



Palmetto





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To provide funds that will enable us to protect Florida's native plant heritage, please join or renew at the highest level you can afford.

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The purpose of the Florida Native Plant Society

is to conserve, preserve, and restore the native plants and native plant communities of Florida.

Official definition of native plant:

For most purposes, the phrase Florida native plant refers to those species occurring within the state boundaries prior to European contact, according to the best available scientific and historical documentation. More specifically, it includes those species understood as indigenous, occurring in natural associations in habitats that existed prior to significant human impacts and alterations of the landscape.

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Features

4 State Parks Benefit From Native Plant Expertise

The Florida Native Plant Society is a valuable partner in preserving natural state park landscapes, and last year, FNPS volunteers served on 100 percent of state land management review panels. *Article by Eric Draper.*

6 Books of Note: *The Nature of Plants*

Craig Huegel's new book brings to light the complex ways plants live and interact with their environment. Not only does the book discuss topics like growth and reproduction, it includes real-life examples from Craig's own gardening experiences to increase understanding of what plants need to thrive. *Review by Ginny Stibolt.*

8 The False Rosemaries of Florida

In the southeastern United States, the genus *Conradina* is comprised of 7 species, each occupying a distinct geographic range, and 5 of these species are endemic to Florida. *Conradina* species are photogenic, attractive to pollinators and sun-loving, however, all but one species are listed as endangered. *Article by Todd Angel, Hanna Rosner Katz and Michael Jenkins.*

14 Building Chapter Success

Challenged to survive a change of venue and answer the call to increase membership, the Martin County Chapter grew by 65% through enhanced communications, vigorous outreach, strong mission-focused programs, and the friendliest meetings in town. *Article by Linda Eastman.*

Palmetto

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Editorial Content

We welcome articles on native plant species and related conservation topics, as well as high-quality botanical illustrations and photographs. Contact the editor for guidelines, deadlines and other information.

ON THE COVER: *Conradina brevifolia* (short-leaved false rosemary) is endemic to the white sand scrub habitat of the mid- to lower Lake Wales Ridge in Polk, Highlands, and Osceola Counties. Photo by Mike Jenkins, Florida Forest Service.

Climate, Speciation, Rarity, and Beauty: The False Rosemaries of Florida

By Todd Angel, Hanna Rosner Katz and Michael Jenkins



Conradina brevifolia. Photo by Mike Jenkins, Florida Forest Service.

This article is dedicated to Dr. Mark Whitten, researcher at the University of Florida Herbarium. Mark passed away this spring and will be missed by his fellow botanists worldwide. He contributed to research in orchid pollination biology, plant genetics, and was a long-time, active FNPS member. He was extremely generous with his time, effort, and knowledge.

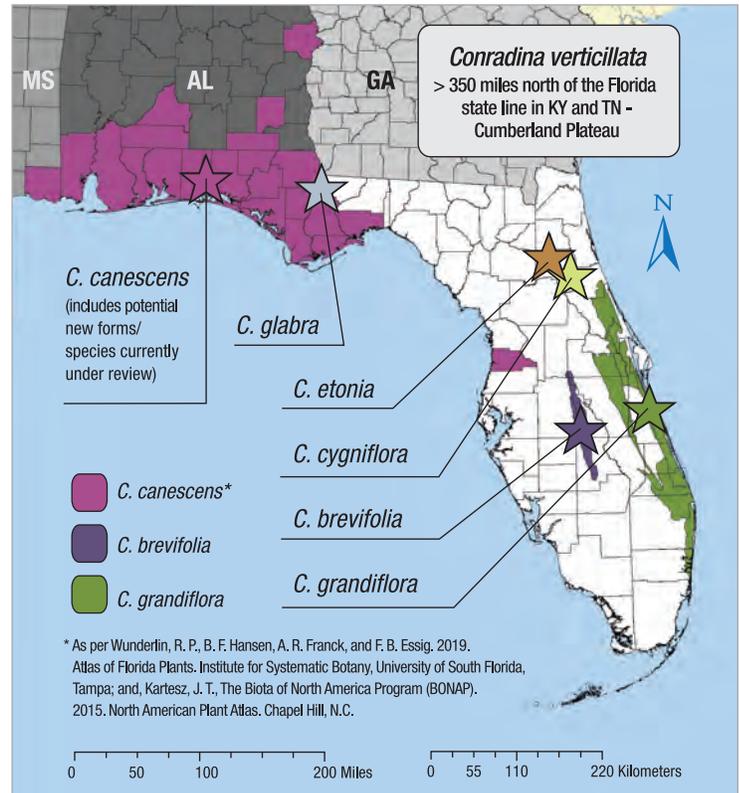
The North American Coastal Plain (Noss, 2015) is identified as a global biodiversity hotspot. This region contains over 6,200 native vascular plant taxa and over 1,800 endemic plant species. Florida contributes extensively to this endemic-rich region with close to 300 recognized endemic species. Ancient upland ridges throughout Florida, with their associated sandhill and scrub communities, harbor a number of narrow-range, endemic plant species that are vulnerable to extinction due to their small range and specific habitat requirements. These ridges are remnant “islands” of once widespread habitat types that existed during the last glacial maximum. As climate changed and these habitat islands became more restricted and isolated, species evolved within specific geographic ranges.

