

THE RESURRECTION AND LECTOTYPIIFICATION OF
TETRAZYGIA FADYENII (MELASTOMATACEAE:
MICONIEAE): A HUMMINGBIRD-POLLINATED TREELET
ENDEMIC TO JAMAICA

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ABSTRACT

In the course of a cladistic analysis and systematic revision of *Charianthus* (Melastomataceae: Miconieae), it was discovered that one species, *C. fadyenii* (Hook.) Griseb., is unrelated to the other members of that genus, and this species is thus reassigned to *Tetrazygia*.

RESUMEN

En el curso de un análisis cladístico y revisión sistemática de *Charianthus* (Melastomataceae: Miconieae), se descubrió que una especie, *C. fadyenii* (Hook.) Griseb., no está relacionada a los otros miembros de este género y por ello es reasignado a *Tetrazygia*.

INTRODUCTION

Tetrazygia fadyenii is a very attractive melastome endemic to the Greater Antillean island of Jamaica. This species was first described by W. J. Hooker (1849) as *Tetrazygia fadyenii*. A. H. R. Grisebach (1864), misled by superficial morphological adaptations common to hummingbird-pollinated plants, transferred the species to *Charianthus* Don. The incorrect placement of this species (as *C. fadyenii* (Hook.) Griseb.) persisted through subsequent classifications and floristic treatments by Triana (1871), Cogniaux (1891), Hodge (1941), Adams (1972), and Howard (1989). Judd and Skee (1991) recognized the non-monophyletic circumscription of *Charianthus*, and transferred this species to *Miconia* sect. *Miconia*. Convergent evolution, likely driven by parallel shifts to bird pollination in *Charianthus* and *Tetrazygia fadyenii*, has resulted in the presence of relatively large, red, pseudocampanulate corollas and nectar production in both taxa. We note that J. Dan Skee, Jr. has observed hummingbirds visiting flowers of *T. fadyenii* (pers. comm.; Skee & Samuels 1840).

In the course of cladistic analyses of *Charianthus* based on both morphology and nuclear ribosomal ITS sequences (Penneys 2001, in prep.), it was discovered that numerous morphological and molecular synapomorphies unite

the six species of that clade. As newly circumscribed (Penneys 2001), *Charianthus* is the only plant genus endemic to the Lesser Antilles.

Additionally, *Tetrazygia fadyenii* was found to form a clade with *T. bicolor* and *T. crotonifolia* (and presumably, other species of *Tetrazygia*). Although *T. fadyenii* is currently best placed within *Tetrazygia*, ongoing investigations by the authors (and collaborators) on the phylogenetics of the Miconieae are needed to confirm this placement. The monophyly of *Tetrazygia* is supported in our preliminary analyses, but additional investigations, using more species, are needed. The monophyly of *Miconia* is doubtful, and recognition of other genera within the tribe may make *Miconia* paraphyletic, but this matter is beyond the scope of this paper.

Some morphological characters distinguishing *Tetrazygia fadyenii* from *Charianthus* and uniting it with *T. bicolor* include: the presence of druse crystals (vs. these lacking), anthers opening by terminal pores (vs. slits), a 2-loculate (vs. 4-loculate) ovary, presence of mite domatia (vs. such structures lacking), spatulate (vs. broadly ovate) petals, the calyx constricted above the ovary (vs. not constricted), an adaxial thickening of the anther base (vs. anther base non-thickened), and rounded branches (vs. flat branches) of the stellate hairs. The presence of a hypanthium strongly constricted in fruit above the ovary may be a synapomorphy for *Tetrazygia*, and is clearly evident in *T. fadyenii*. Thus, this distinctive species should again be known by its basionym, *T. fadyenii*. Its resemblance to *Charianthus* is superficial. As outlined above, these similarities presumably reflect convergent adaptations to bird pollination.

