NITRIC OXIDE ACCUMULATION DURING THE EARLY STAGES OF ARBUSCULAR MYCORRHIZAL SYMBIOSIS

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Nitric oxide (NO) is an important signalling molecule in plant systems, and it is involved in developmental processes and in response to several abiotic and biotic stresses. Evidence for the involvement of NO during symbiotic interactions has been recently found in nodules. Since rhizobial symbioses and arbuscular mycorrhizas (AM), share common features in their signalling pathways the aim of this work is to verify the involvement of NO in early plant responses to arbuscular mycorrhizal fungi. The accumulation of NO in root tissues was visualized by confocal laser microscopy using the cell-permeable NO-specific probe 4,5-diaminofluorescein diacetate (DAF-2DA).

Experiments were performed on transformed roots of Medicago truncatula treated with fungal exudates of Gigaspora margarita germinated spores. Wild type root fragments showed an increase of fluorescence during the first ten minutes following the application of the fungal exudate. The non mycorrhizal mutants dmi1 and dmi2 did not respond while a weak increment was recorded for dmi3. M. truncatula roots treated with Nod factor and the non host plant Arabidopsis thaliana treated with fungal exudates showed no increase in fluorescence. These data suggest that NO accumulation occurs down-stream DMI1 and DMI2 functions but up-stream DMI3. In conclusion, genetic and cellular evidences suggest that NO accumulation is a novel component in the signalling pathway leading to AM symbiosis.