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CPC National Collection Plant Profile

Asimina tetramera

Family: Annonaceae
Common Name: four-petal pawpaw
Author: Small
Growth Habit: Shrub
CPC Number: 315

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Asimina tetramera is **Not Sponsored**

Primary custodian for this plant in the CPC National Collection of Endangered Plants is:

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Anne C. Cox contributed to this Plant Profile.

Asimina tetramera

The four-petal pawpaw, *Asimina tetramera*, is an aromatic shrub or small tree in the Annonaceae family. Another species shares the common name of pawpaw with this plant, and that is the papaya (*Carica papaya*), a well known tropical fruit that is in the Caricaceae family. *Asimina tetramera* is limited to sand pine scrub habitats in Martin and Palm Beach Counties on the Atlantic Coastal Ridge in southeast Florida. Habitat loss and fragmentation have lead to a small number of remaining individuals, questionable reproductive success, narrow endemism, and escalating pressure on public and private land use, all of which are reasons why this species was listed as federally endangered in 1986 (Moyroud 1985). The four-petal pawpaw may never have been abundant within the range.

Research and Management Summary:

Flowering occurs from late March through July and may be extended into fall if the habitat is burned in the spring (Roberts and Cox 2000). Flowers are cream colored turning dark maroon, or rarely yellow, as they mature. Beetles are the primary pollinators, although flies and wasps also visit flowers (Cox 1998). The oblong greenish-yellow fruits develop late in the summer. Fruit are eaten by raccoons, gopher tortoise, and mice. Seeds are dispersed near the parent plant.

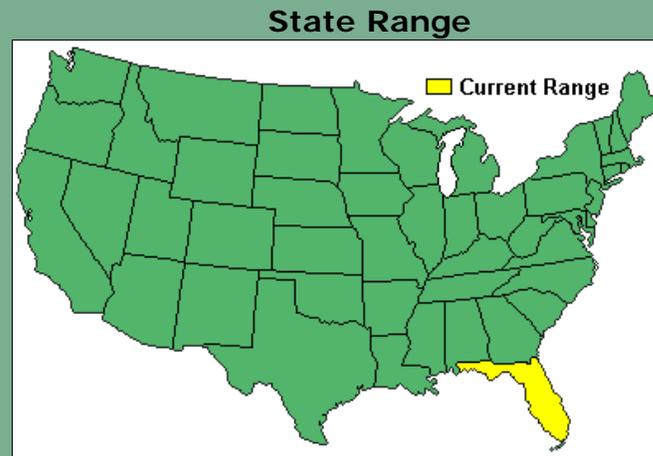
Plant Description:

Grows up to three meters tall, with one to many stems arising from an underground stem with a deep taproot (Small 1926 & 1933, Kral 1960, USFWS 1999). This perennial shrub is fire adapted, resprouting quickly after a fire, producing numerous flowers and fruit. Recruitment primarily occurs following infrequent fire (20-100 years), but may occur intermittently during the long fire-free intervals (Cox Personal Communication).

Distribution & Occurrence

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Florida



Habitat

Asimina tetramera inhabits sand pine scrub and open scrub on excessively drained sands of Pleistocene dunes. The plants appear to be restricted within sites to elevations between 15-35 feet above mean sea level. Originally thought to be intolerant of heavy shade (Kral 1983), plants may persist under the canopy of pines and in dense oaks and palmettos until the overstory is removed by fire or mechanical means (Roberts and Cox 2000).

Distribution

Populations are found in three disjunct areas of southeast Florida: northern Martin County near Jensen Beach, southern Martin County in Jonathan Dickinson State Park (JDSP), and northern Palm Beach County, north of PGA Blvd.

Number Left

Ten of 17 (59%) sites are protected. Only two of six (33%) sites in Martin County are in state ownership, managed by the Florida Department of Environmental Protection. In Palm Beach County, eight of the 11 (72%) sites are protected: six sites are owned and managed by County Departments, one is privately protected by Florida Power and Light Co., and one is owned by the U.S. Coast Guard.

Approximately 950 plants and 400 seedlings, naturally occurring and planted, are known to exist on the 17 sites (FNAI 2001, Cox Personal Communication). In 1988, Florida Natural Areas Inventory conducted an extensive survey, locating 792 individuals on 16 sites (Johnson 1989). These numbers are the result of systematic inventories conducted since the first surveys in 1978. In 1978, only 110 plants were recorded from two sites in Martin County, and populations in Palm Beach County were thought to be extirpated (Austin and Tatje 1979, Austin et al. 1980).

