



How to Select and Plant a Tree

TREE CITY USA®
BULLETIN

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Encouraging America to plant trees is a worthwhile goal, but it's only half the story. Whether planting two trees in the front yard or a million in a city, the effort will come to naught unless the trees are selected and planted correctly. True success is a new tree that is vigorous from the start and lives a long, productive life. This issue of the Bulletin is dedicated toward that goal.

Planting a tree is the ultimate act of optimism and sharing. It is the one act within reach of nearly every man, woman, and child to improve the environment and make this world a better place. It is repayment of our debt to nature for the air we breathe and the joy we know from bird songs, summer shade, or the calming beauty of shimmering leaves.

Apart from the physical benefits of planting a tree, there are also the social benefits of working together to beautify a neighborhood or improve a park. "Friendship is the spirit of the forest," wrote naturalist Enos Mills at the turn of the century, and it is as true of the urban forest as it is of the wilder places in rural America. The benefits of trees are given without prejudice, and the act of planting a tree offers common ground and a natural bond among all humans.

But planting a tree is not to be taken casually. It requires planning, great care, and a knowledge of trees and their needs. Experts estimate that young trees will grow twice as fast when planted correctly and will live at least twice as long as trees improperly set out. It is essential, then, to know the basic rules for selecting and planting trees.



Selecting Your Tree

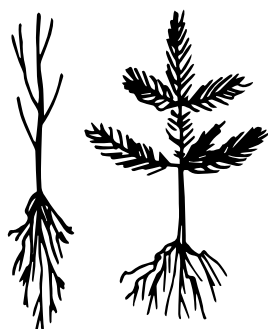
Trees are for a lifetime, so it pays to spend time now making sure you get the best. In fact, several months before you plant is not too soon to start shopping. Here are four steps to help you make the right decisions:

1. Think clearly about the purpose of your new tree (shade, privacy, aesthetics, windbreak, etc.).
2. Write down the limitations of the site where you will be planting (overhead wires, confined root zone, dry climate, clay soil, etc.).

3. Select the species or cultivar to plant that best matches the above conditions you have identified.
4. Examine the trees before you buy, and buy for quality.

Buy only from reputable nurseries (local or mail order). Are they members of professional organizations such as AmericanHort? If local, do they have knowledgeable staff to answer questions and care for trees properly behind the scenes?

Look for These Physical Characteristics in Your Trees:



BARE-ROOT SEEDLINGS

- Roots should be moist and fibrous.
- Deciduous seedlings up to 10" in height should have roots approximately equal to the trunk length; from 12" to 24", look for roots approximately 10" to 12" long.

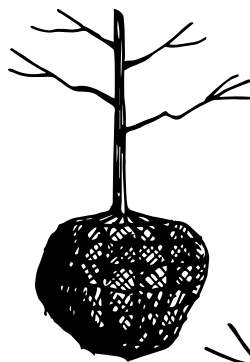
CONTAINERIZED SEEDLINGS

- The soil plug should be moist and firm.
- Avoid tall, spindly tops. Well-developed roots are more important than the height of the seedling.



ROOTS

- Is the rootball firm to the touch, especially near the trunk?
- Is the rootball adequate for the tree's size? (See chart)



(B&B) BALLED AND BURLAPPED TREES



POTTED

- Are large, circling roots absent? (Check this by feeling down into the top 3 or 4 inches of the pot.)
- Are pruned roots cut cleanly and no wider than an average finger?
- Are soil and roots joined tightly?

NOTE: Bare-root trees of large sizes are also available, but at fewer and fewer nurseries. It may be worth locating a source, as this can often save you 30 to 50 percent of the cost. Careful storage is necessary to prevent drying, and planting must be completed before dormancy ends. Success is best with species that continue trunk elongation all summer, such as locust, hackberry, and elm.