In Florida, endemic plants with specific geographic ranges are well represented in the Mint Family (Lamiaceae). Out of the ~6,800 mint species worldwide (Christenhusz et al., 2017), ~130 mint species are found in Florida (Weakley, 2019). Twenty-five rare Florida mint species are protected by the federal government (9 species) and the state (24 species) or tracked by the Florida Natural Areas Inventory (23 species). Of these, 13 are Florida endemics.

Mints are a charismatic family of plants, cherished by plant enthusiasts. Why do the mints have so much interest? Is it because of their beauty, being super-photogenic with their bilateral symmetry, elaborate anthers, stamens, stigmas, and coloration of their showy corollas? Is it the numerous flower visitors and pollinators attracted to their nectar guides? Is it that they are somewhat easy to grow and provide a showy sub-shrub for xeric plantings? Is it their enticing and relaxing smell and taste? Is it that they can flavor teas and dishes or be used in essential oils and even bug repellents? Yes!

Yes, and this is especially true for a group of mints in the “Southeastern Scrub Mint Clade”. This beloved group is made up of 5 very closely related genera: *Piloblephis*, *Stachydeoma*, *Dicerandra*, *Conradina*, and the southeastern U.S. members of the genus *Clinopodium* (species formerly placed in *Calamintha*) (Edwards et al., 2009, Edwards et al., 2008).

Here we focus on *Conradina*, a southeastern U.S. endemic genus comprising seven peripatric species, each occupying a “distinct geographic range” (Edwards et al., 2008). The common name of the species, false rosemaries, denotes their distinction from the culinary herb rosemary of the mint genus *Rosmarinus*, also placed in the genus *Salvia*. Five of the *Conradina* species are endemic to Florida; *C. brevifolia*, *C. cygniflora*, *C. etonia*, *C. glabra*, and *C. grandiflora*. *Conradina canescens* is found in the mid-to southern portions of the western Florida Panhandle (with an interesting collection from Hernando County) and into southern Alabama and extreme southeastern Mississippi. *Conradina verticillata* is endemic to a specific floodplain type within the Cumberland Plateau in Kentucky and Tennessee, so far away from its Florida congeners!



Range map of *Conradina* species in the southeastern United States.

The genus *Conradina* was named in 1870 in honor of Solomon White Conrad (1779 – 1831). Conrad ran a printing business in Philadelphia but was most often found on lengthy field excursions gathering plant specimens for a local natural history salon and collecting and dealing in minerals. Through those activities he became a productive botanist, mineralogist, University of Pennsylvania professor, and writer of important natural science and agricultural publications.

Distinguishing *Conradina* species from other mints can be done by looking at the >90 degree angle of their petals, bent upward. They bear two nearly similar pairs (didynamous sets) of anthers that lack hornlike projections and their trichomes are simple. Their stigmas are arching, slightly longer than the anthers and branched/bifurcate (a Mint Family trait) with equal branches (or nearly so). They are “generous to flower visitors” as they can be found with at least some flowers for most of the year, but peaking at different times, depending on species. All *Conradina* species are sun-loving and that usually requires periodic disturbance such as fire, flooding, or mowing that keeps competing vegetation from shading them out. They like open, well-drained, sandy or rocky areas.

As with many threatened/endangered, endemic, pyrophytic plants, habitat loss and degradation, and lack of fire management all drive *Conradina* population decline. All *Conradina* species are federal- and state-listed as endangered, except *C. grandiflora* (state-listed endangered), and the non-listed

C. canescens. Protecting, restoring and managing intact habitat are key. Because *Conradina* species occupy high-quality habitat and are commonly associated with other rare and endemic plants and animals, each site should be proactively mapped, managed, and monitored.

