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CORRELATION STUDIES IN F_2 SEGREGATING POPULATIONS FOR YIELD AND ITS CONTRIBUTING TRAITS IN OKRA (*ABELMOSCHUS ESCULENTUS* L. MOENCH)

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ABSTRACT

A field experiment was carried out during the *kharif* season of 2024 and the *summer* season of 2025 at the Oilseeds Research Station, Latur-413512, Maharashtra, India. The crossing and selfing programme were conducted during *kharif* 2024 and the experiment was conducted during *summer* 2025. This study aimed to assess the trait correlations and genetic variability of yield and its related characteristics in F_2 populations of three crosses along with their respective parental lines and F_1. Six parents and F_1 were evaluated following a randomized block design with three replications while the F_2 generations of three crosses; Arka Anamika × IC-42464 (Cross-I), Konkan Bhindi × IC-42470 (Cross-II) and Arka Abhay × IC 42472 (Cross-III) were evaluated without replication as segregating F_2 generations were involved. The fruit yield per plant exhibited a significant and positive correlations with fruit weight, number of fruits per plant, fruit diameter, fruit length, plant height, internodal length and number of nodes per plant in the F_2 population of the cross Arka Anamika × IC-42464. Whereas, the F_2 population of the cross Konkan Bhindi × IC-42470 fruit yield per plant showed highly significant and positive associations with fruit weight, fruit length, fruit diameter, number of fruits per plant, plant height, number of nodes per plant and number of primary branches per plant. Similarly, the F_2 population of the cross Arka Abhay × IC-42472 fruit yield per plant exhibited positive and highly significant associations with fruit weight, fruit length, fruit diameter, number of fruits per plant, plant height, number of nodes per plant and number of primary branches per plant. Majority of traits also exhibited positive mutual association emphasizing a promising pattern for simultaneous selection and yield enhancement.

Key words : Okra, Correlation, Segregating, Yield and Selection.

Introduction

Vegetables are considered as ‘protective supplementary foods’ because they are rich in minerals, vitamins, and essential amino acids that are vital for the proper functioning of the human metabolic process. Okra (*Abelmoschus esculentus* [L.] Moench) is a significant vegetable crop propagated from seeds, primarily cultivated in tropical and subtropical regions globally. It belongs to the Malvaceae family with a chromosome number 2n=130 and amphidiploids in nature. This crop can thrive both in home gardens and on large scale commercial farms. It is a versatile crop with a broad range of adaptability, owing to its ease of cultivation, short duration, high export potential, and suitability to diverse environmental conditions and soil types (Priyanka *et al.*, 2018).

The green, non-fibrous fruits of okra which round seeds are harvested while still immature, before fiber develops and are consumed as a vegetable. Okra can be used in various culinary dishes, while its leaves are consumed similarly to spinach in some African cultures. Additionally, the roots and stems are utilized in purifying cane juice for producing jaggery or brown sugar (Chauhan, 1972). The greenish-yellow oil derived from okra seeds is viewed as an alternative to edible oil noted for its richness in oleic acid and linoleic acid. It also possesses substantial nutritional value containing vitamin C (30 mg/100 g), vitamin A (20 mg/100 g), zinc (6 mg/100 g), β-carotene (300 µg/100 g) and folic acid (300 µg/100 g). with its high dietary fiber content, low calorie count and abundance of minerals such as Ca, P, K and Mg okra is a valuable addition to human nutrition. It is known to be a good iodine source and acts as a diuretic to ease gastric discomfort largely due to its high polysaccharide content that creates a mucilaginous texture.

In terms of commercial farming okra is extensively grown in West Africa, India, Southeast Asia, the Southern United States, Brazil and Turkey. In India, key states for okra production include Uttar Pradesh, Assam, Bihar, Orissa, Maharashtra, West Bengal, and Karnataka. Among all vegetables cultivated in India, okra is grown over an area of 562 (000 Ha) yielding an annual production of 7694 (000 MT) (Anonymous, 2024). Specifically, In Maharashtra, okra is cultivated across 12.29 (000 Ha) resulting in a production of 123.69 (000 MT) (Anonymous, 2024). Okra holds considerable export potential, contributing approximately 13% to the total export of fresh vegetables.

