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PRESERVING FLORIDA'S AND THE NATION'S ENDANGERED PLANTS

JONATHAN A. SHAW
Bok Tower Gardens
Post Office Drawer 3810
Lake Wales, Florida 33859-3810

FRANCIS R. THIBODEAU
The Center for Plant Conservation
125 The Arborway
Jamaica Plain, Massachusetts 02130

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Abstract. A national Center for Plant Conservation has been established to coordinate a permanent, comprehensive, systematic, and accessible living collection of rare and endangered plants native to the United States. Through the use of this collection, the Center and participating institutions also promote botanical research, public education, and distribution of plant material. All of these objectives are intended to further conservation of the American flora and to serve as a complement to the preservation of the species' natural habitat. This is the first time on a national level that endangered plants of the United States will be brought into cultivation. Two Florida gardens, Bok Tower Gardens and Fairchild Tropical Gardens, are participating institutions. They will be maintaining living, regional collections on a permanent basis. Their collections will serve as a major resource for public education, garden ornamentals, and as a potential gene pool for medicine and food.

The Center for Plant Conservation is a network of botanic gardens and arboreta for the conservation of endangered American plants. The goal is a nationally coordinated program of plant conservation which will encompass species selection, permitting, field collection, propagation, establishing permanent collections, seed storage, and data

management. This program is part of an emerging national consensus of the need to protect rare and endangered plants native to the United States through *ex situ* conservation (e.g., seed storage, cultivation in living collections) as a complement to *in situ* conservation (e.g., nature preserves, wilderness areas).

Three thousand plant species native to the United States are threatened or endangered (1). Fewer than 10% are known in cultivation despite strong recommendations by the National Academy of Sciences (2), among others, that the creation of a national system of repositories for vulnerable germ plasm is vital for research, habitat management, and public information. Ward (3) lists 168 plant species as endangered, threatened or rare in Florida, and the Center comprehensively lists a total of 220 plant species as endangered, threatened or rare in Florida.

Eighteen gardens (Table 1) are currently affiliated with the Center as participating institutions in all of the 14 biogeographic zones of the United States (Fig. 1). The Center itself is an independent organization incorporated in 1984, funded by gifts and grants, and governed by a Board of Trustees. Scientists and staff from the U.S. Office of Endangered Species, the Smithsonian Institution, The Nature Conservancy, and the American Association of Botanical Gardens and Arboreta form an advisory council to direct activity. The long-term program of the Center as coordinated by the Center and carried out by the participating institutions is to 1) maintain a permanent, well-documented and accessible living collection of U.S. endangered plants supported by the necessary research, storage and propagation facilities; 2) assist preservation in the wild and reintroduction efforts by providing research support, propagation facilities, and a source of live plant material; 3) supply live plants for research and agricultural, medicinal, horticultural and botanical sciences; and 4) increase public awareness of the utility, fragility and beauty of the endangered American flora.

Table 1. Botanic gardens and arboreta currently participating with the Center for Plant Conservation for the conservation of endangered American plants.

Arnold Arboretum	Jamaica Plain, Massachusetts
Berry Botanic Garden	Portland, Oregon
Bok Tower Gardens	Lake Wales, Florida
Denver Botanic Gardens	Denver, Colorado
Desert Botanical Garden	Phoenix, Arizona
Fairchild Tropical Garden	Miami, Florida
Garden in the Woods	Framingham, Massachusetts
Holden Arboretum	Mentor, Ohio
Missouri Botanical Garden	St. Louis, Missouri
Nebraska Statewide Arboretum	Lincoln, Nebraska
New York Botanical Garden	Bronx, New York
North Carolina Botanical Garden	Chapel Hill, North Carolina
Pacific Tropical Botanical Garden	Kauai, Hawaii
Rancho Santa Ana Botanic Garden	Claremont, California
San Antonio Botanical Center	San Antonio, Texas
State Arboretum of Utah	Salt Lake City, Utah
Transition Zone Horticultural Institute	Flagstaff, Arizona
Waimea Arboretum and Botanical Garden	Haleiwa, Hawaii

In order to select the species for cultivation in the participating gardens, the Center's data bank has been coordinated with the listings maintained by The Nature Conservancy, the Smithsonian Institution, and the United States Fish and Wildlife Service, and data from the participating institutions are currently being added to this bank. As the system matures, it will become increasingly possible for conservation efforts to shift from a reactive and oppor-

tunistic acquisition mode (which characterizes most current preservation efforts) to a capability for calculated intervention based on the most complete information available.

The primary criteria for species acquisition then will be the imminence of extinction in the wild assessed as a function of both rarity and probable future rate of decline. Priority will be given in the following order: 1) endangered throughout the range of the taxon, 2) threatened throughout the range of the taxon, and 3) rare throughout the range of the taxon.