CROWN/BRANCHES

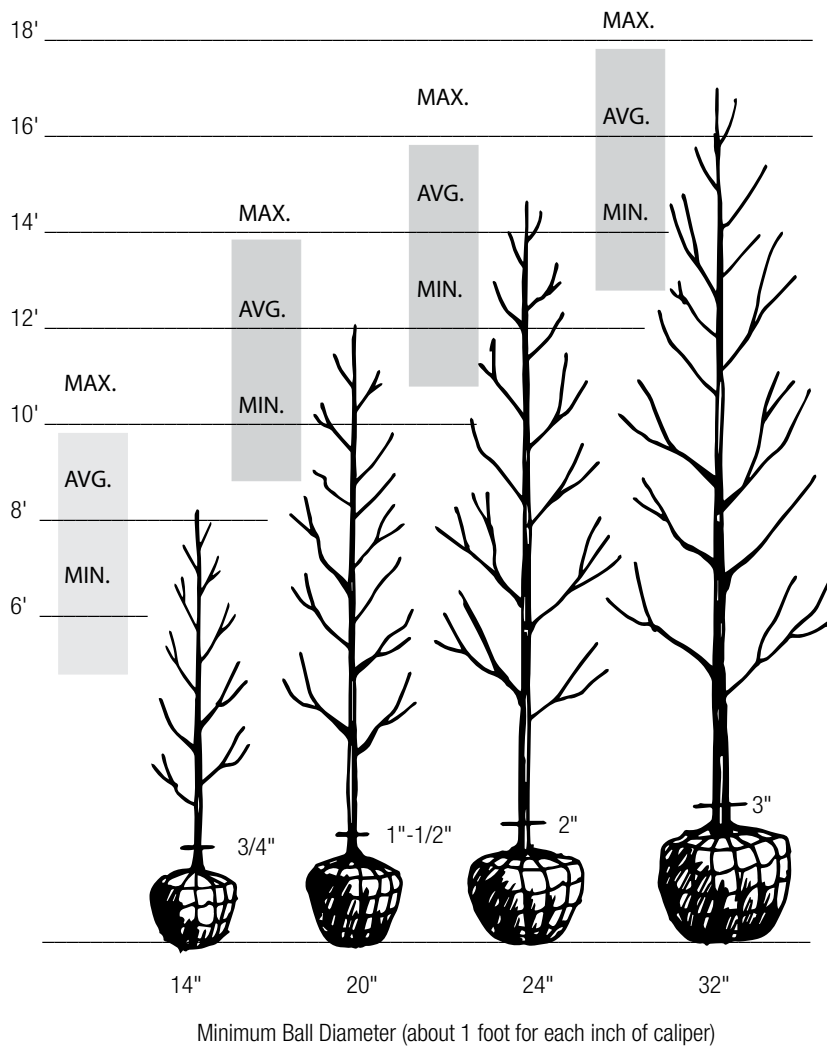
- Is the tree symmetrical?
- Is there a single, well-developed leader?
- Are buds plump and healthy looking?
- Are branches well-distributed around the trunk and considerably smaller than the trunk?
- Do branches approach the ideal spacing of 8" to 12" apart and form at least a 45-degree angle with the trunk?

NOTE: Avoid trees that have been "headed back," the undesirable practice of pruning off the ends of branches. This is sometimes done to reduce the size of an overgrown tree to meet specifications.

TRUNK

- Is it reasonably straight?
- Does the trunk taper nicely?
- Is the bark free of cuts and scrapes? (Reject trees with wounds wider than one-fourth the circumference of the trunk.)
- Are pruning wounds healed over?
- Is it free of frost cracks, sunscald, swollen areas, and evidence of disease or insect injury?

How to Check Proper Size and Rootball Proportions



To reduce transplanting shock and ensure that adequate feeding roots are moved with the tree, the American Nursery and Landscape Association has established standards for height-diameter relationships and rootball sizes. This chart illustrates these standards for most deciduous shade trees. A more complete range of sizes may be found in *American Standard for Nursery Stock*.

WHAT IS CALIPER?