Currently, 89% (281/315) of the plants in Martin County survive in the two protected sites and the remaining plants (79) in private ownership are in decline. Similarly, 87% (547/636) of the plants in Palm Beach County are intact and the remainder are disappearing because of development (Cox, Personal Communication).

Protection

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Global Rank:	G1	2/29/2000	Guide to Global Ranks
Federal Status:	LE	10/24/1996	Guide to Federal Status
Recovery Plan:	Yes	4/5/1988	

State/Area Protection

State/Area	Rank	Status	Date
Florida	S1	LE	4/1/1998

Conservation, Ecology & Research

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Ecological Relationships

- Plants in mature scrub with a closed sand pine canopy may show reduced flowering and fruit set (USFWS 1988); yet produce flowers and fruit at low frequencies.
- Plants may persist for long periods of time, perhaps hundreds of years (Johnson, Personal Communication), remaining in a vegetative state until a natural disturbance such as a tree-fall, hurricane, or fire removes the canopy (Cox 1998).
- A mosaic of mature and recently burned sand pine scrub may be necessary for seed germination and recruitment, as patches of mature scrub may provide refuge for small animals that disperse seeds (Cox 1998).
- Abundance of insect pollinators may be related to the size of the intact scrub habitat, the proximity to development, and the activities associated with urbanization. Pesticides used to curb mosquito and other pest insects may have an adverse effect on pollination, fruit set, and ultimately recruitment (Cox 1998).

Threats

- Habitat destruction
- Habitat fragmentation and small habitat size
- Improper management practices, for example, using mechanical methods instead of burning
- Fire suppression
- Prescribed fire in the dormant season (September to February)
- Genetic variability decrease in small populations
- Pesticide use in urban areas may decrease insect pollinators
- Lack of recruitment in the native scrub habitat in residential areas appears to be a major concern. In open habitats with little or no sand pine canopy, plants are producing abundant flowers and setting fruit, but the fruit fall to the ground and dry without the seeds being dispersed. Perhaps the animal populations in these residential areas have diminished or sufficient plant cover is not available as a refuge from larger predators or domestic animals.

Current Research Summary

- A demographic study is being conducted on 157 plants at Jonathan Dickinson State Park (Cox in progress 2002).
- A pilot study examines cross pollination, seed germination, and seedling establishment to increase the population size at Hawks Bluff in Martin County (Cox and Shropshire in progress 2001).
- Factors affecting micropropagation of *Asimina tetramera*, an endangered Florida Scrub species, is in progress at The Cincinnati Zoo and Botanical Garden, Cincinnati, OH (Pence in progress 2002).
- A phylogenetic study has been proposed at the University of Florida (in progress 2002)
- *Asimina tetramera* planted in 1988 are being monitored for flowering, fruit set, and seedling establishment at Bok Tower Gardens, Lake Wales, FL. Studies include seed germination, viability and nursery propagation techniques.

Current Management Summary

- The Jonathan Dickinson State Park population burned in 1996 & is monitored every six years.
- Palm Beach County sites are monitored at one to two year intervals and after prescribed fire. Several sites have been burned.

Research Management Needs

- Determine the genetic variability among and within populations
- Increase populations on public and conservation lands through cross pollination experiments with nearby genetically diverse populations.
- Conduct demographic studies to determine population stability, increase, and decline.
- Establish demographic monitoring protocol as a management tool. Population monitoring guidelines, relative to various habitat management practices for sand pine scrub habitat and *Asimina tetramera*, have not been established and are not available to land managers. This should be a priority for recovery of this species.
- Conduct population viability and risk assessment analyses to determine number of plants, sites, populations and spatial distribution (USFWS 1999).
- Augment existing populations with seeds from existing plants or through cross pollination with nearby populations.
- Determine habitat management requirements for declining populations and develop management guidelines.

Ex Situ Needs

- Collect seeds from each population in the wild and bring into cultivation at Bok Tower Garden for reintroduction in the event of native population destruction.
- Collect seeds periodically from native populations to establish populations for study and as seed sources for reintroductions.

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