

New Boraginaceae from Tropical America 1: New Species of *Bourreria* and *Tournefortia* from Costa Rica and a Note on the Publication of *Cordia collococca*

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ABSTRACT. *Bourreria rinconensis* and *Tournefortia isabellina* are described as new from Costa Rica. Keys are provided to the Costa Rican species of *Bourreria* and the Central American species of *Tournefortia* sect. *Cyphocema*.

In preparing a treatment of Boraginaceae for *A Manual to the Plants of Costa Rica*, two collections representing previously undescribed taxa were discovered.

Bourreria rinconensis J. S. Miller, sp. nov.

TYPE: Costa Rica. Puntarenas: Cantón de Osa, Aguabuena, margen izquierda de Quebrada El Campo, Rincón, 8°42'45"N, 83°31'35"W, elev. 200 m, 22 Sep. 1990, Gerardo Herrera 4350 (holotype, MO 04660635). Figure 1.

Arbor usque ad 8 m alta. Folia persistentia; lamina glabra, elliptica, 7.7–14 cm longa, 2.7–6 cm lata, apice acuminata, basi acuta ad attenuata; petiolo 1.3–2.3 cm longo, glabro. Inflorescentia terminalis, cymosa; pedunculo 12–18 mm longo, glabro. Flos gemmis 8–9 mm longis, apiculatis; calyce 6.5–8 mm longo, extus glabro, intus strigosus; corolla alba, hypocrateriformi, ca. 16 mm longa, 5-loba, lobulis late ovatis, 3–3.5 mm longis, ca. 3 mm latis; staminibus 5, filamentis ca. 14 mm longis, ad insertionem puberulis. Fructus non visi.

Tree 8 m tall, the bark corky, the twigs glabrous. Leaves persistent; leaf blades elliptic, 7.7–14 cm long, 2.7–6 cm wide, the apex acuminate, the base acute to attenuate, the margin entire, the adaxial surface glabrous, lustrous, the abaxial surface glabrous, the venation brochidodromous, the midrib prominent, strongly impressed above, raised below, the secondary veins arching, 6–8; petioles 1.3–2.3 cm long, broadly canaliculate on the adaxial surface, glabrous. Inflorescences terminal, cymose, the peduncles 12–18 mm long, glabrous. Flowers bisexual, the buds ellipsoid, 8–9 mm long, apiculate; calyx leathery, tubular, 6.5–8 mm long, ca. 3 mm wide at the mouth, glabrous, 5-lobed, the lobes sometimes not separating completely and the calyx appearing 2–4-lobed, triangular, 3–5 mm long, 1.5–2 mm wide at the base, the interior surface of the

lobes densely strigose. Corolla white, salverform, brown tomentulose, the tube ca. 16 mm long, 2.5–3 mm wide at the mouth, the 5 lobes spreading, widely ovate, 3–3.5 mm long, ca. 3 mm wide, the apex obtuse to rounded; stamens 5, the filaments ca. 14 mm long, the upper 8 mm free, puberulent at and just beneath the point of insertion; ovary ovoid, ca. 1.5 mm tall, 1 mm broad, glabrous, the style ca. 9 mm long, the 2 stigmas capitate. Fruit unknown.

Bourreria rinconensis is known only from the type collected in lowland wet forest on the Osa Peninsula.

Bourreria is a complex genus with questionable generic boundaries (Thulin, 1987; Miller, 1989), and there is no comprehensive treatment of the species available. The approximately 50 species have been considered by most authors to be restricted to the New World, occurring in the Caribbean and adjacent south Florida, Mexico and Central America, and northern South America. Thulin (1987) extended both the morphological and geographic boundaries of the genus by including five species of *Ehretia* L. from eastern Africa. The Central American species seem to form two natural groups, one with large corollas and leathery tubular calyces (e.g., *B. grandicalyx* J. S. Miller & Sirot and related species) and the other with smaller corollas and small, membranaceous, campanulate calyces (e.g., *B. andrieuxii* (A. DC.) Hemsley, *B. mollis* Standley, and *B. oxyphylla* Standley). *Bourreria rinconensis* is a member of the group of species with large corollas and leathery tubular calyces that was treated recently by Miller and Sirot (1997). Within this group, *B. rinconensis* shares a narrow salverform corolla with a narrow, nearly parallel-sided tube with *B. quirosii* Standley and *B. cumanensis* (Loefling) O. E. Schulz. *Bourreria cumanensis* occurs along the north coast of South America and differs in having shorter, broader leaves and a much smaller corolla. *Bourreria quirosii* occurs in dry forests in Guanacaste, Costa Rica, and Nicaragua and dif-

