Landscape Plant Selection and Maintenance

The decision making process for plant selection in a well-designed landscape goes hand-in-hand with the long-term maintenance of the site. It is impossible to achieve good landscape design expectations without also having proper maintenance. Conversely, it is impossible to maintain a landscape efficiently if plants are not selected to meet the conditions of the site, including the desires of clients.

Horticulture professionals must take a comprehensive look at many contributing and sometimes conflicting variables and values that go into proper plant selection. The concept of matching the "right plant to the right place" relies on understanding the plant and the site if both are intended to thrive. The better these matches, the less maintenance is incurred, which further reduces the operational costs of the building and adds to the comfort and satisfaction of the owners or occupants.

Planning

Sustainable landscape planning is best achieved by following a process that incorporates site, plant, and user-specific considerations into an easily interpreted implementation plan. A sustainable landscape should be designed to create functional, maintainable, environmentally sound, cost-effective and visually pleasing surroundings.

A ***functional*** landscape allows for easy movement, work, recreation and leisure in and around the landscape as related to the activities associated with a family, business, or public place. A ***maintainable*** landscape provides for reduced maintenance at a particular level or condition, thus lowering labor costs and making upkeep easier. It also reduces the need for inputs from resources that may contribute to non-point source pollution such as fertilizers, pesticides, equipment, water, etc.

An ***environmentally sound*** landscape must first be functional and maintainable. In addition, proper design of plants and related hardscaping greatly affect landscape quality. For example, using the "right plant, right place" concept as well as considering the "right plant, right purpose" influences the amount of environmental, disease, and insect stress a plant can tolerate. A plant continually in stress will require more maintenance, meaning more labor, fertilizer, pesticides, and ultimately cost.

In a sustainable landscape design, ***cost-effectiveness*** is impacted by the processes, plants and hardscape items used in landscape implementation, and by the quality of each.

However, cost should not dictate other aspects of sustainability; a simple, low-cost landscape should be just as sustainable as an extensive, high-cost landscape. Certainly, the ongoing maintenance costs of a functional, maintainable, and environmentally sound landscape will be lowered, which means considerable savings throughout the life of the landscape. Overplanting and improper spacing to create an immediate effect looks fine initially, but in a few years it will be overgrown, difficult, and costly to maintain.

The considerations of functionality, maintainability, environmental soundness, and cost-effectiveness provide the framework needed to create a ***visually pleasing*** landscape (Figure 13-1). Designing a sustainable landscape does require the integration of more variables, but it should not affect the aesthetic value. The development of any design requires each component to be revisited several times, taking into account the others, before the best solution is reached.

Florida law (F.S. Ch. 373.185) labels sustainable landscaping as ***Florida-friendly landscaping*** and defines such as quality landscapes that conserve water, protect the environment, are adaptable to local conditions, and are drought tolerant. The principles of such landscaping include planting the right plant in the right place, efficient watering, appropriate fertilization, mulching, attraction of wildlife, responsible management of yard pests, recycling yard waste, reduction of stormwater runoff, and waterfront protection. Additional components include practices such as landscape planning and design, soil analysis, the appropriate use of solid waste compost, minimizing the use of irrigation, and proper maintenance. Florida-Friendly Landscaping™ (FFL) means using low maintenance plants and environmentally sustainable practices.

The practice of Florida-Friendly Landscape™ design combines art and science to create functional, attractive, and ecologically sound surroundings that complement a home or other structure. This design model promotes plant selection and placement practices that avoid wasted time, energy, and money on care of plants not adapted to the planting site, all without restricting choices of color, texture, and style.

Figure 13-1. An aesthetically pleasing, functional landscape setting designed to create a comfortable outdoor experience with minimum environmental impact.

Site Assessment

Plants grow well when selected according to growth requirements and site conditions. The site has to first be evaluated to understand essential cultural requirements. A complete site evaluation (Figure 13-2) requires site visits and documentation of the above and belowground characteristics. Once site attributes are understood, the process of selecting plants suitable for those conditions can be undertaken. Plants will thrive when placed in site conditions well-matched to their needs.

At a minimum, a site assessment should determine the site's soil characteristics (pH, texture, moisture retention), sun and shade patterns, average rainfall received, and whether the site will be irrigated. Often a site is divided into microclimates. For example, the front of a house facing south might have full sun exposure and a hardscape that directs runoff away from landscape beds. Whereas the back of the same house on the north side might have little to no sun exposure, and low-lying land that retains water in a very different way from the front. Plants selected for the site conditions of the front microclimate will NOT match the site conditions of the back microclimate. A complete assessment will reveal such conditions.

Existing hardscape items and other site elements such as structures, roads, parking lots, and pathways should also be identified. Interesting or unique features that will enhance the user experience and encourage site use, such as view corridors, large shade trees, site landmarks, and water should be noted. The specific function of these areas and how they are intended to be used should be determined at the same time.

Other site assessment considerations include, but are not limited to 1) type and health of existing plants, 2) presence of underground utilities, 3) ordinance restrictions, 4) species diversity, 5) community expectations, 6) tree and design life expectancy, 7) location of existing tree roots, 8) exposure to salt spray or saltwater intrusion, 9) previous site use and potential soil contamination, and 10) recent construction activities, soil layering and/or presence of construction debris.

Figure 13-2. Assessment of existing site conditions is of primary importance during the landscape planning process.

Existing Plant Considerations

Often, some of the most difficult decisions have to do with existing plants. Ultimately, a plant in the wrong place should be removed. Delaying this action will only increase the expense, trouble and potential of damaging neighboring plants and structures.

When making choices about existing plants,

1) Keep healthy plants that show good form and are growing in appropriate locations.
2) Consider simply pruning healthy, overgrown shrubs, but discarding tightly spaced plants. Over time, tight spacing fosters insect and disease problems and stresses plants, plus overcrowding can cause ***leggy*** (stretched and weak) growth in plants competing for sunlight and nutrients.
3) Retain trees with long lifespans, but remove trees that are short-lived. However, if a site is cleared, an isolated tree will become vulnerable to wind damage and could snap or fall over during a windstorm or hurricane. For this reason, it is best to leave trees in clusters, along with any groundcovers or native shrubs growing beneath them.
4) Once plants that will be kept are identified, ensure that roots are not damaged by construction activities or soil compaction; these activities can significantly damage or kill a plant.

Hardscape

Landscape accessories such as lighting, garden decor, and outdoor furnishings provide finishing touches that help bring the landscape to life. As with all elements of the landscape design, thoughtful planning about how the accessories will become part of the garden will help ensure a unified and pleasing landscape design (Figure 13-3).

Plant Selection

Up to this point in the evaluation process, plants have been discussed primarily for their ability to grow at the site. While this is the most crucial criterion for plant selection, desired plant attributes such as size, form, texture, color, longevity, seasonal interest and other aesthetic qualities are also important when choosing a species.

Good landscape design requires that plants serve particular ***functions***. For example, plants are often selected and positioned to provide a transition between the structure and the landscape, a screen for privacy, shade for comfort, rooms for various activities, an increase in wildlife habitat, or paths to direct traffic flow onto and within the property. The function a plant is intended to provide may dictate its size, shape (form), life span, canopy density, color, growth rate, fruit characteristics and other attributes.

photo by whispering crane institute

Figure 13-3. Existing hardscape is incorporated into the landscape planning process.

Appropriate design also influences long-term maintenance. Therefore, plants should be selected that will not outgrow their allotted space. Even though smaller cultivars of landscape plants may take longer to reach the desirable ***size***, they will not have to be pruned as frequently and are less likely to need replacing in a few years. In fact, a good rule of thumb is to

select and place plants to make sure they serve their intended purpose when about three-fourths mature. It is also important to note the natural ***shape*** of a plant may change radically with age. Young southern magnolia trees may have a pyramidal shape, yet become rounded or irregular and spreading when older. If the natural shape has to be drastically altered to maintain the intended form within the design, continuing high maintenance will result.

Landscape designers recommend grouping plants into masses to unify the design of plant beds. Groups of plants are visually pleasing, but this design technique provides environmental benefits as well. Trees planted in groups are much better protected from high winds and provide more atmospheric cooling than the same number of evenly spaced, isolated trees. In addition, trees planted in combination with appropriate shrubs and groundcovers form effective windbreaks and wildlife habitat.

Planting and maintaining a diversity of plant species throughout the community also helps reduce the risk of damage from disease, insects and wind in storms. Creating species diversity may require more effort and creativity to find a variety of plants that can withstand urban conditions and provide aesthetic appeal; but even so, it is well worth it for the long term health of the environment.

Figure 13-4. Small trees function as the ceiling and turfgrass along with paver stones function as the floor in this garden.

Function

Function or purpose defines the reason for using a plant in the landscape. The function guides selection of a plant type, such as trees, shrubs, vines or groundcovers for a specific space. Individually or as a group, plants are the foundation of the landscape and reinforce the intended use of the outdoor space.

Architectural

Plants serve an ***architectural*** function by complementing and reinforcing existing structures, or by defining the floors, walls and ceilings of outdoor rooms (Figure 13-4). Trees, shrubs and groundcovers can be used to emphasize the desirable architectural lines and masses of a building. The form and branching pattern of particular trees or shrubs can reiterate vertical, horizontal, and diagonal roof and wall lines, resulting in a pleasing, unified, and harmonious appearance.

Floors direct movement into and around rooms. These traffic patterns can be defined by the colors, textures, and placement of plants such as turfgrasses or groundcovers.

Walls establish boundaries in outdoor spaces by allowing or limiting visual and physical access. Characteristics of landscape walls are defined by height, depth and density of plants. Screening by evergreen trees or large shrubs, masses of intermediate shrubs or low herbaceous perennials all contribute to the characteristics of a wall.

Ceilings are usually formed by tree canopies. The branching height of a tree can contribute to the openness or intimacy of the space. Density of the tree foliage influences light in the outdoor room, such as whether it is blocked, filtered, dappled or bright.

Framing the outdoor environment with plants can emphasize qualities or downplay an unwanted view. Architecturally, plants shape outdoor rooms; the overall form provides a structural framework, and foliage, flowers and branches provide additional decorative appeal.

Engineering

Plants serve an ***engineering*** function by influencing how people move through the landscape, blocking objectionable views on or off the property, establishing buffers between divergent activities, minimizing drainage or erosion issues, and mitigating noise. Small shrubs bordering a sidewalk may help direct people along the walk. Screens between patios and utility areas of the landscape help to create separation between leisure and work spaces. Tall, dense plants provide physical barriers that prevent access and cannot be seen through (Figure 13-5); shorter, less dense, but wider plantings create implied barriers that separate areas and discourage access, while still allowing views (Figure 13-6). Groundcovers can hold soil on a slope or prevent excessive erosion. Lastly, the effectiveness of plants in reducing noise depends on the type, density, height and location. Sound can be absorbed, reflected, dissipated, diffused or dispersed by plant groupings or plants used in combination with other architectural barriers. These more utilitarian roles contribute to the overall success of the specific landscape design.

Environmental

Plants serve an ***environmental*** function by influencing microclimates. Plants provide shade, insulate structures from heat loss or gain, and cool the surrounding air by transpiring water from leaf surfaces. These functions contribute to human comfort and reduce the consumption of energy required to cool or heat buildings. Air temperatures near shade trees and foundation shrubs are considerably lower than open areas, resulting in lower heat gains through nearby walls or windows (Figure 13-7).

Trees provide good shade and effectively modify air movement. How a particular tree species performs these functions depends on how tall it grows, whether it keeps its leaves during the winter, its form or shape, and its foliage density. Deciduous trees are recommended for use on south, southeast and southwest exposures. In summer, they provide desired shade. In winter, their bare canopy allows the sun to warm the building, creating additional energy savings. On the other hand, evergreen trees on the north and northwest exposures provide the most effective barrier to cold during the winter months.

Shrubs can effectively block early morning and late afternoon sunlight on eastern and western exposures, respectively. Cooling capacity can also be increased if summer breezes are channeled through and across vegetation. Small leaved, open branching shrubs provide shade without unduly restricting air movement for passive cooling. Vegetation close to the building also lowers air temperature, thus reducing heat conduction through the walls. ***Espaliered*** plants (shrubs or small trees trained to grow horizontally against a wall) can block a great deal of sunlight before it strikes and heats up the wall.

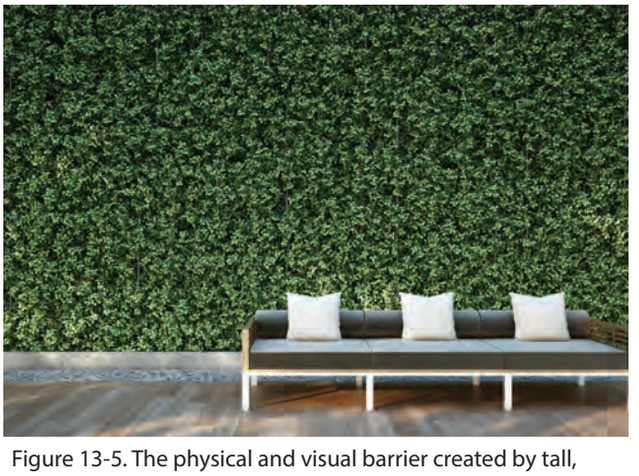


Figure 13-5. The physical and visual barrier created by tall, dense shrubs in the background.

