What is a Cycad?
Cycads
About 300 species of primitive plants related to conifers and Ginkgo that date back >100 million years.
Cycad Trivia

Any similarity to animals is strictly coincidental!

• Cycad plants are dioecious (male or female)
• Some cycads are thought to have sex chromosomes
• Unlike most higher plants, cycads have motile sperm
Cycad Trivia

Resemblance to palms is coincidental

• Cycads are palmlike but are NOT palms

• Common names often have the word “palm” in them and further the misunderstanding (e.g. sago palm)
Phylogeny of Cycads

Phylogeny = evolutionary history of a group of organisms
"Seed Plant Phylogenetic Tree"
Families and Genera of Cycads

Boweniaceae: *Bowenia*
Cycadaceae: *Cycas*
Stangeriaceae: *Stangeria*
Zamiaceae: *Ceratozamia, Dioon, Encephalartos, Lepidozamia, Macrozamia, Microcycas, Zamia*
Midrib: Cycadaceae

Midrib + Dichotomous Secondary veins Stangeriaceae

Dichotomous Veins - Zamiaceae
Geography of Cycads

Cycads are native to the tropical and subtropical regions of both the old and new worlds.
Geographic Distribution of Cycads
Morphology of Cycads

Morphology = form and structure
the swollen underground or aboveground stem is called a "caudex" (pl. "caudices"), full of starch, some fiber, but very little wood
Leaves of Cycads

compound leaves with leaflets –
(2x or more compound in *Bowenia* and some *Cycas*)

*Bowenia* sp.

*Dioon* sp.
Cycads have “strobili” (cones). Plants are male or female; male plants have pollen-bearing cones, and female plants have seed-bearing cones.
Cones of Cycads
In all but *Cycas*, cycad female cone scales bear two seeds each; megasporophylls of some *Cycas* hold up to eight.
After its discovery, *Stangeria eriopus* was at first thought to be a fern …
...until a cone was seen
Cycas revoluta (King Sago)

female strobilus

male strobilus
*Cycas revoluta* (King Sago)

Closeups of male cone showing microsporophylls
Cycas revoluta (King Sago)

Closeups of microsporophyll showing microsporangia (pollen sacks)
Cycas revoluta (King Sago)

Female cone receptive to pollen
Cycas revoluta (King Sago)

Female cone shortly after pollination
**Cycas revoluta** (King Sago)

Female cone with ripe seeds in fall
Plant of *Cycas* sp. with fully developed seed on sporophylls.
Zamia floridana – The Florida Zamia or Coontie
The Florida Zamia or Coontie – how many species?

Zamia floridana, Z. umbrosa, Z. silvicola?
The Palatka Giant Zamia
Discovered in the Ocala National Forest
Zamia floridana – The Florida Zamia or Coontie

Male and female cones
Zamia floridana – The Florida Zamia or Coontie

Closeup of microsporophyll showing pollen sacs
Zamia floridana – The Florida Zamia or Coontie

Ripe seeds of Zamia floridana
Larvae of *Eumaeus atala* (Atala butterfly) feed only on leaves of Florida Zamia.
The stems of *Zamia floridana* are very toxic but were used for starch by indigenous peoples of America, who had detailed methods of preparation to remove poisons.
Some soldiers during the Civil War were poisoned due to improper preparation of the coontie flour, once produced and shipped out of the state as “Florida Arrowroot”
Cycad
Horticulture

Though many cycads are found in tropical zones, they generally don’t want to be overwatered; in habitat, they are in very well-drained soils with few exceptions.
Mature cycads grow new leaves periodically, in impressive flushes of up to 50 or more leaves at once. Some grow only once per year, but other species may produce leaves two or even three times.
Coning is a yearly event, and when female cones are pollinated, seed take from six to 18 months to develop. Once released from the plant, some are ready to germinate while others must ripen off the plant.
Not many plant groups serve in so many different landscape capacities; cycads can be foundation or specimen plants and can range from 8-10” tall to towering palmlike trees in excess of 40’ tall
Neutral to slightly acid soils are best for growing cycads
Cycad Horticulture

Seeds are slow to grow to mature sized plants, but exorbitant prices charged for many cycads make growing from seeds much more satisfying!
Cycads: Endangered Species

Most cycads are threatened or endangered; habitat destruction for pastureland or other development, as well as poaching of plants from the wild by hobbyists or commercial collectors is wiping out the world’s cycads.
Cycads: Where to See Them in the USA

Fairchild Botanical Garden (Miami, FL)
The Huntington Botanical Gardens (Pasadena, CA)
The New York Botanical Garden (New York, NY)
Lotusland (Santa Barbara, CA)
Cycads: Sources

The Cycad Society (www.cycad.org) or Google:

PACSOA (Palm & Cycad Soc. of Australia)
The Cycad Pages
The World List of Cycads