Three New Species of Celastraceae from Costa Rica, One Disjunct from Mexico

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ABSTRACT. Three species of Celastraceae, each represented by many collections from Costa Rica, are compared to near relatives and found to be new: *Gymnosporia haberiana* Hammel, disjunct from Mexico and Costa Rica; *Maytenus recondita* Hammel, of Costa Rica and Panama; and *Crossopetalum enervium* Hammel, of Costa Rica. The South American *Gymnosporia magnifolia* (Loesener) Lundell is here confirmed as a synonym of *G. urbaniana* (Loesener) Liesner, and *Crossopetalum eucymosum* (Loesener & Pitter) Lundell is placed in synonymy under *C. parviflorum* (Hemsley) Lundell. Keys are provided for all accepted neotropical species of *Gymnosporia*, and for all Costa Rican species of *Crossopetalum* and *Maytenus*.

For nearly 20 years collections of two large, cloud forest trees in the family Celastraceae have been accumulating, primarily from the Monteverde region of Costa Rica. Much of this material has been distributed to various herbaria under tentative or approximate names. More recent exploration along the central cordillera has extended the range, within Costa Rica, of these two species and yielded many collections of a third, shrubby species in the genus *Crossopetalum*, also known from the Monteverde region. The two trees are known almost exclusively from mid-elevations on the Pacific slopes of the northern mountains, while the shrub extends nearly the entire length of the country and is known from numerous collections on both slopes.

Although one of the trees has always been known to be a *Maytenus* presumably related to *M. schippii* Lundell, generic placement of the other has been more problematic. This species, while having alternate leaves and capsulate fruits with arillate seeds, as in *Maytenus*, has greener drying, entire leaves, more open and branched inflorescences with 4-merous flowers, and several-seeded, 2–4-lobed fruits. In these respects the Costa Rican (and Mexican) tree can be distinguished from other alternate-leaved Celastraceae and coincides perfectly with two South American species recently described in or transferred to the genus *Gymnosporia* (Lundell, 1985; Liesner, 1993).

Gymnosporia haberiana Hammel, sp. nov. TYPE: Costa Rica. Guanacaste: Cordillera de Tilarán, La Cruz de Abangares, 1400 m, 15 July 1985 (fl), *Haber & Bello 2034* (holotype, INB; isotypes, BM, C, CAS, COL, CR, DUKE, F, FLAS, GH, HNMN, K, MEXU, MICH, MO, NY, P, PMA, TEX, US, USJ, W, WIS). Figure 1.

A *G. gentryi* Lundell foliorum nervis lateralibus minus prominentis et latiore divergentibus, ovario et capsula tantum lobato non anguloso, a *G. urbaniana* floribus majoribus, disco manifesto, ab ambobus sepalis latioribus quam longioribus.

Dioecious trees (3–)5–30 m, the inner bark bright yellow; twigs terete; leaves and twigs drying pale to yellowish green, glabrous. Leaves alternate, 7–12(–14) × 3–6(–8) cm, elliptic, the apex acute to acuminate, the base acute to rounded, the margin entire and often curled under, all leaves often folded and curved along the midrib; main lateral veins mostly 4 or 5; petioles 5–10 mm; stipules small, deciduous. Inflorescences 2- or 3-branched, ca. 10–20-flowered axillary cymes, the rachis minutely and sparsely farinose-puberulent, the pedicels 2–4 mm. Flowers 4-merous, ca. 4.5–7 mm wide, greenish; sepals ca. 0.4 × 1 mm, broadly rounded; petals imbricate, ca. 0.4 × 1 mm, spatulate or ligulate ca. 0.4 × 1 mm; stamens exceeding the style in staminate (pollen-bearing) plants, shorter than the style and without pollen in pistillate plants, anthers ± cordate, versatile; ovary ± globose, confluent with the conically raised disk, 2-celled with 2 ovules per cell. Fruits ca. 1 × 1–1.5 cm, globose or often wider than long and 2–4-lobed, (1)2–4-seeded; seeds dark brown with white aril.

