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Sopan Dinde
Post Graduate Student, College of Agriculture, VNMKV, Parbhani, Maharashtra, India

Avinash Rathod
Assistant Breeder, QSP Farm Khanapur A, VNMKV, Parbhani, Maharashtra, India

SB Borgaonkar
Cotton Breeder, Cotton Research Station, MB Farm, VNMKV, Parbhani, Maharashtra, India

DK Zate
Associate Professor, College of Agriculture, VNMKV, Parbhani, Maharashtra, India

AM Misal
Assistant Professor, College of Agriculture, Latur, Maharashtra, India

Corresponding Author:
Sopan Dinde
Post Graduate Student, College of Agriculture, VNMKV, Parbhani, Maharashtra, India

Heterosis studies for fruit yield and its components in okra (*Abelmoschus esculentus* L. Moench)

Sopan Dinde[1], Avinash Rathod[2], SB Borgaonkar[3], DK Zate[4], AM Misal[5]

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Abstract
The present investigation, " Heterosis studies for yield and its components in okra [*Abelmoschus esculentus* (L.) Moench], "was conducted during Summer 2026 at Quality seed production farm Khanapur A block, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani. Six diverse parents IC-10256A, EC-305612, EC-305672, IC-4507, IC-3769 and IC-7472 were crossed in a diallel mating design (without reciprocals) to produce 15 F_1 hybrids. The experiment consists of 24 genotypes (6 parents, 15 F_1s and 3 checks: Parbhani Kranti, Radhika and *Pusa* Sawani) were evaluated in RBD with two replications. Observations were recorded for 13 characters: days 50% to flowering, plant height, internodal length, number of nodes/plant, number of branches/plant, number of ridges/fruit, fruit length, fruit diameter, number of fruits/plant, fruit weight, fruit yield/plant, YVMV incidence and fruit and shoot borer severity. Analysis of variance revealed highly significant differences among the genotypes for all the traits, confirming ample genetic variability. Diallel analysis showed significant parent and cross differences for all characters; parent vs. cross contrast was significant except for internodal length and fruit diameter. Among parents, IC-7472 was earliest (38.0 days), EC-305612 had the shortest internodes (3.84 cm) and highest fruit weight (15.26 g), IC-4507 recorded maximum ridges (5.90), IC-10256A showed lowest YVMV (2.50%), and IC-3769 excelled in plant height (111.39 cm), nodes (11.90), branches (4.70), fruit length (15.67 cm), diameter (1.86 cm), fruits (16.90), yield (249.02 g), and lowest borer severity (3.25%). Among the hybrids, EC-305612×IC-7472 was found earliest for flowering (37.5 days) with most ridges (6.50); EC-305612 × IC-3769 recoded shortest internodes (3.70 cm); IC-10256A×IC-3769 produced longest fruits (17.83 cm); IC-4507×IC-
7472 recorded highest fruit weight (18.81 g) and lowest borer severity (5.67%); IC-10256A × EC-305672 showed lowest YVMV (2.700%). EC-305612×EC-305672 was superior for plant height (123.35 cm), nodes (13.80), branches (5.00), fruit diameter (1.93 cm), fruits (19.20), and yield (293.25 g). Significant heterosis occurred in both directions. EC-305612 × IC-7472 showed maximum desirable heterobeltiosis for earliness (−22.68%);EC-305612×IC-3769 for reduced internodal length (−34.91%); IC-10256A × EC-305672 for nodes (32.14%), fruit diameter (11.21%), and fruits (24.66%); EC-305612 × EC-305672 for branches (16.97%) and highest standard heterosis for yield over three checks (40.01%, 45.53%, 34.40%) ; IC-4507×IC-7472 for fruit weight (55.69%) and fruit and shoot borer (−58.58%).

Keywords: Heterosis, Okra, Half-diallel, Heterosis, Heterobeltiosis, Useful heterosis

Introduction

Okra (*Abelmoschus esculentus* (L.) Moench) is a warm-season vegetable that has earned a prominent place in kitchen gardens and commercial vegetable systems because of its wide ecological adaptability, year-round market demand and export potential. It is grown extensively across tropical and subtropical regions, particularly in India, West Africa, Brazil, South-East Asia, and the southern United States, where it forms an integral part of daily diets and local cuisines (Siemonsma, 1982) [1]. In India, Okra is cultivated during both summer and rainy (kharif) seasons, allowing staggered sowings and continuous pod supply that support household nutrition, local markets and processing chains (FAOSTAT, 2025). Okra is known by different vernacular names across the world, reflecting its cultural embeddedness: “Bhindi” in India, “Lady’s finger” in England, and “Gumbo” in the United States (Lim, 2012) [2]. Immature fresh green pods are usually consumed as a cooked vegetable, prepared in stir-fries, curries, stews, and mixed dishes, where their characteristic mucilaginous texture helps thicken gravies and soups (Hadiya *et al*., 2018) [3]. The pods are also pickled, canned or dehydrated, expanding their culinary use and shelf life and creating scope for small-scale processing enterprises (Gemede *et al*., 2015) [4]. Traditional uses extend beyond the pods. In parts of India, the root and stem are used to clarify sugarcane juice during jaggery preparation (Gopalakrishnan, 2007) [5]. Seeds have been used as a coffee substitute and as a minor source of edible oil and protein in resource poor settings (Lim, 2012) [2]. Nutritionally, Okra is a low-calorie vegetable rich in water, dietary fibre, vitamins and min

