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NATURALIZED POPULATIONS OF *OCHNA ATROPURPUREA* (OCHNACEAE) IN FLORIDA

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ABSTRACT

Ochna atropurpurea DC. (Ochnaceae), is native to tropical East Africa. There is only one published record of this species growing outside cultivation in the New World, from High Ridge Scrub Natural Area, a nature preserve in Palm Beach Co., Florida, but it appears that land managers have successfully extirpated this population. Here, we report three naturalized populations of *O. atropurpurea* in nearby Martin Co., Florida. We found that this species is often planted as an ornamental shrub or small tree in landscaped yards, but it also invades wooded areas. It seems likely that *O. atropurpurea* will not remain just a locally naturalized species but will spread to other parts of Florida.

The African bird's-eye bush, *Ochna atropurpurea* DC. (Ochnaceae) (Figs. 1–3), is a shrub or small tree native to tropical East Africa, including Kenya, Tanzania, and Mozambique (du Toit 1975). Franck et al. (2016) reported the only record of *O. atropurpurea* growing outside of cultivation in the New World (see below). Here, we document large, naturalized populations of *O. atropurpurea* growing in Martin Co., Florida.

de Candolle (1811: 412) described *Ochna atropurpurea* based on black and white sketches that Leonard Plukenet made of herbarium specimens collected by Alexander Brown (Plukenet 1694, 1696). In his description, de Candolle (1811) quoted Plukenet's figure legend (1696: 41): "*Arbor Africana subrotundo folio margine denticulis acutis aspero, floribus pentapetalis atro-purpureis*," Latin for "African tree, roundish leaf, margin with sharp denticles, five-petal dark-purple flowers." Although de Candolle (1811) indicated that the specimens came from the Cape of Good Hope, South Africa, this was incorrect, resulting in subsequent authors (e.g., Kanis 1968) applying the name *O. atropurpurea* to a South African species with leaves that are narrower and with larger serration than shown in Plukenet's (1696) illustration. Du Toit (1975) examined Brown's type specimens of *O. atropurpurea* in the British Museum and concluded that they matched the later-described (in 1861) type of *Ochna mossambicensis* Klotzsch and that all the South African specimens previously identified as *O. atropurpurea* were actually *O. serrulata* (Höchst.) Walp. True *O. atropurpurea* does not occur in South Africa (du Toit 1975). Despite this correction, some authors still follow Kanis (1968) in considering *O. atropurpurea* to be South African and use the synonymized name *O. mossambicensis* for true *O. atropurpurea* (e.g., Schneider et al. 2021; Shah et al. 2022).

The flowers of *Ochna atropurpurea* have 5 yellow petals and 5 sepals that are initially green but turn red after the petals fall off and the fruits develop (Figs. 1–2). The fruits turn from green to glossy black when they mature (Fig. 2). On dried specimens, the sepals turn a dark reddish purple. Plukenet's (1696) original drawings of *O. atropurpurea* roughly match the appearance of the plant's

mature leaves and inflorescences with developing fruit surrounded by five sepals, after the flowers have lost their petals. Both Plukenet (1696) and de Candolle (1811) clearly mistook dried sepals for petals, so the epithet *atropurpurea*, meaning dark purple, is somewhat misleading.

The oldest published record of *Ochna atropurpurea* introduced to the New World is that of H.L. Shantz of the U.S. Department of Agriculture: seeds were collected in Lourenco Marques (now Maputo), Mozambique, in October 1919 and imported to the USA in January 1920 (USDA 1923). The earliest voucher plant specimen from the New World is deposited at the University of Florida Herbarium (FLAS). This specimen from Miami-Dade County is labelled "Herbarium; Florida Agricultural Experiment Station; *Ochna mossambicensis* Klotzsch in Peters; P.I. 98870 - Chapman Field, Coll. Erdman West, 9 April 1953, Det. B.P.I." (B.P.I. = Bureau of Plant Industry) (FLAS 65011). Chapman Field, run by the U.S. Department of Agriculture, includes "land on which to plant out the increasing number of useful and ornamental plants that are coming in from explorers and correspondents" (Fairchild 1934).