Additional specimens examined. COSTA RICA. **Alajuela:** Cordillera de Guanacaste, P. N. Rincón de la Vieja, 10°47′50″N, 85°18′19″W, 1500 m, 6 July 1991(fl), *Rivera 1423* (CR, F, INB, MICH, MO, USJ, W). **Guanacaste:** Cordillera de Guanacaste, P. N. Guanacaste, Volcán Cacao, ca. 10°55′45″N, 85°28′15″W, 1100–1400 m, 25 Nov. 1989 (fr), *Chávez 7* (CR, F, MO), Dec. 1990 (fr), *478* (CR, F, INB, MO), July 1989 (fl), *Hammel 17661* (BM, CAS, COL, CR, F, INB, MEXU, MO, TEX, US), 9 Feb. 1995 (fr), *Quirós 48* (CR, INB, MO); P. N. Rincón de La Vieja, sendero al Volcán, 10°45′50″N, 85°19′50″W, 820 m, Jan. 1991 (fr), *Rivera 974* (CAS, CR, F, INB, MO). **Puntar-**

Figure 1. *Gymnosporia haberiana* Hammel. —A. Fruiting shoot. —B. Staminate flowers. —C. Pistillate flowers. —D. Fruit. (A, D from *Haber & Zuchowski 11048*; B from *Hammel 17661*; C from *Haber 9303*.)

enas: Cordillera de Tilarán, Monteverde Reserve and vicinity, ca. 10°20′N, 84°50′W, 1200–1550 m, 4 Mar. 1990 (fr), *Bello 2110* (F, INB, MO, MV), 28 July 1977 (fl), *Dryer 1589* (CR, MO), 4 Apr. 1985 (fr), *Haber & Bello 1458* (BM, CAS, CR, F, LL, MEXU, MO, US), 12 July 1985 (fl), *Haber & Bello 1984* (BM, COL, CR, F, LL, MEXU, MICH, MO, P, UPS, W), 29 Nov. 1985 (fr), *Haber ex Bello 3591* (BM, CR, LL, MO), 17 Dec. 1985 (fr), *Haber ex Bello 3935* (CAS, CR, DUKE, F, LL, MEXU, MO), 22 July 1986 (fl), *Haber ex Clagget 5738* (CR, F, GH, LL, MO), 27 Feb. 1987 (fr), *Haber & Bello 6728* (INB, LL, MO), Feb. 1988 (fr), *Haber & Bello 8213* (F, INB, LL, MO, US), 20 July

1989 (fl), *Haber 9303* (CR, F, INB, MEXU, MO, TEX), 26 Mar. 1990 (fr), *Haber 9815* (CR, INB, MO, US), 30 July 1991 (fl), *Haber & Zuchowski 10789* (CR, INB, MO), 12 Mar. 1992 (fr), *Haber & Zuchowski 11048* (CR, F, INB, MO), 27 July 1977 (fl), *Hartshorn 1901* (CR, F), 25 Jan. 1984 (fr), *Pennington 11432* (CR, MO). MEXICO. **Veracruz:** Estación Biológica Los Tuxtlas, 18°35′N, 95°05′W, 300 m, no date (st), *Calzada 79* (F), 29 Nov. 1974 (fr), *Cedillo 436* (MO), 4 Feb. 1986 (fl), *Cedillo 3518* (MO), 24 June 1984 (fl), *Ibarra & Sinaca 1787* (MO), 15 Nov. 1984 (fr), *Ibarra et al. 2124* (MO), 20 Jan. 1985 (fr?), *Ibarra & Sinaca 2240, 2241* (MO), 4 July 1985 (fl), *Sinaca 122* (MO).

Distribution and biogeography. Gymnosporia haberiana is disjunct between one site at about 300 m elevation in Veracruz, Mexico, and several wet-forest, mid-elevation sites in northwestern Costa Rica (Fig. 2). However, its nearest relatives, as discussed below, are from low- and mid-elevation South America, a common pattern for tropical Mexican and Central American taxa (e.g., Hammel, 1986, and references therein). Nevertheless, *G. haberiana* is not known from southern Costa Rica or from Panama. This disjunct distribution between Mexico (or northern Central America) and Costa Rica, then skipping Panama to nearest relatives in South America, is not unique (e.g., *Ziziphus chloroxylon* (L.) Oliver), and if not an artifact of collecting, may itself reflect the complex geological history of the isthmian region.