Good *Conradina* habitat management always results in increased sunlight for the plants. Trees and shrubs, such as scrub oaks (*Quercus* spp.) and staggerbush (*Lyonia* spp.) that outcompete individual plants must be reduced with periodic prescribed fires that mimic natural wildfires. Burning commonly causes an explosion in seedling numbers from these species' persistent soil seed bank, produced through the years by profusions of flowers that fruit and disperse seeds into the soil. One *C. glabra* plant can have over 1,000 flowers at one time and produce over 5,000 seeds (Pruner and Schmidt, 2017). Once in the soil, seeds wait for fire or other disturbance to open up the habitat, increase sunlight, and cause germination. Adult plants commonly die after fire, but moderately burned plants can resprout 2.5 months post-fire. Long-term studies show that shortly after fire, the initial increase in the number of individuals can last up to five years (Slapcinsky et al. 2010). Although intense fires consume adult individuals, periodic, patchy fire benefits *Conradina* populations. In the absence of fire, mowing, or other disturbance, populations decrease steadily with decreased sunlight and increased woody competition.

If prescribed fire is not being used, habitat can be opened up with mowing treatments or the removal of competing vegetation using hand tools. Hand removal may be needed in times of drought when no prescribed fire can be applied and/or mechanical treatments are not feasible or desired. Hand removal of competing vegetation around plants is fun and healthy exercise, done in the cooler months. This kind of work is similar to what Danny Young of the FNPS Pawpaw Chapter calls "reverse landscaping" where plants are removed instead of planted, to benefit a target species. Hand removal in the warmer months is not advised because it can stress the plants (Cheryl Peterson, pers. comm.).

Propagation of *Conradina* species has been successfully conducted for decades by Bok Tower Gardens' Conservation Program, now led by Cheryl Peterson. She summarizes some of her efforts: "We have done some hand-crossing between all of the mints here at Bok and each cross has produced fecund offspring. We regularly have hybrid seedlings pop up in the collection beds (some look pretty odd!), so we have learned to pull all seedlings and remove all seeds so we are not growing hybrids. Seed germination of the mints is very low, but plants produce hundreds of thousands of seeds each year, so seedlings do recruit in populations even with a natural low viability. When we need to propagate mints for reintroduction work, we typically do so by cuttings, since that is successful, easy and quicker. When we have lots of wild-collected seeds we germinate seedlings also, since that will add to the genetic diversity of the seedlings (since cuttings are just clonal). When plants/populations are not robust enough to support cutting or seed collection, we resort to tissue culture, which is why it's important to know tissue culture protocols for a species."

Conradina Species in Florida

***Conradina brevifolia* – short-leaved false rosemary**

This narrow-leaf *Conradina* is endemic to the white sand scrub habitat of the mid- to lower Lake Wales Ridge in Polk, Highlands, and Osceola Counties. Flowering peaks in mid-April until early May. It is very similar to *C. canescens* of the Panhandle. Besides the geographic disjunction and recent genetic analysis that separate *C. canescens* and *C. brevifolia*, these two species differ in that *C. brevifolia* tends to have shorter leaves, less nutlet width, and is more decumbent, commonly rooting at the nodes (Edwards et al. 2009, Wunderlin et al. 2019). Healthy populations occur at the Lake Wales Ridge State Forest where a rare-plant biologist, staff, and volunteers (including FNPS volunteers) monitor and manage for this species and fourteen other federally listed plants. Research revealed that peak seed germination occurs in the spring, from February to May.

***Conradina canescens* – false rosemary**

Conradina canescens is found in the Florida Panhandle, and a noteworthy herbarium specimen exists from Hernando County, Florida. It also grows in southern Alabama and extreme southeast Mississippi. Populations in the interior Florida Panhandle can have different characteristics and may be distinctive or well on their way to becoming individual species or forms/varieties. Close examination of several different populations is under way and may result in taxonomic revisions. This highly variable species has a narrow leaf and can be abundant and robust in well-managed coastal ridges, scrub, scrubby flatwoods, and dry disturbed areas. Pollinators and flower visitors are highly attracted to this ecologically important species. Its peak bloom is in April and occurs at the same time as lupine (*Lupinus*) species in the area, making for an amazing show on the bluer side of the color spectrum.