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erals, therefore contributes meaningfully to balanced diets. Fresh pods typically contain around 88–90% moisture, 7–8% carbohydrates, about 2% protein and negligible fat, along with small amounts of fibre and mineral matter. Okra provides calcium, phosphorus and iron, and is a good source of vitamin C, vitamin K, thiamine, riboflavin, niacin and folate, making it particularly valuable in regions where animal-source foods are scarce or unaffordable (Sugani Devi *et al*., 2017) [6]. In Ayurveda and other traditional systems of medicine, Okra is widely recognized for its soothing, protective and diuretic properties. Pod mucilage is used as an edible infusion in conditions associated with irritation or inflammation of the gastrointestinal tract, kidneys and urinary system, including dysentery, diarrhea, ardor urinae and dysuria (Maramag, 2013; Lim, 2012) [7, 2]. Heterosis or hybrid vigour, refers to the superior performance of a hybrid over its parents with respect to one or more traits of economic importance. In practical breeding, heterosis is commonly quantified relative to the mid-parent value (average heterosis or relative heterosis) and the better parent (heterobeltiosis), and in self-pollinated or vegetatively propagated crops also in relation to a widely grown commercial check, which is termed standard, useful or economic heterosis (Griffing, 1956; Mather *et al*., 1971) [8, 9]. For a vegetable crop like Okra, where marketable yield, pod quality and stress tolerance are critical, estimates of standard heterosis against the best available variety or hybrid provide an applied measure of potential gain for farmers and consumers (Reddy *et al*., 2012). The proposed research study was aimed to study heterosis for yield and its components in Okra, which will help in the identification of a superior parents and hybrids.

Material and Method

The present investigation was undertaken to study "Heterosis for yield and yield component traits in okra (*Abelmoschus esculentus* (L.) Moench)". The experiment was carried out at Quality Seed Production Unit, Khanapur A Block, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, during Summer 2026. The experimental material consisted of six diverse okra genotypes (parents) and fifteen F_1 hybrids developed from these parents in a diallel mating system (without reciprocals), along with three checks. These 24 genotypes (6 parents, 15 F_1s and 3 check) were evaluated to study heterosis for yield and its components in Okra. The inbred lines of the six parental genotypes were raised in a crossing block at BSP Unit, College of Agriculture, Parbhani, for the purpose of diallel hybridization. Recommended doses of fertilizers and plant protection measures were applied to ensure healthy and uniform plant growth. Observations were recorded for 13 characters: days 50% to flowering, plant height, internodal length, number of nodes/plant, number of branches/plant, number of ridges/fruit, fruit length, fruit diameter, number of fruits/plant, fruit weight, fruit yield/plant, YVMV incidence and fruit and shoot borer severity. Seeds of parents, F_1 hybrids and check were sown manually on well prepared ridges and furrows, maintaining the planned spacing and plot size. Standard agronomic practices viz., irrigation, weeding, hoeing, thinning and plant protection were carried out uniformly for all treatments to raise a healthy and uniform crop stand. Five plants were randomly selected from each plot (excluding border plants) and tagged for recording observations. The experiment was laid out in a Randomized Block Design (RBD) with two replications at QSP Unit, Khanapur A Block, VNMKV, Parbhani. The ANOVA was carried out following the standard procedure described by Panse and Sukhatme (1985).

Results and Discussion

The results are obtained from conducting diallel cross using six parents, fifteen F_1 hybrids and three standard checks for thirteen fruit yield and attributing characters. The characters comprised viz; Days to 50% flowering, plant height, internodal length, number of nodes per plant, number of branches per plant, number of ridges per fruit, fruit length, fruit diameter, number of fruits per plant, fruit weight, fruit yield per plant, yellow vein mosaic virus (YVMV) incidence and fruit borer severity. The results are presented and discussed below.

Heterosis

Heterosis was estimated over the mid parent, better parent and three standard checks. Significant negative heterosis was considered desirable for Days to 50% flowering, internodal length, YVMV incidence and fruit borer severity, whereas significant positive heterosis was observed for the remaining characters. The trait-wise results are presented below so that the direction, range and leading combinations are explicit for every character.

Days to 50% flowering

Heterosis for days to 50% flowering ranged from -13.29 to 17.86% over the mid parent while -22.68 to 15.19% over the better parent. Three and six hybrids, respectively, exhibited highly significant and negative heterosis over these two parental bases. The hybrid EC-305612 × IC-7472 recorded highly significant and negative heterosis over the mid parent (-13.29%), better parent (-22.68%), Parbhani Kranti (-16.67%), Radhika (-22.68%) and *Pusa* Sawani (-19.35%). Hence, this hybrid was found superior for earliness. B. Singh *et al.* (2016) [10] observed useful negative heterosis for earliness in okra, while Venkatesan *et al.* (2025) [11] also reported early flowering among desirable okra hybrid hybrids.

2. Plant height (cm)

Heterosis for plant height ranged from -31.27 to 52.98% over the mid parent whereas -38.36 to 37.70% over the better parent. Seven hybrids showed significant positive Average heterosis, whereas three showed significant positive better parent heterosis. The hybrids IC-10256A × EC-305672 displayed highly significant and possible heterosis over the mid parent (52.98%) as well as better parent (37.70%). The hybrid EC-305612 × EC-305672 recorded the highly significant and positive standard heterosis over Parbhani Kranti (36.68%), Radhika (51.80%) and *Pusa* Sawani (29.51%). Kerure *et al.* (2019) [12] reported substantial heterotic variation for plant height, and Abdalla and ElKamil (2025) likewise found cross-dependent hybrid vigour for plant height and fruit.

3. Internodal length (cm)

Average heterosis and heterobeltiosis ranged from -21.72 to 42.93% and -34.91 to 35.07%, respectively. Eight hybrids exhibited significant and negative heterosis over the mid parent whereas, eleven hybrids over the better parent. The hybrid EC-305612 × IC-3769 was found desirable for internodal length over the mid parent (-21.72%), better parent (-34.91%), Parbhani Kranti (-34.91%), Radhika2 (-25.98%) and Radhika3 (-27.61%). El-Sherbeny *et al.* (2018) [13] observed marked heterotic responses for internodal length under different environments and Akotkar *et al.* (2025b) [14] reported useful heterosis for component traits associated with plant compactness.

4. Number of nodes per plant

Average heterosis for number of nodes per plant ranged from -11.25 to 39.94% over the mid parent whereas, it ranged from -18.66 to 32.14% over the better parent. Nine and eight hybrids, respectively, showed significant positive average heterosis and heterobeltiosis for number of nodes per plant. The hybrid IC-10256A × EC-305672 recorded high significance over the mid parent (39.94%) and better parent (32.14%). The hybrid EC-305612 × EC-305672 recorded highly significant and positive heterosis over Parbhani Kranti (23.32%), Radhika (34.53%) and *Pusa* Sawani (27.88%) respectively. Verma *et al.* (2020) [15] reported favourable hybrid vigour for the number of nodes and other yield components in intraspecific okra hybrids.

