

Short-term effects of cover grass intensity on soil microbial communities in an apple orchard

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Abstract

Soil microbiota play an important and diverse roles in horticultural crop nutrition or productivity. However, the soil microbial community composition and the relationships within the taxa in the microbial community populations after cover grass treatments in apple orchards are not well understood. We analysed the microbial community diversity, composition and microbial network of an apple orchard after covering with native wild grasses at different intensities for 2 years in the Loess Plateau, China. The cover grass intensities were 0%, 20%, 40%, 60% and 80%. Soil microbial community diversity was not obviously change by cover grass in the apple orchard. Cover grass altered the microbial bacterial community compositions, their changes exhibited significant differences at the phylum level that were caused by the Proteobacteria, Bacteroidetes, Chloroflexi, Gemmatimonadetes, Nitrospirae. However, low-intensity (20%) and moderate-intensity (40%) treatments were the only cover grass intensities that altered the soil fungal community composition; but their changes did not exhibit significant differences at the phylum level. The positive links among the bacterial taxa decreased with the increasing cover intensity, primarily among Proteobacteria, Acidobacteria, Actinobacteria, Chloroflexi and Gemmatimonadetes. Although cover grass increased the positive links between fungal taxa, these taxa were reduced with the increasing cover intensity. Here we demonstrate that cover grass changed the soil microbial community, and the changes may be attributed to the given phyla in the bacterial community; furthermore, the antagonistic effect between the soil bacterial and fungal communities was significantly increased by higher coverage than by lower coverage.

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