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Evaluation of fungicides and biofungicides to control Phytophthora root rot and Rhizoctonia root rot on red maple

Abstract

Phytophthora nicotianae and *Rhizoctonia solani* are the well described soilborne pathogens of concern causing root rot in red maple plants (*Acer rubrum* L.), resulting in substantial economic losses. The management of root and crown rot disease in red maple is a big challenge. The objective of this study was to test the efficacy of several fungicide and biofungicide products to control Phytophthora and Rhizoctonia root rot on red maple plants. In the greenhouse study, treatments including non-treated, inoculated and non-treated, non-inoculated controls were arranged in a completely randomized design with six replications. Red maples planted in no. 1 nursery containers were artificially inoculated with *P. nicotianae* or *R. solani*. Plant height, plant width, total fresh weight and root fresh weight were measured, and roots were assessed for root rot disease severity on a scale of 0-100 % roots damaged. All tested fungicides and biofungicides reduced Phytophthora and Rhizoctonia root rots on red maple plants compared to the non-treated, inoculated control. Fungicides, such as mefenoxam, oxathiapiprolin, pyraclostrobin + boscalid, and pyraclostrobin provided the most effective control of Phytophthora root rot. Similarly, pyraclostrobin + boscalid and pyraclostrobin followed by biofungicides *Bacillus amyloliquefaciens* strain F727 and *Trichoderma harzianum* Rifai strain T-22 + *T. virens* strain G-41 were most effective in suppressing Rhizoctonia root rot. There were no differences in plant height, plant width, plant fresh weight and root fresh weight among the treatments. These findings will help nursery growers to treat Phytophthora and Rhizoctonia root rot in red maple plantations.

Keywords: biofungicides, fungicides, nursery production, *Phytophthora nicotianae*, *Rhizoctonia solani*, soilborne disease management

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