Hort-17

Establishing Strong Roots: Tree Planting Recommendations for Sustainable Development

Terra Freeman
Florida Friendly Landscaping™ and Commercial Horticulture Agent
UF/IFAS Extension St. Johns County

This publication is designed to support builders, developers, commercial horticulture professionals, homeowner associations (HOA), community development districts (CDD), property managers, and new homeowners. It offers practical, research-based guidance on selecting, planting, and establishing trees that will not only survive but thrive.

In St. Johns County (SJC), Florida, new home construction must comply with specific tree requirements that involve either preserving or replacing existing trees. According to the SJC Land Development Code, at this time of publication, at least 70% of newly planted trees in new developments must be canopy trees. Furthermore, at least half of these trees must be native species, and no more than 50% can belong to the same species. Canopy trees are defined as those that can reach a mature height of at least 35 feet and have a canopy spread of 30 feet. Examples of canopy trees include laurel oak, live oak, shagbark hickory, river birch, maple, eastern red cedar, and southern magnolia.

For additional information, please refer to the St. Johns County Tree Information for Residential Home Sites at https://www.sjcfl.us/wp-content/uploads/2023/08/Section-17.0.5-Tree-inch-worksheet.pdf.

Importance of Proper Tree Selection

Selecting the right tree species is one of the most important decisions in landscape planning. Canopy trees, in particular, will define a property's function and aesthetic for decades. Their initial placement, planting, and maintenance practices impact not only the landscape's beauty but also the tree's long-term health and surrounding infrastructure.

Trees provide significant environmental, monetary, and health benefits, including energy savings, improving air and water quality, erosion control, enhancing visual appeal, increasing property values, and contributing to a higher quality of life for residents. Many studies have examined the benefits of trees in urban areas.

- The USDA Forest Service reports that 100 trees can remove 53 tons of carbon dioxide and 430 pounds of other air pollutants each year. (https://www.fs.usda.gov/learn/trees).
- Trees enhance water quality by decreasing stormwater runoff; according to the EPA, they absorb between 15% and 27% of annual rainfall and filter pesticides, fertilizers, and other pollutants from runoff during rain events. (https://www.epa.gov/heatislands/benefits-trees-and-vegetation)

An Equal Opportunity Institution

- Trees help lower surface and air temperatures, which can help alleviate the urban heat island effect. (https://pmc.ncbi.nlm.nih.gov/articles/PMC7345658/).

Figure 1: Photo credit: Terra Freeman, UF/IFAS

Tree Selection and Placement

One of the most important considerations when selecting a tree is the expected mature size of the tree in relation to the available planting space. At maturity, the tree's height and canopy spread should guide how far the tree is planted from buildings, sidewalks, driveways, and other structures. As a general guideline, it is recommended to plant at least half of the mature canopy spread away from other trees and structures. However, spacing needs may vary between species and even among cultivars of the same species, so always consult species-specific recommendations.

Applying the Florida-Friendly Landscaping™ (FFL) principle of **"**Right Plant, Right Place" is essential. This means matching a tree's requirements, such as light, soil, and water needs, to the site's conditions to ensure long-term success. By following recommended practices, trees can live long and provide increasing environmental and economic benefits as they mature. However, if trees are planted incorrectly, this may lead to costly repairs in the future.

Select a planting location based on the mature height and width of the tree. Ensure the tree will not interfere with utility wires, security lighting, or structures (such as the roofline, driveway, etc.) once fully mature. Additionally, assess the direction the house is facing. According to the Arbor Day Foundation, planting deciduous trees to shade the eastern, southern, and western sides of the house can reduce air conditioning costs by up to 35%.

It's important for trees to have enough space for their root systems to develop properly. Most tree roots are located within the top 2 feet of soil and can extend well beyond the width of the canopy's drip line. The aim is to minimize conflicts with both above-ground and below-ground infrastructure. The root systems of mature canopy trees can damage or displace nearby sidewalks and driveways. For example, the canopy of a mature live oak can spread 60 to 120 feet, with its root system extending far beyond. Roots are often damaged during repair work, which can severely harm the tree's health and stability. This may lead to decline or death, increasing the risk of further damage to people or property.

