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Performance of Coriander (*Coriandrum sativum* L.) var. CO (CR)4 under different growing environment and seasons

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Abstract

An experiment was conducted on observing the influence of season and growing environment on the performance of leafy coriander var. CO (CR)4. Institute of Agriculture under Tamil Nadu Agricultural University located at Kumulur, Trichy district of Tamilnadu was the experimental station. The experimental design was split plot design with two factors and three replications. Leafy coriander of Rabi season performed well and recorded significantly maximum values in parameters such as germination percentage (63.36 %), plant height (27.18 cm), number of leaves per plant (36.16), plant height (6.76 g) and yield per hectare (7.29 t/ha) than kharif crop. Similarly coriander under polyhouse recorded maximum germination percentage (62.55 %), plant height (26.52 cm), number of branches (4.50), number of leaves per plant (36.40), plant height (7.57 g) and yield per hectare (7.99 t/ha). The interaction effect has more influence especially in polyhouse condition during rabi season. The result of the experiment on cultivating coriander under polyhouse during kharif and rabi as well as under shadenet during rabi season will be economically notable.

Keywords: Coriander, herbage yield, seasonal yield, protected cultivation, spices cultivation

1. Introduction

Coriander (Coriandrum sativum L.) is cultivated for both seed and leaf yield. Coriander leaves are rich in Vitamin A and C (Girenko, 1982)[1]. In India, leafy coriander is cultivated throughout the year. But the yield varies according to the season in which it is cultivated. Herbage yield of coriander is maximum when cultivated during rabi season on black cotton or other type of heavy soils having good water retention capacity (Mohanalakshmi et al., 2019)[2]. Corinader is susceptible to high temperature with low relative humidity avail during summer season in India. To meet maximum herbage yield throughout the year greenhouse cultivation can be promoted. Protected cultivation makes possible the production of coriander irrespective of seasons. Protected cultivation reduces the abiotic stresses on crop and maintains the weather, permitting year round cultivation as well as regular market supply (Singh et al., 2005) [3]. Depend upon structure, crop, variety, production technology and market price, protected cultivation assures the profitability (Rajasekar et al., 2013)[4]. Since leafy purpose coriander has short life span, it can be recommended to cultivate it in medium cost protected structures. Our experiment is about the performance of coriander var. CO (CR)4 under different season and cultivating environment.

2. Materials and methods

This experiment was done at Institute of Agriculture, Tamil Nadu Agricultural University, Kumulur of Trichy district, Tamilnadu. The experimental was planned as split plot design with 2 factors, as one main plot and one sub plot and three replications. The main plot treatment viz.,

June sowing (C1) and October sowing (C2). Sub-plot was fixed as three growing environments viz., naturally ventilated polyhouse (S1), shadenet house (S2) and open field condition (S3). The seeds of Coriander CO (CR) 4 were split into halves, soaked in water overnight and treated with Tricoderma viridi before sowing. The seeds are sown in raised beds under the all the fixed environmental condition in both the seasons. Cultivation practices for coriander were followed as per Crop production guide, TNAU. Morphological observations viz., seed germination percentage (%), plant height (cm), number of branches per plant (nos.), number of leaves per plant (nos.), single plant weight (g) and yield per hectare (t/ha) were recorded on time. The data were analyzed using based on Panse and Sukhatme (1985) [5].

Table.1. Effect of season and growing conditions in growth parameters of Coriander (Coriandrum sativum L.) var. CO (CR) 4.

Treatments	Seed germination (%)	Plant height (cm)	No. of branches per plant	No. of leaves per plant	Single plant weight (g)	Yield per hectare (t/ha)
Effect of season						
S1 - Kharif	57.54	22.64	4.33	30.47	5.87	6.10
S2 – Rabi	63.36	27.18	4.33	36.16	6.76	7.29
SED	0.70	0.26	0.00	0.33	0.05	0.07
CD	3.02	1.13	0.00	1.42	0.22	0.30
C.V %	2.47	2.23	0.00	2.10	1.71	2.23
	**	**	NS	**	**	**
Effect of growing conditions						
P1 –Polyhouse	62.55	26.52	4.50	36.40	7.57	7.99
P2 –Shadenet	61.05	26.31	4.00	34.61	6.76	6.39
P3 – Open field	57.74	21.92	4.50	28.94	4.62	5.71
SED	0.32	0.15	0.03	0.43	0.11	0.07
CD	0.74	0.35	0.07	1.49	0.31	0.16
C.V %	0.92	1.06	1.33	1.23	2.44	1.80
	**	**	**	**	**	**
Interaction (S x P)						
S1P1	76.40	24.73	5.00	33.48	7.28	7.82
S1P2	70.50	23.80	4.00	30.54	6.28	5.62
S1P3	65.80	19.40	4.00	27.40	4.05	4.86
S2P1	80.30	28.30	4.00	39.32	7.86	8.15
S2P2	81.50	28.81	4.00	38.67	7.23	7.16
S2P3	76.50	24.43	5.00	30.48	5.19	6.56
Interaction	**	**	**	**	**	**

