FIELD EVALUATION OF FUNGICIDES AND BOTANICALS AGAINST POWDERY MILDEW OF MUNGBEAN


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ABSTRACT

All the treatments significantly reduced powdery mildew intensity and increased the test weight and seed yield of mungbean over unsprayed control. Karathane 48 EC (@ 0.1%) was most effective, recording least mean powdery mildew intensity (15.14%) and highest grain yield (1425 kg/ha) and test weight (58.00 g). The second and third best effective fungicides were Contaf (@ 0.1%) and Calixin (@ 0.1%), which recorded mean disease intensity of 18.43 and 18.99 per cent, respectively and were at par. Botanical NSKE and plain water also recorded comparatively minimum disease intensity of 33.47 and 32.51 per cent, respectively over unsprayed control (54.65%). Cost benefit ratio showed that all the treatments were economical although Sulfix was most economical with C : B ratio of 1:21.11 followed by botanical NSKE (1:12.76), Contaf (1:7.83), plain water (1:7.61) and Calixin (1:7.28).

Key words : Powdery mildew, Fungicides, Botanicals, Mungbean.

Mungbean (Vigna radiata L. Wilczek) is one of the most important pulse crops cultivated during Kharif in Maharashtra and Karnataka. The crop is affected by number of fungal, bacterial and viral diseases. Amongst the major fungal diseases, powdery mildew incited by Erysiphe polygoni DC is one of the most devastating disease inflicting heavy yield losses to the tune of 25 to 40% (Sone et al., 2002; Singh and Sirohi, 2003). Present studies were undertaken during Kharif 2005 to evaluate the efficacy of fungicides, botanical and plain water for its assessment as a component for integrated management of the mungbean powdery mildew.

The field experiment was conducted during Kharif, 2005 at research farm of the Department of Plant Pathology, College of Agriculture, Latur. The details of the experiment are Design: R.B.D.; Replicates: Three; Plot size: Gross : 3.0 m x 1.8 m; Net : 2.40 x 1.20 m; Spacing: 30 x 10 cm and Treatments : T₁ – Calixin (@ 0.1%); T₂ – Karathane (@ 0.1%); T₃ – Sulfix (@ 0.3%); T₄ – Contaf (@ 0.1%); T₅ – Tilt (@ 0.1%); T₆ – Carbendazim (@ 0.1%); T₇ – Topsin-M (@ 0.1%); T₈ – NSKE (@ 5%); T₉ – Plain water and T₁₀ – Control (unsprayed).

Powdery mildew susceptible mungbean Cv. Kopergaon was sown (15th June 05). The crop was grown applying all recommended package of practices, including three sprayings, beginning first at 32-35 DAS appearance of the disease and subsequent at 15 days interval.

Ten plants per treatment per replicate were randomly selected and tagged and observed for powdery mildew intensity one day before each spraying applying 0-9 disease rating scale (Mayee and Datar, 1996). Based on numerical ratings, per cent disease intensity (PDI) was worked out (McKinney, 1923) and per cent disease control (PDC) was calculated applying the formulae :

\[
PDI = \frac{\text{Sum of numerical ratings}}{\text{No. of leaves examined/ }} \times 100 \\
\text{plant x max disease rating}
\]

\[
PDC = \frac{\text{PDI in untreated plot – PDI in treated plot}}{\text{PDI in untreated plot}} \times 100
\]

At harvest, grain yield and test weight were recorded and grain yield was calculated on hectare.
basis. Data was analyzed statistically and economics (C: B ratio) was determined.

Table 1 indicated that all the seven fungicides, botanical NSKE and plain water significantly reduced the mildew intensity over unsprayed control (54.65%) and also increased the seed yield and test weight. However, fungicide Karathane (0.1%) was most effective and recorded lowest mildew intensity (15.14 %) achieving highest disease control (72.54 %) and giving highest grain yield (1425 kg/ha) and test weight (58.00 g). This was followed by the fungicides Contaf (0.1%) and Calixin (0.1%) both of which were at par and recorded the minimum mildew intensity of 18.43 and 18.99 per cent respectively and achieved disease control of 66.54 and 65.50 per cent, respectively.

In order of merit rest of the effective treatments were Sulfex (PDI, 20.36 and PDC, 59.94) and botanical NSKE (PDI, 33.47 and PDC, 44.64). Fungicides Carbendazim and Topsin were at par in respect of the disease control. Plain water was effective in reducing the disease (PDI, 32.51 and PDC, 38.80) over unsprayed control (PDI, 54.65).

