Functional diversity in arbuscular mycorrhiza - the role of gene expression, phosphorous nutrition and symbiotic efficiency

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)

ID 487771
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Year 2010
Title Functional diversity in arbuscular mycorrhiza - the role of gene expression, phosphorous nutrition and symbiotic efficiency
Journal Fungal Ecology
Volume 3
Number 1
Pages / **Article-Number** 1-8
Keywords Arbuscular mycorrhiza, Arbuscular mycorrhizal fungi, Colonization ability, Colonization morphology, Functional diversity, Glomeromycota, Plant and fungal compatibility, Symbiotic efficiency
Arbuscular mycorrhizal fungi (AMF) are of great ecological importance, since arbuscular mycorrhiza (AM) is the most widespread plant symbiosis and often improves plant productivity and resistance to nutrient stress. AMF are essentially obligate biotrophs; their life cycle includes growth and proliferation within the host root and surrounding soil. The mutual recognition and the development of the symbiosis will trigger specific developmental programs in both organisms. Recent studies collectively indicate that there exists a functional diversity in AM, as different combinations of host plant and AMF have different impacts on the morphology, nutritional status, symbiotic efficiency and gene expression patterns in the symbiosis. We suggest that differential expression of symbiosis-associated genes among different AM associations is a phenotypic response to the different fungal and plant genotypes involved and the environment they inhabit; functional diversity is therefore the rule rather than the exception and necessitates carefully replicated experiments that combine close observation of morphology, physiological traits and gene expression.

Publisher Elsevier
ISSN/ISBN 1754-5048
URL http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B8JGS-4XJW06B-2&_u ser=946149&_coverDate=0
=search&_sort=d&_docanchor=&view=c&_acct=C000049002&_version=1&_urlVersion= 0&_userid=946149&md5=ca4
edoc-URL http://edoc.unibas.ch/dok/A5842296
Full Text on edoc No;
Digital Object Identifier DOI 10.1016/j.funeco.2009.07.003
ISI-Number WOS:000274377600001
Document type (ISI) Review