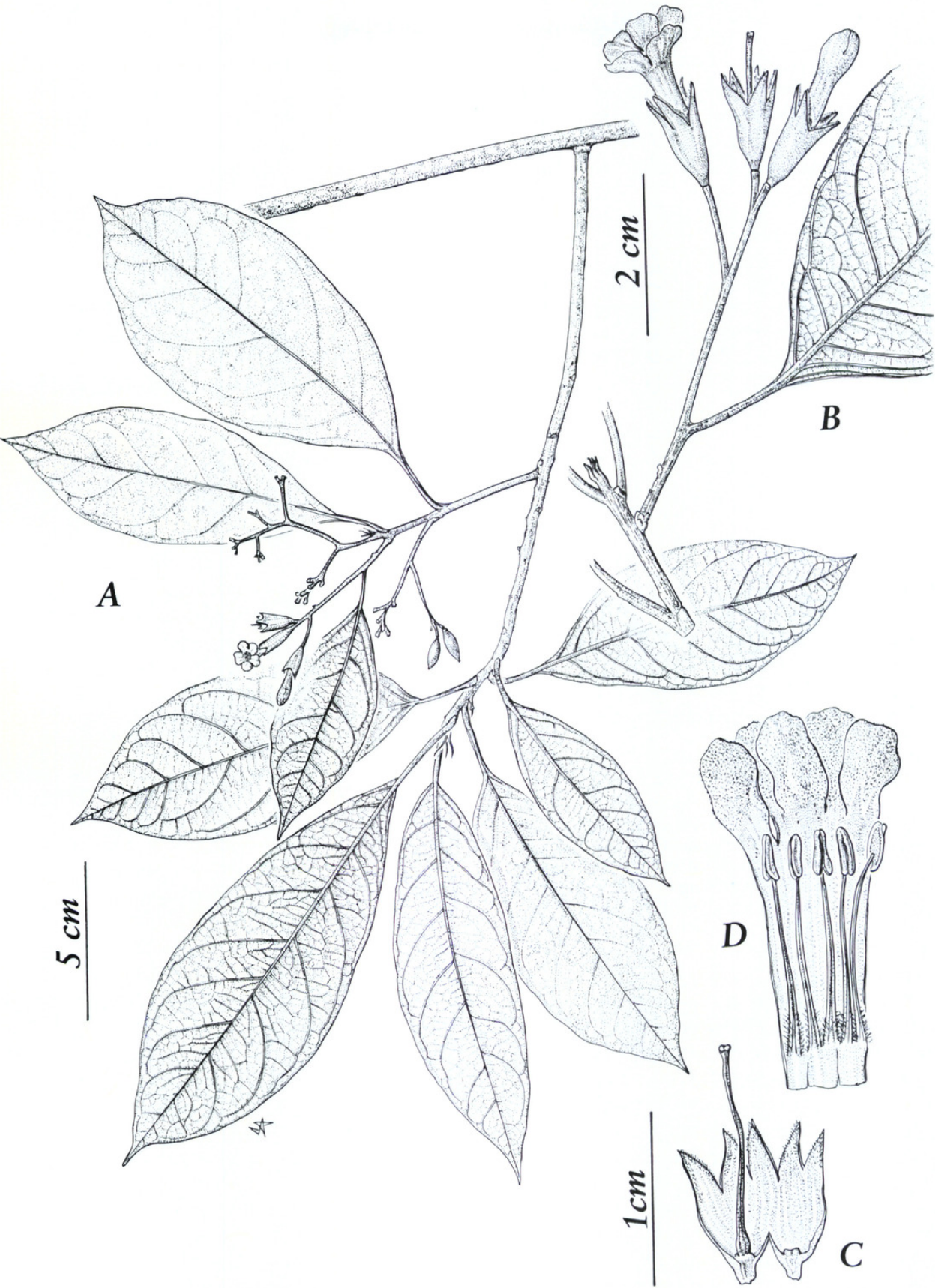


Figure 1. *Bourreria rinconensis* J. S. Miller. —A. Flowering branch. —B. Inflorescence with buds and open flower. —C. Open calyx showing the strigose interior margin of the lobes. —D. Open corolla showing staminal attachment. All from Herrera 4350 (MO).

fers in having pubescent, shorter, broader leaves. *Bourreria cumanensis* and *B. quirosii* also are characterized by a fruit that breaks into 4 pyrenes, each attached to the gynobase with a slender fiber, a group that has been segregated as the genus *Cre-matomia* Miers (Miers, 1869). The fruit of *B. rin-conensis* is unknown, but it would help indicate

whether this new species is more closely allied to *B. cumanensis* and *B. quirosii*, species from dry forests with similar tubular corollas, or to *B. cos-taricensis* (Standley) A. Gentry and *B. grandicalyx* J. S. Miller & Sirot, which have large indehiscent fruits. The following key will help distinguish the species that are known from Costa Rica.