Franck et al. (2016) published the first report of *O. atropurpurea* growing outside cultivation in the New World, based on a museum voucher deposited at the USF Herbarium (cdn.plantatlas.org /img/specimens/USF/247461.jpg) that was originally misidentified as *O. serrulata*. The voucher label includes the following information: "Palm Beach Co.: High Ridge Scrub Natural Area, N central portion, ca. 500 ft distant from the nearest cultivated area (housing development); T45S, R43E, Sec. 9, shrub ca. 1.5 m tall, with several seedlings; dry sandy soil near sand pits; 2 Mar 2007, Lee Lietzky, Corey Lietzky, Lucille Reinert, Robert Reinert." A duplicate voucher was deposited at FLAS (223267) with this additional information: "Voucher specimen received from Sally Channon, Dept. of Environment Resources Management with the following note. High Ridge Scrub Natural Area is publically [sic] owned and managed as a conservation area by Palm Beach County. According to photos and other records, approximately 20 acres of land in the center of this (ca.) 39-acre site were mined for sand in the 1950s and additional areas adjacent the pits were cleared in the 1980s. Per Lee (Lietzky), the plants were found in an area next to the mined pits, but not actually in the mined area. Because this is a non-native plant, it was destroyed along with all seedlings that could be found. Subsequent monitoring of the area has not turned up any more plants." Wunderlin et al. (2024) currently list the USF specimen as the only vouchered record of *O. atropurpurea* growing outside cultivation in Florida.

In addition to vouchers from Chapman Field and High Ridge Scrub and our new vouchers reported below, FLAS has 10 other *Ochna atropurpurea* vouchers, from five Florida counties, all originally identified as *O. mossambicensis*:

Alachua Co.: "Gainesville, University of Florida campus, S of Bartram and Carr Halls, in the Botany Department greenhouse, in pot; shrub ca 0.6 m tall; grown from seed collected at Marie Selby Botanical Gardens in Sarasota; 12 May 2008, *Abbott 24647*." (FLAS 227028).

Manatee Co.: "Shrub; cultivated; 348 S. Orchid Drive, Ellenton, Manatee County; 11 May 1989, *Cashion s.n.*; det. D.W. Hall." (FLAS 169417)

Martin Co.: "Cultivated [address not given; maybe at collector's address: 4856 SE Manatee Cove Rd., Stuart], rare tree 10 ft tall, fruits green, oval; 20 May 1993, *Wakeman s.n.*; rcceived for ID from Robert Whitty, Martin Co. Ext. Service, det. Kent D. Perkins." (FLAS 178688). The house at 4856 SE Manatee Cove Rd is marked with red star in Fig. 5.

Martin Co.: "Sent in by homeowner living at 4856 SE Manatee Cove Rd., Stuart; for additional information, mention is made of Great Pocket Trail; cultivated plant, 10 ft. tall, rare; flowers red, fruit black, oval; 10 April 1994, *Wakeman s.n.*; rcceived for plant ID from Bob Whitty, Martin, Co. Ext. Service; det. Gerald F. Guala, II." (FLAS 188915).

Martin Co.: "Stuart, 5000 SE Post Ter.; Growing in native plant area of property; 28 Jul 2004, *Oakes s.n.*; received for plant ID from Carol Cloud Bailey, Martin Co. Extension Service." (FLAS 212637). Note:

There is no property with this address; Mandy Oakes once lived at 5003 SE Post Terrace, Stuart (red star in Fig. 5).

Martin Co.: "Stuart, 2059 SE Riverside Terrace; Cultivated in residential landscape; low tree with yellow flowers and red, oblong, 1/2 x 1/4 inch fruit; 22 Mar 2016, *Griswold s.n.*; submitted for identification by Yvette Goodiel, Martin County Cooperative Extension Service; det. S. Barry Davis, 30 Mar 2016." (FLAS 262331).

