ROOT SECONDARY METABOLITES AND SOIL FUNGI DIVERSITY

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Complex positive and negative feedback mechanisms between soil micro-organisms and plant roots affect the composition of species-rich vegetations such as grassland communities. Current avenues in research that explore the nature of such feedback mechanisms include associations with mycorrhizal fungi and plant–pathogen interactions, amongst others. In this context, the present study explores the effects of root secondary metabolites from two umbellifers on soil fungi. *Peucedanum cervaria* is the character species of the dry grassland community Peucedanetum cervariae. The co-occurring *Peucedanum alsaticum* is a casual species. Soil fungi included isolates from the rhizosphere soil of the umbellifer's tap roots, the most prominent genera being *Acremonium* and *Penicillium*. Roots of *P. cervaria* contain an extremely sticky resin that is composed of the monoterpene alpha-pinene, the polyacetylene falcarindiol, and a complex mixture of lupane-, ursane-, and oleanane-type triterpenoids. *P. alsaticum* differs from *P. cervaria* by predominantly accumulating alkylbutenolides in its tap root that appear as a latex upon damage. The evaluation of effects on growth and development of germinating conidia of 20 microfungi, 10 isolates from the rhizophere of each umbellifer, in a dilution series of the secondary metabolites yielded the following results: firstly, as expected, all fungal isolates were inhibited to some extent; secondly, secondary metabolites from the dominant *P. cervaria* inhibited fungi from its own rhizosphere less than those *from P. alsaticum*. A comparable phenomenon was not observed for *P. alsaticum*. These results suggest that dominant plant species may select for tolerance against its chemical defence in soil fungi, either as exudates or during decomposition. Thus, diversity of dominant plant species may be required to maintain fungal biodiversity in the rhizosphere soil that again may stabilize the community. This implies a function for secondary metabolite diversity that is beyond chemical defence.