The relationship between fruit yield and the factors contributing to it is extremely beneficial in vegetable breeding programs, especially when the goal is to improve multiple traits simultaneously. Fruit yield is influenced by polygenes and is significantly affected by environmental conditions. Thus, relying solely on fruit yield for selection is insufficient. A wide variety of quantitative traits forms the foundation for selection in breeding programs. Correlation coefficient analysis evaluates the relationships between plant characteristics and identifies which traits can be selected to improve yield. The change in one character brings about a series of changes in other characters as they are interrelated to each other. Therefore, it is important to study the correlation between yield and its contributing traits in any selection programme. This analysis helps clarify the degree of association between pairs of traits and assesses the feasibility of making simultaneous improvements in correlated traits.

Materials and Methods

The experimental material in the present study consisted five contrasting parental lines *viz.*, Arka Anamika, Konkan Bhindi, Arka Abhay, IC-42464, IC-42470, IC-42472 obtained from various sources IIHR, Bangalore, Dr. BSKKV Dapoli and NBPGR, New Delhi. The F_1 progeny of three crosses *viz.*, Arka Anamika × IC-42464 (Cross-I), Konkan Bhindi × IC 42470 (Cross-II) and Arka Abhay × IC-42472 (Cross-III) hereafter referred to as C-I, C-II, and C-III respectively along with their parental line were sown during *kharif* season of 2024 at Oilseeds Research Station, Latur. The crosses were developed by mating the contrasting parents *viz.*, Arka Anamika × IC-42464, Konkan Bhindi × IC-42470 and Arka Abhay × IC-42472. The seeds of parents and F_2 were produced by selfing while fresh F_1 seeds were developed by hand emasculation followed by pollination. The experiment was conducted at Oilseeds Research Station, Latur during Summer season of 2025. The parents and their respective F_1's were sown in separate blocks with three replications and the F_2 population sown without replication. Each entry of Parents and F_1 was sown in a single row of three-meter length with a row-to-row spacing of 60 cm and plant-to-plant spacing of 30 cm in each replication. Each row accommodated ten plants. The parents and hybrids were evaluated following randomized block design with three replications and the F_2 population was unreplicated. The experiment was sown on 23 January 2025. All the recommended agronomic packages of practices and necessary plant protection measures were followed to raise a good crop. The observation recorded following standard procedures from five plants per parent and hybrid cross. The mean of these five plants was considered for statistical analysis. With respect to F_2, observations were recorded on 158 plants in C-I, 143 plants in C-II and 142 plants in C-III on the ten characters *viz.*, days to flowering, plant height (cm), internodal length (cm), number of nodes per plant, number of primary branches per plant, fruit length(cm), fruit diameter (cm), fruit weight (g), number of fruits per plant, fruit yield per plant (g). Variances for all the characters under study were worked out by using the formula of Panse and Sukhatme (1985). The formulae suggested by Johnson *et al.* (1955) is used for calculating phenotypic correlation coefficient. According to the Fisher and Yates (1983) table, significance of correlation coefficient was determined at 5 and 1 per cent level of significance and comparison of 'r' values was done at (n-2) degrees of freedom.

Results and Discussion

Phenotypic correlation coefficients for ten traits are presented in Table 1 for population Arka Anamika × IC-42464 (C-I), Table 2 for population Konkan Bhindi × IC-42470 (C-II), Table 3 for population Arka Abhay × IC-42472 (C-III). Improvement of fruit yield is the most important target trait in Okra. This can be achieved through the direct selection of easily observable characters. But it needs a good understanding of the association of different traits with fruit yield and their association among themselves.

