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Landscape Recommendations for Sustainable Development: Plants for Alkaline Soils in Northeast Florida Landscapes

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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 developing and maintaining a Florida-friendly Landscape.

Florida-friendly landscaping™ (FFL) educates Floridians about environmentally sustainable landscaping practices that conserve water and protect water quality while maintaining an attractive landscape utilizing the following nine principles:

- Right Plant, Right Place
- Water Efficiently
- Fertilize Appropriately
- Reduce Stormwater Runoff
- Manage Yard Pests Responsibly
- Provide for Wildlife
- Mulch
- Recycle Yard Waste
- Protect the Waterfront

Figure 1: Photo: Tyler Jones, UF/IFAS

Role of Soil pH in the Landscape

Soil pH is a measure of the soil's acidity or alkalinity on a scale of 0 to 14. A pH of 7.0 is considered neutral, below 7.0 is acidic, and above 7.0 is alkaline. Soil pH plays a critical role in a plant's ability to absorb essential nutrients. If the soil pH falls outside a plant's preferred range, nutrients in the soil can become unavailable, leading to nutrient deficiencies and poor plant health. Every plant has an optimal soil pH range for healthy growth. When the pH is too high or too low, nutrients become chemically bound in the soil and cannot be absorbed by the roots, regardless of how much fertilizer is applied.

Many of Florida's alkaline soils are the result of naturally occurring limestone or seashell deposits, which are rich in calcium. These conditions are especially common in coastal areas throughout the state. Construction materials that contain lime, such as concrete, can also raise soil pH. In addition, fill soil or soil dredged from

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retention ponds is often highly alkaline and poorly drained, creating challenging growing conditions in the landscape.

Amending soil with sulfur-containing products can temporarily lower soil pH, but there is no practical way to permanently reduce the pH of alkaline soils. As a result, selecting plants that are well adapted to site conditions is the most effective long-term solution. In contrast, raising the pH of acidic soils is relatively easy. Applying liming materials, such as dolomitic limestone or calcium carbonate, can increase soil pH when needed.

It is important to have your soil tested before applying any amendment intended to change soil pH. Altering soil pH without first testing can make the problem worse. For example, adding lime to soil that is already alkaline or sulfur to soil that is already acidic can move the pH even farther from the optimal range for plant growth. For more information on altering soil pH in the landscape, visit: https://gardeningsolutions.ifas.ufl.edu/care/planting/soil-ph/

Adding organic matter, such as compost, can help moderate soil pH in landscapes that are either too acidic or too alkaline. While not a substitute for adjusting soil pH when necessary, regular additions of organic matter can gradually buffer the soil and create more favorable growing conditions. Over time, compost also improves soil structure, drainage, aeration, water-holding capacity, and nutrient retention. Incorporating compost into the soil before installing turfgrass or other landscape plants can greatly improve establishment and long-term plant health, especially in compacted post-construction soils.

This publication focuses on plant selection for alkaline soils in northeast Florida. When the Florida-Friendly Landscaping™ principle of “right plant, right place” is followed, plants are chosen to match the existing soil pH and other conditions of the site. This approach eliminates the need to modify soil pH and reduces the need for additional inputs, increasing the likelihood of successful plant establishment and long-term landscape success.

Plant Species for Alkaline Soils

Shumard Oak (*Quercus shumardii*): The Shumard oak is native across the eastern United States, including northeast Florida, and is hardy from USDA Hardiness Zones 5b through 9b. It is well adapted to urban landscapes, including parking lot islands and other areas with compacted soils, poor drainage, and drought. This oak grows best in full sun and is highly adaptable to a wide range of soil conditions, including acidic to alkaline pH, as well as clay, sand, and loam textures. Research from the U.S. Forest Service has shown that the Shumard oak can be successfully established in soils with pH levels ranging as high as 7.8 to 8.0.

Figure 2: Shumard Oak (Quercus shumardii); Photo: Terra Freeman, UF/IFAS

This resilient shade tree can live for several hundred years and reach heights of up to 80 feet, with a narrowly rounded canopy spreading 40 to 50 feet wide. Its large acorns provide important wildlife food sources and habitat,

and the tree supports nesting birds. It is also a host plant for several Lepidoptera species, including the imperial moth and duskywing. In addition to its ecological value, the striking red-orange fall color is another compelling attribute of this hardy, long-lived shade tree.

Eastern Redbud (*Cercis canadensis*): The Eastern Redbud is an excellent specimen tree, valued for its showy clusters of pinkish-purple flowers and large, heart-shaped leaves. It occurs throughout the eastern United States in hardiness zones 4 through 9a and grows in full sun to partial shade. It is typically one of the first trees to bloom in spring.

Figure 3: Eastern Redbud (Cercis canadensis); Photo: M. Talabac

Redbuds performs well in soils with higher pH, growing best where pH exceeds 7.5. They prefer moist, well-drained sites but are adaptable and can tolerate periods of drought once established.

