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Palms for North Florida[1]

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Palm (päm) n. Any of various chiefly tropical evergreen trees, shrubs or woody vines of the family Palmae (Arecaceae), having unbranched trunks with a crown of pinnate or palmate leaves having conspicuous parallel venation. [ME<OE<OFr. Palme, both < *Latin* palma, palm of the hand.] American Heritage College Dictionary, 3rd ed.

Palms are a prominent part of the Florida landscape. While many of the palms used in the southern parts of the state are not cold hardy, there is still a good selection of palm species that will grow in more northern regions (Figure 1).

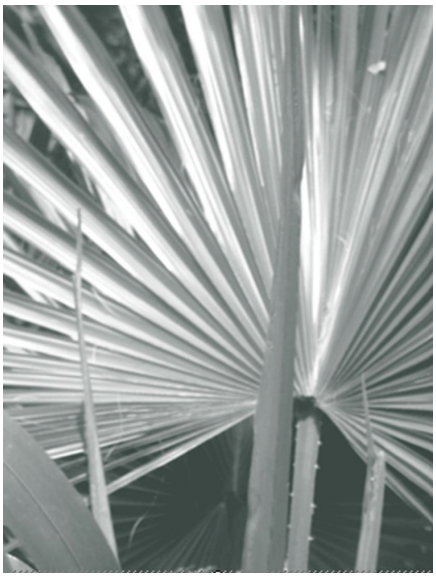

Figure 1. Chinese fam palm, *Livistona chinensis,* is one of many cold-hardy palms. Note spines on the leaf petiole.
Credits: UF/IFAS

Predicting Cold Hardiness in Palms

Palms suitable for northern Florida must be able to withstand at least intermittent periods of below-freezing weather. It is difficult to make generalizations about the cold hardiness of palms. Different growers report different experiences with the same species of palm after a cold spell. The reasons for this are numerous—the nature of the cold spell itself, microclimate differences surrounding the palm, and the palms themselves.

A cold spell can come on slowly or quickly. It is generally thought that a gradual cooling allows plants to acclimate or "harden off." The length of time and depth of hard freeze, wind speed, and relative humidity can also influence how destructive a cold spell might be.

Microclimates surrounding a particular plant can influence whether a palm will survive a particular cold spell. A plant sheltered by a building or other plants is more likely to survive than one that is exposed. The elevation of a location can also be a factor in a plant's survival-cold air tends to accumulate in low-lying areas.

Finally, how successfully a palm can withstand cold is determined by the palm itself. Its age, height, hereditary differences selected out over time by environmental influences in its native habitat, and the overall health of the palm all have an effect on a plant's survival of many environmental conditions, including cold.

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It would seem simple to predict a palm's cold hardiness by looking at a few variables regarding the palm's native habitat—is the palm native to the cooler northern or southern latitudes rather than nearer the equator? Is the palm native to higher altitudes?—however, some tropical species have been found to be somewhat hardy.

Perhaps the best indicator of the potential cold hardiness of a palm is its ability to withstand drought. Many of the more cold-tolerant palms come from regions with distinct wet and dry seasons. Freezing stress for any plant is in many ways similar to drought stress, at both the whole-plant and the cellular level–freezing temperatures prevent or reduce the uptake and translocation of water. Tropical or subtropical palms that are adapted to survive the stress of low water conditions (no matter what conditions—cold or drought—are causing it) will have a better chance of surviving cold temperatures. Palms that grow in semi arid areas, savannas, or exposed sandy coastal zones, and on exposed well-drained rocky outcrops are prime candidates for testing in colder climates.

Growing Conditions for Palms

In many ways, the growing conditions of Florida are ideal for growing palms. Our hot, wet summers and cool, dry winters (relatively speaking) are ideal for the growth of most (but not all) species of palms. In addition, much of Florida is covered with sandy soils underlain by limestone, both of which are conducive to the growth of many palms. The heavier, clay soils found in limited regions of northwest Florida may be made more suitable for the growth of desert-adapted palms by the addition of sand or perlite to "lighten" the soil. In addition, planting the palm in a raised berm may improve the palm's chance of survival.