F_2 population of cross Arka Anamika × IC-42464

In the present investigation, days to flowering has exhibited a negative significant correlation with Fruit yield / plant (-0.22*). It showed negative non-significant correlations with Plant height (0.12), Number of nodes per plant (-0.15), No. of primary branches per plant (-0.09), Fruit diameter (-0.03), Fruit weight (-0.11) and Number of fruits per plant (-0.18). A positive non-significant correlation observed with Internodal length (0.08) and Fruit length (0.05). Plant height has positively and significantly correlated with Internodal length (0.45*), Number of Nodes per Plant (0.32*), Fruit diameter (0.22*), fruit weight (0.31*), No. of fruits per plant (0.27*) and Fruit yield per plant (0.39*). It showed negative non-significant correlations with days to flowering (-0.12) and Number of primary branches per plant (-0.18). A positive non-significant correlation is observed with Fruit length (0.14). Internodal length showed positive significant correlations with Plant height (0.45*), Fruit weight (0.25*), and Fruit yield per plant (0.29*). It has positively and non-significantly correlated with days to flowering (0.08), Number of nodes per plant (0.21), Fruit length (0.17), Fruit diameter (0.19) and Number of fruits per plant (0.16). A negative non-significant correlation is observed with Number of primary branches per plant (-0.11). Number of nodes per plant was positively and significantly correlated with Plant height (0.32*), Number of fruits per plant (0.42*) and Fruit yield per plant (0.35*). Number of nodes per plant showed negative significant correlation with Number of primary branches per plant (-0.24*). Negative non-significant correlation has observed with days to flowering (-0.15). It showed positive non-significant correlation with Internodal length (0.21), Fruit length (0.12), Fruit diameter (0.09), and Fruit weight (0.18). Number of primary branches per plant showed negative significant correlations with number of nodes per plant (-0.24*), Number of fruits per plant (-0.33*) and Fruit yield per plant (-0.37*). It was negatively and non-significantly correlated with days to flowering (-0.09), Plant height (-0.18), Internodal length (-0.11), Fruit length (-0.07), Fruit diameter (-0.13) and Fruit weight (-0.15). Fruit length was positively and significantly correlated with Fruit diameter (0.63*), Fruit weight (0.52*), Number of fruits per plant (0.28*) and Fruit yield per plant (0.45*). It showed positive non-significant correlations with Days to flowering (0.05), Plant height (0.14), Internodal length (0.17) and Number of nodes per plant (0.12). A negative non-significant correlation has observed with Number of

Table 1 : Phenotypic correlation coefficients for fruit yield and yield attributing traits in F_2 population of Arka Anamika × IC-42464 in okra.

S. no.	Character	Days to flowering	Plant height (cm)	Internodal length (cm)	No. of nodes / plant	No. of primary branches/ plant	Fruit length (cm)	Fruit diameter (cm)	Fruit weight (g)	No. of fruits/ plant	Fruit yield / plant(g)
1.	Days to Flowering	1.000									
2.	Plant height (cm)	-0.12	1.000								
3.	Internodal length (cm)	0.08	0.45*	1.000							
4.	No. of Nodes / Plant	-0.15	0.32*	0.21	1.000						
5.	No. of primary branches / plant	-0.09	-0.18	-0.11	-0.24*	1.000					
6.	Fruit length (cm)	0.05	0.14	0.17	0.12	-0.07	1.000				
7.	Fruit diameter (cm)	-0.03	0.22*	0.19	0.09	-0.13	0.63*	1.000			
8.	Fruit weight (g)	-0.11	0.31*	0.25*	0.18	-0.15	0.52*	0.71*	1.000		
9.	No. of fruits / plant	-0.18	0.27*	0.16	0.42*	-0.33*	0.28*	0.31*	0.38*	1.000	
10.	Fruit yield / plant (g)	-0.22*	0.39*	0.29*	0.35*	-0.37*	0.45*	0.58*	0.82*	0.74*	1.000

*, ** : Significance at 5 % and 1%, respectively.

