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Response of Different Cultivars of Okra (*Abeknoschus esculentus* L.) To Three Different sowing Dates in the mid Hill of Swat Valley

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Abstract: Field experiment was conducted to evaluate 4 okra varieties, T-13 (check), Super Green, Pusa Green and Green Tech sown on 3 different dates, 10th May, 25th May, and 10th June, 1998. It was found that variety, T-13, sown on May 25, 1998 gave significantly highest plant population percentage of 199.661. Variety, Green tech, sown on June 10, 1998 took more day's 148.331 from sowing to 1st flowering and remained the tallest variety at first & last picking with 58 & 167 cm plant height when sown on May 25, 1998. Variety, T-13 (check), gave long edible fruits of 10 cm. While significantly highest yield of 15.68 t ha⁻¹ was obtained from variety, T-13 (check), sown on May 25, 1998.

Key words: Okra (*Abelmoschus esculentus* L.) different cultivars, sowing dates, yield, Agro-climatic condition of Swat Valley

Introduction

Response of okra varieties to different sowing dates. Okra (*Abelmoschus esculentus* L.) belongs to the family Malvaceae. Okra originated in tropical Africa, was grown in Mediterranean region. Its wild forms are also found in India. It is now grown in all parts of the tropics and during the summer in the warmer parts of the temperate regions. Okra is delicious and popular summer vegetable. The young tender pods of okra are cooked in curries, stewed and used in soup called gumbo soups. A large portion of crop is processed by canning, freezing or Preserving in brine for future use in canned soups. When ripe the black or brown white- eyed seed are sometimes roasted and used as substitute for coffee. The stem of okra plant provides fiber which is used in the paper industry (Baloch, 1994).

Okra is a herbaceous shrub like dicotyledonous annual plant growing to height of 1-2 m. It has alternate Palmate leaves with reticulate venation. The flowers are hermaphrodite and actinomorphic. The flowers have five sepals and five large yellow petals with purple area covering the base. The fruits, which are harvested, immature are pale green, green or purplish pods and in many cultivars are ridged.

Okra has high nutritive value. In 100 gm edible portion, it contains 88 g water 25 cal energy, 2 g protein, 0.1 g fat, 2.7 g carbohydrate, 660 mg vit. A, 0.2 mg vit.131, 0.06 mg Vit.132, 1.0 mg niacin, 44 mg vit.c, 81 mg Lucien, 70 mg lysine 49 mg methionine + cystine, 79 mg phynylalaline † tyrosine, 49 mg threonine, 12 mg tryptophan and 66 mg valine (Yamaguchi, 1983).

The total area under okra in NWFP was 2151 hectares with total production of 19098 tones in which Malakand division contributed an area of 466 hectares with a total production of 4788 tones during 1998 (Anonymous, 1998).

In NWFP., it is usually sown from Mid of March to Mid of May. The seeds are sown 2-3 cm deep on ridges, which are about 50-80 cm apart. Plant to plant distance is kept 20-30 cm. Approximately 18-20 kg of seed per hectare is required. The land holdings in Malakand Division are very small. The population rate is increasing while the cultivated land decreased due to division of families, construction of new buildings, soil erosion etc. To feed the increasing population there is a need to increase yield per unite area. There is great pressure on the cereal grains. The proper use of vegetables can minimize the said pressure to a greater extent as well as help in the vitamins and mineral needs of human feed. The main

constraint in its production in the division are the use of primitive cultivars, conventional methods of production, ignorance of growers regarding plant protection etc.

Different cultivars require different sowing times and if a good cultivar is sown at proper time it may give maximum yield. Therefore, proper and suitable date of sowing is critical to increase the crop production. Generally, the farmers of the area are using old cultivars with their traditional methods of sowing which results in low yields.

Therefore, this study has been arranged to select desirable cultivar/cultivars for higher yield and optimum time of sowing to increase production per unit area.

