Monrovia Nursery Company Research Report #874

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# Biological Control of Pythium and Rhizoctonia in Seed Flats

## Abstract

Two biologically antagonistic fungi known as Trichoderma harzianum and Trichoderma koningii were applied as a soil drench to determine their ability to control Pvthium and Rhizoctonia damping-off in greenhouse flats. Flats were sown with Fatsia japonica seeds and treatments included control, inoculation with Trichoderma, and Aliette and Subdue drenches. Trichoderma inoculated flats had increased germination, larger seedling size, and darker green foliage.

## Discussion

Aliette and Subdue are presently being used as chemical fungicides for Pvthium, and Terraclor (PCNB) is similarly being used for Rhizoctonia. Trichoderma fungi which are biologically antagonistic to both Pythium and Rhzoctonia species were used in six treatments and compared to the above chemical treatments and a control. The Trichoderma labeled Promot consisted of a liquid suspension of two species: Trichoderma harzianum and Trichoderma koningii. Each treatment consisted of two flats of seed flat mix planted with 250 Fatsia japonica seeds each. Coarse silica sand was spread over the surface.

Drenches were made with the Promot at the recommended rate of 1g/1,000 ml* and applied to treatments 3 and 4 previously inoculated 2 weeks earlier with Pythiurn ultimum and Pythium vexens at the 1g/l,000 ml and 0.5g/1,000 ml rates, respectively. Treatment 5 was drenched with the recommended rate of Terraclor (PCNB) 2 weeks following inoculation with Rhizoctonia solani at the rate of 1g/1,000 ml. Treatments 6 and 7 were drenched with the recommended rate of Promot, but Treatment 7 received twice the amount of Rhizoctonia (2g/1,000 ml) as the previous two treatments. Treatment 8 received twice the recommended rate of Promot (2g/1,000 ml) and the 1g/1,000 ml rate of Rhizoctonia inoculum. Treatment 9 was used as the control. In the above treatments, different amounts of Pythium or Rhizoctonia inoculum and the recommended rate of Promot were employed to determine the effectiveness of Trichoderma at different pathogen population levels.

*g/1,000 rnl indicates grams of infested millet suspended in 1,000 ml of water.

Table 1

Average Percent Germination In Relation To Time After Sowing

| Treatment | Treatment | Description | 4 Wks | 6 Wks | 8 Wks | 10 Wks | 12 Wks | 14 Wks |
|---|---|---|---|---|---|---|---|---|
| 1 | Subdue 4 oz/100 | Pythium 1g/1,000 ml/Flat | 7.2 | 13.4 | 10.6 | 11.2 | 11.0 | 11.2 |
| 2 | Aliette 8 oz/100 | Pythium 1g/1,000ml/Flat | 5.6 | 16.8 | 15.2 | 15.4 | 15.8 | 15.4 |
| 3 | Trichoderma 1g/1,000 ml | Pythium 1g/1,000 ml/Flat | 7.0 | 17.6 | 15.6 | 14.4 | 14.8 | 14.6 |
| 4 | Trichoderma 1g/1,000 ml | Pythium 0.5g/1,000 ml/Flat | 7.4 | 14.8 | 14.0 | 14.6 | 15.4 | 14.8 |
| 5 | PCNB 8oz/100 | Rhizoctonia 1g/1,000 ml/Flat | 0.2 | 1.6 | 1.8 | 2.4 | 2.8 | 2.8 |
| 6 | Trichoderma 1g/1,000ml | Rhizoctonia 1g/1,000 ml/Flat | 3.6 | 5.4 | 3.8 | 3.6 | 3.6 | 3.4 |
| 7 | Trichoderma 1g/1,000 ml | Rhizoctonia 2g/1000 ml/Flat | 4.6 | 10.8 | 6.8 | 6.8 | 7.2 | 7.0 |
| 8 | Trichoderma 2g/1,000 ml | Rhizoctonia 1g/1,000 ml/Flat | 6.2 | 9.8 | 8.2 | 9.0 | 8.6 | 8.0 |
| 9 | Control | | 0.8 | 1.8 | 1.6 | 1.6 | 1.2 | 1.2 |

Fatsia japonica seeded flats at 250 seeds/flat
Date of sowing: 7-22-91
Date treated with Pathogens: 7-29-91
Fungicides: 7-30-91
Trichoderma: 8-13-91

Note: The Batch of seed used was old which may explain low germination percentages.

## Results

The Promot provided similar germination percentages compared to both the Allette and Subdue in Pythium infested flats, (Table 1). Additionally, seedlings in the Promot treated flats were generally greener and larger than those in the Aliette and Subdue treated flats. This seems to support the theory that Trichoderma fungi can inhibit low population levels of a pathogen that may not cause damping-off disease, but "nibble" at the roots and reduce growth and performance. The greater Trichoderma to Pythium ratio of Treatment 4 compared to that of Treatment 3 did not significantly improve germination.

In the Rhizoctonia inoculated flats, disease control was directly correlated to pa thogen/antagonist ratios. The higher the ratio of Trichoderma to Rhizoctonia applied to the flats, the higher the germination percentage. However, Trichoderma was much less effective in reducing seedling mortality in the Rhizoctonia inoculated flats than in the Pythium inoculated flats. The Terraclor (PCNB) treatment had the lowest germination percentage indicating that it may be phytotoxic to the Fatsia seedlings. All treatments had higher germination percentages than the control.

## Conclusion

The Promot could be used as an alternative to the chemical fungicides to control Pythium and Rhizoctonia in greenhouse flats, but further studies w i1l be conducted to determine its success on a wider variety of plant species.

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