STUDIES ON EFFECTIVENESS OF CERTAIN NEW FUNGICIDES IN CONTROLLING STEMPHYLIUM BLIGHT OF ONION SEED CROP

J.N. Bhatia* and Devender Chahal1

Krishi Vigyan Kendra
Ambala - 134 003, India

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ABSTRACT

Stemphylium blight has become a very serious disease of onion causing losses both in bulb as well as seed crops. In addition to old recommended fungicides, now a number of new fungicides are also available in the market to control this disease. In order to achieve the effective control of this disease in seed crop, the present studies were undertaken during the cropping period (rabi season) of 2010-11 & 2011-12 in Ambala district of Haryana. Two years results obtained during the present studies revealed that Tebuconazole 25.9 EC, Propiconazole 25 EC and the combination of Carbendazim 12% + Mancozeb 63% (SAAF) appears to be promising alternatives to the conventional fungicides Mancozeb 75 WP and Copper oxychloride 50 WP for efficient management of stemphylium blight disease of onion seed crop.

Key words: Efficient management, Fungicides, Onion, Stemphylium blight.

India ranks first in area and second in production of onion (Allium cepa L.) in the world. The productivity is however very low i.e. 10.5 tonnes/ha as against 42.5 tonnes/ha in U.S.A. and 38.1 tonnes/ha in Australia (Anonymous, 1990). One of the major factors responsible for this low productivity is a regular incidence of several diseases and pests in this crop. Like purple blotch, stemphylium blight (Stemphylium vesicarium) is also an important foliage disease of onion crop prevalent in almost all the onion cultivated areas of Northern and Eastern India (Gupta et al., 1996; Suhag and Bhatia, 2006). The disease attains severity during prolonged wet period resulting in severe damage to crop (Miller et al., 1978). Under favorable environmental conditions, complete failure of the crop takes place and there is no bulb formation or seed set in both bulb and seed crops.

Control of stemphylium blight is primarily accomplished by the application of fungicides (Srivastava et al., 1995; Gupta et al., 1996). As there is no resistant variety presently available for cultivation in the state, the only alternative to reduce the damage caused by this disease is through the foliar application of fungicides in existing cultivars. Therefore, exploration of more effective fungicides for the control of this disease is unwarranted, which is the subject matter of the present studies.

The field trials were conducted for two consecutive cropping seasons (from October to May) of 2010-11 & 2011-12 in the adopted village (Kadasan) of Krishi Vigyan Kendra, Ambala under the aegis of CCSHAU, Hisar with latest recommended packages and practices of NHRDF, Salaru (Karnal, Haryana) and PAU, Ludhiana(Punjab) by adopting ‘Bulb to Seed’ method of seed production for this crop. Mother bulbs of uniform size (Diameter 4.5-6.5 cm and Weight 60-80 gm) of cultivar ‘Kaali Patti Pyaz’ (Local selection of farmers in Ambala district) were planted during the first week of November in 21 plots and three larger blocks at the spacing of 60x45 cm. Commercial product of different fungicides viz. Tebuconazole 25.9 EC (Folicur); Propiconazole 25 EC (Tilt); combination of Carbendazim 12% + Mancozeb 63% WP (SAAF); Propineb 70 WP (Antracol); Copper oxychloride 50 WP (Blitox) and Mancozeb 75 WP (Indofil M-45) were evaluated for

*Corresponding author’s e-mail: bhatia1960@rediffmail.com
1Krishi Vigyan Kendra (Vill. Tepla), Ambala-133001, Haryana.
their efficacy against stemphylium blight disease of onion. Untreated plots were kept as check. First foliar application of these fungicides was started just after the appearance of disease symptoms in the first week of March followed by three more sprays at an interval of 10 days. On the basis of Percent Disease Index (PDI), the disease scoring was done by taking five plants from each plot on a disease rating scale i.e. 0 to 5, where 0 = no lesions, 1 = 1 to 4 lesions, 2 = 5 to 10 lesions, 3 = 11 to 20 lesions, 4 = 21 to 30 lesions and 5 = more than 30 lesions on each floral stalk. The observations regarding disease incidence were recorded before each spray. Seed yield in each treatment was also recorded and the data of two years was pooled and transformed into angular value sin “ P for statistical calculation.

