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Full Length Research Paper

Impact of vesicular arbuscular mycorrhiza on root anatomy in *Zea mays* and *Lycopersicon esculentum*

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Abstract

The absorption of water and nutrient ions from the soil solution is among the primary roles of roots. To reach the xylem for axial transport, the water and minerals must circumvent the exodermis and (or) endodermis, both of which act as barriers to radial apoplastic diffusion. To do this, the water and minerals must enter the symplast of cells located outside of the outermost apoplastic barrier. Mycorrhiza are known to impact root anatomy and ion uptake, but their effect on those cells where symplastic entry must occur is not known. To examine their impact, the surface area of those living cells apoplastically exposed to the soil solution in *Zea mays* and *Lycopersicon esculentum* was examined. For each species, plants inoculated with vesicular arbuscular mycorrhiza and uninoculated plants were examined. The average cell size and number of cells located outside the endodermis (*L. esculentum*) or exodermis (*Z. mays*) was assessed by microscopic observation and the appropriate calculations were performed. The absorptive surface area of *L. esculentum* was not significantly different between inoculated (161 cm^2/cm root length) and uninoculated (163 cm^2/ cm root length)

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plants. However, there was a statistically significant difference between *Z. mays* inoculated (average 37 cm^2 /cm root length) and uninoculated (average 11 cm^2/cm root length). How this may impact ion uptake pathways is discussed.

Key words: Mycorrhiza, *Lycopersicon esculentum*, *Zea mays*, ion uptake potential.
