

NEWS RELEASE  
January 10, 2002

## ROOT SYSTEMS OF TREES

### BACKYARD HORTICULTURE

By Gary W. Hickman, Horticulture Advisor  
University of California Cooperative Extension, Mariposa County

Old textbooks often showed a diagram of a “typical” tree, with the root system depicted as a mirror image of the top crown growth. The roots conveniently stopped at the dripline (line drawn down from the ends of the branches to the soil level). Root depth was shown to be as deep as the tree was tall. Considering the amount of work necessary to actually look at the total root system of a mature tree, few trees were probably examined to come up the diagrams. As it turns out, the reality of root systems is somewhat different than the pictures.

Most landscape tree roots grow well beyond the dripline. Looking at poplar, green ash, and honeylocust, it has been found that the greatest root lengths were actually outside the dripline. With the poplar trees, over  $\frac{3}{4}$  of the entire root length was beyond the branches. The actual root spread was over two times the distance from the trunk to the dripline. Others have found similar results in spruce, magnolia, maple, and apple.

Root depth in trees is also grossly exaggerated. Most absorbing roots are in the top few inches of the soil, with little root growth below three to four feet. The reason—oxygen. Roots, as with leaves, need air to grow. At soil depths below a few inches, the amount of oxygen becomes too limiting for growth.

From a practical viewpoint, everyone has seen a tree that was blown over in a storm. The wide, but shallow root system is easily seen. Deep roots, many feet down into the soil are mostly

not there. It is true that some seedlings, such as oak, develop a taproot in the beginnings of their life cycle, but as the tree grows, this taproot is replaced by more shallow feeder roots.

Using this information, efficient irrigation of trees can be maximized. Deep (two to three feet), but infrequent irrigation is the best method for most trees. While some lists of tree species have been written to give a selection of deeper rooted trees, in most situations, genetics is not as important as how the tree is watered. Shallow, frequent irrigation, as for lawns, will almost assure that trees located in the area will develop shallow, invasive roots.

The University of California prohibits discrimination against or harassment of any person employed by or seeking employment with the University on the basis of race, color, national origin, religion, sex, physical or mental disability, medical condition (cancer-related or genetic characteristics), ancestry, marital status, age, sexual orientation, citizenship, or status as a covered veteran (special disabled veteran, Vietnam-era veteran or any other veteran who served on active duty during a war or in a campaign or expedition for which a campaign badge has been authorized). University Policy is intended to be consistent with the provisions of applicable State and Federal laws. Inquiries regarding the University's nondiscrimination policies may be directed to the Affirmative Action/Staff Personnel Services Director, University of California Agriculture and Natural Resources, 1111 Franklin, 6<sup>th</sup> Floor, Oakland, CA 94607-5200, (510) 987-0096.