Maintenance of Palms

Palms are not particularly high-maintenance plants, but their care must not be neglected. In Florida, the season for rapid growth coincides with the arrival of high temperatures (80°F or more). It is during that time that maintenance is most important.

Mineral Nutrition

Palms suffer quickly and conspicuously from improper mineral nutrition. The problems may arise from either insufficient or improper fertilization.

Potassium (K) deficiency is perhaps the most widespread and serious nutritional problem of palms. Florida's sandy soils have a poor ability to retain nutrients. This factor combined with heavy rainfall makes Florida's soil low in potassium content.

Symptoms of potassium deficiency vary among palm species but typically begin with translucent yellow or orange "freckles" on the leaflets of the oldest leaves. As the symptoms progress, the freckles may be accompanied by necrotic (dead tissue) lesions. Further progression of the deficiency results in marginal necrosis of the leaflets. The leaflets or entire fronds may become withered or frizzled in appearance.

The first response of most gardeners to partial necrosis of leaves is to prune off the "offending" frond. Rather than helping, this actually worsens the problem by preventing the palm from translocating the remaining potassium to the plant's growing point.

Magnesium (Mg) deficiency is also quite common, especially on date palm (*Phoenix* species). Typical symptoms include a broad band of chlorotic (yellow) tissue along the margin of the older leaves. The center of the leaf remains green. As with potassium deficiency, leaves exhibiting magnesium deficiency should not be removed until they are dead in order to allow the remaining magnesium to be moved to the newer leaves.

Prevention is the key to both potassium and magnesium deficiency. Once symptoms appear, they cannot be reversed. Some "palm special" fertilizers are specially formulated to contain elevated (and balanced) levels of potassium and magnesium, as well as nitrogen, in a controlled-release form.

Iron (Fe) deficiency sometimes occurs in palms in the growing season following a cold winter or in palms growing in poorly aerated soils. Cold temperatures may induce nutrient deficiency by slowing or preventing nutrient uptake. Waterlogged soil effectively suffocates the roots, also preventing nutrient uptake. Iron deficiency appears first on the newest leaves and is characterized by yellowing between leaf veins.

Iron deficiency symptoms may be alleviated by foliar application of iron chelate. This is especially effective for symptoms caused by transient cold spells. However, long-term correction of symptoms due to poor soil conditions is best achieved by changing soil conditions.

For more detailed information on palm nutrition, refer to UF/IFAS publications, *Nutrient Deficiencies of Landscape*

and Field-Grown Palms in Florida, and *Fertilization of Field-grown*[a] *and Landscape Palms*[in] *Florida*[b].

Irrigation

Most palms tolerate some drought. However, it is a good idea to keep palms well-watered during the active growing period. Keep in mind that "well-watered" does not mean waterlogged. Damage of roots due to waterlogging may induce certain nutrient deficiencies and allow infection by pathogenic fungi or bacteria.

The cooler winter months coincide with periods of slower growth. During this time, most palms, but especially those from desert areas, do best with reduced irrigation.

Insects and Diseases

As a group, palms are fairly resistant to pests and diseases. This does not mean, however, that they are pest-free. Certain insects and diseases have proven especially devastating for palms.

Palms are not immune to common pests such as caterpillars, aphids, scales, and spider mites. These pests may be controlled by conventional means.

A not-so-common problem for many palms is the palmetto weevil (*Rhynchophorus cruentatus*). This weevil is attracted to stressed palms, especially during or after transplanting. The adult female deposits her eggs near the crown of the plant, and the resulting larvae tunnel through the tender meristem tissue. Death of the meristem results in the death of the entire palm.

Prevention by reducing stress to the palm is the best method to control the palmetto weevil. The practice of removing the majority of the fronds and roots of a palm during transplanting is one method to reduce transplant stress. For more information, refer to *Palmetto Weevil, 'Rhynchophorus cruentatus'*[c]. Several fungal diseases have proven especially damaging to certain palms. *Ganoderma*, *Fusarium*, *Phytophthora*, and *Thielaviopsis* are fungi that cause diseases that may result in the death of affected palms; see IFAS publications *Ganoderma Butt Rot of Palms*[d]; *Fusarium Wilt of Canary Island Date Palm*[e]; *Thielaviopsis Trunk Rot of Palm*[f]; and *Bud Rots of Palm*[g]. Additional information on diseases may be found in *Leaf Spots and Leaf Blights of Palm*[h].

