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The Buckthorns (Genus *Sideroxylon*): An Underappreciated Group of Florida Native Plants

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INTRODUCTION

Tucked away amongst the rich diversity of Florida plant life surrounding us, one plant group can easily escape our notice: the genus *Sideroxylon*, belonging to the pantropical family Sapotaceae (sapodilla family). This circular will introduce the *Sideroxylon* species native to North America, featuring in detail species adapted to the temperate zone that may be of interest to the southern United States (U.S.). Some are endangered in Florida, and some are Florida endemics. Certain species have landscaping potential, but have long been ignored, but a few species are occasionally available from native plant nurseries (Betrock's Plant Search 2018; FNPS 2018). Species of *Sideroxylon* attract pollinators when blooming, and birds and wildlife when fruiting; thus, they can be desirable additions to any Florida landscape.

Sapotaceae are recognized by the presence of milky sap, brownish T-shaped hairs, fasciculate inflorescences (flowers in a bundle) and seeds with a large scar at one end (Pennington 1990, 1991). This woody family makes a large contribution to tropical plant biodiversity, being a major floristic component of tropical lowland wet forests in the Americas, Asia, Africa and the Pacific Islands (Gentry 1988). Sapotaceous plants are also economically important to humans. "Sapote" comes from the Nahuatl word meaning sweet fruit; most species bear such a fruit (*e.g.,* the sapodilla and mamey sapote) (Smith *et al.* 2007). The family also produces several oil and latex products (*e.g.,* shea butter, argan oil, chicle), and large tree species provide valuable timber (Pennington 1991).

***Sideroxylon* L.** comprises around 80 species worldwide (Govaerts *et al.* 2001), with their New World center of biodiversity in the Caribbean and Central America. The genus name derives from the Greek *sideros* (iron) and *xylon* (wood). Although *Sideroxylon* is primarily a tropical genus, 11 species are currently recognized in the continental United States (Allison 2006; Wunderlin *et al.* 2018). Of these eleven species, three are strictly tropical: *Sideroxylon celastrinum, S. foetidissimum,* and *S. salicifolium*, which occur in the Caribbean and Central America and grow natively only in Florida's southern coastal and subtropical areas. The other eight species are endemic to the temperate North American Coastal Plain, with their center of biodiversity in Florida (Corogin 2015). These eight species are *Sideroxylon alachuense, S. lanuginosum, S. lycioides, S. macrocarpum, S. reclinatum, S. rufohirtum, S. tenax* and *S. thornei*. *Sideroxylon macrocarpum* is endemic to Georgia and does not occur in Florida (Allison 2006).

IDENTIFICATION

Florida's *Sideroxylons* are also referred to as "bumelias," as most of these plants used to be in the genus *Bumelia* (Small 1900). In 1990, *Bumelia* was lumped into a more broadly defined *Sideroxylon* because the morphological characters used to identify *Bumelia* were found to be unreliable (Pennington 1990, 1991). Today these plants are known by the common names "buckthorn," "bully," and "bumelia." Buckthorns are not conspicuous in Florida's floral communities. They are small and sometimes scraggly-looking, and can become overtopped by adjacent faster-growing vegetation; thus they are often hard to spot. However, they do possess some distinctive features. Once a positive identification has been made, these plants become much easier to distinguish in a natural setting.

Most Florida buckthorns are shrubs or small trees, the largest growing to 20 m tall. Thorns are usually present and milky sap is present in all tissues. When a leaf is removed from the plant and squeezed, a small droplet of this white latex can be observed oozing out. Tiny, brown to colorless T-shaped hairs can be seen at least on the vegetative buds, and often on young stems and leaf undersides as well (use a hand lens). Thorns will sometimes sprout leaves and lengthen to become side branches. Leaves are tardily deciduous (old leaves are dropped in spring just as the plant is putting out new ones), alternately arranged on young twigs (long shoots, Fig. 1),

