

**Espeleta J.F., D.M. Eissenstat and J.H. Graham. 1999. Citrus root responses to localized drying soil: A new approach to study mycorrhizal effects on the roots of mature trees. *Plant and Soil* 206: 1-10**

***Abstract***

Because fine roots tend to be concentrated at the soil surface, exposure to dry surface soil can have a large influence on patterns of root growth, death and respiration. We studied the effects of arbuscular mycorrhizal (M) formation on specific root length (SRL), respiration and mortality of fine roots of bearing red grapefruit (*Citrus paradisi* Macf.) trees on Volkamer lemon (*C. volkameriana* Tan. & Pasq.) rootstock exposed to drying soil. For each tree, the fine roots were removed from two woody lateral roots, the roots were surface sterilized and then each woody root was placed in a separate pair of vertically divided and independently irrigated soil compartments. The two split-pot systems were filled with sterilized soil and one was inoculated with arbuscular mycorrhizal fungi (*Glomus etunicatum*/G. *intraradices*). New fine lateral roots that emerged from the woody laterals were permitted to grow inside the pots over a 10-month period. Irrigation was then removed from the top compartment for a 15-week period. At the end of the study, roots inoculated with M fungi exhibited about 20% incidence of M formation whereas the uninoculated roots were completely void of M fungi. Mycorrhizal roots exhibited lower SRL, lower root/soil respiration and about 10% lower fine root mortality than nonmycorrhizal roots after 15 weeks of exposure to dry surface soil. This study demonstrates the feasibility of examining mycorrhizal effects on the fine roots of adult trees in the field using simple inexpensive methods

