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SV Bhavar

Ph.D. Scholar, Chilli and Vegetable Research Unit, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

SM Ghawade

Associate Professor, Chilli and Vegetable Research Unit, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

VG Lajurkar

Ph.D. Scholar, Department of Horticulture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

RP Gore

Soil Expert, Solarvibes, Germany, Europe

Correspondence

SV Bhavar

Ph.D. Scholar, Chilli and Vegetable Research Unit, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

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Influence of sowing times and fertilizer levels on vegetative growth in kasuri methi (*Trigonella corniculata* L.), under Akola (M. S.) conditions

SV Bhavar, SM Ghawade, VG Lajurkar and RP Gore

Abstract

The present investigation entitled "Effect of sowing time and fertilizer levels on seed yield of kasuri methi (*Trigonella corniculata* L.)" was carried out in the year 2016 – 2017 and 2017-18, at Chilli and Vegetables Research Unit, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. An experiment was laid out in Factorial Randomized Block Design (FRBD) with twenty four treatment combinations. There were two factors of an experiment, first being sowing times with six levels and second was fertilizer doses with four levels and replicated as thrice to study the sowing times and fertilizer levels effect on vegetative growth and seed yield of kasuri methi.

Results of the present investigation revealed that, the vegetative growth observations in terms of plant height, branches per plant and number of leaves were increased with early sowing D₁ (10th October) and the higher fertilizer dose F₄ (50:50:25 kg ha⁻¹ NPK). As regards the interaction effect of sowing times and fertilizer levels, the treatment combination D₁F₄ viz., kasuri methi sown on 10th October and fertilized @ 50:50:25 kg ha⁻¹ NPK produced significantly the maximum vegetative growth as well as seed yield per plot and per hectare, respectively.

Keywords: Sowing times, fertilizer levels, vegetative growth, kasuri methi

Introduction

Trigonella corniculata L. is annual, herbaceous, bushy, slow growing spice crop growing to the height of 60 cm. Leaves are pinnate, leaflets, obovate-cuneate, flowers are hermaphrodite, yellow in colour having close racemes type inflorescence. Pods are 1.2-2.0 cm long, sickle shaped, 4 to 8 seeded. The kasuri methi has a diploid number of chromosomes 2n=16 (Anon., 2004). It is used as food, fodder, medicine and cosmetics. The dried leaves and seeds are the economical part of the plant. Seeds and tender pods are used as spice for pickle preparation. These are also used in indigenous medicines like diuretic, tonic, carminative, astringent, aphrodisiac (Sharma, 2006) [10]. The seeds are aphrodisiac and customarily used for the treatment of colic flatulence, diarrhea, dyspepsia with loss of appetite, chronic cough, dropsy, enlargement of liver and spleen, rickets, gout and diabetes and are good for the elimination of bad breath and bad odor. Also, the importance of fenugreek as seed spice is increasing day by day as its seed are exported in the world market (Rana *et al.*, 2015) [15].

Material and methods

The present investigation was carried out during *Rabi* seasons of 2016-2017 and 2017-18, at Chilli Vegetable Research Unit, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. An experiment was laid out in Factorial Randomized Block Design (FRBD) with twenty four treatment combinations. There were two factors of an experiment, first being sowing times with six levels viz. D₁ (10th October), D₂ (30th October), D₃ (20 November), D₄ (10th December), D₅ (30th December), D₆ (20th January) and another was fertilizer doses with four levels i.e. F₁ (40:40:20 kg ha⁻¹ NPK), F₂ (40:50:25 kg ha⁻¹ NPK), F₃ (50:40:20 kg ha⁻¹ NPK) and F₄ (50:50:25 kg ha⁻¹ NPK) and replicated thrice to study the sowing times and fertilizer levels effect on vegetative growth for seed yield of kasuri methi. Irrigations were given at an interval of 4-5 days, during the whole cropping period depending on the soil moisture conditions. Plot size 2.10 m x 2.00 m, spacing 30 cm x 20 cm and seed was sown on flat bed. Variety Rajendra Abha was used for conducting the experiment. In order to evaluate the effect of different treatments on growth and yield of crop, necessary periodical observations were

recorded and the recorded data was statistically analyzed by ANOVA method given by Panse and Sukhatme (1967) [7].