Trunk diameter on young trees is referred to as its caliper size. For standardization, this measurement is taken 6 inches above the ground on trees with a diameter of 4 inches or smaller, and 12 inches above the ground on larger planting stock. The diameter of larger trees is measured approximately 4.5 feet above ground level and is expressed as diameter breast height (DBH).

What is Arbor Day?

The original Arbor Day was celebrated April 10, 1872. In 1885, this tree-planting holiday was moved to April 22 to honor the birthday of its founder, J. Sterling Morton. Later, in 1970, this date was selected as the first Earth Day. Today, by proclamation, National Arbor Day is the last Friday in April.

Trees, however, do not respect legislative fiat. This is why many states have their own unique date for Arbor Day, such as Florida's third Friday in January or Alaska's third Monday in May. States can set the date to coincide with the best time to plant trees.

For a complete list of Arbor Day dates by state, visit the Arbor Day Foundation's website at arborday.org.

Acts of creation are ordinarily reserved for gods and poets, but humbler folk may circumvent this restriction if they know how. To plant a pine, for example, one needs be neither god nor poet; one need only own a shovel. By virtue of this curious loophole in the rules, any clodhopper may say: Let there be a tree — and there will be one. If his back be strong and his shovel sharp there may eventually be 10,000. And in the seventh year he may lean upon his shovel, and look upon his trees, and find them good.

— ALDO LEOPOLD

How to Plant a Tree So It Lives

The goal of tree planting is to have a vigorous, healthy tree that lives to the limits of its natural longevity. Achieving this goal begins with careful tree selection. Next, the tree must be handled carefully until it is safely installed in its new home.

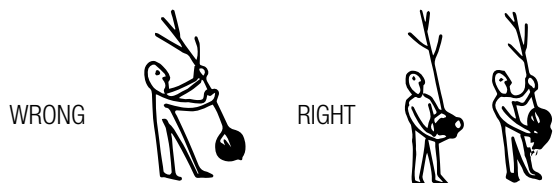
TREES — HANDLE WITH CARE

Trees are perishable products and must be treated accordingly. Reputable nursery operators know how to protect trees in shipment or while on display, but after that, it is up to you. These two cardinal rules will help keep your trees alive until you get them into the ground.



Guaranteed disaster! Tiny root hairs of bare-root seedlings dry quickly. Once robbed of their moisture, they will not recover. During the planting operation, wrap in wet burlap to protect from sun and wind, and keep moist at all times.

1. **CARRY TREES CAREFULLY.** When transporting, load and unload gently, being careful not to break branches. Always provide support beneath balled or potted plants.



2. **KEEP ROOTS MOIST.** Depending on the trees and how long you must store them before planting, techniques to prevent drying vary. They include re-dampening the packing material around small bare-root seedlings and storing in a refrigerator between 30 and 40 degrees F. Bare-root trees of all sizes may also be stored by placing the roots and their packing material under loose soil in a shallow trench. The garden often is a handy place to do this. While actually planting, continue to protect the roots from wind and sun by wrapping in wet burlap or carrying in a bucket of water, possibly with mud, moss, or sawdust added.

Balled and burlapped or potted trees should be checked for dryness by finger length probing into the soil. Sprinkle or water if necessary. Then store them in a cool garage or shaded area out of the wind.

Tip: Buy early in the season to get the best selection of trees — then plant without delay.

PLANTING BARE-ROOT SEEDLINGS

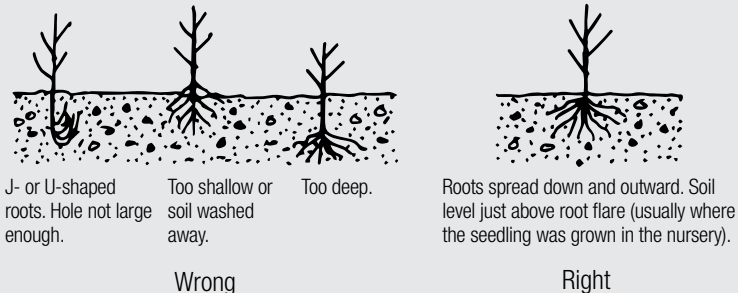


In light or sandy soil, a planting slot makes the job fast and easy. Planting small seedlings in a garden or other temporary spot for the first year is a way to ensure better protection, watering, and weed control until the seedling is larger. Then it may be transplanted to a permanent location.



