



Florida Coonties and Atala Butterflies¹

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Native plant enthusiasts have rediscovered the Florida coontie as a native plant well-adapted to our landscapes and increased use in landscapes has encouraged the presence of the rare Atala butterfly. Landscapers and homeowners can encourage either the plant or the butterfly by following the suggestions in this bulletin.

COONTIE RELATIVES

The coontie is an unusual Florida native that is a Cycad — a "living fossil." These primitive plants were a dominant form of plant life during the Dinosaur era. Other introduced cycads commonly grown in Florida are the Cardboard Palm/Mexican *Zamia* (*Zamia furfuraceae*), and the Sago "Palms," King Sago (*Cycas revoluta*) and Queen Sago (*Cycas circinalis*).

Coontie Species. Most botanists report only a single coontie species in Florida (*Zamia floridana*). Others feel the coontie is represented by several species. Subtle differences in appearance and range have been used by some taxonomists to delineate several species of coontie. *Zamia pumila* is used in the nursery trade as the botanical name for coontie, but this species is actually native to the Dominican Republic.

HABITAT AND RANGE

The coontie is a native to most of peninsular Florida, southeastern Georgia east of the Apalachicola River, and points south into the West Indies. The natural habitat is dominated by pines and well-drained sandy or loamy soils. USDA Hardiness zones for the coontie are between 8B and 11, which mean it should survive a minimum winter temperature of 15°F.

The coontie was once a common plant in Florida hammocks and pinelands, but because of intensive collection for starch production and landscape use, it is not commonly seen in the wild. It is on the Florida Commercially Exploited Plant list, which prohibits collection of the coontie from the wild.

DESCRIPTION

Foliage. This herbaceous plant looks like a small fern or palm, 1 to 3 feet high (Figure 1). It has stiff feather-like fronds, 3 feet long, that are attached to a thick shortened stem. New fronds uncurl from the top of this stem. The thickened underground root can be branched. Coontie fronds have slender 3- to 6-inch long leaflets attached like feathers along the stalk (rachis). The dark green leaflets are stiff and glossy.

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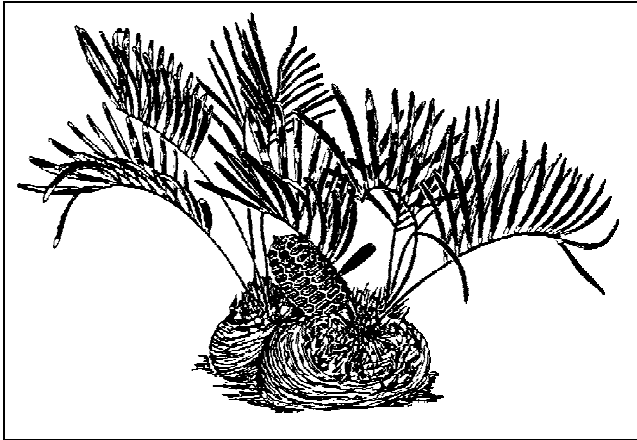


Figure 1. Coontie Plant.

Flowers and Fruit. This primitive plant has a dioecious habit: either female or male cones will grow from one individual plant. The sex of young plants cannot be determined until the cones form on the plant. Thin male cones are 3 to 7 inches tall and produce pollen. Upright female cones are about 6 inches tall and are scaly, brown, and covered with a velvety fuzz. At maturity, they will crumble open to reveal an angularly-shaped seed with an orange-red waxy coating.

NON-LANDSCAPE USES

Native Food Source. Spanish writings from the 16th century report that the original Native Americans removed the toxic chemical, cycasin, from the root by maceration and washing. They used the starchy residue to produce a staple bread that sustained them throughout most of the year. The Seminole Indians learned this process from the natives they displaced, and the common name "coontie" is derived from their phrase "conti hateka," meaning white root or white bread. Another name for the coontie is Seminole Bread. They also used the starchy root to make another dish called "sofkee stew."