Results and discussions

Effect of sowing times

It was observed from the data pertaining to Table 1 that, sowing times significantly influenced on different growth parameters viz. plant height, number of branches, number of leaves, seed yield per plot (g) and per hectare (q). Significantly the maximum plant height at 30, 60, 90 DAS (days after sowing) and at last harvest (7.67 cm, 26.92 cm, 58.26 cm and 61.29 cm, respectively) was attained by sowing date 10th October (D₁). While, the minimum plant height at 30, 60, 90 DAS and at last harvest (5.30 cm, 19.64 cm, 44.79 cm and 49.38 cm, respectively) was reported by sowing date 20th January (D₆). Delayed in sowing time directly influences the plant height of kasuri methi. This might be due to the fact that, an early sowing (10th October) reflect in the maximum height. It may be attributed to the desired day length, temperature and relative humidity. As against delay sowing of kasuri methi plant doesn't get above effect of favourable climatic conditions. The similar findings were also reported by Nandre *et al.* (2011) [6], Abou-Shleel (2014) [1] and Meena *et al.* (2018) [5] in fenugreek. As far as the effect of sowing time on number of branches were concerned, it revealed that, crop sown on 10th October (D₁) was recorded significantly the maximum number of branches at 30, 60, 90 DAS and at last harvest (2.00 cm, 5.34 cm, 7.73 cm and 8.47 cm, respectively). However, significantly the minimum number of branches at 30, 60, 90 DAS and at last harvest (0.89 cm, 3.21 cm, 5.05 cm and 6.57 cm, respectively) were attained by sowing date 20th January (D₆). This might be better vegetative growth achieved due to an early sowing (10th October) and congenial climatic conditions availed by the crop during the growth period. The similar findings were also reported by Nandre *et al.* (2011) [6], Sowmya (2016) [11] and Meena *et al.* (2018) [5] in fenugreek. Similarly, from the data pertaining to Table 1 that, significantly the sowing date 10th October (D₁) was reported the maximum leaves at 30, 60, 90 DAS and at last harvest (11.20, 25.30, 107.19 and 120.32, respectively). While, the minimum leaver per plant at 30, 60, 90 DAS and at last harvest (8.45, 19.21, 53.30 and 87.05, respectively) were attained by sowing date 20th January (D₆). This might be due to the fact that, an early sown (10th October) kasuri methi crop received conducive climatic conditions through the growth which would have resulted into luxurious growth and might have produced the maximum leaves per plant. The similar findings were reported by Nandre *et al.* (2011) [6], Abou-

Shleel (2014) [1] in fenugreek, and Anupama (2012) [3] in kasuri methi.

It was also observed from the Table 1 in respect of different sowing dates that, significant effect on the seed yield per plot and per hectare i.e. the maximum seed yield plot⁻¹ (370.77 g) and ha⁻¹ (8.83 q.) were reported by sowing date 10th October (D₁). This might be due to the improvement in overall growth i.e. better vegetative growth with the early sowing date (10th October) coupled with increased net photosynthesis towards reproduction structure, on the other, might have increase the yield attributes like florets per plant, pods per floret and seeds per pod which is effect on more seed yield per plot. Similar results have been recorded by the earlier workers like Nandre *et al.* (2011) [6] and Singh *et al.* (2017^a) [9] in fenugreek.

Effect of fertilizer doses

It is evident from the data presented in Table 1 that, plant height, number of branches per plant, number of leaves per plant at 30, 60, 90 DAS and at last harvest were showed significant differences in respect to fertilizer levels. Significantly, the maximum plant height at 30, 60, 90 DAS and at last harvest (6.81cm, 23.71 cm, 52.56 cm and 56.84 cm, respectively), maximum number of branches (1.62, 4.73, 6.73 and 7.77 respectively) and the maximum number of leaves (10.36, 22.78, 85.74 and 106.81) were produced at fertilizer dose 50:50:25 kg ha⁻¹ NPK (F₄). The plant height, branches plant⁻¹ and leave plant⁻¹ increased significantly with increase in the fertilizer doses at all stages of growth. This might be due to the fact that, availability of primary nutrients through inorganic sources might have enhanced the meristematic activities and size of cell and formation and functioning of protoplasm which consequently improved the number of branches per plant. Similarly, the maximum height of plant might have produced the maximum number of branches per plant and leaves per plant. Similar results were obtained by Deora *et al.* (2009) [4], Sunanda *et al.* (2014) in kasuri methi.