Within these groups, priority will be given to taxa for which *ex situ* conservation will most significantly enhance the effectiveness of a full conservation strategy. Full species will be given preference over taxonomic subspecies and varieties, and preference will be given to taxa for which it is likely that the means available to the participating institutions will make it feasible to maintain a core collection of living material.

At the present time it is not clear what numbers of genetically different individuals of a given species will be required for effective *ex situ* management. However, the Center now has in draft form for review by the participating institutions and the advisory council a strategy for collection and *ex situ* management that should minimize the loss of genetic diversity.

The creation of a living national collection of endangered species is the hub of the Center's work. The living collections will offer the nation's horticulturists, scientists and the public an unprecedented opportunity to

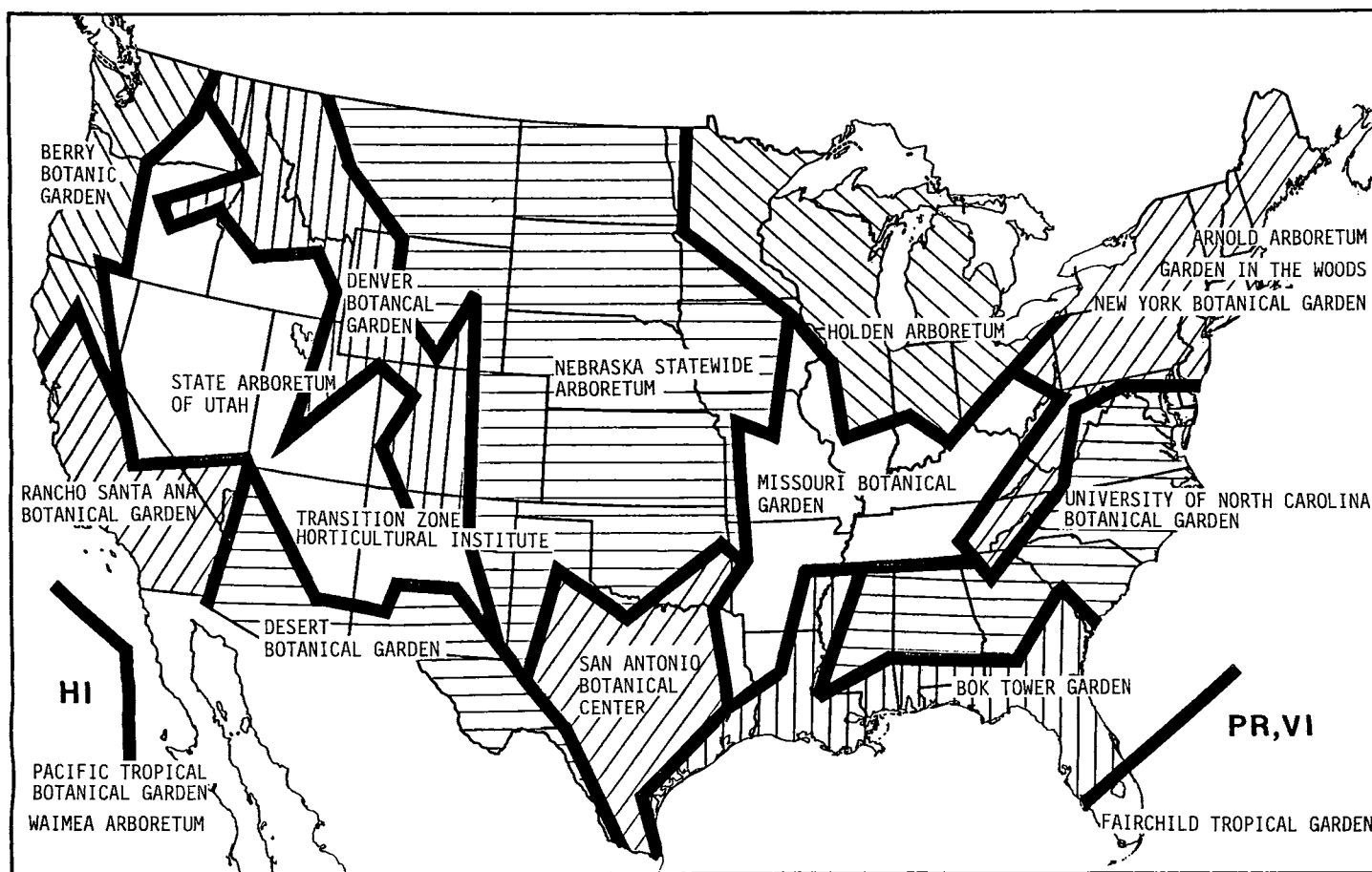


Fig. 1. Distribution of participating botanic gardens and arboreta in the 14 biographic zones of the United States.

