



Asian Journal of Plant Sciences

ISSN 1682-3974

science
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Evaluation of Different Cultivars of Okra (*Abelmoschus esculentus* L.) under the Agro-climatic Conditions of Dera Ismail Khan

Farooq Ali Khan, Jalal-ud-din, Abdul Ghaffoor and Kashif Waseem Khan

Department of Horticulture, Faculty of Agriculture, Gomal University, Dera Ismail Khan, NWFP, Pakistan

Abstract: Five different cultivars of okra viz. (penta green, pusa sawani, local cultivar, pusa green and clemson) were evaluated for their performance under the agro-climatic conditions of D.I.Khan. Minimum number of days to flowering (36.33), maximum pods per plant (43.42), highest pods weight per plant (446.23 gm) and in return the maximum yield of the pods (17.85 t ha⁻¹) were obtained from the pusa green cultivar. Different parameters like days taken to germination, pod size and number of pods per plant remained non-significant for different okra cultivars.

Key words: Okra, *Abelmoschus esculentus* L. pod length, plant height, pod weight, yield

Introduction

Okra (*Abelmoschus esculentus* L.) belonging to the family Malvaceae, is a popular warm seasoned vegetable and is grown commercially in many parts of the world. It is consumed as fresh as well as canned product. Okra cultivars may be classified on the basis of plant height, plant size, pod shape and pod color. All the popular cultivars have spineless pods in fresh form and the pod color ranging creamy white to dark green. It is usually sown from mid March to the mid of April. Approximately 15-20 kg ha⁻¹ seed is used for this crop. The area under its cultivation was 45 hectares with the production of 361 tones in the year 1999-2000, in Dera Ismail Khan district.

Some local cultivars have been cultivated in Dera Ismail Khan for the last several decades. But these cultivars didn't give the reasonable yields and are also affected by different insect pests and various diseases. So there is an intense need to introduce some new cultivars with higher yields and quality products. Blennerhassett and El-Zeftawi (1986) reported that clemson, spineless, dwarf GLP and penta green gave the highest yields. They also reported that cultivars penta green yielded most consistently between years. Khan (1986) reported that perkins dwarf was much more superior than clemson in germination %age, number of fruits, fruit weight (gm), fruit length (cm) and plant height (cm). Wazir *et al.* (1988) reported maximum germination %age and minimum number of days to first flowering in perkins dwarf. Largest pod size (cm) and maximum pods per plant was recorded in T-13, while the maximum pod weight (gm) was recorded in clemson. Singh *et al.* (1993) observed KS-381, KS-114 and KSL-380 as okra cultivars resistant against *Meloidogyne incognita* (Root Knot Nematode). Demrany and Faraq (1994) reported that bolady was the earliest flowering cultivar and produced the most pod/plant and the greatest total yield. Jan *et al.* (1999) reported that MI-5 and Arka Abhay showed very poor performance in terms of pods per plant, pod size, pod weight and hence caused lower yields. Khan *et al.* (2001) also reported that pusa green gave the best results under the climatic conditions of D.I.Khan, as maximum pods per plant (43.42), highest pods weight per plant (446.23 gm) and in return the maximum yield of the pods (17.85 t ha⁻¹) were obtained from the pusa green. In view of the above-mentioned facts, five okra cultivars have been studied and tested under the agro-climatic conditions of D.I.Khan.

Materials and Methods

The research project on the evaluation of different cultivars of okra under the agro-climatic conditions of D.I.Khan was conducted at Horticulture Research Area, Faculty of Agriculture, Gomal University, D.I.Khan. The experiment was laid out in randomized complete block design using 5 different okra cultivars viz. penta green, pusa sawani, local cultivar, pusa green and clemson, as main factor. The net plot size was kept 3 x 2 m². The seeds of okra were sown at a distance of 30 cm on the rows 75 cm apart.

Two seeds were sown on each spot to acquire adequate germination. Nitrogen, phosphorus and potassium were applied at the rate of 130 + 80 + 80 kg ha⁻¹ each. The sources of NPK were urea, triple super phosphate (TSP) and potassium sulphate (SOP). All the cultural practices were remained uniform for all the experimental plots. Following parameters were recorded during the course of study. Days to germination, days to flowering, pod size (cm²), plant height (cm), number of pods per plant, weight of pods per plant (g) and yield of pods (t ha⁻¹). The statistical analysis was performed by using ANOVA techniques (Steel and Torrie, 1984), while DMR test (Duncan, 1955) was adopted to detect the statistical different treatment means.

Results and Discussion

Days taken to germination: The non-significant variations were observed amongst the different okra cultivars for days taken to germination (Table 1). Plots where the okra cultivar pusa sawani was planted took the minimum number of days (7.33) to germination. This might be due to the proper utilization and use of nutrient, which boosted up the performance of okra seeds. As there were no significant variations among the treatment means, the local variety took the maximum days (8.67) to germinate their seeds, closely followed by pusa green with 8.33 days. Khan *et al.* (2001) also reported the non-significant results for days taken to germination in okra.

