 2022. The crosses along with their respective parents were evaluated during *rabi*, 2022-2023 at P.G. research block, College of Horticulture, Mojerla, Wanaparthy District. The experiment and the methodology used for the study are described in brief below. The ten selected lines of okra namely IC42484, IC40289, IC42490, IC42451, IC42464, IC42456, EC329418, IC39136, EC329370 and EC329422 used as female parents and three testers Kashi Lalima, Parbani Kranthi and Punjab Suhavani used as a male parent's (three testers) were grown in separate plots with staggered sowings to ensure synchronization of flowering and each tester is crossed with all the ten lines. The parents were crossed in line x tester mating fashion to obtain F₁ hybrids (30 hybrids) during where developed *khariif*, 2022. Evaluated 30 crosses along with 13 parents and two check varieties (Arka Anamika and PDKV Pragati) (45 entries) were sown in a randomized block design replicating three times in *Rabi*, 2022-23. Thirty hybrids and thirteen parents were sown in three replications. Five competing plants in each treatment were randomly selected and tagged to record all vegetative and reproductive observations in all three replications. The 16 yield contributing traits are plant height (cm), number of primary branches per plant, number of leaves per plant, internodal length (cm), days taken to first flowering, days taken to 50 per cent flowering, fruit length (cm), fruit diameter (cm), days taken to first picking, days taken to last picking, number of locules per fruit, number of seeds per fruit, number of fruits per plant, fruit yield per plant (kg), fruit yield per hectare(ton), YVMV resistance (%).

RESULTS AND DISCUSSION

Mean performance of parents and hybrids

The mean values of 13 parents, 30 hybrids and 2 standard checks for the 13 characters are presented character wise in Table 1.

Plant height (cm): The mean value of plant height ranged from 76.14 cm (IC42451) to 95.67 cm (IC42456) in lines with an average of 82.92 cm. In testers, plant height ranged from 76.96 cm (Punjab Suhavani) to 84.51 cm (Parbhani Kranti) with an average of 80.82 cm. Among hybrids, it ranged from 77.32 cm (IC42464 x Punjab Suhavani) to 110.64 cm (IC42456 x Parbhani Kranti) with an average of 90.71 cm, which is more than the average height of lines and testers. In the case of checks, the average value was 100. Plant height in okra was also reported by Obiadalla-ali *et al.* (2013); Bhatt *et al.* (2016).

Number of primary branches per plant: In lines, the average number of branches per plant is 3.11 with a

range from 2.04 in (IC42451) to 3.70 in (IC42456), whereas in testers it ranged from 2.43 (Kashi Lalima) to 2.60 (Punjab Suhavani) with an average of 2.51. In hybrids, the average number of branches per plant was 3.61 with a range from 3.05 (IC42451 x Kashi Lalima) to 4.23 (IC42456 x Kashi Lalima) and the average of the checks was 3.77. Reported by Tripathi *et al.* (2004); Khanpara *et al.* (2009).

Number of leaves per plant: In lines, the average number of leaves per plant 28.72 with a range from 28.08 in (EC329422) to 30.01 in (IC42456), whereas in testers it ranged from 26.78 (Kashi Lalima) to 29.06 (Punjab Suhavani) with an average of 28.27. In hybrids, the average number of leaves per plant was 33.54 with a range from 30.69 (IC42490 x Kashi Lalima) to 35.38 (EC329422 x Parbhani Kranti) and the average of the checks was 31.87. Similarly given by Jethava *et al.* (2014); Patel *et al.* (2015).

Internodal length (cm): In lines, the average internodal length was 9.09 with a range from 7.14 cm in (IC42456) to 10.21 cm in (IC42451), whereas in testers it ranged from 6.36 cm (Kashi Lalima) to 8.47 cm (Parbhani Kranti) with an average of 7.54 cm. In hybrids, the average internodal length was 7.20 cm with a range from 4.89 cm (IC42456 x Kashi Lalima) to 8.62 cm (IC42484 x Kashi Lalima) and the average of the checks was 6.90 cm. Mehta *et al.* (2007); Khanpara *et al.* (2009).