Materials and Methods

The experiment was laid out in split plot design with 12 treatments replicated 3 times. Plot size was 3 × 1.5 m. Row to row and plant to plant distances were 75 and 20 cm respectively.

The cultivars Super Green, Pusa Green, Green Tech and T-13 (check) wore sown on ridges on three different dates May, 10, 1998, (D1) May, 25, 1998 (D2) and June, 10, 1998 (D3) with fifteen days interval. Before sowing land was well prepared. Farmyard Manure (FYM) was applied at 40 cart load/ha after ploughing. While chemical fertilizers, NPK was also applied at 120:90:60 kgi/ha. Halt of nitrogen phosphorus and potash was applied during the land preparation and the remaining nitrogen was applied at the time of earthing up. Cultural practices such as weeding, hoeing, earthing up, irrigation and sprays against insects pests and diseases were done according to the recommended schedule.

The following parameters data were recorded and analyzed statistically:

1. Population percentage data.
2. 1st flowering (number of days from sowing).
3. Average plant height at 1st picking (cm).
4. Average length of edible fruits (cm).
5. Average plant height at last picking (cm).
6. Fresh yield t ha⁻¹.

Before sowing, soil samples of the experimental site were taken randomly from different parts of the field and were analyzed in Soil & Water Testing Laboratory, Soil Fertility Section at Agriculture Research Station, Mingora Swat, for physico chemical characteristics (Table 1).

Table 1: Physico chemical characteristics of the experimental site

Textural class	Silty clay loam
CaCO ₃	4.92%
Organic matter	1.5%
Nitrogen	0.075%
P ₂ O ₅	10.8 ppm
K ₂ O	104.6 ppm
PH	7.1

Results and Discussion

The results obtained during the experiment are presented parawise as under:

Population percentage: Survival being a polygenic trait is directly proportional to the population %age. In each genotype it is influenced by the physiological activities but the diversity in its expression is generally governed by the prevailing seasonal changes is reported to play significant role in the expression of various agronomic traits in okra (Blennerhassett and El-Zaftawi, 1986; Gupta and Srinivas, 1981; Planasamy *et al.*, 1986).

The data pertaining to population percentage (Table 2) showed that, dates of sowing significantly affected the survival percentage at 5% level of significance. The interaction of dates and cultivars was non-significant. However, it is clear from the results that maximum population percentage (99.6%) was recorded in variety T-13 (check) shown on May, 25, 1998, and lowest population percentage was given by the sowing date of May 10, 1998 with cultivar, super Green. These results are in conformity with the findings of Gadakh *et al.* (1990), who reported that variation in sowing dates causes changes in seedling emergence, their survival and vigor of the seedlings.

First flowering (number of days from sowing): Days to flowering in okra is also an important character. The data Table 2 regarding days to flowering revealed that both the cultivars and sowing dates were significant at 5% level of probability. Moreover, minimum days to flowering were (42.3) in cultivar, T-13 sown on May, 25 and maximum days (48.3) were recorded in cultivar, Green Tech, sown on June 10, 1998. These results agree with that of Iremiren and Okiy (1986) who reported that growing response of okra to different sowing dates is not uniform. However, his findings regarding (number of days from sowing) confirm our results which show that the field sown earlier will blossom soon.

Average plant height at first picking (cm): Plant height is the desired trait in okra for the farmers. The cultivars taken in these studies are of comparable height. However, as it is clear from the data (Table 2) that early sowing produced taller plants than late sowing. Maximum plant height (58.0 cm) was recorded in cultivar, Green Tech, sown on May, 10 while minimum plant height was noted in cultivar, Super Green, sown on June, 10, 1998. Results of similar pattern have been reported by a number of agricultural scientists. Iremiren and Okiy (1986) cultivated okra from first April to first June with 14 days interval in Nigeria and reported that early sowing resulted in more vigorous plants as compared to late sowing. Similarly Gorachand *et al.* (1990) observed that okra sown in April produced the highest plants with more yield as compared to the seed sown during the month of June.