Figure 13-6. The implied physical barrier created by smaller shrubs without impeding a desirable view.

Figure 13-7. Canopy trees, foundation plants and turfgrass provide cooling effects to both the surrounding landscape and the building.

Figure 13-8. A deciduous, twining vine growing on a pergola provides shade in the summer and allows warmth from the winter sun to enter during cooler parts of the year.

Vines are especially useful for shading when the size of a small lot restricts the use of shade trees (Figure 13-8). Self-supporting vines cling to a surface by either flattened, disklike tendrils or aerial roots. Self-supporting vines are not recommended for wood structures because they may trap moisture and lead to decay. On brick or concrete block structures, self-supporting vines can effectively prevent the sun from heating a wall. Twining vines climb by means of stems or tendrils, and require some form of support on a trellis, pergola or lattice-type structure. Twining vines can be used to shade walls, windows and outdoor living areas. As with shade trees, only deciduous vines are recommended for southern exposures to allow for passive heat from the winter sun.

The greater the leaf area in the landscape, the greater the cooling effects of transpiration. Since pavement contributes substantially to summer heat loads, ***turfgrasses*** and ***groundcovers*** are used as alternatives to surfaces such as asphalt or concrete to reduce heat gain in the landscape. Used to their fullest potential, groundcovers can be an efficient part of a passive, energy saving landscape.

Aesthetics

The most notable quality of a landscape tends to be the visual appeal or beauty of the site. Aesthetic appeal attracts attention and improves property values. Plants with aesthetic value should enhance the site's architecture, hardscape, and existing vegetation by contrasting or complementing the color, form, texture, size and proportion of these elements. Visual organization is achieved through ***repetition*** of these design qualities at specific locations in the landscape to create recognizable patterns that emphasize the ***informal*** or ***formal*** style of the structure. Plants should be chosen for their ability to personalize the home or business, enhance the surrounding structures, shift attention away from less desirable views, and bring a sense of beauty to the environment.

Color

Color in plant materials, outdoor furniture, garden art, and other hardscapes adds interest and variety to the landscape and is often used as a ***focal point*** (Figure 13-9). Color is one of the most distinctive and visual characteristics of plants; it is found in flowers, foliage, bark and fruit. Green foliage in all its various shades is

the dominant color by quantity and provides the background and contrast for other colors. Color is also very fleeting, as most plants display prominent color only during short bloom periods. However, plants with colorful foliage can be placed in distinct areas if care is taken not to draw attention away from other landscape features. Herbaceous and woody groundcovers offer a variety of colors and textures in contrast to turfgrass. They can be used to both unify the landscape and complement trees and shrubs.

Colors have properties that can affect emotions, spatial perception, dominance (focal points), light quality, and balance. One property of color can be described relative to the sense of temperature. ***Cool colors*** (blues and purples) tend to be calming and should be used in areas for relaxation and serenity. ***Warm colors*** (reds, yellows, and oranges) tend to be more exciting and should be used in areas for entertaining and parties. The "temperature" of colors can also affect the perception of distance and space. Cool colors tend to recede and are perceived as being farther away, making a space feel larger. Warm colors tend to advance and are perceived as being closer, making a space feel smaller.

Color schemes in the garden can change with the seasons. Summer colors are usually more varied and bright with more flowers, while winter colors tend to be monochromatic (one color) and darker with more foliage. Color is also affected by light quality, which changes with the time of day and time of year. Brighter, more intense summer sun makes colors appear more saturated and intense, while the filtered light of winter makes colors appear more subdued. Consideration should be given to the time of day the area will be used when choosing a color scheme. For example, whites and yellows can brighten a space used primarily in the evening.

Balance can also be achieved with color; a small amount of intense color has as much visual weight as a large amount of a subdued or weaker color. Because color is temporary, it should be used to highlight more enduring elements, such as texture and form.

Texture

Texture is the impression of the coarseness or fineness of a plant gained from feeling or seeing it. In the landscape, texture is sensed primarily through sight. The texture of a plant is mainly a relationship of size, number, spacing, and type of leaves, twigs, flowers and fruits. Some comparisons in plant texture include coarse or fine, rough or smooth, hard or soft, shiny or dull, light or dark and combinations of these characteristics.

Texture is a variable plant quality, since it can change with the seasons when plants lose leaves, and it can change with viewing distance. Many trees, such as oaks, have a coarse texture

Figure 13-9. Color is used to create a focal point in the door, and is balanced by the blooms of plumbago and bougainvillea.

Figure 13-10. Varying texture, form and color in plants, furniture, and hardscape is used to create interest in the landscape.

when viewed close up, but the smaller leaves create a finer texture when viewed from a distance. Texture provides contrast and interest (Figure 13-10), but the use of space is a very important consideration when choosing plant texture. For example, rough textured plants with thorns or spines should be avoided in pedestrian walkways or patron sitting areas.

Form

Form, or growth habit, is the most recognizable or obvious quality of a plant. Form and size are the primary determinants of a location. Choose the plant form most appropriate for the desired function, and the shape and size of the space. For example, sprawling vines are not appropriate near walkways where they require constant trimming for safety; however, trees with a wide, sprawling canopy are appropriate for shade over the walkway. It is important to remember that plant proportions change over time. A tree may be upright and columnar when young, but develop into a broad spreading specimen with age. Consideration of form also helps determine if a plant should be used in masses or as an individual specimen.

Size

The fully mature size of a plant should be considered before selection; otherwise, it will outgrow its location. The proportionate size of plants in a design changes with time because some species grow faster than others. Plant size is one of the most often overlooked characteristics when plant materials are selected. Often, the chosen plant becomes too large for the space in which it is planted. Examples include planting large trees, such as oaks, that may grow over 70 feet tall under overhead power lines (Figure 13-11) or planting a fast-growing hedge, such as oleander, that will eventually grow 15 feet tall in front of windows. In these cases, extensive and unsightly pruning will be necessary to keep plants at the appropriate size.

Another common mistake relative to size is placing a plant too close to a building (Figure 13-12). A plant that becomes too large for the space can cause structural damage. Plants can also be too small for the location or function. For example, a privacy hedge that only grows to five feet is not adequate for most situations.

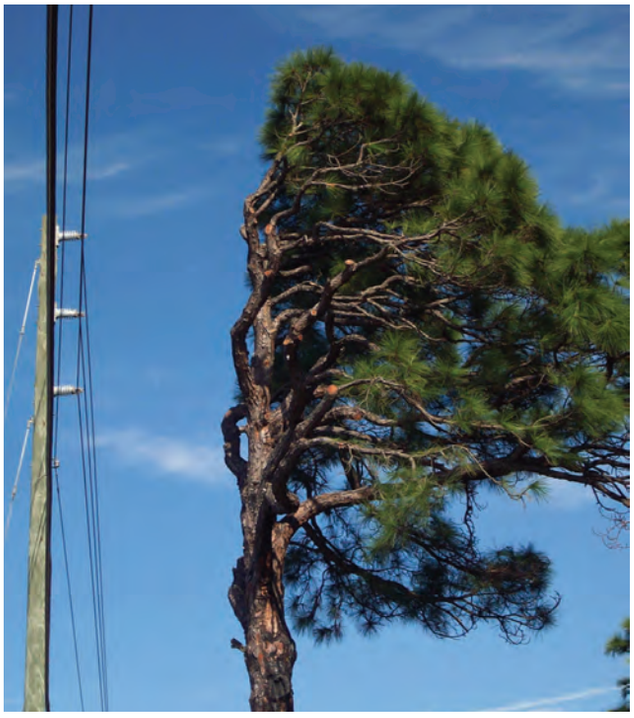


photo by dno, creative commons license

Figure 13-11. Tall trees planted too close to power lines must be pruned for line clearance, often resulting in unnatural shapes.

Figure 13-12. An arborvitae planted too close to the house will eventually grow too large for the space and need removing.

Site Conditions

Site adaptability is the relationship between the needs of the plant and the environmental and soil conditions of the property. The conditions of a site ultimately determine whether a plant will perform to expectations. If the plant is unable to establish and resume vigorous growth after planting, it is not likely to exhibit the aesthetic qualities that led to its selection.

Soil

Soils are one of the most frequently overlooked site characteristics in plant selection, yet critical to a plant's survival. Soil type influences aeration, water retention, drainage and nutrient holding capacity. Soil pH regulates the availability of micronutrients. Soil moisture must be considered, even if an irrigation system is available. Selecting plants suited to the natural moisture conditions of the soil decreases or eliminates the need for artificial irrigation or drainage.

Light

Light is another important consideration when selecting plant materials. Buildings and other structures may affect how much light a site receives. Generally, the south and west sides of a building are exposed to more light than the north and east sides. Daily light patterns across the site and changes with the season influence plant selection. Trees and other plants in the landscape also alter the amount of light on a given site. Some trees provide denser shade (Figure 13-13) than others, and this helps determine the performance of plants growing underneath. Remember, available light can change with the maturity of the planting, making it necessary to change plants in a composition as time influences light levels.

Turf does not grow well in dense shade and is also difficult to establish in extremely wet or dry areas. In this case, a groundcover adaptable to such problem situations should be considered. Plants that do not receive enough light often grow weakly and become ***leggy***. Conversely, plants adapted to shade and lower light usually show signs of sunburn or scald when planted in too much such.

Water

Water quality plays an important role in determining plant performance. Alternative water sources, such as reclaimed water, may have elevated salinity or alkalinity levels. Salt spray is a problem in many coastal landscapes, and care should be taken to select salt tolerant plants. Water splashed from swimming pools, spas, and chlorinated fountains can also damage landscape plants.

Hardiness

Hardiness refers to the plant's ability to withstand cold temperatures. USDA hardiness zones extend from zone 8 to zone 11 in Florida and are based on the average minimum cold temperature in the region. However, the number of buildings and amount of pavement in urban areas compared to open land in rural

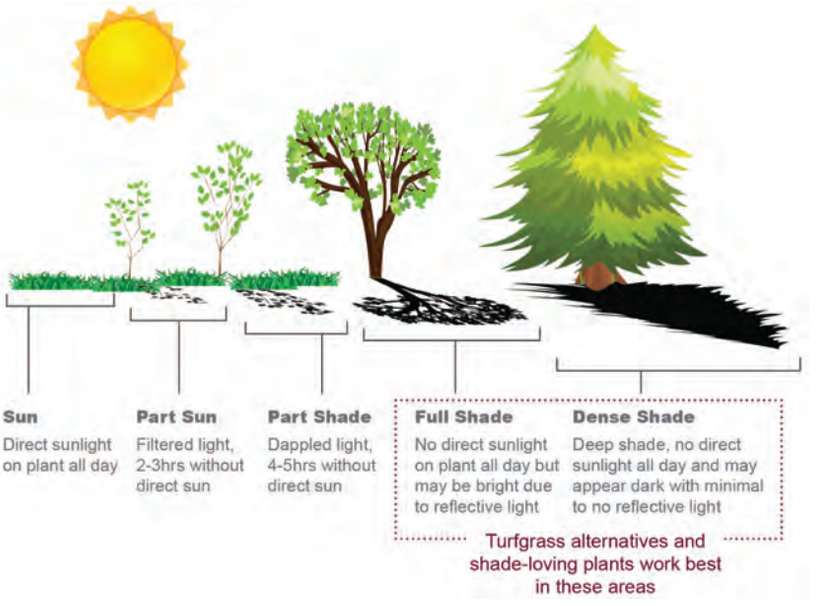


photo by texas a&m university, agrilife research extension

Figure 13-13. Dense shade under thick tree canopies inhibits turfgrass growth. Shade loving shrubs or groundcovers are a better choice for success.

