FINE-ROOT MASS, LENGTH AND SPECIFIC ROOT LENGTH IN A TURKEY-OAK (*QUERCUS CERRIS* L.) STAND IN THE SOUTHERN APENNINES (ITALY) IN RELATION TO SOIL MOISTURE SEASONAL CHANGES

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During the summer, forest ecosystems in Mediterranean climate areas, undergo natural soil moisture deficit coupled with higher temperature. Plants actively adjust growth of different organs to maximize uptake of the most limiting resource (Metcalfe *et al*., 2008). Roots play a key role in terrestrial biogeochemical cycling (Roderstein *et al*. 2005). Fine root dynamics is influenced by a variety of internal (e.g. genotype of plant species) (Chiatante *et al*, 2005) and external (e.g. temperature, precipitation, soil properties) factors (Majdi *et al.* 2005). Thus, different tree species appear to have different adaptation strategies for optimizing the mineral nutrition of the plant (Comas and Eissenstat, 2004). We investigated the effects of changes in soil moisture on fine-root biomass and morphology in a mature Turkey-oak stand (*Quercus cerris* L.) in the Southern Apennines of Italy. Root samples were collected with the auger method (Vogt and Persson, 1991) . The mean annual site fine-root mass and length was 327 g m-2 (live 152.4 g m-2, dead 175.9 g m-2) and 1.16 km m-2 respectively. Mean specific root length (SRL) was 7.68 km kg-1. Fine-root traits showed a complex bimodal pattern that was significantly related to season ($p < 0.001$). The main peak occurred in summer when soil water content was lowest and air temperature the highest of the season. Also SRL pattern peaked when soil water content was lowest ($p < 0.05$). Thus, fine roots were characterized by the growth of very fine roots (diameter < 0.5 mm). Both fine-root mass and length were higher when soil water content was low ($p < 0.001$) and SRL showed the same pattern ($p=0.006$). These results indicate that changes in root length per unit mass, and pulses in root growth to exploit transient periods of low soil water may be a means for trees in this ecosystem to increase nutrient and water uptake under seasonal drought conditions.

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