Biocontrol Agent Studied for *R. Solani* of Creeping Bentgrass

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Trichoderma harzianum Rifai has been used as a biocontrol agent to protect plants against root, seed, and foliar diseases and storage rots. Results from field trials indicate that isolates of the biocontrol agent work well under different environmental conditions, possibly biocontrol of *Rhizoctonia solani* on creeping bentgrass plants. However, a number of *T. harzianum* strains must be selected for their activity against pathogens on different crops because the survival traits of these strains can be strongly influenced by crop-specific environmental factors. Studies are now taking place with creeping bentgrass.

Biocontrol agents differ fundamentally from chemical fungicides in that they must grow and proliferate to be effective. Therefore, effective antagonists must become established in crop ecosystems and remain active against target pathogens during periods favorable for plant infection. The survival ability of biocontrol agents needs to be surveyed and associated with biocontrol effects.

Introduced strains of *Trichoderma* spp. are difficult to distinguish from indigenous strains. Moreover, the distribution of the biocontrol agent is difficult to ascertain on crop plants. Production of strains containing reporter or marker genes has provided a new tool for detection.

Transformed strains must be genetically stable and able to maintain their biocontrol activity after introduction to soil or foliage. Results from our mycelial growth rate and biological control of brown patch disease tests indicated there might be a positive correlation between the growth rate and biocontrol ability of transformants. Consequently, it is important to compare the physiological traits and biocontrol ability of the transformants with original strains before carrying out time-consuming ecological studies.

Trichoderma spp. were detected three hours after application and conidia were seen one day after treatment on all parts of creeping bentgrass plants. This widespread distribution probably occurred because of the high spray volume to surface area used. Creeping bentgrass plants are small with a relatively dense but shallow root system. Conidia are easily carried by mass flow of water over the root surface in soil. Similarly, spray applications in field trials produced high levels of root colonization by *T. harzianum* strain.

In our experiments, both transformed and wild-type *Trichloderma* strains colonized and proliferated on all parts of creeping bentgrass plants for the duration of the experiments.

It has been demonstrated that *T. harzianum* produces enzymes that are toxic to a wide range of fungi. The data in this paper indicate that *T. harzianum* damages *R. Solani* at a distance. However, there could be several mechanisms by which this occurs, and several kinds of metabolites toxic to *R. Solani* might be produced by *T. harzianum*. The findings in this paper provide insight for future research.

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