Relationships. The closest relatives of *Gymnosporia haberiana* are its two South American congeners. In 1985 Lundell transferred *Maytenus magnifolia* Loesener to *Gymnosporia* and described a second neotropical species, *G. gentryi*, thus reinstating for the New World an essentially African genus that had come to be considered congeneric with *Maytenus*. In contrast to species of *Maytenus*, most of which (at least in the Neotropics) have small fasciculate inflorescences, 5-merous flowers, 1- or rarely 2-seeded fruits, and often toothed, gray- or tan-drying leaves, the New World *Gymnosporia* have relatively large, open cymose inflorescences, 4-merous flowers, usually 2–4-seeded fruits, and entire, greenish-drying leaves (see also Hou, 1955). Study of specimens and bibliographic material at MO supports Liesner's conjecture (1993) that *G. urbaniana* (the older name) and *G. magnifolia* are conspecific:

Gymnosporia urbaniana (Loesener) Liesner, Monogr. Syst. Bot. Missouri Bot. Gard. 45: 1254. 1993. *Rhacoma urbaniana* Loesener Repert. Spec. Nov. Regni Veg. Vol. 1(11): 162. 1905. TYPE: Peru. *Weberbauer 1875* (photo MO).

Gymnosporia magnifolia (Loesener) Lundell, Phytologia 57: 314. 1985. Syn. nov. *Maytenus magnifolia* Loesener, Vernh. Bot. Vereins Prov. Brandenburg 48: 176. 1906 (1907). TYPE: Brazil. Amazonas: Flusse Juruá Miry, *Ule 5721* (photo MO).

The new species differs from *Gymnosporia gentryi* of Colombia and Ecuador and *G. urbaniana* of Amazonian Brazil, Peru, and Bolivia by its generally smaller leaves with less conspicuous lateral veins, usually fewer-flowered inflorescences, and sepals that are much broader than long. *Gymnosporia urbaniana* has smaller flowers with almost no nectar disk and is found mostly in lowland Amazonia. *Gymnosporia gentryi*, from 1200 to 2800 m in the northern Andes, has flowers nearly as large as those of *G. haberiana*, but the ovary (and fruit) is distinctly 4-angled and its leaves have very prominent (below) lateral veins that depart from the midrib at a much narrower angle. By these observations, *G. haberiana* and *G. gentryi* appear to be sister species. The three neotropical species of *Gymnosporia* can be separated according to the following key:

1a. Flowers mostly < 4 mm wide, sepals ca. 0.5 mm wide and equally long; filaments widening toward base, but nectar disk inconspicuous; smallest twigs green; plants mostly Amazonian, from below 800 m . . . . . *G. urbaniana*

1b. Flowers > 5 mm wide, sepals ca. 1 mm wide, much shorter than wide or equally long; filaments scarcely widening toward base, nectar disk conspicuous; smallest twigs red or green; plants Andean or north of Panama, from above 1200 m.

2a. Leaves mostly 18–20 cm long, the lateral veins very prominent, arching strongly forward at < 45°; smallest twigs with reddish exfoliating epidermis; ovary (and fruits) distinctly 4-angled; sepals as wide as long or slightly wider; Ecuador, Peru, Bolivia . . . . . *G. gentryi*

2b. Leaves < 14 cm long, the lateral veins not prominent, arching outward mostly at 50° or more; smallest twigs green; ovary globose, the fruits often 4-lobed but not angled; sepals much wider than long; Mexico and Costa Rica . . . . . *G. haberiana*

Mexican material of this species has sometimes been tentatively identified as *Maytenus grisea* Lundell, but examination of the Guatemalan type of that species (*Contreras 6944*, LL) shows *G. haberiana* to be quite distinct. Although the two species are superficially similar because of their somewhat inflated and relatively thin-walled fruits, in contrast to the open cymes and lobed fruits of *G. haberiana*, the inflorescences of *M. grisea* are only pedicellate clusters on a very short or obsolete peduncle, the fruits are not lobed, and the leaves are toothed and