primary branches per plant (-0.07). Fruit diameter is positively and significantly correlated with Fruit length (0.63*), Fruit weight (0.71*), Number of fruits per plant (0.31*) and Fruit yield per plant (0.58*). It showed positive non-significant correlations with Plant height (0.22*), Internodal length (0.19) and Number of nodes plant (0.09). It was negatively non-significantly correlated with days to flowering (-0.03) and Number of primary branches per plant (-0.13). Fruit weight has positively and significantly correlated with Internodal length (0.25*), Fruit length (0.52*), Fruit diameter (0.71*), Number of fruits per plant (0.38*) and Fruit yield per plant (0.82*). It showed positive non-significant correlations with Plant height (0.31*) and Number of nodes plant (0.18). It was negatively and non-significantly correlated with Days to flowering (-0.11) and Number of primary branches per plant (-0.15). Number of fruits per plant is positively and significantly correlated with Plant height (0.27*), Number of nodes per plant (0.42*), Fruit length (0.28*), Fruit diameter (0.31*), Fruit weight (0.38*), and Fruit yield per plant (0.74*). It showed negative significant correlation with Number of primary branches per plant (-0.33*). A positive non-significant correlation was observed with Internodal length (0.16). It was negatively and non-significantly correlated with Days to flowering (-0.18). Fruit yield showed highly significant positive correlations with several characters indicating that selection for these traits would likely lead to increased yield. Specifically, fruit yield was positively and significantly correlated with Plant height (0.39*), Internodal length (0.29*), Number of nodes per plant (0.35*), Fruit length (0.45*), Fruit diameter (0.58*), Fruit weight (0.82*) and Number of fruits per plant (0.74*). Significant negative correlation exists between Fruit yield and Days to flowering (-0.22*) and Number of primary branches per plant (-0.37*). Similar result were noted by Karadi *et al.* (2018) found a negative and significant association between fruit yield per plant and days to flowering. Gangashetty *et al.* (2010) reported a significant positive phenotypic correlation between plant height, fruit length and fruit yield per plant. Rynjah *et al.* (2020) found positive correlations between plant height and number of fruits per plant. Tudu *et al.* (2021) found that fruit yield per plant exhibited significant positive associations with internodal length. Rathod *et al.* (2019) reported a positive and highly significant correlation between plant height at final harvest and internodal length. Narkhede *et al.* (2015) reported significant positive correlations between number of nodes per plant and plant height. Nbeaa *et al.* (2023) concluded that the phenotypic correlation revealed that yield per plant had positively significant correlation with fruit diameter (0.53). Balai *et al.* (2014) reported that yield per plant had highly significant positive genotypic and phenotypic correlation with average weight of edible pod. Agrawal and Singh (2021) reported that Plant height, fruit width (cm), fruit weight (g), total number of fruits per plant, number of marketable fruits per plant and total yield per plant (g) were positively significant with the marketable yield per plant (g) at both genotypic and phenotypic levels. Reddy *et al.* (2013) reported negative correlations between Days to flowering, number of branches per plant with marketable yield per plant.

F_2 population of cross Kokan Bhindi × IC-42470

Days to flowering has exhibited a positive non-significant correlation with fruit length (0.03), fruit diameter (0.01), fruit weight (0.02), and fruit yield per plant (0.01), internodal length (0.08). This indicated that variation in flowering time did not significantly influence these yield-contributing traits. It showed a negative non-significant correlation with plant height (-0.12), number of nodes per plant (-0.05), number of primary branches per plant (-0.1), and number of fruits per plant (-0.04). Plant height has showed a positive highly significant correlation with internodal length (0.52**), number of nodes per plant (0.45**), fruit length (0.22**), fruit weight (0.31**), number of fruits per plant (0.25**), and fruit yield per plant (0.38**). This suggested that taller plants generally possessed more nodes, longer internodes, and produced larger fruits, more fruits, and consequently higher yield. A positive significant correlation was observed with the number of primary branches per plant (0.18*) and fruit diameter (0.19*). Plant height showed negative non-significant correlation with days to flowering (-0.12). Internodal length displayed a positive highly significant correlation with plant height (0.52**). It exhibited a positive significant correlation with fruit yield per plant (0.17*). Positive non-significant correlations were noted with the number of nodes per plant (0.12), number of primary branches per plant (0.05), fruit length (0.11), fruit diameter (0.09), fruit weight (0.15), and number of fruits per plant (0.07). A positive non-significant correlation was also observed with days to flowering (0.08). The number of nodes per plant demonstrated a positive highly significant correlation with plant height (0.45**), number of primary branches per plant (0.33**), number of fruits per plant (0.41**) and fruit yield per plant (0.30**). This indicated that a greater number of nodes was strongly associated with more primary branches, more fruits, and higher overall yield. It showed positive non-significant correlations with internodal length (0.12), fruit length (0.14), fruit diameter (0.1) and fruit weight (0.12). A negative non-significant correlation was found with days