5. Number of branches per plant

Average heterosis ranged from -22.43 to 26.11%, whereas heterobeltiosis ranged from 32.06 to 16.97%. Eleven hybrids displayed significant and positive heterosis over the mid parent whereas, five hybrids recorded significant and positive heterosis over the better parent. The hybrid IC-10256A × EC-305672 exhibited highly significant and possible heterosis over the mid parent (26.11%). Whereas EC-305612 ×

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EC-305672 exhibited highly significant and possible heterosis over the better parent (16.97%) as well as over three checks (20.60%, 25.06% and 23.09%) respectively. Kerure *et al.* (2019) [12] observed positive heterosis for branches per plant in selected crosses, linking improved branching with greater yield potential.

Number of ridges per fruit

Heterosis for number of ridges per fruit over the mid parent ranged from -6.94 to 33.27% whereas over the better parent from -13.42 to 27.68%. Twelve hybrids recorded highly significant and positive heterosis over the mid parent and ten hybrids over the better parent respectively. The hybrid EC-305612 × IC-7472 displayed highly significant and positive heterosis over the mid parent (33.27%), better parent (27.68%), Parbhani Kranti (29.88%), Radhika (42.57%) and *Pusa* Sawani (36.45%) respectively. Yohanna (2023) reported significant heterosis for fruit morphology and yield-attributing characters in okra.

4.3.7 Fruit length (cm)

Average heterosis for fruit length ranged from -23.14 to 39.04% and for better parent heterosis from -26.45 to 34.83%. Eleven hybrids recorded highly significant and positive heterosis over the mid parent whereas ten parents recorded highly significant and positive heterosis over the better parent. The hybrid IC-10256A × IC-7472 exhibited highly significant and positive heterosis over the mid parent (39.04%) and better parent (34.83%), whereas the hybrid IC-10256A × IC-3769 recorded highly significant and positive heterosis over Parbhani Kranti (23.31%), Radhika (15.00%) and *Pusa* Sawani (10.06%) respectively. Verma *et al.* (2020) [15] reported useful heterosis for fruit length and quality, while Akotkar *et al.* (2025b) [14] identified favourable hybrid vigour for fruit dimensions.

4.3.8 Fruit diameter (cm)

Heterosis for fruit diameter ranged from -17.68 to 13.16% over the mid parent whereas -23.12 to 11.21% over the better parent. Eight and four hybrids showed significant positive heterosis over mid parent and better parent respectively. The hybrid EC-305612 × EC-305672 exhibited highly significant and positive heterosis over the mid parent (13.16%), Parbhani Kranti (13.82%), Radhika (15.87%) and *Pusa* Sawani (11.85%), while IC-10256A × EC-305672 was best over the better parent (11.21%).N. Singh *et al.* (2025) [16] found significant heterosis for fruit diameter and related yield-contributing traits in selected okra crosses.

Number of fruits per plant

Average heterosis for number of fruits per plant ranged from -29.09 to 34.80% and 33.26 to 24.66% over the better parent. Ten hybrids recorded highly significant and positive heterosis over the mid parent whereas, seven hybrids recorded highly significant and positive over the better parent. The hybrid IC-10256A × EC-305672 recorded highly significant and positive heterosis over the mid parent (34.80%) and better parent (24.66%). The hybrid EC-305612 × EC-305672 recorded highly significant and positive heterosis over Parbhani Kranti (26.30%), Radhika (31.16%) and *Pusa* Sawani (25.93%) respectively. Kerure *et al.* (2019) [12] and Yadav *et al.* (2023) [17] reported that favourable heterosis for fruits per plant which contributed to hybrid yield superiority.

4.3.10 Fruit weight (g)

Average heterosis for fruit weight ranged from -7.76 to 59.65% whereas, better-parent heterosis ranged from -19.17 to 55.69%. Twelve hybrids displayed highly positive and significant heterosis over the mid parent whereas seven over the better parent. The hybrid IC-4507 × IC-7472 displayed highly positive and significant heterosis over the mid parent (59.65%), better parent (55.69%), Parbhani Kranti (34.87%), Radhika (43.03%) and *Pusa* Sawani (30.84%) respectively. Verma *et al.* (2020) [15] observed strong heterosis for fruit weight and quality traits, and Venkatesan *et al.* (2025) [11] also reported substantial hybrid vigour for fruit weight.

4.3.11 Fruit yield per plant (g)

Heterosis for fruit-yield ranged from -25.24 to 35.48% over the mid parent whereas, -27.60 to 22.53% over the better parent. Nine hybrids recorded highly significant and positive heterosis over the mid parent whereas four hybrids recorded highly significant and positive heterosis over the better parent. The hybrid IC-10256A × IC-4507 was found highly heterotic over the better parent (22.53%), whereas the hybrid EC-305612 × EC-305672 recorded highly significant and positive standard heterosis over Parbhani Kranti (40.01%), Radhika (45.53%) and *Pusa* Sawani (34.40%) respectivel. Which recorded 293.250 g yield, with consistent standard heterosis, identified it as the most promising high-yielding cross combination. Kerure *et al.* (2019) [12], Nanthakumar *et al.* (2021) [18] and Abdalla and El Kamil (2025) reported commercially useful standard heterosis for fruit yield in selected okra hybrids.

YVMV incidence (%)

Heterosis for YVMV incidence ranged from -29.46 to 71.58% over the mid parent and from -37.09 to 67.25% over the better parent. Eight hybrids recorded significant and negative heterosis over the mid parent and ten hybrids recorded significant and negative heterosis over the better parent respectively. The hybrid IC-4507 × IC-7472 recorded highly significant and negative heterosis over the mid parent (-29.46%) and better parent (-37.09%), whereas, the hybrid IC-10256A × EC-305672 recorded highly significant and negative heterosis over Parbhani Kranti (-32.08%), Radhika (-42.55%) and *Pusa* Sawani (-18.18%). Solankey *et al.* (2016) [19] demonstrated useful heterosis from YVMV resistance sources, while Bharathkumar *et al.* (2019) [20] and Khade *et al.* (2020) [21] confirmed a genetic basis for resistance expression.