becoming clustered on stumpy short shoots on older stems (Fig. 2). Leaves vary in size, and leaf shape varies from elliptic (widest at the middle, tapering to the ends) to obovate (widest near the apex, tapering to the base), and the margins are entire (never toothed). The vein pattern of leaves is conspicuously reticulate (net-like), often giving the leaf surface a "veiny" appearance. Flowers are tiny (around 5 mm long), white, on pedicels, and clustered in bundles in leaf axils (the places where a leaf joins the stem) and on stumpy short shoots in the axils of fallen leaves. The plants bloom profusely in late spring and early summer. They are easier to spot while in bloom, when they attract large diverse crowds of pollinating insects – wasps, bees, butterflies, beetles – literally "abuzz" around the plants (Deyrup and Deyrup 2011). Fruits are shiny black berries ±1 cm in diameter, ripening in large quantities in late summer and fall (Fig. 3). They are edible, with a slightly sweet, bland flavor, and are eaten mainly by birds. Many of our buckthorns appear to thrive where soils are high in calcium, *e.g.*, where limestone is near the surface, and in coastal areas rich in shell deposits.

Fig. 1: A young twig (long shoot) of *Sideroxylon alachuense.* Photo credit: Paul T. Corogin

Fig. 2: Leaves and flowers clustered on short shoots (*Sideroxylon rufohirtum*). Photo credit: Paul T. Corogin

Fig. 3: A fruiting branch of *Sideroxylon alachuense*. Photo credit: Paul T. Corogin

SPECIAL INSECT ASSOCIATIONS WITH SIDEROXYLON

Bumelia borer beetle (*Plinthocoelium suaveolens* [LeConte]) – This beautiful brightly colored longhorn beetle (Coleoptera: Cerambycidae) can sometimes be spotted on or near *Sideroxylon* plants, which are the preferred host for the larvae of the species (Linsley & Hurd 1959). Evidence for their presence can be seen at the base of the trunk, in the form of one or more bore holes and piles of frass and sawdust where the larvae tunnel into the wood. This can damage the stems and roots of the plant. **Colletid bee** (*Colletes francesae* [Deyrup & Deyrup]) – This newly described species of native bee (Hymenoptera: Colletidae) appears to visit only flowers of *Sideroxylon tenax,* where the plant occurs in Florida's inland scrub habitats (Deyrup and Deyrup 2011).

FEATURED SPECIES

Sideroxylon alachuense L.C. Anderson (silver buckthorn, Alachua bully) – Endangered (Florida). Endemic to Florida? Possibly. This shrub or small tree, up to 9 m tall, occurs naturally in well-drained calcareous hardwood hammocks, where limestone is near the surface. The species is named for Alachua Sink at Payne's Prairie Preserve State Park, near which its largest population occurs. Identification is easy: the undersides of the dark green, glossy leaves are covered with a silvery, silky pubescence (hairiness) that obscures the leaf surface, and the young twigs are green to cream-white and hairless or nearly so (Figs. 1, 4). Until recently this rare species was known from only a few populations in Alachua, Marion, Lake and Orange counties. However, recent specimens collected from coastal counties in northeast Florida, southeast Georgia, and South Carolina strongly resemble *S. alachuense* and have been identified as such, suggesting a wider distribution for this species. Examination of additional specimens from Georgia and South Carolina will help to answer this lingering taxonomic question. If these also turn out to be *S. tenax*, then *S. alachuense* would be considered a Florida endemic (Anderson 1997; Wunderlin *et al.* 2018). **Landscaping potential:** One of our most attractive buckthorns, *S. alachuense* will grow as a small tree or as a shrub if pruned. The plant grows best in well-drained, slightly alkaline soil, in sun or part shade. Give it plenty of space to grow. Mixing crushed shells into the soil before planting is reported to be helpful.

