

# Saw-palmetto: an Ecologically and Economically Important Native Palm <sup>1</sup>

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## Overview

Saw palmetto (*Serenoa repens*), also known as palmetto, is endemic to the southeastern United States, occurring as a major understory plant on poorly drained pine flatwoods, on well-drained scrubby flatwoods, and in sand pine (*Pinus clausa*) scrub. It can be found in every county in Florida. Saw palmetto distribution becomes sporadic in the northern part of its range which extends from Charleston County, South Carolina, to southern Mississippi (Hilmon 1968). This low-growing palm is recognized by the multiple, persistent leaves, or fronds, protruding from the terminal end of long, horizontal stems that occur at, or just below, ground level. The sharp, spine-like projections that often grow along the edges of the compressed leaf petiole give rise to the plant's common name. This petiole terminates at the edge of the leaf blade, but does not protrude into the leaf blade structure.

## Plant Description

Saw palmetto stems may be partially or completely underground and can reach 10 to 15 feet in total length. Typically, the stems lie prostrate at the

soil surface, but occasionally they grow upright and reach heights of 15 to 20 feet. Some stems begin to deteriorate at one end as new growth is produced from the apical meristem (bud) at the other end. Stem growth has been estimated to range from 0.04in/yr in southern Georgia to about 0.1 inches per year in central Florida. Using these estimates, some saw palmetto plants may be 500 to 700 years old. Roots are located on the ventral side of the stem and are concentrated near the growing end. Saw palmetto roots typically grow near the soil surface—within the first foot in most cases—but in well-drained, sandy soils, roots may extend down several feet.

Approximately 3 to 7 leaves are produced every year and remain alive on the plant for about 2 years. Mature leaves are palmate shaped and range in size from 1.5 to 3 feet wide. The sinuses between veins are split towards the outer edges of the leaves. Leaf color is green throughout most of its range except along Florida's east coast where leaves can be a light, bluish green. Dead leaves remain on the plant for a year or more, are extremely flammable, and make fuel that increases this plant's ability to support a fire. After burning, new leaf tissue emerges within a week.

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During spring, saw palmetto plants produce one to three prominent clusters (spadix) of many white flowers, and fruit matures during summer. Individual plants may flower throughout the year, but their fruit seldom matures when flowering occurs outside of the normal spring period. These flowers are insect-pollinated and are used extensively by honey bees. The fruit is a single-seeded drupe that is surrounded by a fleshy pulp. As ripening occurs, fruits change color from green (May–June) to yellow (mid-August), to orange (September), and then to bluish-black (September–October) when ripe. Fruit production can be variable over the years. The number of seeds per plant varies between 100 and 500 in mid- to late-June. Seed production decreases rapidly until mid-October when no fruits remain on the plants (Hilmon 1968).

Seed germination in the lab averaged about 55% (Hilmon 1968). Germination began 45 days after planting, but optimal rates of germination were observed 4.5 to 6 months after planting. Germination of seeds planted in the field near Arcadia, Florida, averaged just 19.5% after 15 months. Shoots emerged from the soil 30 to 60 days after seed germination. Seed germination may be enhanced after passing through animal digestive systems. Longevity of seed viability is not known.

### Associated Plants

On the dry prairie grasslands and cut-over pine flatwoods of south Florida, saw palmetto often is the dominant woody plant. This species may also occur as a co-dominant with several oak species on scrubby flatwoods sites. It is theorized that infrequent burning and/or burning outside the growing season has allowed this species to become denser throughout much of its range than was described by early European explorers. Also, extensive drainage projects throughout south Florida may have promoted saw palmetto expansion. Other woody plants that commonly occur with saw palmetto are gallberry (*Ilex glabra*), wax myrtle (*Myrica cerifera*), staggerbush (*Lyonia ferruginea*), and runner oaks (*Quercus spp.*). Commonly associated herbaceous plants include wiregrass (*Aristida beyrichiana*), several bluestem species (*Andropogon spp.*), lop-sided indiangrass (*Sorghastrum secundum*), and numerous forbs.