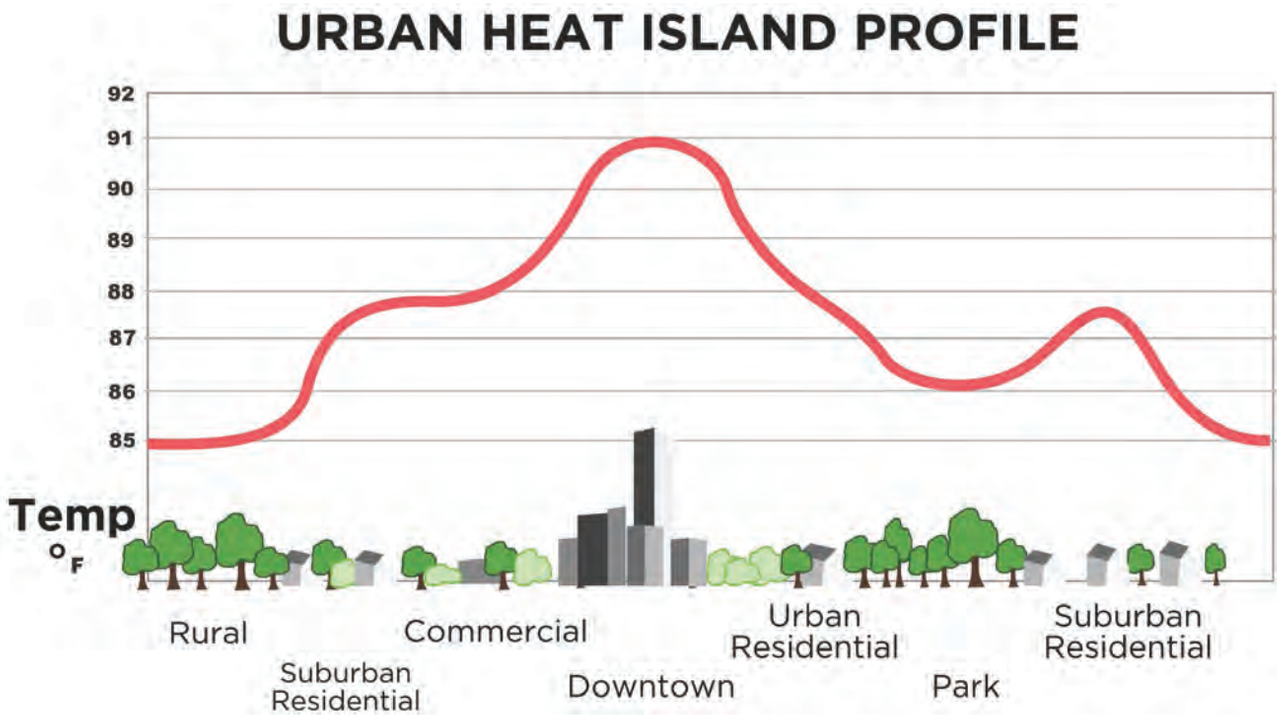


photo by national oceanic and atmospheric administration (noaa)

Figure 13-14. Graphic representation of temperature moderation by the heat island effect compared to surrounding areas.

areas causes more retention of heat. This urban ***heat island effect*** (Figure 13-14) can result in a difference of as much as 10°F at night and in the winter. This may allow plants that are not cold hardy in the surrounding rural areas to survive in more urban environments.

Temperature

Temperatures that are too low or too high limit plant growth and cause poor performance. There are many plants that need lower nighttime temperatures than daytime temperatures (***diurnal*** cycles) to regulate metabolism. Warmer nights speed up a plant's metabolism so much that it cannot produce enough food through photosynthesis to maintain itself. Reflected heat from surfaces in a landscape also affects the choice of plant material for a site. Heat from a west facing wall may be too intense for some species, but it may also provide adequate warmth for others to survive in the winter.

Figure 13-15. Plants near tall buildings and in coastal areas should be chosen to tolerate the abusive conditions of high winds.

Wind

Prevailing winds in the winter come from the north-northwest. Wind direction shifts in the summer to south-southwest. Hilltops and coastal areas often require plants that can contend with frequent winds. Buildings channel wind across portions of a landscape, creating windy conditions (Figure 13-15). In these situations, plants should be selected that perform well where it is windy. Higher winds associated with storms can cause significant problems in a landscape. Selection of plants that tolerate high winds and grouping trees close together to buffer each other can help mitigate storm damage.

Air Pollution

Air pollution can be a limiting factor for plants in some situations. Areas that experience high levels of air pollutants (such as ozone, sulfur oxides and nitrogen oxides) for at least part of the year should use landscape plants that are tolerant of those problems.

Life Span

Many plants have a certain life expectancy. It is important to remember that plants in a landscape may complete their natural or effective life span and have to be removed. Keep in mind that shorter-lived plants may decline sooner than others. This is not necessarily a problem, but it should be a planned part of the dynamic landscape. Short-lived plants can be used to act as placeholders until other species grow large enough to have the desired impact.

Cultural Requirements

The maintenance requirements of plant materials are another important consideration. Choose low maintenance plants for areas that are difficult or inconvenient to access and avoid materials that require frequent chemical application in areas often used by people and pets. For example, there are other groundcovers besides turf that only require a fraction of the upkeep and are frequently more adaptable to a wider range of environmental conditions. It is the feasibility and quality of maintenance that ensures the long-term aesthetic appeal of any plant and certainly highlights its contribution to the overall appeal of the landscape. Horticultural practices such as pruning, fertilization, irrigation and pest management need to be considered in making final plant choices.

The functional uses, aesthetic plant characteristics and site or environmental conditions that must be considered when selecting and placing plant material are summarized in the table below (Figure 13-16).

Implementation

Implementation is the development or creation of the landscape site. It is a stage in the landscape process that includes preparation of the site, securing plant materials, installation of hardscape items, and planting. Planning for required activities can reduce common risks and minimize potential hazards that may be encountered during landscape implementation.

Site Preparation

Before site preparation begins, existing site features intended to remain must be protected and those that are unwanted must be demolished and removed. Plant materials, structures, paving, or permanent improvements that will become part of the finished project must be fenced off or otherwise safeguarded. Erosion control barriers should be installed if needed, and the site must be graded to direct water away from structures and into the appropriate path of water movement for the larger area. After rough grading, landscape lighting, irrigation systems, retaining walls,

Common Considerations for Landscape Plant Selection

Function	*Aesthetics*	*Environment*	
Climate control	Color	Soil characteristics	Wind tolerance
Visual control	Texture	Light level	Pest interactions
Physical control	Form	Water quality	Air pollution
Erosion and water control	Size	USDA hardiness zone	Life span
Noise and odor control		Temperature ranges	Cultural practices

Adapted from Right Plant, Right Place: The Art and Science of Landscape Design – Plant Selection and Siting by Geoffrey C. Denny and Gail Hansen, UF/IFAS

Figure 13-16. Summary of plant characteristics and qualities that influence plant selection.

patios, paving and other construction activities should be completed. Finally, soil modification to adjust pH, add nutrients or organic matter, and any necessary alteration of soil drainage or aeration should occur prior to planting. Soil test results should be relied upon to help determine whether pH and nutrient changes must be made.

Plants

Once the right plants have been decided upon for the landscape site, the number, quality and size of individual plants must be determined for the job. This work is much easier if the project is not governed by a tight budget, thus allowing the best quality and larger-sized specimens to be selected. If budget is a serious problem, then smaller plants might be chosen or a portion of the planting delayed as an alternative to selection of poorer quality plants. When the landscape budget has to be reduced, the option of installing the landscape in phases will probably give the best overall results. If a compromise must be made between size and quality of plant material, the choice for better quality is most appropriate.

Figure 13-17. Example of a rootbound container plant.

Evaluating Individual Characteristics

Each plant should be inspected closely, and only quality plants should be selected for the project. Avoid plants with an unhealthy appearance and those with weak, defective, scarred or cracked trunks or branches. Trees with branches poorly distributed on the main stem usually result in weakly structured plants. Leaves of abnormal size or with excessive yellowing are typically an indication of a plant health problem. The entire plant should be examined closely for insect, disease or mechanical damage.

The root system of a container grown plant should be established well enough that the root ball stays intact when the container is removed. However, the plant should not be ***rootbound*** (Figure 13-17). Such plants have a mass of roots circling near the outside surface of the container medium and may present difficulty during establishment. Instead, roots should be distributed throughout the container medium and not protrude outside the container or penetrate into the ground. The root ball of ***balled and burlapped*** (B&B) trees and shrubs should be moist with the soil firmly held around the roots (Figure 13-18). B&B plant root balls greater than 18 to 24 inches in diameter should be secured by a wire basket if the plant was harvested from sandy soil. A broken or

Figure 13-18. Root balls of B&B trees heeled in for protection against heat stress and water loss.

cracked root ball indicates the plant received rough treatment during shipping, potentially ripping soil from roots and damaging fragile root hairs. This treatment may result in poor establishment and/or growth in the landscape.

The cultural and environmental conditions in the holding area of the nursery or planting site are also important. Plants that are placed in unshaded areas for even one afternoon during summer months may have received substantial root injury due to heat stress caused by direct solar radiation on container walls. Dark brown roots can often be found on the outside of the root ball on the side receiving direct sun exposure. Such injury will reduce the odds of achieving satisfactory growth and quality in the landscape. Holding plants in areas with 30% to 50% shade will reduce or eliminate heat stress on plant roots. Similarly, placing plants in holding areas close enough to provide mutual shading without injuring branches or leaves will reduce ***heat stress*** on plant roots.

Stems and roots of plants unprotected from cold or freezing temperatures may also be damaged. Cold injury to roots and stems may not be obvious until the plant is stressed by warmer weather in the spring. Therefore, roots and stems of plants should be inspected closely for signs of root injury or bark splitting.

Seasonal Color

Flowering annuals and perennials, with their seemingly infinite variety of flower color and plant form, fit into almost any landscape situation. They can provide that necessary touch of color to an often drab landscape. Container plantings can also add a splash of color to a porch, deck, or patio area. Many plants commonly considered tropical foliage plants make equally outstanding additions to the plant palette. Used as annuals, these plants add color and interest in shady areas (Figure 13-19).

In Florida, many annuals and perennials bloom during winter months, contributing impressively to a colorful landscape. Other species grow and flower during the demanding months of summer, persistently blooming through heat and heavy rains. Careful attention must be given to Florida's three very different climate zones when selecting seasonal color and developing rotation schedules to achieve maximum impact (Figure 13-20).

Most annuals only last one season (not one year) in the Florida environment, and must be planted at the right time to be successful. Typically, annuals are categorized as warm season and cool season. ***Warm season*** (tender) annuals are damaged by frosts or freezes and should be planted after the last frost date. ***Cool season*** (hardy) annuals are intolerant of heat, rainfall, and humidity. They are planted in fall and usually decline with the onset of summer.

Florida's winter climate varies greatly from north to south. For example, impatiens are normally considered a warm season annual for shade in north and central Florida, but thrive in full sun as a winter annual in south Florida. Keep in mind also that landscapes along the coast are typically warmer than inland areas of the same county or region. These coastal landscapes demand annuals that tolerate high winds, salt spray, and perhaps irrigation water from wells that contain high levels of salt. Additionally, some plants considered annuals in north Florida grow as perennials in south Florida and vice versa.

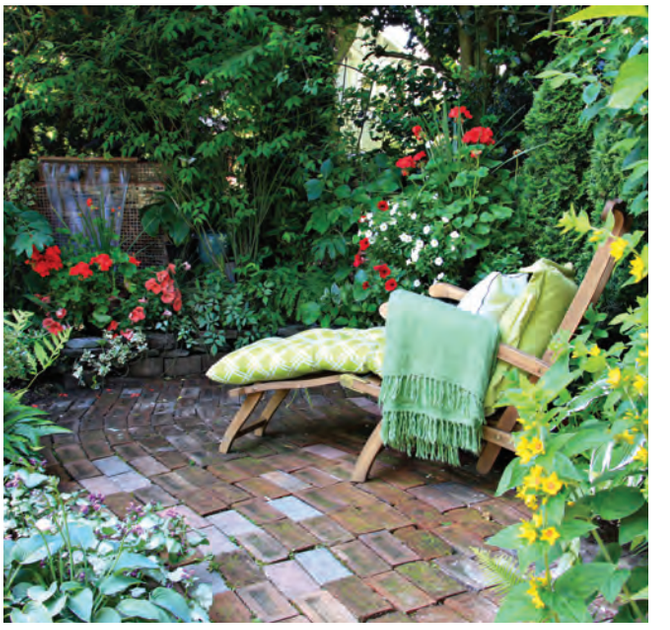


Figure 13-19. Seasonal color is chosen for landscape enhancements based on light exposure and period of use.