4.3.13 Fruit and shoot borer severity (%)

Heterosis for fruit and shoot borer severity ranged from -52.67 to 40.77% over the mid parent whereas -58.58 to 23.32% over the better parent. Ten hybrids showed significant desirable negative heterosis for fruit and shoot borer severity. The hybrid IC-4507 × IC-7472 recorded highly significant and negative heterosis over the mid parent (-52.67%), better parent (-58.58%), Parbhani Kranti (-61.26%), Radhika (-54.20%) and *Pusa* Sawani (-38.90%). The hybrid IC-10256A × EC-305672 ranked second for fruit yield and combined low fruit and shoot borer severity. Nagre *et al.* (2025) [22] and B. Singh *et al.* (2025) [16] emphasized the yield-protecting importance of suppressing *Earias* infestation, while Garg *et al.* (2025) [23] advocated integrating host response with broader pest management.

Based on standard heterosis and per se fruit yield the hybrid EC-305612 × EC-305672 ranked first with 45.53% heterosis with 293.25 g fruit yield. It was followed by the hybrid IC-10256A × EC-305672 (33.11% and 268.21 g), EC-305612 × IC-3769 (24.78% and 251.43 g), IC-4507 × IC-3769 (20.80% and 243.41 g), and EC-305612 × IC-4507 (15.98% and 233.70 g). Nanthakumar *et al.* (2021) [18] and Ranga *et al.* (2024) likewise stressed that standard heterosis should be considered together with per se performance and component-trait superiority.

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Table 1. Analysis of variance for randomized block design

Character	Replication MSS d.f. (1)	Treatment MSS d.f. (23)	Error MSS d.f. (23)	S.E. ±
Days to 50% flowering	0.083	31.869**	0.387	0.440
Plant height (cm)	1.373	538.054**	4.731	1.538
Internodal length (cm)	0.004	0.939**	0.001	0.023
Number of nodes per plant	0.005	2.999**	0.002	0.034
Number of branches per plant	0.001	0.544**	0.001	0.028
Number of ridges per fruit	0.040	0.017**	0.0269	0.116
Fruit length (cm)	0.046	8.676**	0.018	0.095
Fruit diameter	0.001	0.042**	0.0005	0.018
Number of fruits per plant	0.001	9.719**	0.001	0.030
Fruit weight (g)	0.031	8.723**	0.110	0.235
Fruit yield per plant (g)	0.693	2059.451**	19.635	3.133
Fruit and shoot borer severity (%)	0.520	28.238**	7.586	1.947

*, ** Significant at 5% and 1% respectively

Table 2. Average heterosis over mid parent (MP) (%), heterobeltiosis (BP) and standard heterosis (SC) over Parbhani kranti, Radhika and *Pusa* Sawani in okra for different traits

Cross	Days to flowering					Plant height				
	Average heterosis	Heterobeltiosis	Parbhani Kranti	Radhika	*Pusa* Sawani	Average heterosis	Heterobeltiosis	Parbhani Kranti	Radhika	*Pusa* Sawani
IC-10256A × EC-305612	1.14	-8.25 **	-1.11	-8.25 **	-4.30 **	18.69 **	1.17	12.28 **	24.70 **	6.38 **
IC-10256A × EC-305672	17.86 **	11.24 **	10.00 **	2.06	6.45 **	52.98 **	37.70 **	34.58 **	49.46 **	27.51 **
IC-10256A × IC-4507	15.19 **	15.19 **	1.11	-6.19 **	-2.15	23.96 **	16.67 **	3.42	14.86 **	-2.01
IC-10256A × IC-3769	1.89	1.25	-10.00 **	-16.49 **	-12.90 **	-16.17 **	-31.53 **	-15.48 **	-6.13 *	-19.92 **
IC-10256A × IC-7472	14.84 **	12.66 **	-1.11	-8.25 **	-4.30 **	11.23 **	5.01	-7.52 **	2.71	-12.37 **
EC-305612 × EC-305672	8.60 **	4.12 **	12.22 **	4.12 **	8.60 **	30.98 **	23.16 **	36.68 **	51.80 **	29.51 **
EC-305612 × IC-4507	3.41 *	-6.19 **	1.11	-6.19 **	-2.15	12.25 **	0.96	12.04 **	24.43 **	6.16 *
EC-305612 × IC-3769	7.34 **	-2.06	5.56 **	-2.06	2.15	4.78 *	-0.51	22.80 **	36.39 **	16.36 **
EC-305612 × IC-7472	-13.29 **	-22.68 **	-16.67 **	-22.68 **	-19.35 **	-31.27 **	-38.36 **	-31.60 **	-24.03 **	-35.19 **
EC-305672 × IC-4507	7.14 **	1.12	0.00	-7.22 **	-3.23 *	-8.66 **	-12.90 **	-14.88 **	-5.46	-19.35 **
EC-305672 × IC-3769	-6.51 **	-11.24 **	-12.22 **	-18.56 **	-15.05 **	-28.47 **	-35.92 **	-20.90 **	-12.15 **	-25.06 **
EC-305672 × IC-7472	-0.61	-7.87 **	-8.89 **	-15.46 **	-11.83 **	2.94	-2.14	-4.37	6.21 *	-9.39 **
IC-4507 × IC-3769	-3.14 *	-3.75 *	-14.44 **	-20.62 **	-17.20 **	-27.08 **	-37.35 **	-22.68 **	-14.12 **	-26.73 **
IC-4507 × IC-7472	0.65	-1.27	-13.33 **	-19.59 **	-16.13 **	1.06	0.73	-10.71 **	-0.83	-15.40 **
IC-3769 × IC-7472	16.67 **	13.75 **	1.11	-6.19 **	-2.15	3.33	-11.47 **	9.27 **	21.36 **	3.53

