



## Rediscovery of *Eugenia fajardensis* (Myrtaceae), a rare tree from the Puerto Rican Bank

JORGE C. TREJO-TORRES<sup>1,\*</sup>, MARCOS A. CARABALLO-ORTIZ<sup>2,6,\*</sup>, MIGUEL A. VIVES-HEYLIGER<sup>3</sup>, CHRISTIAN W. TORRES-SANTANA<sup>4,7</sup>, WILLIAM CETZAL-IX<sup>5</sup>, JOEL A. MERCADO-DÍAZ<sup>2</sup> & TOMÁS A. CARLO<sup>6</sup>

<sup>1</sup>The Institute for Regional Conservation, 100 East Linton Boulevard, Suite 302B, Delray Beach, Florida 33483 USA.

E-mail: karsensis@yahoo.com.mx

<sup>2</sup>Herbario UPR, Jardín Botánico de la Universidad de Puerto Rico, 1187 Calle Flamboyán, San Juan, Puerto Rico, 00926. Current Address: <sup>6</sup>.

<sup>3</sup>Carr. 485 km 3.1, Barrio San José, Quebradillas, Puerto Rico, 00678.

<sup>4</sup>U.S. Department of Agriculture, Forest Service, International Institute of Tropical Forestry, Jardín Botánico Sur, 1201 Calle Ceiba, Río Piedras, Puerto Rico, 00926.

<sup>5</sup>Centro de Investigación Científica de Yucatán, A. C., Herbario CICY, A. P. 87, Cordemex, Mérida 97310, Yucatán, México.

<sup>6</sup>Pennsylvania State University, Department of Biology, 208 Mueller Laboratory, University Park, Pennsylvania, 16802, USA.

<sup>7</sup>Arboretum Parque Doña Inés, Fundación Luis Muñoz Marín, RR 2, Buzón #5, San Juan, Puerto Rico 00926.

\*These authors contributed equally to this work.

### Abstract

*Eugenia fragrans* var.? *fajardensis* was described in 1895 and raised to species status in 1923 as *E. fajardensis*. In 1925, it was relegated to the synonymy of *Ananomis fragrans* (*Myrcianthes fragrans*). Since 2001, we have re-discovered wild plants and herbarium specimens, including a previously unidentified isotype of *E. fajardensis*, supporting the validity of this species. Here we designate a lectotype and an epitype for *E. fajardensis*. In addition, we provide: 1) an extended description for the species including the previously unknown flowers and fruits, an illustration, and photographs of live plants, 2) a key for the 24 taxa of *Eugenia* reported for Puerto Rico and the Virgin Islands, and 3) descriptions of the three known populations. These populations collectively hold 182 plants in the islands of Puerto Rico, Culebra, and Vieques. Based on the IUCN Red List Criteria, *E. fajardensis* meets the requirements to be considered a Critically Endangered species.

### Resumen

*Eugenia fragrans* var.? *fajardensis* fue descrita en 1895 y elevada al estatus de especie en 1923 como *E. fajardensis*. En 1925, esta especie fue relegada como un sinónimo de *Ananomis fragrans* (*Myrcianthes fragrans*). Desde el 2001, hemos redescubierto poblaciones silvestres y especímenes de herbario, incluyendo un isotipo previamente desconocido de *E. fajardensis*, los cuales apoyan la validez de la especie. En este artículo designamos un lectotipo y un epitipo para *E. fajardensis*. Además, proveemos: 1) una descripción extendida de la especie incluyendo flores y frutos, anteriormente desconocidos, una ilustración, y fotografías de plantas vivas, 2) una clave para distinguir los 24 taxones del género *Eugenia* reportadas para Puerto Rico e Islas Vírgenes, y 3) descripciones de las tres poblaciones conocidas. Estas poblaciones en conjunto contienen 182 plantas en las islas de Puerto Rico, Culebra y Vieques. De acuerdo con los Criterios de la Lista Roja del UICN, *E. fajardensis* cumple con los requisitos para ser considerada una especie en Peligro Crítico de Extinción.

**Key words:** Antilles, Caribbean, Culebra, Fajardo's big guava, "guayabota de Fajardo", Puerto Rico, Vieques, West Indies.

### Introduction

In 1885 Paul Ernst Emil Sintenis collected a new species of *Eugenia* Linnaeus (1753: 470) during his three-year expedition documenting the flora of Puerto Rico. The specimen was then sent to Berlin and described by Leopold Krug and Ignatz Urban as *Eugenia fragrans* (Swartz 1788: 79) Willdenow (1799: 964) var.? *fajardensis* Krug & Urban

(1895: 665), honoring Fajardo, the municipality where it was first collected. The question mark in the original name indicates that the classification as a variety was tentative, a matter that Urban changed in 1923 by raising it to species rank as *Eugenia fajardensis* (Krug & Urban 1895: 665) Urban (1923: 109).

However, *E. fajardensis* was not accepted as a distinct species by Britton & Wilson (1925; 1926), who considered it a synonym of *Ananomis fragrans* (Swartz 1788: 79) Grisebach (1860: 240). Later authors considered it a synonym of *Myrcianthes fragrans* (Swartz 1788: 79) McVaugh (1963: 485) (Liogier 1994; Liogier & Martorell 1982; Acevedo-Rodríguez & Strong 2007; 2012). Nevertheless, Roy Woodbury still recognized *E. fajardensis* as a distinct taxon, noting that it was a rare and poorly known species (Woodbury 1975; 1981).