Selection Guide for Annuals Commonly Grown in Florida

	Exposure*				North Florida		Central Florida		South Florida	
Common Name	***Full sun***	***Sun AM or PM***	***No direct sun***	***Cold tolerance***	***Earliest plant time***	***Typical removal time***	***Earliest plant time***	***Typical removal time***	***Earliest plant time***	***Typical removal time***
ageratum	xx	x	---	Tender	Mar	Aug	Feb	Aug	Feb	July
alyssum	xx	x	---	Hardy	Oct	June	Oct	June	Oct	May
angelonia	xx	x	---	Tender	Mar	Nov	Mar	Dec	Marginal in S FL	
begonia (wax)	x	xx	x	Tender	Mar	Oct	Feb	Nov	Year-round	
celosia	xx	x	---	Tender	Mar	At decline	Mar	At decline	Feb	At decline
coleus	xx	xx	x	Tender	Mar	Oct	Mar	Nov	Year-round	
cosmos	xx	x	---	Tender	Mar	June	Feb	May	Year-round (with only a 3-mth performance pd)	
dianthus	xx	x	---	Hardy	Oct	June	Oct	May	Oct	May
dusty miller	xx	x	---	Hardy	Oct	Sept	Oct	Sept	Oct	June
gaillardia	xx	x	---	Hardy	Mar	Aug	Mar	Aug	Feb	Aug
gazania	xx	---	----	Tender	Mar	June	Mar	June	Year-round	
geranium	xx	x	---	Tender	Oct & Mar	At decline	Oct & Mar	At decline	Oct	May
impatiens	x	xx	x	Tender	Mar	Nov	Mar	Dec	Oct	May
kalanchoe	xx	x	---	Tender	Mar	At decline	Oct	July	Oct	July
marigold	xx	x	---	Tender	Mar & Sept	3 – 4 mths later	Mar & Sept	3 – 4 mths later	Year-round	3 – 4 mths later
melampodium	xx	x	---	Tender	Mar	Oct	Feb	Oct	Year-round	
moss rose	xx	---	---	Tender	Mar	Nov	Mar	Nov	Mar	Nov
ornamental cabbage/kale	xx	x	---	Hardy	Oct	Apr	Oct	Apr	Oct	Apr
pansy	xx	xx	x	Hardy	Oct	June	Dec	May	Marginal in S FL	
pentas	xx	x	---	Tender	Mar	Nov	Mar	Dec	Year-round	
petunia	xx	x	---	Hardy	Oct	June	Oct	May	Oct	May
rudbeckia	xx	---	---	Hardy	Mar	July	Mar	July	Mar	June
salvia	xx	x	---	Tender	Mar	June	Mar	June	Oct	June
snapdragon	xx	x	---	Hardy	Oct	May	Oct	May	Nov	Apr
torenia	x	xx	---	Tender	Mar	Nov	Mar	Dec	Feb	Dec
verbena	xx	x	---	Hardy	Oct	June	Oct	June	Oct	May
viola	xx	x	x	Hardy	Oct	May	Oct	May	Oct	Apr
vinca	xx	x	---	Tender	Mar	Oct	May	Nov	Year-round	
zinnia	xx	x	---	Tender	Mar	Nov	Mar – Sept	4 – 6 mths later	Year-round	4 – 6 mths later

***** Exposure: X = acceptable performance; XX = optimum performance.

Information adapted from Gardening with Annuals in Florida by Sydney Park Brown, University of Florida, IFAS Extension.

Figure 13-20. Seasonal color rotation schedule for common annuals.

Before selecting plants for seasonal color, determine how much sunlight the plants will receive. Some annuals tolerate full sun all day; others do best with just morning or filtered sun. Remember, in summer the sun is directly overhead, while in winter the sun is in the southern sky and may be blocked by trees or buildings. No annuals perform well under heavy shade; tropical plants with good foliage color might be considered for these locations.

Planting Procedures

Because trees are a more permanent addition to the landscape, careful site selection and proper planting techniques are essential. Due to the installed and mature size of trees, additional space and more handling efforts usually apply to bigger plant materials. Therefore, trees and larger specimen plants should be installed first (Figure 13-21), but planting techniques for groundcovers, shrubs and trees are very similar.

Figure 13-21. Large specimen plants, palms or trees should be installed first in the landscape. This avoids damaging the surrounding smaller plants.

Containerized Plants

Container grown plants can be planted during any season in Florida, though local seasonal fluctuations in temperature, rainfall, and other environmental conditions could influence establishment. Planting under hot, sunny, dry conditions typical of the spring or fall in Florida, may reduce plant vigor and slow establishment unless regular irrigation occurs. Nonetheless, plants installed during the fall can establish roots in landscape soil before warm summer temperatures of the following season draw moisture from and stress them. Fall planting could provide an edge over plants installed during the spring, because spring plantings will have fewer roots out into the landscape soil when warm temperatures arrive soon afterward.

Regular irrigation in the months following planting ensures that plants remain healthy and attractive as they establish. Plants are able to survive and grow with little or no irrigation once roots grow to the outer edge of the canopy. For shrubs in most parts of Florida, this root growth typically requires about 20 to 28 weeks after planting when normal rainfall occurs. For trees, this root growth typically requires about three months per inch of trunk caliper. Supplemental irrigation may be needed when rainfall is below normal in the first year after planting.

The ten steps for successful planting may seem simple, but many are often overlooked, resulting in poor plant health, eventual death, and loss of time and money when the plants must be replaced. Using proper planting techniques helps assure the establishment is quick, which ultimately conserves water and other resources (Figure 13-22).

1) ***Call before you dig*** to get underground utility lines marked on site. Calling 811 in Florida provides connection to Sunshine 811, the state's liaison with utility companies, where a request is transmitted to local utilities or facility owners to mark their lines, pipes and cables near the work site. This is a free service and required by law to avoid disruption from damage to underground facilities and to protect human life. Plan ahead because there is usually a two-day lead time required for notification prior to the project start date.
2) Break up compacted soil and amend the entire planting bed if needed. Providing loose, soft soil for several feet around each plant allows roots to position themselves more quickly in a natural, spreading fashion.
3) Locate the point (called the ***flare***) where the first main root meets the trunk (or main stem).
4) Remove roots and media above the first main root. Roots that circle the trunk should be cut prior to planting to prevent ***girdling***.
5) Dig the planting hole wide and shallow. The hole should be at least one and a half (1½) times the width of the root ball, but only deep enough to allow the top of the root ball to sit slightly above the existing grade. In some cases where the soil is hard or compacted, it may be advisable to dig a planting hole three times wider than the root ball.
6) Gently place the root ball straight in the ground and check that the first main root (flare) is just above the soil line. Position the topmost root slightly above the existing grade (one-half inch for small containerized plants, one inch for large shrubs and small trees, and three inches for larger trees).
7) The space around the root ball should be loosely filled with soil backfill. Gently firm, but do not overpack loosened soil, especially when the soil is wet.
8) Do not mound soil on top of the root ball, but form a saucerlike catch basin around the outer edge of the root ball with a soil ridge three to six inches high to retain water during irrigation and allow it to percolate into the root zone.
9) Mulch around the outside of the root ball, but initially no mulch should be placed on the root ball. Instead, mulch should be spread on top of the landscape soil beginning at the edge of the root ball and extending as far away as needed. After establishment, mulch can be placed to within a few inches of the trunk.
10) Water at planting to remove air pockets, then on a regular schedule until plants are established. The ***establishment period*** is the time it takes a plant to regenerate enough roots to stay alive without irrigation. It is important to note that even the most drought tolerant plants require watering during the establishment period.

photo by edmond chung, creative commons license

Figure 13-22. Tree placed in a wide, shallow hole with the flare slightly above existing grade. Backfill soil will be slightly firmed and a catch basin constructed surrounding the root ball. Mulching and watering will complete the task.

Balled and Burlapped Plants

Planting procedures for balled and burlapped (B&B) plants are similar to those for container grown plants. Extra care during handling should occur to avoid disturbing the root ball, as this would severely damage the root system. Always move B&B plants by the root ball only; never use the trunk as a handle to pick up and move these plants (Figure 13-23).

Removal of all the burlap around the roots before planting is not necessary, although the top one-third of the burlap should be pulled back from the stem. Removal of woven plastic wraps completely after setting the plant in the hole is recommended. These non-degradable materials can girdle roots as they expand through the material. Always remove nylon twine tied around the plant stems, since it does not rot and will eventually girdle the stem if left in place.

photo by gale allbritton

Figure 13-23. Balled and burlapped *Phoenix roebelenii* (pygmy date palm) stored in the nursery.

Palms

Palms establish most quickly if transplanted during the spring and early summer when soil temperatures are on the increase (Figure 13-24). An additional advantage is the higher rainfall normally experienced during this time in Florida, thereby reducing the need for supplemental irrigation during the first critical months of establishment.

It is best to install newly dug specimen palms immediately to minimize stress and possible loss. If palms cannot be planted immediately upon arrival at the landscape site, they should be placed out of direct sun and the trunk, root ball and canopy kept moist. Temporarily, ***heeling in*** the root balls under a layer of mulch is advisable, especially if no other means of keeping the roots from drying out is available.

The planting hole for palms should be twice as large as the root diameter, but it needs only

photo by gale allbritton

Figure 13-24. Containerized *Trachycarpus fortunei* (windmill palm) stored in the nursery.

Figure 13-25. Exposed surface roots of *Roystonea* spp. (royal palm).

be deep enough to situate the palm at the same depth it previously grew. Amending backfill soil from the planting hole is not recommended. If the ***backfill*** soil differs greatly in structure and texture from the surrounding site soil, new roots will have a tendency to remain within the backfill.

It is imperative that palms not be transplanted any deeper than they were originally grown. The root initiation zone at the base of the trunk (Figure 13-25) is extremely sensitive in this regard, and planting too deeply will cause root suffocation, nutritional deficiencies, root rot disease and frequently loss of the palm. The decline of deeply planted palms may take several years to become apparent, especially on very well-drained soils, but the problem can only be reversed by removing backfill in the root initiation zone prior to suffocation or by replanting the palm.

Staking and Bracing

Most shrubs and many trees installed in landscapes do not require support from stakes or guy wires following planting. Their trunks are strong enough to hold them upright, or they are relatively small so wind will not blow them over. However, there are times when trees may benefit from extra support provided by stakes and braces.

Tree Staking

Newly installed trees sometimes need to be staked to prevent uprooting or ***windthrow*** until they become established. Due to the light weight of the root ball, container grown and bareroot trees often require stakes to hold them firmly in the soil until roots become established. Root balls must remain firm and stable in soil, so fragile new roots growing into the backfill soil are not broken as the root ball moves in windy weather. Many B&B trees do not require stakes to hold them firmly in the soil because their root balls are heavy enough to prevent movement in moderately windy weather. However, some may require staking if the wire basket is removed when planting, or if the roots are not firm in the root ball.

In situations where staking is required, the stakes should be driven into the soil outside the root ball to avoid damaging plant roots. Stakes should penetrate the undisturbed soil around and below the depth of the hole to provide stable support. Attachment of guying wires or ropes to the tree should be done in such a manner that no damage to the bark, trunk or branches results. This is typically accomplished by running the tying wire through short pieces of rubber hose long enough to loop around the tree trunk (Figure 13-26). These supporting wires should be checked periodically and

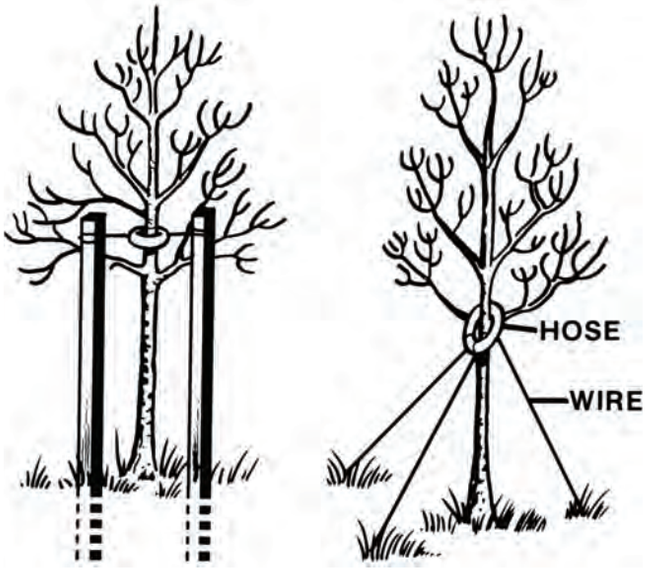


photo by university of georgia

Figure 13-26. Diagram of small tree staking procedures.

removed before any damage occurs. All guying cables should be clearly flagged so they are visible to the public.

Staking is generally not recommended on young trees capable of supporting themselves in an upright position. Staking can actually weaken young trunks of trees by not allowing them to bend and flex during the growing process. If stakes are used, the cables should be kept as low as possible to still provide the stability required. In addition, they should be removed as soon as possible, usually after the first year.

Palm Bracing

Larger palms will require some form of bracing to maintain stability during the first six to eight months after installation. ***Wood battens*** (short lengths of 2" x 4" lumber) are banded or strapped to the trunk, with several layers of burlap under them to avoid scraping or scarring. Support braces or props (also 2" x 4"s) are then nailed into the banded wood battens (Figure 13-27). Under no circumstances should nails be driven directly into a palm trunk. Such damage is permanent, and provides a point of entry for pathogens and possibly insect pests as well.

Figure 13-27. Close up of palm banding and bracing technique. **Note:** Burlap should be placed beneath the wood battens as a precaution against trunk scarring.

Watering

Plants should be watered thoroughly after planting and during the establishment period. Adjust the watering schedule to maintain moist, but not saturated, soil conditions until plants are well established. The establishment period varies from a few months for certain one-gallon-sized plants to several years for trees six inches or greater in trunk diameter. Plants should be watered as needed after establishment.

Irrigation water should be applied directly to the root ball by filling the catch basin constructed around each plant. Application frequency should be determined based on soil type in order to sustain proper moisture levels. The amount applied should be adequate to reach the bottom of the root system during each irrigation cycle. After establishment, plants in the landscape require less frequent watering.

Mulching

Mulches are desirable around many plantings because they help to moderate soil temperature, conserve moisture, reduce weed competition and improve appearance. Practically anything can be used as mulch; the type to be used depends on personal preference, design considerations, availability and cost. Be aware that any mulch requires maintenance. Organic mulch decomposes and must be renewed. Inorganic mulch must be cleaned.

