



Cycads in the South 'Florida Landscape'

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Introduction

Cycads are ancient, palm-like, evergreen gymnosperms (cone-bearing plants) of the Division Cycadophyta. Represented by three families—Cycadaceae, Stangeriaceae, and Zamiaceae—the cycads are composed of approximately 200 species in 11 genera—*Bowenia*, *Ceratozamia*, *Chigua*, *Cycas*, *Dioon*, *Encephalartos*, *Lepidozamia*, *Macrozamia*, *Microcycas*, *Stangeria*, and *Zamia*.

Although many cycads superficially resemble palms, these two groups of plants are in no way related. In fact, cycads are more closely related to pine trees than to palms. During the age of the dinosaurs cycads were the most abundant plants on Earth, whereas palms did not show up on Earth for another 150 million years.

Cycads are dioecious plants, which means that there are separate male and female plants. Female plants produce seeds and male plants produce cones full of pollen. Many of the cones on cycads are highly ornamental, like the bright red cones of *Encephalartos ferox* (see below).

One of the reasons that cycads have survived for so long is that they can grow in harsh conditions. Many cycads naturally grow in pure sand or even on bare rock. Some can withstand hard freezes every year, as well as snow. Others live in areas

that receive no more than a couple of inches of rain per year.

Dioon edule is probably the most cold-hardy of all the cycads. In the 1989 freeze, parts of Lakeland, FL, got down to 17°F. Most king sagoes were completely defoliated, while *D. edule* plants only experienced tip burn.

Many cycads are also salt tolerant. For example, in a particular habitat in Mexico, *Dioon* plants hang over a cliff and are constantly assaulted with salt spray from the Gulf of Mexico.

With our sand- and limestone-based soils here in south Florida, it can be difficult to grow some types of plants. However, the majority of cycads thrive here. As a result, cycads make perfect, easy to maintain plants for our landscapes. In fact, one cycad species is native to Florida. The common name for the plant is "coontie", which is a Seminole name. These plants are adapted to the Florida weather and thrive in our sandy soils.

Even though there are more than 200 cycad species, only four are commonly planted in south Florida: *Cycas revoluta* (king sago) and *C. rumphii* (queen sago; mistakenly called *C. circinalis* [Hill, 1995]) are generally specimen plants, often growing quite large; *Zamia maritima* (cardboard 'palm'; recently changed from *Z. furfuracea* [Schutzman & Dehgan, in

press]) is commonly incorporated into raised planting beds; and *Zamia floridana* (Florida coontie; mistakenly known as *Z. integrifolia*, *Z. pumila*, *Z. sylvatica*, or *Z. umbrosa* [Schutzman & Dehgan, in press]) is used as a small shrub, under-story plant, or groundcover. The main reason that cycads are underutilized in landscapes in south Florida is that most species are not available.

The primary objective of this article is to discuss landscaping practices as they relate to cycads in south 'Florida Landscapes'—*i.e.*, landscapes that help reduce non-point source pollution and conserve water by adhering to the principles of the Florida Yards & Neighborhoods (FYN) program.

Although they are unrelated, palms and cycads are generally thought to be in the same category of landscape plants because they have a similar appearance and because many believe they have similar culture requirements. Although the former statement is true to some extent, the latter certainly is not. A secondary goal of this article is to illustrate some of the reasons that cycads should not be treated like palms.

Florida Yards & Neighborhoods

The University of Florida's FYN program provides educational outreach activities designed to enlist homeowners and other stakeholders in the battle to reduce non-point source pollution and to enhance Florida's environment by improving landscape management practices. This section will examine practices involving cycads in south 'Florida Landscapes', with respect to the nine principles of the FYN program.

Right Plant, Right Place— Learning the culture requirements and site preferences for each cycad species being considered for a landscape, and then conducting a site evaluation are two very important steps in creating a south 'Florida

Landscape'. General culture information for most cycads can be found in Jones (1993), but a general rule of thumb is that nearly all cycads require well-draining soil, and most are sensitive to root rot when over-watered. Therefore, they should not be planted in low or wet areas or in poorly draining soil.

Water Efficiently—Cycads require less water than many other landscape plants and most can tolerate dry spells without irrigation. As mentioned above, cycads should always be planted in well-draining soil and should never be over-watered.

Fertilize Appropriately—The only published fertilization recommendations for cycads are those of Broome (1997), who suggested that, since most palm fertilizers are low in nitrogen, cycads generally do not perform well with such products. The following recommendations are based on Broome's (1997) article.