The uncertainty regarding the status of *E. fajardensis* was reinforced by the use of the unpublished combination *Myrcianthes fajardensis* (Krug & Urban) Alain, as a synonym of *M. fragrans*, in important floristic studies for the region (Little *et al.* 1974; 1988). Woodbury (1981) also used the name *M. fajardensis?* in his unpublished report on the flora of Culebra. The confusion between *E. fajardensis* and *M. fragrans* was promoted further by the fact that Woodbury used the same collection code (*Woodbury V-19*) for specimens of both *E. fajardensis* and *M. fragrans* collected from the same site.

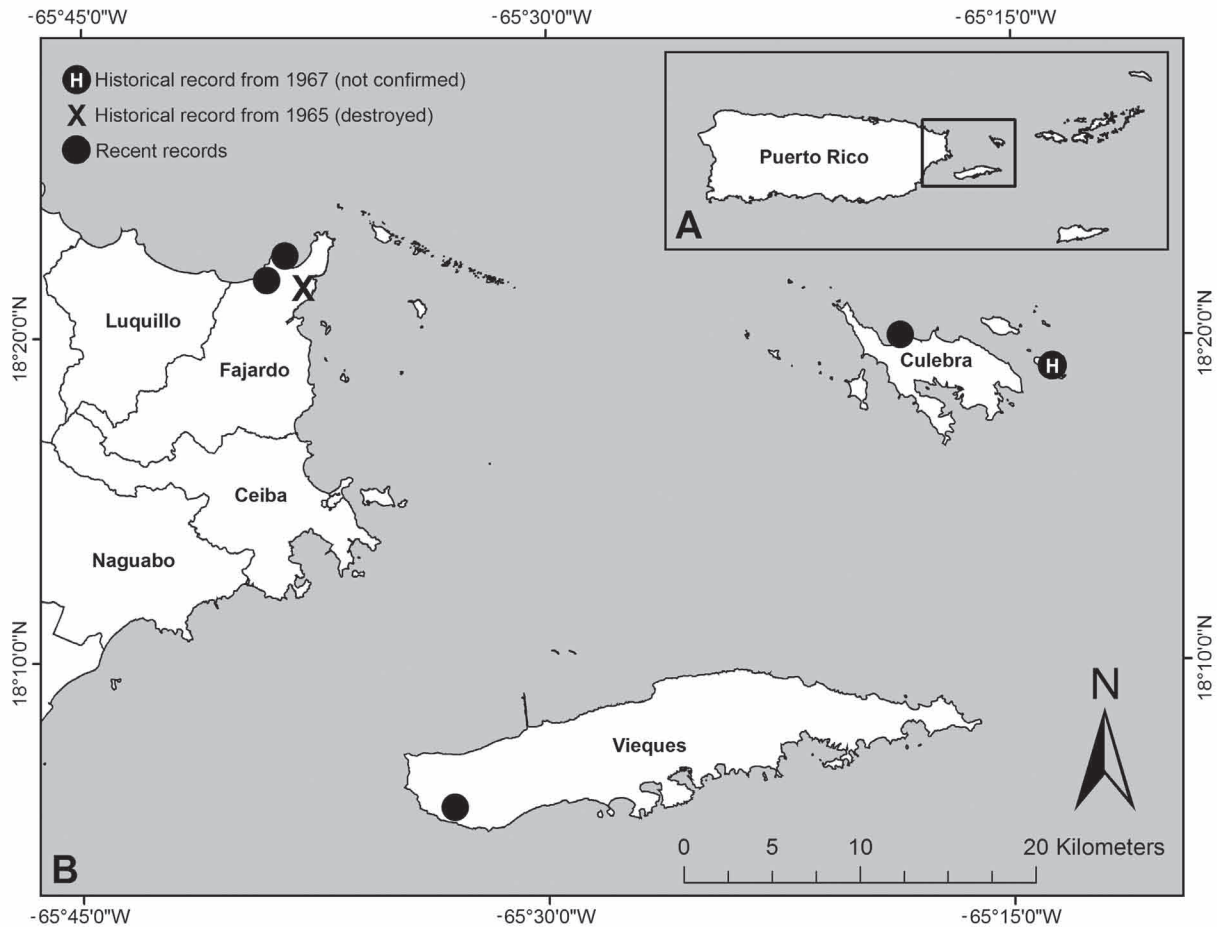
We consider *E. fajardensis* to be a distinct species based on our examination of an undetermined isotype, additional herbarium material, and extant populations. We designate the isotype as lectotype for the name because the holotype was lost during WWII (Robert Vogt, curator of Herbarium B, pers. comm., 2014). This lectotype is sterile, therefore we designate an epitype to provide the missing fruiting characters that unambiguously distinguish *E. fajardensis* from *M. fragrans*. We provide 1) an expanded description of the species, an illustration, and photographs of live plants and habitats, 2) information on the distribution, habitat, phenology, and common names for *E. fajardensis*, 3) a discussion of the characters that distinguish it from similar species of Myrtaceae, 4) a key for the 24 taxa of *Eugenia* reported for Puerto Rico and the Virgin Islands, 5) counts of individuals in the three sites where we have documented the species and 6) a discussion on some aspects on the conservation of the species.

