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Effect of plant population on growth and yield of okra [*Abelmoschus esculentus* (L). Moench] under Kymore plateau of Madhya Pradesh

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Abstract

An research become carried out within the experimental discipline, department of horticulture, college of agriculture, AKS university, Sherganj, Satna (M.P.). impact of plant population on growth and yield of okra [*Abelmoschus esculentus* (L). Moench] underneath kymore plateau of Madhya Pradesh. four spacing's (S1 - forty x 30 cm, S2 - 50 x 30 cm, S3 - 60 x 30 cm and S4 - 80 x 30 cm). The experiment changed into specified in randomized block design factorial association with 3 replications. outcomes indicated that, assets of nitrogen and plant population had importance have an effect on on increase and yield additives of okra. The impact of various spacing on plant peak (cm), range of leaves per plant, quantity of branches / plant, Days to 50% flowering, number of pods/plant, duration of pods (cm), Diameter of pod (cm), Yield /plant (kg) and total pod yield (t/ha). The obtained consequences indicated that the average most plant peak, range of pod in line with plant and pod duration were recorded in spacing (forty x 30 cm) and common minimum plant top and wide variety of pod per plant have been observed in spacing (80 x 30 cm). common maximum number of leaves according to plant and variety of flower in line with plant had been located in spacing (40 x 30 cm) and average minimal range of leaves consistent with plant and range of flower according to plant had been observed in spacing (80 x 30 cm).

Keywords: Okra, spacing, growth, yield

Introduction

Okra (*Abelmoschus esculentus* (L.) Moench) also known as lady Finger is an economically critical summer vegetable crop that belongs to the family Malvaceae. The crop is pretty popular because of its easy cultivation, reliable yield and adaptability to varying moisture conditions (resistant to drought and water logging) and soil sorts (Maurya *et al.* 2013) [6]. Bhindi fruits are used as a vegetable. the root and stem of bhindi are used for cleaning the Gur or Khand or raw sugar. Its fruits with fibrous stalks are used in paper making industry. Bhindi leaves are used in Turkey for making ready a medicament to sooth or reduce irritation, even as ripe seeds are from time to time roasted and ground as a substitute for coffee. it is also utilized in soups and stews. suitable in particularly low yields and exceptional. With growing plant population, yield in line with unit region increases up to a sure restriction, past which it decreases as sources for plant growth come to be restrained (Paththinige *et al.* 2008) [7]. Similarly, it turned into reported that most excellent plant populace is the important thing element for higher yields, as plant growth and yield are affected by intra and inter row spacing. Distance advocated for planting of okra (branching type) is 60 cm x 30 cm and for non branching kind is forty five cm x 30 cm. at some point of spring summer time with less plant growth these spacings are kept at forty five cm x 20 cm or less. Seed should be sown at a intensity of two.5 cm. recommended nutrients for okra is 25 t/ha FYM, 125 kg N, 75 kg P and 63 kg ok/ha. half quantity of nitrogen and full amount of P and k must e applied as basal dose at the same time as last half of of the N should be given as pinnacle dressing 35-40 days after sowing the seeds. Zinc up to two% as soil software or 2mg/litre of foliar spray of molybdenum @ 20mg/litre foliar spray for growing fruit yield. Irrigation is accomplished at an c language of five-6 days.

Planting patterns play an critical position in enhancing standard productivity of plants as it is probable to have an effect on interception, absorption, penetration and usage of incoming sun radiation. Plant density is any other critical person, which may be manipulated to acquire the most production from in step with unit land place. The finest plant density with right geometry of planting is dependent on variety, its growth dependancy and agro climatic conditions. it is also a truth that special types do not showcase the same phenotypic traits in all of the environmental situations.

Substances AND strategies

A area test entitled impact of plant population on boom and yield of okra [*Abelmoschus esculentus* (L). Moench] below kymore plateau of Madhya Pradesh the prevailing test became carried out all through the Rabi season of 2021-2023 at the experimental subject, branch of horticulture, school of agriculture, AKS college, Sherganj, Satna (M.P.).

