



E-ISSN: 2278-4136

P-ISSN: 2349-8234

JPP 2019; 8(1): 1005-1007

Received: 02-11-2018

Accepted: 05-12-2018

SM Ghawade

Jr. Breeder Cum Horticulturist
and Associate Professor of
Horticulture, Chilli and
Vegetable Research Unit,
Dr. PDKV, Akola Maharashtra,
India

Abhilasha P Kharkar

Junior Research Assistant,
Chilli and Vegetable Research
Unit, Dr. PDKV, Akola
Maharashtra, India

DS Phad

Assistant Vegetable Breeder,
Chilli and Vegetable Research
Unit, Dr. PDKV, Akola
Maharashtra, India

SV Bhavar

Junior Research Fellow,
Chilli and Vegetable Research
Unit, Dr. PDKV, Akola
Maharashtra, India

Correspondence**SM Ghawade**

Jr. Breeder Cum Horticulturist
and Associate Professor of
Horticulture, Chilli and
Vegetable Research Unit,
Dr. PDKV, Akola Maharashtra,
India

Studies on economical seed yield of coriander (*Corindrum sativum* L.) as influenced by spacing and sowing time, under Akola condition

SM Ghawade, Abhilasha P. Kharkar, DS Phad and SV Bhavar

Abstract

Appropriate planting time and spacing are the key factors towards production of more seed yield of coriander with high quality. Due to favorable agro-climatic conditions, farmers of Vidarbha region wants to grow coriander crop with diversification of existing cropping pattern of soybean-gram, cotton-chickpea. The experiment was conducted at Chilli and Vegetable Research Unit, Dr. PDKV., Akola, during rabi seasons of three consecutive years, starting from 2014-15 onwards. The experiment was conducted in Factorial Randomize Block Design with fifteen treatment combinations. The different five dates of sowing was first level of an experiment, starting from second fortnight of September i.e. 15th September (D₁), 1st October (D₂), 15th October (D₃), 1st November (D₄) and 15th November (D₅). Another sub factor (S) of spacing with three levels i.e. (S₁) close (30 x 30 cm), (S₂) moderate (45 x 45 cm) and (S₃) wider (60 x 60 cm). The result of the present experimentation reveals that, seed coriander crop sown on 15th October along with 45 X45 cm gave significantly better vegetative growth of the plant. However, significantly the maximum (12.96 q/ha) seed yield, along with good qualitative characters like number of umbels per plant, umbellats per umbel, seeds per umbels, test weight etc. as well as the maximum GMR, NMR and B:C ratio was obtained from the moderate spacing (45 x 45 cm) in between the rows and plant sown on second fortnight of October 15th (D₃S₂) combination.

Keywords: Diversification, GMR, NMR, seed coriander

Introduction

Among the seeds spices, coriander occuppies the top place in terms of area, production and productivity (5.52 lakh hectore, 4.62 lakh tones and 8.37 q/ha, respectively) in India. Rajasthan is major coriander growing state with its share of above 60% in total area and production of country ^[1]. The existing cropping pattern in Vidarbha region is soybean-gram or cotton-pigeonpea followed by gram, which becomes non-profitable as well as pest and disease prone in similar biosphere. The seed production of coriander is not taken in Vidarbha region as a sole crop, but due to appropriate agronomical and climatic conditions, farmers of the region wants to took this venture underrainfed as well as irrigated conditions. The suitable spacing in between rows and plants as well as appropriate time of sowing, which exerts a distinct effect on growth and seed yield of the crop. Further, successfulness of any crop cultivation in commercial way would be possible only if, the temperature and other climatic conditions at critical stages of growth. In Vidarbha, most of the farmers have sufficient facility of irrigation by artificial means, but they want to produced this crop to get maximum economical return with minimum cost of cultivation and under diversification in the cropping pattern.

In view to the above consideration and adequate research evidences, the study was carried out with the objective to know appropriate time of sowing and spacing required under the vertisols of Vidarbha region, for the seed coriander as diversified crop.