Days taken to first flowering: The mean values of days taken to first flowering ranged from 38.95 (IC42451) to 40.65 (EC329422) in lines with an average of 39.66. While in testers, ranged from 38.72 (Kashi Lalima) to 39.54 (Parbhani Kranti) with an average of 39.23.

Among crosses, it ranged from 34.67 (IC42464 x Kashi Lalima) to 39.92 (IC39136 x Kashi Lalima) with a mean of 37.45, which is less than the average days taken to the first flowering of parents (39.56). In the case of checks, the average value was 36.75. Reported by Eswaran *et al.* (2007); Sibsankar *et al.* (2013).

Days taken to 50 percent flowering: The mean value of days taken to 50 percent flowering ranged from 44.01 (IC42484) to 45.43 (IC39136) in lines, whereas in testers it ranged from 44.75 (Punjab Suhavani) to 45.32 (Kashi Lalima). Lines and testers exhibited an average of 44.85 and 45.10 respectively, among crosses, it ranged from 40.01 (IC42464 x Kashi Lalima) to 45.58 (IC39136 x Parbhani Kranti) with a mean of 42.81. In the case of checks, the average value was 41.92. Similar reports given by Dhankhar *et al.* (1996).

Fruit length (cm): The mean value of fruit length ranged from 5.73 cm (IC42451) to 9.17 cm (42456) in lines with an average of 7.41 cm. In testers, it ranged from 8.28 cm (Kashi Lalima) to 9.51 cm (Parbhani Kranti) with an average of 8.72 cm. Among crosses, it ranged from 8.03 (IC40289 x Punjab Suhavani) to 13.28 cm (IC42456 x Kashi Lalima) with an average of 9.50 cm, which was more than the average height of lines and testers. In the case of checks, the average

value was 10.69. Similarly reported by Singh *et al.* (2002); Kumar *et al.* (2006).

Fruit diameter (cm): In lines and testers, the average diameter of fruit was 1.40 cm with a range in lines from 1.32 cm (IC39136) to 1.48 cm (EC329422), whereas in testers it ranged from 1.36 (Kashi Lalima) to 1.40 cm (Punjab Suhavani). In hybrids, the average diameter of fruit was 1.51 cm with a range from 1.41 cm (IC42490 × Parbani Kranti) to 1.51 cm (EC329422 × Kashi Lalima) and an average value was 1.50 cm in the case of checks. Similar findings given by Hosamani *et al.* (2008); Khanpara *et al.* (2009).

Days taken to first picking: The mean value of days taken to first picking ranged from 43.93 (IC42451) to 46.08 (EC329422) in lines, whereas in testers it ranged from 44.22 (Kashi Lalima) to 45.19 (Punjab Suhavani). Lines and testers exhibited an average of 45.11 and 44.76 respectively, among crosses, it ranged from 40.75 (IC42456 × Parbhani Kranti) to 45.42 (IC39136 × Parbhani Kranti) with a mean of 43.12. In the case of checks, the average value was 42.15. Similar results have also been reported by Tripathi *et al.* (2004).

Days taken to last picking: The mean value of days taken to last picking ranged from 92.97 (IC42484) to 97.88 (IC42456) in lines, whereas in testers it ranged from 95.07 (Parbani Kranti) to 96.65 (Kashi Lalima). Lines and testers exhibited an average of 94.51 and 95.99 respectively, among crosses it ranged from 95.57 (IC40289 × Parbhani Kranti) to 106.26 (IC42456 × Kashi Lalima) with a mean of 98.95. In the case of checks, the average value was 102.11. Similar results are reported by Tripathi *et al.* (2004); Parmar *et al.* (2011).

Number of locules per fruit: In lines, the average number of locules per fruit is 5.84 with a range from 5.22 in (EC329422) to 8.06 in (EC329370), whereas in testers it ranged from 5.09 (Punjab Suhavani) to 5.89 (Parbhani Kranti) with an average of 5.51. In hybrids, the average number of locules per fruit was 6.06 with a range from 5.35 (IC42464 × Parbani Kranti) to 8.50 (EC329370 × Parbhani Kranti) and the average of the checks was 5.85. Similar results are reported by Singh *et al.* (2016); More *et al.* (2017).