***Conradina cygniflora* – swan-flowered false rosemary**

This is a wider-leaf species whose flowering peaks in late October and early November. Its entire population occurs at Dunn's Creek State Park in Putnam County, where it is thriving due to proactive monitoring and management efforts. The hilly topography of the Crescent City-DeLand Ridge where this species exists is beautiful, with deep, white sands.

This species is closely related to *C. etonia* but the two differ in their number of inflorescences, calyx and corolla size, and leaf hairs. Analyses of microsatellite data revealed that *C. cygniflora* populations are genetically divergent from all of the other six *Conradina* species (Edwards et al. 2008b).

***Conradina etonia* – Etonia false rosemary**

This wider-leaf species is endemic to a five-square-mile, contiguous xeric upland in Etoniah Creek State Forest (ECSF) in Putnam County. Florida Forest Service (FFS) biologist Charlie Pederson has led monitoring efforts there since 2000 with the help of FFS staff and dedicated volunteers, with FNPS volunteers

Continued on page 12

FNPS Grants and Awards

Continued from page 2

FNPS Conservation Grants

Conservation Grants support projects that promote the preservation, conservation, or restoration of rare or imperiled native plant taxa and rare or imperiled native plant communities.

- “Habitat enhancement and restoration of clasping warea (*Warea amplexifolia*)” – submitted by Putnam Land Conservancy. This award was sponsored by the Tarflower Chapter in honor of Dick Deuring, the Sea Rocket Chapter, the Dade Chapter in honor of Don and Joyce Gann, the Nature Coast Chapter, and Annie Schmidt.
- “Save Florida’s Bromeliads Conservation Project” – submitted by Martha Pessaro and sponsored by Florida Power & Light.

Dan Austin Award for Ethnobotany

This award is limited to graduate or undergraduate students studying Florida ethnobotany. Research must focus on Florida native plant species or plant communities and must have a human/plant connection.

- “The North Florida Heritage Garden Project” – submitted by the University of Florida and sponsored by Anne Cox in memory of Dick Workman and Debbie Dixon.
- “The adoption of Florida natives as insectary plants to promote beneficial insects in agricultural communities via trophic resource enhancement” – submitted by Andrea Salas Primoli, Ph.D. Candidate in the Plant Ecology Lab, Florida International University, and sponsored by the Coccoloba Chapter in honor of Dick Workman.

Research Grants

FNPS Research Grants support research that promotes the preservation, conservation, and restoration of the native plants and native plant communities of Florida.

- James W. Horn, Florida Gulf Coast University, Department of Biological Sciences – “Testing species boundaries and inferring the biogeographic history of *Stillingia* (Euphorbiaceae) in the North American Coastal Plain, with a focus on Florida.”
- Charles Ray, Auburn University, Department of Entomology & Plant Pathology – “Understanding how pollination can guide conservation of *Spigelia gentianoides*, a Federally-listed endangered plant.”
- Jasmine S. Peters, Cornell University, Department of Ecology & Evolutionary Biology – “Do prescribed burns control a viral plant pathogen in native and endemic prairie grass species?”
- Kasey Kiesewetter, University of Miami, Department of Biology – “Effects of soil microbiome on growth and dispersal of a native plant (*Croton linearis*) in a fragmented landscape.”

This year FNPS received contributions of \$500 from the Sea Rocket Chapter and \$1,500 from the Tarflower Chapter in honor of Sam Hopkins. The award to Kasey Kiesewetter is funded by the contribution in honor of Sam Hopkins.

BOOKS of NOTE

The Nature of Plants: An Introduction to How Plants Work

Continued from page 7

hormones is based on other hormones discovered in the past few decades and for which a developing body of information is now emerging.” It turns out that plants are just as complex as animals when it comes to hormonal activity.

Plants use hormones as a means of defense, and Huegel includes fascinating information on how this works and what compounds are involved in the process. He writes: “Because plants cannot avoid danger by moving away, they must form defenses against pathogens, competitors, and herbivores while standing their ground.” Huegel closes the chapter with a discussion of the roles plant hormones play as growth regulators, in coping with stressful situations such as drought, salt, or nutrient deficiencies, and in flowering, where the primary hormone involved, florigen, was not pinpointed until 2005.