It is also of interest that the species of *Tetrazygia* occur chiefly over limestone, as does *T. fadyenii*, while the species of *Charianthus* sensu stricto grow on volcanic substrates.

Jamaica is home to four species of *Tetrazygia*, of which three are considered to be endemic (Adams 1972). This pattern of endemism is the norm for *Tetrazygia* throughout its range; the majority of species in the genus are single-island endemics. *Tetrazygia fadyenii* can be distinguished from other Jamaican members of the genus by the combination of elliptic (rarely widely elliptic or narrow obovate), essentially glabrous leaves, and bright red petals that are 9.5 to 13.5 mm long.

TAXONOMIC TREATMENT OF *TETRAZYGIA FADYENII*

Tetrazygia fadyenii Hook., Hooker's J. Bot. Kew Gard. Misc. 1:379, t. 12. 1849. *Charianthus fadyenii* (Hook.) Grisebach, Fl. Br. W. Ind. Isl. 264. 1864. *Miconia fadyenii* (Hook.) W. Judd & Skee, Bull. Florida Mus. Nat. Hist. 36(2):25–84. 1991. LECTOTYPE, designated here: "Melastoma. Hab – [illegible] District St. Anns [sic]. This is the most beautiful plant I have seen in Jamaica. Seeds 227." Macfadyen (K, H2001/02842-1, fragment A!). ISOLECTOTYPES, designated here: "Jamaica. Dr. McFadyen *Tetrazygia fadyenii*." (K, H2001/02842-2, fragment D!); "*Tetrazygia? fadyenii* Hook. Kew Journ. 1849. Jamaica. Macfadyen. Hooker 1849." (K, H2001/02842-3, fragment G!).

Nomenclatural note.—Three sheets located at K must be considered in the lectotypification of *Tetrazygia fadyenii* Hook. Each of the three sheets contain three twigs, which have been designated with consecutive letters for clarity, thus, sheet H2001/02842-1 has fragments labeled A through C, H2001/02842-2 with fragments D through F, and H2001/02842-3 with fragments G through I. All specimens designated here as lectotype material were seen by Hooker in 1849, or earlier, and were collected by MacFadyen. Proof of this is demonstrated either by their label data or by representation in the illustration of the species published by Hooker in 1849.

The BM collection H2001/02842-1 has attached to it the illustration that accompanied Hooker's description of the new species (Hooker's J. Bot. Kew Gard. Misc. 1:379, t. 12. 1849.). In that description, Hooker noted that MacFadyen provided him with specimens of the species, which he then named in his honor. This sheet also has a label, presumably written in the field by MacFadyen, that reads, "*Melastoma* sp. Hab – [illegible] District St. Anns[sic]. This is the most beautiful plant I have seen in Jamaica. Seeds 227." Written in a different hand at the top of that label is "*Charianthus* sp. nov." Fragment A, a leafy twig in fruiting condition, is here selected as the lectotype of *Tetrazygia fadyenii* Hook. This collection is from the Hooker herbarium, and was annotated by Hooker as *T. fadyenii* Hook. A fruit and seed of fragment A are represented as figures six and seven in the abovementioned illustration. Fragment B is in bud and flower, but cannot be definitively considered to have been seen by Hooker. Fragment C is a poor, sterile specimen.

Label data are completely lacking on H2001/02842-2. However, fragment D, at least, was observed by Hooker, who wrote next to that flowering twig, "Jamaica. Dr. McFadyen *Tetrazygia fadyenii*." This fragment was likely used for the habit (figure unnumbered) and flower figures two and three of the illustration cited above, which it very closely resembles, and we consider it to be an isolectotype. Fragment E is a smaller flowering twig, and F is nothing more than a scrap with five mature fruits and the date 1850. The sheet is annotated in an unidentified hand as *Charianthus fadyenii* Griseb.