Number of seeds per fruit: In lines, the average number of seeds per fruit was 56.83 with a range from 51.46 in (EC329418) to 62.43 in (IC42456), whereas in testers it ranged from 54.53 (Punjab Suhavani) to 56.89 (Parbani Kranti) with an average of 55.52. In hybrids, the average number of seeds per fruit was 59.17 with a range from 51.53 (EC329418 × Punjab Suhavani) to 67.10 (IC42456 × Parbhani Kranti) and the average of the checks was 60.35. Similar findings were reported by Sriram *et al.* (2007).

Number of fruits per plant: In lines, the average number of fruits per plant was 17.15 with a range from 15.98 in (EC329418) to 19.13 in (IC42464), whereas in testers it ranged from 15.49 (Punjab Suhavani) to 16.34 (Kashi Lalima) with an average of 15.87. In hybrids, the average number of fruits per plant was 19.12 with a range from 16.11 (EC329418 × Punjab Suhavani) to 24.53 (IC42456 × Kashi Lalima) and the average of the checks was 19.87. Similarly reported by Khanpara *et al.* (2009); Parmar *et al.* (2011).

Fruit yield per plant (kg): In lines, the average fruit yield per plant was 0.170 with a range from 0.153 in (IC42464) to 0.196 in (IC42456), whereas in testers it ranged from 0.159 (Punjab Suhavani) to 0.169 (Parbhani Kranti) with an average of 0.165. In hybrids, the average fruit yield per plant was 0.193 with a range from 0.180 (IC42451 × Kashi Lalima) to 0.238 (IC42456 × Kashi Lalima) and the average of the checks was 0.193. These results are given by Singh *et al.* (2016); Nimbalkar *et al.* (2017).

Fruit yield per hectare (ton): In lines, Table 1 the average fruit yield per hectare was 12.65 with a range from 11.33 in (IC42464) to 14.57 in (IC42456), whereas in testers it ranged from 11.80 (Punjab Suhavani) to 12.54 (Parbhani Kranti) with an average of 12.24. In hybrids, the average fruit yield per hectare was 14.36 with a range from 13.40 (IC42451 × Kashi Lalima) to 17.69 (IC42456 × Kashi Lalima) and the average of the checks was 14.31. Reported by Medagam *et al.* (2012); Obiadalla-ali *et al.* (2013) Fig. 1, 2.

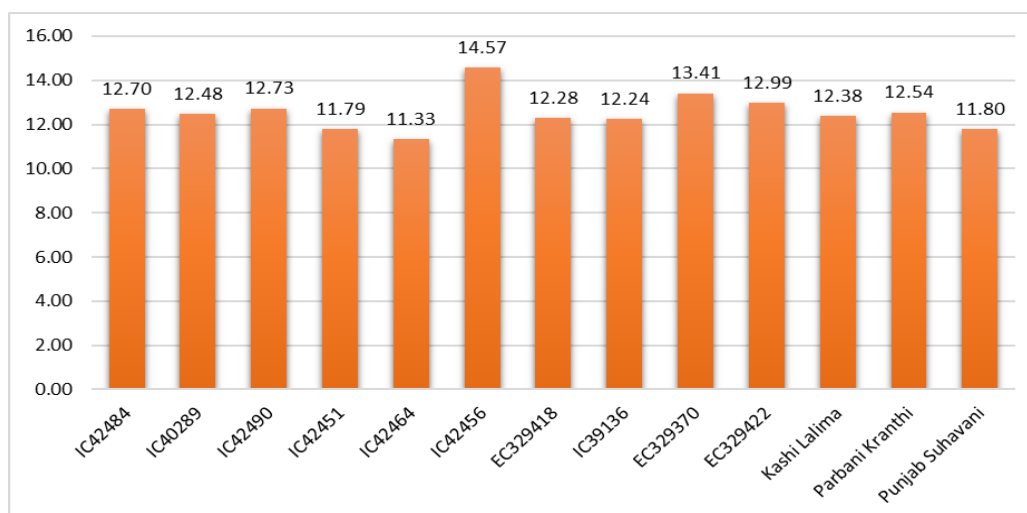


Fig. 1. Estimation of mean fruit yield per hectare (ton) of 13 parents in okra.