Miami-Dade Co.: "Flowers yellow; multiple stems, bush 12 ft. tall; cultivated at 2800 Kirk Street in Miami, Dade County; 10 Mar 1981, *Perry s.n.*; det D.W. Hall." (FLAS 142971).

Miami-Dade Co.: "Flowers yellow; infrequent; cultivated at 5620 SW 67th Avenue in Miami, Dade County; 22 March 1986, *Moore s.n.*; det. D.W. Hall." (FLAS 159913).

Miami-Dade Co.: "south Miami, Fairchild Tropical Garden, 10901 Cutler Road; shrub 1-2.5 m tall; calyx red, seeds black; 23 May 1996, *Abbot 8773*." (FLAS 191315).

Palm Beach Co.: "4660 71st Court South, Lake Worth; cultivated in home landscape, shrub 6-8 feet tall with yellow flowers; 5 Mar 2002, *Zimmerman s.n.*; det Robert Dressler, conf. S. B. Davis; Rcvd. for plant id. from Gene Joyner, Palm Beach Co. Ext. Service." (FLAS 207936).

METHODS

On 23 May 2022, we posted five photos to the iNaturalist website of a fruiting shrub at the edge of a highly disturbed wooded area dominated by Australian pine (*Casuarina equisetifolia*) north of the Sailfish Splash Waterpark parking area (inaturalist.org/observations/118427774). Alan R. Franck, the FLAS collection manager, identified the photos as a species of *Ochna*. We collected vouchers from this same shrub and a nearby shrub. Franck identified these vouchers as *O. atropurpurea* (FLAS Accession #281797, #281798, and #281799).

We searched Martin and Palm Beach counties for additional *Ochna atropurpurea* plants, particularly in areas where this species was previously recorded. We mapped the species distribution using georeferenced photographs posted to iNaturalist. We also searched through iNaturalist photos from around Florida and elsewhere in the New World, looking for any additional observations of *O. atropurpurea*.

RESULTS

We posted to iNaturalist 225 observations of *Ochna atropurpurea* growing at three sites in Martin County (sites A, B, and C; Fig. 4). At site A in Stuart, we found many hundreds of *O. atropurpurea* in the area extending west and south of our original find, across SE Willoughby Boulevard and S Kanner Highway to the edge of the mangroves along the St. Lucie River (Fig. 5). These plants ranged from seedlings to 5-meter tall trees. Although some were growing as trees or trimmed hedges in landscaped areas, most were found in the understory on undeveloped land below overstories of both native and non-native trees. The largest population was on an undeveloped lot south of SW Watercress Way with a "For Sale" sign indicating the lot was zoned for development of "commercial marina, restaurant, hotel/motel." In February 2023, we found *O. atropurpurea* at this site beginning to flower. In March 2023, we found many *O. atropurpurea* at different stages of flowering and fruiting (Fig. 1). Below plants with mature fruit, we observed many fallen fruits.

Except for our observations, there were photos of *Ochna atropurpurea* posted on iNaturalist from only one other site in North America — an observation of *O. atropurpurea* (misidentified as *O. serrulata*) from 4 March 2022 with flowers and fruit that has been trimmed to form a 1-meter tall hedge in the southwestern part of site A (inaturalist.org/observations/107898236; blue point in Figs. 4–5).

In April 2024, we searched the area in Port Salerno (site B; Figs. 3 and 6) that was the source of the first three FLAS vouchers of *Ochna atropurpurea* from Martin County (collected in 1993–2004; see above). We found hundreds of individuals of the species, ranging from seedlings to 7-meter tall trees, growing in both wooded areas and landscaped yards adjacent to SE Great Pocket Trail and SE Miles Grant Road (Fig. 6). Many of the plants bore large clusters of fruit (Fig. 2). We did not search

on SE Post Terrace, which had signs saying it was a private road for residents only. The collector of the voucher from this site no longer lives there.