The remedies have been compress of 4 spacing (forty x 30 cm, 50 x 30 cm, 60 x 30 cm and eighty x 30 cm). The test became laid out in randomized block design factorial arrangement with 3 replications. The place is situated at the south of Satna at the right bank of the river Satna at Panna road at a distance of approximately 7 km from Satna town. it is located 24.fifty eight range and eighty.82 longitudes and it's far situated at elevation 329 meters above sea stage. The experimental site is fairly level land with Clay soil of uniform fertility fame with high clay and coffee sand percent.

The observations were recorded *viz.*, plant height (cm), wide variety of leaves in step with plant, number of branches / plant, Days to 50% flowering, wide variety of pods/plant, period of pods (cm), Diameter of pod (cm), Yield /plant (kg) and general pod yield (t/ha). The information had been statistically analyzed in keeping with the technique recommended by using Fisher (1950) [4].

Consequences and Discussion

Boom Parameters

Plant peak

From the test, it's far obvious from pooled data at 90 DAS that the most plant height (eighty two.sixty three cm) become discovered in S1 (40 x 30 cm) observed through intermediate

plant height (eighty one.14 cm) was discovered in S2 (50 x 30 cm) and minimum plant peak (seventy eight.94 cm) changed into discovered in S4 (eighty x 30 cm). The findings of this studies are similar with that of Ram *et al.* (2013) [8] and Soni *et al.* (2006) [9] who concluded that mean plant height was maximum in 40 cm observed by 50 cm and minimal plant peak became recorded in 80 cm. (table 1).

Range of leaves consistent with plant

The facts in discovered that the statistical analysis, effect of plant population was located extensive. At ninety DAS, from pooled facts that the most wide variety of leaves in keeping with plant became discovered in S1 (39.sixty nine) (40 x 30 cm) followed via S2 (38.44) (50 x 30 cm) and minimal range of leaves changed into found in S4 (35.forty) (80 x 30 cm). Soni *et al.* (2006) [9] and Madisal *et al.* (2015) [5] also pronounced maximum number of leaves beneath wider spacing.

Variety of internodes in line with plant

it is obtrusive from pooled records at 90 DAS that the most variety of internodes in keeping with plant (19.29) turned into located in S1 (40 x 30 cm) accompanied via wide variety of internodes consistent with plant (18.86) was found in S2 (50 x 30 cm) and minimal quantity of internodes according to plant (17.46) changed into determined in S4 (80 x 30 cm). The findings of this studies are comparable with that of Ram *et al.* (2013) [8] and and Soni *et al.* (2006) [9] who concluded that imply plant top was maximum in 40 cm followed by 50 cm and minimal quantity of internodes in step with plant become recorded in eighty cm. (desk 1).

Number of branches consistent with plant

The statistics in found out that the statistical analysis, effect of plant populace turned into found widespread. At 90 DAS, from pooled facts that the most wide variety of branches consistent with plant turned into observed in S1 (10.53) (forty x 30 cm) observed via S2 (10.46) (50 x 30 cm) and minimal wide variety of branches become found in S4 (nine.sixty one) (80 x 30 cm). The findings of this studies are comparable with that of Maurya *et al.* (2013) [6] and Madisal *et al.* (2015) [5] also pronounced similar outcomes.

Table 1: Effect of plant population on Plant height, Number of leaves per plant, Number of internodes per plant and Number of branches per plant of okra

Treatment	Plant height (cm)			Number of leaves per plant			Number of internodes per plant			Number of branches per plant		
	2021-2022	2022-2023	Pooled	2021-2022	2022-2023	Pooled	2021-2022	2022-2023	Pooled	2021-2022	2022-2023	Pooled
S ₁	84.48	80.78	82.63	41.03	38.35	39.69	20.63	17.94	19.29	11.26	9.79	10.53
S ₂	82.95	79.33	81.14	39.73	37.14	38.44	20.17	17.54	18.86	11.19	9.73	10.46
S ₃	81.59	78.02	79.81	37.56	35.11	36.34	19.27	16.76	18.02	10.59	9.21	9.90
S ₄	80.70	77.17	78.94	36.59	34.20	35.40	18.67	16.24	17.46	10.28	8.94	9.61
S.E.(m) ±	0.10	0.11	0.09	0.30	0.13	0.20	0.10	0.08	0.09	0.11	0.10	0.11
C.D. (5%)	0.29	0.31	0.27	0.80	0.40	0.60	0.27	0.24	0.26	0.32	0.28	0.33

