

YOU CAN TAKE THE TREE OUT OF THE FOREST, BUT NOT THE FOREST OUT OF THE TREE



Urban trees have the luxury of growing out, as they have the space to do so. All images courtesy of the author.

By John Ball, Ph.D., CTSP

For those who had the privilege of meeting with Dr. Alex Shigo in a small group at his place, you might remember his walks in the woods. Not only was he continuing to exhort everyone to “touch trees,” but he also reminded us to observe how trees grow in their natural environment – the forest. You cannot understand, or appreciate, how trees survive in town until you really know how they grow in the forest.

It may be stating the obvious, but trees did not evolve in towns but in forests, surrounded not by buildings, but by other trees. This is an important observation. Trees almost always perform better in the company of other trees. Yet in most urban “forests,” we separate trees by 30 to 40 feet or more, so that instead of functioning as a forest, they now must grow as individuals.

The British author John Fowles has a

phrase in his book, *The Tree*, that sums up this need for trees to be surrounded by their kind: “Evolution did not intend trees to grow singly. Far more than ourselves they are social creatures, and no more natural as isolated specimens than man is as a marooned sailor.”

Dr. Shigo was a proponent of cluster planting, a concept he discussed in *Modern Arboriculture*, where trees and their forest associates, shrubs and vines, could co-exist in patches in the urban landscape. Dr. Thomas Perry, another frequent speaker at arborist conferences in the 1980s and 1990s, also spoke on the fact that trees performed better when planted in groups rather than as individuals. During his informative, but entertaining, presentations, he would show slide after slide of trees growing as isolated specimens and in groups, often on the same site, and they all illustrated the same idea – trees do better with a buddy.

So what is the difference between a tree growing in a forest and one in the middle

of a lawn? First, the form, regardless of species, is quite different. In the forest,



Forest trees are trained by the surrounding trees to grow straight.

trees are forced to grow upward toward the light. Forest trees tend to grow straight and maintain a single leader until they reach the height of the canopy. Only then do they have the luxury of spreading out. Forest trees rarely have large lower limbs. The lower limbs are continually shed as they reach a size that cannot be sustained by the low light intensity beneath the canopy.

Light is a critical resource for a tree, but not all tree species require the same light intensities to function. One of the first characteristics of a tree species learned by young foresters is its shade tolerance. This is the ability of a species to reproduce, establish and grow in the presence of shade. Some species, red maple (*Acer rubrum*) as an example, are considered shade tolerant. The red maple's leaves can produce a surplus of sugars (more than is needed to support the respiration needs of the leaf) in less than 20 percent full sunlight.

Eastern cottonwood (*Populus deltoides*) is at the other extreme and is so shade intolerant that its own branching and outer leaves inhibit the function of the leaves deeper in the crown. Subsequently, cottonwoods naturally develop a very open canopy as their interior leaves cannot survive in the shade.

Many people have the mistaken belief that trees move sugars from the roots and trunk out to the limbs and supporting branches, but really the reverse is more common. A leaf must manufacture enough food to support its own needs and export a surplus. Some of this surplus is



Urban trees retain their lower branches far longer than forest trees.

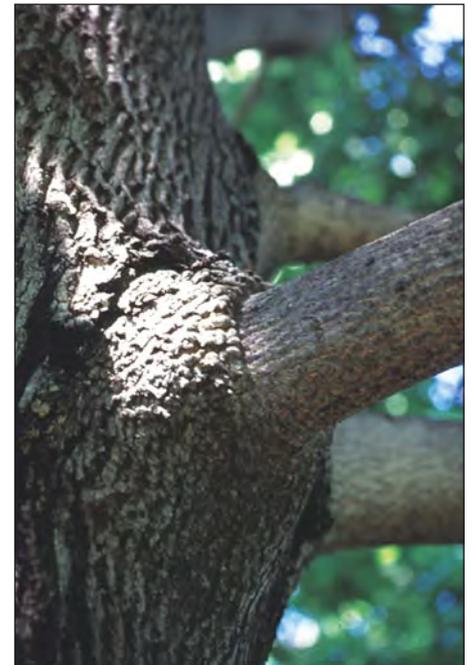


You can train a young tree to be anything. Pictured is a row of pleached (interlaced branches) trees in Kew Gardens, London, United Kingdom.

utilized by the supporting twig, branch and limb – think of it as the leaf paying a “toll” for the water and nutrients that must be supplied by the common pipeline through these supportive tissues. If the collective foliage on a limb is receiving so little light that it cannot produce enough food to export to the common trunk, the limb dies.