Table 1: Mean performance of 13 parents, 30 F₁'s and two checks for the 16 characters studied in okra.

Sr. No.	Parents	Plant height (cm)	Number of primary branches per plant	Number of leaves per plant	Internodal length (cm)	Days taken to first flowering	Days taken to 50 percent flowering	Fruit length (cm)	Fruit diameter	Days taken to first picking	Days taken to last picking	Number of locules per fruit	Number of seeds per fruit	Number of fruits per plant	Fruit yield per plant (kg)	Fruit yield per hectare (ton)	YVMV resistance (%)
Lines																	
1.	IC42484	79.24	3.28	28.63	9.58	39.03	44.01	7.27	1.35	44.19	92.97	6.22	55.71	16.96	0.171	12.70	64.12
2.	IC40289	81.61	3.21	28.68	8.38	39.70	44.71	6.59	1.44	45.04	93.59	5.45	52.14	16.51	0.168	12.48	50.87
3.	IC42490	80.26	3.03	28.61	9.45	40.04	45.04	8.53	1.43	45.51	93.32	5.36	55.18	16.64	0.171	12.73	57.67
4.	IC42451	76.14	2.04	29.30	10.21	38.95	44.42	5.73	1.35	43.93	95.22	6.32	61.16	17.09	0.159	11.79	51.66
5.	IC42464	77.33	3.27	28.40	8.84	39.43	44.69	7.13	1.40	44.77	93.61	5.44	58.01	19.13	0.153	11.33	56.52
6.	IC42456	95.67	3.70	30.01	7.14	39.16	44.6	9.17	1.41	45.16	97.88	5.33	62.43	18.93	0.196	14.57	38.12
7.	EC329418	80.40	3.62	28.85	10.16	39.72	44.98	7.22	1.38	44.99	93.11	5.52	51.46	15.98	0.165	12.28	45.76
8.	IC39136	84.84	3.42	28.25	9.40	40.25	45.43	7.14	1.32	45.95	93.38	5.53	55.07	16.59	0.165	12.24	50.33
9.	EC329370	88.76	3.1	28.36	8.23	39.68	45.26	8.63	1.46	45.51	97.25	8.06	60.51	17.06	0.181	13.41	43.41
10.	EC329422	84.94	2.4	28.08	9.55	40.65	45.29	6.71	1.48	46.08	94.85	5.22	56.65	16.66	0.175	12.99	44.33
	Lines mean	82.92	3.11	28.72	9.09	39.66	44.85	7.41	1.40	45.11	94.51	5.84	56.83	17.15	0.170	12.65	50.28
Testers																	
1.	Kashi Lalima	80.99	2.43	26.78	6.36	38.72	45.32	8.28	1.36	44.22	96.65	5.54	55.15	16.34	0.167	12.38	16.95
2.	Parbani Kranthi	84.51	2.50	28.96	8.47	39.54	45.23	9.51	1.39	44.88	95.07	5.89	56.89	15.77	0.169	12.54	26.65
3.	Punjab Suhavani	76.96	2.60	29.06	7.79	39.43	44.75	8.37	1.40	45.19	96.26	5.09	54.53	15.49	0.159	11.80	22.45
	Testers mean	80.82	2.51	28.27	7.544	39.23	45.10	8.72	1.38	44.76	95.99	5.51	55.52	15.87	0.165	12.24	22.01
	Parents mean	82.43	2.97	28.61	8.73	39.56	44.91	7.71	1.40	45.03	94.86	5.77	56.53	16.86	0.169	12.56	43.76