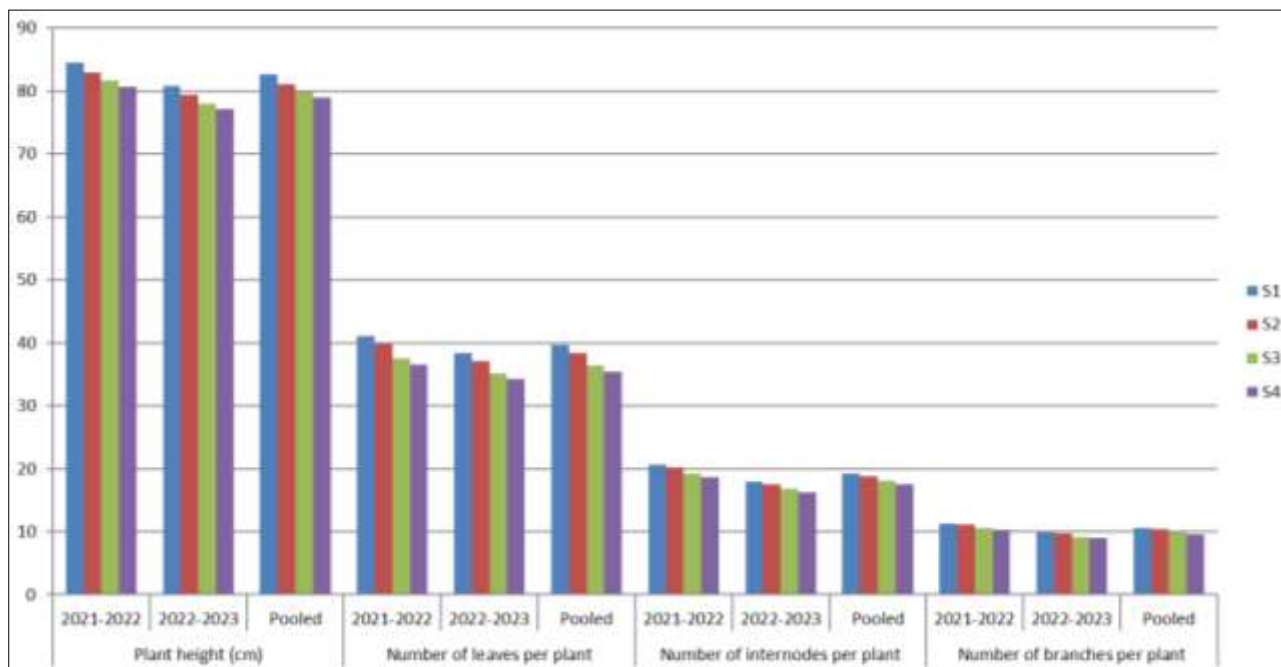


Fig 1: Effect of plant population on Plant height, Number of leaves per plant, Number of internodes per plant and Number of branches per plant of okra

Yield Parameters

Wide variety of pods in keeping with plant:-

it's miles glaring from pooled facts that the maximum range of pods per plant (24.17) was located in S1 (forty × 30 cm) accompanied with the aid of variety of pods according to plant (23.46) turned into located in S2 (50 × 30 cm) and minimum variety of pods in step with plant (21.47) was discovered in S4 (80 × 30 cm). The findings of this research are similar with that of Amjad *et al.* (2001) [1] and Ekwu *et al.* (2012) [2] also reported maximum range of fruits in line with plant at the widest spacing (desk 2).

Period of pods

It's miles obtrusive from pooled information that the most period of pods (13.82 cm) become determined in S1 (40 × 30 cm) followed by using duration of pods (thirteen.38 cm) became observed in S2 (50 × 30 cm) and minimum period of pods (12.57 cm) become determined in S4 (eighty × 30 cm). The findings of this research are similar with that of Ram *et al.*

(2013) [8] and Soni *et al.* (2006) [9] (desk 2).

Diameter of pods

It's far obvious from pooled statistics that the most Diameter of pods (7.thirteen cm) was determined in S1 (forty × 30 cm) accompanied by way of Diameter of pods (6.ninety two cm) become located in S2 (50 × 30 cm) and minimal Diameter of pods (6.45 cm) was discovered in S4 (eighty × 30 cm) (table 2).