KEY TO THE COSTA RICAN SPECIES OF *BOURRERIA*

- 1a. Calyx rotate to campanulate, membranaceous.
 - 2a. Corolla less than 1.5 cm long; leaves scabrous above *Bourreria litoralis* Standley
 - 2b. Corolla greater than 2 cm long; leaves glabrous above *B. huanita* (Llave & Lexarza) Hemsley
- 1b. Calyx tubular, leathery.
 - 3a. Petioles greater than 10 mm long; leaf blade greater than 6 cm long, glabrous above; plants usually trees.
 - 4a. Corolla less than 2 cm long; calyx less than 8 mm long *B. rinconensis* J. S. Miller
 - 4b. Corolla greater than 2 cm long; calyx greater than 13 mm long.
 - 5a. Flowering calyx greater than 2.5 cm long; edges of the lobes pubescent; fruits completely enclosed by the accrescent calyx *B. grandicalyx* J. S. Miller & Sirot
 - 5b. Flowering calyx less than 1.8 cm long; edges of the lobes glabrous; fruits not enclosed by the calyx *B. costaricensis* (Standley) A. Gentry
 - 3b. Petioles less than 10 mm long; leaf blade less than 7.5 cm long, scabrous above; plants shrubs *B. quirosii* Standley

Tournefortia isabellina J. S. Miller, sp. nov.
TYPE: Costa Rica. Puntarenas: Parque Inter-nacional La Amistad San Vito coto Brus, Finca Cafrosa, 8°54'15"N, 82°46'50"W, elev. 500 m, 4 July 1990, *Roberto Delgado 47* (holotype, MO 05022359). Figure 2.

Liana, ramis velutinis isabellinis. Folia persistentia; lamina ovata, 8–12 cm longa, 4.9–7.2 cm lata, apice acuminata, basi rotundata, supra sparse sericea, infra velutina isabellina; petiolo 7–16 mm longo, supra canalicu-lato, velutino isabellino. Inflorescentia terminalis, cymosa, ca. 11 cm longa, 15 cm lata, ramulis velutinis isabellinis; pedicellis in fructu 1–3 mm longis. Flores non visi. Fructus 4-lobus, 2.5–3 mm longus, 3–4 mm latus, glaber.

Liana, the stems evenly dull golden brown ve-lutinous, the hairs 1–1.5 mm long. Leaves alter-nate, persistent; leaf blade ovate, 8–12 cm long, 4.9–7.2 cm wide, the apex acuminate, the base rounded, the margin entire, the adaxial surface sparsely sericeous, more densely so along the mid-rib, the hairs appressed, dull golden brown, ca. 1 mm long, the abaxial surface evenly velutinous, more densely so on the midrib and secondary veins, the hairs erect, dull golden brown, 1–1.5 mm long, the venation brochidodromous, the midrib promi-nent, impressed above, rounded and raised below, the secondary veins arching, 6–8; petioles 7–16 mm long, dull golden brown velutinous. Flowers unknown. Infructescence terminal, a much-branched cyme, ca. 11 cm long, 15 cm broad, the branches dull golden brown velutinous. Fruits yel-low with green markings, strongly 4-lobed, 2.5–3 mm tall, 3–4 mm broad, glabrous, borne 4–9 mm

apart, on pedicels 1–3 mm long, the pedicels and persistent calyx with sparse, spreading, dull golden brown hairs, the 4 nutlets black, ovoid, ca. 1.5 mm long, colliculate.