A number of conditions resembling pest damage may be caused by environmental factors. For more information, refer to UF/IFAS publication *Physiological Disorders of Landscape Palms*[i].

Pruning

Like all plants, palms benefit from regular pruning. Ideally, pruning of palms should be limited to removing dead fronds. Practically, this is not always acceptable. When fronds with living tissue need to be pruned, remove only the lower fronds extending out less than 90 degrees from the trunk.

New growth should never be pruned. The natural growth habit of palms does not allow them to be maintained at a constant height.

Treating Cold-Damaged Palms

Even with the best of care, palms growing in northern Florida are going to experience temperatures below those that they can tolerate without damage.

Effects of Cold Temperatures

Cold weather affects palms in several ways. Growth of the apical bud is reduced, and growth of roots is slowed. This reduced activity often weakens the palm to the point that diseases may become active and kill the palm.

Severe cold damage caused by frost or below-freezing temperatures may destroy plant tissues. Due to the nature of the water-conducting tissue in palms, the destruction of stem tissue may severely reduce water conduction for years. As warmer weather returns, plant pathogens, whether primary or secondary, may attack weakened plants through damaged tissue.

After a Freeze

After a palm experiences damaging temperatures, it is important to protect the growing point until active growth resumes.

Carefully inspect the damaged fronds before pruning. Leaves should not be removed if they still contain viable green tissue. The green portions of leaves are important for adequate production of sugars from photosynthesis. Allowing the leaves to die naturally allows the nutrients remaining in the leaf to be translocated to other areas where they are needed.

Immediately after pruning away dead tissue, spray the palm with a fungicide; copper-containing fungicides often are recommended. This will reduce the level of potentially

pathogenic bacteria and fungi. Repeat the fungicide spray as recommended by the fungicide label or about 10 days after the first treatment. Make sure that these sprays cover the damaged tissue and the bud thoroughly. If the fungicide contains copper, do not repeat the sprays more than twice so as to avoid possible copper toxicity. If the soil has frozen, a soil drench of a combination of a broad-spectrum and a water-mold-specific fungicide may suppress root diseases.

Freeze damage to the palm's vascular tissue in the trunk may limit the ability of the plant to supply water to the canopy. Unlike typical trees, palms do not have the ability to regenerate vascular tissue within the trunk. A sudden collapse of some (or all) of the leaves during the first periods of high temperatures in the spring or summer following a damaging winter freeze may indicate this type of trunk damage. Unfortunately, there is nothing that can be done at this point. Loss of the palm is likely inevitable.

Palm Selection

An important factor to consider when selecting a palm for a particular area is the average minimum temperature that can be expected. The US Department of Agriculture has used historical climatic data to divide the country into climate zones. Each zone represents a 10°F range. Most of northern Florida can be placed in one of two USDA climate zones. Extreme northern parts of the state are placed in the lower half of USDA zone 8 (10°F–19°F), meaning that the average minimum temperature that may be expected is 15°F. Coastal regions of northern Florida are typically in the upper half of zone 9 (20°F–29°F), meaning that the average minimum temperature that may be expected is 20°F. Of course these are only average lows. Single-digit lows have been recorded several times in the last 100 years.

The table in this publication includes palms exhibiting some degree of cold hardiness. In addition to cold hardiness, intended use and characteristics of the site should be used as selection criteria. Careful study of the list of palms and their characteristics will allow selection of the right palm for the landscape situation.