Pod yield t/ha

it is glaring from pooled information that the most Pod yield t/ha (eight.53 t/ha) became located in S1 (40 × 30 cm) followed with the aid of Pod yield t/ha (7.ninety t/ha) changed into found in S2 (50 × 30 cm) and minimum Pod yield t/ha (6.sixty eight t/ha) turned into found in S4 (eighty × 30 cm). The findings of this studies are similar with that of Firoz *et al.* (2007) [3] who concluded that mean plant peak become most in 40 cm accompanied by 50 cm and minimal Pod yield t/ha turned into recorded in 80 cm. (desk 2).

Table 2: Effect of plant population on Number of pods per plant, Length of pods (cm), Diameter of pods (cm) and Pod yield t/ha of okra

Treatment	Number of pods per plant			Length of pods (cm)			Diameter of pods (cm)			Pod yield t/ha		
	2021-2022	2022-2023	Pooled	2021-2022	2022-2023	Pooled	2021-2022	2022-2023	Pooled	2021-2022	2022-2023	Pooled
S ₁	26.28	22.05	24.17	14.36	13.28	13.82	7.44	6.82	7.13	9.23	7.82	8.53
S ₂	25.68	21.23	23.46	13.90	12.85	13.38	7.22	6.62	6.92	8.55	7.24	7.90
S ₃	24.66	20.38	22.52	13.06	12.08	12.57	6.91	6.34	6.63	7.88	6.68	7.28
S ₄	23.51	19.43	21.47	14.71	11.76	13.24	6.73	6.17	6.45	7.23	6.12	6.68
S.E.(m) ±	0.06	0.07	0.09	0.05	0.08	0.06	0.04	0.05	0.10	0.02	0.01	0.03
C.D. (5%)	0.17	0.19	0.25	0.15	0.22	0.18	0.13	0.16	0.29	0.05	0.03	0.10

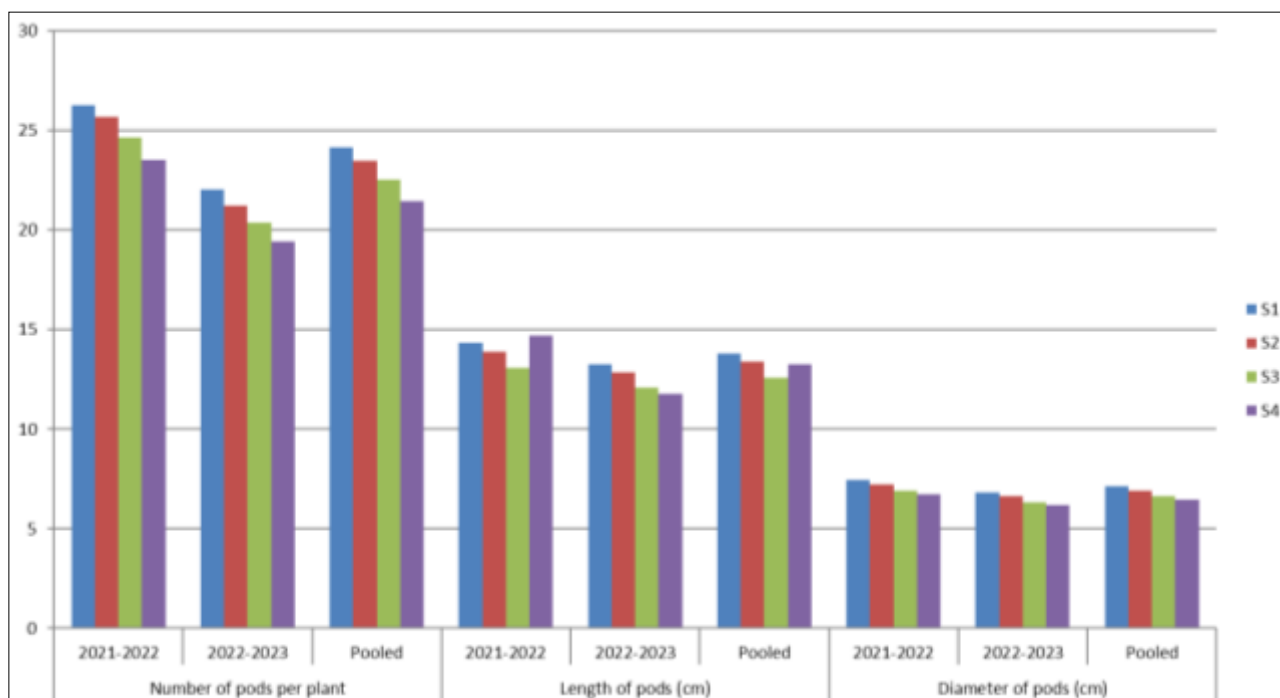


Fig 2: Effect of plant population on Number of pods per plant, Length of pods (cm) and Diameter of pods (cm) of okra

