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## Effect of dates of sowing on powdery mildew disease intensity in coriander

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### Abstract

Some of plant diseases can be effectively lowered by altering sowing dates. The present work was carried out to study the effect of sowing dates on intensity of powdery mildew disease of coriander incited by *Erysiphe polygoni* during the year 2021-22. The coriander variety Gujarat coriander-2 was sown at four different dates having fortnightly intervals. The results indicated that the subsequent delay in sowing caused progressive increase in the powdery mildew intensity. The early sown crop (1<sup>st</sup> week of November) proved to be the most effective in reducing the disease (24.79%) and increasing the seed yield of coriander (1418 kg/ha) followed by sowing of 3<sup>rd</sup> week of November in succession with subsequent increase in per cent disease intensity (46.40%) and reduction in yield (1063 kg/ ha). The highest volatile oil (0.408%) and 1000 seed weight (14.06 g) was recorded in early sown crop (1<sup>st</sup> week of November), whereas, they were the lowest in late sown crop (3<sup>rd</sup> week of December) with 0.278 per cent of volatile oil and 9.48 g of 1000 seed weight.

**Keywords:** Coriander, powdery mildew, date of sowing, disease intensity

### 1. Introduction

India has been known as the “Home of Spices” from very ancient times. Spices are an important place in agricultural commodities, which have been considered essential for the taste of food items since ancient times. They also play an important role in India’s national economy. Indian spices and spice products were exported to 180 destinations globally in 2020–21. The estimated export of spices during 2020–21 has been 17,58,984 tonnes valued Rs. 30973.32 crores (Anon., 2020-21) [2]. The coriander (*Coriandrum sativum* L.) is an important seed spice crop known as “Dhaniya” in India and cultivated from its seeds throughout the year. It belongs to the family *Apiaceae*. All the tender aerial parts including stem, leaf, flower and fruit of coriander are used due to its aromatic flavour.

Coriander is well known for its antioxidant, anti-diabetic, anti-mutagenic, anti-anxiety and antimicrobial activity along with analgesic and hormone balancing effect that promotes its use in foods due to numerous health benefits and its protective effect to preserve the food for longer period. Leaves of this plant are rich source of vitamins while seeds are rich in polyphenols and essential oils. Coriander plant is a rich reservoir of micronutrients and nutritional elements (Bhat *et al.*, 2014) [3].

Production of coriander crop is affected by various disease such as vascular wilt, stem rot, root rot, seedling blight, stem gall, leaf blight, powdery mildew, seed rot, grain mould, bacterial blight, reniform and root knot nematodes, phyllody and viral diseases. Among them, powdery mildew disease is a very important disease of coriander resulting in heavy losses. It appears in February-March as the disease is flavoured by dry conditions with warmer days. Powdery white masses are observed sprinkled on the foliage and tender plant parts which cover the whole foliage and plant parts. The leaves turn yellow then brown. When the disease appears early, seed is not produced but in case of late infection some seeds are formed and most of them remain small in size (Khare *et al.*, 2017) [4].

### 2. Material and Methods

The field experiment was conducted during *Rabi* season of the year 2021-22 at the Agronomy Instructional Farm, Department of Agronomy, C. P. College of Agriculture, S. D. Agricultural University, Sardarkrushinagar. Gujarat coriander-2 (G. cor-2) was sown in the month of November to December at 30 cm row spacing with a plot of size 4.00 m × 2.40 m. The study was laid out in RBD with five replicates of four date of sowing.

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The crop was sown in natural condition and were regularly observed for the development of the disease till harvest, without adding any inoculum.

**Table 1:** Details of different dates of sowing

Treatment No.	Date of sowing
T <sub>1</sub>	1 <sup>st</sup> week of November
T <sub>2</sub>	3 <sup>rd</sup> week of November
T <sub>3</sub>	1 <sup>st</sup> week of December
T <sub>4</sub>	3 <sup>rd</sup> week of December

### Observations recorded

#### 1) Percent disease intensity

Per cent disease intensity of powdery mildew was recorded from 15 randomly selected plant from each plot at 7 days

$$\text{Per cent Disease Intensity} = \frac{\text{Sum of all numerical ratings}}{\text{Total plants examined} \times \text{Maximum rating}} \times 100$$

#### 2) Seed yield (kg/ha)

The crop was harvested after 4 months of sowing *i.e.*, (110-120 days) when coriander seeds were matured and dried enough to be separated by threshing. The seeds were cleaned and plot-wise yield was recorded in kg/plot and converted into kg/ha.

#### 3) Volatile oil (%)

The analysis of volatile oil content from coriander seed, seeds was carried out using steam distillation method (AOAC, 1984) [1]. For carrying out analysis of volatile oil content, plot-wise harvested seeds were collected and 50 g sample from each plot subjected for analysis. Volatile oil (%) was calculated by using following formula.

$$\text{Volatile oil (\% (v/w))} = \frac{\text{Volume of oil (ml)}}{\text{Weight of sample}} \times 100$$

#### 4) 1000-seed weight (g)

The 1000-seeds of coriander were randomly selected from the yield lot of each plot and weighed on digital analytical balance. The data were recorded for each sample and subjected to statistical analysis.