In heavier (clay) soil or when planting larger bare-root stock, it is best to use the shovel and hole method. This prevents soil compaction and glazing of the hole's sides, allowing new roots to spread more easily.

AVOID THESE COMMON PLANTING ERRORS:



J- or U-shaped roots. Hole not large enough.

Too shallow or soil washed away.

Too deep.

Roots spread down and outward. Soil level just above root flare (usually where the seedling was grown in the nursery).

Wrong

Right

Transplant Shock — and How to Avoid It

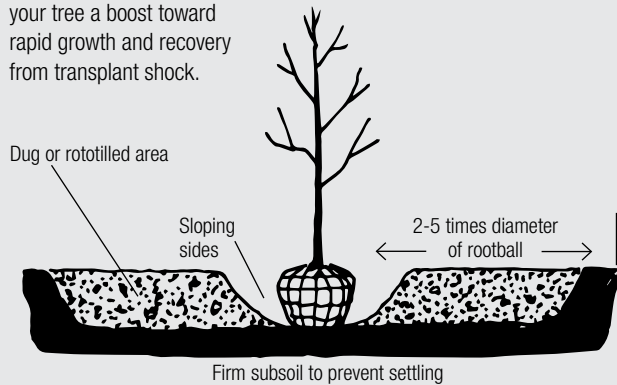
The late George Ware of the Morton Arboretum explained that any transplanted tree undergoes severe physiological shock. This is because the tree's capacity for water absorption is greatly diminished from root loss while its demands for water continue. The challenge is to keep root hairs from drying or being damaged and to use planting techniques that induce rapid root growth so a favorable root/crown ratio can be restored before drought, insects, or some other stress event occurs.

PLANTING BURLAPPED OR POTTED TREES

Recommendations for planting have evolved in recent years as more is learned about the nature of roots and urban soils. Local conditions make generalizations difficult, but here are some guidelines that reflect the latest opinions of tree experts:

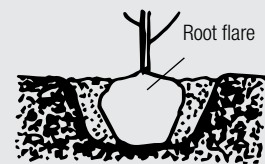
The Planting Hole

More than any other change in tree-planting procedures is the new focus on the planting hole. It can be summed up by the saying, "Don't plant a \$100 tree in a \$10 hole!" Proper preparation will encourage root growth rather than adding to the difficulties already challenging the young tree. Here's the way to give your tree a boost toward rapid growth and recovery from transplant shock.



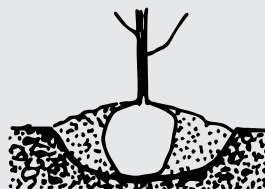
This method recognizes the fact that most roots spread through the top 12 inches of soil in a wide periphery around the tree. Therefore, slope the side of the hole and dig or deeply rototill an area around the hole at least twice the diameter of the ball or container. An area up to five times the diameter is recommended if the soil is particularly compacted, the roots of other trees will not be damaged, and space and aesthetics allow.

How Deep Should You Plant?



- Under normal conditions, root growth is best encouraged by planting so that the root flare (the point just above the first roots) is just below soil level.

Note: Sometimes the root flare is covered by several inches of nursery soil or packing material. That should be removed.



- When wet conditions or heavy soil are problems, raising about one-third of the rootball above ground will aid the spread of lateral roots.

3x root ball diameter



- In arid climates, a basin can be used to collect precious water.

Width of canopy



WHAT ABOUT THE WRAPPING MATERIAL?

