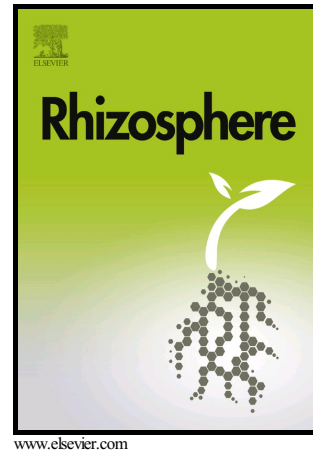


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Stephan Unger, Martina Friede, Katharina Volkmar, Janik Hundacker, Wolfram Beyschlag



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## Relationship between mycorrhizal responsiveness and root traits in European sand dune species

Stephan Unger\*, Martina Friede, Katharina Volkmar, Janik Hundacker, Wolfram Beyschlag

Department of Experimental and Systems Ecology, University of Bielefeld, Universitätsstr. 25, D-33615 Bielefeld, Germany

\*Corresponding author: tel.: +49 521 106 5574. email: stephan.unger@uni-bielefeld.de

### Abstract

Evolutionary detachment from mycorrhizal symbiosis and the resulting need for efficient autonomous nutrient acquisition may have induced a relationship between root architecture and mycorrhizal responsiveness in modern land plants. This study examines the predictability of mycorrhizal responsiveness from root architecture within the context of naturally co-occurring species from the same ecosystem type and age in an environment with the same nutrient, light and watering conditions. We attempted to relate 16 root morphological parameters with mycorrhizal responsiveness and mycorrhizal parameters in 13 species frequently co-occurring in European sand dune ecosystems. We found clear relationships of root architecture with mycorrhizal responsiveness, hyphal density and colonization level. All mycorrhizal parameters could be reliably predicted from a combination of root traits, involving ratio of cortex / central cylinder, root / shoot ratio and the number of forks per root length. This indicates the existence of the proposed relationship between root architecture and mycorrhizal responsiveness in the context of comparing differentially mycotrophic species from similar environments under similar conditions. However, surprisingly we did not find root architecture to be clearly adaptable towards AMF. Apparent changes in root architecture with mycorrhization in the studied species are thus rather to be evaluated as AMF effects on plant development, than as a direct adaptation of the root system to mycorrhizal foraging.

**Keywords:** arbuscular mycorrhizal fungi; mycorrhizal responsiveness; root architecture; root morphology; *Glomeromycota*

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