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Trees and Levees: How and Where Do Tree Roots Grow?

ABSTRACT

The growth patterns of tree root systems will be reviewed, with particular reference to conditions that tree roots may encounter when growing on or near levees. Mature tree root systems consist of major structural roots (woody), smaller diameter woody lateral roots, and large quantities of fine, absorbing roots. Tree species develop different structural root architectures, with certain types and combinations being most common (heart roots, plate roots, sinker roots), depending on soil conditions. Within this framework, individual roots will be opportunistic, growing only where soil conditions are favorable, namely where there is adequate moisture and aeration, and in soils without high mechanical impedance. The great majority of roots in most tree root systems are located in the top 3-4 feet of the vertical soil profile. Although tree root systems can easily extend horizontally 1-2X the distance from the tree trunk to the dripline (canopy edge), roots that extend out beyond the dripline are mostly relatively small in diameter due to branching. Roots do not grow into highly-compacted soils, except in fracture planes, where highly-branched, small-diameter roots may manage to proliferate. Tree root death and annual turnover of fine roots provide channels (pedotubules) where repeated new root growth takes place, filling in with organic matter. Examples of tree root system distribution patterns, especially in relation to levees, will be presented. Strategies for managing roots on trees growing near levees will be discussed.

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Dr. Berry's research interests include: tree root architecture in relation to levees, assessment of the role of nitrogen-fixing plants in semiarid ecosystems, agroecosystems, and urbanized environments, and plant biomass degradation for biofuels.

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