Research Article

Effect of sowing dates on the yield and seed production of Okra cultivars in Mansehra

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Abstract

Generally, the farmers are realizing low yield due to many reasons such as, use of primitive cultivars, conventional sowing methods, improper sowing time, imbalanced fertilization, weeds infestation and ignorance of plant protection measures etc. Therefore, present study was undertaken to determine high yielding cultivar (s) as well as the most suitable sowing date to maximize per unit production. To monitor the effect of different sowing dates on the yield and seed production of okra cultivars, an experiment was conducted at Agricultural Research Station, Baffa Mansehra during 2008. Six cultivars of okra i.e. Irka, Sabz Pari, Pusa Green, Pusa Sawani, Sarhad Green and Green Star were sown on three different sowing dates with 15 days interval i.e. 15th March, 30th March and 14th April, 2008. Maximum number of pods plant⁻¹ (32.12), pod length (11.12 cm), pod diameter (1.54 cm), pod weight (15.24 gm), plant height (184.28 cm), number of branches plant⁻¹ (9.12), pod yield (16.24 t ha⁻¹), seed yield (1601.92 kg ha⁻¹) and 1000-seed weight (86.92 gm) were recorded in cultivars, sown on 30th March, 2008. Maximum number of pods plant⁻¹ (32.75), pod length (11.57 cm), pod diameter (1.67 cm), pod weight (16.04 gm), plant height (187.17 cm), number of branches plant⁻¹ (9.25), pod yield (17.50 t ha⁻¹), seed yield (1735.00 kg ha⁻¹) and 1000-seed weight (89.32 gm) were recorded in cultivar Sabz Pari. Sowing of okra cultivar Sabz Pari on 30th March is recommended for realizing maximum fresh pod and seed yields under the agro-climatic conditions of Mansehra District.

Key words: *Abelmoschus esculentus* L.; genetic characteristics; sowing dates; okra cultivars; crop productivity.

Introduction

Okra or Lady's finger (*Abelmoschus esculentus* L.), locally known as Bhindi, belongs to the family Malvaceae. It originated in tropical Africa and was also grown in Mediterranean region and its wild forms are found in India. It is now grown in

all parts of the tropics and during the summer in the warmer parts of the temperate region [1]. It is a popular summer vegetable in Pakistan and is especially valued for its tender and immature pods, which are rich sources of vitamins, calcium, potassium and other minerals. The marketable size of pods

ranges 3 to 5 inches in length and is considered optimum for consumption. Plant growth and yield are both adversely affected if the pods are not harvested when young on regular basis. The average yield of green pods is about 8-10 tons ha⁻¹ [1] which is very low as compared to other developed countries of the world, where yield could reach as high as 30 t ha⁻¹. [2] For seed production, the pods are allowed to dry on the plant, harvested periodically to avoid shattering of seed, and sun dried and threshed. The seed is dried to 8 percent moisture and stored in a dry cool place. Under normal storage conditions, seed remains viable for two years or so [3]. Different cultivars require different climatic condition as well as different sowing time and a good cultivar when sown at improper time give poor yield [4]. Therefore, proper date of sowing of a suitable cultivar is critical for enhancing crop productivity.

Generally, the farmers of the Mansehra District are realizing low yields due to many reasons such as, use of primitive cultivars, conventional sowing methods, improper sowing time, imbalanced fertilization, weeds infestation and ignorance of plant protection measures etc. Therefore, present study was undertaken to determine high yielding cultivar(s) as well as the most suitable sowing date to maximize per unit production.

Materials and Methods

The experiment was conducted at Agricultural Research Station Baffa Mansehra during 2008. The experiment was laid out in randomized complete block (RCB) design with split plot arrangements. There were two factors in the experiment viz. sowing dates and cultivars. Three sowing dates with 15 days intervals i.e. SD1 = 15th March 2008, SD2 = 30th March 2008 and SD3 = 14th April 2008 were assigned to main plots. Six different okra cultivars i.e. V1 = Irka, V2 = Sabz Pari, V3 = Pusa

Green, V4 = Pusa Sawani, V5 = Green Star and V6 = Sarhad Green were assigned to sub-plots. There were eighteen treatments of different combination and each was replicated three times. Each plot was 9 m² (5 x 1.8m²) having 3 rows, each 5 meter long and 60 cm apart. Plant to plant distance was 20 cm. Before sowing of crop, the land was prepared thoroughly and nitrogen, phosphorus, and potash @ 120–90–60 kg ha⁻¹ was applied in the form of urea, triple super phosphate and potassium sulphate respectively. All phosphorus, potash and ½ nitrogen was applied at the time of sowing while remaining ½ nitrogen was applied at the time of hoeing / earthing up. Sowing was done on ridges by putting three seeds per hill 20 cm apart, on different sowing dates. When the seedlings were 6 cm tall, thinning was done to leave one per hill in order to maintain the required plant population. All the recommended cultural practices were done uniformly in all the treatments. During the course of experiment, the data was recorded on number of pods plant⁻¹, pod length (cm), pod diameter (cm), pod weight (gm), plant height (cm) at maturity, pod yield (t ha⁻¹), seed yield kg ha⁻¹ and 1000-seed weight (gm). The data were statistically analyzed using analysis of variance technique, Least Significant Difference (LSD) test was used to compare the treatment means at 5% level of significance.