Organic mulch should be kept a few inches away from the trunks of shrubs and trees to prevent stem rot. Initial application rates of organic mulch should be a minimum of three inches in depth with annual renewal of at least one inch of additional mulch. In many situations, mulching is not recommended for annual plantings, except at the outside edges or perimeter of the bed, because these plantings tend to quickly grow together and shade soil below, thus impeding weed seed germination.

A large, aesthetically pleasing mulched area should be maintained around trees and

shrubs. A general rule is to maintain a two-foot diameter mulched area for each inch of trunk diameter on newly planted trees; for example, a tree with a two-inch diameter trunk would grow best with a four-foot diameter mulched area.

The size of the mulched area can be increased as plant size increases. This mulched area promotes faster tree establishment by eliminating grass root competition for water and nutrients. Additionally, the maintenance of turf areas adjacent to plant trunks is not recommended because it is difficult to trim turf without damaging the trunks. However, other types of groundcovers that are not such strong competitors for water and nutrients can be planted near trees.

Maintenance

Landscape management is an increasingly important, major segment of the environmental horticulture industry in Florida. The scope, complexity and customer demand for near perfection have made the growth of commercial landscape management particularly noteworthy. Nurseries have added landscape maintenance departments, large landscape management companies have emerged, and many small companies as well as thousands of individuals are in the business. Countless condominium units and business complexes have their own maintenance crews. Municipalities, park departments, golf courses and theme parks also employ large numbers of people in landscape maintenance operations.

Landscape management includes not only the management of turf areas, but maintenance of ornamental plants including groundcover plantings, annual and perennial beds, shrubs, trees, and sometimes container plants. Quality management requires trained and dedicated labor, up-to-date techniques properly applied, well-chosen plant materials, as well as carefully maintained tools and equipment that are used appropriately. Good maintenance practices are essential to the appearance and long-term health of landscape plantings.

Professional Landscape Maintenance Checklist

Lawn Care

- Mow regularly as needed to maintain proper height for the turfgrass species.
- Edge curbs and planting beds.
- Blow loose grass clippings, fallen leaves and debris from patios, walkways and driveways.
- Pick up yard debris and trash.
- Aerate, dethatch, etc. if needed to maintain turfgrass health.
- Fertilize as needed. *

Plant Care

- Prune as needed to maintain size and health.
- Inspect regularly for pests and diseases. *
- Deadhead annuals and perennials to remove old, spent blooms and encourage new flower formation.
- Fertilize as needed. *
- Manage weeds to maintain an attractive appearance and plant health. *
- Replace mulch as needed.

Water Management

- Inspect the irrigation system weekly and adjust run schedules accordingly.
- Check for leaking pipes and broken sprinkler heads; repair as needed.
- Make sure sprinkler rotations are on target, not watering sidewalks or roadways.

Safety

- Inspect sidewalks for cracks.
- Clear leaves, twigs and other debris from walkways to avoid slipping or tripping hazards.
- Trim weak or dead branches that could fall and injure people or damage cars and buildings.
- Clear storm drainage to avoid backup and puddling or flooding potential.
- Check outdoor lighting and replace bulbs as needed.

** Commercial applications of fertilizer, pesticide or herbicide to landscapes require a license/certificate issued by the Florida Department of Agriculture and Consumer Services (FDACS).*

If properly maintained, the landscape should perpetually improve in function, beauty and value. Without proper maintenance, the landscape can change dramatically and rapidly in a negative direction, failing to be either functional or aesthetically pleasing. The effectiveness of any landscape management program is only as good as the expertise of the personnel responsible for day-to-day tasks.

The Florida-Friendly Landscaping™ (FFL) program was created in 2008 to promote the understanding and adoption of research-based, environmentally sound practices in the overall management of Florida landscapes. The FFL program encompasses philosophies of both the Florida Yards & Neighborhoods (FYN) program by UF/IFAS and the Florida-Friendly Best Management Practices for Protection of Water Resources by the Green Industries (GI-BMP) program by FDEP. The guiding principles provide strategies that support an integrated approach to landscaping with the goal of creating landscapes that are mutually beautiful and environmentally friendly by reducing non-point source pollution from lawn maintenance activities.

Pruning

Pruning is the selective removal of plant parts (typically shoots and branches) to improve health, control growth, or enhance fruiting, flowering and appearance. Basic pruning begins in the nursery, but continued pruning is required in the landscape throughout the life of the plant.

Plants are diverse in their shapes, sizes and habits, but their basic means of survival and growth are generally similar. Remember, leaves produce sugars from sunlight, water and carbon dioxide. Stems support the leaves, expose them to light, and produce new ones. They also transport water and minerals from the roots to the leaves, and foods that have been manufactured in the leaves to other plant parts. Roots supply water and minerals, plus provide anchorage and support. Clearly, there is an interrelationship and balance between all plant parts.

Pruning alters the balance between roots and shoots, and temporarily changes the resulting growth patterns. If part of the branch (stem) system is removed, the excess supplying capacity of the roots results in a vigorous flush of new shoots. Similarly, if roots are pruned, new feeder roots develop, rapidly using the excess food supply from the intact shoot system. Weather conditions may delay this rapid growth pattern. If pruning occurs in winter, the growth flush will be delayed until the weather is warm enough for growth.

Pruning stimulates growth in plant parts near the cuts, but overall, is a dwarfing process. This is due to removal of existing plant parts and reduction of the food or water supplying capacity of the plant. If excessive amounts of either branches or roots are removed, the plant will be weakened. Consequently, shoot pruning for the purpose of compensating for some root loss during transplanting is not recommended. Prune only to remove dead, diseased, crossed, rubbing or broken branches. Routine pruning should begin about one year after transplanting to develop the appropriate form and structure.

Proper plant selection can eliminate much of the pruning requirements in a landscape (Figure 13-28). Unfortunately, plants are frequently placed in the landscape according to their current size and shape, not the size they

Figure 13-28. The large shrubs placed along this narrow driveway require frequent pruning to maintain adequate clearance.

Principles of Florida-Friendly Landscaping™

1) Right Plant, Right Place
Match the plant to the site conditions. Well-suited plants need less irrigation and fertilizer and are more resistant to pest infestation. Aim for diversity while avoiding invasive species.

2) Water Efficiently
Irrigate only when needed. Efficient watering is the key to a healthy landscape and conservation of limited resources. Overwatering makes plants prone to pest problems and contributes to non-point source pollution. Group plants with similar water needs, and zone irrigation systems appropriately.

3) Fertilize Appropriately
Overuse of fertilizers can be hazardous to the landscape and the environment. Fertilize according to recommended rates and application times to prevent leaching. Look for fertilizers with slow-release nitrogen and little or no phosphorus. Never fertilize within 10 feet of any waterbody (or three feet with a spreader guard, unless prohibited by local fertilizer ordinances, homeowner association or community restrictions), and never fertilize before heavy rain. Sweep up any fertilizer spilled on the lawn, sidewalk or driveway and put it back in the bag.

4) Mulch
Maintain a three-inch layer of mulch to retain soil moisture, prevent erosion, suppress weeds, reduce the need for herbicide applications, ease maintenance, and provide a neat appearance. Always leave at least two inches of space around tree trunks to prevent rot. Create self-mulching areas under trees by letting fallen leaves lie. Be sure to choose sustainably harvested mulch like melaleuca, pine straw, or eucalyptus.

5) Attract Wildlife
Use plants that provide food, water and shelter to attract and foster Florida's diverse wildlife. Select plants with seeds, fruit, foliage, flowers or berries that animals can eat. Supply water in rain gardens, bird baths or fountains. Increase vertical and horizontal layering of plantings to provide habitat. Many animals contribute to landscape stability by eating pests and pollinating plants.

6) Manage Yard Pests Responsibly
Unwise use of pesticides can harm people, pets, beneficial organisms and the environment. Prevent disease and insect outbreaks by selecting pest-resistant plants and placing them in suitable locations. Pick insects off by hand, or spot treat only (rather than blanket spraying) and use selective, low toxicity controls rather than broad spectrum insecticides. Always follow pesticide label instructions.

7) Recycle Yard Waste
Decomposed organic matter, like pruned branches or grass clippings, releases nutrients back to the soil in a form that plants can easily use. Returning composted materials to the soil improves structure, increases water holding capacity, increases fertility, and results in less yard trash going to the landfill.

8) Reduce Stormwater Runoff
Fertilizers and pesticides can leach through the soil or run off into storm drains. Along with landscape debris and eroded soil, these substances can wreak havoc on water quality and fragile ecosystems. Retain and use as much rainfall and irrigation water that falls on landscapes as possible by creating shallow rain gardens, or shaping the earth on slopes with berms (rises) and swales (dips) to help slow runoff from heavy rains and allow water time to soak into the ground.

9) Protect the Waterfront
Waterfront property and surrounding watersheds (drainage areas) should be carefully protected to maintain freshwater and marine ecosystems. Homeowners are encouraged to protect any waterbody by creating a 10-foot maintenance free zone around it (three feet is acceptable with a guard if following the GI-BMP program and not otherwise prohibited by local or homeowner restrictions). Do not mow, fertilize, or use pesticides in this zone. Do not let grass clippings or pet waste get into the water, as these carry nutrients and harmful bacteria.

Information summarized from UF/IFAS resources.

are likely to attain in five or more years. The homeowner or landscape manager soon finds it necessary to clip or prune plants frequently to keep them within bounds. For instance, frequent pruning is assured when sweet viburnum shrubs are selected as foundation plants, because this plant can quickly grow to 25 feet tall. Using a low growing juniper, dwarf pittosporum or other compact shrub in such a location would greatly reduce or eliminate required pruning.

If a plant needs to be pruned several times each year to control size, it may be the wrong species for that location. Many pruning tasks can be eliminated by proper plant selection; this can also save space in landfills by reducing the volume of yard waste. It is less time consuming and less costly to select and install the right sized plant than to choose one that will require frequent, timely pruning.

Reasons to Prune

Proper pruning enhances the beauty of almost any landscape plant, while improper pruning can ruin or greatly reduce its landscape potential. Plants may be pruned for a number of reasons. The reason pruning is needed must be determined before beginning the process.

Figure 13-29. Young tree pruned to develop branch structure.

Maintain or Improve Vigor

Removal of dead, dying, or damaged wood and diseased or insect infested plant parts is an effective way to stop the spread of decay, disease, and insects to other portions of the plant or to neighboring plants. For example, if several branch tips are infested with aphids or scale, prune and discard the affected shoots. This can be an effective alternative to spraying insecticides if the infestation is small and localized.

Control Plant Size and Form

A common objective of pruning is to maintain or develop a desired size or form. To accomplish this goal, pruning should be a routine part of landscape maintenance, and not delayed until the plant is overgrown. An unkempt plant can be tall as well as leggy with little foliage close to the ground. Having such characteristics makes it impossible to prune a plant to the desired size in a single pruning without severely damaging it. Consequently, the plant must be pruned back gradually over a period of several years.

Selective pruning of shoots can be used to shape plants or produce either a thin or thick canopy. A thinner canopy will allow more light penetration and help keep interior leaves on the plant. ***Root pruning*** can be used to slow plant growth, producing a more compact plant. When this technique is used, prune one-half the root system, wait four to six weeks, then prune the other half. Root pruning should be scheduled when roots will be watered thoroughly in order to keep the soil moist for four to six weeks following each root pruning activity.

Training Young Plants

Pruning young trees can dramatically influence their long-term health, function and survival (Figure 13-29). Early pruning on young shrubs encourages branching and fullness, characteristics that are frequently desirable in landscape plants.

Branch spacing and arrangement, along with the ultimate structural strength and safety of a tree, can be controlled by selectively removing branches from a young sapling. When performing this task, always work with the natural form of a plant. Encourage only one central trunk to develop by removing competing, upright trunks or branches. This process should begin within the first two to three years after the tree is propagated. Tree training continues for 10 or more years on large maturing species. Frequent, light pruning done several times each year encourages faster growth and prevents undesirable sprouting when compared to one heavy pruning each year. Do not attempt to dramatically alter the natural tree form in all but the most intensely maintained landscapes; instead, choose a species that has more of a natural tendency to grow into the desired shape and size. For example, a river birch, red maple, or trumpet tree would be better suited as a shade tree in a narrow vertical space than would a live oak.

Create Desired Shapes

Plants can be pruned into different shapes, such as balls, squares, rectangles, or animal figures, to create special effects. Plants pruned in this manner (known as ***topiary***) become focal points and should be used sparingly in most landscapes (Figure 13-30). Small leaved plants with dense foliage (such as holly, boxwood, rosemary, yews and some juniper) are the best choice for topiaries, because they can be more easily trained into a specific form. Another technique uses a wire mesh frame packed tightly with sphagnum moss. Appropriate plant species, including begonias, English ivy and creeping fig, can be planted in the sphagnum, forming a fully grown topiary in several months to two years.

The practice of growing plants against a wall (***espalier***) requires frequent pinching and pruning (Figure 13-31). Plants trained in this manner are used as specimen plants. Not all plants are adaptable to this pruning technique,

Figure 13-30. An example of a topiaried boxwood shrub.

Figure 13-31. An example of an espaliered pyracantha shrub.

but sea grape, fatshedera, magnolia, yaupon holly, podocarpus, and loquat make excellent espalier plants.

