The study of variability heritability and genetic advance in okra [(*Abelmoschus esculentus* L.) Moench]" crop

ABSTRACT

The study of variability heritability and genetic advance in okra okra [*Abelmoschus esculentus*(L.) Moench]" crop was conducted during kharif 2019 to ziad 2020 at the research farm of shri Durga ji post graduate college Chaneshwar Azamgarh U.P. with ten genotypes Azad Bhindi1, Azad Bhindi 2, Azad Bhindi 3, KS 312, VRO5, KS 442, KS 439, BO2, Arka Abhay and Prabhani Kranti along with 11 characters viz days to flowering, height of plant, number of branches per plant /main shoot,number of first fruiting node height of first fruiting node number of nodes per plant ,length of internodes, length of fruit, width of fruits , number of fruits per plant and fruit yield per plant . All data recorded as per scientific. for good genotypes of releasing factors i.e.high yielding and good quality characters. coefficient of variability for all the characters and the number of first fruiting node coefficients of variability was more in F_1 generations. F_1 generation showed coefficients of variability of greater magnitude for number of first fruiting node, number of nodes in F_1 generation. Number of branches per plant showed maximum coefficient of variabilities in F_2 than parents and F_1 generations and other characters. The High heritability estimates in narrow sense were observed for length of fruit in both the generations and height for all the characters except height of plant, width of fruit, number of fruits per plant and fruit yield per plant in F_1 generation only. Other characters showed moderate heritability F_2 generations and height of plant in both generation, genetic advance in narrow sense higher in F_2 then F_1 generation for all the characters. The maximum genetic advance was observed for fruit yield per plant in F_1 and F_2 and moderate genetic advance was observed for height of plant in both F_1 and F_2 generation

INTROUCTION

Okra or *Bhindi* [*Abelmoschus esuculentus* (L.) Moench] is an important vegetable crop of India. It belongs to the family Malvaceae and having chromosome number 2n = 130. It behave as often cross-pollinated crop although it is potential self pollinated crop, 8.75 to 9.61 percent out crossing (Purewal and Randhawa, 1947). Okra is believed to have originated in the Hindustani centre of origin. However, Ethiopia is also considered as its native place from where it disseminated into Arabia down Nile Valley and was

introduced in to Europe by the Moors and further into Louisiana during the early 17th century by French colonists (Woodruff, 1927). India is also considered its native place as various ancestral wild forms are met with here (Yawalkar, 1965).According to ICMR report per day per capita requirement of vegetables in India is 300g (125 g leaf vegetables, 100 g root and tuber vegetables and 75 g other vegetables) but availability of vegetables in India is about 175 g per day per capita.India stands on second place in vegetable production near about 96.02 million tonnes in the world after China from 6.75 million hectare of land with average productivity of 18.40 tonnes per hectare (NHB report, 2019). Tamilnadu has the highest productivity (25.3 t/ha.) followed by Kerala (22.6 t/ha.) and Uttar Pradesh (18.5 t/ha.). Presently, India's share 13.60 per cent of total world vegetables production, considering the present situation as well as the growing demand of vegetable consumption to fulfill the need of next coming generation of the country, there is an urgent need to increase the productivity per unit area and overall production of vegetables in the country.

Material and Methods

The study of variability heritability and genetic advance in okra okra [*Abelmoschus esculentus*(L.) Moench]" crop was conducted during kharif 2019 to ziad 2020 at the research farm of shriDurgaji post graduate college Chaneshwar Azamgarh U.P. with ten genotypes Azad Bhindi1, Azad Bhindi 2, Azad Bhindi 3, KS 312, VRO5, KS 442, KS 439, BO2, Arka Abhay and Prabhani Kranti along with 11 characters viz days to flowering,height of plant, number of branches per plant /main shoot,number of first fruiting node height of first fruiting node number of nodes per plant ,length of internodes, length of fruit, width of fruits , number of fruits per plant and fruit yield per plant . All data recorded as per scientific. for good genotypes of releasing factors i.e. high yielding and good quality characters.

Results& discussion :

Variability

In the present study, the magnitude of phenotypic coefficient of variability was higher than that of genotypic coefficient of variability for all the characters and the number of first fruiting node coefficients of variability was more in F_1 generations. F_1 generation showed coefficients of variability of greater magnitude for number of first fruiting node, number of nodes in F_1 generation. Number of branches per plant showed maximum coefficient of variabilities in F_2 than parents and F_1 generations and other characters.

