Management of powdery mildew (*Erysiphe polygoni* DC) in coriander (*Coriandrum sativum L.*)

GJ Goswami, LF Akbari and AR Khunt

Abstract

Coriander (*Coriandrum sativum L.*) is one of the most important spice crop belonging to the family Aoeaceae. It is commonly known as ‘Dhania’ or “Dhana” and grown in Gujarat and other states of India. Gujarat occupies an area of 92100 hectares, with production of 143378 metric tonnes (Anon. 2015) [2]. *Erysiphe polygoni* DC is an important and destructive pathogen causing powdery mildew disease in coriander. The present investigation was carried out at P.G. Research farm, Department of Plant Pathology, Junagadh Agricultural University, Junagadh, during 2014-15 and 2015-16. Disease appears after flowering and continues up to maturity of the crop in severe form and cause reduction in yield. Under cool and dry condition the disease spreads in entire field within short duration. In such congeneral condition the crop must be protected with frequent applications of fungicides. Farmers start fungicidal applications onward from disease appearance generally in flowering stage. Srivastava (1971) [9] reported losses 15-20% in Rajasthan due to *Erysiphe polygoni* in coriander. The effectiveness of propiconazole in coriander (Akbari and Parakhia, 2010) [1] and pentaconazole and propiconazole (Dhruj et al., 2000) [3] in fenugreek for control of powdery mildew has been reported. The wettable sulphur has been reported effective against powdery mildew in (Mathur et al. 1971) [5], pea (Rana et al. 1991 and Loganathan et al. 2011) [7, 4] and coriander (Singh 2006, Patel et al. 2008 and Tomer and Tomer, 2010) [8, 6, 10].

Methodology

For studying the efficacy of different fungicides against *E. polygoni* on coriander *in vivo*, six different fungicides viz., hexaconazole, difenoconazole, propiconazole, picoxystrobin, dinocap and wettable sulphur were tested on coriander cv. Gujarat Corian-2 under field conditions during the *Rabi*, 2014-15 and 2015-16. The first spray was given on initiation of disease and remaining two sprays of fungicides were done at 15 days interval. Control was maintained by water spraying (400 lit/ha) and without spraying of any fungicide. Observations on disease intensity were recorded from randomly selected ten plants from each treatment after seven days of last spray using 0-5 scale given by Singh (2006) [8] for coriander crop. Each plant was evaluated for its disease reaction using following score.

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

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Per cent disease severity with description

<table>
<thead>
<tr>
<th>Grade</th>
<th>Disease Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No symptoms on the plant</td>
</tr>
<tr>
<td>1</td>
<td>1 to 10 small patches on leaves</td>
</tr>
<tr>
<td>2</td>
<td>11 to 20 small patches on leaves</td>
</tr>
<tr>
<td>3</td>
<td>More than 50% leaf area covered with patches</td>
</tr>
<tr>
<td>4</td>
<td>Symptoms on the leaves and stems covering more than 75% plant area</td>
</tr>
<tr>
<td>5</td>
<td>Symptoms on the umbel and capsules</td>
</tr>
</tbody>
</table>

Per cent disease intensity (PDI) was calculated by using the following formula:

$$PDI = \frac{\text{Sum of total rating}}{\text{Total no. of plants observed}} \times \frac{100}{\text{Maximum disease rating}}$$

The per cent disease control and the percentage deviation in seed yield were calculated with the help of the following formula (Mathur et al., 1971) [5].

$$PDC(\%) = \frac{\text{P.D.I. in check} - \text{P.D.I. in treatment}}{\text{P.D.I. in check}} \times 100$$

Results and Discussion

Data presented in Table 1 revealed that all fungicides tested reduced the disease intensity significantly as compared to the control. The propiconazole (0.025%) was the most effective fungicides with 4.10 per cent (pooled) least mean disease intensity followed by wettable sulphur (0.2%) with 7.73 per cent mean disease intensity. Hexaconazole, difenoconazole, dinocap and picoxystrobin were found moderately effective with 13.14, 15.21, 31.00 and 33.10 per cent disease intensity, respectively. Maximum disease control of 80.73 per cent was also observed in the treatment of propiconazole followed by treatment wettable sulphur by 73.14 per cent as compared to control. Similar trend was observed in both the seasons. It is evident from data presented in table that propiconazole performed the best with minimum mean per cent disease intensity of 4.10 per cent (pooled). These results are in agreement with in various crop viz, coriander (Akbari and Parakhia, 2010) [1] and fenugreek (Dhruj et al., 2000) [3].