## Rediscovery of *Eugenia fajardensis* in the wild

In 2001 MAVH discovered an unknown Myrtaceae (later found to be *E. fajardensis*) on the upper slopes of Monte Pirata Mountain in western Vieques (an island-municipality of Puerto Rico) (Fig. 1). From 2005 to present, additional surveys throughout Vieques have resulted on the discovery of 20 individuals of *E. fajardensis* at all life stages, all restricted to Monte Pirata (Fig. 1). In Culebra (another island-municipality of Puerto Rico), field explorations throughout the island since 2005 have located 28 plants of *E. fajardensis* in the mid slopes of a small peninsula between Flamenco and Resaca beaches in the northern part of the island (Fig. 1). Explorations in the municipality of Fajardo have resulted in the discovery of 136 plants in the western part of Bahía Las Cabezas (Seven Seas Public Beach) and on a small hill at El Convento Norte (Fig. 1). In summary, *E. fajardensis* is currently known from 182 individuals (71 of them reproductive or potentially reproductive) representing all life stages, in three sites in the islands of Culebra, Puerto Rico, and Vieques (Table 1).

**TABLE 1.** Demographic and descriptive data of the populations of *Eugenia fajardensis*: Column 1.- Estimated number of individuals categorized by life stage (R = reproductive or potentially reproductive; SA = saplings; SE = seedlings); Column 2.- Estimated percentage of plants protected (i.e., habitat legally protected, <sup>1</sup>Culebra National Wildlife Refuge, <sup>2</sup>Seven Seas Natural Reserve, <sup>3</sup>Northeast Ecological Corridor Natural Reserve, and <sup>4</sup>Vieques National Wildlife Refuge); Column 3.- Habitat description (the exact locality where the plant was collected within Culebra is unknown); Column 4.- Elevation range (m.a.s.l. = meters above sea level); and Column 5.- Annual Average Rainfall (AAR), obtained from Daly *et al.* (2003).

Extant Populations	Number of individuals (R / SA / SE)	Plant in protected lands (%)	Habitat	Elev. (m.a.s.l.)	AAR (mm)
Culebra island	26 (19/6/1)	85 <sup>1</sup>	Coastal dry forest along rocky dry ravines	15–100	<1000
Culebrita islet	Unknown	100 <sup>1</sup>	Coastal dry forest	ca. 1–75	<1000
Fajardo (El Convento Norte & Seven Seas Public Beach)	136 (42/21/74)	100 <sup>2,3</sup>	Moist forest on gentle slopes; coastal thickets on rocky cliffs	3–35	1500–1750
Vieques island	20 (10/10/0)	100 <sup>4</sup>	Moist forest on steep slopes	240–275	1000–1250
<b>Total</b>	<b>182 (71/37/75)</b>	<b>98%</b>		<b>1–275</b>	<b>&lt;1000–1750</b>



**FIGURE 1.** Distribution of *Eugenia fajardensis*. **A.** Map of the Bank of Puerto Rico and St. Croix. **B.** Close-up of the eastern municipalities of Puerto Rico, including Culebra and Vieques. The historical collection by Sintenis in 1885 (*Sintenis 1859*, C) was made at an unspecified locality along the coast of the municipality of Fajardo.

### *Eugenia fajardensis* in herbaria

Four specimens of *E. fajardensis* were found by JCTT while revising specimens of rare Puerto Rican plants at several herbaria in the Caribbean, Europe and North America (visited herbaria are listed in the Acknowledgements section; acronyms follow Thiers (2014)). The oldest specimen of *E. fajardensis* was collected in 1885 by Sintenis on the coast of Fajardo. It was identified only at the generic level (*Eugenia* sp.) and deposited in the herbarium at the University of Copenhagen (C). The second specimen of *E. fajardensis* was collected in 1965 by Richard Howard in the Las Croabas area in Fajardo. This specimen was also determined as *Eugenia* sp. and deposited in the herbarium at Harvard University (HUH). Roy Woodbury collected the third and fourth specimens in 1966 at Vieques (Monte Pirata), and in 1967 at Culebrita (an offshore islet of Culebra), respectively. Both specimens were found at the herbarium of the Botanical Garden of the University of Puerto Rico (UPR). The specimen from Vieques was misidentified as *Calyptanthes thomasi* O. Berg (1855–1856: 26), whereas the specimen from Culebrita was misidentified as *M. fragrans*. Collection numbers for these four specimens are provided within the Taxonomy section.

### *Eugenia fajardensis* in the literature

The botanical literature and research reports in Puerto Rico played an important role for the rediscovery of *E. fajardensis*. Key evidence to determine the identity of the taxon emerged from the species protologue, as we noticed

that the unidentified specimen found at C was an unstated isotype of *E. fajardensis*. We suspect that this duplicate specimen remained unidentified because it was sent to Copenhagen before Krug and Urban classified the species in Berlin. Important insights for the existence of the species also came from two governmental reports made by Woodbury, who in 1975 reported *E. fajardensis* for Fajardo and in 1981 (as *M. fajardensis*?) for Culebra (Woodbury 1975; 1981). However, we know of no herbarium specimens determined as *E. fajardensis* by Woodbury. Additional information on the existence of *E. fajardensis* was found on a publication on endangered plants from the Caribbean islands, in which Howard (1977: 111) mentioned the existence of “a probably new species of the Myrtaceae found in fruit” at El Conquistador Hotel in Fajardo, which we suspect corresponds to Howard’s abovementioned specimen of *E. fajardensis* collected in 1965 and deposited at HUH.