From the sheet H2001/02842-3, it may be presumed that Hooker sent material of *Tetrazygia fadyenii* to Bentham as this sheet has "Herbarium Benthamianum 1854" stamps next to fragments G and I. Fragment G is a small flowering specimen overlaid by a label stating: "*Tetrazygia? Fadyenii* Hook. Kew Journ. 1849. Jamaica Macfadyen. Hooker 1849." It, therefore, appears that this fragment was included with the material originally under consideration by Hooker when he described the species. We consider it to be a possible additional isolectotype. The fruiting (and sparsely budding) twig H cannot definitively be assigned to either of the other two samples of this sheet. Fragment I is a budding twig with a label glued over it on which it is written, "Jamaica. Hooker 1843." The collec-

tor of fragment I is unknown. This sheet is annotated below as "*Charianthus fadyenii* Griseb. Triana in Linn. Trans. Vol. 28, p. 99."

Description.—Evergreen shrubs or small trees to 10 m high. Druse crystals present. Bark smooth to shallowly, longitudinally fissured; young twigs terete (slightly quadrangular), gray-brown, essentially glabrous but with a very sparse indumentum of inconspicuous, stellate and unicellular, uniseriate hairs, the stellate hairs ca. 0.09–0.13 mm in diameter, nodes (1.93–)2.13–3(–5) mm in diameter, a slightly expanded, inconspicuous interpetiolar ridge present, with inconspicuous stellate pubescence, the hairs (0.05–)0.08–0.19(–0.21) mm in diameter. Leaf blade coriaceous, elliptic (widely elliptic or narrow obovate), (3.2) 4.4–6.5(–8) cm long, (1.8–)2.2–3.1(–3.5) cm wide, blades somewhat V-shaped, margins flat (very slightly revolute), light green, yellowish-green below, with midrib, secondary veins, and margins sometimes reddish; apex acute (barely obtuse), base acute, acute cuneate or cuneate (obtuse); adaxial surface of young blades with sparse stellate hairs (some sunken in pits) and unicellular hairs, the stellate hairs (0.05–)0.08–0.19 mm in diameter, mature leaves glabrous with extremely sparse stellate and unicellular hairs, abaxial surface of young blades with few unicellular or multicellular uniseriate hairs, sometimes with very dense stellate hairs (0.05–)0.08–0.19(–0.24) mm in diameter, mature leaves appearing glabrous but with few stellate hairs, often sunken in pits and appearing as punctations (0.05–)0.08–0.24(–0.25) mm in diameter; domatia (occasionally absent) of primary-axillary hair tufts, the domatium hairs multicellular multiseriate dendritic setae, domatia (0.48–)0.56–2.34(–2.80) mm long, (0.32–)0.33–1.47(–2.54) mm wide; margin entire; venation suprabasal (basal) with (1–)2 pairs of secondary veins, and 1 pair of inconspicuous submarginal secondary veins, the tertiary veins very indistinct (10–)12–19(–21), intergrading with quaternary veins at base and apex; midrib and secondary veins flat to slightly impressed adaxially, tertiary and quaternary veins very indistinct adaxially, midrib raised abaxially, secondary veins slightly raised to flat abaxially, tertiary and quaternary veins flat abaxially. Petiole (0.51–)0.60–1.35(–1.80) cm long, shallowly canaliculate, often reddish, moderately stellate pubescent, with the hairs ± evenly distributed on all parts of petiole or somewhat denser abaxially, these (0.06–)0.08–0.19(–0.25) mm in diameter. Inflorescence terminal, cymose, paniculate (loosely corymbose), (3.6–)5.7–8.8(9.5) cm long, (3.4–)3.5–5.4(–5.5) cm wide, with 2–3 orders of branching, the caducous bracts to ca 3 cm long; peduncle (1.9–)2.2–2.9(–3.6) cm long, first internode above peduncle (1.03–)1.30–1.80(–2.20) cm long, first lateral internode (1–)1.1–1.7(–2.2) cm long, the flowers (21–)27–43(–76) per inflorescence. Pedicels (4.75–)5.25–7.75(–10.50) mm long, with stellate hairs (0.09–)0.11–0.16(–0.18) mm in diameter. Hypanthium cylindrical to suborbicular around ovary, tubular above ovary, (2.69–)2.75–3.60(–3.63) mm long as measured from base of hypanthium to torus, (2.07–)2.16–3.14(–3.47) mm wide, indumentum of stellate hairs, (0.05–)0.06–0.11(–0.18) mm in diam-

