



CORRELATION STUDIES IN OKRA (*ABELMOSCHUS ESCULENTUS* L. MOENCH) GENOTYPES

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Abstract

The present investigation was carried out with an aim to study the correlation between various morphological traits of okra genotypes. Various morphological parameters *viz.*, days to germination, plant height (cm), number of branches per plant, number of pods per plant, days required for first flowering, days required for 50% flowering, fruit length (cm), fruit weight (g) and yield per plant (g) were recorded. Correlation studies at phenotypic and genotypic level revealed that fruit yield per plant had significant positive correlation with plant height, number of branches and fruit weight.

Key words: Okra, genotypes, morphological traits, correlation

Introduction

Okra (*Abelmoschus esculentus* L. Moench) is one of the popular vegetables of the malvaceae family. It is native to Africa and grown in many tropical and subtropical parts of the world for its tender green fruit. India is the largest producer of okra in the world and it is cultivated extensively round the year (Javed *et al.*, 2009). Its fruits have high nutritive, medicinal and industrial value and export potential. Okra production and productivity is seriously affected by the use of low yielding local varieties, sub optimal plant density, heavy attack of insect pests, diseases and weeds etc. One of major problem in okra cultivation is the selection of low yielding varieties due to which productivity in India is less as compared to other countries leading to heavy yield losses. Higher production of this crop is possible by the cultivation of varieties which show remarkable enhanced returns, compared to other cultivars grown at same climatic conditions and inputs applied. However, productivity could be improved through careful evaluation and selection of proper okra varieties based on location (Deepak *et al.*, 2015). Proper knowledge about association between various yield and yield related traits is essential for improvement of crops through conventional breeding methods. Such characters are controlled by polygenes and influenced by

environmental fluctuations. Pod yield of okra is a complex quantitative trait, which is conditioned by the interaction of various growth and physiological processes throughout the life cycle (Adeniji and Peter, 2005). Correlation analyses are prerequisites for improvement of any crop including okra for selection of superior genotypes and improvement of any trait. In plant breeding, correlation analysis provides information about yield components and thus helps in selection of superior genotypes from diverse genetic populations. In this study, an attempt was made to study the association among characters and the direct and indirect effects of some important yield components on pod yield in okra genotypes by adopting correlation analysis.

Material and methods

Experimental material comprised 10 okra genotypes *viz.*, Mahyco Hybrid 10, Mahyco Hybrid 777, OH 2324, F₁ Hybrid Chhaya, F₁ Farid, F₁ Nirogi, F₁ Nirogi, Rakshya, Super Pratik, Raj Rani and Hari Kranti. All genotypes were evaluated in a randomized block design with five replications at Research Farm of School of Agriculture, Lovely Professional University, Jalandhar, Punjab, during 2016-2017. Cultural and agronomic practices were followed as per the standard recommendations and need based plant protection measures were taken up to maintain healthy crop stand. Observations were recorded

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on five competitive plants excluding border plants in each replication in each genotype for days to germination, plant height (cm), number of branches, number of pods per plant, days required for first flowering, days required for 50% flowering, fruit length (cm), fruit weight (g) and yield per plant (g). The correlation coefficient analysis was performed according to the method suggested by Weber and Moorthy (1952).

Results and Discussion

The genotypic and phenotypic correlation coefficients were computed between various traits under present study for ten genotypes of okra are presented in table 1 and table 2 respectively. The genotypic correlation coefficients were higher in magnitude than phenotypic correlations for most of the characters except for few exceptions indicating inherent genetic association. Correlation analyses are useful for improvement of okra for selection of superior genotypes and improvement of any trait.

A highly positive significant association of plant height was observed with number of branches per plant, fruit weight and yield per plant at both genotypic and phenotypic level. However, a negatively non significant correlation was observed with days required for first flowering, fruit length and days required for 50% flowering. A non significant positive correlation of plant height was observed with days required for germination. Similar results for this trait have been reported by Jaiprakashnarayan and Mulge (2004), Bello *et al.* (2006), Dakahe *et al.* (2007) and Kumar and Reddy (2016).

The trait days required for first flowering showed a highly significant positive correlation with days required for 50% flowering at genotypic and phenotypic level. A positively non significant association of days required for first flowering was observed with number of pods per plant, fruit weight and yield per plant. This result was found in agreement with the findings of Dhankhar and Dhankhar (2002) and Jagan *et al.* (2013). However a negative association of this trait was observed with days required for germination and number of branches. Panda and Singh (1997) and Dwivedi and Sharma (2017) also reported the negative correlation of days to first flowering with number of branches per plant.

Positive and non significant correlation of number of pods per plant was observed with fruit length, days required for 50% flowering, number of branches per plant and yield per plant. The result from the present investigation were in the favour of the finding done by Akinyele and Osekita (2006) and Divya and Sreenivasan (2010).