Many plants considered to be large shrubs, such as ligustrum, wax myrtle and pittosporum, can be trained into small trees by gradually removing (over a period of one to three years) all the foliage and small branches from the lower portion of one or more stems. This should not start before the plants are about eight feet tall, so the main trunks can develop properly. Small branches left along the lower trunk will build the trunk caliper and create a sturdier tree. The longer they remain on the trunk, the thicker and stronger the trunk becomes.

Figure 13-32. Oleander shrubs bloom on new vegetative growth. Pruning just prior to the new season's growth promotes lateral branching with increased flower bud formation.

photo by meghan pressley

Figure 13-33. Branches with narrow V-shaped angles produce a wedge of included bark that prevents strong branch attachment; it often breaks at this point.

Enhance Flower and Fruit Production

Larger fruit can be produced by selectively removing flowers or developing fruits; energy will be directed to those remaining and they will become larger. Light pruning helps to maintain annual flowering and fruiting on fruit trees. Severe pruning on plants that flower in the current season's growth, such as oleander and plumbago, will generally stimulate vegetative growth and produce fewer, but larger flower clusters (Figure 13-32). However, this practice should not be completed at the expense of the natural plant shape, as is too commonly seen on crape myrtles. In species that flower terminally (such as azalea, cassia or oleander), pinching new vegetative growth during the growing season will stimulate growth of lateral shoots and increase the number of flowers produced. Additionally, removal of developing seed heads on crape myrtle will promote a second, and perhaps third, flower display.

Promote Safety

The manner in which stems are attached to each other and to the trunk influences the structural strength of a tree. Branches with embedded (or included) bark having narrow "V" shaped crotches (Figure 13-33) are weak and should be removed in favor of wider angled, strong "U" shaped crotches (Figure 13-34). Large decayed, broken, or poorly attached

photo by michael coghlan, creative commons license

Figure 13-34. Trees with strong, "U" shaped branch unions are much stronger and better able to withstand storms without breakage.

tree limbs should be promptly removed by a professional before they fall. Dead branches and branch stubs should also be removed as they can lead to serious trunk decay. Periodic tree inspection by a professionally trained tree specialist (***arborist***) can help prevent these situations from becoming unsafe conditions.

When to Prune

Trees and shrubs can be lightly pruned anytime. However, some plants have specific pruning periods (Figure 13-35) that allow them to perform at their maximum potential.

Spring Flowering Plants

To minimize reduction of next year's flowers, prune spring flowering plants such as azaleas (Figure 13-36), spireas and redbuds in late spring before the flower buds set for the next season. Spring flowering plants set their flower buds on the previous season's growth, and buds overwinter on this older wood. For example, azaleas form flower buds in July for the following year's flower display; pruning them between the end of the flower display and late spring or early summer will not reduce the number of flower buds set. Pinching new shoots on azaleas anytime from several weeks after they begin elongating through May will encourage lateral branching. Each of these laterals is likely to develop a flower bud. Thus, a pinched plant produces many more flowers the following year than does an unpinched plant. Pruning azaleas between July and the flower display will remove flower buds and reduce the flower display, but should not affect the health of the plant.

Winter and Spring Flowering Plants

(flowers produced on previous season's growth)

Shrubs	***Trees***
azaleas	fringe tree
camellia	Hong Kong orchid
French hydrangea	Japanese magnolia
Indian hawthorn	purple trumpet tree
spireas	redbud
prune after flowering but before new flower buds form	

Summer Flowering Plants

(flowers produced on current season's growth)

Shrubs	***Trees***
abelia	bottlebrush
allamanda	cassia
bougainvillea	crape myrtle
hibiscus	frangipani
oleander	jacaranda
plumbago	princess flower
rose	royal poinciana
prune during the dormant season	

Figure 13-35. Pruning period for common flowering plants.

Figure 13-36. Azalea blooms are located on last year's growth or one year old wood. This makes it important to wait for pruning until after the blooms have occurred. If pruned too late the plant will not have time to set flower buds on the new growth before fall begins. A good rule of thumb is to prune before the month of July.

Summer Flowering Plants

Plants that produce flowers in the current season's growth such as abelia, hibiscus and rose are usually pruned while dormant or just before the spring growth flush. Developing shoots can be pinched to encourage lateral branching, which will enhance the flower display. Moderate to severe pruning may encourage production of fewer but larger flowers or flower clusters.

Deciduous and Evergreen Trees

It is best to prune trees, such as oaks, maples, hickory and other large shade trees, late in the dormant season or several weeks following a growth flush. Pruning at other times frequently promotes undesirable sprouting. Trees sprout excessively and are easily damaged when pruned during active shoot elongation. The worst times to prune are when leaves are forming. Trees should never be pruned while under stress.

Terminal growth of pines can be controlled by removing one-half of the new shoot (called "candles" in pines) in the spring just prior to needle expansion (Figure 13-37). This encourages new bud formation at the pinch, slows growth on the pinched branch, and creates a more compact plant. Never pinch a pine at other times of the year, since new buds will not form.

Some trees such as birch, maple, elm, and walnut bleed sap from wounds if they are pruned during late winter or early spring. This ***bleeding*** is not usually harmful to the tree, but the dripping sap is often objectionable (Figure 13-38). Trees that show this tendency should be pruned in late fall or early winter.

Figure 13-37. Pinch the ends of candles on pines to encourage dense new growth.

Evergreen Shrubs

Most evergreens, such as podocarpus, holly, boxwood, ligustrum, juniper and wax myrtle can be pruned anytime. To encourage rapid shoot development and the greatest overall plant growth, prune just prior to bud swell in the spring. To retard growth for maximum dwarfing effect, prune just after each growth flush, when leaves have expanded fully. Late summer pruning may stimulate an additional flush of shoot growth on species that flush several times each year. These shoots could be damaged by an early frost.

Pruning Wounds

Closure (***callusing***) of pruning wounds on most trees and shrubs should be most rapid if pruning is conducted just before, or immediately following, the spring growth flush. This is desirable because a closed wound is more aesthetically pleasing, plus insects, diseases, and decay organisms are discouraged from entering the plant. In addition, cold injury can be reduced if pruning is conducted close to spring bud break. Late fall and early winter pruning can stimulate new growth, particularly when a mild period occurs during the winter. These succulent stems are not cold hardy and can be easily damaged, even by a

Figure 13-38. Bleeding from pruning cuts can be unsightly but is usually not harmful, and will naturally heal over time.

light frost. Low winter temperatures can also cause cambium damage beneath improperly executed pruning cuts, even if growth is not stimulated by pruning. This is particularly true of plants that are marginally hardy. If in doubt about cold susceptibility, it is best to delay heavy pruning to just before growth begins in the spring.

Research has shown that pruning wound dressings do not prevent decay. When exposed to the sun, the protective coating often cracks, allowing moisture to enter and accumulate in pockets between the wood and the wound covering. This situation may be more inviting for wood rotting organisms than one with no wound cover. In situations where aesthetics are important, the practice may be justified.

Pruning Tools

Knowing and practicing the rules of pruning is most important, but of equal importance is using the correct tools. Always select quality tools that will do the job, keep a sharp edge, and are relatively easy to sharpen and handle. Sharp tools cut plant material easily without injuring the surrounding tissues. Injured tissues are susceptible to disease and decay; this can lead to long-term health problems for the plant.

The basic tools (Figure 13-39) used in pruning are hand pruners, loppers, hedge shears and saws. ***Hand pruners*** are used for small branches and twig cleanup. Most of them are designed for cutting stems up to ½ inch in diameter. Attempting to cut larger branches risks making a poor cut and/or ruining the shears. Two common styles of hand shears are the scissor action (bypass) and the anvil cut. In bypass shears, a thin, sharp blade slides closely past a thicker but also sharp blade. Bypass shears usually cost more but make cleaner, closer cuts. In anvil cut shears, a sharpened blade cuts against a broad, flat blade. If not kept sharp, anvil blades are more likely to crush plant tissues when attempting a cut.

Lopping shears (loppers) have long handles that are operated by both hands with cutting blades like hand pruners. Loppers can easily cut branches up to one and a half (1½) inch in diameter and some are capable of cutting larger materials.

Pruning saws, either rigid or folding, are very useful for cutting larger branches that are too large for hand shears or loppers. Pruning saws have teeth that are designed to cut on the pull stroke. The teeth in these saws are set for a wider cut; this allows the sawdust to kick out and results in less green wood binding. Bow saws are good only where no obstructions exist for a foot or more above the area to be cut.

Pole pruners usually have a cutter with one hooked blade above and a cutting blade beneath, similar to a large pair of lopping shears (Figure 13-40). The cutter is on a pole and is operated by pulling a rope downward. Poles can be made of various materials and can either be in sections that fit together or that telescope. Wooden poles are sturdy but heavy, while aluminum poles are light but can conduct electricity if they touch an overhead electrical wire. Fiberglass or some type of plastic compound is probably the best pole material. Poles can

photo source: felco

Figure 13-39. Sampling of common hand pruning tools by Felco.

photo source: corona and stihl

Figure 13-40. Pole pruners with saw, manual hedge shears (Corona), and power driven hedge shears (Stihl).

also be fitted with saws, but these are usually very frustrating to use. The use of pole pruners can be dangerous. Material that is cut overhead can fall on the operator. The user should exercise caution and wear head and eye protection, and avoid pruning near overhead electrical wires.

Hedge shears are used mainly for shearing plants into hedges or formal shapes. Manually operated shears can be used for small jobs; however, power-driven shears are more practical in larger areas (Figure 13-40).

Gas powered and electrical ***chain saws*** are best suited for removing trees and cutting firewood, but can also be used to prune live plant material. However, only professional arborists should use chain saws for pruning trees because of safety concerns.

Care of Tools

Properly cared for, tools do a better job and last longer. Use tools for the task they were designed to complete. Do not twist or strain pruners or loppers. Keep the branch to be cut as deeply in the jaws and near the pivot point as possible. Never cut wires with pruning tools because permanent damage to the metal blades can occur.

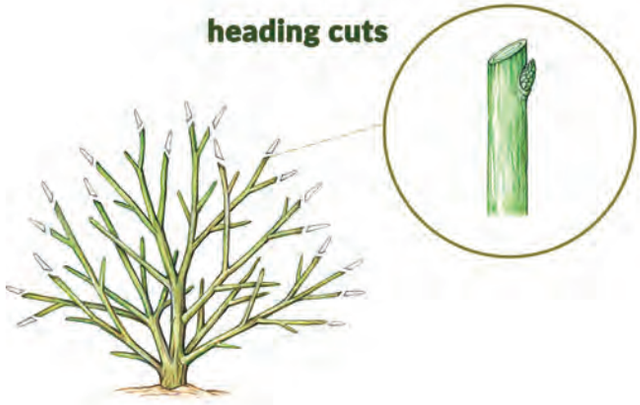
When pruning diseased plants, ***disinfect*** all shears and saw blades after each cut to prevent spreading disease to healthy plants. Pruning shears and saws can be dipped in a weak alcohol solution (one part alcohol to nine parts water) to prevent the spread of disease between plants.

At the end of the day, oil the blades and other metal surfaces well to avoid rusting. Keep the cutting edges sharp; several passes with a good oil stone will usually suffice (Figure 13-41). Paint, varnish or regularly treat wooden handles with linseed oil.

Figure 13-41. Maintaining a sharp edge on bypass pruner blades.

Pruning Techniques

Heading back (Figure 13-42) is selective cutting of the terminal ends of twigs or young branches back to an axillary bud or node. When heading back trees or shrubs, make the cut on a slight slant about ¼ inch above a healthy bud (Figure 13-43). In nearly all plants, active growth of the terminal bud suppresses the growth of the buds below. Removing the terminal bud of a shoot or branch releases more than one of the lower buds to begin development, and thus increases branching and fullness. Usually, the buds closest to the cut develop and inhibit the growth of buds below them. Because the uppermost bud will probably be the most vigorous, the direction toward which it points will be the direction of the new growth. For that reason, new growth can be aimed in a preferred direction by pruning back to selected buds.



graphic source: this old house

Figure 13-42. Heading cuts remove shoots no more than 2 years old back to a bud, cuts an older stem back to a lateral branch less than 1/3 the diameter of the cut stem, or cuts a stem to an indiscriminate length.

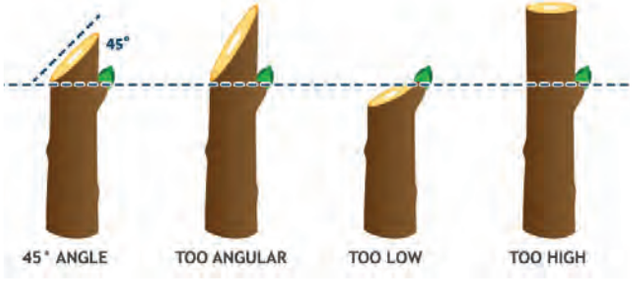


Figure 13-43. Proper pruning technique requires branches to be cut just above a bud (#1). Cutting the branch at too sharp an angle (#2), too close to the bud (#3), or too high above the bud (#4) are common mistakes.

