Pruning Strategy

By Edzard Teubert

This article discusses pruning for lateral growth by pruning top growth and introduces appropriate timing sequences for desired growth responses. The article stresses pruning from the top down, outside in at all times. Too many arborists prune from the inside outwards and upwards, stripping the middle out of mature trees and leaving the ends untouched. In fact, the opposite should be done, and inner buds and branches should be left that may be used to regrow important scaffold branches. Continuously stripping the laterals over the years creates imbalanced, out-of-proportion limbs and in some cases results in lion tailing.

That tree shape is to follow natural form is a given, unless there is a specific function for a tree of an unnatural shape. The objective is to encourage a naturally shaped tree on a smaller scale that will match the site the tree is growing in (a balanced tree). This should not result in a tree that is out of proportion unless this is necessary for some purpose. Unfortunately, the pruning of most municipalities does not achieve the objective of a well-proportioned tree.

To develop needed growth, there should be a pruning plan for urban trees at the time of their planting that reflects the site where the trees are growing. If trees are predicted to overgrow their root containers, then trees with canopies approaching their maximum size should be pruned to reduce growth and enabled to produce planned crowns on pre-developed scaffold branches. This is accomplished by simply requiring a change of pruning practice in which the strong upward leader growth is removed and horizontal growth is encouraged, which is also known as “pruning to a lateral” scaffold branch. This may be dropcrotching, however in the tree that has been thoughtfully developed with a growing strategy, limb removal that equates to dropcrotching would already have been done many years earlier. By the time of approaching maturity there should not be any cuts that are being made that exceed 2 inches in diameter. Therefore the concept of pruning for maximum growth needs to be altered to become a proportionately smaller tree that fits in that location. This would create trees grown for longevity and be usefully grown for purposes needed in urban or environmental design, such as shaped for heat retention; air redirection; shade creation; as a sign post marking a public location; as a street tree with large vehicle access needing higher scaffolds; or for defining a community with the development of wide, gently arcing branches that almost touch over residential streets.

The practice of pruning for maximum height needs to be changed to a strategy that reduces growth and at maturity promotes horizontal growth thereby prolonging that tree’s life.

In addition to practicing best planting strategies, which everyone does already, the best pruning strategies could now be changed to the pruning strategies that correspond to the trees maturity and condition.

To control and predict how much pruning is needed, a control model of untouched growth period must be noted or observed from internodal growth averages. The species or cultivar growth average must be taken into consideration and compared with the growing zone. To shorten these internodes, pruning must be carried out from later in spring and into the summer growing periods, depending upon the species and desired result. This shift of timing also ensures that branch elongation is reduced in scale that in turn slows the corresponding root elongation. This slower root growth prolongs the tree’s life and starts the process towards a tree that is growing in balance with its available root space. As growing horizontally slows a trees growth, the root growth slows and the corresponding annual growth rings reduce in size so that the structural column of the tree becomes stronger.

Tree Cost

As previously mentioned, at the time of tree loss and subsequent replacement, a value should be ascribed to the tree that reflects the cost of growing that tree, in that location, to an acceptable degree of health. As tree health and aesthetics create an increase in real estate value, an urban landscape is an investment that

also requires tree development costs to be predictable and determined. In case this connection of value and development is not understood, please consider that every time an arborist prunes a tree there is a cost. In addition, the aesthetic or functional value has been increased proportionally at least, to the purpose for which the tree is being grown. Furthermore a tree can also be mal-pruned and mismanaged to become a detriment and loss of investment in addition to the cost of removal in preference to a potential lawsuit. Some examples may be when a tree is pruned to eventually become a Hazard or to eventually become less aesthetic or the removal or reduction of the function the tree serves. As a specific example: if the purpose of the tree is to block and redirect high winds, then to remove the lower scaffolds and to open the canopy completely in such a way that wind penetrates the tree, and the branches can not be re-grown, obviates the trees value. Every pruning professional has the choice to produce an investment, not a loss for their client, as eventually poor practice losses will become malpractice suits.