Results and Discussion

Means values of the data recorded on various growth and yield parameters are presented in Table-1. The data revealed that sowing dates and cultivars significantly affected the growth and yield parameters, while their interaction was non-significant.

Number of pods plant⁻¹

The data presented in Table-1, revealed that maximum number of edible pods plant⁻¹ (32.12) were found in okra cultivars sown on 30th March 2008, while minimum number of edible pods plant⁻¹ (29.02) were

recorded in cultivars sown on 14th April, 2008. It might be due to the reason that 30th March 2008, sowing had longer harvest duration of fresh edible pods than 14th April 2008, sowing. These results are in agreement with the findings of [5] who recorded higher number of pods plant⁻¹ in okra, sown on 1st April as compared to 15th April. Similarly [6] observed the variation of increased fruit number plant⁻¹ in okra with optimum planting. By comparing the mean values of okra cultivars with one another, maximum number of pods plant⁻¹ (32.75) were observed in cultivar Sabz Pari, closely followed by Sarhad Green (31.65), while minimum number of pods plant⁻¹ (27.62) were recorded in cultivar Green Star. Variation in number of pods plant⁻¹ might be due to the genetic characteristics of okra cultivars.

Pod length (cm)

The data presented in Table-1 showed that maximum pod length (11.12 cm) was observed in cultivars sown on 30th March, 2008, while minimum pod length (10.34 cm) was found in cultivars sown on 15th March, 2008. These results are in agreement with the findings of [5] who noticed maximum pod length in okra, sown on 1st April as compared to 15th April. Similarly [7] reported that growing response of okra to different sowing dates is not uniform and found increased pod length in okra sown on 1st April. By comparing the mean values of okra cultivars with one another, maximum pod length (11.57 cm) was noted in cultivar Sabz Pari, closely followed by Sarhad Green (11.03 cm), while minimum pod length (9.69 cm) was recorded in cultivar Green Star. Variation in pod length might be due to the genetic characteristics of different okra cultivars.

Pod diameter (cm)

The data presented in Table-1, showed that maximum pod diameter (1.54 cm) was noticed in cultivars sown on 30th March

2008, while minimum pod diameter (1.42 cm) was found in cultivars sown on 15th March, 2008. These results are in agreement with the findings of [7] who reported that growing response of okra to different sowing dates is not uniform and found increased pod diameter in okra sown on 1st April. By comparing the mean values of okra cultivars with one another, maximum pod diameter (1.67 cm) was recorded in cultivar Sabz Pari, closely followed by Sarhad Green (1.56 cm), while minimum pod diameter (1.32 cm) was noticed in cultivar Green Star. Variation in pod diameter can be inferred to the genetic characteristics of different okra cultivars.

Pod weight (gm)

The data presented in Table-1, revealed that the highest pod weight (15.24 gm) was recorded in cultivars sown on 30th March 2008, while the lowest pod weight (13.48 gm) was found in cultivars sown on 15th March, 2008. These results obtained are in consonance with the findings of [7] who reported that growing response of okra to different sowing dates is not uniform and found increased pod weight in okra sown on 1st April. By comparing the mean values of okra cultivars with one another, the highest pod weight (16.04 gm) was recorded in cultivar Sabz Pari, closely followed by Sarhad Green (15.76 gm), whereas the lowest pod weight (11.62 gm) was recorded in cultivar Green Star. Variation in individual pod weight might be due to the genetic potential of different okra cultivars.

Plant height (cm)

The data presented in Table-1, revealed that maximum plant height (184.28 cm) was observed in cultivars sown on 30th March 2008, while minimum plant height (165.18 cm) was noted in cultivars sown on 14th April, 2008. These results are in accordance with the findings of [5], who reported that plant height was higher in okra, sown on 1st April as compared to 15th April. Similarly

[8] recorded maximum plant height in okra cultivars sown on 28th May, while minimum

in cultivars sown on 8th June. By comparing the mean values of okra cultivars with one

Table-1: Effect of different sowing dates on the growth and yield of various okra cultivars.

