Compost fungi allow for effective dispersal of putative PGP bacteria

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Abstract

Use of compost is a common agricultural practice. It improves soil fertility by adding nutrients and plant growth promoting (PGP) microorganisms. The role of bacterial-fungal interactions for compost-driven fertilization, however, is still poorly understood. In this study, we investigated whether putative PGP bacteria associate to and disperse along mycelia of fungal isolates. A 'Fungal highway column system' was used to isolate and characterize fungal—bacterial couples derived from commercial compost (C), non-composted bulk soil (BS) and rhizosphere soil with compost application (RSC). Bacterial-fungal couples were identified by 16S and 18S rRNA gene sequencing and isolated bacteria were tested for representative PGP traits. Couples of fungi and associated migrator bacteria were isolated from C and RSC only. They included the fungal genera Aspergillus, Mucor, Ulocladium, Rhizopus and Syncephalastrum, and the bacterial genera Rhodococcus, Bacillus, Pseudomonas, Agrobacterium, Glutamicibacter and Microbacterium. Many of migrator bacteria in RSC and C showed PGP traits (e.g., tryptophane—induced auxin synthesis or phytate mineralizing activity) suggesting that fungi contained in C and RSC allow for dispersal of putative PGP bacteria. Next to being provider of nutrients, compost may therefore be source for PGP bacteria and fungal mycelia serving as networks for their efficient dispersal.

Author keywords

Bacteria-fungi interactions; Bacterial dispersion; Compost; Plant growth-promoting bacteria; Rhizosphere soil