Methodology

The present investigation on the “Studies on seed yield of coriander (*Corindrum sativum* L.) as influenced by spacing and sowing time, under vertisols of Vidarbha” was carried out at the field of Chilli and Vegetable Research Unit, Dr. PDKV., Akola, during rabi seasons of 2014-15 to 2016-17. The experimental material comprised of genetically pure seed of coriander cv. ACr-1 (Ajmer Coriander-1) procured from National Research Centre for Seed Spices, Ajmer (Rajasthan).

The experimental site was slightly alkaline with 7.6 pH, 0.15 Ec (dSm-1) and 4.21 gm/kg organic carbon. The available nitrogen, phosphorus, potassium and sulphur in the experimental plot was estimated to be (220 kg/ha, 8.75 kg/ha, 318 kg/ha and 9.48 mg/kg, respectively).

The experiment was carried out in Factorial Randomize Block Design (FRBD) and comprised of fifteen treatment combinations. There were five levels of dates of sowing i.e. factor 'A' viz. D₁ (15th September), D₂ (1st October), D₃ (15th October), D₄ (1st November), D₅ (15th November) and three levels of spacing, i.e. factor 'B' viz. S₁ (30 x 30 cm), S₂ (45 x 45 cm), S₃ (60 x 60 cm) with three replications.

Result and Discussion

During the course of investigation carried out to ascertain the effect of different dates of sowing and various spacing used on coriander (*Coriandrum sativum* L) cv. ACr-1 (Ajmer coriander – 1) as seed yield production, many significant variations due to different treatments were observed. Certain experimental results need possible explanation, reasoning, support and or contradiction as presented below.

Influence of dates of sowing

The pooled results of analysis of variance of three years data presented in (Table 1), for vegetative growth characters and

yield contributing characters showed that, plant height, number of branches per plant, days to 50% flowering, umbels per plant, Umbellets per plant, seeds per umbel and 1000 seed weight (Test weight) of coriander were significantly affected by sowing dates. Pooled means comparison indicated that, 15th October sowing of coriander reflects maximum (109.18 cm. and 14.47) plant height and branches per plant, respectively. Furthermore, the maximum umbels per plant, umbellets per umbel, seeds per umbel and test weight (39.33, 7.48, 35.16 and 13.58 g, respectively) were also observed with 15th October sowing as compare to rest of the sowing dates. The profuse vegetative growth, early flowering in the moderate spaced plant seems to have led to adequate supply of metabolites due to the increase in biomass per plant, which might be lead to get maximum yield contributing characters in coriander i.e. umbels per plant, umbellets per umbel, seeds per umbel and test weight, as compared to sparse population in greater spacing as well as overcrowding of plants in less spacing. These results are in line with the findings [7] in coriander, under Mandasaur (M.P.) conditions.

Table 1: Effect of sowing dates and spacing on pooled means of vegetative growth characters in coriander

Treatments	Plant height (cm)	Number of branches per plant	Days to 50% flowering	Number of umbels per plant	Umbellets per umbel	Seeds per umbels	Test Weight (g) (1000 seed wt.)	Seed yield per ha. (q)
Sowing Dates								
D ₁ - 15 th September	97.80	10.69	64.66	33.96	5.51	28.29	9.71	6.34
D ₂ - 1 st October	105.54	13.13	65.10	35.16	6.24	32.98	12.47	8.35
D ₃ - 15 th October	109.18	14.47	64.36	39.33	7.48	35.16	13.58	11.46
D ₄ - 1 st November	103.11	10.81	63.83	33.92	5.76	31.12	10.94	9.77
D ₅ - 15 th November	97.17	8.84	71.90	27.38	4.47	26.43	8.23	6.56
F test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
SE(m)+	0.858	0.319	0.630	1.172	0.255	0.57	0.323	0.15
CD at 5%	2.412	0.897	1.771	3.293	0.718	1.61	0.909	0.43
Spacing								
S ₁ - 30 X 30 cm	101.43	11.48	63.24	32.64	5.94	30.72	11.39	7.93
S ₂ - 45 X 45 cm	105.30	12.38	65.64	36.64	6.61	31.62	11.47	9.60
S ₃ - 60 X 60 cm	100.94	10.90	69.02	32.57	5.12	30.05	10.11	7.06
F test	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.	Sig.
SE(m)+	0.665	0.247	0.488	0.908	0.198	0.44	0.250	0.12
CD at 5%	1.868	0.695	1.372	2.551	0.556	1.24	0.704	0.33
Interaction (DXS)								
F test	Sig.	NS	Sig.	NS	NS	Sig.	Sig.	Sig.
SE(m)+	1.486	0.553	1.091	2.03	0.442	0.99	0.560	0.26
CD at 5%	4.177	--	3.067	--	--	2.78	1.574	0.74