Sr. No	Crosses	Plant height (cm)	Number of primary branches per plant	Number of leaves per plant	Internodal length (cm)	Days taken to first flowering	Days taken to 50 percent flowering	Fruit length (cm)	Fruit diameter(cm)	Days taken to first picking	Days taken to last picking	Number of locules per fruit	Number of seeds per fruit	Number of fruits per plant	Fruit yield per plant (kg)	Fruit yield per hectare (ton)	YVMV resistance (%)
1.	IC42484 x Kashi Lalima	81.62	3.8	34.34	8.62	37.08	43.04	9.42	1.54	43.19	98.25	6.21	58.85	17.41	0.191	14.16	46.48
2.	IC42484 x Parbani Kranthi	85.33	4.02	33.67	7.15	35.50	42.33	9.95	1.48	41.61	96.64	6.22	57.68	17.43	0.186	13.79	47.27
3.	IC42484 x Punjab Suhavani	81.35	3.54	35.00	6.87	38.17	43.4	9.68	1.47	42.7	96.13	6.41	54.06	18.24	0.183	13.60	45.94
4.	IC40289 x Kashi Lalima	85.64	3.60	32.51	7.25	37.57	42.78	8.62	1.54	43.65	99.77	5.58	57.93	19.96	0.186	13.82	34.23
5.	IC40289 x Parbani kranthi	83.99	3.74	32.43	7.91	38.18	43.65	9.00	1.55	43.59	95.57	5.59	55.62	18.76	0.188	13.97	44.70
6.	IC40289 x Punjab Suhavani	89.34	3.62	33.96	6.66	37.94	43.04	8.03	1.48	43.66	96.61	5.78	55.61	19.07	0.186	13.81	36.01
7.	IC42490 x Kashi Lalima	89.74	3.32	30.69	7.50	38.09	43.61	9.20	1.56	44.2	98.27	5.79	52.23	21	0.192	14.25	50.46
8.	IC42490 x Parbani Kranthi	90.38	3.35	34.96	6.34	37.2	42.14	10.25	1.41	42.7	98.31	5.87	60.77	18.57	0.192	14.26	53.84
9.	IC42490 x Punjab Suhavani	86.63	3.37	34.23	7.50	35.11	40.44	8.99	1.54	42.28	98.02	5.57	58.32	20.17	0.191	14.18	48.00
10.	IC42451 x Kashi Lalima	81.61	3.05	33.94	8.08	37.26	42.92	8.07	1.49	42.93	100.86	6.53	62.36	21.01	0.180	13.40	49.66
11.	IC42451 x Parbani Kranthi	86.36	3.35	33.97	8.17	37.54	42.87	8.52	1.51	43.01	97.22	6.34	58.43	19.69	0.184	13.68	54.49
12.	IC42451 x Punjab Suhavani	77.48	3.17	33.98	7.65	37.97	42.89	8.64	1.44	43.93	98.51	6.41	60.87	19.07	0.190	14.09	45.21
13.	IC42464 x Kashi Lalima	82.51	3.88	33.49	7.67	34.67	40.01	9.34	1.46	40.79	96.60	5.52	60.80	20.66	0.195	14.45	47.87
14.	IC42464 x Parbani Kranthi	89.44	3.82	34.96	7.15	36.31	41.65	10.24	1.48	41.98	98.76	5.35	61.67	19.37	0.187	13.87	46.37
15.	IC42464 x Punjab Suhavani	77.32	3.4	32.34	5.61	37.69	43.18	9.87	1.47	43.27	99.05	5.54	59.33	19.49	0.191	14.15	47.09
16.	IC42456 x Kashi Lalima	109.92	4.23	33.90	4.89	35.53	40.68	13.28	1.60	40.87	106.26	5.65	65.43	24.53	0.238	17.69	24.24
17.	IC42456 x Parbani Kranthi	110.64	3.98	34.00	6.61	34.92	40.58	13.07	1.59	40.75	99.52	5.38	67.10	19.54	0.230	17.07	32.89
18.	IC42456 x Punjab Suhavani	102.56	3.50	31.55	6.77	38.44	43.77	10.07	1.49	43.91	102.88	5.54	60.54	21.42	0.210	15.58	41.28
19.	EC329418 x Kashi Kalima	88.43	3.83	33.94	7.6	38.32	43.65	8.95	1.45	43.36	97.18	5.72	57.25	19.32	0.187	13.87	39.58
20.	EC329418 x Parbani Kranthi	89.70	3.90	33.5	8.51	38.15	43.45	10.18	1.5	44	98.36	5.75	58.77	17.14	0.187	13.86	43.11