All the treatments were superior over untreated control in respect of grain yield as well as test weight. However, highest grain yield (1425 kg/ha) and test weight (5.80 g) were obtained in the treatment Karathane (0.1%). This was followed by the treatment Contaf (1342 kg/ha, 548 g), Calixin (1275 kg/ha, 448 g), Tilt (1191 kg/ha, 433 g) and Sulfex (1140 kg/ha, 403 g). However, maximum increases in seed yield (50.92%) and test weight (49.31%) were observed in Karathane, followed by Contaf (47.81%, 46.35%), Calixin (45.08%, 39.75%) and Tilt (41.21%, 31.10%).

Considering the cost : benefit ratio (Table 2) the most economical treatments were Sulfex (1:2) and botanical NSKE (C:B 1:13). Rest of the treatments found economical in order of merit were Contaf (C:B 1:80), plain water (C:B 1:80), Calixin (C:B 1:70) and Carbendazim (C:B 1:50).

Results in the management of mungbean powdery mildew were in conformity with those reported earlier (Shrivastava, 1996; Shetty et al., 1996; Khunti et al., 2002; Singh and Prithivraj, 1997; Singh et al., 2002 and Vijaya, 2004). Results obtained on increased grain yield and test weight in all the treatment over unsprayed control were similar to those reported earlier (Das and Narain, 1990; Kappor and Thakur, 1997; Gupta and Sharma, 2004). Results obtained on cost benefit ratio in respect of the treatment were in consonance with those reported earlier (Sharma, 1991; Khunti et al., 2002; Banyal and Rana, 2003).

From present study it could be concluded that, first spray of plain water followed by second spray

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Mean PDI*</th>
<th>Mean PDC*</th>
<th>Yield* (kg/ha)</th>
<th>Test wt.* (g)</th>
<th>% Increase over control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Yield</td>
</tr>
<tr>
<td>T1</td>
<td>18.99(25.71)</td>
<td>65.50</td>
<td>1275</td>
<td>44.8</td>
<td>45.08</td>
</tr>
<tr>
<td>T2</td>
<td>15.14(22.84)</td>
<td>72.54</td>
<td>1425</td>
<td>58.00</td>
<td>50.92</td>
</tr>
<tr>
<td>T3</td>
<td>20.40(26.59)</td>
<td>59.94</td>
<td>1140</td>
<td>40.3</td>
<td>38.60</td>
</tr>
<tr>
<td>T4</td>
<td>18.43(25.31)</td>
<td>66.54</td>
<td>1342</td>
<td>54.8</td>
<td>47.81</td>
</tr>
<tr>
<td>T5</td>
<td>27.90(31.85)</td>
<td>50.08</td>
<td>1191</td>
<td>43.3</td>
<td>41.21</td>
</tr>
<tr>
<td>T6</td>
<td>33.65(35.45)</td>
<td>41.55</td>
<td>999</td>
<td>40.6</td>
<td>29.25</td>
</tr>
<tr>
<td>T7</td>
<td>33.05(35.07)</td>
<td>41.53</td>
<td>1051</td>
<td>40.1</td>
<td>33.41</td>
</tr>
<tr>
<td>T8</td>
<td>33.47(34.73)</td>
<td>44.64</td>
<td>881</td>
<td>40.6</td>
<td>20.53</td>
</tr>
<tr>
<td>T9</td>
<td>32.51(33.50)</td>
<td>38.80</td>
<td>768</td>
<td>39.5</td>
<td>8.85</td>
</tr>
<tr>
<td>T10</td>
<td>54.65(47.78)</td>
<td>–</td>
<td>700</td>
<td>29.4</td>
<td>–</td>
</tr>
<tr>
<td>S.E.±</td>
<td>0.127</td>
<td>–</td>
<td>9.042</td>
<td>0.088</td>
<td>–</td>
</tr>
<tr>
<td>C.D. (P=0.05%)</td>
<td>0.378</td>
<td>–</td>
<td>26.867</td>
<td>0.263</td>
<td>–</td>
</tr>
</tbody>
</table>

* Average of three replications

Table 1. Efficacy of fungicides, botanical NSKE and plain water on intensity of powdery mildew, grain yield and test weight in Mungbean cv. Kopergaon.
of NSKE and if the disease was not still reduced or controlled, then sprayings with the fungicides either of Karathane (0.1%), Sulfex (0.3%), Contaf (0.1%) or Calixin (0.1%) could effectively and economically manage the mungbean powdery mildew disease.

REFERENCES