*, ** Significant at 5% and 1% respectively Table No. 2 Continued

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Table 2. Average heterosis over mid parent (MP) (%), heterobeltiosis (BP) and standard heterosis (SC) over Parbhani kranti, Radhika and *Pusa* Sawani in okra for different traits

Cross	Internodal length					Number of nodes per plant				
	Average heterosis	Heterobeltiosis	Parbhani Kranti	Radhika	*Pusa* Sawani	Average heterosis	Heterobeltiosis	Parbhani Kranti	Radhika	*Pusa* Sawani
IC-10256A × EC-305612	-0.63	-11.09 **	-25.34 **	-15.10 **	-16.97 **	25.35 **	12.27 **	12.97 **	23.25 **	17.15 **
IC-10256A × EC-305672	-16.42 **	-18.48 **	-31.55 **	-22.16 **	-23.87 **	39.94 **	32.14 **	18.41 **	29.18 **	22.79 **
IC-10256A × IC-4507	14.91 **	8.42 **	-8.97 **	3.53 **	1.25	9.25 **	3.51 **	-7.89 **	0.49	-4.48 **
IC-10256A × IC-3769	-0.19	-8.19 **	-8.19 **	4.41 **	2.11 **	-5.98 **	-17.95 **	-12.35 **	-4.38 **	-9.11 **
IC-10256A × IC-7472	-21.39 **	-26.52 **	-29.05 **	-19.31 **	-21.09 **	6.77 **	1.51 **	-10.34 **	-2.19 **	-7.03 **
EC-305612 × EC-305672	-2.54 **	-10.80 **	-28.79 **	-19.02 **	-20.81 **	29.65 **	22.55 **	23.32 **	34.53 **	27.88 **
EC-305612 × IC-4507	42.93 **	35.07 **	0.60	14.41 **	11.89 **	11.73 **	5.27 **	5.93 **	15.56 **	9.85 **
EC-305612 × IC-3769	-21.72 **	-34.91 **	-34.91 **	-25.98 **	-27.61 **	3.76 **	0.75	7.62 **	17.41 **	11.60 **
EC-305612 × IC-7472	26.31 **	6.52 **	2.84 **	16.96 **	14.38 **	-2.93 **	-8.86 **	-8.29 **	0.05	-4.90 **
EC-305672 × IC-4507	19.33 **	15.33 **	-7.93 **	4.71 **	2.40 **	12.88 **	12.49 **	0.80	9.97 **	4.53 **
EC-305672 × IC-3769	-7.57 **	-16.90 **	-16.90 **	-5.49 **	-7.57 **	-9.94 **	-17.20 **	-11.55 **	-3.50 **	-8.28 **
EC-305672 × IC-7472	-15.25 **	-22.59 **	-25.26 **	-15.00 **	-16.87 **	2.43 **	1.69 **	-8.87 **	-0.58	-5.50 **
IC-4507 × IC-3769	10.67 **	-3.45 **	-3.45 **	9.80 **	7.38 **	-11.25 **	-18.66 **	-13.11 **	-5.20 **	-9.89 **
IC-4507 × IC-7472	-2.92 **	-14.02 **	-16.98 **	-5.59 **	-7.67 **	-0.73	-1.10 *	-11.99 **	-3.99 **	-8.74 **
IC-3769 × IC-7472	-11.49 **	-13.02 **	-13.02 **	-1.08	-3.26 **	-2.63 **	-11.06 **	-4.99 **	3.65 **	-1.48 **

*, ** Significant at 5% and 1% respectively Table No. 2 Continued

Table 2. Average heterosis over mid parent (MP) (%), heterobeltiosis (BP) and standard heterosis (SC) over Parbhani kranti, Radhika and *Pusa* Sawani in okra for different traits

Cross	Number of branches per plant					Number of ridges				
	Average heterosis	Heterobeltiosis	Parbhani Kranti	Radhika	*Pusa* Sawani	Average heterosis	Heterobeltiosis	Parbhani Kranti	Radhika	*Pusa* Sawani
IC-10256A × EC-305612	15.90 **	5.20 **	8.45 **	12.47 **	10.69 **	2.91	1.92	3.92	3.92	3.92
IC-10256A × EC-305672	26.11 **	16.95 **	15.00 **	19.26 **	17.38 **	3.92	1.92	3.92	3.92	3.92
IC-10256A × IC-4507	17.91 **	14.75 **	1.90 *	5.68 **	4.01 **	0.97	0.00	1.96	1.96	1.96
IC-10256A × IC-3769	-22.43 **	-32.06 **	-24.05 **	-21.23 **	-22.48 **	2.91	1.92	3.92	3.92	3.92
IC-10256A × IC-7472	10.98 **	8.07 **	-9.17 **	-5.80 **	-7.29 **	-0.97	-1.92	0.00	0.00	0.00
EC-305612 × EC-305672	19.74 **	16.97 **	20.60 **	25.06 **	23.09 **	0.99	0.00	0.00	0.00	0.00
EC-305612 × IC-4507	9.06 **	1.50	4.64 **	8.52 **	6.80 **	0.00	0.00	0.00	0.00	0.00
EC-305612 × IC-3769	3.71 **	-0.32	11.43 **	15.56 **	13.73 **	0.00	0.00	0.00	0.00	0.00

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Cross	Number of branches per plant					Number of ridges				
	Average heterosis	Heterobeltiosis	Parbhani Kranti	Radhika	*Pusa* Sawani	Average hetero-sis	Heterobeltiosis	Parbhani Kranti	Radhika	*Pusa* Sawani
EC-305612 × IC-7472	-19.35 **	-28.52 **	-26.31 **	-23.58 **	-24.79 **	1.96	1.96	1.96	1.96	1.96
EC-305672 × IC-4507	6.74 **	1.57	-0.12	3.58 **	1.94 *	0.99	0.00	0.00	0.00	0.00
EC-305672 × IC-3769	-15.81 **	-20.87 **	-11.55 **	-8.27 **	-9.72 **	6.93*	5.88	5.88	5.88	5.88
EC-305672 × IC-7472	7.83 **	-2.42 *	-4.05 **	-0.49	-2.07 *	0.99	0.00	0.00	0.00	0.00
IC-4507 × IC-3769	-17.03 **	-25.56 **	-16.79 **	-13.70 **	-15.07 **	0.00	0.00	0.00	0.00	0.00
IC-4507 × IC-7472	2.61 **	-2.68 *	-13.57 **	-10.37 **	-11.79 **	1.96	1.96	1.96	1.96	1.96
IC-3769 × IC-7472	7.96 **	-7.56 **	3.33 **	7.16 **	5.47 **	1.96	1.96	1.96	1.96	1.96

