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Evaluation of cultivars against powdery mildew disease (*Erysiphe polygoni* DC) of coriander (*Coriandrum sativum* L.)

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Abstract

Coriander (*Coriandrum sativum* L.) is one of the most important spice crops in India. The major constraints for low productivity are several biotic stresses viz., powdery mildew, root rot, termite and other sucking pests. Among them powdery mildew is an important disease. The powdery mildew disease caused by *Erysiphe polygoni* DC is one of the most destructive diseases of coriander causing severe losses in yield India is the leading country in the world for the production and consumption of seed spices and is recognized as a land of spices. The experiment was conducted during *rabi* 2003 with fifteen cultivars none were free from powdery mildew, the least intensity of the diseases was recorded in Jawahar Dhania-1 (20.83%) followed by CS-6 (21.67%), CO-2 (24.32%), UD-375 (24.81%) and G-5365 (25.56%). While the maximum intensity of the disease was recorded in CS-7 (56.56%) and it was significantly inferior over all other fourteen tested varieties.

Keywords: Coriander, *Erysiphe polygoni*, powdery mildew, fungicides

Introduction

The coriander (*Coriandrum sativum* L.) is an important spice crop of India and its seeds (Fruits) and leaves are extensively used. Coriander (*Coriandrum sativum* L.) belongs to family Umbelliferae (Apiaceae) and is believed to be native of the Eastern Mediterranean region and Southern Europe. It is an aromatic annual herb of 1-2 ft. height having diploid chromosome ($2n=22$). India is one of the largest producer, consumer and exporter of seed spices (Peter *et al.*, 2000)^[9]. Coriander is being used as natural additives in cooking added to food in order to improve its appearance, flavour, texture as well as appetite. The pleasant aroma is due to an essential element called at d- Linalol or coriandral. The essential oil content ranges from 0.1 to 1.3 percent in dry seeds. Besides essential oil, the seeds of coriander contain 18- 21 percent fatty oils which are used in the cosmetic industries. Coriander (*Coriandrum sativum* L.) grown in different countries such as India, USSR. Mexico, Poland, Hungary, U.S.A. The major coriander growing states are Rajasthan, Madhya Pradesh, Andhra Pradesh, Gujarat and Tamil Nadu, In Madhya Pradesh Several coriander cultivars are grown but the common ones are UD-1, CS-2, UD-2, UD-373 UD-436, CS-4, CS-208, G-5365 and R C R-41. Madhya Pradesh alone accounts an area of 37147 hectares with the average production of 9374 metric tons in 2002-2003. In M.P., coriander is grown in Gwalior, Guna, Indore and Mandso districts. The coriander crop suffers from different diseases which is one of the limiting factors in its production. Mukherji and basin (1986) listed twenty fungal pathogens and bacterium causing different diseases. Out of these some common fungal diseases are stem gal (*Protomyces macrosporus*), powdery mildew (*Erysiphe polygoni* DC), wilt (*Fusarium oxysporum* f.sp. *coriandrii*), stem rot (*Rhizoctonia* spp.) and blight (*Alternaria* spp.). Out of these powdery mildew is a very destructive disease and cause losses by deteriorating the quality of the seed and reducing the yield. It is observed that once the parasite establishes itself in the field it takes quits a heavy toll from year to year. Coriander crop is affected by number of diseases, out of which powdery mildew caused by *Erysiphe polygoni* L. is one of the most important disease (Dange *et al.*, 1992)^[3]

Methodology

The present investigations were undertaken at the research farm, College of Agriculture, Gwalior (M.P.) during 2003-04 of powdery mildew of coriander to examine the fifteen coriander varieties/ cultivates were sown in post-replication thrice. Twenty seed of each variety were sown in each plot and just after germination ten plants by using forcep. The

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Evaluation was done on these ten plants. The design was randomized block design (RBD) replicated three times, 15 treatments, keeping plot size 30x30x45 cm and maintained the distance row to row and plant to plant 25x10 cm. and date of sowing 30-11-2002. The harvesting time was 20-03-2003.

Table 1: Plants showing symptoms of powdery mildew were given score as follows

Grade	Per cent disease severity with description	Resistance reaction
0	No Symptoms	Immune-I
1	1 trace to 10% Plants Infected	Highly Resistant-HR
3	Above 11 to 25% Plants Infected	Resistant- R
5	Above 26 to 50% Plants Infected	Moderately Resistant-MR
7	Above 51 to 75% Plants Infected	Susceptible-S
9	More than 75% Plants Infected	Highly Susceptible-HS

Based on these observations, per cent disease intensity (PDI) of the disease was worked out by using formula given by McKinney (1923) [7] and rated as No Symptoms-I, 0%, Highly Resistant-HR, 1 to 10%, Resistant-R, 11-25%, Moderately resistant-MR, 26-50%, Susceptible-S, (more than 50%), Highly susceptible- HS. (More than 75%)

Per Cent Disease Intensity (PDI) was Calculated by Using the Following Formula

In each plots total number of plants and incidence of powdery mildew were recorded separately as per following formula

$$PDI = \frac{\text{Sum of numerical rating}}{\text{Total number of observation}} \times \frac{100}{9}$$

The resistant/ susceptible reaction to each entry was given by adopting the 0-9 point rating scale suggested by Agrawal and Nema (1989).

Results and Discussion

Evaluation of Cultivars for Resistance against Powdery Mildew

It is obvious from table 1.1 that out of fifteen cultivars none were free from powdery mildew, The least intensity of the diseases was recorded in Jawahar Dhania-1 (20.83%) followed by CS-6 (21.67%), CO-2 (24.32%), UD-375 (24.81%) and G-5365 (25.56%). While the maximum intensity of the disease was recorded in CS-7 (56.56%) and it was significantly inferior over all other fourteen tested varieties.

