EFFECT OF TRICHODERMA SPP. ON THE GROWTH OF FUSARIUM MONILIFORMAE ISOLATED FROM COTTON SEED*

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ABSTRACT

The seed-borne pathogen Fusarium moniliformae was isolated from cotton seed. The bioagents viz., Trichoderma viride, T. hamatum, T. harzianum, T. longiforum and T. koningii were tested for their antagonistic property against F. moniliformae by direct bit placement method. All the biological agents were significantly superior over control in checking the growth of F. moniliformae. Among all the biological agents T. viride was significantly superior than the rest of the biological agents.

India is an important cotton growing country with the largest acreage under cotton in the world. India also has unique distinction of growing all four commercially cultivated Gossypium species viz., G. arborium (Deshi), G. herbarium (Asiatic), G. hirsutum (American upland) and G. barbadence (Egyptian) and their hybrids (Mathews, 1989). The crop is infected by many seed-borne pathogens viz. Alternaria macrospora (Bashi et al., 1983 ), Botryodiplodia theobromae, Fusarium moniliformae, Macrophominaphaseolina, and Xanthomanas compestris pv. malvacearum which cause substantial losses in the yield (Mukewar et al., 1998). Fusarium moniliformae causes heavy reduction in seed germination (Alagarsamy et al., 1989 and Mukewar, 1993 ). Seson et al., (1986) reported the reduced infection of Fusarium moniliformae on cotton seed by seed treatment with Trichoderma viride in the glass house. The seed of cotton cv. Namdeo was collected from All India Cotton Improvement Project, Mahatma Phule Krishi Vidyapeeth, Rahuri in the year 1999. The isolation of Fusarium moniliformae from the cotton seed was made by ESTA’s standard blotter test as described by Neergard (1979). The colonies of F. moniliformae were picked up with the help of the sterilized inoculating needle and transferred on PDA slants and incubated at 27±2°C for 7 days. The pure culture was obtained by adopting single spore isolation and then Kotch’s postulates were proved. The bioagents viz., Trichoderma viride, T. longiforum, T. harzianum, T. hamatum and T. koningii were tested for their antagonistic property against F. moniliformae by direct bit placement method (Bordent et al., 1971). The experiment was laid out in completely randomized block design with four replications.

The bulk potato dextrose agar medium was prepared, sterilized in autoclave at 1.05 kg/cm² pressure and required plates were poured. Quadruplet potato dextrose agar plates were inoculated with a bit (5 mm dia.) of seven days old growth of biological agent at one corner of plate and subsequently inoculated with a bit (5 mm dia.) of Fusarium moniliformae at opposite corner of the plate keeping 15 mm distance form periphery. The inoculation of pathogen alone in another plate served as control. The plates were incubated in incubator at 27±2°C. The growth of the F. moniliformae was measured on seventh day from incubation. The per cent inhibition of growth of the F. moniliformae by each of the antagonist was calculated by the formula outlined by Arora and Upadhyay (1978).

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Table 1. Effect of biological agents on the growth of *Fusarium moniliformae* in-vitro

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Biological agents</th>
<th>Mean colony diameter* (mm)</th>
<th>Per cent inhibition of <em>F. moniliformae</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Trichoderma viride</em></td>
<td>05.25</td>
<td>94.00</td>
</tr>
<tr>
<td>2</td>
<td><em>Trichoderma longiforum</em></td>
<td>10.50</td>
<td>88.00</td>
</tr>
<tr>
<td>3</td>
<td><em>Trichoderma harzianum</em></td>
<td>08.00</td>
<td>90.86</td>
</tr>
<tr>
<td>4</td>
<td><em>Trichoderma hamatum</em></td>
<td>11.25</td>
<td>87.14</td>
</tr>
<tr>
<td>5</td>
<td><em>Trichoderma koningii</em></td>
<td>17.50</td>
<td>80.00</td>
</tr>
<tr>
<td>6</td>
<td>Control</td>
<td>87.50</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>S.E. ±</td>
<td>00.69</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>C.D. at 5%</td>
<td>02.06</td>
<td>-</td>
</tr>
</tbody>
</table>

* Average of four replications.

The results on the effect of biological agents on the growth of *F. moniliformae* are presented in Table 1. It is revealed from the results that all the biological agents viz., *Trichoderma viride*, *T. longiforum*, *T. harzianum*, *T. hamatum* and *T. koningii* were significantly superior over the control in checking the growth of *F. moniliformae*.

Among all the biological agents, *T. viride* recorded minimum mean colony diameter of *F. moniliformae* i.e. 5.25 mm against 87.5 mm in the control. It was followed by *T. harzianum* (8.00 mm). The other biological agents showed colony diameter in between 10.5 to 17.5 mm. Among all the biological agents *T. viride* showed maximum growth inhibition of *F. moniliformae* i.e. 94.00 per cent followed by *T. harzianum* (90.86 %). However, *T. longiforum*, *T. hamatum* and *T. koningii* showed 88.00, 87.14 and 80.00 per cent growth inhibition of *F. moniliformae*, respectively. The above results are more or less in agreement with Seson et al. (1986) who reported the reduced infection of *F. moniliformae* on cotton seed by seed treatment with preparations from *Trichoderma viride* in the glasshouse.

REFERENCES