

AREA Forum

WHY FERTILIZE TREES IN THE URBAN LANDSCAPE?

Tree fertilization is a topic of much debate and disagreement. Three specialists have submitted their thoughts on this subject: Larry Hall, Tom Smiley, and Jitze Kopinga. We have included the commercial and academic points of view as well as the American and European approaches to fertilizer use. Please let us know your thoughts at ach@correo.uam.azc.mx or ach@hp.fciencias.unam.mx; or contact the Journal Editor (see inside front cover). We welcome suggestions on subjects to be considered for future Forum discussions.

Alicia Chacalo
AREA Past President

Laurence R. Hall
Hendricksen the Care of Trees
Chicago, IL USA

If we were to follow nature's rules in landscapes, fertilization seldom would be required. Because we abuse the soils and do not aggressively replenish them with organic materials, most of our inner-city soils are lacking in the required elements as well as the soil organisms that are so important in sustaining a rich medium for roots to thrive.

We often plant trees in poorly drained areas with restrictive rooting environments. Sometimes we backfill with rich, fortified soil, giving roots an initial good start, but as the roots expand they may grow into clay, rubble, concrete, and who knows what else. It isn't easy to be an urban tree. The roots never know what may be beyond that next soil particle. In my decades of dealing with trees in urban environments, there is no question that, in most instances, a well thought-out fertilization program is beneficial.

Proper mulching, in my opinion, is one of the best things we can do to contribute to tree health. Unfortunately, many city sites, such as narrow parkways, are not conducive to mulching. Whatever the mulch may be, it will slough off onto walks and into gutters. We should promote mulching but be aware of proper sites as well as improper sites. Unmulched sites are prime candidates for fertilization.

Proper mulching may preclude applications of fertilizer. I have observed many sites that were mulched and then top-dressed with additional mulch on a 2- or 3-year basis. Soil tests performed on some of these sites suggested that applications of fertilizers were not required. It was observed that adding a surface application of nitrogen was beneficial on certain sites.

Different species have different nutrient requirements. The professional arborist should be aware of such requirements. We should stress the antagonistic influence of sod on many of our trees. Younger trees especially can have a difficult time competing with the fibrous root systems of grasses.

Trees in urban landscapes contribute much to our cities' ambiance. If we wish to keep these trees healthy, we should monitor them and provide proper cultural procedures as needed. A well thought-out fertilization program can be a significant part of these cultural processes. However, let us not jump in and fertilize without careful analysis of the trees and the site. Soil tests should be a part of this, with larger sites getting multiple soil tests. Are you aware of the pH requirements of the trees? Is the drainage adequate? Will water be required before and/or after if fertilizing is to be done?

For most sites, subsurface injections of liquid fertilizer is the preferred method. Do be aware of soil tests and blend fertilizers to accommodate test findings. Certain tree sites are so limed (alkaline) as to require trunk injections of the required nutrients. The injection method is useful, but it can be harmful—especially to stressed trees. Often the injection sites seal over slowly; sometimes not at all. Healthy trees have few problems with injection sites, but a stressed tree is more susceptible to injury.

Urban trees do benefit from proper care—and proper fertilizing is a part of this process. Let's do it right and perhaps we can keep our urban trees like Mother Nature keeps her forest trees.

E. Thomas Smiley
Bartlett Tree Research Laboratories
Charlotte NC USA

According to the American National Standard Association A300 standard for Tree Care Operations, "the reason for fertilization is to supply nutrients determined to be deficient to achieve a clearly defined objective." This simple statement clearly defines why trees and shrubs should be fertilized, explains which elements to use, and implies which rates of fertilizer to use.

To start with, the trees or shrubs that should be fertilized are those that are nutrient deficient. Those that are not deficient do not need to be fertilized. The difficulty comes in defining which trees are deficient. This has traditionally been done by looking for visual symptoms of deficiency, specifically leaf color and twig growth. This method continues to work well in many cases, but other methods, including soil and foliar nutrient analysis, also are available and often are much more precise. Laboratory nutrient analysis is superior at detecting mild deficiencies and the underlying causes of some deficiencies (e.g., soil pH). Analyses can also detect secondary element (Ca, Mg) deficiencies or excesses that are overlooked with visual analysis.

Nutrient deficiencies occur for a number of reasons in the urban environment. Most new construction starts with the removal of topsoil from the entire building area. This means that when the landscape is planted at the end of construction, the plants go into subsoil that has only low levels of essential elements. On established sites, there is an annual removal of fallen leaves and lawn chemical applications that may be detrimental to the trees' nutrient status. Under forest conditions, these fallen leaves would break down and release nutrients to the soil. In most landscapes, almost every fallen leaf is removed. Nutrients applied to turfgrasses are not always beneficial to trees. Turf requires a higher pH than most tree species, so annual lime applications may end up being detrimental to trees surrounded by turf.