Availability

Palms are increasingly appreciated by consumers. Cold-hardy palms are in great demand and the nursery industry is responding with additional production. Currently, palms that are most widely available are in the genera *Butia* (pindo palm), *Chamaedorea* (parlor palm), *Livistona* (fan palm), *Phoenix* (date palm), *Rhapidophyllum* (needle palm), *Rhapis* (lady palm), *Sabal* (palmetto), *Serenoa* (saw palmetto), *Syagrus* (queen palm), *Trachycarpus* (windmill palm), and *Washingtonia* (washington palm; Figure 2). Refer to Table 1 for specific species and their cold hardiness information. Other cold-hardy palms may be found at better garden centers and specialty nurseries.

Figure 2. *Washingtonia filifera* leaves—note filaments hanging from leaf margins.
Credits: UF/IFAS

Endnotes

[a] *Nutrient Deficiencies of Landscape and Field-Grown Palms in Florida*, ILN# ENH1018 / DLN# EP273 (https://edis.ifas.ufl.edu/EP273)

[b] *Fertilization of Field-grown and Landscape Palms in Florida*, ILN# ENH1009 / DLN# EP261 (https://edis.ifas.ufl.edu/EP261)

[c] *Palmetto Weevil, Rhynchophorus cruentatus*, ILN# EENY013 / DLN# IN139 (https://edis.ifas.ufl.edu/IN139)

[d] *Ganoderma Butt Rot of Palms*, ILN# PP54 / DLN# PP100 (https://edis.ifas.ufl.edu/PP100)

[e] *Fusarium Wilt of Canary Island Date Palm*, ILN# PP215 / DLN# PP139 (https://edis.ifas.ufl.edu/PP139)

[f] *Thielaviopsis Trunk Rot of Palm*, ILN# PP219 / DLN# PP143 (https://edis.ifas.ufl.edu/PP143)

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McClendon, T., W. Roberds and J. LeVert. 2007. *Hardy Palms for the Southeast. Southeastern Palm Society, Inc., Apison*,

UF/IFAS Fort Lauderdale REC. Palm Production & Maintenance. http://flrec.ifas.ufl.edu/palmprod/.

Table 1. Palms for northern Florida and their associated characteristics[3].

Scientific Name	Common Name	Origin	Native Habitat	Hardiness Zone	Typical Height	Growth Rate	Habit	Light	Salt Tolerance	Leaf Type	Foliage Color	Comments
Acoelorrhaphe wrightii	Paurotis palm, Everglades palm	Southern Florida, Caribbean region	Moist, swamp-like regions	9a–11 23°F	20′	Slow to moderate	Clustering	Partial shade to full sun	Moderate	Palmate	Green, silvery-green below	Native to the Florida Everglades. Adaptable to drier soils. Reported to tolerate 19°F.
Arenga engleri	Dwarf sugar palm	Taiwan, Ryukyu Islands	Open forests	9a–11 23°F	6©–8′	Slow to moderate	Clustering	Partial shade to full sun	Low	Pinnate	Dark green above, silvery below	Fiber-covered stems. Fruit contain irritating calcium oxylate crystals.
Brahea armata	Blue hesper palm	Mexico, southern California	Arid, desert regions	8a–10 14°F	30©–40′; 4©–8© in FL	Slow	Solitary	Full sun	Moderate	Costa-palmate	Blue-green, waxy	Does not like high humidity. Requires well-drained soil.
Butia capitata	Pindo palm, jelly palm	Brazil, Argentina, Uruguay	Coastal grassland plains	8–10 14°F	15′	Slow	Solitary	Full sun to partial shade	Moderate	Pinnate	Blue-green	Hardiest of the feather-leaved palms. Widely cultivated. Exhibits variability from plant to plant. Var. strictior has fronds with less curve. Hybridizes with members of the genus *Syagrus*.
Butia eriospatha	Wooly jelly palm	Southern Brazil	Hillsides to 4000′	8–10 15°F	15©–20′	Slow	Solitary	Full sun to partial shade	Moderate	Pinnate	Blue-green to blue-gray	Leaf bases covered with brown hair. Faster growing than *B. capitata*.
Butia yatay	Yatay palm	South America	Dry savannas	8–10 15°F	35′	Slow	Solitary	Full sun to partial shade	Moderate	Pinnate	Gray-green	Similar to *B. capitata*, but having more widely spreading leaves.
Butia Jubaea hybrid	No common name	Occurs only in cultivation	Not applicable	8a–10 13°F	40′+	Moderate	Solitary	Full sun	Moderate	Pinnate	Bluish-green	Faster growing and more cold hardy than either parent. Massive trunk with retained leaf bases.
Butia Syagrus hybrid *Butiagrus nabonnandi*	Mule palm	Occasionally produced in the wild in South America	Dry savannas	8b–10 19°F	40′+	Moderate	Solitary	Full sun	Unknown–likely moderate	Pinnate	Bluish-green	Resembles *Butia* more than *Syagrus*—but with finer, less stiff foliage. Faster growing than *Butia*.