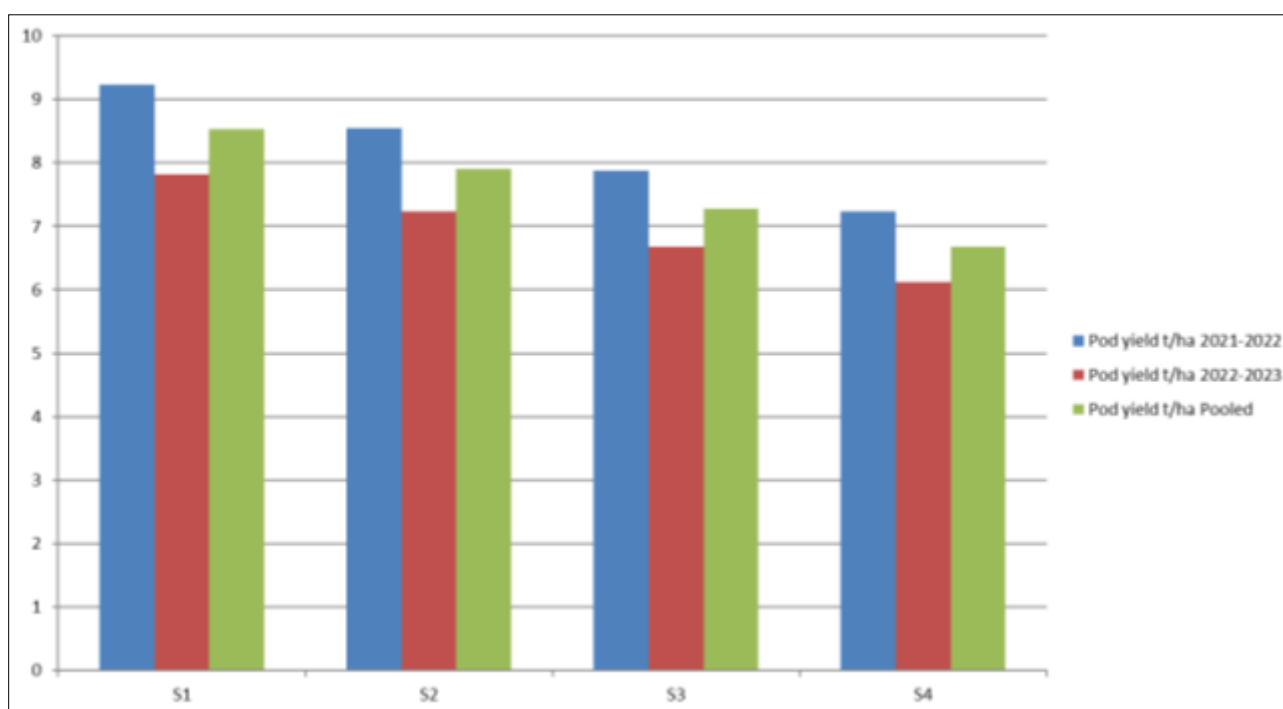


Fig 3: Effect of plant population on Pod yield t/ha of okra

Conclusion

In conclusion, the study investigated various parameters influencing the growth and yield of okra plants under different plant population densities. From the findings, it is evident that plant height, number of leaves, internodes, branches, as well as yield parameters such as number, length, diameter of pods, and pod yield per hectare, were significantly influenced by the spacing between plants. The results revealed that closer spacing resulted in taller plants with more leaves, internodes, and branches per plant, whereas wider spacing led to higher pod yield per hectare with larger and longer pods. These findings corroborate with previous research, indicating the importance of optimal plant population density in maximizing okra yield.

Understanding these parameters can aid farmers in making informed decisions regarding planting densities to enhance productivity and optimize resource utilization in okra cultivation.

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