eter, the portion of hypanthium free from ovary (0.97–)1.11–1.38(–1.57) mm long; inner hypanthium smooth (inconspicuously ridged), torus to calyx apex length (1.72–)2.50–3.54(–3.73) mm, torus to calyx notch length (1.63–)2.19–3.27(–3.32) mm. Calyx lobes 4, (0.09–)0.16–0.53(–0.69) mm long, (2.13–)2.32–2.97(–3.13) mm wide, lobes very broadly triangular (often to such a degree that the lobes are difficult to discern), the indumentum similar to that of hypanthium, the external calyx teeth (0.25–)0.33–0.63(–0.67) mm long, usually only a blunt knob on rim of hypanthium. Petals 4, bright red, oblong spatulate, the apex truncate, (9.50–)9.88–13.13(–13.63) mm long, (3–)3.13–4(–4.31) mm wide, glabrous, many-veined, erect or slightly spreading. Stamens 8, folded adaxially in bud, in two series, isomorphic, (19–)20–21.5(–22) mm long; filaments pink, slightly tapered towards apex, 14.5–16 mm long, with proximal filament segment (0.38–)0.41–0.60(–0.67) mm wide, distal segment (0.22–)0.28–0.50(–0.53) mm wide; anthers yellow, (4.46–)4.94–5.94(–6.07) mm long, (0.53–)0.60–0.81(–0.82) mm wide, elliptic, slightly curving, opening by a single apical pore (0.19–)0.27–0.37(–0.45) mm wide. Ovary inferior, 2-loculate, (1.94–)1.97–2.94(–3) mm long, (1–)1.13–1.41(–1.87) mm wide, with an apical appendage (0.94–)0.97–1.22(–1.25) mm long, with deeply intruded axile placentation; style pink or red, straight to shallowly S-shaped, glabrous, (20.5–)21–24(–24.2) mm long, (0.38–)0.41–0.57(–0.60) mm wide; stigma not expanded, papillose. Berries globose-urceolate, 4–7 mm in diameter, urceolate, deep purple. Seeds pyramidal, 1.35–1.50 mm long, 0.75–1.03 mm wide, the testa smooth. See Figure 1 (see also Hodge 1941, *plate 6, figures 5 and 6*).

Distribution and ecology.—*Tetrazygia fadyenii* is endemic to Jamaica. It occurs on limestone hills in xeric to mesic woodlands and forest edges from 450 to 950 meters elev. where it may be locally common (Fig. 2).

Phenology.—*Tetrazygia fadyenii* has been collected in reproductive condition throughout the year, with the exception of the month of November.