Other publications that mention *E. fajardensis* include several reports, listings, recovery, and conservations plans of endangered species, where it has been mistakenly identified as other species of Myrtaceae, such as *Eugenia woodburyana* Alain (Liogier 1980: 185) (USFWS 2007) and *C. thomasiana* (Woodbury 1975; Ayensu & DeFilipps 1978; Little & Woodbury 1980; Center for Plant Conservation 1992; USFWS 1994; Silander 1997; Clubbe *et al.* 2003; DNER 2004; 2008; USFWS 2007; Center for Plant Conservation 2010). However, recent reports clarified that *C. thomasiana* is not present on Puerto Rico or its adjacent islands (Acevedo-Rodríguez & Strong 2012; Breckon in prep.; USFWS 2013).

Based on our information, *E. fajardensis* was listed as a “Critical Element” by the Department of Natural and Environmental Resources of the Commonwealth of Puerto Rico (DNER 2008). However, this status does not imply any legal protection for the species. Subsequently, *E. fajardensis* has also been mentioned as an accepted species in a thesis (Castro-Canabal & López-Morales 2010), on governmental documents about the Northeast Ecological Corridor Natural Reserve (DNER 2010), and in two recent floristic treatments for the region (Axelrod 2011; Breckon in prep.).

## Taxonomy

*Eugenia fajardensis* (Krug & Urban) Urban, Symb. Ant. 9: 109. 1923. Figures 2 & 3.

Basionym: *Eugenia fragrans* (Swartz) Willdenow var.? *fajardensis* Krug & Urban, Bot. Jahrb. Syst. 19: 665. 1895.

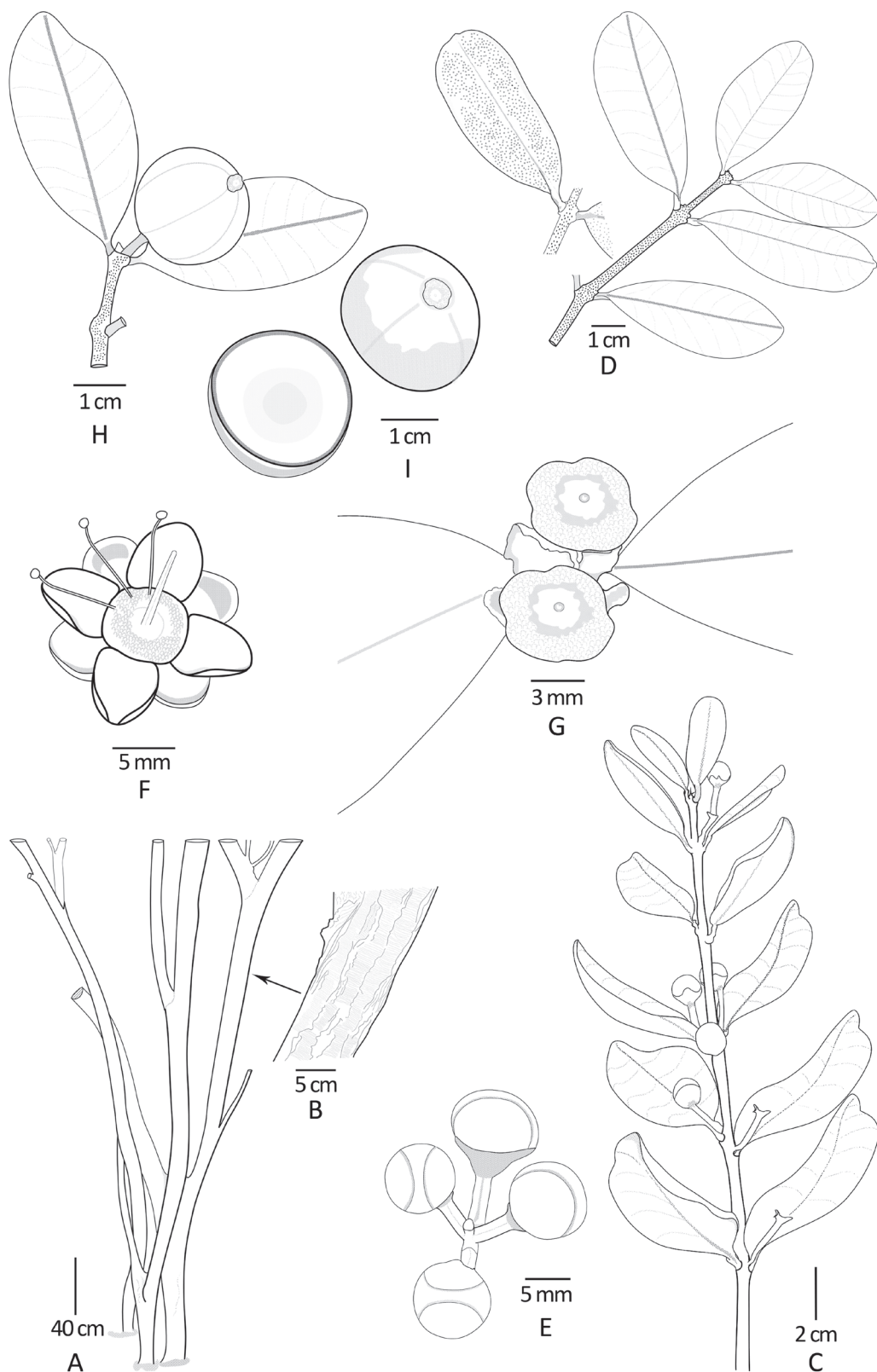
**Type**:—PUERTO RICO. Prope Fajardo, in fruticetis litoralibus, 22 May 1885, *Sintenis 1859* (holotype at B destroyed; isotype at C! here designated as lectotype).