Table 2 : Phenotypic correlation coefficients for fruit yield and yield attributing traits in F_2 population of Kokan Bhindi x IC-42470 in okra,

S. no.	Character	Days to flowering	Plant height (cm)	Internodal length (cm)	No. of nodes / plant	No. of primary branches/ plant	Fruit length (cm)	Fruit diameter (cm)	Fruit weight (g)	No. of fruits/ plant	Fruit yield / plant(g)
1.	Days to Flowering	1.000									
2.	Plant height (cm)	-0.12	1.000								
3.	Internodal length (cm)	0.08	0.52**	1.000							
4.	No. of Nodes / Plant	-0.05	0.45**	0.12	1.000						
5.	No. of primary branches / Plant	-0.1	0.18*	0.05	0.33**	1.000					
6.	Fruit length (cm)	0.03	0.22**	0.11	0.14	0.09	1.000				
7.	Fruit diameter (cm)	0.01	0.19*	0.09	0.1	0.07	0.65**	1.000			
8.	Fruit weight (g)	0.02	0.31**	0.15	0.12	0.11	0.72**	0.78**	1.000		
9.	No. of fruits / plant	-0.04	0.25**	0.07	0.41**	0.29**	0.17*	0.12	0.21**	1.000	
10.	Fruit yield / plant (g)	0.01	0.38**	0.17*	0.30**	0.22**	0.54**	0.48**	0.82**	0.62**	1.000

*, ** : Significance at 5% and 1%, respectively.

Table 3 : Phenotypic correlation coefficients for fruit yield and yield attributing traits in F_2 population of Arka Abhay x IC-42472 in okra.

S. no.	Character	Days to flowering	Plant height (cm)	Internodal length (cm)	No. of nodes / plant	No. of primary branches/ plant	Fruit length (cm)	Fruit diameter (cm)	Fruit weight (g)	No. of fruits/ plant	Fruit yield / plant(g)
1.	Days to Flowering	1.000									
2.	Plant height (cm)	-0.08	1.000								
3.	Internodal length (cm)	0.12	0.58**	1.000							
4.	No. of Nodes / Plant	-0.03	0.47**	0.15	1.000						
5.	No. of primary branches/plant	-0.05	0.21*	0.08	0.36**	1.000					
6.	Fruit length (cm)	0.05	0.25**	0.14	0.17*	0.11	1.000				
7.	Fruit diameter (cm)	0.02	0.22**	0.12	0.12	0.09	0.68**	1.000			
8.	Fruit weight (g)	0.04	0.35**	0.18*	0.15	0.13	0.75**	0.81**	1.000		
9.	No. of fruits / plant	-0.02	0.28**	0.09	0.44**	0.31**	0.19*	0.14	0.24**	1.000	
10.	Fruit yield / plant (g)	0.03	0.42**	0.20*	0.33**	0.24**	0.57**	0.51**	0.85**	0.65**	1.000

*, ** : Significance at 5 % and 1 % respectively.