Average length of edible fruit (cm): The data (Table 2) pertaining to length of edible fruit revealed that all the cultivars significantly vary at 5% level of probability. It is clear that the length of fruit was maximum (10.0 cm) in cultivar, T-13, and minimum (6.3 cm) in cultivar, Super Green. The response of different cultivars to various sowing dates was not the same. The average fruit length was 9.33, 10 and 8.67 cut in the plots sown on May, 10 May, 25 and June, 10, 1998. Planasamy *et al.* (1986) reported that the quality of okra can be manipulated through the variation in sowing dates. Results of the same nature have been reported by Mondal *et al.* (1989) and Pandita *et al.* (1991).

Average plant height at last picking (cm): Plant height is a desired trait for the farmers. It is clear from the data (Table 2), that the early sowing produced taller plants than the later one. In this case maximum plant height (167 cm) at last picking was recorded in cultivar, Green Tech, sown on May, 25 while minimum (143 cm) was recorded in, Super Green, sown on June 10, 1998. The results of similar pattern have been reported by a number of researchers. Gorachand *et al.* (1990), observed that okra sown in April produced the highest plants with more yield as compared to the seed sown in June.

Fresh yield data t ha⁻¹: The data (Table 2), pertaining to fresh yield, revealed that both cultivars and date of sowing were significant, while their interaction was non-significant

Table 2: Showing means data on various aspect of response of different cultivars of okra to three different sowing dates on the mid hilt of swat valley

Treatment Cultivars/Dates	Pop: % age	1st flowering No. of days from, sowing	Avg. plant height at 1st picking (cm)	Avg. length of edible fruit in lcm)	Avg. plant height (cm) at last picking	Fresh yield data t ha ⁻¹
Super Green x 10 May 1998.	95.00	43.00	56.00	7.33	145	12.35
Pusa Green "	96.00	44.33	56.67	8.33	160	15.13
Green Tech "	96.33	48.00	58.00	8.00	167	10.55
T-13 (Check) "	97.33	43.67	57.00	9.33	162	14.71
Super Green s 25 May 1998.	99.00	42.67	55.00	8.33	154	13.91
Pusa Green "	99.33	43.67	56.00	8.67	162	14.28
Green Tech "	98.33	46.67	56.33	8.67	167	12.97
T-13 (Check)"	99.67	42.33	56.67	10.00	164	15.68
Super Green x 10th June 1998.	97.00	44.00	53.33	6.33	143	9.84
Pisa Green "	96.67	45.33	54.67	7.33	154	13.64
Green Tech "	96.67	48.33	55.67	7.67	166	8.04
T-13 (Check) "	97.67	45.00	55.00	8.67	161	12.60
LSD at 5% (Dates).	1.035	0.5682	0.6371	0.5398	N.S	0.7648
LSO at 5%(Cultivarsi.	NS	1.313	1.180	0.9083	0.05159	0.5386
LSD at 5% (Interaction).	N.S	N.S	NS	NS	N.S	N.S

at 5% level of probability. Maximum fresh yield (15.68 t ha^{-1}) was recorded in variety T-13 (check), sown on May 25, 1998 while minimum (8.04 t ha^{-1}) was recorded in variety, Green Tech, sown on June 10, 1998. Results of similar pattern have been reported by a number of workers. Bhuiabhar *et al.* (1989) obtained the highest yield from cultivar, Pusa Sawani, sown on July 4. Similarly Ghanti *et al.* (1991) got highest yield from okra crops sown on April 14th.

Conclusion: On the basis of the results recorded in this experiment, conclusion and recommendations can be generalized. It is concluded that Variety, T-13 (Check) was high yielding cultivar amongst the other three cultivars Pusa green, Super green, and cultivar Green Tech was at the bottom in this regard.

According to the above results 25th May, is the best time of sowing for okra crop in this *area*. So it is therefore, recommended that cultivar T-13 may be sown on 25th May under the agro-climatic condition of Mingora Swat.

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