Sr. No.	Crosses	Plant height (cm)	Number of primary branches per plant	Number of leaves per plant	Internodal length (cm)	Days taken to first flowering	Days taken to 50 percent flowering	Fruit length (cm)	Fruit diameter	Days taken to first picking	Days taken to last picking	Number of locules per fruit	Number of seeds per fruit	Number of fruits per plant	Fruit yield per plant (kg)	Fruit yield per hectare (ton)	YVMV resistance (%)
21.	EC329418 x Punjab Suhavani	84.80	3.75	33.88	6.2	35.98	41.32	9.01	1.51	41.5	99.50	5.63	51.53	16.11	0.182	13.50	40.56
22.	IC39136 x Kashi Lalima	91.22	3.69	33.52	5.90	38.81	44.15	8.92	1.48	44.47	98.17	5.58	59.17	18.30	0.181	13.42	34.93
23.	IC39136 x Parbani Kranthi	91.67	3.88	31.98	6.99	39.92	45.58	9.08	1.48	45.42	100.69	5.68	60.85	18.47	0.182	13.48	41.62
24.	IC39136 x Punjab Suhavani	91.77	3.63	33.45	6.62	38.15	43.15	8.95	1.60	43.65	99.11	5.65	57.96	17.89	0.190	14.13	38.65
25.	EC329370 x Kashi Lalima	103.57	4.03	31.20	7.37	36.85	42.18	10.12	1.56	42.29	103.21	8.43	60.69	17.40	0.213	15.79	36.47
26.	EC329370 x Parbani Kranthi	107.66	3.47	32.09	6.74	38.98	43.98	10.99	1.63	44.65	97.07	8.5	63.53	19.27	0.212	15.71	41.68
27.	EC329370 x Punjab Suhavani	97.38	3.35	34.99	8.39	39.25	44.25	9.10	1.54	44.97	103.26	8.42	60.23	19.37	0.196	14.57	25.72
28.	EC329422 x Kashi Lalima	95.03	3.77	35.09	7.64	37.94	43.27	8.13	1.62	43.37	97.97	5.84	59.41	17.99	0.194	14.43	43.50
29.	EC329422 x Parbani Kranthi	96.70	2.93	35.38	7.6	37.93	42.93	9.01	1.56	43.45	98.29	5.58	61.54	18.57	0.193	14.29	38.35
30.	EC329422 x Punjab Suhavani	91.70	3.42	33.38	8.07	38.2	43.53	8.39	1.46	43.47	98.65	5.84	56.5	18.34	0.190	14.08	39.66
	Crosses mean	90.71	3.61	33.54	7.20	37.45	42.81	9.50	1.51	43.12	98.95	6.06	59.17	19.12	0.193	14.36	41.99
1.	Arka Anamika(check-1)	97.26	3.82	32.59	6.68	35.76	40.76	10.31	1.50	41.31	102.27	5.74	60.09	20.63	0.195	14.46	15.45
2.	PDKV Pragati(check-2)	102.74	3.71	31.15	7.13	37.74	43.08	11.08	1.51	42.98	101.95	5.96	60.61	19.10	0.191	14.15	21.26
	Checks mean	100.00	3.77	31.87	6.90	36.75	41.92	10.69	1.50	42.15	102.11	5.85	60.35	19.87	0.193	14.31	18.35
	SE m +	2.03	0.07	1.07	0.18	0.46	0.61	0.51	0.03	0.58	0.98	0.12	0.97	0.70	0.0054	0.40	3.00
	CD (P=0.05)	5.71	0.20	3.02	0.51	1.31	1.71	1.44	0.08	1.63	2.76	0.33	2.73	1.97	0.0153	1.13	8.44
	CD (P=0.01)	7.56	0.27	4.00	0.67	1.74	2.27	1.90	0.11	2.16	3.66	0.44	3.62	2.61	0.0202	1.49	11.18
	CV%	3.96	3.66	5.81	4.13	2.13	2.44	9.81	3.51	2.30	1.74	3.47	2.88	6.56	5.03	5.03	12.54