Root Space

When a tree has filled its available root space, the roots will automatically begin to decline. This decline is in addition to the natural attrition of aged roots and annual reproduction of replacement roots. Branches that have been grown too rapidly from over abundant conditions such as excessive water, fertilizer, sudden exposure to sunlight, or incorrect pruning, along with many other growing conditions, now require too much support from the roots to maintain themselves. This causes selective branch loss and allows pathogens to enter the tree system via the dead branches. If the scaffold structure is preplanned for the root space, then significant scaffold branches or branches over a size that can not be easily covered by callous tissue will not need to be removed.

In nature, possible damages aside, an essential concept to understand is that current growth is regulated by last years growth determining the amount of stored sugars in the root system. The amount of growth or decline of the root system during the commonly termed period of dormancy, which includes rest and the time of emergence can also be affected by the availability of heat units, water availability and subsequent frost penetration. These factors among others, will determine the ratio of growth for that tree in the next growth period.

The ratio of internodal growth becomes measurable when the pruning is done between the bud emergence and before leaf maturity. Keep in mind that not all trees should be pruned at the same time because not all grow the same even though the location may be similar. This ratio is a useful system that results in predicting pruning times and how much and what pruning should occur based on the root space, stage of maturity, and the trees objectives. For example, if an un-pruned stem grows to 100% of its genetic average annual length in the given growing period; then pruning at the timing sequence of 20% of the stems growth will theoretically allow 80% of growth to continue. If a tree is growing too quickly, then if pruned 80%of the annual internodal growth, then the following growth will only grow another 20%. If this timing is followed repeatedly, tree growth will slow because the root system will not be able to store the maximum of sugars in the roots. This procedure is in effect a natural reduction method, achieving the same result as application of growth reducing chemical applications. The same phenomenon of growth acceleration is evident when chemical spraying ‘wear’s off’ if the tree is allowed to continue growth untouched. The difference of knowing how much removal to make at which portion of the growing season determines the amount of reduction to plan for and during which years pruning is applied in. A schedule should be adapted to the tree’s growth response so that adequate juvenile growth is maintained to a healthy level for the trees continued longevity.

Already established is the concept that confined root space for a tree limits the maximum growth of the tree. It follows that in street locations, the maximum growing area made available around obstacles such as pavement, foundations, plant competition, or compacted soil, determines the maximum size of the root space. If this obvious consideration is observed, then trees can be grown to accommodate the site by slowing the growth direction of roots in areas where obstacles will be encountered.

If a tree is pruned after leaf maturity during the production of sugars for leaf storage or second growth flush prior to the start of autumn root growth, then that

known percentage of reduction will limit the sugars transferred and stored to that approximate percentage in the root mass. Therefore redirecting root growth using branch control is a similar technique to spring root pruning that is commonly done to slow spring tree growth while simultaneously causing tertiary feeder roots to be produced closer to the primary roots and root flare. The fall root pruning can be accomplished by reducing the amount of energy available to the roots through crown pruning. If the tree is pruned in autumn just prior to and during leaf abscission, then the amount of sugars stored in the root system is reduced and the subsequent year's growth will be reduced accordingly. Therefore, to slow a mature tree's growth, the ideal solution would be to prune late in the summer to reduce the available sugar getting to the root system. To speed up a mature trees growth, the timing would be during dormancy to early spring. This methodology is opposite the technical pruning technique applied for creating charwood, which produces maximum tissue and internodal growth and has been employed for hundreds of years.

This tree care system of devising a strategy for developing tree growth has been used in Europe and Asia in various alternate forms and has many applications. Strategies for pruning sequences can be devised for every situation if the objective is known. Two examples:

1. In utility strip situations, branch growth can be arrested in one scaffold area while alternate scaffold branches encourage growth around objects.
2. Crowns can be redirected before the tree is weakened by major leader removals.

In existing utilities, if clearing is done to slow growth, then this clearing is done before sugar storage begins and pruning is avoided during dormancy or spring.

When a tree is to be moved or saved at a building site, then a program to salvage roots can be developed. Knowing that roots grow every autumn, then any pruning during the previous year would be suspended to maximize sugars for storage. Then if the roots were to be cut as they start growing, during the sugar storage period, the maximum amount of sugars will be stored in the smaller root mass. If the roots are cut after sugar storage, then a corresponding loss of stored sugars will be lost for the next year's growth.

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