New foliage that develops after heading back may be so thick that it shades the lower growth, forming a top-heavy plant. This can be avoided in shrubs by heading back shoots to several different heights (Figure 13-44). In some plants, notably many of the conifers, lateral buds on older wood lose the ability to resume active growth, and cutting these plants back to only old wood will result in the death of the limb or tree if it is the main trunk.

If the pruning cut is made too far above a healthy bud, regrowth will not occur below the cut and a stub will develop (Figure 13-45). The stub will die because there are no leaves to supply food and maintain water conduction. The dead stubs then offer entry for wood rotting fungi and wood eating insects, as well as make the plant unsightly. This is one way trees become hazards; the decay spreads, creating a hollow, unstable tree.

photo by the plant addict

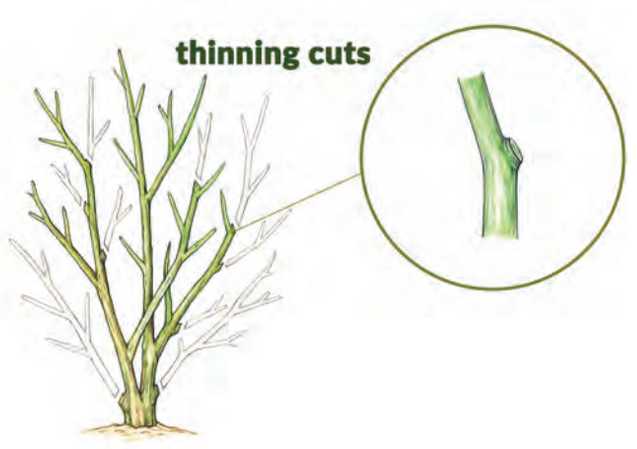
Figure 13-44. Heading back azalea shoots to different heights.

photo by i sáček sr, creative commons license

Figure 13-45. Leaving stubs from pruning cuts may provide an entrance for wood decay organisms.

Thinning (Figure 13-46) is the complete removal of branches back to the next lateral branch or the main trunk; or, in some shrubs, older branches can be cut to the ground. Thinning gives a plant an open appearance and can encourage new growth inside the crown, depending on how the plant is thinned. If thinning is heavy, interior sprouts will develop. If the plant is lightly thinned, interior shoots are not likely to develop. This technique is used primarily on shrubs to control size while maintaining a natural appearance; it contrasts with hedging or heading back to the same spot on all branches, which gives a shrub a manicured, controlled appearance.

Trees can be thinned to increase light penetration and encourage turf growth beneath the tree. Trees with properly thinned crowns also resist wind damage better than unpruned trees. This is a specialized technique best done by a professional arborist.



graphic source: this old house

Figure 13-46. Thinning, also known as selective cutting or drop-crotching, involves complete removal of a branch back to the main stem, to another lateral branch, or to the point of origin.

Pruning Shrubs

The first step in pruning a shrub is to remove all dead, diseased or injured branches. Remove branches that cross or touch each other and those that look out of place. If the shrub is still too dense or large, remove some of the oldest branches. Head back excessively long branches to a bud or lateral branch that is six to 12 inches below the desirable plant height.

If the shrub is two to three feet taller than desired, both heading and thinning may be desirable. Do not use hedge shears; cut each branch separately to different lengths with hand pruners. This will maintain a neat informal shrub with a natural shape. Plants sheared into various geometric shapes produce a formality not suitable for many modern, natural landscapes.

A properly pruned shrub is a work of art and beauty, and does not look as if it has been pruned. Pruning cuts should not be visible, but located inside the plant, covered up by remaining foliage (Figure 13-47).

photo by gale allbritton

Figure 13-47. Only minor heading back of longer shoots with pruning cuts made inside the foliage is needed to maintain the natural form of this *Camellia sasanqua*.

Hedge Pruning

The method of pruning hedges depends on the type of hedge desired. Informal hedges generally consist of a row of closely planted shrubs that are allowed to develop into their natural shape. Annual pruning consists of thinning and heading back just enough to maintain the desired height and width.

Formal or clipped hedges require specialized pruning, which may become a continuous job during the growing season. The desired appearance of a formal hedge is a soft outline of foliage from the top of the hedge to the ground.

graphic by ms state extension

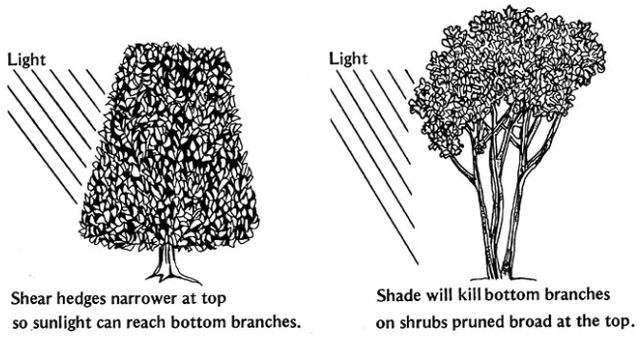


Figure 13-48. Correct form of a sheared hedge is slightly wider at the bottom to allow light penetration and to maintain fullness.

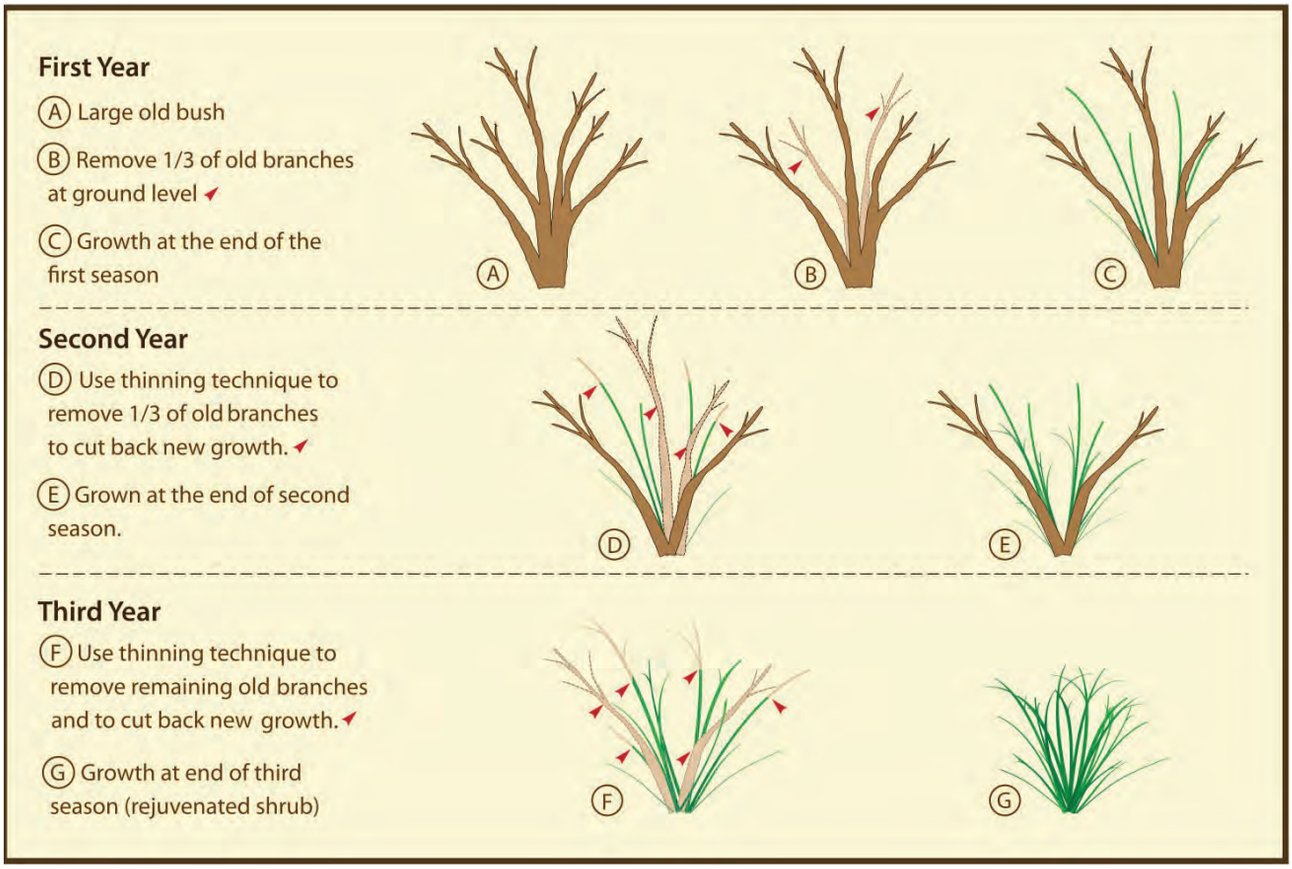
There are two important factors to remember when pruning formal hedges: 1) hedges should be clipped while new growth is green and succulent; and 2) plants should be trimmed so the base of the hedge is wider than the top (Figure 13-48). Hedges pruned with a narrow base will lose lower leaves and branches because of insufficient light. This condition will worsen with age, resulting in sparse growth at ground level and an unattractive hedge that does not provide the desired privacy.

Flowering hedges grown formally should be sheared after they have bloomed, as more frequent shearing reduces the number of flowers. If the flowers are of secondary importance, pruning may be conducted at any time.

Rejuvenation of Shrubs

Rejuvenation is a drastic method of pruning old shrubs that have become much too large or have a large amount of nonflowering wood. On single stem shrubs, such as ligustrum and gardenia, rejuvenation is carried out over a period of two to three years by severe thinning out to the basic limb framework. In this case, 1/3 to 1/2 of the old growth is removed each year.

Multiple stem shrubs are rejuvenated by cutting back all stems at ground level over a period of three years. Remove 1/3 of the old, mature stems in the first year. The second year, remove 1/2 of the remaining old stems and head back long shoots growing from the previous year's pruning cuts (Figure 13-49). Remove the remaining old wood and head back the long new shoots in the third season.



graphic by morris arboretum, university of pennsylvania

Figure 13-49. Severe pruning in taken in steps over three years to rejuvenate old, overgrown landscape shrubs.

The best time for rejuvenation is in late winter or early spring, just before new growth begins. Large, old shrubs should not be rejuvenated during late summer, as new growth will be stimulated and possibly killed by cold weather in the winter.

Pruning cane type shrubs (such as mahonia) is best done on a two or three-year cycle. The tallest canes are pruned to a stub three inches to six inches above the soil line during the first spring, just as growth begins. By the second spring, last year's medium-sized canes have grown to become tall canes and should be cut back to a three-inch stub. Canes from the first year's pruning will have already begun to grow and should be about one to three feet tall. In the third spring, the canes that were the shortest in the first spring should now be fairly tall and can be cut back. In this way, there is always foliage near the ground and the shrubs can be kept from becoming leggy.

Pruning Trees

The characteristic form of a tree should be known before any live branches are removed. In most landscape settings, little or no attempt should be made to significantly change the characteristic growth habit common to the species. First, prune out dead, diseased or broken twigs and branches. After studying the tree form (Figure 13-50), select the best spaced and positioned permanent branches, then remove or shorten others. Permanent branches should be spaced between six inches and 24 inches apart on the trunk, depending on the ultimate mature size of the tree. For smaller trees such as redbud, a six-inch spacing is adequate; whereas, for larger trees such as oaks, an 18 inch to 24 inch spacing is best. Next, remove fast-growing suckers at the base of, and along, tree trunks, or those found on large, interior limbs.

Young trees should be pruned to a ***single leader*** (stem) after locating the straightest and best leader to retain. Most trees can be grown in this form when they are young, but the growth habit of some species will change to a multileader, spreading form as they mature.

There should not be any narrow forks or branches leaving the trunk at an acute angle. Crotches of 45 to 90 degrees from the vertical are less likely to split than narrow "V-shaped" crotches of less than 40 degrees. Branches with a narrow angle of attachment should be removed as soon as possible. Any such branches that are 1/3 the diameter of the trunk or larger should be removed at once all the way back to the trunk.

When training a young tree, prune the lower branches back to about eight inches from the trunk, but do not remove them

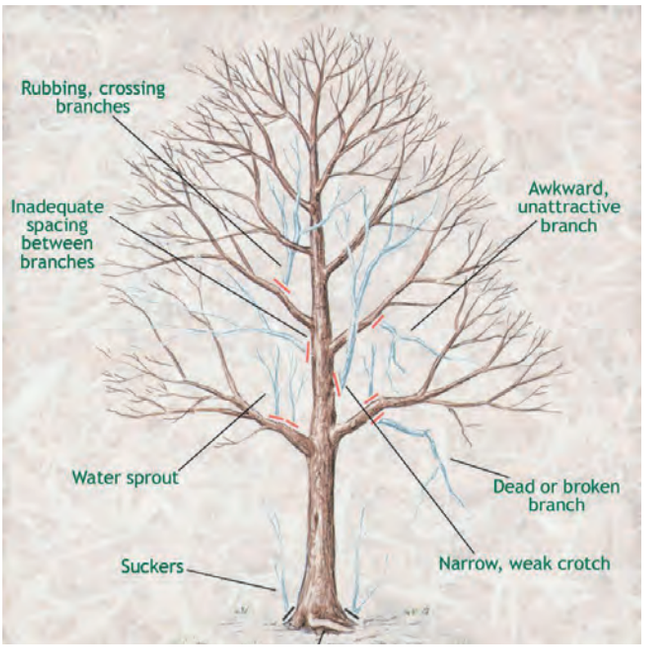


photo by the garden glove

Figure 13-50. Pruning techniques for trees.

photo by joanbanjo, creative commons license

Figure 13-51. Hat-racking is stressful to trees and may result in reduced vigor, decline, structural failure, or even death.

entirely. By keeping the lower, smaller diameter branches on the trunk, the tree will grow faster, develop a thicker trunk, and the trunk will be better protected from sun burn and vandalism. Removing the lower branches too soon will result in a poorer quality plant. When the tree approaches two to three inches in diameter, remove temporary lower branches, beginning with the largest diameter branches. Lower branches that are larger than ¼ inch in diameter should be removed immediately.