Starch Industry. Early settlers in the Miami area learned the Seminole's technique of removing the toxic cycasin from the root to produce starch. In 1911, a Miami factory was extracting Florida Arrowroot starch from coonties.

Florist Greens. Florists sometimes use coontie fronds as greenery in floral arrangements. They provide tropical appeal and have the ability to last as a cut green.

LANDSCAPE CHARACTERISTICS AND USES

Because of its high drought tolerance and moderate salt tolerance, coonties are an excellent choice as a low maintenance landscape plant for coastal Florida. The coontie can be planted in a variety of light conditions, from deep shade to full sun. Well-drained soils are needed, and a small amount of organic material will benefit the coontie. It may be used as a specimen, a foundation planting, or as a massed planting as a ground cover. When used for ground cover, space the plants 12 to 20 inches apart. Do not plant them where foot traffic is likely to occur. Nursery grown plants are superior to those collected from the wild because the natural taproot is easily damaged when transplanted.

PROPAGATION

Seed Collection. Seed from the coontie are slow to germinate and when they do, the plant grows slowly. A nursery-raised plant may take five years to reach marketable size. This is why they are expensive and sometimes difficult to locate in nurseries. Established plantings provide seed for propagation. Artificial pollination may improve seed set because male and female cones may not be receptive at the same time. Successful germination is accomplished by collecting the crumbled female cones.

Seed Preparation. The orange-red fleshy covering, the sarotesta, must be removed as it contains germination inhibitors. Some nursery workers float the seed in water and pour off the floating non-viable seed. It has also been suggested that rattling seed may have reduced viability. To speed germination, the thick stony layer, the sclerotesta, may be scarified by mechanical means (e.g. filing) or by chemical treatment (one hour of sulfuric acid followed by two days of gibberellic acid to initiate embryo growth).

Planting. Seed are covered in a flat with a thin layer of soil. Within six weeks of sprouting, seedlings are transplanted to containers. Coonties with a single taproot often get potbound and are more difficult to become established in the landscape. To avoid the growth of a single taproot, this root may be cut soon after germination at the shoot junction. The cut is treated with 2000 ppm indolebutyric acid for five seconds. This will cause two or three primary roots to develop. Keep the media moist for two weeks to prevent drying out after moving seedlings into individual pots.

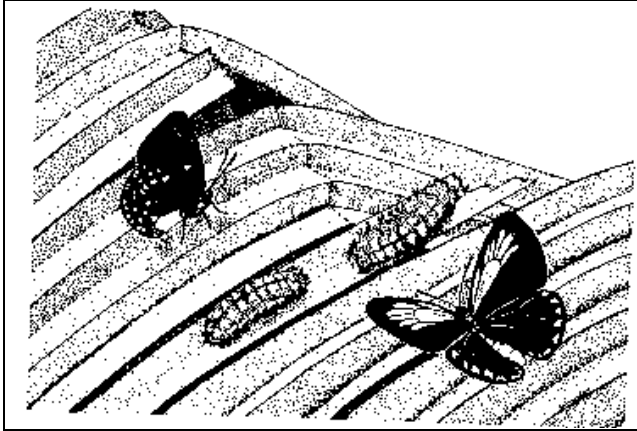


Figure 2. Atala butterfly and caterpillars.

Soil and Fertilizer. Natural conditions for coonties indicate a need for well drained soil. A successful soil-less media for container production has been suggested as follows: one part Metro-Mix 500 (W.R. Grace Co.) or similar mix, one part sharp sand, one part perlite, one part pine bark, plus 5 lbs. of Dolomite and 3 lbs. of Perk micronutrient per cubic yard.

Blue green algae are known to associate with surface (coralloid) roots of *Zamia*. They have the symbiotic ability to take nitrogen from the air and change it into nitrogen fertilizer sources. Using nitrate nitrogen reduces the effectiveness of these algae, while ammoniacal forms encourage the uptake of nitrogen into the cycads. In the wild, a soil pH of 6.0 or more has been noted in locations with dense healthy plants.