Research has not yet provided a definite answer about the potential harm of leaving wire baskets in place after planting. However, the most prudent action is to cut and remove the top two tiers of wire after the ball is set in the hole. Problems more serious than wire baskets are treated burlap (feels like plastic) and nylon rope. Twine and rope should definitely be removed, but folding down the top one-third of the burlap instead of removing it completely should free lateral roots while serving to keep the root ball from cracking (and thereby damaging roots). Never let remaining pieces protrude above the soil or they can act as wicks, drying the soil. Trees in pots or cans should be gently removed before planting. Cut away the plastic or metal if the rootball does not slide out easily. Paper or plastic trunk wrappers should also be removed. This material was put on the tree to protect it during shipment and will generally do more harm than good if allowed to remain on the tree.

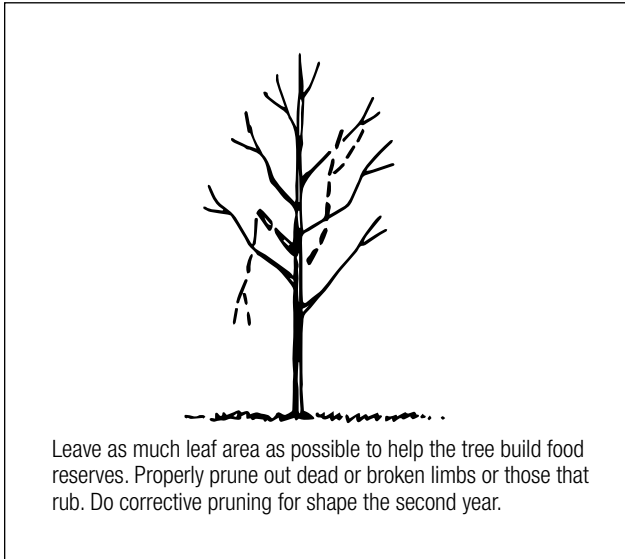
FILLING THE HOLE

Backfill with native soil unless it is clay from basement excavation or other undesirable fill material. In that case, mix in soil amendments according to instructions from a local nursery, or bring in as much good topsoil as possible. Tamp gently and add water to fill large air spaces and to give your tree its first good drink in its new home. As the tree grows, be sure to water the surrounding soil area to encourage root spread.

CALL BEFORE YOU DIG!

Before digging, always contact your local utility offices or dial 811. In most areas, the utilities offer to locate and stake underground cables and pipes at no cost to you.

Following Up After Planting

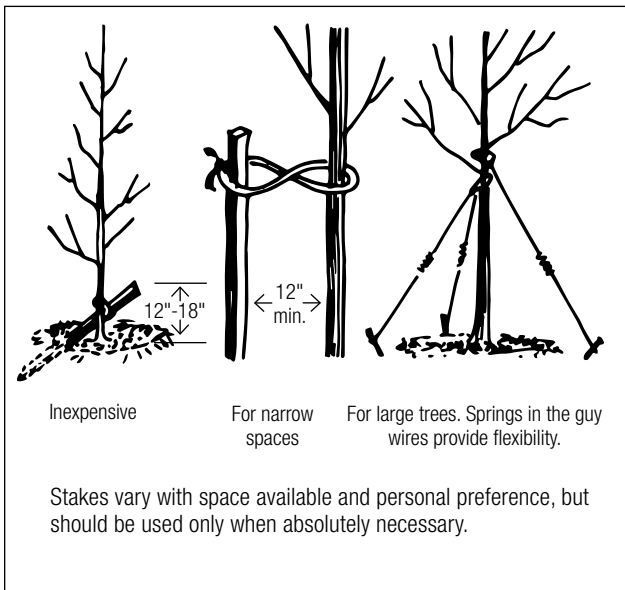


WATERING

Watering is the key to tree survival. It should be used when filling the planting hole to eliminate large air cavities, firm the soil around fine roots, and make nourishment available to the new tree. During planting, bare-root trees can be dipped in water-absorbing polymers. This amazing chemical comes under a variety of brand names and is available from nurseries. Its function is to attract water when abundant and hold it longer than soil when conditions get dry. It can also be used with balled and burlapped trees, being mixed with the backfill. The effects last for about two years. With or without the aid of polymers, water deeply around your tree once a week during warm dry spells.