to flowering (0.05). Number of primary branches per plant showed positive highly significant correlation with the number of nodes per plant (0.33**). It also showed a positive highly significant correlation with number of fruits per plant (0.29**) and fruit yield per plant (0.22**). A positive significant correlation was observed with plant height (0.18*). Positive non-significant correlations were found with internodal length (0.05), fruit length (0.09), fruit diameter (0.07), fruit weight (0.11). A negative non-significant correlation was observed with days to flowering (-0.1). Fruit length has exhibited a positive highly significant correlation with plant height (0.22**), fruit diameter (0.65**), fruit weight (0.72**), and fruit yield per plant 92 (0.54**). This suggested that longer fruits were strongly associated with larger diameter, heavier fruits, and greater total fruit yield. A positive significant correlation was observed with the number of fruits per plant (0.17*). Positive non-significant correlations were noted with days to flowering (0.03), internodal length (0.11), number of nodes per plant (0.14), and number of primary branches per plant (0.09). Fruit diameter demonstrated a positive highly significant correlation with fruit length (0.65**), fruit weight (0.78**), and fruit yield per plant (0.48**). This indicated that wider fruits were strongly linked to longer, heavier fruits and higher yield. A positive significant correlation was observed with plant height (0.19*). Positive non-significant correlations were found with days to flowering (0.01), internodal length (0.09), number of nodes per plant (0.1), number of primary branches per plant (0.07) and number of fruits per plant (0.12). Fruit weight showed positive highly significant correlations with fruit length (0.72**), fruit diameter (0.78**), number of fruits per plant (0.21**), and fruit yield per plant (0.82**). This strong association indicated that heavier individual fruits contributed substantially to overall fruit yield and were correlated with larger fruit dimensions. It also had a positive highly significant correlation with plant height (0.31**). Positive non-significant correlations were observed with days to flowering (0.02), internodal length (0.15), number of nodes per plant (0.12) and number of primary branches per plant (0.11). The number of fruits per plant exhibited positive highly significant correlations with plant height (0.25**), number of nodes per plant (0.41**), and fruit yield per plant (0.62**). This highlighted the critical role of fruit number in determining total yield. A positive significant correlation was noted with fruit length (0.17*). Positive non-significant correlations were found with internodal length (0.07), number of primary branches per plant (0.29**), fruit diameter (0.12), and fruit weight (0.21**). A negative non-significant correlation was observed with days to flowering (-0.04). Fruit yield per plant demonstrated positive highly significant correlations with plant height (0.38**), number of nodes per plant (0.30**), number of primary branches per plant (0.22**), fruit length (0.54**), fruit diameter (0.48**), fruit weight (0.82**), and number of fruits per plant (0.62**). This indicated that fruit weight, number of fruits, fruit length, and fruit diameter were major direct contributors to the final yield, while plant height, number of nodes, and primary branches were also strongly associated. A positive significant correlation was observed with internodal length (0.17*). A positive non-significant correlation was found with days to flowering (0.01). The similar results were obtained by Barman and Marboh (2022) showed that Plant height and wide variety of end result per plant confirmed particularly nice substantial affiliation with fruit yield according to plant each at phenotypic and genotypic degree. Sood *et al.* (2016) support a positive and significant correlation between number of nodes per plant and fruit yield. Janarthanan and Sundaram (2020) support a positive and significant correlation between number of primary branches per plant and fruit yield. Balai *et al.* (2014) reported that yield per plant had highly significant positive genotypic and phenotypic correlation with length of pod and average weight of edible pod. Madhumitha *et al.* (2024) support a strong positive correlation between fruit weight and yield. Balakrishnan and Sreenivasan (2010) found a significant positive correlation between plant height and fruit number. Ranganayaki *et al.* (2020) support a strong positive correlation between number of fruits per plant and yield. Nbeaa *et al.* (2023) specially noted yield per plant was positively highly significant correlation with fruit weight.