Recommended Planting Practices

- **Planting Hole Depth:** One of the most common mistakes when planting a tree is placing it too deep in the ground. The root ball should be at least one inch above the surrounding soil. To do so, dig the planting hole slightly shallower than the depth of the tree's root system. This way, the top 1 to 2 inches of the root ball will be above ground level once the tree is planted. It is always better to plant a tree too high than too deep.

Figures 2&3: The planting hole should be dug slightly shallower than the depth of the tree's root system, allowing the top 1 to 2 inches of the root ball to remain above ground once the tree is planted.

- **Planting hole width:** When preparing the planting hole, ensure it is at least 1.5 times wider than the root ball. This allows the new roots to expand more easily into the surrounding soil. If the soil is particularly hard, it's advisable to loosen the compacted soil in a larger area around the tree.

Figures 4&5: *The width of the planting hole should be at least 1.5 times wider than the root ball to encourage new roots to expand into the surrounding soil.*

- **Remove outer materials:** If the root ball is wrapped in burlap, make sure to remove at least the top third of the burlap after placing it in the planting hole. If it is wrapped in synthetic burlap or plastic, ensure that all of it is removed; this can be done after the tree is set in the planting hole.

- **Prepare the root ball for planting:** After removing the tree from the pot, loosen or shave off the outer inch of the root ball to encourage the roots to grow laterally into the surrounding soil. If the topmost root is not visible at the soil line, remove enough soil to expose it and use this as your guide for planting depth. Look for circling or girdling roots; prune them away or spread them out to prevent them from constricting the tree as it grows. However, avoid cutting any roots that are larger than one-third the width of the tree trunk, as this may place too much stress on the tree and could lead to its demise.

Figures 6 & 7 : Loosen or shave off outer inch of root ball to encourage roots to grow laterally into surrounding soil. Photo credit: Terra Freeman, UF/IFAS

Figure 8: Prune or spread out circling or girdling roots to prevent them from constricting the tree as it grows. Do not cut off any roots that are larger than one-third the width of the tree trunk. In this example, the 2 larger roots that were encircling the rootball were not cut, rather they were spread out to grow towards the surrounding soil. Photo credit: Terra Freeman, UF/IFAS

- **Planting the Tree:** Position the tree in the hole so that the root ball is 1-2 inches higher than the surrounding soil surface. When lifting the tree, avoid holding it by the trunk, as this can damage the roots. Once the tree is in place, step back and examine it from all angles to ensure it is straight and that any leading branches are facing the desired direction. After confirming the position, backfill the hole with the same soil that was initially removed. It is not beneficial to add extra organic matter, such as compost or potting soil, to the planting hole.

    - When the hole is about half full of soil, water it thoroughly to eliminate air pockets. Then, continue filling the hole until the soil level is even with the ground. Stabilize the rootball by firmly packing the soil, but avoid hardpacking, as this can reduce the soil's capacity to hold oxygen and moisture. Additionally, do not place soil on top of the root ball, as this can restrict oxygen flow to the roots. Create a catch basin for water by surrounding the planting hole with a 3-inch berm made of mulch. Finally, irrigate the area thoroughly.

Figures 9, 10, 11: When the hole is about half full of soil, water it thoroughly to eliminate air pockets, then continue filling the hole until the soil level is even with the ground.

Figure 12: Create ***a catch basin for water by surrounding the planting hole with a 3-inch berm made of mulch***

Recommended Mulching Practices

After planting, apply a 2-to-3-inch layer of mulch over the entire planting area, avoiding direct placement on the root ball. You may apply 1 inch of mulch over the root ball for aesthetic purposes, but excessive mulch on the root ball can hinder irrigation. A general guideline is to create a circle of mulch 2 to 3 feet in diameter for every inch of the tree trunk's diameter. Keeping grass and other plants away from the trunk helps prevent damage from lawn equipment and reduces competition for nutrients and water.

Mulch offers numerous benefits, including moisture retention, temperature regulation, and weed control. It is best to use organic mulch materials like pine bark or pine straw, as these decompose over time, improving soil texture and contributing to the overall health of the soil. Avoid using rock or pebble mulch, as they do not decompose into organic matter.

Do not heap mulch against the trunk, a practice known as "volcano mulching." This can be harmful to the tree, leading to trunk rot, restricting irrigation to the root system, and cutting off oxygen to the roots. Additionally, roots may grow into the mulch pile, causing girdling and overall decline of the tree.