The results presented in table 2 showed significant differences in seed yield due to fungicidal sprays of different treatments. Mean seed yield of both year was found significantly maximum in the treatment of propiconazole (1473 kg/ha) and it was at par with wettable sulphur (1385 kg/ha). Water spray control produced 970 kg/ha mean seed yield as compared to no spray control with the minimum mean seed yield of 877 kg/ha. However, they were statistically at par with each other. Per cent increase in seed yield over no spray control was also higher in the treatment of propiconazole (40.50%) followed by wettable sulphur (36.70%), hexaconazole (29.96%), difenoconazole (26.74%), dinocap (23.44%), picoxystrobin (12.91%), respectively (Fig. 1).
Table 2: Effect of different fungicide on seed yield

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Fungicides</th>
<th>Seed yield (kg/ha)</th>
<th>Mean</th>
<th>Yield Increased (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2014-15</td>
<td>2015-16</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Hexaconazole 5% EC</td>
<td>1133</td>
<td>1370</td>
<td>1252</td>
</tr>
<tr>
<td>2</td>
<td>Difenoconazole 25% EC</td>
<td>1067</td>
<td>1327</td>
<td>1197</td>
</tr>
<tr>
<td>3</td>
<td>Propiconazole 25% EC</td>
<td>1437</td>
<td>1510</td>
<td>1473</td>
</tr>
<tr>
<td>4</td>
<td>Picoxystrobin 25%EC</td>
<td>930</td>
<td>1083</td>
<td>1007</td>
</tr>
<tr>
<td>5</td>
<td>Dinocap 48% EC</td>
<td>1023</td>
<td>1267</td>
<td>1145</td>
</tr>
<tr>
<td>6</td>
<td>Wettable sulphur 80% WP</td>
<td>1333</td>
<td>1437</td>
<td>1385</td>
</tr>
<tr>
<td>7</td>
<td>Control (water spray)</td>
<td>903</td>
<td>1037</td>
<td>970</td>
</tr>
<tr>
<td>8</td>
<td>Control</td>
<td>800</td>
<td>953</td>
<td>877</td>
</tr>
</tbody>
</table>

Mean: 1078.25, 1248, 1163.25

Y: S. Em. + 1248, 24.48, -
C.D. at 5%: 70, -

T: S. Em. + 65.7361, 72.6114, 48.97, -
C.D. at 5%: 199, 220, 142, -
C.V. %: 10.56, 10.08, 10.31, -

YxT: S. Em. + 69.25, -
C.D. at 5%: NS, -

T = Treatment
YxT = Year x Treatment
Water was used average 400 lit/ha for spraying

Fig 1: Per cent disease intensity, control and yield increase as influenced by different fungicides in vivo during Rabi 2014-15 and 2015-16

Conclusion
It is concluded from the experiment that effect of different fungicides against Erysiphe polygoni on coriander was tried in field condition during Rabi 2014-15 and 2015-16. Propiconazole (0.025%) was the most effective fungicides with 4.10 per cent (pooled) least mean disease intensity followed by wettable sulphur (0.2%) with 7.73 per cent (pooled) mean disease intensity. Hexaconazole, difenoconazole, dinocap and picoxystrobin were found moderately effective with 13.14, 15.21, 31.00 and 33.10 per cent disease intensity, respectively. The highest coriander yield of 1473 kg/ha (two year pooled) was recorded in the treatment of propiconazole 0.025 per cent followed by wettable sulphur (1385 kg/ha).

References