In the early stages of growth, cycads push a single leaf at a time on a fairly regular schedule. After the plants reach a certain size, each consecutive flush begins to contain more leaves. When cycads reach the next threshold size, the plants change from a continuous to an episodic growth pattern (Robbertse, 1995). Since small cycads exhibit continuous growth, they benefit from a continuous release fertilizer, such as a 360-day, plastic-coated 18-6-8 with micronutrients. When the plants switch to episodic growth, they require a different formulation at approximately quarterly intervals to coincide with leaf flushes. A product labeled 24-7-8 plus micronutrients, with about half of the nitrogen in a fast-acting form, works best for larger cycads.

Maximize Mulch—The benefits of mulch are numerous and include conserving soil moisture, moderating soil temperature, discouraging weeds, and preventing damage to plants from mowers and line trimmers. Organic mulches have the added benefit of improving the

limestone- and sand-based soils of south Florida. Mulch should be applied 3-4 inches thick around all cycads and reapplied as necessary.

Recycle Yard Waste—The key to this principle is to reduce municipal solid waste by converting cycad leaf debris into mulch or compost. Cycads generally do not produce as much leaf debris as palms and do not need to be pruned like many trees or hedges. Therefore, they make good landscape plants with respect to this principle.

Manage Pests & Diseases Responsibly—Most cycads are relatively free of pests and diseases; this makes them welcome additions to a south 'Florida Landscape'. One notable exception is the aulacaspis scale epidemic of king and queen sagoes in south Florida. The causal organism, *Aulacaspis yasumatsui*, is a white scale insect pest introduced to the U.S. from Thailand a few years ago (Howard *et al.*, 1996). This scale primarily infects cycads of the genus *Cycas*. Left untreated, infected plants will die. The recommended course of action in a 'Florida Landscape' is—whenever possible—to remove infected sagoes and replace them with species that are resistant to this scale (see below).

The most important disease of cycads is stem and root rot, which is usually caused by over-watering or by planting cycads in soil that does not drain freely. This problem is easily circumvented by carefully choosing planting locations and by watering efficiently.

Reduce Non-Point Source Pollution—With respect to cycads, the simplest way to reduce non-point source pollution is to choose species with low fertilizer and water requirements and few pests and diseases (see below).

Attract Wildlife—Due to the toxins in their leaves and seeds, cycads do not represent an attractive food source for most forms of wildlife. In fact, cycads are considered pest plants in some parts of the world because livestock often get

sick or die from eating the foliage and/or seeds (Jones, 1993). Rodents do not appear to be affected by these toxins, however, and the flesh around the seed (called the sarcotesta) of some cycads is a delicacy for squirrels and rabbits. Cycads also attract interesting insects. For example, a recent experience by the author in a private cycad garden in Sarasota suggests that large cycads are highly attractive to lightning bugs, which can put on an impressive show at dusk when in large numbers. Another insect that is attracted to certain cycads is the atala butterfly (*Eumaeus atala*), a rare south Florida endemic whose sole food source is the Florida coontie (Culbert, 1995).

Protect the Waterfront—Since cycads cannot be recommended for planting near water, an effective general recommendation for this principle is to establish a 20-foot-wide "No Application Zone" along the entirety of the waterfront and to construct raised beds or dig swales to prevent storm water from running off into surface waters.

Twelve Cycads Recommended for South 'Florida Landscapes'

Cycads can be broadly categorized into two groups: those that live in hot and/or dry areas, and those that live in rainforests. Due to their high drought tolerance, low nutrient requirements, and minimal pest and disease problems, only cycads in the former group are recommended for south 'Florida Landscapes'.

Although many such cycads are well suited to the soil conditions and climate of south Florida, most species were traditionally unavailable except to the avid cycad collector. However, much interest has been generated in cycads in the last few years through several new books and numerous new societies. As a result, supply of unusual cycads in wholesale nurseries in Florida has tripled in the last five years (Broome, 1998).

Twelve 'low maintenance' cycads that grow well in south Florida and that are either widely available or will be within a few years are *Ceratozamia hildae*, *C. kuesteriana*, *C. latifolia*, *C. robusta*, *Dioon edule*, *D. mejiae*, *D. spinulosum*, *Encephalartos ferox*, *E. gratus*, *Zamia floridana*, *Z. loddigesii*, and *Z. vazquezii*. The attractive characteristics and general culture requirements for each are provided below (adapted from Broome, 1998; Hubbuch, 2000; and Jones, 1993).

Ceratozamia hildae, or the bamboo cycad, gets its name from the upright habit of its leaves,



which contain clustered, 'bow-tie' leaflets and can attain a height of seven feet. This cycad prefers partial shade, but can be grown in moderate sun or in deep shade. It can become mature in as little as four to five years with proper care.