examine many of the planet's rarest life forms first-hand. Although this will be a national collection, the holdings themselves will not be centralized. The collections will be maintained in the participating institutions around the country in climates similar to those they encounter in the wild. Because it will be coordinated by the Center, information sharing and decision making is expected to be organized consistently and efficiently while the actual cultivation of the plants will take place at the most appropriate sites around the nation. The participating institutions and any additional institutions affiliated with them will focus on regionally viable species. This focus will result in 1) greatly reduced costs for maintenance; 2) reduced vulnerability to support service interruptions, power failures, and water shortages; 3) maintenance of hardy genotypes, exposed to a climate in which the natural populations live; and 4) educational value in enhancing an understanding of the regional flora.

Bok Tower Gardens and Fairchild Tropical Gardens are participating institutions. They will be maintaining living regional collections on a permanent basis. Their collections will serve as a major resource for public education, garden ornamentals and as a potential gene pool for medicine and food.

As required by the Center, the Board of Directors of each of these nonprofit institutions approved in May, 1985, their institutional participation in the Center for Plant Conservation.

Bok Tower Gardens has been concerned with the conservation of Florida fauna and flora since its founding in 1929. Currently, Bok Tower Gardens has 11 species under cultivation that are on the Center for Plant Conservation's list of rare and endangered Florida plant species. These include: *Calamintha ashei*, *Chionanthus pygmaeus*, *Dicerandra cornutissima*, *Dicerandra frutescens*, *Dicerandra immaculata*, *Illicium parviflorum*, *Magnolia ashei*, *Prunus geniculata*, *Rhododendron austrinum*, *Taxus floridana*, and *Torreya taxifolia*.

Since Bok Tower Gardens has only recently begun a formal program to conserve endangered plants, most of the specimens of these species are immature or not well established. It should be noted that Bok Tower Gardens is

not a research institution, but has as part of its mission the conservation of Florida's endangered flora, both *ex situ* and *in situ*, and is currently managing the 4,000-acre Tiger Creek Nature Preserve in Polk County on behalf of The Nature Conservancy.

Fairchild Tropical Gardens has 25 species currently under cultivation that are on The Center for Plant Conservation's list of rare and endangered species for its biogeographic area. Thirteen of these are Florida natives and include: *Amorpha crenulata*, *Cereus eriphorus* var. *fragrans*, *Cereus robinii*, *Coccothrinax argentata*, *Comelina gigas*, *Forestiera segregata* var. *pinetorum*, *Hypelate trifoliata*, *Opuntia triacantha*, *Peperomia floridana*, *Pseudophoenix sargentii*, *Roystonia elata*, *Torreya taxifolia*, and *Tripsacum floridanum*. The other species are from Puerto Rico and the Virgin Islands.

The living collections of endangered species of Bok Tower Gardens and Fairchild Tropical Gardens will be increasing in the future and will serve not only as a resource for public education and as a potential gene pool, but will also become a source for garden ornamentals.

Such endangered Florida species as *Chionanthus pygmaeus*, the Pygmy Fringe Tree, may well become common in cultivation. Not only are the flowers of this particular species highly ornamental, but the species is well adapted to the excessively drained, sandy soils of much of Florida. As Florida's population increases and water crises become more frequent, this and other species of water-conserving plants may well come into prominence as ornamentals and become the first proof, although in all likelihood not the last, of the direct societal benefit of the conservation of Florida's endangered plants.

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INTRODUCING NATIVE FLORIDA SHRUBS FOR LANDSCAPING

NANCY J. BISSETT

The Natives

P.O. Box 1797

Winter Haven, Florida 33882

WILLIAM F. BISSETT

Landscape Architect

P.O. Box 1797

Winter Haven, Florida 33882

Abstract. Though many Florida native trees have long been familiar to us, only a few of Florida's native shrubs have been commercially grown and regularly used for landscaping until the last few years. A new environmental awareness has encouraged growers to take a second look at the wide variety

of native shrubs that could be cultivated. This synopsis reviews the basic characteristics of the shrubs such as family relationships, size and form, color, ecosystem membership, growth, range, cultural notes, and successful propagation techniques. The list was compiled with a geographical emphasis for central Florida though the range of most of these shrubs is much greater.

Florida's early horticulturists were intrigued by our native vegetation and put much effort into bringing it into cultivation. Dr. Henry Nehrling grew and described a large number of native plants including *Zamia pumila*, L., coontie, and *Befaria racemosa*, Vent., tarflower. Frederick Law Olmsted, Jr. designated up to half of the plantings at Bok Tower Gardens and Pineland (the nearby home) for native