Influence of spacing

Amongst the various spacing used in the present investigation, significantly maximum plant height, branches per plant (105.30 cm and 12.38, respectively) was obtained due to 45 x 45 cm spacing (S₂) and the minimum (63.24 days) number of days were noticed with 30 x 30 cm spacing (S₁) treatment (table 1). However, significantly minimum plant height, branches per plant (100.94 cm and 10.90, respectively) and late (69.02 days) was noticed due to higher 60 x60 cm (S₃) spacing treatment. The yield contributing characters like umbels per plant, umbellets per umbel, seeds per umbel and test weight (1000 seed weight) showed significantly maximum values (36.34, 6.61, 31.62, 11.47 g, respectively) when grown with moderate spacing (45 x 45 cm) treatment (table 1). Dates of sowing is an important management factor for almost all seed spices including coriander. Change in the sowing time leads into significant change in weather microclimate and subsequently the performance of crop. These reviews are supportive to the present investigation as suggested [5]. Further, in the agro techniques, spacing in between the plant and rows plays significant improvement in

growth, yield contributing and yield parameters of any crop. In the annual crop like coriander, the moderate spacing implied might be responsible for higher growth inputs (sunlight, water and nutrients) with least competition in too closer and too wider spacing. These results are in conformity with the findings [6] in coriander, under Mondouri (W.B.) conditions.

Influence of interaction

As far as the interaction between sowing dates and spacing (D x S) in the present investigation is concerned, the pooled effects towards plant height, days to 50% flowering, seed yield, seeds per umbel and test weight were found statistically significant. However, branches per plant, umbels per plant, umbellets per umbel did not showed the statistically significant differences among themselves. However, the maximum (12.96 q/ha) seed yield of coriander was reported, when the coriander crop was sown on 15th October at 45 x 45 cm spacing (D₃S₂) (Table 2). The higher values of seed yield of coriander with this treatment combination might be due to the fact that, moderate spacing and appropriate time of

planting controls the crop phonological development along with efficient conversion of biomass into economic yield of

coriander crop. These results are inconformity with the findings^[3] in wheat, ^[4-5] in coriander.

Table 2: Interaction effect of pooled means of sowing dates and spacing on seed yield in Coriander (q ha⁻¹)

Treatment	S ₁ (30 X 30 cm)	S ₂ (45 X 45 cm)	S ₃ (60 X 60 cm)	Mean
D ₁ - 15 th September	5.91	7.32	5.77	6.34
D ₂ - 1 st October	7.74	8.90	8.42	8.35
D ₃ - 15 th October	9.58	12.96	11.85	11.46
D ₄ - 1 st November	7.59	11.41	10.36	9.77
D ₅ - 15 th November	5.35	7.40	6.94	6.56
Mean	7.93	9.60	7.06	
F test	Sig.			
SE (m) +	0.26			
CD at 5%	0.74			

Economics

From the pooled data presented in table 3, it is opined that, significantly the maximum GMR (Rs. 129665/-), NMR (Rs. 85145/-) and B:C ratio (1:1.91) was obtained from the coriander crop sown on 15th October with 45 x 45 cm, moderate spacing (D₃S₂) treatment combination. However, it was reported to be minimum GMR, NMR and B:C ratio (Rs. 53525/-, Rs. 6665/- and 1:0.24, respectively) when the crop was sown late by 15th November with less spacing of 30 x 30 cm viz., D₅S₁ treatment combination. Sowing of coriander crop in agro climatic conditions of Vidarbha region with moderate spacing (45 x 45 cm.) and at appropriate time of start of the rabi season i.e. second fort night of October (15th October) might get the sufficient natural resources from soil as well as environmental condition to these crop as compared to rest of sowing dates and spacing treatment combinations. Further, naturally profused growth, yield and yield contributing characters obtained during investigation directly reflect into the maximum GMR, NMR and economical outlay of the seed coriander. These results are in support to the findings^[2-5-7] In coriander.