Specimens examined: **JAMAICA.** **Clarendon:** 1.5 mi SSW of junction at Cave Valley, 17 Jul 1977, *Goodfriend* (FLAS); Peckham Woods, Upper Clarendon, 7 Jul 1911, *Harris 10997* (NY, US); Peckham Woods, Upper Clarendon, 27 Sep 1912, *Harris 11181* (NY, US); Bird Cave Rock, Glenwood Springs, Balcarres, Sunbury Road, 4 Jan 1974, *Morley & Whiteford 967* (A); Glenwood Springs district, between Balcarres and Sunbury, 18 Aug 1973, *Proctor 33485* (IJ). **Hanover:** Dolphin Head, 18 May 1906, *Harris 9234* (A, US); Dolphin Head, SW of Askenish, ca. 7 mi S of Lucea, 12 May 1987, *Judd & Samuels 5300* (FLAS, NY); 12 May 1987, *Judd & Samuels 5311* (FLAS, NY); near Askenish, Dolphin Head, 29 Jun 1975, *Judd, Kress & Clarkson 75-141* (A); summit of Dolphin Head, 29 Oct 1952, *Proctor 7275* (IJ, US); Dolphin Head, on the top, 9 Jul 1986, *Skean & Samuels 1840* (NY, US); Dolphin Head Mountain, 8 mi SSE by road from Lucea, 1 Aug 1967, *Weaver 1278* (GH, MO); Dolphin Head, 28 Jul 1954, *Webster & Wilson 5071* (A, US); slopes of Dolphin Head, 24 Jun 1959, *Webster et al. 8563* (S). **Manchester:** at Banana Ground, 14 Jul 1963, *Crosby, Hespenheide & Anderson 673* (GH, NY); 0.5 mi NW of Christiana, 3 Jul 1955, *Howard & Proctor 14331* (A); between Fairfield and Huntley, 9 Jan 1957, *Proctor 16106* (GH); Gourie Forest, ca. 1 mi SW of Coleyville, 18 Apr 1971, *Proctor 31748* (IJ); Huntley Hill, 20 Jul 1978, *Proctor 37906* (MO). **Middlesex:** St. Anne. Mt. Diablo, 22 Jan 1938, *Hunnewell 15322* (GH). **St. Ann:** Albion, 14 Mar 1850, *Grisebach s.n.* (GOET); Holly Mount, near Ewarton, 11 Aug 1896, *Harris 6572*