Two years pooled data presented in Table 1 revealed that all the tested fungicides proved effective in controlling the disease as compared to untreated control. The average disease severity varied from 5.2 to 15.7 per cent in different fungicidal treatments compared to 36.6 per cent in untreated control. Lowest disease severity of 5.2 per cent was recorded with the application of Tebuconazole followed by Propiconazole (8.3 percent). The combination of Carbendazim 12% + Mancozeb 63% WP @ 0.2 per cent was found to be equally effective in controlling stemphylium blight with disease severity of 8.7 per cent. Mancozeb appeared next in order of efficacy followed by Copper oxychloride and Propineb with PDI of 10.2, 12.6 and 15.7 respectively. Mancozeb and Copper oxychloride have been reported most effective and economical fungicides against stemphylium blight and purple blotch disease in vitro as well as under field conditions by several workers (Gupta and Srivastava 1988 & 1993; Srivastava et al., 1995; Gupta et al., 1996; Jakhar et al., 1996). Several fungicides and their combinations have been used to control this disease or, more often, for the control of stemphylium blight and purple blotch diseases together in this crop (Gupta et al., 1996). It is obvious that any fungicide treatment applied for the controlling of stemphylium blight must also be effective against purple blotch disease of the onion crop because, both diseases normally occur together.

Among the new fungicides tested Tebuconazole, Propiconazole and the combination of Carbendazim 12% + Mancozeb 63% WP have been proved highly effective fungicides against this disease and these fungicides can further be used as an alternate fungicide in place of conventional fungicides. Hug et al. (1994) has earlier demonstrated good efficacy of Propineb @ 0.2 percent in controlling purple blotch disease of onion, but in present studies, the highest disease severity of 15.7 percent and lowest increase in seed yield (32 percent) was obtained with this fungicide over untreated control. Tebuconazole and Propiconazole were also found most effective fungicides against purple blotch disease of onion and gave lowest disease severity (6.1 and 7.3 percent respectively) with 73.0 and 66.6 percent increase in seed yield over untreated control under Punjab conditions (Aujla et al., 2010).

The maximum seed yield (3.99 q/ha) was also recorded with the application of Tebuconazole which showed 77.3 percent increase in yield over untreated control. The highly effective fungicide Propiconazole increased onion seed yield by 68.8 percent followed by the combination of Carbendazim 12% + Mancozeb 63% with 60 percent increase in yield. Moreover, the applications of conventional

### TABLE 1: Effect of different fungicides on the control of stemphylium blight disease of onion under field conditions during 2010-11 and 2011-12 rabi seasons

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Concentration (%)</th>
<th>Percent Disease Index (PDI)</th>
<th>Seed Yield(q/ha)</th>
<th>Increase in yield over control(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propineb 70 WP</td>
<td>0.10</td>
<td>15.7 (23.3)*</td>
<td>2.97 (9.80)*</td>
<td>32.0</td>
</tr>
<tr>
<td>Tebuconazole 25.9 EC</td>
<td>0.10</td>
<td>5.2 (13.2)</td>
<td>3.99 (11.54)</td>
<td>77.3</td>
</tr>
<tr>
<td>Copper oxychloride 50 WP</td>
<td>0.25</td>
<td>12.6 (20.8)</td>
<td>3.30 (10.47)</td>
<td>46.6</td>
</tr>
<tr>
<td>Mancozeb 75 WP</td>
<td>0.25</td>
<td>10.2 (18.6)</td>
<td>3.36 (10.63)</td>
<td>49.3</td>
</tr>
<tr>
<td>Propiconazole 25 EC</td>
<td>0.10</td>
<td>8.3 (16.7)</td>
<td>3.80 (11.24)</td>
<td>68.8</td>
</tr>
<tr>
<td>Carbendazim 12% + Mancozeb 63%</td>
<td>0.20</td>
<td>8.7 (17.1)</td>
<td>3.60 (10.94)</td>
<td>60.0</td>
</tr>
<tr>
<td>Control</td>
<td>-</td>
<td>36.6 (37.2)</td>
<td>2.25 (8.53)</td>
<td>-</td>
</tr>
</tbody>
</table>

*Angular transformed values are given in parenthesis*
fungicides viz., Copper oxychloride and Mancozeb also increased the seed yield 46.6 and 49.3 percent, respectively. Lowest increase in seed yield was observed in case of Propineb (32 percent) over untreated check.

The quality seed is the basic input for improving the crop productivity. Non availability of quality seed is a major problem with the farmers. The great fluctuation in seed production of onion from year to year is noticed because of weather vagaries which lead into the development of destructive diseases like stemphylium blight and purple blotch (Pandita, 1994). Control of stemphylium blight by chemicals under field conditions does not appear to be very statistical because of the rapidity with which the disease spreads under optimum environmental conditions during crop growth. Nevertheless, the chemical if sprayed at the proper time can reduce the further spread of this disease and it has been observed that tested fungicides applied at regular intervals (10 days) after the appearance of the disease gave a considerable control. Conclusively based on the results of two years field studies Tebuconazole 25.9 EC, Propiconazole 25 EC and the combination of Carbendazim 12% + Mancozeb 63 % WP appear to be promising alternatives to the conventional fungicides for the effective management of stemphylium blight of onion seed crop even at low doses.

REFERENCES