Table 4: Effect of sowing dates and spacing on GMR, NMR and B:C ratio in coriander

Treatment combinations	Yield per ha (q)	Gross monetary return (Rs.)	Net monetary return (Rs.)	B:C ratio
D ₁ S ₁	5.91	59118	14258	0.26
D ₁ S ₂	7.32	73287	28767	0.64
D ₁ S ₃	5.77	57776	16916	0.42
D ₂ S ₁	7.74	77426	30566	0.65
D ₂ S ₂	8.90	89040	44520	1.00
D ₂ S ₃	8.42	84217	43357	1.06
D ₃ S ₁	9.58	95868	49008	1.05
D ₃ S ₂	12.96	129665	85145	1.91
D ₃ S ₃	11.85	118507	77647	1.90
D ₄ S ₁	7.59	75927	29067	0.62
D ₄ S ₂	11.41	114185	69665	1.57
D ₄ S ₃	10.36	103250	62390	1.53
D ₅ S ₁	5.35	53525	6665	0.24
D ₅ S ₂	7.40	74084	29564	0.66
D ₅ S ₃	6.94	69465	28605	0.70
F test	Sig.	Sig.	Sig.	
SE(m)+	0.26	2627.88	2627.88	
CD at 5%	0.74	7386.76	7386.76	

Conclusion

Taking into consideration of available huge area (2.5 lakhs sq.km.) under saline track in Vidarbha region, area, under the seed spice crop like ajwain, fennel and coriander as sole crop is not only surprisingly increases but also increase the farmers

income due to less cost of cultivation as compared to existing cropping pattern.

Present investigation results are enthusiastic towards the use of appropriate variety, time of sowing of coriander crop for seed production and more importantly the use of agro techniques like distance between two rows and two plants (Spacing), under irrigated and rainfed conditions both. Due to the heavy demand of Coriander seed for preparation of readymade masala throughout country and abroad, cultivation of seedcoriander would be economical milestone for farmers of the region.

Recommendation

Hence, we recommend that, "Dibbling of Coriander seed cv. ACr-1, during second fortnight of October, with the moderate spacing of 45 x 45 cm is recommended for obtaining the higher seed yield and monetary returns for Vidarbha region."

References

1. Anonymous. Spices Statistic at a Glance, Directorate of Arcanum and Spices Development, The Ministry of Agriculture and Farmers Welfare, Government of India, Calicut, Kerala. 2016, 101-138.
2. Ghobadi ME, Ghobadi M. The effects of sowing dates and densities on yield and yield components of Coriander (*Coriandrum sativum* L.). Int. J of soil, biom, agril. Food and biotech. Enginn. 2010; 4(10):725-728.
3. Khichar ML, Niwas R. Microclimatic profiles under different sowing environment in wheat. J Agromet. 2006; 8:201-209.
4. Meena SS, Malhotra SK. Effect of sowing time, nitrogen and plant growth regulators on green leaf yield of Coriander. Haryana J. Hort. Sci. 2006; 35:310-311.
5. Moosavi SGR, Seghatoleslami MJ, Zareie MH. The effect of planting dates and plant density on morphological traits and essential oil yield of Coriander (*Coriandrum sativum* L.). Int. J Agirl. Crop Sci. 2012; 4:496-501.
6. Sharangi AB, Roychowdhury A. Phenology and yield of Coriander (*Coriandrum sativum* L.) at different sowing dates. J. of Plant Sci. 2014; 9:32-42.
7. Sharma A, Naruka IS, Shaktawat RPS. Effect of row spacing and nitrogen and growth and yield of Coriander (*Coriandrum sativum* L.) J Krishi Vigyan. 2016; 5(1):49-53.