Fig. 4: *Sideroxylon alachuense*. Note the greenish to cream-white color of twigs, and the silvery, silky leaf undersides.
Photo credit: Paul T. Corogin

Fig. 5: *Sideroxylon tenax*. Note the dark red-brown twigs and silky, golden-brown leaf undersides.
Photo credit: Paul T. Corogin

Sideroxylon tenax L. (tough bully, tough bumelia) – This species inhabits sand dunes, both ancient and modern, throughout much of the Florida peninsula and along the Atlantic coast to South Carolina. It is abundant on coastal dunes and in Florida's interior scrub habitats, where it lives up to its name (*tenax* is Latin for tough, tenacious). It tolerates drought and salt, as well as very nutrient-poor sandy soils and it can withstand infrequent fires. Most often occurring as a bushy or scraggly shrub, under favorable conditions it will grow as a single-trunked tree to 12 m tall with a spreading crown. Like its rare close relative *S. alachuense*, this more common species features leaves that are dark green and glossy above, with the undersides having a dense covering of appressed hairs that obscure the leaf surface and usually appear lustrous and silky. Unlike *S. alachuense*, the young twigs of *S. tenax* (Figs. 5, 6) are dark brown and densely hairy (versus green to cream-white and hairless), and the color of its leaf hairs is light gold to dark coppery-brown (versus silvery-white in *S. alachuense*). **Landscaping potential:** *Sideroxylon tenax* will thrive in full to partial sun, in any xeric well-drained deep sandy soil. This plant can look scraggly in its natural habitat, but with a little care it will grow fast and produce lush foliage. Through pruning, this species can be trained to grow either as a small tree or as a bushy shrub (Fig. 7). *S. tenax* should be planted where it has space to grow, and where its beautiful silky foliage can be seen.

Fig. 6: *Sideroxylon tenax*, flowering branch.
Photo credit: Paul T. Corogin

Fig. 7: *Sideroxylon tenax*, growing as a bushy shrub around 2 m tall at Anastasia State Park, Florida
Photo credit: Paul T. Corogin

Fig. 8: *Sideroxylon lanuginosum*, Wooly buckthorn
Photo credit: Paul T. Corogin

Sideroxylon lanuginosum Michx. (wooly buckthorn, gum bully, gum bumelia) – This species has the widest range of all U.S. buckthorns, extending throughout the Southeast, northward to southern Illinois, and westward into Texas, Arizona, and the northern tier of states in Mexico. It is found in a variety of habitats, often near rivers and streams, especially where limestone is near the surface. It is usually associated with other hardwood species. *Sideroxylon lanuginosum* is typically arborescent, growing as a tree up to 20 m tall, but it can also take a shrubby form. Of all Florida buckthorns, this species has the greatest potential to grow to a large size. Identification is easy: the leaf undersides have an even and persistent covering of fine wooly, red-brown to light brown to grey hairs that do not obscure the leaf surface (Fig. 9). Young twigs, sepals and pedicels are also wooly-pubescent (Fig. 8). **Landscaping potential:** This species tends to become a small tree, but it can be pruned as a shrub. Give it plenty of space to grow, as it can become large in size. It prefers neutral to slightly alkaline soils, moist to relatively dry, in sun to part shade.

Fig. 9: *Sideroxylon lanuginosum*, showing leaf undersides.
Photo credit: Paul T. Corogin

Fig. 10: *S. lanuginosum*, a typical branch.
Photo credit: Paul T. Corogin

Sideroxylon thornei (Cronquist) T.D. Penn. (Georgia bully, Thorne's buckthorn, Thorne's bumelia) – Endangered (Florida). This shrub or small tree, to 6 m tall, associates with other hardwood species in the understory of forested wet sandy bottomlands over limestone and in woods bordering cypress ponds, where the soil is seasonally saturated, but not completely inundated for long periods. Once one of these inconspicuous plants has been located, identification of the plant is easy. The younger twigs are dark red-brown and dotted with lenticels (corky bumps on the smooth bark). Leaves, 2-5 cm long and variably shaped, are glossy green above, while the undersides are pale green with a sparse and persistent covering of wooly blond to light brown hairs (Figs. 11, 12). *Sideroxylon thornei* has a relatively narrow range centered on a geological feature in southwest Georgia called the Dougherty Plain, from which it extends west into southeast Alabama, and northeast across southern Georgia (Cronquist 1949). The species is fairly common in southern Georgia, but it is rare in Florida, having been collected from only a few counties in the Panhandle (Wunderlin *et al.* 2018). **Landscaping potential:** While it is not unattractive, this species has not been reported as being used as a landscape plant in Florida. It would probably be successful if planted in the far northern counties, in partial shade and moist, neutral to slightly alkaline soils.