Chamaedorea elegans	Parlor palm	Parlor palm	Rainforest understory	9a–11 24°F	3–5′	Slow	Solitary	Shade to partial shade	Low	Pinnate	Green	Popular houseplant since Victorian times. Separate male and female plants. Most effective when several planted together.
Chamaedorea microspadix	Hardy bamboo palm	Mexico	Open forests	8b–11 18°F	8′	Moderate	Clustering	Shade to partial shade	Low	Pinnate	Dull green	Resembles *C. seifrizii* and *C. erumpens*, popular interior palms.
Chamaedorea radicalis	Radicalis palm	Mexico	High elevation rainforests	8b–11 19°F	5′	Slow to moderate	Solitary	Shade to partial shade	Low	Pinnate	Dark green	Often trunkless, but trunked forms exist. Separate male and female plants.
Chamaerops humilis	European fan palm	Mediterranean Region	Arid coastal zones to 3000′ in elevation	8–9 16°F	10′	Slow	Clustering	Full sun to partial shade	Moderate–may be variable	Palmate	Green, blue-green and silvery forms	Great variability from one plant to another. Var. cerifera is blue-green in color and is not as cold hardy as the green form.
Corypha umbraculifera	Talipot palm	Southern India and Sri Lanka	Rainforest	9a–11 20°F	80′	Slow when young	Solitary	Full sun to partial shade	Low	Costa-palmate	Dull green	Flowers after 60–80 years and then dies. Massive leaves 12–18′ in diameter when mature. Dies after flowering.
Dypsis baronii	Sugar cane palm	Madagascar	Mountain regions around 1600′	9a–11 24°F	15′	Slow to moderate	Solitary	Full sun to partial shade	Low	Pinnate	Green	Heat and drought tolerant, but does best with adequate water.
Dypsis decipiens	Manambe palm	Madagascar	Dry highlands to 6700 feet	9a–11 21°F	15′	Slow	Solitary	Full sun	Low	Pinnate	Blue-green	One of the few cold-tolerant palms with a crown shaft.
Guihaia argyrata	Dainty lady palm	Vietnam	Open forests on limestone hills	9a–11 22°F	4′	Slow	Clustering	Shade to partial shade	Low	Palmate	Green above, silvery white below	First placed in the genus *Trachycarpus*. Grows best at higher pH.
Howea forsteriana	Kentia palm	Lord Howe Island, New South Wales, Australia		9a–11 24°F	6©–14′	Slow	Solitary	Partial shade	Moderate	Pinnate	Dark green above, lighter below	Excellent container plant.