In April 2024, we visited the address in Stuart where the fourth *Ochna atropurpurea* voucher from Martin County was collected in 2016 (Fig. 4; site C; see above). The current occupant said there were no plants in her yard fitting the description of *O. atropurpurea*, and she would not let us go back and look. In the yard of the house next door (2099 SE Riverside Terrace), however, there were many small *O. atropurpurea* plants growing under *Casuarina equisetifolia* next to SE Wentworth Drive (Fig. 6). In addition, over the low rear fence along SE Wentworth Drive, we photographed mature *O. atropurpurea* trees with large clusters of fruit growing in both backyards. It seems likely that this population extends to properties beyond these two yards.

In Palm Beach County, we did not find *Ochna atropurpurea* in the High Ridge Scrub Natural Area and surrounding areas. Lee Lietzke (pers. comm.) believes that the population was completely extirpated from the reserve in 2007. The one other *O. atropurpurea* voucher from Palm Beach County (see above) was collected at a residence by Mike Zimmerman of Zimmerman Tree Service, whose business address, which is ~5 kilometers west of High Ridge Scrub Natural Area, is listed on the voucher label. Mike Zimmerman (pers. comm.) does not remember the location of the residence.

DISCUSSION

We documented populations of *Ochna atropurpurea* established outside cultivation at three sites in Martin Co., Florida (Figs. 4–6). There were earlier unpublished records of this species from all three sites, but the earlier photographs posted to iNaturalist from site A had been misidentified, and the earlier FLAS vouchers from sites B and C may have been deemed to be from cultivated populations. These three sites are now the only known populations of naturalized *O. atropurpurea* extant in North America. Where the founders of these populations originated, how they arrived in Martin County, and whether this species has spread elsewhere in Martin County is unknown.

Given the attractiveness of *Ochna atropurpurea* flowers and fruits (Figs. 1–2), it is likely that there are additional populations growing in backyards and gardens in Martin County. We found this species treated as an ornamental hedge or small tree in several landscaped yards, but most plants were growing in undeveloped wooded areas. This suggests that *O. atropurpurea* will probably, and perhaps already has, spread in other parts of Florida. While the spread of this species at the three sites in Martin County has been in landscaped and wooded areas within residential neighborhoods, the population at site B extends to within 400 m of Seabranch Preserve State Park (Fig. 4). It would be useful to survey for possible naturalized populations of *O. atropurpurea* in areas around where other FLAS vouchers were collected, in Manatee and Miami-Dade counties, as well Marie Selby Botanical Gardens in Sarasota County, the source of seeds for greenhouse plants grown in Alachua County (see above).

The observed high localized densities but limited spread of *Ochna atropurpurea* in Martin County indicates fairly short-range dispersal. It is possible that this species lacks efficient seed dispersers in Florida. Continued land development, however, may facilitate its spread. For example, in the past year a wooded section of site A with *O. atropurpurea* on the east side of Kanner Highway has been cleared of all vegetation in preparation for the construction of a new neighborhood and shopping center. The dumpsite for the removed vegetation may have received an influx of *O. atropurpurea* plants and seeds. Similarly, discarded trimmings from *O. atropurpurea* growing in landscaped areas may be taken to dumpsites.

From elsewhere in the New World, a voucher at MO of *Ochna atropurpurea* from Puerto Rico (tropicos.org/specimen/3220310) with the following collection information: "On hill, Villa Capri, Río Piedra; Shrub or small tree, to 4 m tall, flowers yellow; Feb. 19, 1984." In addition to Martin County observations, there are photos of *O. atropurpurea* on iNaturalist from four other New World sites, three

in Puerto Rico and one in El Salvador. Two are in urban forests south of San Juan, Puerto Rico — in the Bosque Urbano Doña Inés Mendoza (inaturalist.org/observations/55251286 and 162338845) and around the now abandoned Casa Klum (inaturalist.org/observations/66854600 and 68423410). Of greater concern is an observation from San Cristóbal Canyon Protected Natural Area, a forested preserve near the center of the island (inaturalist.org/observations/161652790). The one site in El Salvador, the Jardín Botánico La Laguna, San Salvador, had two observations of *O. atropurpurea* (inaturalist.org/observations/21741041 and 111057025). The status of *O. atropurpurea* populations in Puerto Rico and El Salvador deserves attention.

