Compensatory Pruning

... To prune or not to prune at planting, that is the question!

By Rich Hauer

Should tree canopies be pruned at planting? Thirty years ago you would have likely heard yes. Now you will likely get a mix of yes and no responses. Conventional wisdom says tree canopies should be pruned at planting to compensate for root loss. Tree root systems are reduced in size to facilitate transplanting bare root, balled and burlaped, and tree spade-moved trees, altering the natural root to crown balance. Removing branches at planting to compensate for root loss just seemed logical.

Compensatory pruning is the removal of branches to offset the loss of roots during any period of the tree’s life. Reestablishing the natural balance of root to crown conventionally meant removing one-third of the canopy. It was thought that transplant survival should increase, canopy dieback should decrease and trees would be healthier because of compensatory pruning. As reasonable as this practice seemed, a scientific base to support it never existed. In fact, a mounting body of evidence over the last twenty years finds that compensatory pruning does not benefit newly transplanted trees.

To understand why compensatory pruning is not beneficial, let’s travel back over 20 years to a tree nursery in Oklahoma. A research team lead by Dr. Carl Whitcomb was conducting a weed control study. As part of the research plan, tree canopies were pruned back at transplanting—since this was the standard practice any respectable arborist and horticulturist would do. However, Mother Nature intervened! A rainy spring season prevented compensatory pruning in 40% of the trees. By the time the nursery fields dried and workers could resume work, the trees had started their spring flush of growth. It was decided not to prune the remaining unpruned trees. During the first growing season a fortuitous finding occurred: pruned trees grew slower and had greater mortality. This certainly flew in the face of conventional wisdom that trees pruned to compensate for root loss should do better. Perhaps the observations were merely due to species differences. Trees within each species were treated equally; three species had all trees pruned and two species had no trees pruned.

Follow-up experiments were conducted to confirm if the earlier findings were merely due to species differences or if compensatory pruning was truly not beneficial. In a total of 11 different species, subsets of trees were either not pruned or pruned to remove 15%, 30% or 45% of the canopy. Each treatment was replicated 12 times and tree responses were evaluated for two years. Again, compensatory pruning was found to be not beneficial. Since then three...
additional studies in other locations (Colorado and England) by different research teams produced similar results.

The findings in England are interesting in that they suggested pruning to compensate for root loss was not the critical question; rather, soil moisture was more important. When pruned or unpruned treatments were grown in a droughted condition they both grew very little. But when water was not a limiting factor, pruned trees had less root growth, fewer leaves and smaller leaves. Trees not pruned at planting that received ample water had more leaf tissue to photosynthesize and a greater ability to produce plant-growth regulators to influence root growth.

But if compensatory pruning is not the answer, what can be done to decrease canopy dieback, increase transplant survival and foster tree health? Water! It’s as simple as that. But how much? A conventional tree-watering guide suggests 1 to 1.5 inches of water every seven to ten days is appropriate. But apparently this common watering guideline is not any more research-based than the compensatory pruning assumption.

Research within the last five years from the Morton Arboretum and the University of Florida at Gainesville suggests more frequent watering is optimal. Newly transplanted trees benefit from daily watering for the first one to two weeks, applying approximately 1.5 gallons per caliper inch per watering. For the next two or three months, water trees every two to three days and then weekly until established. Remember, newly transplanted trees are absorbing water from a diminished rooting area (i.e., apply water to the root ball). Roots must generate and grow into surrounding soils before a larger soil volume can be tapped for moisture. Trees in Minnesota will become established within one to one-and-a-half years for each caliper inch of stem. Thus, it takes two to three years before a two-inch caliper tree is established.

If you cannot adequately meet the water requirements of newly transplanted trees, planting smaller trees is recommended. For example, one- and two-inch caliper trees have less root loss and recover faster than trees two inches to three inches in stem caliper. Mulching trees to a two- to three-inch depth is recommended as it helps to conserve the precious water.

To prune or not to prune at planting—that is the question! Removing branches to compensate for root loss (i.e., compensatory pruning) is not beneficial—that is the answer. At least five independent research studies have reached this conclusion. The fact is young adolescent trees require nurturing to survive and become prosperous adult trees. The simple act of watering every couple of days with 1.5 gallons of water per stem caliper inch is one of the best things you can do for newly-planted trees. Selecting structurally sound and healthy plants is also a must. Whitcomb said it best 20 years ago: “Top pruning and other practices are unlikely to help an unthrifty plant and a thrifty plant doesn’t need it.”

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Establishing New Trees

By Gary Johnson

Whether the reason for planting a new tree is to recover from losses courtesy of 1998’s storm season, oak wilt, construction damage or simply the desire to plant a tree, tree health only begins with best planting practices (Johnson, Ash, 1998) and a high-quality tree. Trees, like children, require a lifetime of care—sometimes intensive maintenance as with urban trees, sometimes just occasional guidance and attention. But no matter what the site and the tree may be like, the first several years—the formative years—are the most important for developing worthy and healthy trees for our urban forests. Consider these myths:

- “It made it through the guarantee period, so it should be just fine.”
  
  Just about anyone can get a tree to survive for a growing season or a year, so don’t be lulled into a false sense of security and complacency once the tree has survived the normal, one-year guarantee that most retailers provide. Establishing healthy trees is a 15-20 year commitment beyond that survival guarantee period. All transplanted trees must first live through a period of transplant shock, whether they’ve been dug and transplanted from a field nursery or transplanted from a container to the landscape.

- “Trees seem to survive just fine in forests...why should I meddle with nature?”
  
  Under normal circumstances, the transplant shock period is approximately one year for each inch of stem caliper. Therefore, a three-inch caliper tree will need at least three years in the

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