COONTIE PEST MANAGEMENT

Coonties are well-adapted to our Florida landscapes because they have adapted themselves to this environment over many millions of years. Weeds are best controlled by mulching around the plants to prevent turf or other plants from competing with this slow growing native. However, do not allow mulch to lay in contact with the crown, as this may encourage rot. Diseases have been noted in cases where excessive irrigation is supplied.

One of the very few significant insect pests common to coontie is Florida Red Scale (Plate 1). Mealy bugs also are found on landscape coonties (Plate 2). These insects will encourage the development of sooty mold (Plate 3). All of these pests can be controlled with insecticidal soaps or other contact insecticides. Check with your county

extension office for the latest chemical pesticide recommendations.

ATALA BUTTERFLY

An occasional insect found on the coontie is the larva of the Atala butterfly (*Eumaeus atala*), once thought to be extinct (Plate 4). This insect is able to withstand the natural toxins in coonties and in turn uses the toxins accumulated in its body as a measure against bird predation. The combination of brilliant coloration and toxin accumulation is called aposomatic protection.

Range. The Atala has been reported from Dade County north into Martin County. In 1993, it was sighted in St. Lucie and Indian River counties. The increased presence of Atala butterflies can be attributed to the increased use of coonties in the landscape and a series of mild winters.

Description. Caterpillars, or larva, (Plate 5) are orange-red with seven pairs of yellow spots running along the back (dorsal side), and will reach 1.25 inches long. Orange and brown pupae (chrysalises) hang from a sling under coontie leaflets, and are 1 inch long.

The adult butterfly (Figure 2) has a 1.5 inch wingspan, with its velvety wings roughly oval in shape. Wings are black with metallic blue spots on the underside of the hind wing arranged in three bands. Blue bands also occur on the top side of the hind wing. There is an orange-red spot on the underside of the hind wing adjacent to the abdomen, which also is orange-red in color. The head and thorax are black. Males have greenish patches on the front wing and top of the hind wing margins. Females have bluish patches across the top of the forewing.

Life Cycle. A single female may produce about 40 eggs. Eggs (Plate 6) are yellowish-white in color and are deposited on newly emerging fronds or the top end of mature leaflets. Eggs also have been found to be deposited on the female coontie cones. They are deposited singly or in clusters of 5 to 15 eggs.

Eggs will hatch in 4 to 5 days. At the first stage (instar), the larva measures 2.5 mm. Younger instars are found in groups, but often are solitary when they reach full size. Caterpillars are known to be cannibalistic, especially in captivity.

The larval period lasts approximately 18 days. At the end of this period, the caterpillar will stop feeding, remain stationary, hunch up and attach itself to the frond, and finally molt into the pupa (chrysalis) (Plate 7). The pupal stage lasts about 10 days, but is very temperature dependent. At the end of this stage, the light orange-tan color changes to dark brown. The outer shell becomes opaque just prior to adult butterfly emergence, which usually occurs in early morning hours.

The butterfly exhibits a weak erratic flight and travels close to the ground. Courtship and mating occur in late afternoon. Adults may live for as long as 10 days before dying.

All life stages have been observed in every month, so continuous activity is expected through all seasons of the year. Atala have survived a temperature of 29°F (-1.7°C). The number of larval instars and the number of broods produced in a year is not known.

LEGAL STATUS

At present, the Atala is not listed by federal or state authorities as an endangered species. The Atala is not on the Federal list because it was thought to be extinct in 1965 and Federal Listing was thus impossible. The U.S. Office of Endangered Species reviewed the Atala's status in 1975. Recommendations for state protection were proposed, but were not acted on.

While loss of coontie plants in the wild and habitat destruction may make this insect vulnerable to extinction, no special permit is required at this time for either control or collecting purposes.