Heading back (***stubbing***) trees is rarely warranted in landscape sites. If it is necessary, for example, to prune beneath power lines or to clear a tree from interfering with a structure, always head back to a fork where there is a live branch. Within several months, prune out all sprouts growing in response to the pruning cut. Never ***hat-rack*** a landscape tree (Figure 13-51); that is, cut all branches back to about the same length without regard for their location. This type of pruning has no place in horticulture and is not recommended.

Removing Large Tree Branches

Large branches too heavy to be held by hand (those 1½ inches or larger in diameter) require three separate cuts to prevent trunk bark stripping (Figure 13-52). The first cut is made on the lower side of the branch about 15 inches away from the trunk and as far up through the branch as possible before the branch weight binds the saw. The second cut is made downward from the top of the branch about 18 inches from the main trunk to cause the limb to split cleanly between the two cuts without tearing the bark. The remaining stub is easily supported with one hand while it is cut from the tree. The final cut should begin on the outside of the ***branch bark ridge*** and end just outside the ***branch collar*** swelling on the lower side of the branch. The accuracy of this last cut is usually achieved by cutting at a right angle to the branch bark ridge (Figure 13-53). Flush cuts should never be made since they injure the trunk and delay healing. Research has conclusively shown that close cutting causes extensive decay because wood is cut that is part of the trunk.

When large branches are cut, it is not always possible to make the cut to a distinct bud, because the bark may obscure the dormant (***latent***) buds. In such cases, numerous latent buds may begin to grow very rapidly, producing excessively vigorous shoots called watersprouts (Figure 13-54). These ***watersprouts*** should be thinned out, leaving the more desirable and properly located ones to become branches.

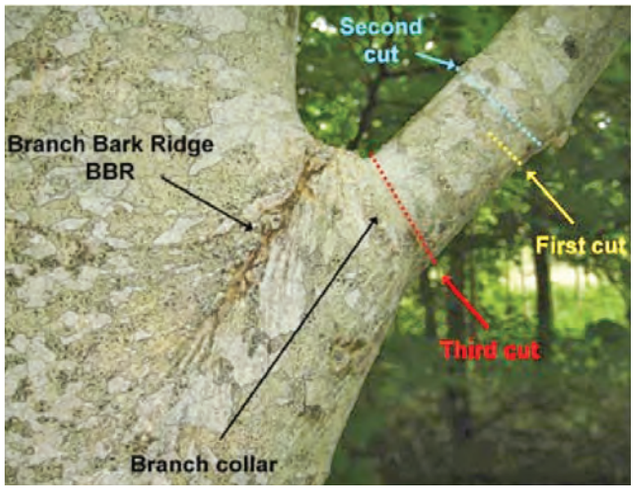


photo by researchgate

Figure 13-52. The three-cut method of removing large limbs.

photo by rasbak, creative commons license

Figure 13-53. Properly healed pruning wound.

photo by gale allbritton

Figure 13-54. Watersprouts growing vertically from an older limb.

Pruning Palms

A properly fertilized and pruned palm should have a round canopy with green leaves right down to the bottom (Figure 13-55), but not all palms require pruning. Palms with ***crownshafts*** (a region of smooth, usually green, tightly clasping leaf bases at the top of the gray trunk) should never need pruning if properly fertilized (Figure 13-56). In these palms, a healthy old leaf will be completely green one day, completely orange-brown the second day, and completely brown the third day, when it should fall off by itself. This is natural ***senescence*** (aging). Half-dead old leaves that remain on the palm for months at a time are usually deficient in potassium (K); instead of pruning, the plant should be fertilized to prevent this problem.

Old leaves (fronds) in palms without crownshafts deteriorate with age, similar to those with crownshafts, but dead leaves may have to be cut off manually. Dead fronds usually drop downward and hang against the trunk when they die, whereas potassium deficient leaves usually remain in their normal position within the canopy.

When to Prune

Since palm pruning is done primarily for aesthetic purposes, there is no one time of the year that is better than another. Ideally, a dead leaf is pruned whenever it appears on a palm, but commercially, palms are pruned on a fixed schedule (yearly, semiannually, etc.) or whenever the palm's appearance becomes unacceptable to the owner. Pruning dead leaves prior to hurricane season may reduce the chances that these easily detached leaves will become missiles in a storm.

What to Prune

Several palm species retain their leaves (***fronds***) after they have turned brown. Other species look bedraggled when certain nutrient deficiencies appear in the older leaves. Old leaves that persist on palms, such as Washington palm (Figure 13-57), should be removed as they often harbor insects and rodents, may become a fire hazard, or simply are not aesthetically pleasing. However, palms naturally translocate nutrients to younger foliage from the browning fronds, and frond removal can deprive the tree of needed

Figure 13-55. Example of properly fertilized and pruned palms.

Figure 13-56. Palms with a crownshaft are considered self-cleaning and only need minor attention if properly fertilized.

Figure 13-57. The dead fronds of *Washingtonia robusta* hang close to the trunk in a thatch. The dry leaves are a fire hazard and provide a home for undesirable creatures.

nutrients. Cutting deficient leaves off rather than treating the problem with adequate fertilization will only lead to the return of deficiency symptoms. Removal of completely dead leaves or flower and fruit stalks from palms is never a problem.

Palms such as royal palms shed their heavy leaves; so, remove them before they drop if they are growing where falling leaves may be hazardous. The large fruits of coconut palms can be dangerous to pedestrians and automobiles passing beneath the palm (Figure 13-58). Prevent formation of fruits by removing the flower stalks, but flower stalks on Christmas palms and others can be left on the plant to take advantage of the ornamental characteristics of the fruit that develops.

How to Remove Leaves

Care must be taken when pruning palms not to cut or otherwise injure the ***terminal bud***, or the whole tree will die (Figure 13-59). Leaves should be cut close to the trunk and from the underside to avoid tearing the fibers of the palm's stem. Never cut into the trunk with a machete as this can result in wounds that have been shown to allow lethal diseases to become established. Finally, never use climbing spikes for pruning palm leaves, because wounds

Figure 13-58. Dead fronds and coconuts being removed before having a chance to fall on pedestrians and automobiles below.

photo by billy deal

Figure 13-59. Palms have a single growing point at the top of its trunk called the terminal bud. If injured, the palm may die.

caused by the spikes will never heal and can become entry sites for diseases or attractants for serious insect pests.

Overpruning

If palms are overpruned, the reduction in canopy size results in reduced photosynthetic capacity. If this practice is repeated frequently, the palm may also develop a smaller trunk diameter. Overpruned palms often fare more poorly in cold weather events than those with fuller canopies. The additional leaves or leaf bases left on the palm can provide insulation to the bud or meristem. Following cold weather events, it is recommended that cold damaged leaves not be pruned off until after the threat of additional cold weather has passed.

Palms are also sometimes overpruned prior to hurricane season. "Hurricane-cut" palms have most of their leaves cut off, leaving only a tuft of the youngest leaves intact (Figure 13-60). This method is intended to reduce wind resistance in the palm, thereby protecting it from wind

photo by sally scalera

Figure 13-60. An overpruned cabbage palm (*Sabal palmetto*) that is now subject to being snapped off in high wind.

damage. However, in severe hurricane seasons, these palms are more likely to have their crowns snapped off than those with fuller crowns, possibly because the youngest remaining leaves were not hardened off to the extent that older leaves were and lack the support of the older leaf bases. Repeated hurricane pruning produces a narrowed trunk just below the fronds, a phenomenon known as "pencil top." This weakens the palm and may cause premature death of the tree. To avoid problems associated with overpruning, remove only dead leaves, and do not remove fronds that are held above a horizontal angle, sometimes called the 9 o'clock to 3 o'clock rule (Figure 13-61).

photo by tia silvasy, uf ifas extension

Figure 13-61. Guidelines to avoid overpruning palms.

Seasonal Cultural Practices

Annuals must be planted two to three times per year to maintain the continuous vigor and color demanded in public areas. Although perennials and foliage plants are considered long-lived and relatively low maintenance plants compared to annuals, they also require maintenance, such as dividing or thinning, and occasional replacement to eliminate unsightly plants.

Winter temperatures in many parts of the state are often not low enough to completely kill tender flowering and tropical plants. While many of these plants may perform as perennials and grow outdoors for several years in mild climates, they should be treated as annuals and replaced periodically with new, vigorous, disease and insect-free plants. This will eliminate tall, unattractive plants and prevent the buildup of pathogens and insects.

It is worth noting that the addition of seasonal color to the landscape will increase maintenance tenfold compared to turf (Figure 13-62). Infertile sandy soils, insects, and heavy rain often necessitate repeated applications of fungicides for disease control, insecticides for insect control, and fertilizer to maintain adequate nutritional levels. Additionally, annual and perennial plants must have faded flowers removed to extend the blooming period, a practice known as ***deadheading*** (Figure 13-63).

Allow plants to dry slightly between watering to encourage flower production. This will also reduce the overall plant height, discourage fungus from developing, and reduce excessive fertilizer release. Morning watering is strongly recommended.

Disposal of Landscape Material

Lawn and landscape maintenance involves the removal of leaves, clippings, pruned branches and even whole plants. Careless disposal may spread invasive plants to areas where they do not belong. It may also spread insects and diseases.

Depending on the situation and local ordinances, several options are available to dispose of plant material. Living plant tissue can be destroyed onsite through burning, composting in bins or putting it in or under heavy plastic. Material may also be dumped in designated disposal areas.

Summary

Consideration of the growing needs of plants, the site characteristics, and the needs of the user should always guide the selection and siting of plants. The necessity for pruning and other maintenance activities can be reduced by selecting the proper plant for the location. Understanding and applying practices that support the development of a sustainable landscape results in a healthier, long-lived, low maintenance, and less costly landscape that is functional, attractive and enjoyable for the user.

Figure 13-62. A combination of annuals and perennials incorporated into the landscape setting.

Figure 13-63. Faded flowers must be deadheaded to maintain attractive appearances and encourage continued bloom.

References

Broschat, T. K. (2011, June 30). *Pruning palms (ENH1182/EP443)*. Florida Online Journals. ***https://journals.flvc.org/edis/article/view/119237***

Denny, G. C., & Hansen, G. (2022, June 9). *Right plant, right place: The art and science of landscape design - Plant selection and siting (ENH1156/EP416)*. University of Florida, IFAS Extension. ***https://edis.ifas.ufl.edu/publication/ep416***

Gilman, E. F. (2020, January 24). *Pruning shade trees in landscapes*. Environmental Horticulture - University of Florida, IFAS Extension. ***https://hort.ifas.ufl.edu/woody/pruning.shtml***

Hansen de Chapman, G. (2022, May 20). *Landscape design: Ten important things to consider (ENH1112/EP375)*. University of Florida, IFAS Extension. ***https://edis.ifas.ufl.edu/publication/ep375***

Hansen, G., & Alvarez, E. (2022, June 16). *Color in the landscape: Finding inspiration for a color theme (ENH1164/EP425)*. University of Florida, IFAS Extension. ***https://edis.ifas.ufl.edu/publication/EP425***

Park Brown, S. (2021, September 10). *Gardening with annuals in Florida (CIR1134/MG319)*. University of Florida, IFAS Extension. ***https://edis.ifas.ufl.edu/publication/MG319***

Schutzki, R. E. (2016, September 28). *A guide for the selection and use of plants in the landscape (E2941)*. MSU Extension. ***https://www.canr.msu.edu/resources/a_guide_for_the_selection_and_use_of_plants_in_the_landscape_e2941***

University of Florida, IFAS Extension. (2023, October 11). *Florida-friendly landscaping™ guide to plant selection & landscape design*. Florida-Friendly Landscaping™ Program. ***https://ffl.ifas.ufl.edu/resources/publications/***

University of Minnesota Extension. (2024). Landscape design. ***https://extension.umn.edu/lawns-and-landscapes/landscape-design***

Welsh, D. F., & Janne, E. (2008, November). *Follow proper pruning techniques*. Texas A&M AgriLife Extension. ***https://aggie-horticulture.tamu.edu/earthkind/landscape/proper-pruning-techniques/***