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Effect of dark septate endophytic fungi treatment on the belowground microbial community of the Allium plant

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Soil microorganisms play an important role in the nutrient acquisition for plants. With the increasing concerns for environmental friendly farming, low input agricultural practices using microbial agents will be promising for the enhancement of plant growth and the induction of tolerance to various stresses. Our recent studies showed that dark septate endophyte (DSE) fungi could help several plants to grow under unfavorable environmental conditions. In this study, we aimed to analyze the effect of DSE fungi on the belowground microbial community of the Allium plant. Allium (*Allium fistulosum*) was grown in a commercial culture soil (Ginnobaido) inoculated with each of DSE fungi, *Phialocephala fortinii* LtPE2 or *Veronaeopsis simplex* Y34, in a nursery pot. A couple of DSE treatments at different soil pH (5.0 and 6.5) were prepared to examine the effect of pH on DSE colonization in plant. Total DNAs of rhizosphere and endophytic communities were subjected to T-RFLP profiling analyses targeting bacterial 16S-rRNA gene and fungal ITS region. *V. simplex* Y34 colonized successfully on the plant root, while *P. fortinii* LtPE2 did not. The DSE colonization was more efficient at pH 5.0 than at pH 6.5. Fungal diversity index was 1.48, 1.30, 3.01, 2.30 and 2.85, whereas bacterial diversity were 3.71, 3.70, 3.91, 3.23 and 3.38 for the treatments with *P. fortinii* LtPE2 (pH 5.0), *P. fortinii* LtPE2 (pH 6.5), *V. simplex* Y34 (pH 5.0), *V. simplex* Y34 (pH 6.5) and control group, respectively. ? These results suggest that the high degree of DSE colonization with *V. simplex* Y34 at pH 5.0 resulted in higher microbial diversity. NMDS ordination on the T-RFLP profiles of rhizosphere soil showed a distinct clustering of communities across the treatments, suggesting the influence of the DSE treatment on the bacterial and fungal communities. This work was supported by Council for Science, Technology and Innovation (CSTI), Cross-ministerial Strategic Innovation Promotion Program (SIP).