### 3. Result and Discussion

The data revealed (Table 3) significant differences in mean per cent disease intensity of powdery mildew in coriander among different dates of sowing. The minimum disease intensity was recorded with the sowing of 1<sup>st</sup> week of November (24.79%), followed by 3<sup>rd</sup> week of November (46.40%), 1<sup>st</sup> week of December (63.73%), and 3<sup>rd</sup> week of December (70.13%), respectively. As the sowing time of coriander crop was delayed from November to December, it resulted in increasing powdery mildew intensity. Thus, it can be revealed that the late sown crop exhibited more powdery mildew intensity because of readily availability of inoculum and favorable weather conditions. The inoculum in early sown crop was carried to late sown crop which resulted in heavy build-up of inoculum with increasing powdery mildew disease intensity.

The differences in seed yield of coriander were found significant among different dates of sowing. The highest

interval. The plants were graded in to 6 class using 0-5 scale.

**Table 2:** Powdery mildew disease rating scale

Grade	Description
0	Healthy plants (no infection)
1	Nearly 50 per cent leaves covered with whitish growth
2	> 50 per cent leaves covered with whitish growth
3	> 50 per cent leaves, umbels/branches covered with whitish growth
4	> 50 per cent leaves, umbels/branches and seed covered with whitish growth
5	Plant completely covered with whitish growth

The percent disease intensity was worked out by using following formula (Singh, A. K., 2008) [7].

mean seed yield (1417 kg/ha) was recorded with sowing 1<sup>st</sup> week of November followed by 3<sup>rd</sup> week of November (1062 kg/ha), 1<sup>st</sup> week of December (834 kg/ha) and 3<sup>rd</sup> week of December (486 kg/ha). The delayed sowing of coriander crop from 1<sup>st</sup> week of November to 3<sup>rd</sup> week of December resulted in decreasing seed yield. The higher seed yield in early sown crop might be due to the lower powdery mildew disease intensity. Similarly, decrease in seed yield was in accordance with increasing powdery mildew intensity in late sown crop.

**Table 3:** Effect of different dates of sowing on per cent disease intensity of powdery mildew and seed yield of coriander

Sr. No.	Date of sowing	Percent disease intensity	Seed yield (kg/ha)
1	1 <sup>st</sup> week of November	29.82 (24.79)	1418
2	3 <sup>rd</sup> week of November	42.91 (46.40)	1063
3	1 <sup>st</sup> week of December	52.98 (63.73)	834
4	3 <sup>rd</sup> week of December	56.89 (70.13)	486
	S.Em. ±	1.20	42.11
	C. D. at 5%	3.73	131
	C. V. %	5.88	9.91

\*Figures in parentheses are original values of arcsine transformed values

Mean of 1000 seed weight of coriander was recorded from different sowing dates where maximum seed weight of 14.06 g was recorded with 1<sup>st</sup> week of November sowing. The least 1000 seed weight of coriander (9.48 g) was recorded with sowing in 3<sup>rd</sup> week December as due to the high disease intensity in late sown crop.

The mean oil content with different dates of sowing of coriander crop was varied significantly. The maximum mean oil content (0.408%) was recorded with 1<sup>st</sup> week of November sowing. While minimum oil content was recorded with sowing of 3<sup>rd</sup> week of December. The succeeding dates of sowing progressively decreased the oil content might be due to the high intensity of the powdery mildew diseases which deteriorates the quality of grains (Table 4).

It can be revealed in the present study that as delayed the sowing time of coriander crop progressively increase powdery mildew intensity, which reduce the seed yield, seed weight and volatile oil content significantly.

**Table 4:** Effect of different dates of sowing on 1000 seed weight and volatile oil of coriander

Sr. No.	Treatments	1000 seed weight (g)	Volatile oil %
1	1 <sup>st</sup> week of November	14.06	0.408
2	3 <sup>rd</sup> week of November	12.81	0.362
3	1 <sup>st</sup> week of December	11.39	0.322
4	3 <sup>rd</sup> week of December	9.48	0.278
	S.Em. $\pm$	0.236	0.006
	C.D. at 5%	0.73	0.019
	C. V. %	4.42	4.06

Patel *et al.* (2017) <sup>[5]</sup> observed that as delayed in the sowing time of dillseed crop, progressively increased powdery mildew intensity, which resulted decrease in seed yield, seed weight and oil content significantly. Sharma (1999) <sup>[9]</sup> reported that powdery mildew intensity of fenugreek was comparatively less in early sown crop of October month than the late sown crop of November month, as a result reduced seed yield in late sown crop. It is noted that with the subsequent delayed in sowing time, progressively increased powdery mildew intensity in mungbean (Wadje *et al.*, 2008) <sup>[8]</sup>.

#### 4. Conclusion

The early sowing of coriander crop (1<sup>st</sup> week of November) is ideal for escape from powdery mildew disease and higher yield as weather parameter are unfavourable for powdery mildew disease development during vulnerable stage of the crop under said period of sowing.

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