F_2 population of cross Arka Abhay × IC-42472

Days to flowering exhibited a non-significant positive correlation with internodal length (0.12), fruit length (0.05), fruit diameter (0.02), fruit weight (0.04), and fruit yield per plant (0.03). It showed non-significant negative correlations with plant height (-0.08), number of nodes per plant (-0.03), number of primary branches per plant (-0.05), and number of fruits per plant (-0.02). Plant height showed highly significant positive correlation with internodal length (0.58**), number of nodes per plant (0.47**), number of primary branches per plant (0.21*), fruit length (0.25**), fruit diameter (0.22**), fruit weight (0.35**), number of fruits per plant (0.28**) and fruit yield per plant (0.42**). It showed a non-significant negative correlation with days to flowering (-0.08). Internodal length was positively highly significantly correlated with plant height (0.58**). It showed non-significant positive correlations with number of nodes per plant (0.15), number of primary branches per plant (0.08), fruit length (0.14), fruit diameter (0.12), fruit weight (0.18*), number of fruits per plant (0.09) and fruit yield per plant (0.20*). A non-significant positive correlation was observed with days to flowering (0.12). The number of nodes per plant exhibited highly significant positive correlation with plant height (0.47**) and number of primary branches per plant (0.36**), number of fruits per plant (0.44**), and fruit yield per plant (0.33**). It also showed significant positive correlations with fruit length (0.17*). It also showed non-significant positive correlations with internodal length (0.15), fruit diameter (0.12), fruit weight (0.15). A non-significant negative correlation was noted with days to flowering (-0.03). The number of primary branches per plant showed positive highly significant correlation with number of nodes per plant (0.36**), number of fruits per plant (0.31**), and fruit yield per plant (0.24**). It also showed a positive significant correlation with plant height (0.21*). Non-significant positive correlations were observed with internodal length (0.08), fruit length (0.11), fruit diameter (0.09), fruit weight (0.13). A non-significant negative correlation was found with days to flowering (-0.05). Fruit length showed highly significant positive correlations with plant height (0.25**), fruit diameter (0.68**), fruit weight (0.75**) and fruit yield per plant (0.57**). It also showed a positive significant correlation with number of nodes per plant (0.17*) and number of fruits per plant (0.19*). Non-significant positive correlations were observed with days to flowering (0.05), internodal length (0.14), number of primary branches per plant (0.11). Fruit diameter exhibited highly significant positive correlations with plant height (0.22**), fruit length (0.68**), fruit weight (0.81**), and fruit yield per plant (0.51**). Non-significant positive correlations were observed with days to flowering (0.02), internodal length (0.12), number of nodes per plant (0.12), number of primary branches per plant (0.09) and number of fruits per plant (0.14). Fruit weight showed highly significant positive correlations with plant height (0.35**), fruit length (0.75**), fruit diameter (0.81**), number of fruits per plant (0.24**), and fruit yield per plant (0.85**). A positive significant correlation was noted with internodal length (0.18*). Non-significant positive correlations were observed with days to flowering (0.04), number of nodes per plant (0.15) and number of primary branches per plant (0.13). The number of fruits per plant exhibited highly significant positive correlations with plant height (0.28**), number of nodes per plant (0.44**), number of primary branches per plant (0.31**), fruit weight (0.24**), and fruit yield per plant (0.65**). A positive significant correlation was observed with fruit length (0.19*) and positive non-significant correlation observed with fruit diameter (0.14). Non-significant positive correlations were noted with internodal length (0.09). A non-significant negative correlation was found with days to flowering (-0.02). Fruit yield per plant showed highly significant positive correlations with plant height (0.42**), number of nodes per plant (0.33**), number of primary branches per plant (0.24**), fruit length (0.57**), fruit diameter (0.51**), fruit weight (0.85**), and number of fruits per plant (0.65**). A positive significant correlation was observed with internodal length (0.20*). A non-significant positive correlation was noted with days to flowering (0.03). These findings align with previous reports by Shinde *et al.* (2023) Fruit yield per plant was significantly positively correlated with plant height, number of nodes per plant and number of fruits per plant. Ashraf *et al.* (2020) found plant height had a highly significant positive genotypic correlation with fruit length and fruit weight. Thulasiram *et al.* (2017) found yield per plant significantly associated with number of primary branches per plant and number of nodes per plant. Pundir *et al.* (2022) found fruit yield per plant showed highly significant and positive correlation with number of branches per plant, plant height and fruit diameter. Ullangula *et al.* (2021) found fruit yield per plant exhibited high significant positive association with plant height, fruit length, fruit weight and number of fruits per plant. Saryam *et al.* (2015) reported highly significant positive phenotypic correlations of yield per plant with number of fruits per plant, fruit diameter, fruit length, and fruit weight.

Conclusion

The results of the current study revealed that the F_2 population of the cross Arka Anamika × IC-42464 exhibited a significant and positive association of fruit yield per plant with plant height, internodal length, number of nodes per plant, fruit length, fruit diameter, fruit weight, and number of fruits per plant. Similarly, the F_2 populations of the crosses Kokan Bhindi × IC-42470 and Arka Abhay × IC-42472 showed highly significant and positive associations of fruit yield per plant with plant height, number of nodes per plant, number of primary branches per plant, fruit length, fruit diameter, fruit weight, and number of fruits per plant. There is much scope for breeder in improvement of yield through selection.

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