Days taken to flowering: The data pertaining to number of days taken to flowering showed a significant behavior (Table 1). Maximum number of days (48.33) to flowering was taken by pusa sawani followed by penta green and clemson with 45.00 & 44.33 days, respectively and the both cultivars were statistically at par with each other. Whereas, pusa green took 36.33 days to give the flowers was remained minimum among the other treatments. The results are in resembles with that of Wazir *et al.* (1988) who also stated that pusa sawani took the maximum number of days to flowering.

Pod size (cm²): The economical part of the okra crop is its pods. Okra pods are used as a fresh vegetable and used in our daily diet. Although, the results for okra pod size remained non-significant. Maximum pod size (17.96 cm²) was achieved by pusa green. Very minute differences were checked among the treatment means because of all the cultivars under study were the most productive and uniform cultivars, as clemson and penta green provided the pod size of 17.86 and 17.83 cm², respectively. These results coincide with the findings of Jan *et al.* (1999) who stated that pod size of okra cultivars in our conditions showed poor results.

Plant height (cm): Results on the plant height (cm) showed the significant variations for all the varieties of okra. Maximum height (99.67 and 99.63 cm) was recorded in pusa green and clemson showing the similarity in case of the plant height between the two

Khan *et al.*: Evaluation of okra varieties

Table 1: Data regarding yield and yield parameters of different okra cultivars

Cultivars	Days to germination	Days to flowering	Pod size (cm ²)	Plant height (cm)	Pods/plant	Weight of pods/plant	Yield of pods (t ha ⁻¹)
Penta green	8.00	45.00b	17.83	91.00b	33.63	401.63ab	16.07ab
Pusa sawani	7.33	48.33a	17.30	85.00c	33.34	383.17bc	15.33bc
Local cultivar	8.67	40.67c	17.46	97.20a	40.60	341.60c	13.66c
Pusa green	8.33	36.33d	17.96	99.67a	43.42	446.23a	17.85a
Clemson	8.00	44.33b	17.86	99.63a	36.43	416.67ab	16.67ab

NS = Non-significant Means with different letters differ significantly at P < 0.05

cultivars. Hussain (1980) also reported that pusa green is the tallest cultivar of Okra. Khan (1986) observed that the clemson is one of the good height producing cultivars of okra. But the local variety was also highly competed with these two. The results of these three cultivars were statistically at par with each other and also remained non-significant among each other. Pusa sawani was a short height cultivar. It might be due to its varietal nature. The results coincide with the findings of Demrany and Faraq (1994) who stated that different okra cultivars showed varied plant heights with various N doses.

Number of pods per plant: The results show the non-significant differences in the number of okra pods per plant for various cultivars (Table 1). However, the maximum number of pods per plant (43.42) was recorded in the plots where pusa green was sown followed by the local cultivar, which produced 40.60 pods per plant. The minimum pods per plant were noted as 33.34 from the plots where pusa sawani was sown and it was very closely followed by penta green, which gave 33.63 pods per plant. Probably it might be due to their natural characteristic or it might be due to the non-adaptation with the climatic and soil conditions of the area. These findings are in resemblances with the results obtained by Wazir *et al.* (1988), who also stated that pusa sawani had the lowest number of pods per plant. Jan *et al.* (1999) also reported that number of pods per plant had a non-significant effect on different varieties of okra.

Weight of pods per plant (g): Statistical analysis of the data revealed significant differences among the various treatment means of the okra cultivars (Table 1). Maximum weight of pods per plant (446.23 g) was recorded in the pusa green plots followed by clemson and penta green with the pod weight of 416.67 and 401.63 g, respectively. Statistically all these three cultivars were at par with each other. Whereas, the minimum pods weight was observed as 341.60 g, in local variety of okra though producing more number of pods but the weight of pods was stumpy. It was closely followed by pusa sawani with 383.17 g weighed pods, both the varieties were at par to each other. The results are supported by those the findings of Wazir *et al.* (1988) who reported that maximum pod weight 742.32 g were recorded in the clemson.

Yield of pods (t ha⁻¹): The analysis of the treatment means revealed significant differences for different okra cultivars. Fresh pods are the economic portion of the okra. Different cultivars gave almost similar trend as it was in the case of pods weight. Maximum yield (17.85 t ha⁻¹) was recorded in the treatment where pusa green was sown. It was followed by 16.67 and 16.07 t ha⁻¹ yield obtained from clemson and penta green, respectively.

The results of these three cultivars were statistically at par and also non-significant among each other. Minimum pods yield was observed as 13.66 t ha⁻¹, from the local variety of okra, followed by pusa sawani with 15.33 t ha⁻¹ yield of pods. The results are in agreement of the findings of Hussain (1980) in which he stated that pusa green is one of the leading cultivar of okra producing high yields of pods. Khan *et al.* (2001) also reported the same results that pusa green is the highest yield producing cultivar, closely followed and at par with clemson and penta green. In conclusion pusa green is the variety with maximum pods per plant, highest pod weight per plant and maximum yield of pods and therefore is recommended for sowing under the agro-climatic conditions of Dera Ismail Khan.

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