



Universität
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Research Project

Community and population studies of arbuscular mycorrhizal fungi using mitochondrial markers genes

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Project title Community and population studies of arbuscular mycorrhizal fungi using mitochondrial markers genes

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Organisation / Research unit

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The majority of plants are partners in the arbuscular mycorrhizal symbiosis. Arbuscular mycorrhizal fungi (AMF) play an important role in plant nutrient uptake and plant growth. Among the host plants of this symbiosis are many agriculturally important plants. AMF cannot be cultivated without their plant hosts and are therefore difficult to study. In the past few years, molecular marker genes have been used to identify AMF and allowed new insights into the species structure of communities of AMF in field settings. Previously, spores were used to distinguish AMF species, which can be problematic as the spores are not always formed. The nuclear ribosomal RNA genes still are the only molecular marker available covering all families of AMF. Numerous sequence variants of the variable regions of rDNA occur in every AMF spore, which makes it difficult to distinguish the gene variation within individuals from the variation among isolates of the same species or even closely related species. Some other genes also show a high number of variants within the fungal organism. We have previously shown that mitochondrial large subunit rDNA (mtLSU) does not show variants within fungal isolates. It is therefore a promising molecular marker at the fine-scale taxonomic level, and in some respects superior to nuclear-encoded rDNA. In the present project, mtLSU is used as a molecular marker to study the genetic structure of AMF species on a local and global scale. We have developed molecular tools to characterize mtLSU sequences of *Glomus* spp. within the roots of their host plants and are applying these tools in a variety of field settings. We also have sequenced mtLSUs from genera other than *Glomus* to extend the set of fungal taxa we can analyze.

Keywords mitochondrial genes, phylogeny, DNA sequence markers, arbuscular mycorrhiza, molecular ecology, Glomeromycota

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