This small to medium-sized tree has a vase-shaped crown and may be grown as either a single- or multi-stemmed trunk, depending on the cultivar. Its fast growth makes it useful for an area that needs to fill in quickly, reaching 20 to 30 feet in height with a spread of about 25 feet. Because it is short-lived in the landscape, rarely exceeding 30 years, it is better suited for residential and commercial landscape settings rather than street tree plantings.

The pinkish-purple flowers emerge in clusters along the stems before the leaves appear in spring. A range of cultivars are available, including selections with white flowers, purple foliage, and weeping or cascading forms.

The flowers, which are edible, provide nectar for hummingbirds and the Henry's elfin butterfly. After flowering, redbuds produce attractive seed pods that provide food for birds and other wildlife.

Southern Live Oak (*Quercus virginiana*): Few trees are as iconic to the Southeast as the Southern Live Oak. Well adapted to the challenging coastal and urban environments of Northeast Florida, this tree is prized for its glossy evergreen foliage, deeply furrowed bark, and broad, spreading canopy often draped in Spanish moss. Its expansive form and generous shade make it one of the region's most impressive landscape trees.

The Live Oak is tolerant of a wide range of soil conditions, including pH and soil texture; drought and flooding; salt spray and soil salinity. While they prefer a more acidic pH, live oaks are adaptable and found growing throughout Florida's more calcareous soils as well.

Reaching heights of 60 to 90 feet and developing a canopy that can spread more than 150 feet wide, the Southern Live Oak has a life expectancy of 300 to 500 years. Its exceptionally hard wood contributes to its resilience, and a well-maintained tree can withstand hurricane-force winds remarkably well. Given its immense size and longevity, this oak deserves a location where its roots can expand freely without conflicting with sidewalks or driveways, and where its broad canopy will not interfere with power lines. When provided with adequate space, a Live Oak can thrive for centuries.

Live Oak acorns provide an important food source for a wide variety of wildlife, including Florida scrub-jays, woodpeckers, crows, deer, squirrels, and black bears. They also provide habitat for numerous plant species, such as resurrection ferns, mosses, lichens, and native orchids.

Figure 4:: Live Oak (Quercus virginiana); Photo: Terra Freeman, UF/IFAS

Figure 5: Live oaks lining a street; Photo: Terra Freeman, UF/IFAS

Sabal Palm (*Sabal palmetto*): Florida's state tree, the Sabal Palm, is exceptionally adaptable and can thrive in a wide range of soil conditions, including highly alkaline soils. They are tolerant of salt spray on their foliage, but not of salt accumulation in the root zone.

The Sabal Palm can live for more than 100 years, with mature trees reaching heights of up to 40 feet and trunk diameters ranging from 12 to 24 inches. The trunk is gray and fibrous, often retaining old leaf bases known as "boots". Broad, fan-shaped leaves spread approximately 10 feet across.

In late spring, the Sabal Palm produces clusters of tiny, creamy-white fragrant flowers. These blooms attract bees and other pollinating insects, making the tree an important resource for pollinators. By late summer, the flowers develop into small black fruits that provide food for birds and other wildlife.

Figure 4: Sabal Palm (Sabal palmetto); Photo: UF/IFAS

The palm's terminal bud is edible and is commonly known as "heart of palm" or "swamp cabbage." Historically, it has been harvested as a food source; however, removing it kills the palm. With its resilience, longevity, and ability to support wildlife, the Sabal Palm is one of Florida's most recognizable and valuable native trees.

Figure 5: Simpson Stopper (Myrcianthes fragrans); Photo credit: Louise Raterman

Simpson's Stopper (*Myrcianthes fragrans*): Naturally found in Florida's coastal hammocks, Simpson's Stopper is a versatile native plant that thrives in a variety of conditions. It is highly tolerant of salt exposure and alkaline soils, thriving in soil pH ranges from 6.0 to 8.0. It can also tolerate poor drainage, making it a resilient choice for challenging sites. Once it is completely established, it is very drought tolerant.

Simpson's Stopper grows well in full sun or partial shade, although its appearance varies depending on light conditions. In full sun, the plant develops a dense canopy of evergreen foliage. In partial shade, the canopy becomes more open, allowing its attractive exfoliating bark to show through, revealing the smooth, reddish-brown bark beneath.

In spring, clusters of tiny, fragrant white flowers cover the plant, attracting pollinators and adding seasonal interest to the landscape. These blooms are followed by bright red to orange berries in late summer and early fall. The berries provide a food source for birds, while the dense foliage offers shelter and nesting habitat. Even when not in flower or fruit, Simpson's Stopper remains attractive year-round thanks to its glossy evergreen leaves, which release a nutmeg-like fragrance when crushed, and its distinctive peeling bark.

Although considered a slow-growing plant, adding about one foot of growth per year, Simpson's Stopper eventually reaches heights of up to 20 feet. For smaller landscapes, the dwarf cultivar 'Compacta' matures at approximately 5 feet tall. Its tolerance for pruning makes it exceptionally versatile in the landscape. Depending on the desired use, it can be maintained as a formal hedge or trained into a small specimen tree.