Fig. 11: *Sideroxylon thornei*, leaf undersides.
Photo credit: Paul T. Corogin

Fig. 12: *Sideroxylon thornei,* typical branch.
Photo credit: Paul T. Corogin

Sideroxylon rufohirtum Herring & Judd (rufous Florida bully) – Endemic to Florida. Found in only 14 counties in the northern and west-central Florida peninsula (Wunderlin *et al.* 2018), this species is adapted to sandy upland habitats that experience frequent fires. *Sideroxylon rufohirtum* can also be found thriving on powerline rights-of-way, where regular mowing (instead of periodic fires) keeps the competition down. This Florida endemic is relatively uncommon within its range, but once it is spotted, identification is easy. It is highly clonal, forming patches of low-growing, thorny shrubs less than 1 m tall that are interconnected by horizontal underground stems (stolons). The low stature and extensive underground biomass are probably adaptations to frequent fire. Young twigs have a dense covering of fine wooly, red-brown (rufous) hairs that often persist well past the current season (Fig. 13). Leaves, 1-5 cm long and variably shaped with a rounded tip, are glossy green above, while the undersides have a covering of scattered rufous hairs when young (Figs. 13, 14), becoming hairless with age. Fruits are larger than those of the other species, being 1.2-1.5 cm across. This species shares habitat with the gopher tortoise (*Gopherus polyphemus* [Daudin]), which eats its low-borne fruits (Allison 2006). **Landscaping potential:** This species will thrive in sunny, well-drained, dry sandy locations. This plant's thorniness and its tendency to spread vegetatively by stolons should be considered when choosing a site to establish.

Fig. 13: *Sideroxylon rufohirtum*, young growth.
Photo credit: Paul T. Corogin

Fig. 14: *S. rufohirtum,* flowering branch.
Photo credit: Paul T. Corogin

Sideroxylon reclinatum Michx. **subspecies *austrofloridense*** (Whetstone) Kartesz & Gandhi (Everglades bully) – Endangered (Florida). Endemic to Florida. *Sideroxylon reclinatum* has two subspecies: subsp. *reclinatum*, and subsp. *austrofloridense*. The former, known as "smooth bumelia" or "Florida bully," is a low-growing shrub of moist lowland habitats, common throughout the Florida peninsula, and found also along the Gulf coast from the panhandle westward to Louisiana. The latter subspecies, *austrofloridense,* is found only in Miami-Dade and Monroe counties, Florida, occurring in pine rocklands, marl prairies and edges of rockland hardwood hammocks. *Sideroxylon reclinatum* subsp. *austrofloridense* is a scraggly, thorny, crooked-branched shrub to 1.5 m tall (Fig. 15), occasionally a small tree, to 3 m tall. Young twigs are red-brown, becoming mottled light gray with age. Leaves are 1-5 cm long, the shape obovate to elliptic with a rounded tip. Leaf blades are semi-glossy and veiny-textured above, while the undersides usually have a sparse to moderate covering of fine wooly light brown to grey hairs (Fig. 16). This covering of hairs can help distinguish subsp. *austrofloridense* from subsp. *reclinatum*, whose mature leaves are completely hairless. *Sideroxylon reclinatum* subsp. *austrofloridense* was recently listed as federally threatened (and therefore, by law, Florida endangered) because its habitats are being destroyed and fragmented by human development, degraded by fire suppression, and possibly facing doom from predicted sea level rise (Whetstone 1985; Corogin & Judd 2014; USFWS 2018). **Landscaping potential:** *Sideroxylon reclinatum* subsp. *austrofloridense* grows in thin soils over limestone, where conditions are seasonally wet. It can tolerate periods of inundation. The spare and leggy growth habit of this plant, along with its narrow habitat requirements, may make it problematic as an ornamental, but it could be grown as a botanical novelty. The more common subspecies *reclinatum* has a similar growth habit, and will grow in moderately moist conditions in neutral to alkaline soil.