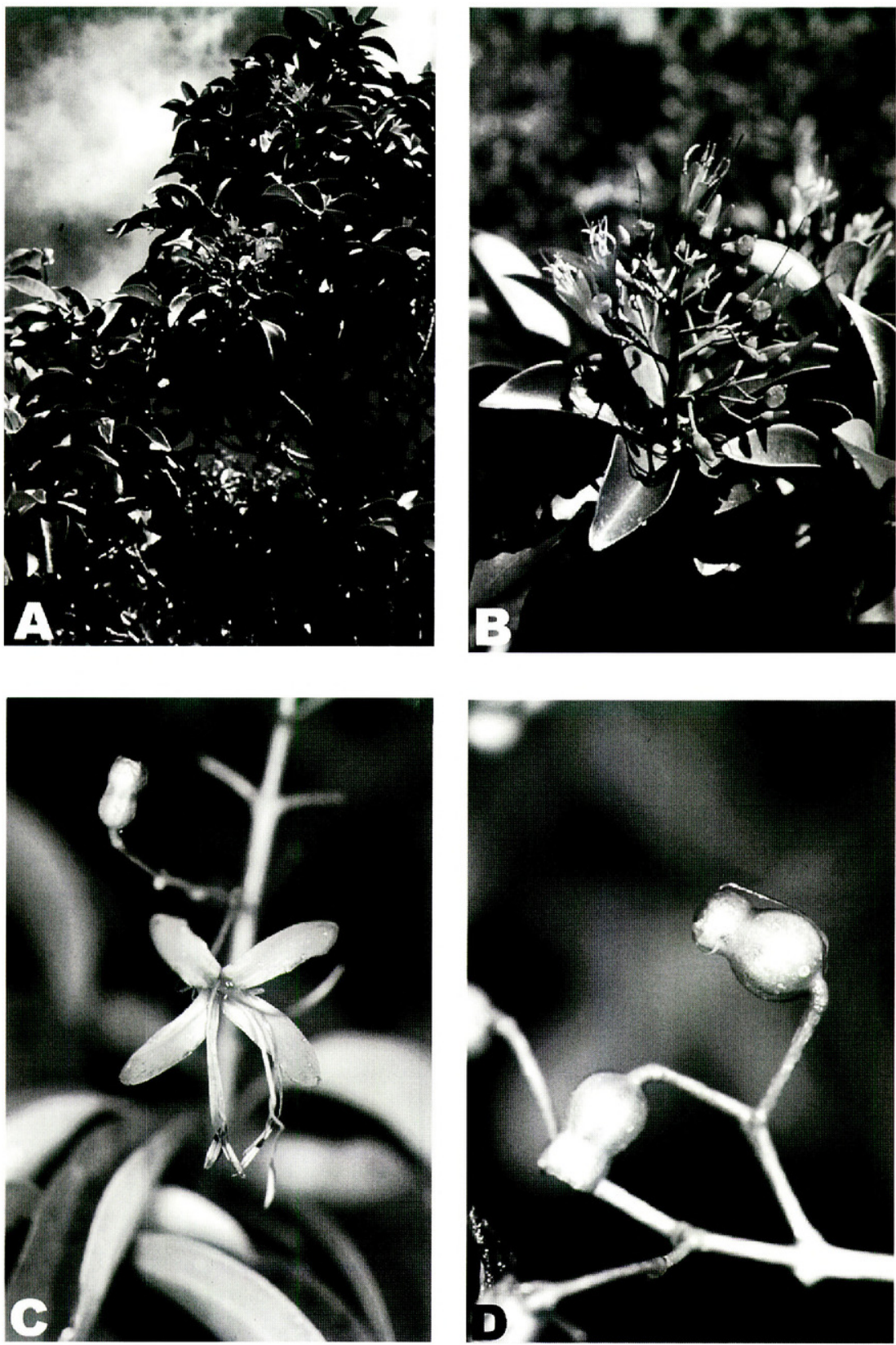


FIG. 1. *Tetrazygia fadyenii*. A. Habit. B. Inflorescences. C. Flower. D. Fruits.

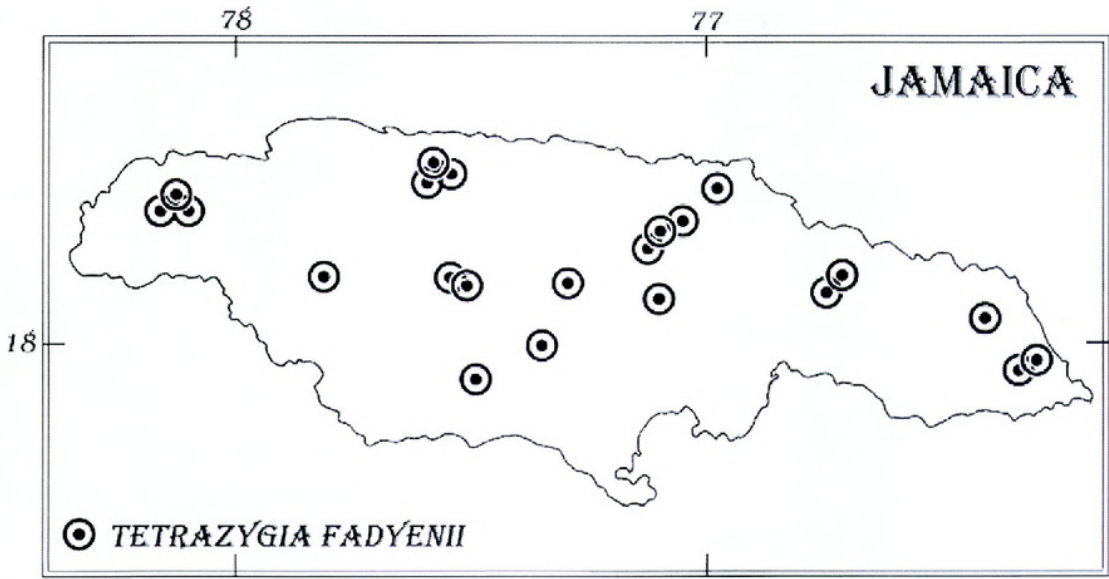


FIG. 2. Distribution of *Tetrazygia fadyenii*.