Jubaea chilensis	Chilean wine palm	Chile	Desert, coastal valleys	8b–10a 14°F	50©–80′	Very slow	Solitary	Full sun	Low	Pinnate	Dull green above, gray below	Requires well-drained soil. Has the thickest trunk of any palm–up to 6 feet in diameter.
Livistona australis	Australian fan palm	Australia	Rainforest understory	9a–11 22°F	40′	Slow	Solitary	Partial shade to full sun	Moderate	Palmate	Deep, glossy green	Secondmost cold hardy *Livistona* after *L. chinensis*.
Livistona chinensis[4]	Chinese fan palm	China, southern Japan	Open forests	8b–11 18°F	25′	Slow	Solitary	Partial shade to full sun	Moderate	Palmate	Olive Green	Often defoliated by hard freezes, but re-grows a new canopy in spring. Rarely forms trunk in northern regions. Armed petiole
Livistona decipiens	Ribbon fan palm	Australia	River banks and coastal areas	9a–11 23°F	30′	Slow to moderate	Solitary	Partial shade to full sun	Moderate	Palmate	Deep green above, waxy gray below	The leaves are deeply divided and the long segments hang downward in a curtain-like manner.
Nannorrhops ritchiana	Mazari palm	Afghanistan, Pakistan to Arabia	Desert mountain regions	7b–11 7°F	10′	Slow	Clustering	Full sun	Moderate	Costa-palmate	Blue-green	Requires well-drained soil. After flowering and fruiting, a stem will eventually die back, but not before branching just below the crown.
Phoenix canariensis	Canary Island date palm	Canary Islands	Desert regions, 600©–1900′	8b–11 19°F	40′	Very slow	Solitary	Full sun	Moderate	Pinnate	Dull deep green	Form impressive, large specimens. Poorly drained sites should be avoided.
Phoenix dactylifera	Date palm	North Africa–exact origin unknown	Desert regions	8b–11 19°F	40©®–50′	Slow	Slowly clustering	Full sun	High	Pinnate	Gray-green	Most landscape specimens transplanted from date groves in AZ or CA.
Phoenix reclinata[5]	Senegal date palm	Africa	Desert regions	9a–11 25°F	24©–30′	Moderate	Clustering	Full sun	Moderate	Pinnate	Dark green	Suckers vigorously. Slender trunks. Thicker trunks may indicate hybridization with other *Phoenix* species, and may be indicative of greater cold tolerance.
Phoenix roebelenii[6]	Pygmy date palm	Southeast Asia – Laos, Vietnam, Thailand	Rainforests	9a–11 24°F	10′	Slow	Solitary	Partial shade to full sun	Low	Pinnate	Glossy green	May require some protection in particularly cold periods. Separate male and female plants. Adapts well to container production.

Phoenix sylvestris	Wild date palm	India	Desert regions	9a–11 22°F	40′	Slow	Solitary	Full sun	Moderate	Pinnate	Blue-green	Shorter leaves than *P. canariensis* and *P. dactylifera*. Hybridizes with other *Phoenix* species.
Phoenix theophrastii	Cretan date palm	Crete, limited areas of Turkey	Arid, desert-like regions	8b–11 19°F	25′	Slow	Clustering	Full sun	Moderate	Pinnate	Silvery-gray	Similar to *P. reclinata*, but more cold hardy.
Rhapidophyllum hystrix	Needle palm	Southeastern US	Dry, pine flatwoods	7b–10a 5°F	5′	Slow	Clustering	Partial shade to full sun	Moderate	Palmate	Dark green above, silvery below	Florida native. Separate male and female plants. 10–”.®12” needles from crown.
Rhapis excelsa	Lady palm	China	Forest understory	9a–11 21°F	7′	Moderate	Clustering	Shade to partial shade	Moderate	Palmate	Shiny Green	Leaves tend to yellow with too much sun. Excellent container plant. Variegated forms available, but very expensive.
Rhapis humilis	Slender lady palm	China	Known only in culture	9a–11 21°F	13′	Slow	Clustering	Shade to partial shade	Moderate	Palmate	Green, slightly shiny	Smaller stems and leaves than *R. excelsa*. All plants are male; no females exist.
Sabal bermudana	Bermuda palmetto	Bermuda	Sandy, dry regions	8b–11 16°F	25′	Slow	Solitary	Full sun	Moderate to high	Costa-palmate	Blue-green	Requires well-drained location.
Sabal causiarum	Puerto Rican hat palm	Puerto Rico	Sandy, dry regions	8b–11 19°F	50′	Slow	Solitary	Full sun	Moderate to high	Costa-palmate	Green	Massive trunk, not frequently seen in the landscape.
Sabal domingensis	Dominican palmetto	Haiti, Hispanola, eastern Cuba	Hot dry inland areas to 3300′	9a–11 22°F	60′	Slow to moderate	Solitary	Full sun	Moderate to high	Costa-palmate	Green	Large whitish trunk. Thrives on sandy soils
Sabal etonia	Scrub palmetto	Southeastern US	Dry scrublands	8b–10 16°F	5′	Slow	Solitary	Partial shade to full sun	Moderate	Costa-palmate to palmate	Dull green to blue-green	Similar to *S. minor* but has smaller, deeply folded leaves.
Sabal mexicana	Rio Grande palmetto	Texas, Mexico, El Salvador	Arid, desert-like regions	8b–11 17°F	40′	Slow	Solitary	Full sun	Moderate	Costa-palmate	Emerald green	Drought tolerant, but grows faster with adequate water.
Sabal minor	Dwarf palmetto	Southeastern US	Understory of pine flatwoods	7a–10b 5°F	6′	Slow	Solitary	Partial shade to shade	Moderate	Costa-palmate to palmate	Green to blue-green	Does not form a trunk. Larger crown than *S. palmetto*.