At phenotypic level a non significant positive correlation of the days required for germination was observed with fruit length, fruit weight and yield per plant. However, at genotypic level positive significant correlation was reported with number of branches per plant and yield per plant. A negative non significant correlation was observed with days required for 50% flowering at both genotypic and phenotypic level. The results from the present investigation were in confirmation with the findings of Dhankhar and Dhankhar (2002) and Jagan *et al.* (2013).

Positive association of fruit length was observed with fruit weight and yield per plant at both genotypic and phenotypic level. Whereas negative correlation of fruit length was found with days required for 50% flowering and number of branches per plant. The similar results for this traits were also reported by Solankey *et al.* (2009) and Jagan *et al.* (2013).

Days required for 50% flowering were found to be negatively correlated with number of branches per plant and fruit weight. However it was found to be positively associated with yield per plant at both genotypic and phenotypic levels. Dhankhar and Dhankhar (2002), Dwivedi and Sharma (2017) and Jagan *et al.* (2013) also reported similar results for this trait. A highly significant positive correlation of number of branches was observed with fruit weight and yield per plant at genotypic and phenotypic level. Fruit weight was found to be significantly correlated with yield per plant. The results for these traits were in the confirmation with the findings of Mehta *et al.* (2006), Mohammad and Marker (2017) and Priyanka *et al.* (2018).

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Table 1: Genotypic correlation between various morphological traits of okra genotypes.

Traits	Height at 30 DAS	Height at 45 DAS	Height at 60 DAS	Height at 75 DAS	Height at Harvesting stage	Day to first flowering	Number of pod/plant	Days to germination	Fruit length	Days to 50% flowering	No. of branches /plant	Fruit weight	Yield per plant
Height at 30 DAS		0.977**	0.949**	0.967**	0.966**	-0.037	0.023	0.433*	-0.322	-0.157	0.996**	0.947**	0.918**
Height at 45 DAS			0.886**	0.902**	0.936**	-0.072	0.189*	0.429*	-0.181	-0.165	0.919**	0.843**	0.954**
Height at 60 DAS				0.970**	0.939**	-0.040	0.197*	0.456*	-0.224	-0.134	0.950**	0.955**	0.918**
Height at 75 DAS					0.975**	-0.079	0.164*	0.346	-0.150	-0.177	0.996**	0.991**	0.871**
Height at Harvesting stage						-0.068	0.029	0.351	-0.149	-0.175	1.000**	0.951**	0.875**
Days to first flowering							0.090	-0.252	-0.670**	1.007**	-0.102	0.041	0.088
Number of pod/plant								0.043	0.082	0.062	0.075	0.314*	0.083
Days to germination									0.184	-0.170	0.369*	0.196	0.277*
Fruit length										-0.644**	-0.149	0.222	0.378*
Days to 50% flowering											-0.200	-0.063	0.008
Number of branches/plant												0.989**	0.850**
Fruit weight													0.830**
Yield per plant													1

*DAS: Days After Sowing, *Significant at 5 per cent level, ** Significant at 1 per cent level

Table 2: Phenotypic correlation between various morphological traits of okra genotypes.

Traits	Height at 30 DAS	Height at 45 DAS	Height at 60 DAS	Height at 75 DAS	Height at Harvesting stage	Day to first flowering	Number of pod/plant	Days to germination	Fruit length	Days to 50% flowering	No. of branches /plant	Fruit weight	Yield per plant
Height at 30 DAS		0.868**	0.843**	0.858**	0.875**	-0.057	0.024	0.219	-0.263	-0.125	0.862**	0.820**	0.826**
Height at 45 DAS			0.876**	0.895**	0.919**	-0.071	0.047	0.221	-0.187	-0.146	0.885**	0.809**	0.934**
Height at 60 DAS				0.949**	0.907**	-0.043	0.151	0.284	-0.249	-0.103	0.891**	0.916**	0.883**
Height at 75 DAS					0.968**	-0.078	0.131	0.193	-0.156	-0.153	0.963**	0.960**	0.863**
Height at Harvesting stage						-0.066	0.016	0.221	-0.147	-0.170	0.971**	0.922**	0.875**
Days to first flowering							0.058	-0.132	-0.645**	0.949**	-0.072	0.042	0.088
Number of pod per plant								-0.281	-0.008	0.092	0.051	0.224	0.057**
Days to germination									0.046	-0.154	0.202	0.157	0.181
Fruit length										-0.606**	-0.152	0.239	0.364*
Days to 50% flowering											-0.186	-0.048	0.007
Number of branches/plant												0.915**	0.822**
Fruit weight													0.806**
Yield per plant													

*DAS: Days After Sowing, *Significant at 5 per cent level, ** Significant at 1 per cent level

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