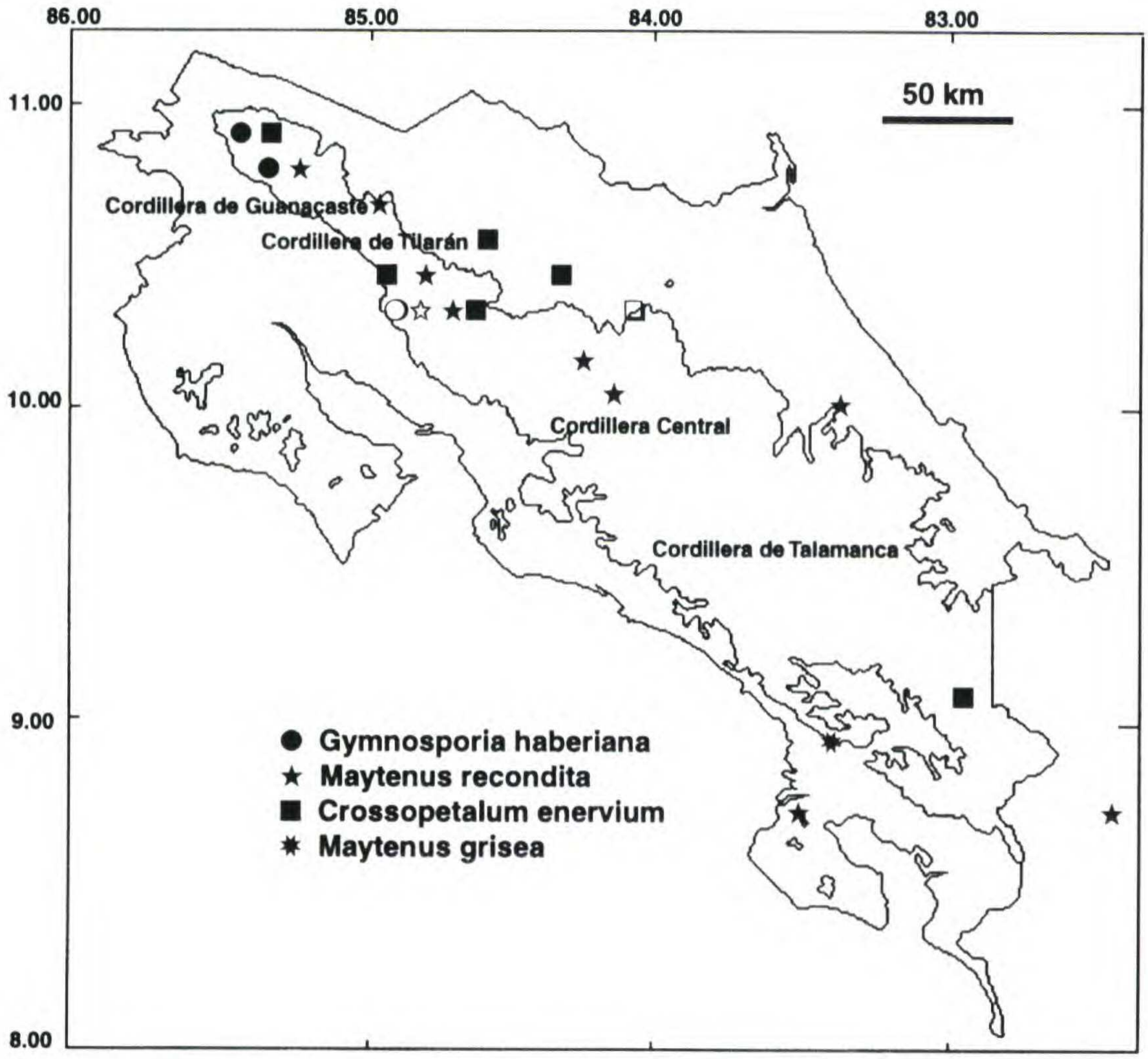

Figure 2. Distribution of four species of Celastraceae in Costa Rica (hollow symbols mark type localities; 500 m contour is indicated).

dry gray rather than green. Unexpectedly, this study has revealed that a rarely collected Costa Rican plant from hills near Palmar Norte (*Allen 6327*, F [as "Maytenus pallidifolius Standley & L. O. Williams ined."]; *Bohlke 20*, F; *Hammel et al. 20296*, INB; *Poveda & Hoet 3050*, CR) is certainly conspecific with *M. grisea*. Thus, *M. grisea*, known only from the type in Guatemala and now from southern Costa Rica (Fig. 2), is similar to *G. haberiana* in being disjunct within the region.

