



ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.03
TPI 2019; 8(3): 303-305
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www.thepharmajournal.com
Received: 11-01-2019
Accepted: 14-02-2019

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Impact of different varieties/hybrids of okra [*Abelmoschus esculentus* (L.) Moench.] on yield and Growth parameters under late sown condition of Malwa region

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Abstract

The present investigation entitled “Evaluation of different varieties/hybrids of okra [*Abelmoschus esculentus* (L.) Moench.] under late sown condition of malwa region” was conducted at the Research Farm of Department of Horticulture, College of Agriculture, Indore (M.P.) during late *kharif* the year 2015-2016. The experimental materials for the present investigation were comprised of fifteen varieties (Parbhani Kranti, Jhilmil, No.55, Shakti, Arya Mohini, Sahiba, NO.64, Okra Hrita, Sarmili, Hisar Unnat, Sonal, Shaan, Cos.2106, Ns-801 Saarika of the okra. These varieties were sown in experimental field in Randomized Block Design with three replications. The genotype Saarika recorded highest yield (142.64q/ha) followed by Ns-801 (138.17 q/ha). Saarika recorded highest plant height (92.68 cm), maximum number of functional leaves ((23.43), maximum leaf area (246.10 cm²) and Leaf length 17.59 cm.

Keywords: Okra hybrid, *Kharif*, growth parameters and fruit yield

Introduction

Okra [*Abelmoschus esculentus* (L.) Moench] Okra is a polyploidy, belonging to the family Malvaceae with $2n = 8x = 72$ or 144 chromosome. According to Vavilov (1951) ^[19], it was probably domesticated in the Ethiopian region. Okra is an often cross pollinated crop, occurrence of out crossing to an extent of 4 – 19% pollination. Okra is cultivated comprehensively in the tropical, subtropical and warm areas of the world like India, Africa, Turkey and other neighboring countries. In India, Okra has occupied a prominent position among the export oriented vegetables because of its high nutritive value, palatability and good post-harvest life. It has an enormous potential as one of the foreign exchange earner crops and accounts for 60 per cent of the export of fresh vegetables. At present, it is being exported to the neighboring countries in the Gulf and South-East Asia, particularly Singapore, Mauritius, Malaysia, Sri Lanka and Bangladesh. Okra is widely cultivated in plains of India mostly in Uttar Pradesh, Bihar, Orissa, West Bengal, Andhra Pradesh, Karnataka and Assam. In India it is being cultivated in 5.33 lakh ha. and its annual production is 6346.0 thousand MT. (Anonymous: 2015). In Madhya Pradesh okra is grown in 26.51 thousand ha area and 305.91 thousand MT. (Anonymous: 2015).

It is a very wide range of adoptable crop and can be grown with considerable success on a wide range of soils and under variable environmental conditions. In India, it is grown twice in a year for getting regular supply. In the country, a large number of okra varieties are grown, the variation occurs with regards to quantitative and qualitative traits. The plant height, number of primary branches per plant, number of fruits per plant, size of fruit i.e. length as well as weight of fruits are the yield contributing characters while, colour of fruit and fiber content determine the quality of fruit. The foremost challenges faced by okra crop are that it is ravaged by many species of insect-pests and diseases throughout its growth period. Among these, jassid, fruit and shoot borer, powdery mildew and yellow vein mosaic are quite serious and major restraining factors in okra cultivation. Another challenge faced how to produce adequate quantity of food from the available acreage to meet the requirements of ever expanding world population. The rate of yield gain in crop improvement programme must be in proportion to the rate of population growth so, as to avoid malnutrition and hunger.

