

Publication

Expression of major intrinsic protein genes in *Sorghum bicolor* roots under water deficit depends on arbuscular mycorrhizal fungal species

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Drought is a limiting factor for crop plant production, especially in arid and semi-arid climates. In this study, sorghum (*Sorghum bicolor*) was inoculated with two arbuscular mycorrhizal fungi, either the standard *Rhizophagus irregularis* or the desert-adapted *Rhizophagus arabicus*, and grown in experimental microcosms under well-watered or drought conditions. We investigated gene expression of selected major intrinsic proteins (MIPs) of sorghum in these mycorrhizal plants, compared to non-inoculated, well-watered sorghum (control). Colonization with *R. irregularis* induced the MIPs SbPIP2.2 and SbPIP2.5, regardless of whether sorghum plants were well watered or not. Root colonization with *R. arabicus*, however, caused an exclusive, strong reduction in the transcript levels of three MIP genes (SbTIP2.1, SbNIP1.2, SbNIP2.2) under drought conditions. We also studied water transport properties of mycorrhiza-regulated MIPs. One particular MIP, SbPIP2.8, was associated with high water permeability of roots. Expression of this gene was strongly repressed in all sorghum plants (mycorrhizal and non-inoculated) that experienced drought conditions.

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