Tournefortia isabellina is a distinctive species, and the epithet refers to the distinctive color of the hairs that cover the plant (Stearn, 1973). It is a member of section *Cyphocema* I. M. Johnston, an entirely Neotropical section that is characterized by a strictly vining habit and unusual fruits with four distinct nutlets that are surrounded and held to-gether by a membranaceous epicarp (Johnston, 1930). The individual nutlets are angular on their ventral surface with the curved embryo bent around an intrusion of the ventral wall. The species of sec-tion *Cyphocema* typically have elongate corolla lobes and anthers that are connate apically (Miller, 1988). Johnston (1930) pointed out that while the section *Cyphocema* is well marked within *Tourne-fortia*, the species are notoriously difficult to sep-arate. However, the majority of confusion lies with the South American species, and only two species have been recognized in Central America by recent authors (Nowicke, 1969; Gibson, 1970; Miller, 1988). Johnston's (1935) reference to *Tournefortia paniculata* Chamisso in Costa Rica probably refers to plants better placed in *T. maculata* Jacquin. The present species is quite distinctive in its terminal, dense, cymose inflorescence and distinctive indument. It differs from the other Central American species of the section in its much larger leaves and golden brown indument. The Central American

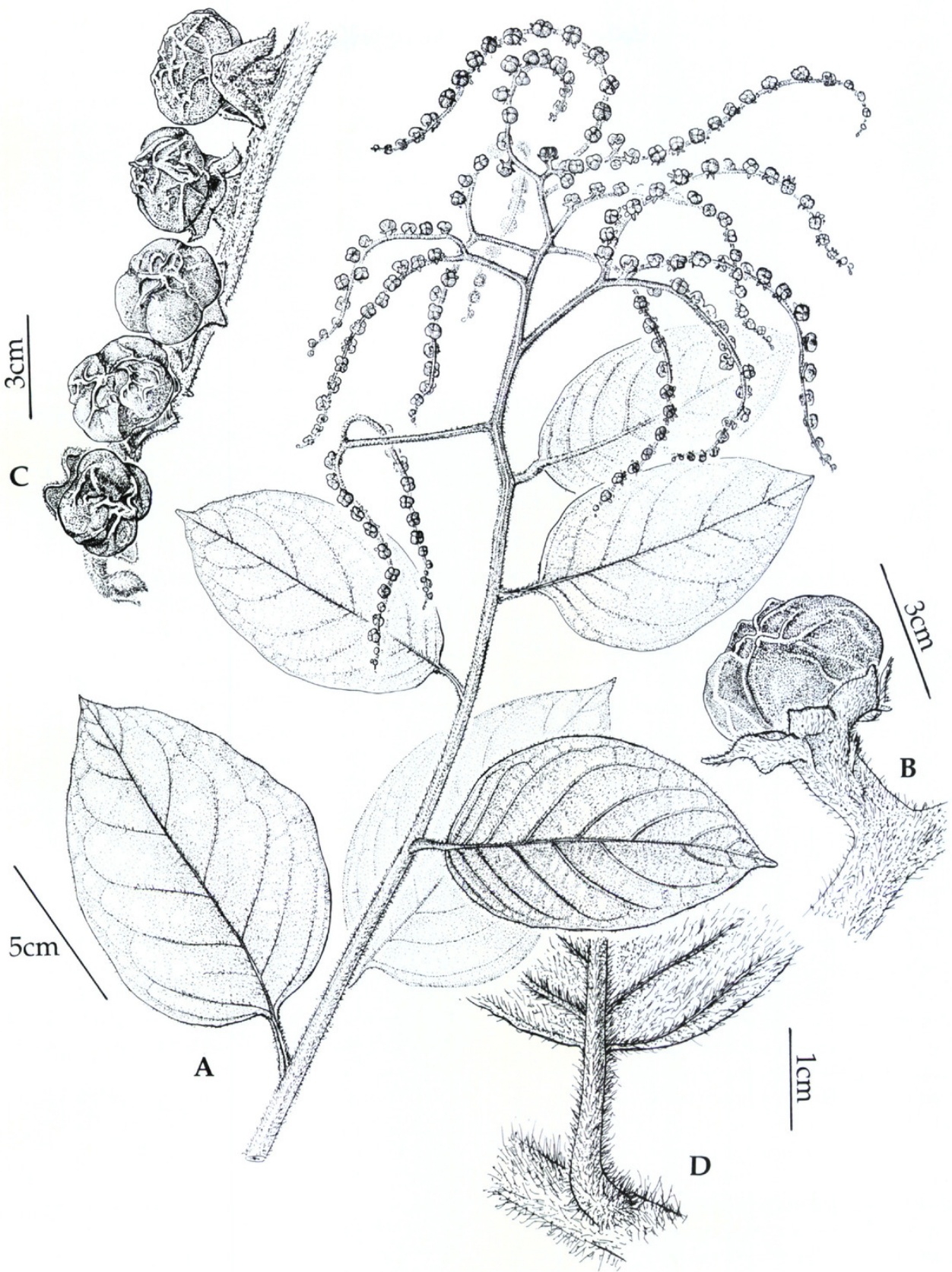


Figure 2. *Tournefortia isabellina* J. S. Miller. —A. Branch with cymose infructescence. —B. Mature fruit. —C. Infructescence branch. —D. Petiole and leaf insertion on branch. All from *Delgado 47* (MO).

species of *Tournefortia* sect. *Cyphocema* can be separated as follows.

