Genetic study of segregating generations in Okra (Abelmoschus esculentus (L.) Moench)

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Abstract-To find superior parents to achieve these objective parents during grown the *rabi* 2022-23. Six parents were obtained and grown at Department of Agril. Botany, College of Agriculture, GHRU Saikheda, Dist, Chhindwara, Madhya Pradesh in randomized block design with two replications. Spacing of 75 X 30 cm^2 was kept between row to row and plant to plant and 15 plants were raised in each row. Other genotypes, Parbhani Kranti VROR-159 and Pusa Sawani were found to be superior for yield and different characters which are contributing towards yield by exhibiting a better performance for nearly most of the traits. The moderate estimates of GCV and PCV were recorded for the traits viz., plant height (cm), internodal length (cm), number of nodes on main stem, number of branches per plant, seed weight (g), number of seeds per fruit and fruit yield per plant (g), while the traits like plant height (cm), internodal length (cm), number of nodes on main stem, number of branches per plant, 100 seed weight (g) and fruit yield per plant (g).

Key words: Okra, yield, GCA, PCA)

INTRODUCTION

Okra is a noteworthy vegetable that is grown in subtropical and tropical climates, together with an annual herbaceous crop worldwide for its young, verdant fruits and new foliage. Okra is amphidiploid, with a number of chromosomes of 2n=130, & belongs to the Malvaceae family. The the soft okra fruits are widely utilized in culinary preparations, boiled, sliced and fried, or used in soups and curries. Okra is valued for its higher nutritive content compared to tomatoes, eggplants, and most cucurbits. Its high mucilage content makes it ideal for thickening soups and gravies. Okra can be canned, dehydrated, or frozen for consumption during off-seasons. While not typically used as a leafy vegetable in India, it is highly profitable compared to other vegetables. In Turkey, okra seeds are roasted and ground as a coffee alternative, and it is also used in preparing vegetable curries (Anonymous, 2019). Stems and ripe fruits are utilized in the paper industry as well as being used as a clarifier for sugarcane juice. used to make guar and brown sugar (Chauhan, 1972). Okra leaves, which are important in reducing inflammation, are utilized in the manufacture of a medication. It prevents goiter since it is an excellent source of iodine (Chadha, 2001). According to Nadkarni (1927), it is effective against spermatorrhoea, gastrointestinal diseases, and chronic diarrhea. The potential of the current cultivars must be evaluated since it shows the genetic variety of the starting materials, which holds the key to future improvement. The degree of genetic diversity that exists has a major influence on how successful a breeding program designed to increase quantitative traits. Inside the germplasm. Breeders can use heritability and genetie advance estimations to choose the best breeding methods for their crop improvement program. (1955, Johnson et al.).

MATERIALS AND METHODS

Experiment will be conducted at department of genetics and plant breeding School of agricultural Science, Saikheda. During *kharif* 2023, were obtained study by 6 parental inbred line in full diallel mating design were planted in randomized block design with 3 replications in *kharif* 2023 for evaluation having spacing 75 cm X 30 cm. The recommended cultural practices were followed to raise the healthy crop. The statistical analysis carried out as per Panse and Sukhatme (1965). Average annual rainfall is 1,187 mm. Minimum temperature during winter is 5 to 7 degrees Celsius while maximum temperature during summer is 39 to 43 degrees Celsius.

RESULT AND DISCUSSION

Genotypic coefficient of variation and phenotypic coefficient of variation

1. Days to 50 per cent flowering

For the characteristics of days to 50% flowering, In comparison to phenotypic coefficient of variance PCV (3.76), It had a lower genotypic coefficient of variation GCV (3.01).similar result found on sharma et,al (2016) and Yavdav et,al.(2016).

2. Plant height (cm)

The genotypic coefficient of variation (10.18%) for plant height was somewhat less than the phenotypic coefficient of variance (10.44%).Mishra et,al.(2015), Reddy et.al.(2012) reported findings that were similar

3. Internodal length (cm)

For the trait internodal length, the genotypic coefficient of variation (12.63).exceeded the phenotypic coefficient of variation (13.07)

4. Number of nodes on main stem

The genotypic coefficient of variation for the quantity of nodes on the primary stem (10.87%) was smaller than the coefficient of variance based on phenotype. (11.02%). similar result found on sharma et,al (2016) and Yavdav et,al.(2016).

5) No. of branches / plant

For the trait no. of branches plant-1, the genotypic the variation coefficient (13.26) was less than the phenotypic the variation coefficient (13.74). Mishra et,al.(2015), Reddy et.al.(2012) reported findings that were similar.

6) Fruit length (cm)

The genotypic coefficient of variation for fruit length (5.61) were less than the diversity in phenotypic traits. (5.71).

7) Fruit diameter (cm)

For fruit diameter, the genotypic coefficient of variation GCV (4.04%) was slightly was less than the diversity in phenotypic traits. (4.05%).

8) Number of ridges per fruit

The genotypic coefficient of variation (7.28%) for the trait no. of ridges / fruit were smaller the diversity in phenotypic traits. (11.35%). similar result found on sharma et,al (2016) and Yavdav et,al.(2016).