**Epitype** (designated here):—PUERTO RICO. Fajardo, Las Croabas, slopes below El Conquistador Hotel, 18 January 1965, *Howard 16063* (HUH!).

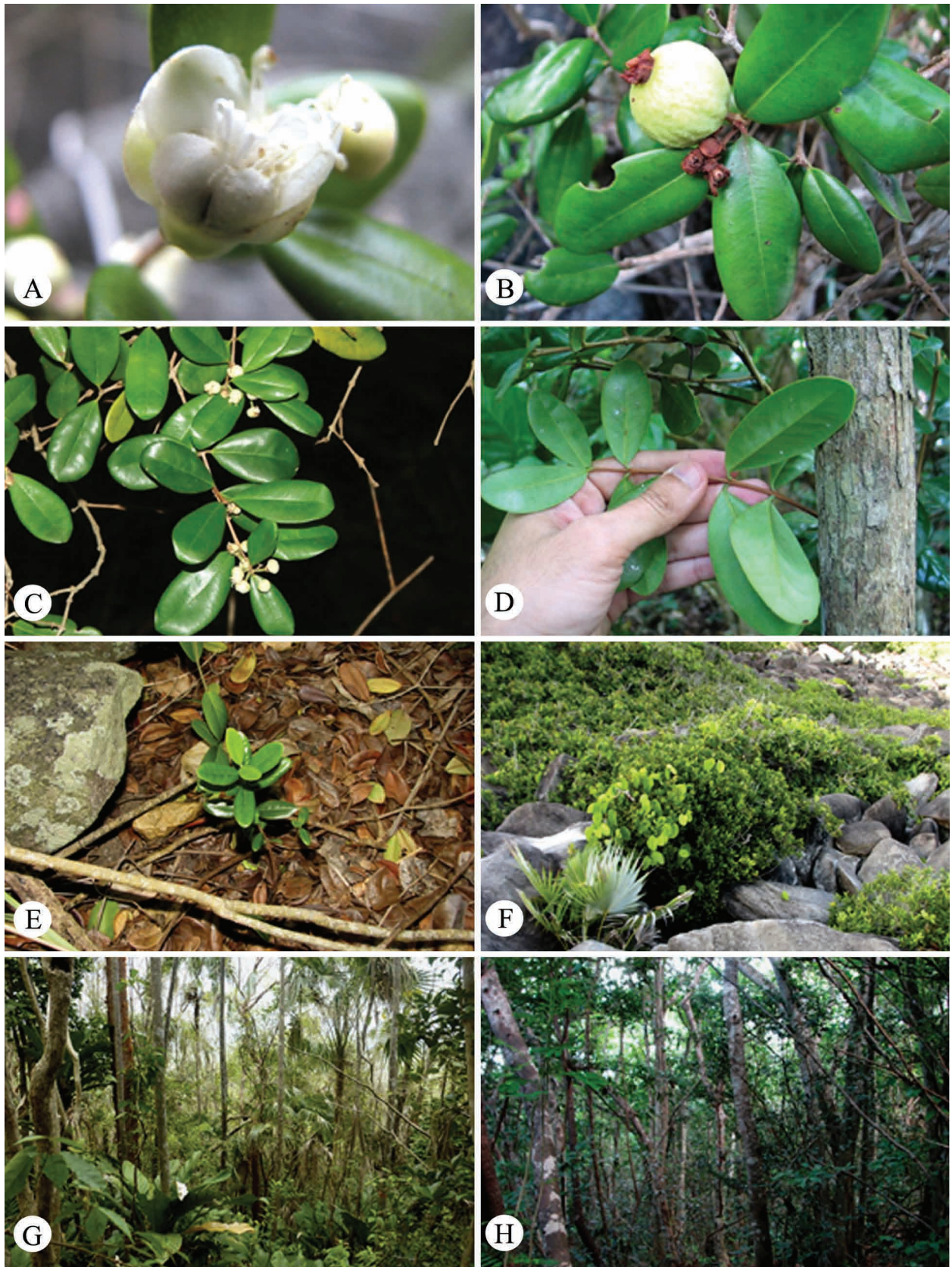
**Tree** or shrub up to 13 meters with one to several trunks, up to 13 cm in diameter; bark on trunks and mature branches vertically fissured and gray; twigs compressed, ferruginous, glabrescent. **Leaves** coriaceous and fragrant when crushed; petioles up to 3.5 × 1.5 mm; blade obovate or obovate-elliptic, 4–6 × 2.5–4.2 cm, cuneate at base, edges entire, revolute and usually white or hyaline when fresh, apex obtuse or retuse; venation brochidodromous with secondary veins finely raised on both surfaces; adaxial blade bright and smooth with central vein slightly sunken basally; abaxial blade pale and punctate, turning mammillate when dry, glands black, with central vein raised. **Inflorescences** in short racemes of up to 7 mm long, with one or two decussate pairs of flowers. **Flowers** with pedicels up to 5 × 1 mm, papillate, hirsute, pale green; buds globose-depressed, papillate; bracteoles ovate-deltoid, 1 mm long, papillate, ciliate; hypanthium broadly conical, papillate, lanose outside, brown; staminal ring square-orbicular, flat, and slightly concave around the style; sepals 4, 4–5 mm in diameter, orbiculate, pubescent abaxially and more dense towards the edges, papillate, white; petals 4, 4–5 mm in diameter, orbiculate, pubescent abaxially, papillate, white; stamens numerous, filiform, white; style linear, ca. 6 mm long, stigma neither narrowed nor swollen at apex, white. **Fruits** baccate, 2–3.5 cm in diameter, globose, bright red when ripe; peduncles up to 5 × 2 mm; endocarp lignified, 1–2 mm thick; seeds solitary, 1.7–3.2 cm in diameter; germination hypogeous.

