



Seasonal and Depth-Related Patterns of Fine Root Biomass in Mediterranean Riparian Forests in Central Spain

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Riparian zones are widely recognized as important in enhancing erosion protection, flood control and water quality. The role of roots in these functions are relevant because 1) dense networks of roots bind the riparian substrates increasing resistance to streamflow's erosive potential, and 2) the removal of contaminants from groundwater through plant uptake and microbial immobilization and denitrification takes place in the rhizosphere. Different types of vegetation could differ in their relative merit in stream bank protection since they present different fine root density and rooting depth, and furthermore, they could also differ in their response to seasonal changes in soil water availability.

In this work we have assessed depth related variations of root biomass in natural and afforested Mediterranean riparian forests in Central Spain in two different moments (January and June 2007). We established 9 25x25 m plots at four different habitats: two different aged afforested areas (1994, 1999), one natural riparian forest and finally, an area covered by herbaceous vegetation only. In each plot we performed root profiles (from 0 to 50 cm in 10 cm depth classes). Soil samples were obtained by means of a metal core. Two root fractions were considered, fine roots (≤ 1 mm) and coarse roots (1-5 mm) that were weighted separately.

Results showed that depth-related fine root variations were very similar for all areas in both studied months. On the other hand, total fine root biomass differed between areas in relation to forest maturity in January. Natural mature forest presented more fine-root

biomass than older afforested areas with the more recent afforested area showing fine root biomass values close to those of deforested areas. Nevertheless, these differences disappeared in June, with no differences in fine root biomass between areas. This lack of differences could be related to the different response of vegetation to early summer drought.