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The impact of ecosystem degradation on the diversity of AM fungal communities associated to shrub species from the semiarid Spanish southeast

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Both the incidence of some soil environmental factors and the disturbance of natural plant communities, are often accompanied or preceded by loss of key physical-chemical and biological soil properties. In particular, plant community degradation causes disturbance of AM inoculum potential which is a critical ecological factor to help further plant developments in degraded habitats. The effect of disturbance of the vegetation cover on AM fungal population (number and diversity), is particularly relevant in the case of shrub communities, characteristics of semiarid Mediterranean ecosystems. In this context, a series of experiments have been carried out based on five representative communities of shrub species from southeast Spain. Both morphological and molecular approaches were followed for characterization of AM fungi associated to the target plant species, either as spores, extra-radical mycelia or actually colonizing their roots. The experiments can be grouped into three categories:
(i) Analyzing the effect of plant cover degradation status. We demonstrated that degradation affects negatively the density and diversity of AM fungi as spores.
(ii) Analyzing the community composition, and the temporal colonization dynamics, of AM fungi colonizing the roots of representative shrub species. It was found that the different co-occurring plant species are colonized by AM fungal communities of different composition, and that many AM fungal sequences detected in plant roots cannot be related to known AM fungal taxa present as spores in the rhizosphere soil.
(iii) Assessing the effect of soil disturbance on AM fungal populations. It was found that, in spite of the induced perturbation, the phylotype diversity of AM fungi in receptor plants exclusively colonized by the AM propagules from the altered soil was not reduced in comparison to that of plants exclusively colonized from donor plants taken from the target ecosystem, used as inoculum source.
The results will be discussed in terms of how the extent of AM fungal population changes, as induced by ecosystem disturbances, can affect AM managements.