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A lot of okra hybrids/varieties are being grown by the farmer's, but best performing hybrids/varieties of okra having desirable quantitative and qualitative characters such as adaptability to adverse environments and resistance to biotic and abiotic stresses result into better monetary return to the vegetable growers. Keeping in view, it is essential to work out on the appropriate quantitative and qualitative characters of okra crop so that maximum yield and high quality produce can be obtained. It is a common fact that the genotypes performing better under one locality may not be suitable for another locality or region. Hence, the present investigation is proposed to screen out best variety / hybrid of okra for Malwa region. In view of the above facts, the present study in okra entitled "Evaluation of different varieties/hybrids of okra [*Abelmoschus esculentus* (L.) Moench.] under late sown condition of malwa region." has been carried out at Research Farm of Department of Horticulture Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, College of Agriculture, Indore during *Kharif* season, 2015-2016.

Material And Methods

The experiment was laid out in a Randomized Block Design with three replications at the field of the Research Farm of Department of Horticulture, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, College of Agriculture, Indore during *Kharif* season, 2015. The treatments under study were T₁ (Parbhani Kranti), T₂ (Jhilmil), T₃ (No.55), T₄ (Shakti), T₅ (Arya Mohini), T₆ (Sahiba), T₇ (NO.64), T₈ (Okra Hrita), T₉ (Sarmili), T₁₀ (Hisar Unnat), T₁₁ (Sonal), T₁₂ (Shaan), T₁₃ (Cos.2106), T₁₄ (Ns-801), T₁₅ (Saarika). The soil of the experimental field has been grouped under medium black clay soil (Vertisols) and slightly alkaline in nature with pH was (7.6). The average annual rainfall is 941 mm (AICRP, Indore). The south – west monsoon is responsible for the major precipitation. The recommended package of practices was adopted to raise the crop successfully. Observations on weight of fruit, number of seeds per fruit, number of fruit per plant, marketable yield per plot and hectare, unmarketable yield per plot and hectare, total yield per plot and hectare, length, diameter, ridges and keeping quality of fruits were recorded. The mean data were subjected to statistical analysis following standard procedure (Panse and Sukhatme, 1967).

Result and discussion

Plant height (cm) and Number of leaves per plant: The genotype Saarika recorded highest plant height (92.68 cm) followed by Jhilmil No.55 (85.41 cm) as compared to rest of the genotypes. Whereas, genotype Sahiba was recorded minimum (67.62 cm) plant height. Reddy *et al.* (2013) [12, 13].

They studied different genotypes at various places and recorded plant height between the average ranges of 65 to 135 cm. Number of leaves per plant is considered a crucial component for yield in okra because of its usefulness as the facility for photosynthesis. The fifteen okra cultivars varied significantly among themselves with respect to number of leaves per plant. The highest number of leaves was obtained from genotype Saarika (23.43), followed by No.55 (22.60). Probable reason for increased number of leaves is due to the increased rates of photosynthesis and photosynthates supply for maximum growth and apical dominance. These findings are in agreement with Pandey *et al.* (1994) [9], Hazra and Basu (2000) [5], Tiwari and Singh (2003) [18] and Nagre *et al.* (2011) [7]. They studied different genotypes at various places and found number of leaves per plant up to 26.6

Leaf area (cm²), Leaf length (cm) and Leaf Length (cm):

The cultivars differed significantly with respect to leaf area. The genotype Saarika was found significantly superior (246.10 cm²) and which was followed by Sarmili (238.42cm²) as compared to rest of the genotypes. Whereas, the cultivar Cos.2106 was recorded minimum 195.40 cm² leaf area and Leaf length (13.43 cm) These findings are in agreement with the results reported by Pandey *et al.* (1994) [9], Kuwar *et al.* (2003) [6] and Nagre *et al.* (2011) [7].