Treatments	Number of pods plant ⁻¹	Pod length (cm)	Pod diameter (cm)	Pod weight (gm)	Plant height (cm)	Pod yield (t ha ⁻¹)	Seed yield (kg ha ⁻¹)	1000-seed weight (gm)
Sowing dates								
SD1 = 15 th March	30.35 ab	10.34 b	1.42 b	13.48 b	172.97 b	15.31 b	1553.78 b	78.63 b
SD2 = 30 th March	32.12 a	11.12 a	1.54 a	15.24 a	184.28 a	16.24 a	1601.92 a	86.92 a
SD3 = 14 th April	29.02 b	10.59 ab	1.47 b	14.10 b	165.18 c	14.09 c	1402.36 c	81.34 b
LSD at 5%	1.92	0.59	0.05	1.04	4.34	0.58	55.61	2.97
Cultivars								
V1 = Irka	31.20 abc	10.84 bc	1.49 c	15.09 ab	175.66 bc	15.51 b	1522.36 bc	85.17 ab
V2 = Sabz Pari	32.75 a	11.57 a	1.67 a	16.04 a	187.17 a	17.50 a	1735.00 a	89.32 a
V3 = Pusa Green	30.30 bc	10.66 bc	1.45 c	14.38 b	172.21 c	14.63 bc	1444.22 cd	82.30 b
V4= Pusa Sawani	29.44 cd	10.28 cd	1.37 d	12.74 c	168.53 c	13.96 cd	1391.70 dc	76.89 c
V5 = Green Star	27.62 d	9.69 d	1.32 d	11.62 d	159.90 d	13.11 d	1301.09 c	73.74 c
V6=Sarhad Green	31.65 ab	11.03 ab	1.56 b	15.76 a	181.38 ab	16.57 a	1621.74 ab	86.37 ab
LSD at 5%	2.11	0.62	0.07	1.02	7.58	1.00	116.50	5.28

Means followed by the same letter (s) do not differ significantly from one another at 5% probability level, using LSD test.

another, maximum plant height (187.17 cm) was observed in cultivar Sabz Pari, closely followed by Sarhad Green (181.38 cm), while minimum plant height (159.90 cm) was recorded in cultivar Green Star. Variation in plant height might be due to the genetic characteristics of okra cultivars coupled with environment. These results are in conformity with the findings of [9] who recorded maximum plant height (1.69 m) in okra cultivar Green Tech, and minimum in cultivar Super Green.

Pod yield (t ha⁻¹)

The data presented in Table-1, revealed that the highest fresh pod yield (16.24 t ha⁻¹) was realized when okra cultivars were sown on 30th March 2008, while the lowest fresh pod yield (14.09 t ha⁻¹) was obtained when sown on 14th April, 2008. These results are in

conformity with the findings of [5] who recorded higher fresh pod yield in okra, sown on 1st April as compared 15th April. By comparing the mean values of okra cultivars with one another, it was noted that cultivar Sabz Pari gave the highest fresh pod yield (17.50 t ha⁻¹), followed by Sarhad Green (16.57 tons), whereas the lowest fresh pod yield (13.11 t ha⁻¹) was obtained from cultivar Green Star. Variation in fresh pod yield hectare⁻¹ can be attributed to the genetic potential of various okra cultivars.

Seed yield (kg ha⁻¹)

The data presented in Table-1, revealed that the highest seed yield (1601.92 kg ha⁻¹) was obtained from cultivars sown on 30th March 2008, while the lowest seed yield (1402.36 kg ha⁻¹) was obtained from okra cultivars sown on 14th April, 2008. These results are

in consonance with the findings of [10] who found that sowing of okra on 13th June resulted in maximum seed yield hectare⁻¹ as compared to other sowing dates. By comparing the mean values of okra cultivars with one another, the greatest seed yield (1735.00 kg ha⁻¹) was realized in cultivar Sabz Pari, followed by Sarhad Green (1621.74 kg), while the lowest seed yield (1301.09 kg ha⁻¹) was observed in cultivar Green Star. Variation in seed yield hectare⁻¹ can be inferred to the genetic potential of various okra cultivars.

1000-seed weight (gm)

The data presented in Table-1, showed that 1000-seed weight (86.92 gm) was maximum in cultivars sown on 30th March, 2008, while minimum (78.63 gm) in cultivars sown on 15th March, 2008. These results are in agreement with the findings of [9] who recorded maximum 100-seed weight in cultivars sown on 25th May as compared to other sowing dates. By comparing the mean values of okra cultivars with one another, maximum 1000-seed weight (89.32 gm) was recorded in cultivar Sabz Pari, followed by Sarhad Green (86.37 gm), while the minimum 1000-seed weight (73.74 gm) was observed in cultivar Green Star. These results are in agreement with the findings of [9] who recorded maximum 100-seed weight in cultivar T-13 as compared to other cultivars. Variation in 1000-seed weight can be attributed to the genetic potential of various okra cultivars.

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