KEY TO THE CENTRAL AMERICAN SPECIES OF *TOURNEFORTIA* SECT. *CYPHOCEMA*

- 1a. Plants evenly covered with a golden brown pubescence 1 mm or more long; leaves greater than 4.9 cm wide *T. isabellina* J. S. Miller
- 1b. Plants glabrous to tomentose, the hairs white to yellowish, never golden brown; leaves less than 5 cm wide.
 - 2a. Corolla tube 3.3–5 mm long; leaves glabrous to evenly short-strigillose below *T. maculata* Jacquin
 - 2b. Corolla tube 2–2.3 mm long; leaves densely white puberulent to tomentose below *T. volubilis* L.

THE ORIGINAL PUBLICATION OF *CORDIA COLLOCocca* L.

Cordia collococca L. is widespread in tropical America, and the name has been considered to have been published in the second edition of *Species Plantarum* (Linnaeus, 1762) by most authors treating Central American species (e.g., Johnston, 1940; Gibson, 1970; Nash & Moreno, 1971; Miller, 1988). Johnston (1949) discovered that the name originated in a thesis of Carolus Gust. Sandmark, but attributed it to a later reprint (Linnaeus, 1760) rather than to its earliest publication. In 1759, Linnaeus published two treatments of Jamaican species based on specimens given to him by Patrick Browne and material collected by Hans Sloane currently deposited at BM. The first of these works, published 28 November 1759, *Plantarum Jamaicae Pugillus* (Linnaeus, 1759a) mentioned only *Cordia bourreria* L. However, later in the same year, on 22 December, he published *Flora Jamaicae* (Linnaeus, 1759b), the thesis of Carolus Gust. Sandmark, which was a list of binomial names for the plants collected by Browne and Sloane. Here Linnaeus published the name *Cordia collococca* by listing it with reference to page 166 of Browne's *Civil and Natural History of Jamaica* (Browne, 1756). The page reference provided by Linnaeus is incorrect, but on page 167, Browne did provide a description of *COLLOCOCUS* 1. *Folii rugosis venosis oblong-ovatis, floribus laxae racemosis*, the clammy cherry or turkey-berry tree. As Browne's *COLLOCOCUS* 2. *Platyphyllus major, racemis umbellatis* on page 168 clearly seems to be the basis for *Cordia macrophylla* L., the species on page 167 is the only logical source of the name *Cordia collococca*. The name appears with the same orthography in a reprint of the *Flora Jamaicae* article in volume 5 of *Amoenitates Academicae* (Linnaeus, 1760), a series of reprints of the Linnaean

dissertations, but is finally corrected to the original spelling of Browne as *Cordia collococca* in edition 2 of *Species Plantarum* (Linnaeus, 1762).

While the publication of *Cordia collococca* is confusing, the 1759 *Flora Jamaicae* does appear to be valid publication of the name conforming to relevant articles of the *International Code of Botanical Nomenclature* (Greuter et al., 1994). Although Linnaeus merely listed the name, he did provide a direct reference to a previously published description (article 32.4). Although the reference to Browne's earlier description is to an incorrect page number, article 33.3 states that "errors of bibliographic citation. . . do not invalidate publication of a new combination or avowed substitute." Also the change in orthography in the second edition of *Species Plantarum* in 1762 to conform with Brown's spelling of *Collococcus* seems to be an acceptable correction of an orthographic error as allowed by article 60.1. While some authors have questioned authorship of names in Linnaean theses, Rickett (1955) and Stearn (1957) have argued that names published in these works should be attributed to Linnaeus and not his students. Krok (1925) did not include *Flora Jamaicae* in his list of Linnaean theses written by the students themselves, so it also seems that the name should be attributed to Linnaeus and not Sandmark. Thus the correct citation of original publication is:

***Cordia collococca* L., Fl. Jamaic. 14. [22 Dec.] 1757. TYPE: Jamaica. *P. Browne* s.n. (lectotype, designated by Miller (1988), LINN, Savage Catalog number 253.8).**

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