PRUNING

Unless directions specify otherwise, it is better not to prune after planting if the tree will be watered regularly. Leaves manufacture the food needed for root growth, so the young tree needs as much of its crown as possible. Always prune dead or broken branches. (See *Bulletin No. 1.*)



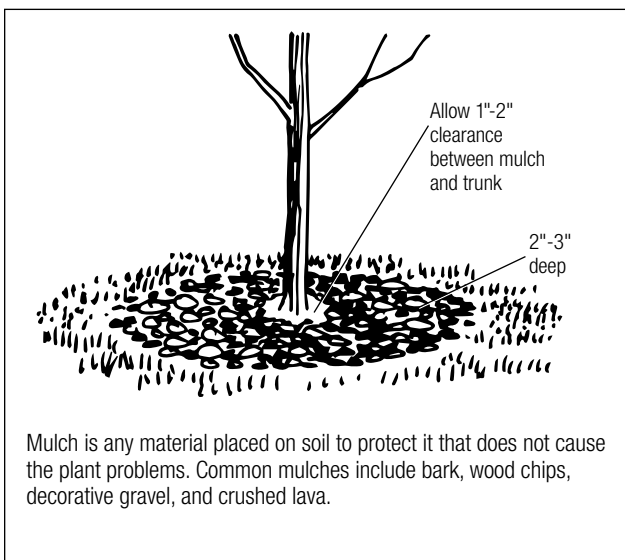
FERTILIZING

Avoid fertilizing shade trees until late spring of the second year following planting. Fertilizers can “burn” roots or stimulate crown growth faster than the roots can supply water.

STAKING

Stakes and guy wires should be used only if support is necessary. Stakes sometimes create tripping hazards and can weaken a young tree. However, when using, avoid common problems by following these guidelines:

- If the main stem droops, find the best place for support ties by moving your hand up the trunk to locate the point above which the top can stand up on its own. Place the support ties about 6 inches above that point.
- Ties can be made many ways, but a loosely-fitted figure 8 tie made of polyethylene, cloth or webbed strap is easy to install, provides good support and cushions the tree from rubbing against the stake. Using two ties will also minimize the chance of bark damage from rubbing.
- Regardless of the tie used, allow slack for the top to sway.
- Avoid driving stakes through the root ball, or using stakes with flanges that will break roots when removed.
- Remove support ties after one or two years.



MULCH

Mulch is a young tree’s best friend. It holds down competing weeds or grass, retains soil moisture, prevents soil cracking that can damage new roots, protects the trunk from lawnmower damage, and helps prevent soil compaction. Organic mulches such as wood chips or pine needles also contribute to better soil structure and aeration as they decompose. Avoid limestone rock and allow no mulch to touch the tree’s trunk or be piled higher than 3 inches.



Tree planting in the community forestry program is a big need with a big cost. It has been estimated that 75 million trees need to be installed just to fill existing and projected spaces along streets alone. Aging parks, school grounds, and other public property expand this figure upward. Considering that the national average for planting one street tree and nurturing it to vandalproof size is around more than \$400 per tree, a little math reveals that the price of planting trees is considerable.

It is essential to make this investment wisely. The challenge is to make certain that each public planting project is a success, with “success” measured not simply by counting the number of trees placed in the ground, or even how many survive the first year or two. Rather, the successful planting program is one that ensures that the new trees have a service life longer than the current national average of only 10 to 25 years.