Etymology and history. This new species is dedicated to my friend and colleague, William Haber, long-time student and professor of the rich flora of Monteverde, Costa Rica, locality of the type and most other collections cited here. Bill's keen observation and field notes brought to my attention the dioecious nature of this species. The earliest known collection of this species is from Mexico (*Cedillo 436*, Nov. 1974). In Costa Rica it was apparently first collected in July 1977 (*Dryer 1589*).

Maytenus recondita Hammel, sp. nov. TYPE: Costa Rica. Puntarenas: Cordillera de Tilarán, Monteverde community, 10°18′N, 84°48′W, 1350 m elev., 11 July 1989 (fl), *Haber & Zuchowski 9286* (holotype, INB; isotypes, CR, F, MICH, MO, US). Figure 3.

A *M. schippii* atque *M. guyanense* inflorescentiis cymoso-paniculatis, foliis in sicco viridi-griseis aut fuscis, praesentia altitudinis majoris differt.

Dioecious trees 5–25 m; twigs usually zig-zag, terete. Leaves alternate, (5–)7–11 × 2–5 cm, elliptic, the apex acuminate, the base decurrent, shallowly toothed in the distal ½ or without teeth, with 4–7 indistinct lateral veins, these looping and not reaching the margin, glabrous, drying dark, gray-brown above, gray-green below; petioles 2–5 mm; stipules small, triangular, ± persistent. Inflorescences small, usually 1–4(–8)-flowered, axillary cymose, panicles, the rachis 1–7 mm, the pedicels 1–2 mm, occasionally proliferating on ± leafless branchlets up to 4 cm long. Flowers 5-merous, ca. 3–4 mm across, pale green; sepals ca. ½ or less the length of the petals, rounded, ± erose-margined; petals 1 × 1 mm at base, ± triangular; stamens yellow, born on the margin of a flat disc ca. 1.5 mm wide, the filaments ca. 0.5–0.6 mm. Capsules bivalvate mostly 1 or 2 (to 6) per axis, obovoid, 10–15 mm, bright orange, usually 1- or occasionally 2-seeded; seeds with a white aril.

Additional specimens examined. COSTA RICA. **Alajuela:** Cordillera de Guanacaste, entre Río Celeste y ca-

Figure 3. *Maytenus recondita* Hammel. —A. Flowering shoot. —B. Pistillate flowers. —C. Fruits. (A, B from *Hartshorn 1895*; C from *Haber & Zuchowski 8737.*)

beceras del Río Chimurria, 10°43′15″N, 85°00′20″W, 700–800 m, July (fl & fr), *Herrera 2008* (F, INB, MO); Cordillera de Tilarán, altos del Río Caño Negro, 10°21′N, 84°48′W, 1300 m, 17 Sep. 1989 (fl), *Bello 1376* (INB, MO); (Puntarenas, by error, on labels) Bosque Eterno De Los Niños, 10°23′N, 84°42′W, 1100 m, fl Apr., *Bello et al. 2156* (CAS, CR, F, INB, MO, W); 10°24′N, 84°39′W, 800–900 m, 17 July 1993 (fr), *Haber et al. 11544* (CAS, CR, F, INB, MICH, MO, W); Parque Nacional Juan Castro Blanco, 10°15′30″N, 84°15′30″W, 1200 m, 26 June 1993