The difference between phenotypic and genotypic coefficients of variability for all the characters were very small indicating that all characters were less influenced by environmental factors.

Heritable variation can not be estimated with the help of genetic coefficient of variation alone Singh *et al.* (1974) had also observed similar variations.

Heritability

Heritability denotes the amount of variability, which is heritable, whereas the genetic advance predict the amount of gain expected by imposing a particular intensity of selection. Therefore, deciding the breeding methodology to be followed, the information on these parameters is important. The heritability facilitates evaluation of genetic and environmental effects in phenotypic variation and helps in selection since response to selection for quantitative characters is directly proportionate of the function of its heritability and genetic advance.

Robinson (1949, 1966) categorized the heritability estimate as low (below 10%) medium or moderate (10 to 30%) and high (above 30%) in narrow sense. Several methods have been developed by several workers (Mather, 1949; Warner, 1952; Crumpacker and Allard, 1962; Mather and Jinks, 1971) for estimation of heritability in narrow sense.

According to present study heritability was high for length of fruit in both F_1 and F_2 generation, high for days to flowering, number of branches per plant, number of first fruiting node, height of first fruiting node, number of nodes per plant, length of internode and length of fruit in F_1 generation, moderate for height of plant, width of fruit, number of fruits per plant and fruit yield per plant in both F_1 and F_2 generation and moderate for all the character except length of fruit in F_2 population. Heritability estimates alone could not be given the real picture of improvement which could be realized during selection. It is only reliable when accomplishment of genetic advance under selection.

Genetic Advance

In the present study, the magnitude of genetic advance in narrow sense higher in F_2 then F_1 generation for all the characters. The maximum genetic advance was observed for fruit yield per plant in F_1 and F_2 and moderate genetic advance was observed for height of plant in both F_1 and F_2 generation presented in Table . The genetic advance was found low for all the characters except height of per plant and fruit yield per plant in F_1 and F_2 which the suggested that these characters will not be amenable to selection. Singh and Katiyar (2004), Comstock and Robinson (1952), Yadav *et al*. (2002), Mahajan and Sharma (1979) and Rao *et al.* (1977) have also reported similar results in okra Singh *et al.* (1974), Rao and Satyavarthi, (1977

These findings were in agreement with those of Chacko *et al.* (1999), Yadav *et al.* (2002), Singh *et al.* (2004), Mishra *et al.* (2004), Bharagava*et al.* (2006), Yadav *et al.* (2007), Kumar *et al.* (2007), High heritability estimates in narrow sense were observed for length of fruit in both the generations and height for all the characters except height of plant, width of fruit, number of fruits per plant and fruit yield per plant in F_1 generation only. Other characters showed moderate heritability F_2 generations and height of plant in both generation.

Table 1: Estimates of variability, heritability and genetic advance for the different characters under study in okra [*Abelmoschus esculentus* (L.) Moench]

Characters	Phenotypic coefficient of variability in per cent			Genotypic coefficient of variability in per cent			Heritability (narrow sense)		Genetic advance in percent of mean (narrow sense)	
	Parent	F1	F2	Parent	F1	F2	F1	F2	F1	F2
Days to flowering	8.56	8.69	9.21	8.29	8.48	8.92	38.02	28.88	7.25	7.58

Height of plant	8.48	10.29	12.33	8.26	9.98	12.10	22.15	14.52	21.15	26.69
Number of branches per plant	22.42	23.33	32.97	21.14	22.12	32.22	32.61	13.60	1.32	2.09
Number of first fruiting node	20.02	14.22	20.00	19.79	19.95	19.65	51.43	29.41	1.93	2.93
Height of first fruiting node	14.67	12.54	13.19	14.22	12.10	12.60	50.83	29.60	4.76	4.83
Number of nodes per plant	12.71	11.64	15.11	12.27	10.66	14.92	37.28	19.29	4.12	6.30
Length of internode	18.02	18.74	19.56	17.52	18.26	19.14	31.70	25.57	3.88	4.35
Length of fruit	16.52	12.93	13.12	15.47	11.97	13.11	42.04	40.04	2.82	3.05
Width of fruit	17.33	20.58	21.32	15.86	18.94	21.31	22.11	16.98	0.75	0.89
Number of fruits per plant	15.74	17.30	18.42	15.00	16.61	18.41	25.88	19.65	5.40	6.10
Fruit yield per plant	11.59	16.93	16.22	11.03	16.17	16.21	13.43	13.94	61.83	62.22

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