Fig. 15: *Sideroxylon reclinatum* subsp. *austrofloridense* (foreground) in its pine rockland habitat.
Photo credit: Paul T. Corogin

Fig. 16: *Sideroxylon reclinatum* subsp. *austrofloridense*, fruiting branch.
Photo credit: Paul T. Corogin

Fig. 17: *Sideroxylon lycioides*, with ripe fruit.
Photo credit: Paul T. Corogin

Fig. 18: *Sideroxylon lycioides*, flowering branch.
Photo credit: Paul T. Corogin

Sideroxylon lycioides L. (gopherwood buckthorn, buckthorn bully) – Endangered (Florida). This small tree, up to 14 m tall, grows primarily in moist habitats, found along riverbanks and in wooded bottomlands and adjacent slopes and bluffs, especially where limestone is present. In Florida, identification can be difficult, as small individuals may resemble large plants of *S. reclinatum*. On very young growth just emerging from bud, leaf and stem can have a sparse to moderate covering of white, appressed, silky hairs that quickly slough off as the new growth matures. Mature leaves and stems are hairless. Leaf size varies from 2-15 cm long, 1-4 cm wide. Leaf shape is elliptic (widest at the middle), often with a pointed tip (Figs. 17, 18). Although *S. lycioides* is widespread and relatively common in the southeastern United States outside of Florida, it is quite rare within Florida's borders, having been collected in only a handful of counties. Northern Florida marks the southernmost limit of the species range (Wunderlin *et al.* 2018). **Landscaping potential:** There is no mention of this species being used as a Florida landscape plant in the literature. It would probably be successful if planted in the northern counties, in moderately moist conditions with neutral to slightly alkaline soil.

CONCLUSION

Florida's temperate buckthorns are a group of closely related species, a small branch on the larger family tree of the tropical genus *Sideroxylon*. They make a contribution to the richness of the flora of the southeastern North American Coastal Plain, a geographic region that includes Florida, and which recently gained recognition as a global biodiversity hotspot (Noss *et al.* 2015). Buckthorns can be found throughout nature and may serve as a yard plant.

REFERENCES CITED

Allison JR. 2006. Big-fruited buckthorn, *Sideroxylon macrocarpum* (Sapotaceae), a long-forgotten Georgia endemic. Sida 22:243–264.

Anderson LC. 1997. *Sideroxylon alachuense*, a new name for *Bumelia anomala* (Sapotaceae). Sida 17:565–567.

Betrock's Plant Search. 2018. Hollywood, Florida: Betrock Information Systems, Inc. [Accessed February 2018]. https://www.plantsearch.com/.

Corogin PT. 2015. *Sideroxylon* sect. *Frigoricola* (Sapotaceae): A clade endemic to temperate North America [dissertation]. Gainesville, Florida: University of Florida.

Corogin PT and Judd WS. 2014. New geographical and morphological data for *Sideroxylon reclinatum* subspecies *austrofloridense* (Sapotaceae), a taxon endemic to southeastern peninsular Florida, U.S.A. Journal of the Botanical Research Institute of Texas 8:403–417.

Cronquist A. 1949. Noteworthy plants of Georgia. Castanea 14:101–108.

Deyrup MA and Deyrup LD. 2011. *Colletes francesae*, a new species of Colletid bee (Hymenoptera: Colletidae) associated with *Sideroxylon tenax* (Sapotaceae) in Florida scrub habitat. Florida Entomologist 94:897–901.

[FNPS] Florida Native Plant Society. 2013. [Accessed February 2018]. http://www.fnps.org/.

Gentry AH. 1988. Changes in plant community diversity and floristic composition on environmental and geographical gradients. Annnals of the Missouri Botanical Garden 75:1–34.