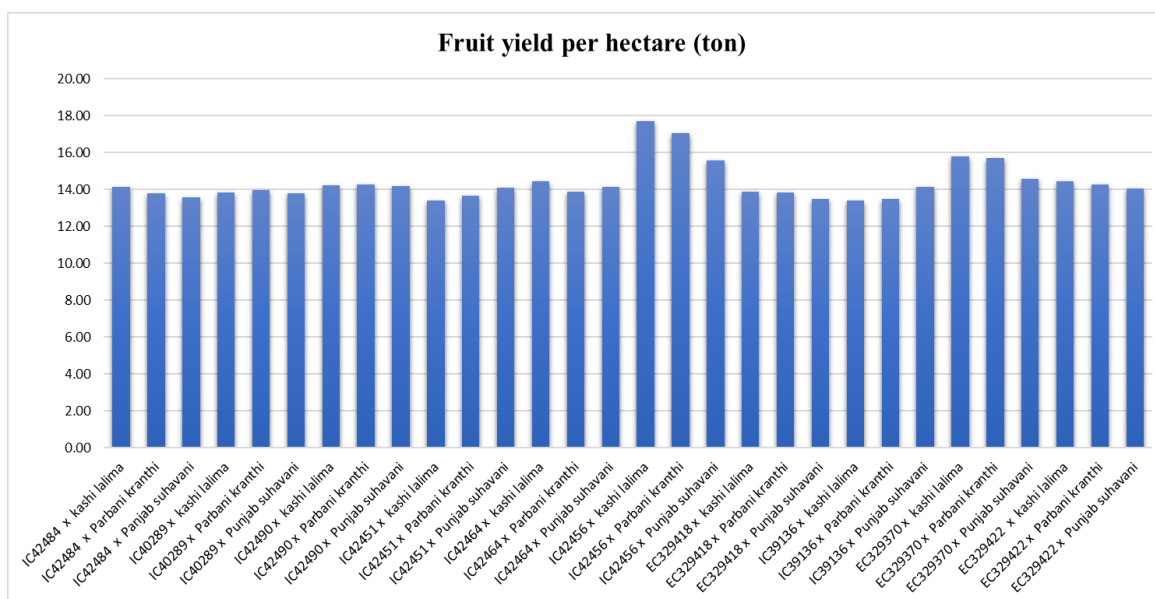


Fig. 2. Estimation of mean fruit yield per hectare (ton) of 30 F₁ hybrids in okra.

YVMV resistance (%): In lines and testers, the average YVMV resistance (%) was 50.28 respectively with a range in lines from 38.12 (IC42456) to 64.12 (IC42484), whereas in testers it ranged from 16.95 (Kashi Lalima) to 26.65 (Parbhani Kranti). In hybrids, this trait ranged from 25.72 (EC329370 × Punjab Suhavani) to 54.49 (IC42451 × Parbhani Kranti) with an average of 41.99 and an average of the checks was 18.35. Similar results are given by Medagam *et al.* (2012); Sibsankar *et al.* (2013).

CONCLUSIONS

Mean performances of parents and hybrids. Indicated that hybrids performed better than the parents from the heterosis studies promising hybrids identified based on *per se* performance for the yield and yield contributing characters *viz.*, number of fruits per plant, fruit yield per plant (kg), fruit yield per hectare (tonn) of IC42456 and IC42456 × Kashi Lalima and IC42456 × Parbhani Kranti.

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Conflict of Interest. None.

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