- Trees have a natural widened area at the base of the trunk known as the root flare. If trees are planted too deep or if mulch is piled too high, this root flare may not develop correctly or may be hidden from view. The root flare is crucial for the tree's health and stability; without it, the roots may girdle, leading to the tree's decline over time.

Establishment Staking

If a tree is located in a windy area, or if it is top-heavy or unstable, it may need to be staked. Staking should only be done if it can be removed within the first year. Leaving the stakes in place for longer than a year increases the risk of girdling from wires and other supports. In many cases, stakes can be safely removed after six months.

Recommended Irrigation Practices

As a general guideline, trees should be irrigated a minimum of 2 to 3 times a week with 2 gallons of water for each inch of trunk caliper until their root systems are established and they can thrive without additional irrigation. If the soil has poor drainage, reduce the frequency of watering. Additionally, water less in the winter months. The goal is to keep the root system moist, but not too wet. Smaller trees tend to establish themselves more quickly than larger ones. If you can only provide supplemental irrigation for 3 months after planting, it’s best to choose trees that are smaller than one inch in caliper.

An Equal Opportunity Institution

To ensure a more vigorous establishment of trees, follow the irrigation schedule outlined below:

- For trees with a caliper of less than 2 inches:
  - Irrigate daily for the first 2 weeks.
  - After that, switch to watering every other day for the next 2 months.
  - Once the initial period is complete, water weekly until the tree is fully established.

- For trees with a caliper of 2 to 4 inches:
  - Irrigate daily for the first month.
  - Then, change to every other day for the next 3 months.
  - After this period, water weekly until established.

- For trees with a caliper greater than 4 inches:
  - Irrigate daily for the first 6 weeks.
  - Following this, water every other day for the next 5 months.
  - Finally, switch to weekly irrigation until the tree is established.

Recommended Fertilization Practices

Do not fertilize when planting; instead, wait at least six months after planting before applying a slow-release fertilizer, if necessary. Apply the fertilizer evenly under the drip line of the tree's canopy. Avoid using fertilizer stakes, as they do not distribute nutrients evenly. Once the trees are established, they typically do not require regular fertilization, except for palms and fruit trees. Palms need a specific fertilizer with a nutrient ratio of 8-2-12 plus 4% magnesium.

Establishment Pruning

Pruning during planting can improve a tree's overall structure and eliminate any structural defects. However, it's generally best to retain as many leaves as possible, as these leaves produce sugars that support root growth. Leaving lower branches on the tree at the time of planting can aid its growth and establishment; however, any undesirable branches should be removed before they exceed ¾ to 1 inch in diameter, allowing the pruning cut to seal properly.

Conclusion

Following recommended planting and cultural practices creates an optimal environment for a tree’s successful establishment and longevity, reducing future monetary and maintenance needs. Careful selection and placement, along with proper planting, mulching, and irrigation techniques, all contribute to a tree’s ability to thrive and provide value to a property. By adhering to best practices, homeowners, HOAs, CDDs, and commercial horticulture professionals can work together to create resilient urban landscapes.

An Equal Opportunity Institution

References:

Chapter 11: Planting and Establishing Trees: https://edis.ifas.ufl.edu/publication/EP314

Tree Planting: A Quick Guide for Homeowners: https://sfyl.ifas.ufl.edu/media/sfylifasufledu/miami-dade/documents/landscapes-amp-gardening/Tree-planting-Homeowners-2014.pdf

Pruning at Planting: https://hort.ifas.ufl.edu/woody/pruning-needs.shtml

Planting Trees for Energy Savings: https://gardeningsolutions.ifas.ufl.edu/design/landscaping-for-specific-sites/planting-trees-for-energy-savings/

Article IV Natural Resources: https://www.sjcfl.us/land-development-code/

https://www.sjcfl.us/code-compliance/#:~:text=To%20maximize%20the%20retention%20of,or%20is%20a%20specimen%20tree

https://www.arborday.org/tree-resources/summer-shade

https://hort.ifas.ufl.edu/woody/natural-root-flare.shtml

https://edis.ifas.ufl.edu/publication/EP314

Photo Credit: All photos by Terra Freeman, UF/IFAS

2026

An Equal Opportunity Institution