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Short Note

Influence of spacings and sowing dates on growth and yield attributes of okra (*Abelmoschus esculentus* L. Moench.)

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Under mid hill conditions of Himachal Pradesh, okra is grown during summer and rainy season on limited scale exclusively for supply to local markets, since most of the area under vegetable crops is occupied by tomato, capsicum and cucumber. Comparatively less importance is given to this crop, which calls for standardization of agro techniques as the prices of okra are very high during summer and rainy season. Timely planting, choosing the appropriate spacing and proper fertilization coupled with control over diseases will help in boosting the income of the growers. Agro-techniques for raising a successful off-season crop of okra, therefore, need to be standardized vis-à-vis its impact on yield parameters. In view of this, the present study was undertaken to study the effect of different treatment combinations of spacing and date of sowing on yield and contributing traits in okra.

The present studies were conducted at experimental farm of Dr. Y. S. Parmar University of Horticulture and Forestry, Horticultural Research Station, Kandaghat, District Solan, Himachal Pradesh during 2001. The experiment was conducted in randomized block design with three replications. The treatment combination comprised of two row spacings (S_1= 45 x 15 cm, $S_{2=}$ 60 x 20 cm) and four dates of sowing ($D_{1=}$15 April, $D_{2=}$ 30 April, $D_{3=}$ 15 July and $D_{4=}$ 30 July, 2001). The plot size was kept 3 x 2 meters and all the recommended cultural practices like hoeing, weeding, irrigation, and application of fertilizers and pesticides were followed from time to time to ensure a healthy crop stand (Anonymous, 2005). The observations were recorded on ten randomly selected plants for plant height (cm), branches per plant, Number of fruits per plant, yield per plant (g) and per hecare.The tender pods at marketable maturity were harvested and twenty randomly selected pods were retained for recording data on fruit length (cm) and width (cm). Observations on germination were recorded one week after sowing. The data were analyzed following Panse and Sukhatme (1978). The data presented in Table 1 revealed that germination of seed after sowing was maximum in $S_1 + D_3$ i.e. sowing on 15 July with a spacing of 45 x 15 cm followed by $S_1 + D_4$.This clearly show that germination of seed was more in rainy season as compared to summer season crop. Numbers of branches per plant and fruit width were not influenced by different combinations of spacing and sowing dates. However, number of fruits per plant, plant height and fruit length were significantly influenced by different plant spacings and sowing dates. Maximum number of fruits per plant, fruit length, and plant height were recorded in closest spacing than in wider spacing. Similarly, rainy season sowing dates were favourable for fruits per plant, plant height, and fruit length and fruit width. The treatment combination of row spacing S_1 (45x15 cm) and sowing date D_3 (15 July) gave maximum number of fruits per plant, plant height, fruit length and fruit width followed by closer spacing S_1 (45x15 cm) and sowing date D_4 i.e. 30 July. Minimum values for these characters were obtained with treatment combination of S_2 (60 x 20 cm) and D_1 (15 April). Similar observations have also been reported by Lal (2004). The results also revealed that closer spacing (45 x 15cm) with later sowings (15 July) were significantly favourable for obtaining higher fruit yield per plant and ultimately per hectare. Maximum fruit yield was obtained with a treatment combination of $S_1 + D_3$ followed by $S_1 + D_4$. Similar trend was observed with S_2 treatment combinations. An increase of over 45 per cent more yield was obtained in treatment combination S_1 (45x15cm) and D_3 (15 July)

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Table 1. Effect of spacing and sowing date combinations on morphological characters and yield of okra

Treatments	Germination (%)	Branches/ plant	Fruits/ plant	Fruit length (cm)	Fruit width (cm)	Plant height (cm)	Fruit yield	
							Per Plant (g)	Per ha (q)
S1+D1	64.2	2.8	17.8	19.5	5.6	152.8	238.0	157.0
S1+D2	64.8	2.8	17.6	18.0	5.8	148.2	235.3	155.3
S1+D3	70.3	3.2	18.6	22.5	6.2	176.0	248.6	164.1
S1+D4	68.1	3.0	18.2	20.5	6.2	162.3	243.3	160.5
S2+D1	60.5	1.8	12.8	12.8	4.1	110.1	171.1	112.9
S2+D2	61.2	2.0	14.2	13.5	4.2	120.9	189.8	125.3
S2+D3	62.0	2.6	14.8	16.6	5.2	146.1	197.8	130.5
S2+D4	62.7	2.4	14.6	14.6	5.1	134.5	195.2	128.8
CD (P=0.05)	1.6	NS	2.8	3.6	NS	24.7	36.3	-

S_1= 45 x 15cm, S_2= 60 x 20cm,
D_1= 15 April, D_2= 30April, D_3=15July, D_4=30July

over S_2 (60x20cm) and D_1 (15 April). Similar findings were also drawn by Randhawa (1967) as well as Lal and Singh (1967). From the overall results, it can be inferred that mid July sowing with closer spacing proved to be most favourable for enhancing the yield of okra under mid- hill conditions of Himachal Pradesh.

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