Govaerts R, Frodin DG, and Pennington TD. 2001. World checklist and bibliography of Sapotaceae. Kew, UK: Royal Botanic Gardens.

Linsley EG and Hurd PD. 1959. The larval habits of *Plinthocoelium suaveolens plicatum* (LeConte) (Coleoptera: Cerambycidae). Bulletin of the Southern California Academy of Sciences 58:27–33.

Noss, RF, Platt WJ, Sorrie BA, Weakley AS, Means DB, Costanza J, and Peet RK. 2015. How global biodiversity hotspots may go unrecognized: lessons from the North American Coastal Plain. Diversity & Distribution 21:236–244.

Pennington TD. 1990. Sapotaceae. New York: New York Botanical Garden. (Flora Neotropica Monographs; vol. 52).

Pennington TD. 1991. The genera of Sapotaceae. Kew, UK: Royal Botanic Gardens.

Small JK. 1900. The genus *Bumelia* in North America. Bulletin of the New York Botanical Garden 1:437–447.

Smith N, Vasquez R, and Wust WH. 2007. Amazon River fruits, flavors for conservation. St. Louis, Missouri: Amazon Conservation Association, Missouri Botanical Garden Press.

[USFWS] U.S. Fish and Wildlife Service. 2017. ECOS – Environmental Conservation Online System. Species profile: Everglades bully (*Sideroxylon reclinatum* ssp. *austrofloridense*). [Accessed Feb 2018]. https://ecos.fws.gov/ecp0/profile/speciesProfile?sId=4735.

Wunderlin RP, Hansen BF, Franck AR, and Essig FB. 2018. Atlas of Florida Plants. Tampa, Florida: Institute for Systematic Botany, University of South Florida. [Accessed Feb. 2018]. http://florida.plantatlas.usf.edu/.

ADDITIONAL REFERENCES

Clark RB. 1942. A revision of the genus *Bumelia* in the United States. Annals of the Missouri Botanical Garden 29:155–182.

Cronquist A. 1945. Studies in the Sapotaceae, III. *Dipholis* and *Bumelia*. Journal of the Arnold Arboretum 26:435–471.

Godfrey RK. 1988. Trees, shrubs, and woody vines of northern Florida and adjacent Georgia and Alabama. Athens, Georgia: The University of Georgia Press.

Gonzalez-Soberanis C and Casas A. 2004. Traditional management and domestication of tempesquistle, *Sideroxylon palmeri* (Sapotaceae) in the Tehuacan-Cuicatlan Valley, Central Mexico. Journal of Arid Environments 59:245–258.

Huegel C. 1992. Bumelias. The Palmetto 12(3):6–7.

Inglett GE and May JF. 1968. Tropical Plants with Unusual Taste Properties. Economic Botany 22:326–331.

Khallouki F, Spiegelhalder B, Bartisch H, and Owen RW. 2005. Secondary metabolites of the argan tree (Morocco) may have disease prevention properties. African Journal of Biotechnology 4:381–388.

Maranz, S and Wiesman Z. 2003. Evidence for indigenous selection and distribution of the shea tree, *Vitellaria paradoxa*, and its potential significance to prevailing parkland savanna tree patterns in sub-Saharan Africa north of the equator. Journal of Biogeography 30:1505–1516.

Morton JF and Voss GL. 1987. The argan tree (*Argania sideroxylon*, Sapotaceae), a desert source of edible oil. Economic Botany 41:221–233.

Ruehle GD. 1951. The Sapodilla in Florida. Circular no. S-34. Gainesville, Florida: University of Florida Agricultural Experiment Stations.

Whetstone RD. 1985. *Bumelia reclinata* var. *austrofloridensis* (Sapotaceae), a new variety from South Florida, USA. Annals of the Missouri Botanical Garden 72:544–547.

Williams L. 1964. Laticiferous Plants of Economic Importance V. Resources of Gutta-Percha–*Palaquium* Species (Sapotaceae). Economic Botany 18:5–26.