From south Florida to the northern extent of saw palmettos range, this plant can become the major woody species in the understory beneath canopies of slash pine (*Pinus elliottii*) and longleaf pine (*P. palustris*). Regardless of the region, plant associates of saw palmetto are adapted to frequent growing-season fires, and can withstand periodic drought and flooded conditions.

### Ecological Importance

Many species of wildlife use saw palmetto for nesting, protective cover, and as a food source. The endangered Florida grasshopper sparrow (*Ammodramus savannarum*) places its nests in association with palmetto, and the Florida panther prefers this plant for both day rest sites and natal dens. The labyrinth of stems often is used for structural support for ground-nesting rodents such as the Florida woodrat (*Neotoma floridana*). Wild turkey (*Meleagris gallopavo*) is known to use palmetto as nesting cover, and white-tailed deer (*Odocoileus virginiana*) will use it as escape cover when pursued, or as bedding cover on the leeward side of clumps during windy, cold winter days.

Various parts of the plant are eaten by a wide variety of animals. The apical meristem material (or heart) is physically extracted and consumed by black bears (*Ursus americanus*) and feral pigs (*Sus scrofa*). They accomplish this by grasping the newest leaves in their mouths and pulling them out, after which they consume the bases. Feral pigs readily forage in this manner on fresh re-growth after a fire. Such herbivory will often cause adventitious sprouting and branching of individual plants. Cattle will forage on the fronds during the winter, especially when fed supplements containing urea-based nitrogen compounds, such as molasses. Although palatability of the fronds is low (<30% digestible), phosphorous content is relatively high for a native flatwoods species. Many species of insects forage on the fleshy pulp of the fruit while it's on the plant or after it falls onto the ground.

Several species of wildlife seek out the fruit as excellent sources of oils and carbohydrates. Black bears have been documented to forsake established home ranges in favor of areas containing large stands of saw palmetto during late summer when the fruit is ripe. At times, bears also have been known to engorge

themselves on the fruit. A road-killed adult female bear in the Ocala National Forest was found to have over 30 lbs. of palmetto fruit in her stomach. White-tailed deer and other mid-sized mammals, including the raccoon (*Procyon lotor*), opossum (*Dasypus novemcinctus*), and gray fox (*Urocyon argenteus*) readily consume the fruit. All of these species serve as seed dispersal agents because the seeds pass through their digestive systems and are distributed in feces throughout the landscape.

### Management and Use

As Europeans occupied Florida and the southeastern region of the United States, saw palmetto presented itself as an obstacle to establishing crop fields, pastures, and homesites. The plant is adapted to fire, so simply burning areas did not remove it: the plant had to be physically eradicated from the areas being converted to other uses. Various pieces of equipment were developed to assist in this process. The web plow and heavy duty discs were used to kill the plant (Tanner *et al.* 1985), but the remains of the stems had to be raked into piles and burned. Ranchers wanting to reduce the competition with native forage grasses, or foresters preparing a site to re-plant pine trees, used roller-drum choppers pulled behind rubber-tired tractors or caterpillars to crush the palmetto and temporarily reduce the foliar cover of the plant (results lasted from 4 to 6 years).

More recently, use of native plant species for landscaping has become popular, and saw palmetto is one of the plants people are interested in using. However, landscapers have found it difficult to transplant this species from the wild and have it survive. Consequently, nurseries specializing in native species have begun to raise plants from seed to supply market demand. Saw palmetto is naturally drought- and insect-resistant. It requires no fertilizer and is a perfect plant for enviroscaping.

The fruit of saw palmetto has been eaten by humans for centuries. Hale (1898) speculated that palmetto fruit was a staple food item for the aborigines in Florida, although the taste is reported to be repugnant. The medicinal value of the fruit has been described in scientific literature since the 1800s. Hale (1898) described tinctures of the fruits and

crushed seeds being used for relief of prostate gland swelling and also possessing various aphrodisiac qualities. Permixon, a pharmaceutical extract of saw palmetto fruit, possesses antiandrogenic activity that significantly improves symptoms of human benign prostatic hypertrophy (Sultan *et al.* 1984, Di Silverio *et al.* 1992). Commercialization of the fruit has been active for several decades at least. Hilmon (1968) described an advertiser in southern Georgia wanting to purchase 40,000 to 50,000lb of dried fruit in 1961 for \$0.12/lb. The fruits were being processed and resold to wholesale drug manufactures.