In the chapter on plant communication, Huegel discusses both above- and below-ground communication methods. Above ground, plants may release volatile organic chemicals (VOCs) to warn other plants about danger and/or to attract predators to the presence of herbivores attacking the plant. Plants can even tell the difference between damage from hedge clippers and that of herbivores and respond accordingly. Below-ground communication methods involve special fungi, mostly mycorrhizae, as the message bearers to other plants’ rhizospheres. This is fascinating stuff to know and drives home the case that we should “stop treating our soil like dirt.”

Huegel concludes his book with this thought: “Perhaps your understanding of plants and how they work has been changed a bit. If we have done that together, we will have accomplished something significant both for ourselves and this amazing world we share with the rest of creation. Tend your plants and garden with reverence.”

As a botanist, I think this is an important book to add to your collection, because the more you know, the better your landscape grows. You can order it online at the University Press of Florida website: www.upf.com

About the Author

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coming from several chapters. Surveys are at peak flowering in late October to early November, letting volunteers work in some very nice inland scrub and scrubby flatwoods (notably, Halloween candy is supplied to volunteers to help restore lost nutrients during hard monitoring work). Populations are proactively managed with invasive plant removal, prescribed fire, and major habitat restoration efforts. The late, great Dr. Mark Whitten of the University of Florida Herbarium documented carpenter bees (*Xylocopa* sp.) at ECSF, stealing nectar from *C. etonia* flowers by piercing the base of the calyx and corolla, acquiring the nectar without pollinating the flowers. He also noted germination of *C. etonia* seedlings where roots were exposed from hurricane treefall.

***Conradina glabra* – Apalachicola false rosemary**

This species occurs only in Liberty County at Torreya State Park and was successfully introduced into The Nature Conservancy’s (TNC) Apalachicola River Bluffs and Ravines Preserve with the help of Bok Tower Gardens in the early ’90s. Populations are being managed and monitored by the Florida Park Service, TNC staff, the Atlanta Botanical Garden and volunteers, many from FNPS. This species flowers heaviest in autumn and spring, but recent intensive monitoring indicates that April may be the peak flowering month. Sandhill habitat where *C. glabra* grows is being restored and plants are numerous; that trend will continue exponentially as aggressive management efforts continue. Plants also grow on the ecotone of sandhill and slope forest (itself, a highly diverse habitat). Two Southeast Scrub Mint Clade species grow with *C. glabra* here: *Clinopodium dentatum* (Florida calamint) grows abundantly with *C. glabra* in some areas, creating an amazing mintscape, as does *Dicerandra linearifolia* var. *robustior* (coastalplain balm) but to a much lesser degree.

***Conradina grandiflora* – large-flowered false rosemary**

This *Conradina* has larger flowers and blooms loosely all year, peaking in late winter and early spring. Its northernmost population starts in the Rima Ridge at Tiger Bay State Forest and goes to the central-east and southeast portion of the state, down the Atlantic Coastal Ridge. The Florida Natural Areas Inventory Natural Heritage database has this plant in 9 counties and 54 different managed areas/conservation lands, with over 80 populations. However, the majority of the populations’ last observations are over twenty years old and require updating. This species is in need of field surveys and management of its habitat, as well support and advocacy by local plant enthusiasts.

***Conradina verticillata* – Cumberland false rosemary**

This *Conradina* exhibits very interesting phytogeographical distribution in southeast Kentucky and north-central Tennessee. It mainly grows in sandy soils within Cumberland Plateau rocky river floodplains, in distinct “scour prairies” or “cobble bars” (Todd Crabtree, pers. comm.). The populations are found on National Park Service lands, including Big South



Conradina canescens. Photo by Floyd Griffith, FNPS Magnolia Chapter.



Conradina cygniflora. Photo by Brenda Herring, Florida Natural Areas Inventory.



Conradina etonia. Photo by Bill Chitty, FNPS Payne’s Prairie Chapter.



Conradina glabra. Photo by Floyd Griffith, FNPS Magnolia Chapter.



Conradina grandiflora. Photo by Mike Jenkins, Florida Forest Service.



Conradina verticillata. Photo by Todd Crabtree, Tennessee Department of Natural Areas.

Fork and Obed National Wild and Scenic River and are monitored by the Tennessee Department of Environment and Conservation, Division of Natural Areas.

Conradina species are some of the most compelling plants for us to conserve. One can imagine them in pre-settlement times, millions of acres feeding massive populations of butterflies and other arthropod groups. They are a major part of an ecological system. The more the better! They have useful life traits and attributes developed while surviving the millennia in harsh conditions on Earth. Knowledge and use of them is to our advantage and for the “better-mint” of the human condition.

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