In respect of powdery mildew JD-1 was least infected and it was significantly superior over CS-7 (56.56%), UD-374 (44.44%), UD-1 (39.79%), UD-20 (38.63%), CS-375 (36.25%), RCR-41 (36.12%), CS-2 (36.01%), CS-208 (35.15%), CO-5 (34.48%) and CO-3 (30.00%) but it was at par with CS-6 (21.67%), CO-2 (24.32%) and UD-375 (24.81%), CS-6, CO-2 and UD-375 were also superior over CS-7 (56.56%), UD-374 (44.44%), UD-1 (39.79%), UD-20

(38.63%), CS-375 (36.25%), RCR-41 (36.12%), CS-2 (36.01%), CS-208 (35.15%), CO-5 (34.48%), and CO-3 (30.00%) Table 1.1 and CS-6, UD-375, JD-1, CO-2 Varieties are Resistant recorded but CS-2, CS-375, CS-208, UD-1, UD-374, UD-20, CO-3, CO- 5 RCR-41, G-5365 varieties are Moderately Resistant show and only one variety CS-7 is Susceptible nature diseases intensity very high observed given below Table 1.2. Variation in degree of resistance among different varieties or genotypes of coriander against powdery mildew has also been reported by Kalra *et al.*, (1995) [5], Keshwal and Khatri, (1998) [6], Kalra *et al.*, (2003) [4]. This slow mildewing character could be studied in detailed and further utilized in breeding programme.

Table 2: Evaluation of cultivars for resistance against powdery mildew

S. No.	Varieties	% Mean Diseases Intensity
1.	CS - 2	36.01 (36.83)
2.	CS - 6	21.67 (27.67)
3.	CS - 7	56.56 (48.76)
4.	CS - 375	36.25 (38.82)
5.	CS - 208	35.15 (36.11)
6.	UD- 1	39.79 (39.07)
7.	UD- 374	44.44 (41.78)
8.	UD- 375	24.81 (29.80)
9.	UD- 20	38.63 (38.40)
10.	JD- 1	20.83 (27.09)
11.	CO- 2	24.32 (29.47)
12.	CO- 3	30.00 (33.15)
13.	CO- 5	34.48 (35.91)
14.	RCR- 41	36.12 (36.92)
15.	G- 5365	25.56 (30.30)
S.E. m.±		1.178
C.D. (at 5%)		3.412

Table 3: Disease reactions of coriander genotypes against powdery mildew under field conditions

Grade	Per cent disease severity with description	Resistance reaction	Varieties
0	No Symptoms	Immune-I	Nil
1	1 trace to 10% Plants Infected	Highly Resistant-HR	Nil
3	Above 11 to 25% Plants Infected	Resistant- R	CS-6, UD-375, JD-1, CO-2
5	Above 26 to 50% Plants Infected	Moderately Resistant-MR	CS-2, CS-375, CS-208, UD-1, UD-374, UD-20, CO-3, CO-5 RCR-41, G-5365
7	Above 51 to 75% Plants Infected	Susceptible-S	CS-7
9	More than 75% Plants Infected	Highly Susceptible-HS	Nil

(R-Resistant; MR-Moderately Resistant; S-Susceptible; HS-Highly Susceptible)

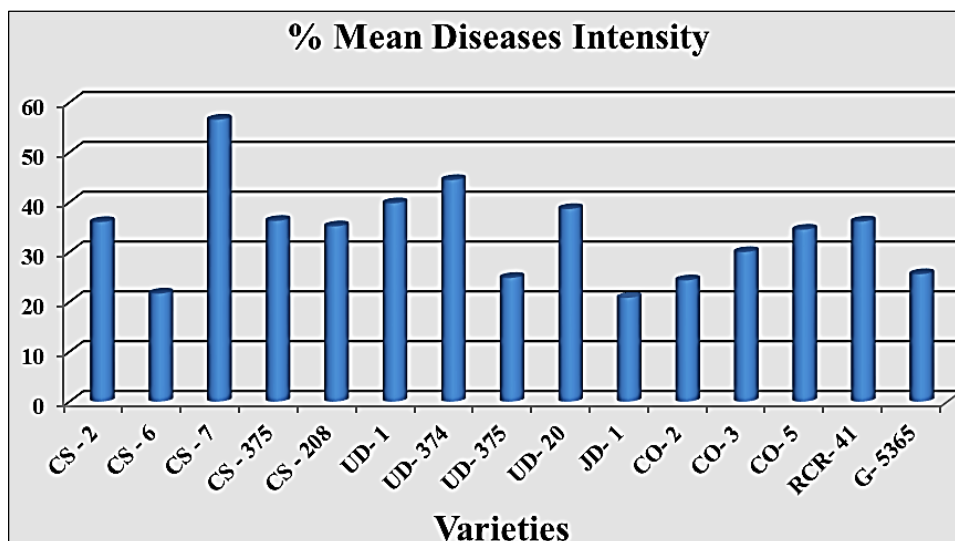


Fig 1: Evaluation of cultivars for resistance against powdery mildew

Conclusion

Variation in degree of resistance among different varieties or genotypes of coriander against powdery mildew. Jawahar Dhania-1 (20.83%) followed by CS-6 (21.67%), CO-2 (24.32%), UD-375 (24.81%) and G-5365 (25.56%). While the maximum intensity of the disease was recorded in CS-7 (56.56%) and it was significantly inferior over all other fourteen tested varieties in Gwalior (M.P.) during 2003-04.

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