

## TOPICS IN PLANT HEALTH CARE

# TREE BIOLOGY AND PROBLEM TREES

By Kevin T. Smith

Topics in Plant Health Care is a regular column, featuring information on pests, beneficials, and Plant Health Care practices. If you have a topic you'd like to see in the future or if you wish to submit something, contact Ian Wilson at [iwilson@citykelowna.bc.ca](mailto:iwilson@citykelowna.bc.ca).

## MODERN ARBORICULTURE AND PROBLEM TREES

Have you met any problem trees? Have you created any problem trees? Can you spot them early, or even prevent them? Problem trees are those that are difficult to treat and that require special care. The care and prevention of problem trees require a holistic view of trees and their environment. Trees capture, transform, and use energy to organize chemical elements into highly ordered systems. In biological terms, trees are organized to survive, grow, and reproduce. That organization is reflected in many individual variations of a few patterns or strategies.

As part of the urban forest, trees are sometimes presented as inanimate sources of shade, air filtration, and social amenities. In arboriculture, we need to remember that urban and community trees are living organisms in our care. Intentionally or not, we frequently place trees in alien, and even hostile, environments. We are responsible to them as well as to the society we serve.

Problem trees often result from neglect or a lack of understanding about tree biology. Trees in the urban and community landscape can become problems as a result of conflicts with human society with respect to form, location, and the legacy of past treatments.

In a world of limited time and money, one source of problem trees is neglect. Enhanced awareness of the value of urban and



Figure 1. Problems such as this could be prevented by establishing a leader when the tree is young.

community trees and community involvement can increase the allocation of resources to help reduce the frequency of problems caused by neglect.

Perhaps an even larger source of problem trees in our communities is improper care. Improper care consists of tree treatments that work against the natural systems of tree growth, health, and survival. Improper care tends to be repeated on the

same trees over and over again, aggravating the harmful impact on tree health.

## TREE FORM

Some trees have a form (that is, the aboveground branch and stem structure) that likely will cause problems as the tree matures in the urban and community landscape. Problems with form may be characteristic of an individual tree, but poor form often may be characteristic of a tree species or variety.

Problems with tree form extend far beyond appearance. Some tree species, especially those that readily produce basal sprouts, may form tightly adpressed codominant stems with included bark (Figure 1). The attachment between the codominant stems is weak. Trees do not "grow out" of this problem. As stems increase in size and weight, the attachment grows weaker, not stronger. The outward-growing vascular cambium of each stem physically pushes against the other stem and results in dead spots. This situation is especially unfortunate because the potential for this type of problem often is apparent when the tree is a small sapling and the problem could have been corrected by establishing a leader. The ideal time to select a leader is when the codominant stems are small enough that one can be clipped off with hand pruners.

## TREE LOCATION

Tree location is the spatial relationship of the tree to its natural and humanmade surroundings, both above- and belowground. Many tree problems begin belowground, especially for trees planted in construction debris rather than soil (Figure 2). Planting too deeply impairs root respiration and can encourage girdling roots.

Trees growing near structures are another source of problems, for both "volunteer" and planted trees. The growth of volunteer trees immediately next to buildings illustrates the tenacity of trees



Figure 2. Belowground problems can begin when trees are planted in construction debris.



**Figure 3. Volunteer trees such as this one illustrate the tenacity of trees to survive.**

to survive and grow in a harsh environment (Figure 3). Perhaps such a volunteer should be considered a weed ("a plant out of place") and removed. At the same time, however, that tree may help give local residents some sort of living landscape that is not being provided otherwise. Ideally, removing the misplaced volunteer should be part of developing a greenspace to enrich the

immediate neighborhood. Is that likely to happen?

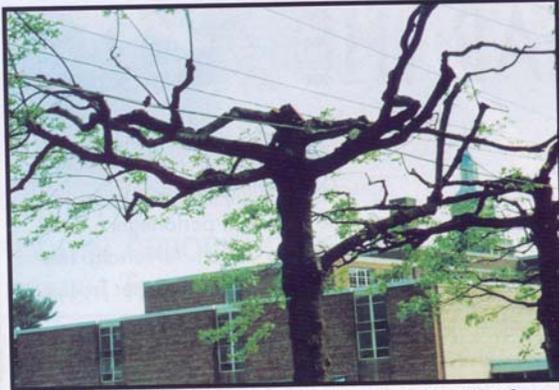
Perhaps more alarming than neglect is repeated, wasted effort. Rows of trees continue to be planted under long-established utility lines (Figure 4). To maintain energy capture, each tree continues to resprout from around the topping and sprout cuts. Repeated sprouting reduces the length of the cutting rotation and increases maintenance costs. A way to solve the problem could include planting low-growing shrubs and other ornamental plants in those locations.

## TREATMENT LEGACIES

Many cities and towns are fortunate to contain veteran trees that contribute character to the community's environment. Unfortunately, too many of these trees bear witness to improper tree treatments. Many of these legacy treatments involved tree wounding. The biological response to tree wounding is the compartmentalization process. Compartmentalization in wood resists the spread of pathogens through the formation of boundaries. Trees may endure repeated cycles of topping, flush cutting, and excavation of cavities. These improper practices work against the natural compartmentalization process and result in extensive cracking, decay,



*Topics in Plant Health Care (continued)*



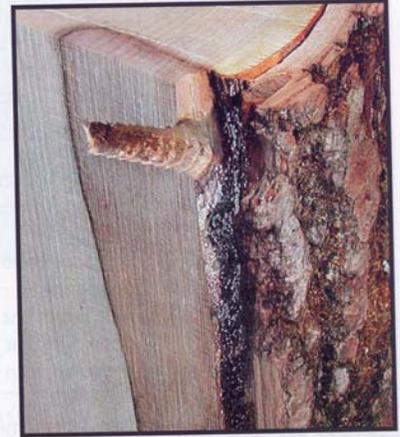
**Figure 4.** It is better to plant low-growing trees under utility lines.

and a risk to people and property. The risk comes from the disregard of basic tree biology concerning how branches are attached to stems and how compartmentalization boundaries resist the spread of infection and the loss of normal functioning.

It's appealing to think that improper practices that harm trees are part of the past. However, trees still are systematically mutilated: removing too much of the foliage and energy-capture system while providing enhanced opportunities for fungal infection and weakening of tree structure.

Concern about the spread of invasive pests has renewed attention to treatments involving stem injection. Under special circumstances, stem injection of toxic chemicals might be a legitimate part of a tree

protection program. However, some combinations of injection methods and treatment materials result in extensive dieback of the vascular cambium (Figure 5). This dieback produces a wound far larger than the point of injection. The consequences of tree injury should become part of the decision-making process about whether to inject.



**Figure 5.** Some injection methods might cause dieback of the vascular cambium.

## LEGACY FOR THE FUTURE

Land managers and the public are learning more than ever about the many benefits bestowed by healthy urban and community trees (Figure 6). These benefits are increasingly viewed as necessities, not just as amenities. Properly trained and educated arborists have a great opportunity to enhance the quality of urban and community trees. An application of the fundamentals of tree biology in selecting and applying tree treatments will make the most of this opportunity.

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*Photos courtesy of Kevin Smith.*



**Figure 6.** Healthy trees are increasingly viewed as necessities that provide many benefits.