3. Result and Discussion

3.1 Influence of season

Performance of coriander under influence of seasons (main plot) was shown in Table 1. October crop showed significantly maximum performances in recorded parameters such as germination percentage (63.36 %), plant height (27.18 cm), number of leaves per plant (36.16), plant height (6.76 g) and yield per hectare (7.29 t/ha) on comparing with June crop. The seasons have no significant influence on increasing number of branches. Since coriander is a climate sensitive crop with its higher growth yield during rabi season as stated by Mohanalakshmi et al., 2019 [2], it performed well during October month in our experiment. Kichar and Niwas (2006)[6] stated that the time of sowing controls the crop phenological development along with efficient conversion of biomass into economic yield as in our experimental results. Statement of Sagarika et al., (2014)[4-7] and Guha et al., (2016)[9] that October sown plants had optimum climate which delayed the

reproductive stage and plants with prolonged vegetative phase gave higher fresh green leaf yield is in line with our results. Ayub et al., (2008)[9] and Anitha et al., (2016) [10] reported that the maximum biological yield in October sown crop can be attributed to greater leaf area.

3.2 Influence of environmental condition

Coriander cultivated under polyhouse recorded significantly maximum results in growth and yield parameters as shown in Table 1. Coriander cultivated under naturally ventilated polyhouse recorded maximum results in germination percentage (62.55 %), plant height (26.52 cm), number of branches (4.50), number of leaves per plant (36.40), plant height (7.57 g) and yield per hectare (7.99 t/ha). Coriander grown under shadenet house and open field condition performed next to polyhouse respectively. The increase in single plant weight under polyhouse condition has direct influence on increased plant height, number of branches and number of leaves per plant. Secondly, shadenet house influences the performance of coriander than open field. From the experiment, we understood that protected structure provides suitable microclimatic condition for leafy coriander growth than open condition. Dixit (2007) [11] stated that a substantial increase in yield along with enhancement in yield attributing characters has been found in protected cultivation compared to that of open. Research findings by Pan et al. (2003)[12], Karetha et al., (2014) [13-19] and Mohanalakshmi et al., (2019) [2] are similar to our findings.

3.3 Interaction performance of season and protected structures

The interactive influence of growing season and protected structures has more influence especially in naturally ventilated polyhouse condition during October crop as shown in Table 1. Leafy coriander grown under naturally ventilated polyhouse during October month performed better and yielded maximum of all time during the experiment period. Though leafy coriander grown under shadenet condition during October yields as like polyhouse, it is not suited for June crop due to the negative influence of monsoon. But coriander under polyhouse performed with maximum yield on both seasons which may be due to the standard maintenance of temperature, relative humidity and rain shelter condition throughout the year. On analysing the interactive influence of seasons and growing environmental conditions, both polyhouse and shadenet grown corianders of October crop are given on par results in seed germination, plant height and number of leaves per plant. On comparing open field grown crop of both seasons, October grown crop performed better than shade net grown crop of June month. This indicates that the climatic condition during October favours better than June. There was no economically poorer yield in any treatments. The plant height was very much influenced under shade net during October. This shows that shade net condition promotes more vegetative growth than any other growing condition utilized in experiment. Imam and Ranjbar (2000) [14] stated that decreased light penetration into middle and lower layers of canopy which decreases the auxin decompositions there by enhances the plant height. Reports by Singh et al. (1994) [15] and Tehlan and Malik (2010) [16] showed that plant height increases with effect of shading. Like findings of Jeeva and Sathiyamurthy (2001) [17] in coriander supports our experimental findings. Similar experiment was done by Karetha et al., (2014)[13] in which better result was recorded in naturally ventilated polyhouse and shadenet house grown leafy corianders during June month. Mohanalakshmi et al., (2019)[2] recorded that October sown coriander in open field and year around production under shade net will give maximum yield on comparing. Higher temperature is the main limiting factor for the germination and growth of coriander (Sarada, 2011) [18], in June crop under open field. Singh et al., (2007) [19] stated that in peri-urban areas of northern India, protected cultivation of vegetables increases the productivity and quality of vegetables as well as biotic and abiotic stress condition compared to open field.

Conclusions

On concluding this experiment, the influence of seasons and various environmental condition on Coriander CO (CR) 4 is notable. Structures having controlled environmental condition will promote coriander yield throughout the year. Particularly, coriander under polyhouse as well as under shadenet will be economically profitable.

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