9) No. of fruits / plant

For the quantity of fruits produced plant-1, the phenotypic coefficient of variation (6.84%). was more than the genotypic coefficient of variation (6.59%)

Table No. 1 Estimation of genetic variability parameters for twelve characters

Sr.No	Character	Mean	GCV %	PCV %	Hb (%)	GA	GAM %
1	Days to 50% flowering	49.5	3.01	3.76	64.30	2.24	4.98
2	Plant height	135	10.18	10.44	94.90	26.03	20.43
3.	Internodal length	5.92	12.63	13.07	93.30	1.42	22.13
4.	No. of nodes on main stem	16.5	10.87	11.02	97.30	3.29	22.10
5.	No. of branches per plant	3.07	13.26	13.74	93.20	0.85	26.38
6.	Fruit length (cm)	13.83	5.61	5.71	96.30	1.48	11.34
7.	Fruit diameter (mm)	2.36	4.04	4.05	99.60	0.15	8.31
8.	No. of ridges per plant	5.75	7.28	11.35	41.20	0.53	9.62
9.	No. of fruit per plant	15.45	6.59	6.84	92.80	2.01	13.08
10.	100 Seed weight	5.50	11.22	11.31	98.60	1.30	22.96
11.	No. of seed per fruit	46.93	10.19	13.32	58.50	8.10	16.06
12.	Fruit yield per plant	290.35	12.25	12.27	99.70	68.80	25.19

10) 100 seed weight (g)

For 100 seed weight, the genotypic coefficient of variance (11.22%) was found to be was less than the diversity in phenotypic traits. (11.31%). reported findings that were similar Adgar et,al.(2011), Varma et.al.(2018).

11) No. of seeds / fruit

For the quantity of seeds fruit-1, the genotypic coefficient variance (10.19%) was less than the diversity in phenotypic traits. (13.32%). reported findings that were similar Kavya et,al.(2019), Rambabu et.al.(2019).

12) Fruit yield per plant (g)

The variety in phenotypic traits (12.27 %) was greater than the variance caused by the genotype. (12.25 %) for the trait fruit production per plant.

Heritability and Genetic advance

1) Days to
2) 50 per cent flowering

High heritability (64.30 %) combined with lower Genetic progress was measured for the trait days to 50% blooming as a percent mean (4.98).

2) Plant height (cm)

High heritability (94.90 %) combined with a substantial genetic progress, as indicated by the attribute plant height's percent mean (20.43).

3) Internodal length (cm)

The trait inter-nodal length has observed strong genetic advancement as a percentage mean (25.13) and high heritability (93.30%).

4) No. of nodes / stem

The trait no. of nodes on main stem has exhibited high heritability (97.30 %) combined with a high mean genetic progress percentage (22.10).

5) No.of branches / plant

The every plant's no. of branches revealed substantial genetic progress as measured by percent mean (26.38) and high heritability (93.20%). Mishra et,al.(2015), Reddy et.al.(2012) reported findings that were similar

6) Fruit length (cm)

Fruit length is a characteristic that has modest genetic progress as expressed as a mean percentage (11.34) and high heritability (96.30%).

7) Fruit diameter (cm)

Fruit diameter showed a minimal genetic progress as measured by the percent mean (8.31) and a high heritability of 99.60 %.

8) No. of ridges / fruit

No. of ridges / fruit showed reasonable heritability (41.20%) & modest genetic progress as measured by the percent mean (9.62).

9) No. of fruits per plant

As mean of percentage, the characteristic quantity of fruits / plant has a high heritability of 92.80% and a modest genetic progress. (13.08). Mishra et,al.(2015), Reddy et.al.(2012) reported findings that were similar.

10) 100 seed weight (g)

High heritability (98.60 %) coupled having a high percentage of genetic advancement (22.96) was spotted for 100 seed weight. reported findings that were similar Rana (2020) et,al.(2019), Rambabu et.al.(2019).

11) No. of seeds / fruit

The trait no. of seeds / fruit has shown moderate heritability (58.50 %) combined with a little genetic advancement as a mean percentage (16.06).

12) Fruit yield / plant (g)

High heritability (99.70 %) combined with a high genetic advancement as a mean percentage (25.19) It was witnessed for fruit yield / plant. In present study, heritability ranged from 41.20 % to 99.70 %, while combined with a little genetic advancement as a mean percentage 4.98 to 25.19 % was observed similar result found on sharma et,al (2016) and Yavdav et,al.(2016).

CONCLUSION

The genotype variability for all the variables under study is mostly attributable to genetic factors, with a little amount of variation seen between the values of GCV and PCV. Furthermore, the values of GCV were found to be lower than those of PCV. Traits exhibiting high GCV, PCV, heritability as well as genetic progress, along with a positive correlation between the amounts of fruit produced by each plant, are crucial for the improvement of okra yield. The current study identified Pusa Swani, VROR-159, and Parbhani Kranti as superior among six genotypes, showing superior performance across various yield-contributing characteristics. Therefore, advancing these genotypes to the next generation could lead to significant improvements in okra yield.

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