(NY); Holly Mount, Mt. Diablo, 29 Aug 1905, *Harris* 8994 (NY); Mt. Diablo area; ca. 1 mi along road towards Resource, 11 Aug 1965, *Hespenheide* 973 (FLAS, GH, MO, NY, US); Mt. Diablo, 27 Jan 1952, *Hunnewell* 19761 (A); Mt. Diablo region, lower slopes of Hollymount, 28 May 1987, *Judd* 5509 (FLAS, NY); Mt. Diablo, Jul 1849, *McNab* s.n. (US); vicinity of Mosely Hall Cave, 1 mi W of Blackstonedged, 14 Dec 1952, *Proctor* 7483 (IJ); Mt. Diablo, Grier Mount, 29 Aug 1954, *Webster & Proctor* 5640 (A, US); Mt. Diablo, E slopes above Schwallenburgh, 25 Jun 1959, *Webster et al.* 8530 (S). **St. Catherine:** Hollymount, 22 Sep 1962, *Adams* 11725 (MO); near summit of Hollymount, 5 Jul 1966, *Anderson & Sternberg* 3048 (US); Grier Mount, Mt. Diablo, 20–31 Dec 1953, *Howard & Proctor* 13601 (A, IJ); Grier Mount, Mt. Diablo, 20–31 Dec 1953, *Howard & Proctor* 13617 (A). **St. Elizabeth:** Mulgrave, 14 Jun 1916, *Harris* 12373 (MO, NY, P). **St. Mary:** forests at Union Hill near Moneaque, 13 Jul 1950, *Howard* 12019 (A, NY). **St. Thomas:** Big Level District, SE end of John Crow Mts., 16 Mar 1956, *Stearn* 508 (A); between Rowlandsfield and Big Level; John Crow Mts., 15 Jun 1976, *Thorne & Proctor* 48305 (NY); John Crow Mts., Big Level, above Rowlandsfield, 16 Jun 1959, *Webster et al.* 8281 (GH, IJ, S, US). **Trclawny:** between Burnt Hill and Ramgoat Cave, 20 Jul 1997, *Acevedo-Rdgz.* 9558 (US); the Cockpit Country, near Barbecue Bottom, 14 Aug 1963, *Crosby & Anderson* 1212 (GH); 2–3 mi N by road of Burnt Hill crossroads, 16 Aug 1965, *Hespenheide* 1267 (FLAS, MO, NY); at Ramgoat Cave on road from St. Vincents to Kimloss, 26 Sep 1954, *Howard* 14130 (A); along road to Mango Tree Hill from Burnt Hill, 27 May 1967, *Read* 1937 (GH, US). **Location unknown:** Apr 1903, *Alexander* s.n. (GH, NY); *Grisebach* s.n. (GOET); 15 Feb 1905, *Harris* 8883 (NY); 27 Sep 1912, *Harris* 11190 (NY, US).

Illustrations of this species can be found in Hooker (1849) and Fawcett and Rendle (1910–1936). Hodge (1941) provided photos of flowers and fruits in plate six, figures five and six.

ACKNOWLEDGMENTS

We gratefully acknowledge the following individuals: Norris H. Williams and W. Mark Whitten provided vouchers and material freshly collected in silica gel that was used in the molecular analyses. Kent Perkins and Trudy Linder at FLAS kindly provided curatorial services. Thanks also to the staff at A, GH, GOET, IJ,

MO, NY, P, S, US. The authors are especially grateful to the staff of Kew for furnishing taxonomically critical specimens from their type collection.

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Penneys, Darin S and Judd, Walter S. 2003. "THE RESURRECTION AND LECTOTYPIIFICATION OF TETRAZYGIA FADYENII (MELASTOMATACEAE: MICONIEAE): A HUMMINGBIRD-POLLINATED TREELET ENDEMIC TO JAMAICA." *SIDA, contributions to botany* 20, 877–884.

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