Sabal palmetto	Cabbage palm	Southeastern US		8a–11 10°F	30©–40′	Slow	Solitary	Full sun	High	Costa-palmate	Dull green	The state tree of both FL and SC. Adapts well to many different soils and situations.
Sabal rosei	Llana Palm	Western Mexico	Dry savannas	8a–11 10°F	25©–30′	Slow	Solitary	Full sun		Costa-palmate	Blue-green	Drought and flood tolerant. Trunk is more slender than that of *S. palmetto*.
Sabal umbraculifera	Hispanolian palm	Santo Domingo		7b–11 9°F	60′	Slow	Solitary	Full sun	High	Costa-palmate	Dull green	Stout, heavy trunk with very large leaves. Thrives on sandy soil.
Sabal uresana	Soronan palmetto	Mexico	Open forest	8b–11 14°F	60′+	Slow	Solitary	Full sun	Moderate	Costa-palmate	Silvery-blue	Bluish tint to foliage becomes less distinct as the plant ages.
Serenoa repens	Saw palmetto	Southeastern US	Dry pine flatwoods	8b–11 18°F	3©–6′	Slow	Clumping	Partial shade to full sun	High	Palmate	Green or blue green, waxy	Florida native. Large specimens do not transplant easily.
Syagrus romanzoffiana[7]	Queen palm	Brazil to Argentina	Lowland humid forests	9a–11 23°F	30′	Fast	Solitary	Full sun to partial shade	Moderate	Pinnate	Dark green	Susceptible to Mn deficiency on high-pH soil. Produces large numbers of fruit which some consider messy.
Trachycarpus fortunei	Windmill palm, chusan palm	China	Mountain regions to 7500′	8a–10a 10°F	20′	Slow	Solitary	Partial shade to full sun	Moderate	Palmate	Dark green above, silvery below	Fiber-covered trunk. Very cold hardy, even tolerating light snow.
Trachycarpus latisectus	Windamere palm	Himalayas of northern India	Mountain regions to 8000′	7a–10a 1°F	18′	Slow	Solitary	Partial shade to full sun	Moderate	Palmate	Dark green	Leaves shed naturally, leaving a smooth slender trunk. Unknown before 1992.
Trachycarpus martianus	Himilayan windmill palm	China, Nepal, India	Mountain regions	9a–10a 23°F	20′	Slow	Solitary	Partial shade to full sun	Moderate	Palmate	Green above, silvery below	Slimmer trunk than *T. fortunei*. New growth covered by whitish pubescence.
Trachycarpus oreophilus	Thai mountain fan palm	Northwest Thailand	Rocky outcrops, mountain regions	8a–10a 14°F	30′	Slow	Solitary	Partial shade to full sun	Unknown	Palmate	Green above, silvery below	Small compact crown of foliage. Smooth, slender trunk.
Trachycarpus takil	Kamaon fan palm	North central India	Mountain regions to 8000′	7b–10a 6°F	25′	Slow to moderate	Solitary	Partial shade to full sun	Unknown	Palmate	Green	Compact growth habit. Smooth trunk.