In 1995, the economic value of saw palmetto fruit made the news when the price for raw fruit exceeded \$3/lb. Thus, a plant that had been viewed as a pest promises to add economic value to the landscape. The current demand for the fruit by pharmaceutical companies is projected to remain strong. Saw-palmetto-based products are also sold in health food stores. Today, just as it was a century ago, the fruit is processed for treatment of prostate gland swelling.

### Managing Fruit Production

Saw palmettos must be at least 1.9 feet in height to flower and in native stands saw palmettos usually take about a decade to reach this height (Carrington *et al.* 2000). The probability of flowering increases with plant height once the saw palmetto plant reaches a height of 1.9 feet. Number of inflorescences generally ranges from 2–3 per ramet but only a few flowers set fruit (Carrington *et al.* 2000). Fruit yields typically average around 178 pounds per acre, but yields can vary from 89 pounds per acre to 1335 pounds per acre. Under natural conditions it appears that saw palmettos fruit heavily every 2–4 years, though Smith (1972) reported good fruiting in 5 of 20 years. One explanation for this high variability may be related to depletion of plant carbohydrate levels in the plant following heavy fruiting events.

Saw palmetto is a fire-adapted plant native to habitats that are subject to periodic burning. Hilmon (1968) tagged 20 plants that had not been burned in four years and followed flowering and fruit production for the next six years. The number of fruit per plant was approximately 400 in 1961, 1963, and 1964. In 1960, and 1965, only 100 fruit were

produced per plant, and no fruit were produced in 1962 even though 45% of the marked plants flowered. Fruit production was sporadic during the first four years following fire. This response may be related to reduced carbohydrate levels in plants following fire. It took approximately four years following a winter fire (time for maximum stored carbohydrate level) for carbohydrates to reach pre-burn levels in the stems. Plants burned on alternate years seldom produced fruit, though flowering occurred in the spring following the burns. Mr. Ralph Hughes, range scientist for the Southeastern Forest Experiment Station in Tifton, Georgia, indicated to J.B. Hilmon that palmettos in south Georgia did not consistently set seed unless they were protected from fire for 5–10 years.

Burning at any time of the year stimulates flowering within 1 year of the fire (Carrington et al. 2000). Though there will be an increase in flowering during the year following a burn, flowering will be reduced for several years afterwards (Abrahamson 1999). Prescribed burning is the most cost-effective land management practice for control of saw palmetto. However, to optimize flowering and fruit production land owners should burn once every 5–8 years (Carrington et al. 2000). Ranchers in south Florida typically perform a winter-season burn of rangeland containing saw palmettos every 3 to 4 years in order to reduce canopy coverage of the saw palmettos and to promote growth of desirable herbaceous plants. This burning frequency results in modest fruit production so that ranchers have berries to harvest. Landowners that sell saw palmetto fruits can expect a return of \$91–\$185 per acre (151–303 pounds per acre harvested fruit), which compares favorably to income from the production of beef cattle on native rangelands (Carrington et al. 2000). Flowering and fruiting can be negatively affected by either the cabbage palm caterpillar or by anthracnose (*Colletotrichum* spp.). The caterpillar can feed on emerging saw palmetto inflorescences while the anthracnose can cause fruit rot and premature drop (Carrington et al. 2001). Other pests may affect fruit yields, but additional research is needed.

**Cautionary Note:** Landowners wanting to manage for game and/or nongame wildlife populations on their property may not want to harvest

*all the saw palmetto fruit produced each year. Most omnivorous wildlife species seek out the fruit whenever it is available. It is presently unknown what effect total removal of these fruit year after year may have on the resident wildlife populations that inhabit the property.*

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