With its adaptability, wildlife value, year-round interest, and low-maintenance nature, Simpson's Stopper is an excellent native plant for both residential and commercial landscapes.

Coontie (*Zamia floridana*): Coontie is a compact, mounded, native evergreen that makes an excellent addition to many northeast Florida landscapes. It is well suited for foundation plantings, typically growing about 3 feet tall and 4 feet wide while maintaining a dense, rounded form with glossy, leathery foliage. They can also be planted in mass to serve as a groundcover. Coonties tolerate full sun to shade but perform best in partial sun. They are adaptable to a range of soil types, from acidic to alkaline, as long as soils are well drained. Once established, they are highly drought tolerant.

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Coontie is a cycad, an ancient group of plants that reproduce by producing cones rather than flowers. The species is dioecious, meaning individual plants are either male or female. In fall, female plants produce cones that develop bright orange-red seeds, which are highly ornamental, albeit toxic, in the landscape. All parts of coontie are toxic, with the highest concentration of toxins found in the seeds within the female cones. For this reason, it is best to avoid planting coontie in areas where children or pets frequent.

Figure 8: Coontie (Zamia floridana); Photo: Terra Freeman, UF/IFAS

Figure 9:: Cluster of coonties; Photo: Terra Freeman, UF/IFAS

Firebush (*Hamelia patens*): Adaptable, colorful, and easy to grow, firebush is a favorite for both residential and commercial landscapes. It works well as a specimen plant, informal hedge, or as part of a mixed planting. Although it performs best in full sun, firebush also grows well in partial shade. Once established, it is drought tolerant and adapts to a wide range of well-drained soils with a pH between 5.5 and 8.2. In northeast Florida, firebush usually dies back to the ground after the first hard freeze but quickly returns with vigorous new growth each spring. The native species typically reaches 8 to 15 feet in height and width, making it an excellent choice for larger landscapes. For smaller spaces, non-native dwarf cultivars are available, such as *Hamelia patens* 'Dwarf', 'Compacta' or 'Firefly'.

Figure 6: Firebush (Hamelia patens); Photo: Terra Freeman, UF/IFAS

Firebush produces an abundance of orange-red, tubular flowers from late spring until the first frost. These nectar-rich blooms are highly attractive to hummingbirds, butterflies, and other pollinators. As the flowers fade, they are replaced by glossy black berries that provide an important food source for many species of birds, making firebush an excellent addition to wildlife-friendly landscapes. With its long blooming season, low maintenance

requirements, and exceptional wildlife value, firebush is one of Florida's most reliable native shrubs for adding both beauty and ecological benefits to the landscape.

Figure 7: Adam's Needle (Yucca filamentosa); Photo: Shirley Denton

Yucca species: Three species of yucca are native to Florida, all of which are highly adaptable in landscapes with well-drained soil. They can handle soil pH from acidic to alkaline and are highly drought tolerant. While they do best in full sun, they can also handle partial shade.

Yucca adds a strong textural element to the landscape and can serve as specimen plants or planted in clusters. Due to their sharp, needle-like tips, all yuccas are best planted away from walkways or entryways.

Although they vary in size and growth habit, each species is characterized by long, strap-like leaves with sharply pointed tips and tall flower stalks bearing fragrant, bell-shaped blooms in the spring or summer. These flowers attract butterflies as well as yucca moths, which serve as their primary pollinators.

Yucca filamentosa, commonly known as Adam's needle, grows about 3 to 4 feet tall and wide. Its creamy white flower spikes can reach up to 8 feet in height. The stiff leaves are about 1 foot long and have sharp, needle-like tips. Several variegated cultivars are also available.

Figure 82: Moundlily Yucca (Yucca gloriosa); Photo: Edward Gilman, UF/IFAS

Yucca gloriosa, commonly known as Moundlily yucca, grows 6 to 8 feet tall, with flower stalks that rise an additional 6 to 8 feet. It has grayish blue-green, arching leaves with smooth margins and sharply pointed, needle-like tips.

Yucca aloifolia, commonly known as Spanish bayonet, is the tallest of Florida's native yuccas, reaching 10 to 15 feet in height and 3 to 6 feet wide. This slow-growing species develops multiple trunks topped with stiff, dark green leaves that have rough margins and sharp, needle-like tips. Its fragrant flowers are white with light purple accents. Spanish bayonet makes an excellent accent plant in the landscape.

Figure 139: Spanish Bayonet (Yucca aloifolia); Photo: Edward Gilman, UF/IFAS

By following the Florida-Friendly Landscaping™ principle of right plant, right place, creating a thriving landscape in Northeast Florida's alkaline soils is achievable. Selecting plants that are naturally adapted to the existing soil pH improves their ability to establish, grow, and remain healthy with fewer maintenance inputs. Choosing the right plants for your site's conditions is one of the most effective ways to create a resilient, attractive landscape that will flourish for years to come.

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