Trachycarpus wagnerianus	Wagner's fan palm	Japan	Unknown in the wild	8a–10a 13°F	10′	Slow	Solitary	Partial shade to full sun	Unknown	Palmate	Green above, silver below	Similar to *T. fortunei*, but smaller. Fiber-covered trunk.
Trithrinax acanthocoma	Spiny fiber palm	Southern Brazil	Open forests, dry savannas	9a–11 20°F	15′	Slow	Solitary	Full sun	Moderate	Palmate	Deep green above, whitish below	Not widely cultivated. Long spines on trunk.
Trithrinax campestris	Blue needle palm, Caranday palm	Argentina and Uruguay	Arid regions	8a –11 13°F	12′	Slow	Clumping	Full sun	High	Palmate	Blue-green	Erect, stiff leaflets. Drought tolerant. Fiber-covered trunk with stiff spines. Good drainage essential.
Washingtonia filifera	California Washington palm	California, Mexico	Desert regions	8a–11 12°F	50′	Moderate	Solitary	Full sun	Moderate	Costa-palmate	Grayish-green	Requires well-drained soil. Larger diameter trunk than *W. robusta*. Hybridizes with *W. robusta*.
Washingtonia robusta[8]	Washington palm	Mexico	Desert regions	9a–11 22°F	70–100′; 25′ in northern FL	Fast	Solitary	Full sun	Moderate	Costa-palmate	Bright green	Though from desert regions, fastest growth occurs with regular irrigation. Requires well-drained soil.

[3]Non-native palms found in Florida's natural areas are indicated, with footnotes stating their status as established by the "IFAS Assessment of the Status of Non-native Plants in Florida's Natural Areas" (https://assessment.ifas.ufl.edu/). Non-native palms without footnotes have not been reported in Florida's natural areas and/or have not yet been assessed using the UF/IFAS Assessment.

[4]The assessment for *Livistona chinensis* in north, central and south Florida is Caution: may be recommended but manage to prevent escape (University of Florida, Institute of Food and Agricultural Sciences. 2020. "Assessment of Non-native Plants in Florida's Natural Areas, *Livistona chinensis*" (https://assessment.ifas.ufl.edu/assessments/livistona-chinensis/, 4/23/2020) Gainesville, FL, 32611-4000, USA.

[5]The assessment for *Phoenix reclinata* in north and central Florida is Not a problem species and may be recommended; however, in south Florida the assessment is Invasive and not recommended (University of Florida, Institute of Food and Agricultural Sciences. 2020. "Assessment of Non-native Plants in Florida's Natural Areas, *Phoenix reclinata*" (https://assessment.ifas.ufl.edu/assessments/phoenix-reclinata/, 4/23/2020) Gainesville, FL, 32611-4000, USA.

[6]The assessment for *Phoenix roebelenii* in north, central and south Florida is Not a problem species and may be recommended (University of Florida, Institute of Food and Agricultural Sciences. 2020. "Assessment of Non-native Plants in Florida's Natural Areas, *Phoenix roebelenii*" (https://assessment.ifas.ufl.edu/assessments/phoenix-roebelenii/, 4/23/2020) Gainesville, FL, 32611-4000, USA.

[7]The assessment for *Syagrus romanzoffiana* in north, central and south Florida is Caution: may be recommended but manage to prevent escape (University of Florida, Institute of Food and Agricultural Sciences. 2020. "Assessment of Non-native Plants in Florida's Natural Areas, *Syagrus romanzoffiana*" (https://assessment.ifas.ufl.edu/assessments/syagrus-romanzoffiana/, 4/23/2020) Gainesville, FL, 32611-4000, USA.

[8]The assessment for *Washingtonia robusta* in north and central Florida is Not a problem species and may be recommended; however, in south Florida the assessment is Caution: may be recommended but manage to prevent escape (University of Florida, Institute of Food and Agricultural Sciences. 2020. "Assessment of Non-native Plants in Florida's Natural Areas, *Washingtonia robusta*" (https://assessment.ifas.ufl.edu/assessments/washingtonia-robusta/, 4/23/2020) Gainesville, FL, 32611-4000, USA.