



Effects of different management practices on fungal biodiversity in agricultural soils

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Symbiotic associations between arbuscular mycorrhizal fungi (AMF) and plant roots are widespread in natural environments and provide a range of benefits to the host plant. These include improved nutrition, enhanced resistance to soil-borne pests, diseases, and drought, as well as tolerance to heavy metals. In addition, the presence of a well developed AMF hyphal network improve the soil structure.

As obligate mutualistic symbionts these fungi colonize the roots of many agricultural crops and it is often claimed that agricultural practices (use of fertilizers and biocides, tillage, dominance of monocultures and the growing of non-mycorrhizal crops) are detrimental to AMF. As a result, agro ecosystems impoverished in AMF may not get the fully expected range of benefits from these fungi.

Using molecular markers on DNA extracted directly from soil and roots we studied the effects of different management practices (tillage and nitrogen fertilization) on the AMF populations colonizing an experimental agro ecosystem in Central Italy. Fungi in roots and soil were identified by cloning and sequencing a region of 550bp of the 18S rDNA and 600bp of the 28S rDNA.

In symbiosis with the maize roots we detected only members of Glomeraceae group A that showed decrement in number under nitrogen fertilization.

Instead in soil were mainly present members of two AMF groups, respectively Gigasporaceae and Glomeraceae group A. In addition only the low input management practices preserve also members of Diversisporaceae and Glomeraceae group B.

From our study we can conclude that agricultural practices can directly or indirectly influence AMF biodiversity. The result of this study highlight the importance and significant effects of the long term nitrogen fertilization and tillage practices on specific groups of fungi playing a key role in arable soils.

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