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Figure 1. *Ochna atropurpurea* flowering at site A in Stuart, Florida.

Figure 2. *Ochna atropurpurea* fruiting at site B in Port Salerno, Florida.

Figure 3. *Ochna atropurpurea* growing under *Casuarina equisetifolia* at site C in Stuart, Florida.

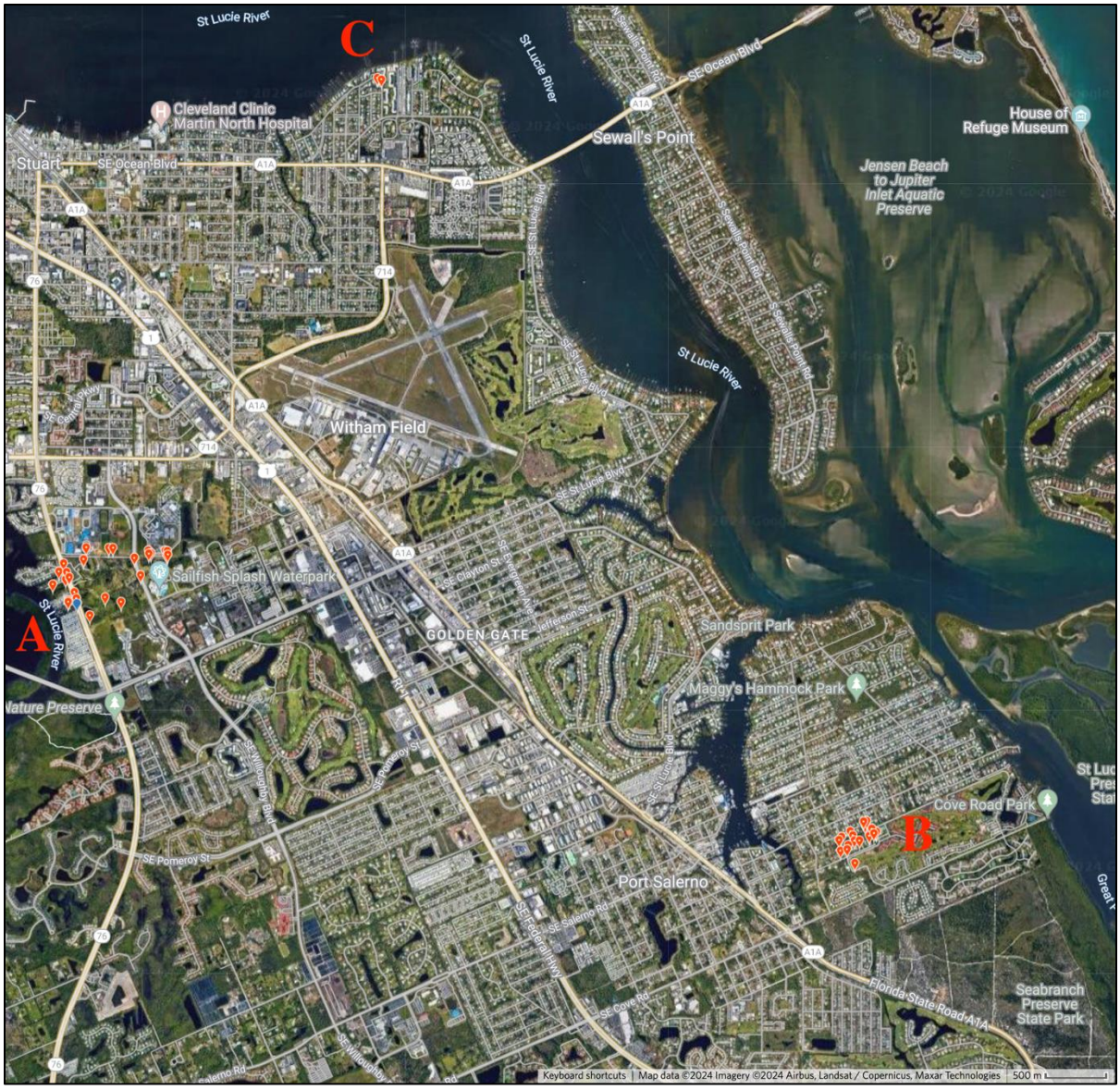