**Distribution**:—Restricted to northeastern Puerto Rico and its adjacent islands of Culebra and Vieques, all of them under the jurisdiction of the Commonwealth of Puerto Rico (Fig. 1).

**Habitat**:—From sea level to approximately 275 m elev. (Table 1). The soil substrates on all populations are derived from volcanic rocks, and the climate is subtropical seasonally dry or moist (*sensu* Holdridge Life Zones; Gould *et al.* 2008), with a regional annual average rainfall ranging from <1000–1750 mm (Daly *et al.* 2003). The species has been found in several environments (Table 1).



**FIGURE 2.** *Eugenia fajardensis*. **A.** Multiple trunks branching. **B.** Bark with vertical fissures. **C.** Young twig with flower buds. **D.** Twig with leaves showing adaxial (right) and abaxial (left) sides. Note gland punctuation in abaxial side. **E.** Inflorescence (upper view) showing the decussately-arranged flower buds. **F.** Flower in late anthesis, with some stamens and style remaining. **G.** Flower hypanthia (upper view) with all flower whorls fallen, except dry retrorse sepals. **H.** Twig with fruit. **I.** Transverse dissection of fruit. (**A–E, G.** Based on photos from the authors. **F.** Artist reconstruction based on senescent flowers from Trejo *et al.* 3030 (UPR). **H–I.** Based on Howard 16063 (HUH)).



**FIGURE 3.** *Eugenia fajardensis*. **A.** Opening flower bud. **B.** Fully developed fruit (ripening red, not shown). **C.** Branch with leaves and inflorescences with flower buds. **D.** Bark and leaves underneath. **E.** Seedling. **F.** Scrubland habitat in Culebra island. **G.** Forested habitat in Vieques island. **H.** Forested habitat in Puerto Rico island (El Convento Norte). Images: **A–B, E–H** by CWTS; **C** by MACO; **D** by JCTT.

**Conservation:**—According to the IUCN Red List Criteria, *E. fajardensis* meets the requirements of the category Critically Endangered under the criteria C2(a)(i), which implies the highest risk of extinction (IUCN 2001). A comprehensive conservation assessment is in progress and will be presented elsewhere (Torres-Santana *et al.*, unpublished data, 2014).

**Phenology:**—Evergreen tree. It has been recorded flowering in July, August and December, and fruiting in January, July, and August. In August we observed abundant flowers on a large individual in Culebra, but no fruits were recorded during subsequent visits.

**Common name:**—No common name is known for this species. We propose the name “Fajardo’s big guava” (“guayabota de Fajardo”, in Spanish) based on the common names of similar species of *Eugenia* in Puerto Rico, and because the species was originally described from the municipality of Fajardo.

**Additional specimens examined:**—PUERTO RICO. Culebra: Culebrita islet, 1967, *Woodbury s.n.* (NY! [#00946401], UPR! [# 028396], US! [#3532185]); Bo. Flamenco, western slopes of the peninsula between Flamenco and Resaca beaches. 19 m elev., 4 Aug. 2005, *Caraballo et al. 480* (HUH!, K!, NY!, UPR!); slopes of the peninsula between Flamenco and Resaca beaches, Aug 4 2005, *Trejo et al. 3030* (MAPR!, NY!, UPR!, US!); Jan 7 2008, *Caraballo & Torres 2197* (UPR!), *2198* (NY!); May 6 2009, *Monsegur & Pacheco 1069* (MAPR!). Fajardo: Punta Cabeza Chiquita, west of Seven Seas Beach, Aug 27 2005, *Carlo & Aukema 68* (UPR!); Mar 11 2006, *Trejo 3061* (UPR!); El Convento Norte, Feb 7 2008, *Sustache et al. 1397* (SJ!); Aug 6 2011, *Torres & Mercado 18* (MAPR!, UPR!, UPRRP!, NY!, US!); May 20 2013, *Torres & Hogan 19* (UPRRP!); May 20 2013, *Acevedo-Rodriguez et al. 15599* (US). Vieques: Monte Pirata, southeastern slopes, Jun. 22 1966, *Woodbury V-19* (MAPR!, UPR!); Jan 16 2005, *Caraballo & Vives 370A* (UPR!), *370B* (MAPR!); Jun. 5 2005, *Trejo et al. 2981* (UPR!).