*, ** Significant at 5% and 1% respectively Table No. 2 Continued

Sawani in okra for different traits

Table 2. Average heterosis over mid parent (MP) (%), heterobeltiosis (BP) and standard heterosis (SC) over Parbhani kranti, Radhika and *Pusa* Sawani in okra for different traits

Cross	Fruit length					Fruit diameter				
	Average heterosis	Heterobeltiosis	Parbhani Kranti	Radhika	*Pusa* Sawani	Average hetero-sis	Heterobeltiosis	Parbhani Kranti	Radhika	*Pusa* Sawani
IC-10256A × EC-305612	13.56 **	4.48 **	8.02 **	0.74	-3.58 **	6.69 **	5.16 **	7.94 **	9.88 **	6.07 **
IC-10256A × EC-305672	18.68 **	11.38 **	10.30 **	2.87 **	-1.54	11.87 **	11.21 **	10.88 **	12.87 **	8.96 **
IC-10256A × IC-4507	36.43 **	29.62 **	12.59 **	5.00 **	0.49	9.15 **	3.83 *	3.53 *	5.39 **	1.73
IC-10256A × IC-3769	26.32 **	13.78 **	23.31 **	15.00 **	10.06 **	-10.27 **	-14.25 **	-6.18 **	-4.49 **	-7.80 **
IC-10256A × IC-7472	39.04 **	34.83 **	17.12 **	9.22 **	4.54 **	7.59 **	0.29	0.00	1.80	-1.73
EC-305612 × EC-305672	16.26 **	13.81 **	17.67 **	9.74 **	5.03 **	13.16 **	10.89 **	13.82 **	15.87 **	11.85 **
EC-305612 × IC-4507	16.43 **	2.24 *	5.71 **	-1.42	-5.65 **	6.26 **	-0.29	2.35	4.19 **	0.58
EC-305612 × IC-3769	6.66 **	4.21 **	12.93 **	5.32 **	0.80	3.47 **	0.27	9.71 **	11.68 **	7.80 **
EC-305612 × IC-7472	-1.20	-11.61 **	-8.61 **	-14.77 **	-18.43 **	0.62	-7.45 **	-5.00 **	-3.29 *	-6.65 **
EC-305672 × IC-4507	29.29 **	15.68 **	14.56 **	6.84 **	2.25 *	-2.96 *	-7.16 **	-8.53 **	-6.89 **	-10.12 **
EC-305672 × IC-3769	-23.14 **	-26.45 **	-20.30 **	-25.67 **	-28.86 **	-17.68 **	-21.77 **	-14.41 **	-12.87 **	-15.90 **
EC-305672 × IC-7472	14.74 **	4.64 **	3.63 **	-3.35 **	-7.50 **	1.91	-4.48 **	-5.88 **	-4.19 **	-7.51 **
IC-4507 × IC-3769	-4.50 **	-17.80 **	-10.93 **	-16.93 **	-20.49 **	-15.63 **	-23.12 **	-15.88 **	-14.37 **	-17.34 **
IC-4507 × IC-7472	-14.91 **	-16.69 **	-32.02 **	-36.60 **	-39.32 **	-3.51 *	-5.56 **	-15.00 **	-13.47 **	-16.47 **
IC-3769 × IC-7472	10.59 **	-3.06 **	5.05 **	-2.03 *	-6.23 **	5.26 **	-5.91 **	2.94	4.79 **	1.16

*, ** Significant at 5% and 1% respectively Table No. 2 Continued

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Table 2. Average heterosis over mid parent (MP) (%), heterobeltiosis (BP) and standard heterosis (SC) over Parbhani kranti, Radhika and *Pusa*

Cross	Number of fruits per plant					Fruit weight				
	Average heterosis	Heterobeltiosis	Parbhani Kranti	Radhika	*Pusa* Sawani	Average heterosis	Heterobeltiosis	Parbhani Kranti	Radhika	*Pusa* Sawani
IC-10256A × EC-305612	20.21 **	8.17 **	12.81 **	17.14 **	12.48 **	18.89 **	1.97	11.54 **	18.28 **	8.21 **
IC-10256A × EC-305672	34.80 **	24.66 **	22.37 **	27.07 **	22.01 **	36.15 **	22.35 **	20.07 **	27.33 **	16.48 **
IC-10256A × IC-4507	20.33 **	19.08 **	1.41 **	5.31 **	1.11 **	25.65 **	19.57 **	3.58	9.84 **	0.49
IC-10256A × IC-3769	-13.65 **	-24.46 **	-15.95 **	-12.72 **	-16.20 **	14.25 **	9.39 **	-6.45 *	-0.80	-9.25 **
IC-10256A × IC-7472	5.25 **	4.24 **	-11.37 **	-7.96 **	-11.63 **	18.44 **	15.50 **	-4.91	0.84	-7.75 **
EC-305612 × EC-305672	24.77 **	21.11 **	26.30 **	31.16 **	25.93 **	24.46 **	18.05 **	29.14 **	36.94 **	25.28 **
EC-305612 × IC-4507	4.43 **	-5.15 **	-1.08 **	2.72 **	-1.37 **	9.97 **	-1.47	7.78 **	14.29 **	4.55
EC-305612 × IC-3769	4.54 **	1.27 **	12.68 **	17.01 **	12.34 **	14.53 **	2.03	11.61 **	18.36 **	8.28 **
EC-305612 × IC-7472	-25.05 **	-31.97 **	-29.05 **	-26.33 **	-29.26 **	-7.76 **	-19.17 **	-11.58 **	-6.23 *	-14.22 **
EC-305672 × IC-4507	9.92 **	2.64 **	0.75 *	4.63 **	0.46	10.92 **	4.42	2.47	8.67 **	-0.59
EC-305672 × IC-3769	-29.09 **	-33.26 **	-25.75 **	-22.89 **	-25.96 **	-6.48 *	-12.49 **	-14.12 **	-8.93 **	-16.69 **
EC-305672 × IC-7472	2.59 **	-4.27 **	-6.03 **	-2.41 **	-6.30 **	10.15 **	1.28	-0.61	5.40	-3.58
IC-4507 × IC-3769	-15.82 **	-25.70 **	-17.33 **	-14.15 **	-17.57 **	41.70 **	40.79 **	21.97 **	29.34 **	18.32 **
IC-4507 × IC-7472	-6.89 **	-6.96 **	-20.77 **	-17.72 **	-21.00 **	59.65 **	55.69 **	34.87 **	43.03 **	30.84 **
IC-3769 × IC-7472	6.42 **	-6.12 **	4.45 **	8.47 **	4.15 **	2.93	1.01	-13.62 **	-8.40 **	-16.20 **