Figure 4. Three *Ochna atropurpurea* sites in northeastern Martin Co., Florida. Red points = our observations; blue point = March 2022 iNaturalist observation (see Results). Mapped using iNaturalist.

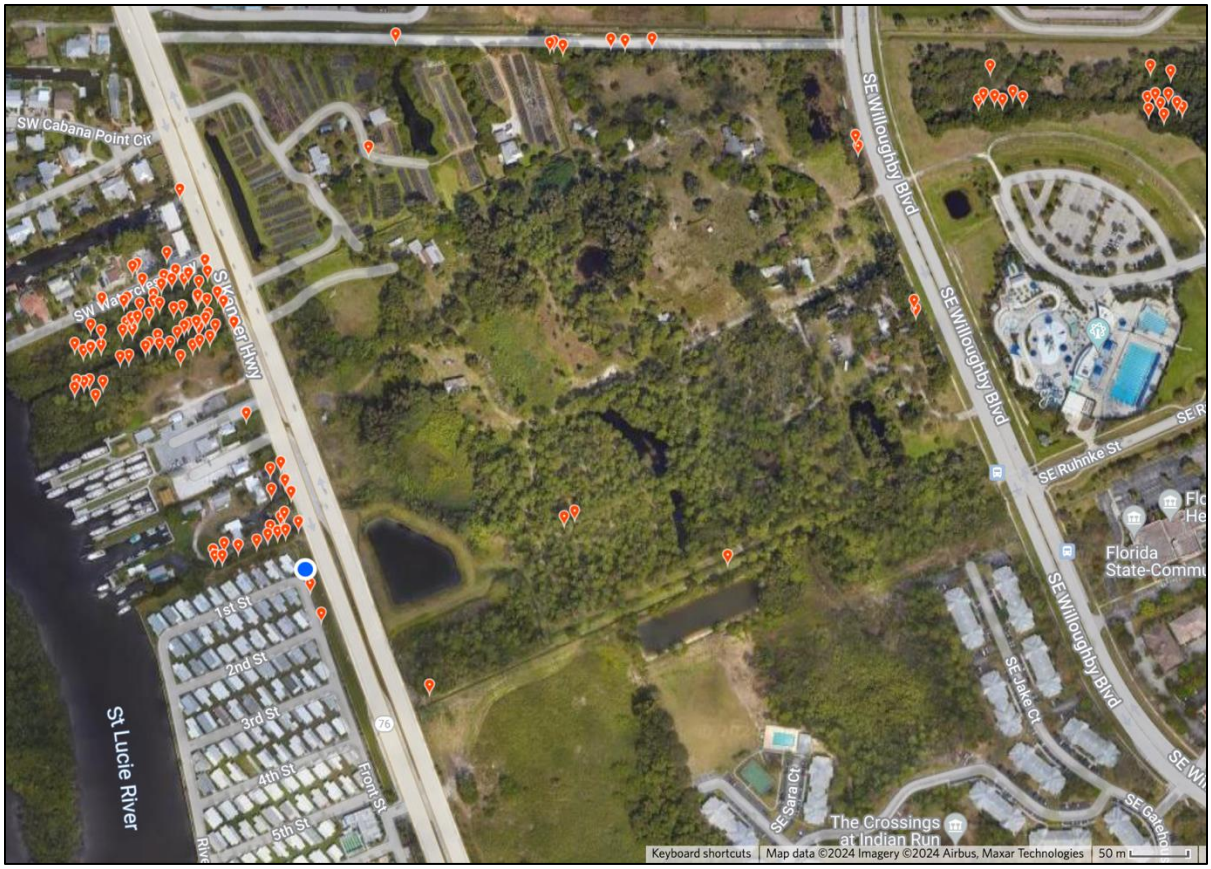

Figure 5. *Ochna atropurpurea* observations posted to iNaturalist at site A in Stuart, Florida. Red points = our observations; blue point = March 2022 iNaturalist observation (see Results). Mapped using iNaturalist.