Trees are not stupid. It makes no sense for productive limbs to export food to support unproductive limbs. Only governments can support “branches” that cannot pay their own way! In the forest, these lower, shaded limbs are shed while still very small, often only an inch or so in diameter. The tree self-prunes, eliminating lower limbs as they become unproductive, shedding them while they are small and the wound can be compartmentalized.

In town, where an isolated tree has the luxury of light not only from above but from the sides, the



Branches that are in the process of dying present with an enlarged collar.

tree will retain these lower limbs, all of them, so that the trunk becomes thick with limbs almost pressing against one another and many with included bark. These limbs are prone to breaking with wind or ice loading. The tree was not expected to carry these limbs, they were supposed to be shed when the tree, and the limbs, were small.

When I used to go out on pruning requests in New England, a common question from tree owners was, “Why do I need to prune my trees? No one pruned them in the forest.” Of course they are pruned in the forest. They are pruned by the surrounding trees in the continual struggle to push their way up into the collective canopy. However, in town, where the trees are now growing in isolation so every limb can survive and multiple leaders form, we have to become the trainers.

If more people would train their trees while the trees are young, pruning to maintain a single leader, thinning out laterals as they increase in size and maintaining proper spacing among these limbs, we could save ourselves a lot of work and improve the health of our trees. Instead of annually pruning young trees with small saws and pruners, gradually creating a strong structure over a decade or so, most tree owners will not contact an arborist until the tree is mature. Now our pruning to remove de-



Forest trees also develop codominant leaders low on the trunk.

fects involves pruning large limbs to the detriment of the tree’s health and the tree

owner’s pocketbook.

However, even in these situations, the tree can guide us in our pruning. I once had a tree owner contact me about pruning her large, mature, European beech (*Fagus sylvestris*). The tree was magnificent, one that was such a joy to climb I knew I could probably get the crew to pay me for the opportunity to be working within this arboreal monkey bars.

The tree did require some pruning, and the owner agreed to the price, but asked when the crew was going to be there. The request was not so she could be gone (a frequent request of owners), but so she could be present during the pruning. When I inquired why, the response was that she needed to show the crew what limbs and branches to prune!

My suggestion was that she hire someone else; if we were just extensions of her own arms, there were people she could hire cheaper. She then asked me how the crew would know what to prune,



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Forest trees shed their branches while they are small.

and I told her the tree would tell us. And it can.

As mentioned earlier, a limb whose leaves are receiving so little sunlight that they have nothing to export will be shed. You can recognize these limbs, as there is so little food available that the diameter growth at their base has almost stopped. These limbs are easily identified by an enlarged collar, since the trunk is growing at its normal rate but the limb is not. It's species dependent, of course. Some tree species form more apparent collars than others. Regardless of species, a limb in the process of dying will present with a larger collar in relation to its limb than an adjacent limb receiving more sunlight.

By pruning these dying limbs, we are merely accelerating the natural process. We are working with the tree, rather

than fighting it. Pruning should be more than the indiscriminate hacking away of random tree parts. It is done with intent and purpose.

When we learn about how trees grow and function in the forest, we understand that perhaps our placing trees on 30- to 40-foot centers, requiring them to function in isolation, may result in the trees developing poor forms. We should consider cluster planting whenever feasible and when we cannot, remember that these isolated trees will require training to develop strong structure.

Growing a tree in isolation creates stresses for the roots as much as the canopy. Above ground, trees appear as individuals in the forest, but below ground, they truly do form a community. This will be covered in "You Can Take the Tree Out of the Forest, but Not the Forest Out of the Tree: Part 2" in a future issue of *TCI*.

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