ATALA CONTROL

Application of Pesticides. Some sites may experience high populations of Atala which can make coontie plantings unsightly. Voracious Atala larva can defoliate coonties in several weeks. While insect control may be desired in some locations, there is only minimal and temporary damage to the coontie plant from the Atala caterpillar.

Little research has been done to verify effective control of this caterpillar. Chemical insecticides may be effective based on their use on other caterpillars. Most caterpillars can be controlled by spraying with *Bacillus thuringiensis* (*B.t.*) products such as Dipel, Thuricide, etc. These are bacterial spores that

produce a toxin in the stomach of the caterpillar and provide specific control for nearly all forms of caterpillars. One trial showed no difference between different forms of *B.t.* products, but use of these materials did result in reduced Atala caterpillar populations.

Modern approaches to pest control suggest that a variety of pest control methods be used. The concept of Integrated Pest Management (IPM) is to use a variety of control measures to keep pest populations below acceptable levels of damage. Because of the unusual nature of the Atala butterfly, an IPM approach for this insect is suggested.

ATALA GARDENING

Relocation to Butterfly Gardens. When this insect causes unwanted damage to landscape coonties, an alternative to insecticidal applications can be attempted. Before the control is initiated, the Atala's eggs, larva or pupa may be relocated to another site. Butterfly gardeners can encourage the Atala but only at the expense of the coontie's appearance. Consider neighbors who may not wish their coonties to be chewed up. You may wish to contact botanical gardens, conservation groups or the County Extension office for assistance in relocating an unwanted colony or if you wish to establish the Atala as part of a butterfly garden.

Environmental requirements for the Atala. As the Atala is a neo-tropical butterfly, its range is limited by cold temperatures. Expect a killing frost to eliminate or reduce the population. Because cold temperatures are moderated by large bodies of water, successful sites in more northerly areas should be close to the ocean.

Larval food and nectar plants. While other cycads such as the newly emerging fronds from Mexican Zamia and Queen Sago have been shown to support the dietary needs of the Atala, the preferred caterpillar food is the young shoots of the coontie. One butterfly enthusiast (Anne Kilmer) suggested that 12 larva are needed to establish a colony on one plant and that 8 or more large coonties (12 to 16 inches tall) are needed for the Atala colony to survive.

The adult requires specific nectar plants. Known nectar plants have compound flowers with short tubular corollas. Plants identified as nectar sources for the Atala butterfly are listed in Table 1.

Table 1. Nectar Plants for the adult Atala Butterfly.

Botanical name	Common name(s)
<i>Bidens bipinnata</i>	Spanish Needles, Beggarticks
<i>Bucida buceras</i>	Black Olive
<i>Buddleia lindleyana</i>	Butterfly Bush
<i>Cnidoscolus chaymanense</i>	Chaya
<i>Cordia globosa</i>	Bloodberry
<i>Dombeya</i> spp.	Pink Powder Puff
<i>Eupatorium odoratum</i>	---
<i>Forestiera segregata</i>	Florida Privet
<i>Lantana</i> spp., esp. <i>L. involucrata</i>	Lantana
<i>Macadamia integrifolia</i>	Macadamia Nut
<i>Murraya koenigii</i>	Curry Tree
<i>Persea americana</i>	Avocado
<i>Psychotria nervosa</i>	Wild Coffee
<i>Randia aculeata</i>	White Indigo Berry
<i>Rhus copallina</i>	Winged Sumac
<i>Sabal palmetto</i>	Cabbage Palm
<i>Schinus terebinthifolius</i>	Brazilian Pepper Tree
<i>Schoepfia scheberi</i>	Whitewood
<i>Serenoa repens</i>	Saw-toothed Palmetto

There may be other environmental factors necessary for the survival of a colony. Successful relocation sites should be carefully evaluated for both natural conditions and the potential for human disturbance before relocation is begun.

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