Ceratozamia kuesteriana is a cold-hardy cycad from Mexico with a short or subterranean stem and brown emergent leaves. Because it is one of the few cycads that is completely unarmed (*i.e.*,



lacking all spines and prickles), this species makes a good accent plant near walkways, where most people would not normally want to use a cycad. It prefers a shady location with well-drained soil and will attain a spread of five feet.

Ceratozamia latifolia is one of the best landscape plants in the genus. It prefers to be in the shade to look it's best. It has proven to be very cold and frost hardy. It grows fairly fast and reacts well to fertilizer applications. This plant will eventually attain a seven-foot spread. There are variations of this species, but most have beautiful red or reddish-brown emergent leaves.



Ceratozamia robusta has thin, green leaflets and green emergent leaves. It has proven to be one of the most cold-hardy of the genus. This plant can attain a spread of nine feet over time. It can grow in the sun or in shade, and reacts well to fertilizer applications. It is much less common than many others in the genus.



Dioon edule is the most widely available, as well as the most-cold hardy of the uncommon cycads grown in Florida. This species prefers sandy conditions in full sun, but performs well in virtually any soil type with good drainage. It has a high tolerance to salt and has the general appearance of the king sago, except with lighter green foliage. Some varieties have lavender, pale-blue, or pale-red emergent leaves. Old plants have multiple trunks and can reach 6-8 feet in height.



Dioon mejiae is a small to medium-sized cycad that develops a trunk to three feet tall and ten inches across, often producing offsets at the base. Young leaves are light green with very long white or golden hairs. These emergent leaves harden off to become rigid, dark green, slightly spiny mature leaves. This is a tough species that will withstand considerable exposure to sun and short periods of drought. This species should also be considered as a replacement or alternative for the king sago in south Florida.



Dioon spinulosum, a native of the lowlands of the Sierra Madre Oriental mountains in Mexico, is the largest of all American cycads, with



multiple trunks reaching heights of up to 30 feet. Mature specimens bear numerous stiff, light green leaves that can reach six feet in length. This species is an attractive, easily grown, and popular plant for the subtropics, preferring partial shade and tolerat-

ing a wide range of soils. It should be considered as a favorable replacement or alternative for the queen sago.

Encephalartos ferox, from South Africa, is one of the most sought-after and unusual cycads in south Florida. This species has glossy, dark-green leaflets that resemble holly leaves and mature plants bear large, bright-red cones. This cycad prefers a semi-shady area and can attain a spread of nine feet.



Encephalartos gratus is one of a large group of highly collectable cycads from South Africa. All require bright light and well-drained soil, but may need some supplemental irrigation in dry weather. It is a relatively fast-growing cycad and can reach immense dimensions. Other species in the genus also make good landscape plants for south Florida but are generally rare or expensive.



Zamia floridana is the native Florida coontie. It grows throughout the state, but exhibits a high degree of variation from place to place. The leaflets range from long and narrow to short and wide, and overall heights range from two feet (southern, Miami-Dade County) to five feet (northern, 'Palatka giant'). The coontie is a popular landscape plant that is especially attractive in borders and as a groundcover. It can be grown in full sun or partial shade. Coonties have an underground stem and dark, glossy green leaves forming a graceful crown. Large, reddish-brown cones are borne near the surface of the soil. Male cones are lance-shaped; female cones are more rounded and much larger overall.



Zamia loddigesii is an extremely tough and drought-tolerant cycad from Mexico. It is related to the common cardboard 'palm', but has much narrower leaflets. Its light green leaves can grow up to three feet long and the plant can grow to be three feet across. It prefers to grow in full sun but can tolerate partial shade. This cycad can be used as a small shrub or accent plant.



Zamia vazquezii (commonly called *Z. fischeri*), resembles a fern and is sometimes mistakenly sold as one. This cycad prefers to grow in partial shade and can be used as a small shrub or a large groundcover. It can have green or brownish emergent leaves and can grow up to four feet tall and four feet across.



Cycad Internet Resources

Cycad-related information on the Internet has dramatically increased in recent years. Anyone interested in this ancient group of plants can now subscribe to e-mail lists and participate in online discussion forums. Numerous websites throughout the world also contain information on cycads. The *Virtual Cycad Encyclopedia* (VCE), on the website of the Palm & Cycad Societies of Florida <<http://www.plantapalm.com>>, is a fairly comprehensive online resource for cycads. The VCE also contains an extensive list of links to other cycad-related websites.

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