So as not to add excess nutrients to the environment, the standard calls for application of only the deficient elements. While we know that nitrogen is the most commonly deficient element, there are others that are deficient on a regional basis, or maybe just on one tree. Again, nutrient analysis can deter-

mine which elements these are so that they can be targeted with a prescription fertilization program. The overall results of prescription-based fertilizer programs are fewer nutrients being applied. Many sites do not require phosphorus and/or potassium fertilizer. With a prescription program, they would not be applied.

The opening statement of A300 also implies which rates of fertilizer to use when it states that fertilization is to "achieve a clearly defined objective." A sufficient amount of fertilizer needs to be applied to achieve the goal. That goal may be to overcome an obvious nutrient deficiency; to increase growth, such as with a small tree; or it may be to maintain the health of a large tree. In the case of a small tree, a high rate of nitrogen would be used, but for a mature tree, a lower rate usually would be adequate.

Fertilization of landscape trees should be done when trees need additional nutrients to achieve the manager's goals. Fertilizer is not a cure to all tree ills; neither is it a treatment that should be overlooked by a competent arborist.

Jitze Kopinga
Institute for Forest and Nature Research
Wageningen, the Netherlands
A few reasons commonly given for tree fertilization include the following:

- it's tradition, a common practice
- it's a sign of taking good care of trees and proof of good professional skill
- it earns money to do so
- we think the tree needs to be fertilized

If we pass over the three first reasons, which are difficult to explain from a tree biology point of view, there is one justification left. We usually think a tree needs to be fertilized because it is looking poorly (small leaves, yellow foliage, sparse foliage, presence of marginal leaf necrosis, etc.), but do we really solve these kinds of problems by fertilizing the tree?

Maybe yes and maybe no. Experience has shown that in many cases symptoms of other problems can be suppressed, for at least some period of time, by the application of a fertilizer. But are we satisfied by only suppressing symptoms, or do we try to provide a structural solution for the problem? Have we taken fully into consideration other factors that might affect

tree health or interfere with the effects of fertilizing, such as soil pH, the water status of the soil (drought or water logging), anaerobic soil conditions, volume of rootable soil, and quality of the root system (e.g., presence of root rot or other damaging factors).

If we have evaluated these factors and concluded they are not the source of the problem, there is a good chance we could help the tree through fertilization. However, if we need more confirmation about the need for fertilization, we may wish to consider foliar analysis.

Which method of fertilizing is most effective? This depends partly on the nature of the deficiency. Deficiencies of P and some trace elements can be adjusted for a long period with just one application of a simple inorganic fertilizer. Deficiencies of N, however, are best adjusted by soil improvement with organic matter. In sandy soil, the addition of organic matter also increases the water-holding properties of the soil. Fertilizing with only a simple inorganic N-fertilizer normally will give only short-term effects.

To summarize the main question, Why fertilize trees in the urban landscape?, we should consider the following questions:

- Does the nutritional status of the soil need adjustment (soil analysis)?
- Is the tree deficient of nutrients (leaf analysis)?
- Are other factors determining the availability or uptake of nutrients (soil study)?
- Is fertilizing the most appropriate remedy for the tree?

The latter question applies to a more general concern and potential solution. If it is clear that a tree is not adapted to its environment, why try to keep it alive with intensive-care practices? Why not advise replacement with species that are better adapted to site conditions? Or is this a too creative thought in a world where (some) people think that everything, even nature, can be made to conform to their wishes?

LETTER TO THE EDITOR

To the Editor:

It is my opinion, after practicing urban forestry for 30 years, that all three authors in the May 2000 Journal AREA Forum missed the main reason for conducting tree inventories. These authors addressed the data that can be collected about each street tree and how that data can be used to better manage the urban forest. I suggest that data are nice to have, but the most important reason to conduct a tree inventory at least every 10 years is to generate emotional support to get money for the forestry program.

Most city foresters know there is far more tree work needed than they can afford to do with or without an inventory. What they need is money. Yet, when they alone—maybe carrying stacks of data—visit their city councils and use rational arguments in an effort to secure more money, they usually do not get the dollars. Why? Emotions! The crying, young mother demanding the installation of a new traffic signal gets it with no questions asked even though the traffic engineer presents data proving the new traffic signal is not needed.

The city forester who sits quietly in the back of city council chambers and listens to 100 or more emotional citizens with little or no data demand more

money for tree care usually gets the appropriation. Who are these emotional citizens (and voters)? They are volunteers from the city's many neighborhoods, political wards, planning units, and census tracts who have helped the city forester conduct a simple, inexpensive, and speedy windshield survey of trees in their respective areas. The forester calls the trees by species, size, and condition (no street addresses!), the citizens tally this information, and they stop to discuss specific issues in the field. The volunteers have seen each dangerous tree as well as each potential planting place that could beautify their homes and properties. Because they love trees and their town, these citizen volunteers (rather than the city forester) get money so tree work can be done.

Sure, it is nice to have a little data (as little as possible and only what is really needed) to help efficiently manage trees. The forester's goal should be to manage people first, trees second, and data last. That is how it works best in the real world.

Steve Sandfort, RF, CA
Cincinnati City Forester
Cincinnati, OH