Title: Agronomic management of AMF functional diversity to overcome biotic and abiotic stresses - The role of plant sequence and intact extraradical mycelium

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Abstract

Intentional use of arbuscular mycorrhizal fungi (AMF) in cropping systems has been marginal, owing to the high cost and limited biodiversity of commercial inocula, together with the timeliness of colonization to achieve benefits. Additionally, mycorrhiza are considered incompatible with high input cropping systems. Combining results from 4 different experiments resulted in a strategy for the earlier and faster colonization by AMF, through an extensive extraradical mycelium (ERM) acting as a preferential source of inoculum if kept intact by the adoption of appropriate tillage techniques. Selection of host plants on which the ERM develops, provides the tool to manage AMF functional diversity. This strategy resulted in protection of sensitive crop species against biotic and abiotic stresses and can be implemented in low- and high-input cropping systems. Under Mn toxicity arbuscular colonisation increased 2.6- and shoot dry weight 2.3-fold. In presence of Fusarium, arbuscular colonisation increased 2.1- and shoot dry weight 1.5-fold.

Descriptors: Arbuscular mycorrhizal fungi, biotic stress, abiotic stress, cropping system, extraradical mycelium, no-tillage, reduced tillage, AMF diversity