Some seedling diseases of rapeseed-mustard and their control

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Rapeseed-[Brassica campestris (L.) var. toria Duth. and Full., B. campestris (L.) var. yellow sarson Prain] and mustard [B. juncea (L.) Czern and Coss.] crops have been found to be affected by seedling diseases in the range of 6-15 percent under field conditions particularly when these rabi crops are grown in rotation with short duration kharif crops such as soybean, maize or grain legumes. This results in reduction in plant stand ultimately reflecting in low yield of the crop per unit area particularly at times when these diseases start appearing after normally recommended plant thinning operation in a line sown pure crop or when the crop is sown by broad-casting the seed under the field conditions. However, recommended seeding rates usually compensates for part of the loss. However, in some fields reseeding is required (3). The effect of this changing crop sequence on seedling diseases of rapeseed-mustard has not been reported earlier in India. Hence, the present communication deals with investigating the causes of seedling diseases of rapeseed-mustard and their control through seed treatment with fungicides.

Rapeseed-mustard seedlings exhibiting collar rot, wilting, root and stem rot symptoms were collected from the fields. Isolation of fungi associated with the collected seedlings and test for their pathogenicity was undertaken. Isolations from the diseased seedlings yielded the growth of fungi most frequently of Sclerotium rolfsii Sacc. followed by Rhizoctonia solani Kuhn. AG-2-1 and Fusarium oxysporum Schlecht. Other two fungi F. moniliforme Sheldon and Penicillium spiculisporum SG Lehman (IMI 288298) were also obtained in isolations from some diseased seedlings.

Pathogenicity studies in pot culture under the glass house with seedlings inoculated by S. rolfsii showed distinct symptoms of collar rot which further spread from collar region to root and stem resulting in rotting covered with mycelial growth and sclerotia of the fungus. Seedlings infected by R. solani showed black colour stripes or spots irregular in shape on the stem which spread upward on the stem and laterally enlarged in size resulting collapse of the seedlings within 3-4 days. Seedlings inoculated by F. oxysporum showed distinct marginal yellowing of cotyledons and true leaves followed by wilting of the plants with the symptoms developing in both the directions of the plants. This is, however, in contrast with the results obtained by Rai and Singh (2) who reported unilateral development of symptoms in mustard in response to infection of F. oxysporum.

Though F. moniliforme and P. spiculisporum were isolated less frequently from the diseased seedlings, in the pathogenicity tests they were found to cause more pre-emergence mortality than the post-emergence death indicating that these could be potential pathogens. This appears to be the first report of F. moniliforme and P. spiculisporum causing damping-off of mustard seedlings. Earlier Penicillium spp. was reported to cause seed rot and damping off of mustard seedlings under laboratory conditions (1).

To study the effect of fungicidal seed treatment, five fungicides viz., thiram (tetramethyl thiuram
Table 1. Effect of fungicidal seed treatment on plant stand of mustard plants

<table>
<thead>
<tr>
<th>Fungicides</th>
<th>Plant stand (%)&lt;sup&gt;a&lt;/sup&gt;</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>S. rolfsii</td>
</tr>
<tr>
<td>Indofil M-45</td>
<td>67.1(84.2)</td>
</tr>
<tr>
<td>Tospin-M</td>
<td>63.6(79.5)</td>
</tr>
<tr>
<td>Thiram</td>
<td>67.3(85.2)</td>
</tr>
<tr>
<td>Bavistin</td>
<td>62.2(78.0)</td>
</tr>
<tr>
<td>Apron 35 SD</td>
<td>66.4(83.7)</td>
</tr>
<tr>
<td>Check (untreated)</td>
<td>23.3(15.7)</td>
</tr>
</tbody>
</table>

C.D. at P = 0.5 7.8 21.1 11.4

<sup>a</sup>Figures in parentheses are actual % plant stand and others are arcsin transformed values

Disulphide 75 w.p., Bavistin (methyl-2 benzimidazole carbamate 50 w.p.), Apron 35 SD [methyl D, L - N-(2, 6 - dimethylphenyl) - N - 2 (2, methoxyacetyl) alaninate], Tospin-M (thiophanate methyl 70w.p.) and Indofil M-45 [zinc ion (2%) and manganese ethylene bis dithiocarbamate 80w.p.] were used @ 2 g/kg seed. Mustard (B. juncea) var. "Varuna" was used as test variety and the seeds were treated with each of the above mentioned fungicides. Untreated seeds served as check. One hundred treated and untreated seeds were sown at a depth of 2 cm in sterilized soil artificially infested separately with each of the three pathogens in plastic pots of 10 cm size maintaining four replications for each of the fungicides and check. Plants were observed up to 35 days after sowing and final percent plant stand recorded. The per cent plant stand was calculated by the following formula.

\[
\text{Plant stand (%) = \frac{\text{Number of healthy plants left}}{\text{Total number of seeds sown}} \times 100}
\]

Seed treatment with all the fungicides showed significant (P=0.05) increase in plant stand in soils infested with S. rolfsii and F. oxysporum as compared to check (Table 1). But in the case of soil infested with R. solani, only two fungicides viz., Tospin-M and Bavistin showed significant (P=0.05) increase in the plant stand though the percentage range of plant stand with respect to these two fungicides was only 35.2 and 33.5 percent respectively as compared to plant stand of 12.7 percent in untreated seeds. Maximum plant stand of 85 percent was obtained with Thiram seed treatment in case of S. rolfsii infestation. However, Tospin-M seed treatment showed maximum plant stand in the case of soil infested with R. solani and F. oxysporum (Table 1) and good control of seedling infection of mustard caused by S. rolfsii.

REFERENCES


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