Electronic Journal of Plant Breeding, 4(3): 1255-1257 (Sep 2013)
ISSN 0975-928X

Research Note

Genetic variability, heritability and genetic advance in okra (*Abelmoschus Esculentus* L. Moench.)

Shaikh Md. Soyab Akhil Mohd. Ab. Mazid*, Mohrir M.N and Jadhav R. S.
Department of Botany, Pratishtan Mahavidyalaya, Paithan, Aurangabad (M.S.)
E-mail: msrama_res@yahoo.com

(Received: 10 Sep 2013; Accepted: 25 Sep 2013)

Abstract
Genetic variability, heritability and genetic advance as percent of mean were studied among the 25 germplasm lines of okra Significant differences among genotypes were observed for all the characters under study. Plant height (cm), number of fruits per plant and number of seeds per fruit observed high GCV and PCV. Plant height (cm), number of seeds per fruit, and number of fruits per plant recorded high heritability coupled with high GCV and high genetic advance as per cent of mean indicates selection could be effective for improvement in these characters.

Key words
Okra, Variability, heritability, genetic advance

Okra (*Abelmoschus esculentus* L. Moench) is an important vegetable crop grown in the subtropical to tropical with low altitude regions of Asia, Africa, America and temperate regions of the Mediterranean basin. In India, okra is commercially grown in state of Gujarat, Maharashtra, Andhra Pradesh, Uttar Pradesh, Tamil Nadu, Karnataka, Haryana and Punjab as a kharif as well as summer season crop. The variability for various characters is prerequisite for plant breeder, however variability along with high to medium genetic advance provide scope for selection In the present investigation, an attempt has been made to assess genetic variability parameters for yield and yield contributing traits.

Twenty five genotypes of okra collected from the Indian Institute of Vegetable Science (IIVR), Varanasi were grown in randomized block design with three replications and spacing of 60 x 30 cm at the Department of Botany, Pratishthan Mahavidylaya, Paithan, Aurangabad, Maharashtra in kharif 2009. The observations were recorded on five randomly selected plants from each genotype for eight quantitative characters viz., days to first flowering, days to 50 per cent flowering, tender fruit length (cm), plant height (cm), number of seeds/ fruit, number of branches per plant, number of nodes per plant, internodal length (cm), number of fruits per plant and weight of fruits/plant (g). The coefficient of variation was estimated according to Burton (1952), while heritability in broad sense calculated as per suggestion of Burton and De Vane (1953). The expected genetic advance was calculated according to Johnson *et al.* (1955).

Analysis of variances revealed significant differences among genotypes for all the quantitative characters studied (Table 1). Similar results were reported by Ramanjinappa *et al.* (2011) and Kumar *et al.* (2012). Phenotypic coefficient of variation was higher than genotypic coefficient of variation for all that characters, however large difference observed between PCV and GCV for characters viz., internodal length (cm), plant height (cm), number of seeds per fruit, number of fruits per plant and weight of fruits per plant, indicating the influence of the environment in the expression of these characters (Table 2). These results are contrary with Ramanjinappa *et al.* (2011) and Kumar *et al.* (2012). High GCV was shown by the characters viz., plant height (cm), number of seeds per fruit and number of fruit per plant and improvement could be possible trough selection in these traits. Characters weight of fruits per plant (g) and tender fruit length (cm) recorded moderate GCV values, while low GCV values exhibited by days to first flowering and days to 50 percent flowering. Similar finding were reported by Rajani and Manju (1997), Gandhi *et al.* (2001) and Ramanjinappa *et al.* (2011).

High heritability estimates were recorded by characters viz., days to 50 percent flowering (70.26%), days to first flowering (54.92%), plant height (cm) (54.74%) and number of seeds per fruit (34.72%). However, characters like weight of fruits per plant (g) and number of fruits per plant showed low heritability estimates (Table 2). These results are contrary with findings of Panda et al. (1997), Vishalkumar *et al.* (2006) and Ramanjinappa *et al.* (2011).

The high genetic advance (GA) revealed by characters plant height (cm) (9.11) and number of seeds per fruit (7.51), while internodal distance (cm) (0.22) and tender fruit length (cm) (0.70) registered low GA value. Characters viz., plant height (cm) (21.59%) and number of seeds per fruit (16.25) and number of fruits per plant (10.87%) had high and medium values respectively for genetic advance as percent of mean (GAM), however characters weight of fruits per plant (g) (4.45%), days to first flowering (4.58), tender fruit length (cm) (6.53) and days to 50 percent flowering (6.79) expressed low GAM (Table 2). Similar results reported by Prakash *et al.* (2011) and Ramanjinappa *et al.* (2011).

