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Title: Mycorrhizal Colonization and Overall Fungal Communities Change in Response to Upland and Wetland Site Conditions in *Acer* Forests of the Virginia Coastal Plain

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ABSTRACT

Mycorrhizal associations between plants and fungi involve the symbiotic transfer of soil nutrients from fungi to plant and the transfer of photosynthate from plant to fungi. Arbuscular mycorrhiza (AM) are widespread occurring in about 67% of all angiosperms and nearly all non-Pinaceae gymnosperms. One of the primary nutrients provided by AM fungi is phosphorus. Wetland soils are subjected to period of low oxygen. Two primary factors proposed in the literature as limiting the extent of mycorrhizal colonization of wetland plants are: 1) the low oxygen environment; and 2) the presence of adequate available phosphorus characteristic of many wetlands.

The present study evaluated AM colonization of *Acer* roots and the fungal community structure in paired upland/wetland locations in the Virginia Coastal Plain. The range of observed AM colonization, based on 60 samples collected on 11 dates covering 3 years, ranged from 4% to 55%. The average colonization by site ranged from 15% to 31%. Of the two wetland-upland paired sites, the difference in percent colonization was significant at only one location. In that location, the wetland site had a higher percent colonization than the upland site. Further, the site with the greatest percent colonization in this study was a wetland site. Overall, soil redox potential and available phosphorus concentration were not significant in explaining the difference in AM colonization of *Acer* roots.

A comparison of fungal diversity between the pooled wetland site community and the pooled upland site community was conducted and the difference was significant ($p = 0.003$), but the upland sites exhibited the lower diversity. Communities from all sites were dissimilar. Proximity exerted a greater effect over community structure than did upland versus wetland status. That is, the paired upland/wetland sites at each location were more similar than any comparisons with other locations. This study concludes that forested wetland environments neither limit AM colonization nor reduce the overall fungal community.