*, ** Significant at 5% and 1% respectively Table No. 2 Continued

Table 2. Average heterosis over mid parent (MP) (%), heterobeltiosis (BP) and standard heterosis (SC) over Parbhani kranti, Radhika and *Pusa* Sawani in okra for different traits

Cross	Fruit yield per plant					Shoot borer severity				
	Average heterosis	Heterobeltiosis	Parbhani Kranti	Radhika	*Pusa* Sawani	Average heterosis	Heterobeltiosis	Parbhani Kranti	Radhika	*Pusa* Sawani
IC-10256A × EC-305612	15.29 **	-3.43	11.05 **	15.43 **	6.60 **	-6.67	133.33	-22.22	-30.00	-12.50
IC-10256A × EC-305672	35.48 **	14.97 **	28.06 **	33.11 **	22.92 **	-47.37*	-28.57	-44.44	-50.00*	-37.50
IC-10256A × IC-4507	29.83 **	22.53 **	7.21 **	11.44 **	2.91	-41.67*	-41.67*	-22.22	-30.00	-12.50
IC-10256A × IC-3769	-6.54 **	-22.75 **	-8.15 **	-4.53	-11.84 **	-5.26	28.57	0.00	-10.00	12.50
IC-10256A × IC-7472	20.44 **	17.18 **	-3.80	0.00	-7.65 **	-4.35	0.00	22.22	10.00	37.50
EC-305612 × EC-305672	23.70 **	21.75 **	40.01 **	45.53 **	34.40 **	0.00	66.67	-44.44	-50.00*	-37.50
EC-305612 × IC-4507	10.20 **	-2.97	11.58 **	15.98 **	7.10 **	6.67	166.67*	-11.11	-20.00	0.00
EC-305612 × IC-3769	2.65	0.97	20.05 **	24.78 **	15.23 **	-20.00	33.33	-55.56*	-60.00*	-50.00
EC-305612 × IC-7472	-9.23 **	-22.22 **	-10.55 **	-7.02 **	-14.14 **	57.14*	266.67**	22.22	10.00	37.50

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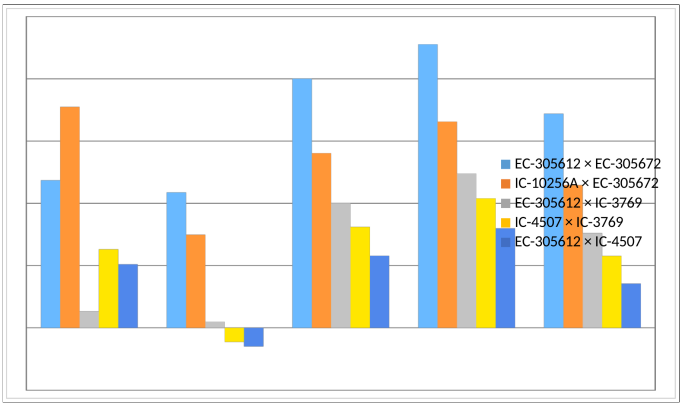
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Cross	Fruit yield per plant					Shoot borer severity				
	Average heterosis	Heterobeltiosis	Parbhani Kranti	Radhika	*Pusa* Sawani	Average hetero-sis	Heterobeltiosis	Parbhani Kranti	Radhika	*Pusa* Sawani
EC-305672 × IC-4507	5.60 **	-5.73 **	5.00 *	9.14 **	0.79	5.26	42.86	11.11	0.00	25.00
EC-305672 × IC-3769	-25.24 **	-27.60 **	-13.92 **	-10.53 **	-17.38 **	85.71**	85.71*	44.44	30.00	62.50*
EC-305672 × IC-7472	-1.59	-14.53 **	-4.80 *	-1.04	-8.62 **	11.11	42.86	11.11	0.00	25.00
IC-4507 × IC-3769	12.62 **	-2.25	16.22 **	20.80 **	11.56 **	-68.42**	-57.14	-66.67*	-70.00**	-62.50*
IC-4507 × IC-7472	4.64	1.42	-11.27 **	-7.76 **	-14.82 **	13.04	18.18	44.44	30.00	62.50*
IC-3769 × IC-7472	8.77 **	-8.06 **	9.31 **	13.63 **	4.93 *	-22.22	0.00	-22.22	-30.00	-12.50

*, ** Significant at 5% and 1% respectively

Table 3. Top five cross combinations with average heterosis (MP), heterobeltiosis (BP) and standard heterosis over Parbhani Kranti, Radhika and *Pusa* Sawani

Sr. No.	Cross combination	Heterosis %				
		MP	BP	Parbhani Kranti	Radhika	*Pusa* Sawani
1	EC-305612 × EC-305672	23.70 **	21.75 **	40.01 **	45.53 **	34.40 **
2	IC-10256A × EC-305672	35.48 **	14.97 **	28.06 **	33.11 **	22.92 **
3	EC-305612 × IC-3769	2.65	0.97	20.05 **	24.78 **	15.23 **
4	IC-4507 × IC-3769	12.62 **	-2.25	16.22 **	20.80 **	11.56 **
5	EC-305612 × IC-4507	10.20 **	-2.97	11.58 **	15.98 **	7.10 **



Average heterosis (MP), heterobeltiosis (BP) and standard heterosis over Parbhani Kranti, Radhika and *Pusa* Sawani

Conclusion

The hybrids PA 987 X PA 837, PA 950 X AKA 2016-3 and PA 987 X PA 402 were found to be highly heterotic for seed cotton yield whereas, the hybrids PA 972 X PA 785 and PA 987 X PA 402 were found highly heterotic for fibre quality traits. Hence these hybrids could be further tested at multilocations and seasons before release as commercial hybrid for commercial cultivation.