START WITH THE NURSERY

Planting for survival and long life starts with the tree selection process. For the homeowner, this begins at the point of sale. But in a community forestry program, it begins with a contract between the municipality and a nursery. The late Bob Skiera, long-time city forester in Milwaukee, Wisconsin, offered this advice about contractual arrangements with a nursery:

1. Write a contract for the growing and delivery of trees, and do it with the help of both an attorney and an experienced forester or arborist.
2. Use specifications developed by the American Nursery and Landscape Association rather than making up your own.
3. Work with a local or regional nursery whenever possible, but by all means work only with a nursery that understands how to grow street trees.
4. Where vandalism is a problem, tree mortality can be reduced by specifying that street trees must have a caliper of at least 2 inches in the nursery and have a high crown. The lowest limbs should eventually be at least 7 feet (6 feet on flowering crabapples).
5. Specify the right to visit the nursery and tag trees before shipment.
6. Be sure to know the origin of seeds, root stock, and scions. This is necessary because tree growth and development are so dependent on the species, variety, or cultivar being suited to the latitude and altitude of the planting site.

Other selection criteria, such as those suggested on pages 2 and 3, are as important for large projects as for purchases by a homeowner. Of special importance in planting street trees is matching species to the soil pH of the site. Fill

material from former building sites and rainwater washing over concrete surfaces tend to raise the alkalinity of soil. Soil pH levels of 7.5 to 8.0 are common in downtown areas, whereas nutrient uptake of most trees is optimal at the slightly acidic level of 6.0 to 7.0. Therefore, it is important to test the soil and select species that can tolerate this essential part of the environment.

For professionals, the guide to nursery stock, planting and transplanting terminology and practices are part of the ANSI series (American National Standards Institute). Visit arborday.org/bulletins for links to the pertinent publications.

PLANTING FOR A LONGER LIFE

Additional guidelines are suggested by consultant James R. Urban of Annapolis, Maryland. After his study of thousands of trees next to sidewalks and in plazas, he correlated the condition of each tree with a wide range of site and management factors. The results can be found in his book, *Up by Roots*, available from the International Society of Arboriculture.

Here is a summary of suggestions resulting from Urban's findings:

1. The key to growing trees in good condition is the volume of soil available to roots. A minimum of 100 to 200 cubic feet of soil is necessary to sustain long-term growth. (New research suggests 400 cubic feet.)
2. Whenever possible, urban designers would do better to focus on planting trees in lawn areas adjacent to sidewalks rather than using confined tree pits.
3. In developments where symmetrical landscaping is an important element, it is important to design so that each tree has the same amount of soil volume available to it. Otherwise, asymmetrical design should be used.
4. The cost of tree grates and tree guards would be better spent on other things, such as importing good soil or providing more growing space. In addition to their high cost, these devices can cause injury to the trees as they grow.



Unless maintained — which is rarely done — grates and other devices around planted trees will cause serious damage as the tree matures.

The Tree-Planting Ceremony

Few things are as memorable as a special tree planting. Whether it is for Arbor Day or to honor someone or some event, the tree provides a living connection between past, present, and future. It is not uncommon for elderly people to vividly recall a tree-planting event from their youth, and it quite often helped form their attitude toward the stewardship of trees. A tree-planting event also builds goodwill and public support for the park, school, or other venue for the event — and the tree is often paid for through donations. For all these good reasons, the event should be carefully planned and conducted. Here are some basic tips:

- Select quality planting stock.
- Prepare the hole ahead of time and have the tree in place; remove the shipping material but cover the rootball with moist burlap and remove it as the ceremony begins.
- Remember that hearing outdoors is difficult, especially for older folks. Use a portable, weatherproof amplifier.
- Arrange chairs for the elderly and dignitaries; arrange in advance for photography and provide an advantageous place for those who will be taking pictures.
- Have a printed agenda or program and include information about the tree. It is also a good opportunity to include educational information about tree planting and care.
- Plan who will do the planting and have the shovel(s) ready. If planting with children and it is a large group, it is sometimes best to select some representative planters in advance.
- Be sure to provide careful, regular after-care. From a public relations standpoint, there are few things worse than the premature demise of a memorial tree — especially if it is due to lack of watering or other care.



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