Fruit yield quintal per hectare (q/ha): The yield of any crop is the final index of the experiment which indicates the success or failure of any treatment, With this view the fruit yield of okra was recorded. The data for the fruit yield per plot under different genotypes were recorded and converted into fruit yield q/ha. The data was analyzed statistically. The fruit yield per hectare as influenced by different genotypes is presented in Table 1 The analysis of variance table showed that okra fruit yield q/ha was significantly affected due to various genotypes. Significantly the highest 142.64 q/ha fruit yield was recorded in the genotype Saarika followed by Ns-801 (138.17 q/ha), Okra Hrita, (135.02) q/ha and Hissar Unnat (129.13 q/ha). Whereas, the genotype Cos.2106 recorded minimum fruit yield per hectare among fifteen genotype. The lower yield of okra genotype was due to rains at initial growth stage and at the time of fruiting. These finding are in agreement with the findings reported by Patil and Ranpise (1998) [11], Bendle *et al.* (2003) [3], Kuwar *et al.* (2003) [6], Tiwari and Singh (2003) [18], Verma (2004) [20], Alam *et al.* (2006) [1], Sachan (2006) [14], Singh *et al.* (2006) [16], Senapati *et al.* (2011) [15], Somashekhar and Salimath (2011) [17], Nwangburka *et al.* (2012) [8] and Reddy *et al.* 2013 [12, 13].

Table no.1 Yield and growth parameters as affected by different genotypes of okra.

Name of genotypes	Source of seed	Plant height (cm)	Number of leaves per plant	Number of branches per plant	Leaf area (cm ²)	Leaf length (cm)	Leaf width (cm)	Fruit yield (q/ ha)
T ₁ Parbhani Kranti	Agri. Uni. Parbhani (MH)	81.23	19.06	11.65	216.22	16.43	23.70	117.64
T ₂ Jhilmil	Shriram Seed	91.36	18.33	11.36	225.14	16.61	21.25	128.41
T ₃ No.55	Mahyco Seed	85.41	22.61	10.29	231.98	16.81	24.13	124.48
T ₄ Shakti	Nunhems	80.47	20.66	11.60	227.54	17.25	22.31	114.13
T ₅ Arya Mohini	Seed Arya Hybrid	75.54	22.53	12.56	202.93	16.50	19.74	124.47
T ₆ Sahiba	RASI	67.62	20.19	10.54	202.63	16.59	20.69	122.04
T ₇ NO.64	Mahyco Seed	73.22	20.35	12.67	208.52	17.12	20.68	125.65
T ₈ Okra Hrita	Arya hybrid seeds (Aurangabad)	81.32	22.10	11.71	212.98	16.44	23.19	135.02

T ₉ Sarmili	Arya hybrid seeds (Aurangabad)	82.26	21.53	12.58	238.42	17.31	19.98	128.52
T ₁₀ Hisar Unnat	(HAU) Hariyana	80.53	19.053	12.83	224.29	16.44	21.02	129.13
T ₁₁ Sonal	Nunhems (Bangalore)	74.16	15.57	12.98	226.16	15.48	22.54	124.13
T ₁₂ Shaan	RASI	77.16	21.81	11.23	232.99	16.60	22.09	119.18
T ₁₃ Cos.2106	(TNAU)	77.80	17.73	9.55	195.40	13.43	19.35	108.86
T ₁₄ Ns-801	Namdhari seeds (Bangalore)	71.99	21.72	12.66	235.10	17.19	22.94	138.17
T ₁₅ Saarika	Namdhari seeds (Bangalore)	92.68	23.43	13.00	246.10	17.59	24.25	142.64
SEm±		2.75	1.27	0.69	1.64	0.70	1.06	2.30
C.D. at 5% level		7.90	3.68	2.02	4.76	2.04	3.08	6.68

Conclusion

Knowledge of the extent of variation among okra cultivars and the nature of the association between characters provide useful information for selecting appropriate procedure for crop improvement. It is revealed from the data obtained, that the significantly highest 142.64 q/ha fruit yield was recorded in the genotype Saarika and which was statistically superior and followed by Ns-801 (138.17 q/ha) and early fruiting in 50 to 51 days after sowing. These were identified as best genotypes in terms of having better growth and yield potentials under Malwa Region agro-climatic region of M.P.

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