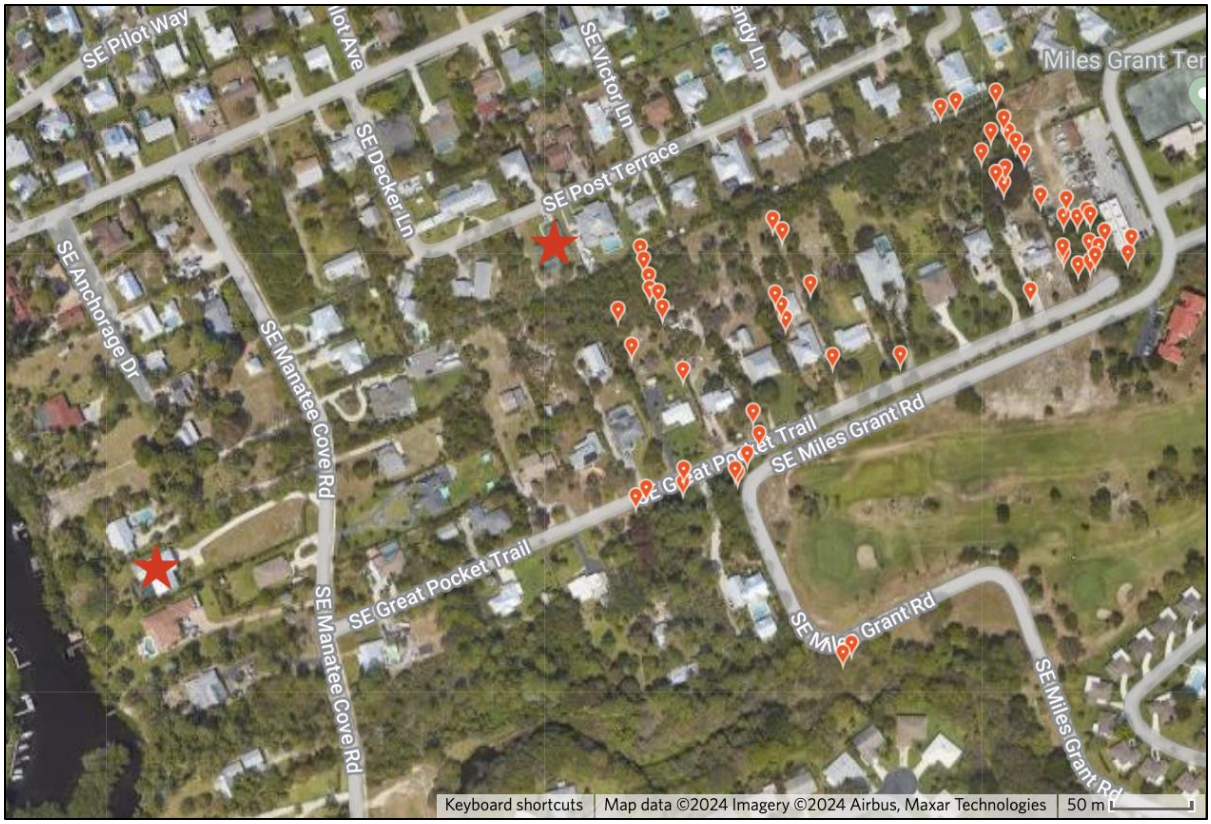

Figure 6. *Ochna atropurpurea* observations posted to iNaturalist at site B in Port Salerno, Florida. Red points = our observations; red stars = FLAS voucher collector homes (see Introduction). Mapped using iNaturalist.