HAVING YOUR TREES AND UTILITIES, TOO

by Roger C. Funk

Abstract. Trees are a necessary part of the urban infrastructure, providing social, psychological, physical, environmental and economic benefits for residents. Unfortunately, trees disrupt utilities and pavement when insufficient growth space, both above and blow ground, is provided. Street trees also are subjected to stress-inducing factors that cause decline and premature death. Information regarding tree requirements and tree-site compatibility needs to be developed and disseminated to everyone involved in the planning of urban infrastructures and in the growing, installation and maintenance of trees.

Surveys show that urban residents want large, mature trees that form a canopy over their street. They also expect uninterrupted service from utilities, and paved streets and sidewalks. The end result is often two forms of mass attempting to occupy the same space at the same time. Tree roots upheave sidewalks and curbs or clog sewers, and tree limbs grow into utility lines, causing loss of service. When this happens, something has to give and that something is usually tree parts. Since a tree is a continuous, living system in equilibrium, any major loss in either the root or shoot system will adversely affect the health and vigor of the entire organism.

Growing street trees in the urban environment can be compared to the ancient Japanese art of bonsai. In both situations, the root and shoot systems of trees are confined which results in a dwarfing effect. In bonsai, miniaturized trees apparently can live as long as undisturbed trees through controlled pruning, watering, fertilization and other cultural practices. Street trees, however, are subjected to the confines of bonsai without the cultural intensity required to maintain health and vigor. In addition, street trees often are not adapted to the environment and are not tolerant of existing site conditions which include channeled wind, air pollution, compacted soils, poor drainage, heat build-up, drought, waterlogged soils, de-icing salts, mechanical injury, turfgrass competition, insect and disease pests and improper soil pH. For obvious reasons, the estimated life expectancy of a city street tree is less than 30 years.

Although often treated as an afterthought in planning and budgets, or as a nuisance because of liability and maintenance costs, street trees are an important part of the urban infrastructure. Trees provide social, psychological, physical, environmental and economic benefits to residents. Trees consistently rate high in public opinion surveys and, without belaboring the pros and cons, street trees will remain a part of the urban landscape for a very simple reason—public demand.

Success in any line of business has been defined as "finding out what the customer wants and then providing that product or service." Success for all of us is interdependent since the customer will not be satisfied unless all segments of the infrastructure, including trees, are present and functional. Our challenge is to successfully integrate into an urban infrastructure street trees that will maximize the satisfaction of residents while minimizing the costs of maintenance. We can accomplish this through proper planning, selection, planting, maintenance, research and education.

Planning is the first step in a successful urban infrastructure since trees have specific cultural requirements, including space in which to grow. Although some species are more tolerant of urban conditions than others, certain minimum requirements must be met for all trees. For example, something as basic as drainage is often overlooked or inadequate. Failure to meet the basic needs of a tree increases maintenance costs and the potential for the tree to become a liability and/or a candidate for replacement. It is less costly and more effective to prevent tree problems than to correct the problems after they occur. To borrow

1. Presented at the annual conference of the International Society of Arboriculture in Philadelphia in August of 1991.

a line from another service, "either pay not or pay more later."

Tree selection should be coordinated with the planning process since, as stated earlier, different trees species have different requirements. Planting trees which are not adapted to site conditions results in decline and/or excessive maintenance and is a waste of time, effort and money. It also reflects poorly on the person(s) responsible and gives the tree species an undeserved reputation.

Planting is often done improperly, affecting the tree's ability to establish and grow properly. The most common problem is deep planting, which places a portion of the root system below oxygen levels in the soil that can support root growth. The tree may decline as a direct result of aggravated root loss or from secondary disorders such as cankers or borers that attack weakened plants.

Maintenance requirements are greater for street trees than for their landscape counterparts because of stress-inducing factors in the urban environment. The following should be included in routine maintenance:

Prune. Pruning should be started early to develop properly-spaced, strong support branches and to reduce the potential for future removal of large branches.

Fertilize. Most soils are deficient in nitrogen, the soil element required in the greatest amount. Phosphorus and potassium are often deficient for optimum tree growth and micronutrients may also be deficient for certain species growing in alkaline soils.

Mulch. Apply mulch over the root system to help protect roots from temperature extremes and drought. Mulch also eliminates turfgrass competition and reduces the potential for soil compaction and mechanical injury from mowers.

Water. Trees may require supplemental water during establishment or drought periods, particularly those with restricted root areas and/or surface rooting. Since too much water can also cause injury, soil should be monitored before watering newly planted trees.

Research is needed to evaluate the performance of existing street trees. Selections can be introduced from those individuals that are the most tolerant. In the future, genetic engineering may produce desirable traits and improve tree vigor. For example, sterile cultivars of maple or elm would eliminate energy loss in the production of undesirable fruit.

Education or information is of little value unless communicated to those people who can use it. Researchers need to know what problems exist and what tree characteristics are desirable. City planners need to know what conditions are required to grow trees and what trees are recommended. Nurserymen need to know what market exists for the recommended trees. And homeowners need to know what their choices are if they are to have their trees and utilities, too.

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