**Discussion:**—Given that the original description of *E. fajardensis* was based on sterile material (leafy branches), the taxon was classified tentatively in the genus *Eugenia*. During our field expeditions we found one tree in full bloom (*Caraballo et al. 480*, *Trejo et al. 3030*), allowing the examination of its flowers. In addition, the herbarium specimen collected by Howard (16063) includes two fruits, both of them with single large seeds. The morphology these reproductive structures validates its identity as a *Eugenia*. As a matter of caution, the specimen collected by Sintenis (1859) includes fragments of the inflorescence of a different, albeit common congener: *Eugenia biflora* (Linnaeus 1759: 1056) De Candolle (1828: 276).

*Eugenia fajardensis* has been confused consistently with *Myrcianthes fragrans*. Although the leaves of *M. fragrans* are variable in shape and sometimes resemble those of *E. fajardensis* (Figs. 2D & 3C), the species can be easily distinguished even from sterile specimens. The main diagnostic characters are: (1) *E. fajardensis* has a vertically fissured rough dark-grey bark (Figs. 2B & 3D), in contrast to the smooth reddish-brown and grayish bark that peels in large irregular plates (guava-like) of *M. fragrans*; (2) the axillary leaf buds of *E. fajardensis* are inconspicuous with a loose ferruginous puberulence, whereas they are conspicuous with an adpressed silvery pubescence in *M. fragrans*; (3) the flowers of *E. fajardensis* are born solitary or in simple short racemes (Figs. 2E & 3C), whereas those of *M. fragrans* are produced in elongate dichasia; and (4) the fruits of *E. fajardensis* measure up to 2.5 cm in diameter with short and stout peduncles (Figs. 2H & 3B), in contrast to those of *M. fragrans*, which are up to 1 cm in diameter on filiform peduncles. *Eugenia fajardensis* has been also confused with *E. woodburyana* because both species share leaf size, shape, and glandular dotting, as well as fruit size. However, *E. woodburyana* is distinctive in its ciliate leaves and winged fruits.

## Population descriptions

In addition to the information presented in the Habitat section, we provide here information on geography, counts of individuals, estimated areas of occupancy, and occurrence within protected areas for each of the known populations of *E. fajardensis* (see also Figure 1 and Table 1).

**Fajardo:**—The largest known population of *E. fajardensis* is located in El Convento Norte and consists of 135 plants, distributed along an area of ca. 3000 m<sup>2</sup>. The population is within the boundaries of the recently established Northeast Ecological Corridor Natural Reserve (GELAPR 2013). In addition, an isolated tree has been recorded at Bahia Las Cabezas (Seven Seas Public Beach), 1.5 km southwest of El Convento Norte, within the Seven Seas Natural Reserve. The record from Las Croabas at the peninsula Las Cabezas de San Juan, reported by Howard in 1965, was destroyed by building constructions; further explorations to locate additional individuals at the site were unsuccessful (Howard 1977). The historical specimen from 1885 was collected at an unspecified coastal locality within the municipality of Fajardo and provides no information on habitat or abundance.

**Culebra:**—The population of *E. fajardensis* at the eastern slope of the peninsula between Flamenco and Resaca beaches is distributed along an area of ca. 4000 m<sup>2</sup>. It consists of 25 individuals, of which 22 are located within the Culebra National Wildlife Refuge boundaries, and three of them (12%) inside private property. An isolated tree was found at the western slope of that peninsula. The record from the islet of Culebrita in 1967 lacks information on specific locality, abundance and habitat. Culebrita is within the Culebra National Wildlife Refuge.

**Vieques:**—The population of *E. fajardensis* at Monte Pirata is scattered along an area ca. 3000 m<sup>2</sup> and consists of about 20 individuals. The site is within the Vieques National Wildlife Refuge.

### Key to distinguish the *Eugenia* taxa reported for Puerto Rico and the Virgin Islands

*Eugenia* is the most species-rich genus in the West Indies with 239 recognized taxa, of which 218 (91%) are endemic (Acevedo-Rodríguez & Strong 2008). Myrtaceae is one of the ten most diverse families of flowering plants in the West Indies, with ca. 542 taxa, of which 494 (91%) are endemic (Acevedo-Rodríguez & Strong 2008). Such richness can pose a challenge to accurately identify taxa to species level and below, especially when the available taxonomic keys are outdated or incomplete, most of the specimens lack reproductive structures, many species are poorly known and/or have incomplete descriptions, and key characters to discern species in the field are rarely available.

Here we present a key to distinguish all the *Eugenia* reported for Puerto Rico and the Virgin Islands. This key includes the taxa recognized for Puerto Rico by Axelrod (2011) and for the Virgin Islands by Acevedo-Rodríguez (1996). We also include notes on distributions and habitats whenever possible to assist with recognition of taxa in the field. Regional endemic taxa are indicated as follows: Puerto Rico (PR), and the Virgin Islands (VI).

