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DIFFERENTIAL MODULATION OF PLANT AND FUNGAL PHOSPHATE TRANSPORTERS AND EXPRESSION OF MYCELIAL TRAITS IN DIVERSE MYCORRHIZAL MAIZE INBRED LINES

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Current food crop production systems are heavily dependent on the use of chemical fertilizers, of which those containing phosphorus (P), essential for plant growth and development, represent a non-renewable mineral resource whose reserves are estimated to decline within 100-200 years. The microbiota associated with plant roots, mainly represented by arbuscular mycorrhizal fungi (AMF) can be exploited for reducing external P input into agro-ecosystems. In this study, plant and fungal variables involved in P acquisition were investigated in four maize inbred lines (Oh40B, Mo17, Oh43 and B73), differing for mycorrhizal responsiveness and low-P tolerance, when inoculated with the symbiont *Rhizoglomus irregulare*. The expression patterns of genes encoding phosphate transporters (PTs) in extraradical and intraradical mycelium (ERM and IRM) and in maize roots were assessed along with plant growth responses, P uptake and ERM extent and structure. The four maize lines differed in expression levels of *PT* genes in both plant and fungal tissues, in ERM phenotypic traits and plant performance. Expression of *PT* genes in roots and ERM of the low-P tolerant maize line Mo17 was higher than that detected in the low-P susceptible line B73, which revealed larger ERM hyphal densities and interconnectedness. Significant correlations were found between ERM structural traits, and both expression

levels of *PT* genes and mycorrhizal host benefit data.

Further studies aimed at improving our knowledge of the genetic mechanisms regulating the functioning of AMF symbiosis may lead to the development of new strategies of targeted molecular breeding to obtain more sustainable low-P tolerant crops.