References

1. Siemonsma JS. La culture du gombo (*Abelmoschus* spp.), légume-fruit tropical: Avec référence spéciale à la Côte d'Ivoire [Doctoral dissertation, Wageningen Agricultural University]. 1982.
2. Lim TK. Edible medicinal and non-medicinal plants: Volume 3, Fruits. Springer; 2012.
3. Hadiya DN, Mali SC, Baraiya VK, Patel AI. Studies on assessment of heterosis for fruit yield and attributing characters in okra [*Abelmoschus esculentus* (L.) Moench]. International Journal of Chemical Studies. 2018;6(5):1919–1923.
4. Gemede HF, Ratta N, Haki GD, Woldegiorgis AZ, Beyene F. Nutritional quality and health benefits of okra (*Abelmoschus esculentus*): A review. International Journal of Nutrition and Food Sciences. 2015;4(2):208–215.
5. Gopalakrishnan TR. Vegetable crops (Vol. 4). New India Publishing Agency; 2007.
6. Sugani Devi, Choudhary BR, Verma IM. Combining ability analysis for yield and yield contributing characters in okra [*Abelmoschus esculentus* (L.) Moench]. The Bioscan. 2017;12(3):1593–1596.
7. Maramag RP. Diuretic potential of *Capsicum frutescens* L., *Corchorus olitorius* L., and *Abelmoschus esculentus* L. Asian Journal of Natural and Applied Sciences. 2013;2(1):60–69.
8. Griffing B. A generalized treatment of the use of diallel crosses in quantitative inheritance. Heredity. 1956;10(1):31–50.
9. Mather K, Jinks JL. Biometrical genetics: The study of continuous variation (2nd ed.). Chapman and Hall; 1971.
10. Singh B, Goswami A, Sharma AK. Estimation of heterosis in okra (*Abelmoschus esculentus*) for fruit yield and its components using line × tester mating design. The Indian Journal of Agricultural Sciences. 2016;86(12).
11. Venkatesan M, Priyadharshini R, Anessa RMS. Heterosis studies for fruit yield and its attributing traits in Okra (*Abelmoschus esculentus* L. Moench). Plant Science Today. 2025;12(sp3).
12. Kerure P, Pitchaimuthu M, Srinivasa V, Venugopalan R. Heterosis for yield and its components in okra. International Journal of Current Microbiology and Applied Sciences. 2019;8(01):353-367.
13. El-Sherbeny G, Khaled AGA, Obiadalla-Ali H, Ahmed AY. Estimates of heterosis and combining ability in okra under different environments. Journal of Sohag Agriscience (JSAS). 2018;3(1):50-64.

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14. Akotkar P, Mankar AA. Estimation of heterosis for yield and related characters in okra [*Abelmoschus esculentus* (L.) Moench]. International Journal of Agricultural Sciences. 2025;21(1):117-124.
15. Verma A, Sood S. Heterosis and combining ability of fruit yield and quality traits in intraspecific hybrids of okra. Indian Journal Of Horticulture. 2020;77(4):655-662.
16. Singh N, Singh DK, Kholia A, Singh AK. Heterosis Estimation in Okra [*Abelmoschus esculentus* (L.) Moench) for Yield and Contributing Traits. RASSA Journal of Science for Society. 2025;7(3):151-158.
17. Yadav K, Dhankhar SK, Singh D, Singh U, Amit, Yogita. Exploitation of combining ability and heterosis potential for improvement in okra (*Abelmoschus esculentus*) genotypes. The Indian Journal of Agricultural Sciences. 2023;93(2):127-132.
18. Nanthakumar S, Kuralarasu C, Gopikrishnan A. Heterosis and Combining Abilities Studies in Okra [*Abelmoschus esculentus* (L.) Moench]. Current Journal of Applied Science and Technology. 2021:25-33.
19. Solankey SS, Singh AK, Singh RK. Heterosis of okra resistance sources for okra yellow vein mosaic virus (OYVMV) in okra (*Abelmoschus esculentus*). The Indian Journal of Agricultural Sciences. 2016;86(11).
20. Bharathkumar MV, Dhankhar SK, Dahiya MS, Srikanth M. Genetic architecture of resistance to yellow vein mosaic virus disease in advance lines of okra (*Abelmoschus esculentus*). The Indian Journal of Agricultural Sciences. 2019;89(4):640-645.
21. Khade YP, Kumar R, Yadav RK. Genetic control of yellow vein mosaic virus resistance in okra (*Abelmoschus esculentus*). The Indian Journal of Agricultural Sciences. 2020;90(3):606-609.
22. Nagre VA, Tayde AR, Khan SH. Efficacy of selected insecticides and botanicals against shoot and fruit borer, *Earias vittella* (Fabricius) on okra. Pest Management in Horticultural Ecosystems. 2025;31(1):116-118.
23. Garg V, Kumar P, Sarsaiya V, Ahirwar G, Singh A. Integrated Pest Management Strategies for Eco-Friendly Control of Okra Shoot and Fruit Borer under Climate Variability. Journal of Advances in Biology & Biotechnology. 2025;28(7):1124-1133.
24. Devi NN, Kayande NV, Gawande PP, Nichal SS. Evaluation for heterosis in okra (*Abelmoschus esculentus* L.). International Journal of Pure and Applied Bioscience. 2017;5(6):590–593.

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