1. Leaf apex obtuse, rounded or emarginate (a few acute leaves sometimes present in *E. sessiliflora* Vahl) ..... 2.
- Leaf apex acute, acuminate or mucronate ..... 11.
2. Leaf base obtuse or cuneate ..... 3.
- Leaf base cordate ..... 9.
3. Mature fruits > 1 cm in diameter ..... 4.
- Mature fruits ≤ 1 cm in diameter ..... 7.
4. Flowers sessile; PR and VI ..... *E. sessiliflora*
- Flowers pedicellate ..... 5.
5. Leaf margins ciliate; fruits distinctively winged; lowlands in southern PR ..... *E. woodburyana*
- Leaf margins glabrous; fruits without wings ..... 6.
6. Leaves 4–5 cm; margins revolute; pedicels 0.5 cm long; lowlands in eastern PR (including Culebra and Vieques islands) ..... *E. fajardensis*
- Leaves 6–9 cm long; margins flat; pedicels 0.6–1 cm long; high elevation forests throughout PR ..... *E. stahlii* (Kiaerskov) Krug & Urban
7. Leaves broadly elliptic; margins flat ..... *E. cordata* (Swartz) De Candolle var. *sintensisii* (Kiaerskov) Krug & Urban
- Leaves narrowly elliptic or obovate; margins revolute ..... 8.
8. Leaves ≤ 3.7 cm long; petioles 0.5 cm; inflorescence cauliflorous; moist and wet forests in western PR ..... *E. padronii* Alain
- Leaves > 3.7 cm; petioles 0.2 cm long or less; inflorescence axillary; mid and low elevations in dry forests and coastal habitats ..... *E. foetida* Persoon
9. Leaves 1.8–2.5 [rarely –5] cm; pedicels absent or < 0.1 cm; fruits 0.6 cm diameter; lowlands in eastern PR and VI ..... *E. cordata* (Swartz) De Candolle var. *cordata*
- Leaves 3.1–6.2 cm; pedicels > 0.5 cm; fruits > 1.5 cm diameter ..... 10.
10. Inflorescence axillary; pedicels 0.9–3.1 cm; fruits 1.8 cm diameter; summit of mountain forests in central and eastern PR ..... *E. borinquensis* Britton
- Inflorescence cauliflorous; pedicels 0.5–0.9 cm; fruits 2–3 cm diameter; deciduous and scrubby forests in VI (Saint John) ..... *E. earhartii* Acevedo-Rodríguez
11. Petioles ≤ 0.3 cm ..... 12.
- Petioles > 0.3 cm ..... 14.
12. Leaf base obtuse or cuneate; mountain forests at high elevations in central and western PR ..... *E. stewardsonii* Britton
- Leaf base cordate, oblique or truncate ..... 13.
13. Leaf blade 1.8–2.5 [–5] cm; base cordate; petioles absent or < 0.1 cm; lowlands in eastern PR and VI ..... *E. cordata* var. *cordata*
- Leaf blade 10–18 cm; base oblique, truncate or slightly cordate; petiole 0.2–0.3 cm; forests at middle and high elevations in PR ..... *E. haematocarpa* Alain
14. Fruits > 1.5 cm diameter; PR ..... *E. stahlii*
- Fruits ≤ 1.5 cm ..... 15.
15. Pedicels absent (flowers sessile) or ≤ 0.2 cm long ..... 16.
- Pedicels > 0.2 cm long ..... 19.
16. Leaves > 3.7 cm long ..... 17.
- Leaves ≤ 3.7 cm long ..... 18.



17.	Leaves elliptic or obovate; fruits rounded, ripening red .....	<i>E. cordata</i> var. <i>sintensis</i>
-	Leaves elliptic-ovate; fruits oblong, ripening black .....	<i>E. glabrata</i> (Swartz) De Candolle
18.	Leaves oblanceolate; leaf blade strongly revolute .....	<i>E. foetida</i>
-	Leaves ovate to narrowly ovate; leaf blade flat or revolute only at the base .....	<i>E. monticola</i> (Swartz) De Candolle
19.	Inflorescences fasciculate, or with few flowers ( $\leq 5$ ), or flowers solitary .....	20.
-	Inflorescences of numerous flowers ( $>5$ ) in racemes or panicles .....	26.
20.	Inflorescences fasciculate .....	21.
-	Inflorescences of few flowers ( $\leq 5$ ), or flowers solitary .....	23.
21.	Leaf blade strongly coriaceous and stiff; apex bent downward; petioles $> 0.5$ cm long .....	<i>E. confusa</i> De Candolle
-	Leaf blade slightly coriaceous; apex not bent; petiole $\leq 0.5$ cm long .....	22.
22.	Fruits 0.6 cm in diameter .....	<i>E. procera</i> (Swartz) Poirlet
-	Fruits 0.9–1.5 cm in diameter .....	<i>E. rhombea</i> (O. Berg) Krug & Urban
23.	Twigs with lanceolate or linear bracts .....	<i>E. ligustrina</i> (Swartz) Willdenow
-	Twigs without lanceolate or linear bracts .....	24.
24.	Petiole $> 0.6$ cm; inflorescence cauliflorous .....	<i>E. laevis</i> O. Berg
-	Petiole $\leq 0.6$ cm; inflorescence axillary or terminal .....	25.
25.	Twigs pubescent; petioles often reddish or purple .....	<i>E. axillaris</i> (Swartz) Willdenow
-	Twigs glabrous; petioles green .....	<i>E. pseudopsidium</i> Jacquin
26.	Leaves $> 6$ cm long .....	27.
-	Leaves $\leq 6$ cm long .....	<i>E. biflora</i>
27.	Fruits smooth .....	<i>E. domingensis</i> O. Berg
-	Fruits verrucose; PR .....	<i>E. eggersii</i> Kiaerskov

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