It was also observed from the Table 1 in respect of different fertilizer doses that, significantly effects to the seed yield per plot and per hectare i.e. maximum seed yield plot⁻¹ (297.71 g) and seed yield ha⁻¹ (7.09 q) were reported by fertilizer dose 50:50:25 kg ha⁻¹ NPK (F₄). This might be due to the fact that, an application of required nutrient through inorganic sources might have made availability of the primary nutrients freely and which would have produced more plant height, number of branches, florets per plant, pods per florets which would have resulted into the maximum seed yield per plot and per hectare. Results of present investigation are in close agreement with the findings of Sharma (2006) [10] in kasuri methi.

Table 1: Effect of dates of sowing and fertilizer levels on plant height (cm), branches, leaves plant⁻¹, seed yield plot⁻¹ (g), ha⁻¹ (q) in kasuri methi

Treatments	Plant height (cm)				Number of branches				Number of leaves				Seed yield per plot (g)	Seed yield per ha (q)
	30 DAS	60 DAS	90 DAS	At last harvest	30 DAS	60 DAS	90 DAS	At last harvest	30 DAS	60 DAS	90 DAS	At last harvest		
Dates of sowing (D)														
D ₁ - 10 th October	7.67	26.92	58.26	61.29	2.00	5.34	7.73	8.47	11.20	25.30	107.19	120.32	370.77	8.83
D ₂ - 30 th October	7.37	26.10	57.76	60.42	1.89	5.21	7.51	8.29	11.92	24.56	105.07	118.04	361.85	8.42
D ₃ - 20 th November	6.90	23.57	53.20	57.75	1.68	4.87	6.93	7.91	10.28	23.31	93.63	109.04	305.15	7.27
D ₄ - 10 th December	6.44	22.81	49.82	55.12	1.44	4.48	6.26	7.56	9.71	22.14	77.64	100.34	259.42	6.18
D ₅ - 30 th December	5.85	19.71	45.79	52.14	1.15	3.77	5.36	6.82	9.02	19.87	60.56	91.07	220.88	5.27
D ₆ - 20 th January	5.30	19.64	44.79	49.38	0.89	3.21	5.05	6.57	8.45	19.21	53.30	87.05	189.39	4.51
'F' test	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig
SE(m) ±	0.05	0.22	0.24	0.25	0.04	0.04	0.10	0.04	0.08	0.11	0.63	0.36	3.54	0.08
CD at 5%	0.14	0.63	0.69	0.71	0.11	0.13	0.27	0.11	0.24	0.30	1.79	1.02	10.08	0.24
Fertilizer dose (F)														
F ₁ - 40:40:20 kg ha ⁻¹ NPK	6.39	22.49	50.63	55.14	1.42	4.38	6.22	7.14	9.92	21.96	80.37	101.83	273.58	6.51
F ₂ - 40:50:25 kg ha ⁻¹ NPK	6.51	23.42	51.96	56.30	1.48	4.68	6.57	7.68	10.09	22.55	83.96	105.16	288.33	6.87

F ₃ - 50:40:20 kg ha ⁻¹ NPK	6.65	22.88	51.26	55.78	1.53	4.56	6.36	7.55	10.24	22.31	82.87	103.44	278.69	6.64
F ₄ - 50:50:25 kg ha ⁻¹ NPK	6.81	23.71	52.56	56.84	1.62	4.73	6.73	7.77	10.36	22.78	85.74	106.81	297.71	7.09
'F' test	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig	Sig
SE(m) ±	0.04	0.18	0.20	0.20	0.03	0.06	0.08	0.03	0.07	0.09	0.51	0.29	2.89	0.07
CD at 5%	0.12	0.51	0.57	0.58	0.09	0.16	0.22	0.09	0.20	0.25	1.46	0.83	8.23	0.20
Interaction (D X F)														
'F' test	NS	Sig	Sig	Sig	NS	NS	Sig	Sig	NS	Sig	Sig	Sig	Sig	Sig
SE(m) ±	0.10	0.44	0.49	0.50	0.08	0.09	0.19	0.08	0.30	0.21	1.26	0.71	7.08	0.17
CD at 5%	-	1.25	1.39	1.42	-	-	0.55	0.23	-	0.61	3.58	2.03	20.16	0.48

Conclusion

From the two years experimentations, it could be concluded that, the growth parameters such as plant height, number of branches and leaves per plant as well as yield parameters viz. yield plot⁻¹ and ha⁻¹ were significantly increased with early sowing (10th October) and fertilizer dose applied at the rate of 50:50:25 kg ha⁻¹ NPK (F₄). There is scope to undertake this study for more years for confirmation of the results obtained in present study.

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