High heritability along with high or moderate genetic advance as percent of mean (GAM) were recorded by plant height (cm), number of seeds per fruit and number of fruits per plant revealed that selection could be effective for these characters. Similar results for plant height were recorded by Pooja *et al.* (2011). Heritability should be considered along with genetic advance as per cent of mean, however it is not necessary that character showing high heritability will also exhibit high genetic advance (Johnson *et al.*, 1995). Characters days to first flowering and days to 50 percent flowering exhibited high heritability accompanied by low genetic advance as percent of mean (GAM) and the high heritability may be due to the influence of environmental condition. Similar results reported by Prakash et al. (2011), however these finding are contrary with Patil *et al.* (1996) and Ramanjinappa *et al.* (2011). Hence, it may be concluded that traits viz., plant height, number of seeds per fruit and number of fruits per plant are considered as suitable to effect selection.

References

Burton, G. W. 1952. Quantitative inheritance in grasses. *Proc. 16th Int. Grassland Congr.*, **1**: 273-283.

Burton, G. W. and Devane, E. M. 1953. Estimation of heritability in tall fescue (*Festica rundinaceae*) from replicated clonal material. *Agron J.*, **45**: 478-481.

Gandhi, H. T., Yadav, M. D. and Navale, P. A. 2001. Studies on variability in okra (*Abelmoschus esculentus* L. Moench.). *J. Maharastra Agric. Univ.*, **26** (2): 146-148.

Johnson, H. W., Robinson, H. F. and Comstock, R. E. 1955. Estimates of genetic and environmental variability in soybean. *Agron. J.*, **47**: 314-318.

K. Prakash, Pitchaimuthu, M., Venugopalan, R., Shivanand Hongal and Jainag, K. 2011. Variability, heritability and genetic advances studies in okra (*Abelmoschus esculentus* L. Moench.). *Asian J. Hort.*, **6** (1): 124-127.

Panda, P., Singh, K.and Singh, K. P. 1997. Genetic variability, Heritability and genetic advance for pod yield and its contributing traits in okra hybrids. *Madras Agric. J.*, **84** (3): 136-138.

Patil, Y. B., Madalageri, B. B.. Biradar, B. D. and Hosmani, R. M.1996. Variability studies in okra (*Abelmoschus esculentus* L. Moench.). *Karnataka J. Agric. Sci.*, **9** (2): 289-293.

Pooja Chaukhande, Chaukhande, P. B. and Dod, V. N. 2011. Genetic variability in okra (*Abelmoschus esculentus* L. Moench.). *Asian J. Hort.*, **6** (1): 241-246.

Rajani, B. and Manju, P. 1997. Variability studies in okra (*Abelmoschus esculentus* L. Moench.). *South Indian J. Hort.*, **45**: 61-62.

Sanjay Kumar, Annapurna, Yogesh Chandra Yadav, and Raghvendra Singh. 2012. Genetic variability, heritability, genetic advance, correlation and path analysis in okra. *Hort Flora Res. Spectrum*, **1** (2): 139-144.

Ramanjinappa, V., Arunkumar, K. H., Ashok Hugar and Shashikhaskar, M. S. 2011. Genetic variability in okra (*Abelmoschus esculentus* L. Moench.). *Plant Archives*, **11** (1): 435-437.

Vishalkumar, M. Patil, G. , Allolli, T. B., Naik, M. K. and Patil, R. S. 2006. Variability studies in okra (*Abelmoschus esculentus* L. Moench.). *Asian J. Hort.*, **2** (3): 208-210.

Table 1. Analysis of variance for quantitative characters in okra

Characters	Replications	Treatments	Error
Days to first flowering	0.64	6.47**	1.39
Days to 50 percent flowering	0.37	13.01**	1.60
Tender fruit Length (cm)	0.28	2.19**	0.97
Internodal al length (cm)	0.021	0.24**	0.11
Plant height (cm)	38.18	136.91**	29.58
Number of seeds/ fruit	20.01	187.23**	72.14
Number of fruits/Plant	0.14	8.46**	4.31
Weight of fruits/Plant (g)	108.97	1218.95*	696.17

*, ** significance at 5% and 1% level respectively

Table 2. Genetic variability parameters for quantitative characters in okra

Characters	Range	Mean	PCV (%)	GCV (%)	h^2 (BS) (%)	GA	GAM (%)
Days to first flowering	42.00-48.00	43.36	4.04	3.00	54.92	1.98	4.58
Days to 50 percent flowering	48.00-55.66	49.57	4.69	3.93	70.26	3.36	6.79
Tender fruit Length (cm)	9.80-14.10	10.85	10.79	5.85	29.37	0.70	6.53
Internodal length (cm)	2.20-3.16	2.72	14.20	7.60	28.65	0.22	8.38
Plant height (cm)	21.60-57.50	42.22	19.14	14.16	54.74	9.11	21.59
Number of seeds/ fruit	30.66-59.33	46.25	22.72	13.39	34.72	7.51	16.25
Number of fruits/Plant	8.73-13.20	10.97	21.74	10.71	24.27	1.19	10.87
Weight of fruits/Plant (g)	97.00-168.13	133.74	20.83	6.71	10.38	5.95	4.45