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Management of Phytophthora root rot of boxwood using biofumigants in field production

Abstract

Phytophthora root rot caused by *Phytophthora nicotianae* is one of the major limitations faced by boxwood growers. In this study, we evaluated the efficacy of different biofumigants combined with solarization for managing Phytophthora root rot of boxwood. Field experiment was conducted at the Otis Floyd Nursery Research Center, McMinnville, TN in 2019 and 2020. Ground beds were artificially inoculated with *P. nicotianae*, biofumigants were seeded, incorporated at flowering stage, and then solarized for a month. Inoculated, non-biofumigated, non-covered and non-inoculated, non- biofumigated, non-covered plots were used as controls. Treatments were yellow mustard, turnips, arugula, mighty mustard, dwarf essex rape, amara mustard, oriental mustard, biofumigant DOMINUS, mustard meal and only solarization. In 2019, all treatments except both rate of DOMINUS significantly reduced Phytophthora root rot disease severity compared to the inoculated, non-biofumigated, non- solarized control. Treatments such as amara mustard, oriental mustard, mighty mustard and solarization alone resulted lower Phytophthora root rot severity compared to the inoculated, non-biofumigated, non- solarized control boxwood plants. Average height and width increase, total plant weight and fresh root weight were not significantly different among treatments. In 2020, all treatments significantly reduced Phytophthora root rot disease severity compared to the inoculated, non-biofumigated, non-solarized control boxwood plants. Treatments such as yellow mustard, amara mustard, oriental mustard, argula and mighty mustard resulted lower Phytophthora root rot severity compared to the inoculated, non- biofumigated, non-solarized control. Boxwood plants grown in Mustard meal and non-inoculated, non- treated plots had a higher increase in plant height compared to the inoculated, non-biofumigated, non- solarized control. Average width increase, total plant weight and fresh root weight were not significantly different among treatments. This finding could be used by boxwood growers to manage Phytophthora root rot of boxwood in field conditions.

Keywords: Biofumigation, *Phytophthora nicotianae*, boxwood

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