(fl, fr), *Jiménez 1327* (COL, CR, F, INB, MO); Parque Nacional Arenal, 10°25′N, 84°43′W, 1200 m, 18 Sep. 1990 (fl), *Bello 2403* (INB); Peñas Blancas River Valley, 10°20′N, 84°50′W, 1250 m, 12 Oct. 1985 (fr), *Haber ex Bello 3100* (CR, F, MO); Reserva Biológica de San Ramón, 10°17′N, 84°36′W, 1000 m, 16 Feb. 1994 (fl), *Herrera 6894* (CR, USJ). **Guanacaste:** Cordillera de Guanacaste, Parque Nacional Rincón de La Vieja, cabeceras de Quebrada Rancho Grande, 10°46′N, 85°49′W, 1350–1400 m, 2 Dec. 1987 (fr), *Herrera 1474* (MO); Cordillera de Tilarán, 3 km N Santa Elena, ca. 10°20′N, 84°50′W, 1500 m, near 20 Dec. 1985 (fr), *Haber ex Bello 3824* (CR, F, MO), *3831* (CR, F, MO), *3863* (CR, MO); 5 km N Santa Elena on road to Las Nubes, 10°22′N, 84°49′W, 1400 m, 10 Nov. 1988 (fr), *Haber & Zuchowski 8737* (INB, MO); Río Negro de Tilarán, 1500 m, 4 Oct. 1985 (fl, fr), *Haber & Bello 2989* (CR, F, MO); 10°21′N, 84°49′W, 1400 m, 27 May 1987 (fl), *Haber & Bello 7125* (F, MO). **Heredia:** Cordillera Central, vicinity of Vara Blanca, 1710 m, Apr. 1938 (fl), *Skutch 3765* (MO, US); Volcán Barva, 1700–2000 m, 24 May 1972 (fl, fr), *Stone 3261* (CR, F, MO). **Limón:** Cordillera de Talamanca, Z. P. Barbilla, frente a confluencia entre Río Caño Seco y Río Dantas, 10°N, 83°26′W, 150–350 m, 3 Nov. 1988 (fl), *Herrera 2278* (F, MO). **Puntarenas:** Cordillera de Tilarán, Monteverde Reserve and vicinity, ca. 10°20′N, 84°50′W, 1000–1700 m elev., 25 May 1989 (fl), *Bello 922* (INB, MICH, MO, TEX, US), 21 Nov. 1991 (fl), *Bello 4164* (INB), 17 to 20 Mar. 1973 (fr), *Burger & J. Gentry 8601* (CR, F), 30 Oct. 1976 (fl, fr), *Dryer 933* (CR, F, MO), 15 Dec. 1976 (fr), *Dryer 1082* (CR), 13 Jan. 1977 (fl, fr), *Dryer 1125* (CR, F, MO), *Gentry & Haber 48761* (F, MO), 20 Mar. 1976 (fl, fr), *Gómez-Laurito et al. 1402* (USJ), 5 Aug. 1978 (fl, fr), *Haber 162* (CR), *Haber 446* (F, MO), *692* (F, MO), *693* (F, MO), 20 Oct. 1985 (fl), *Haber ex Bello 3108* (CR, MO), 20 Oct. 1985 (fr), *Haber ex Bello 3117* (CR, F, MO), 10 Dec. 1985 (fr), *Haber ex Bello 3673* (CR, MO), 16 Jan. 1986 (fl, fr), *Haber ex Bello 4266* (CR, F, MO), 2 May 1974 (fl), *Hartshorn 1470* (CR 4 sheets, F, MO), 19 Feb. 1976 (fr), *Hartshorn 1820* (F), 26 July 1977 (fl), *Hartshorn 1895* (CR 3 sheets, F, MO), 19 Aug. 1995 (fl, fr), *Penneys & Zuchowski 683* (CR, F, INB, MO, TEX), 8 Aug. 1975 (fl, fr), *Poveda 1110* (CR, F, MO, USJ); Cordillera de Tilarán, Ojo de Agua, Río Aranjuez, 10°17′N, 84°46′W, 1550 m, 14 Nov. 1987, *Haber & Bello 7738* (F, MO); San Luis, Cerro Amapola, 10°16′33″N, 84°47′45″W, 1100 m, 23 Nov. 1993 (fr), *Fuentes 583* (INB, MO); Península de Osa, Quebrada Agua Buena, 08°42′40″N, 83°31′00″W, 500 m, 13 Mar. 1996 (fl), *Aguilar 4524* (CR, INB, F, MO). PANAMA. **Chiriquí**: Bajo Mono-Robalo trail ca. 1500–2100 m, 27 July 1947 (st), *Allen 4844* (F).

Distribution. Except for one sterile collection from western Panama, *Maytenus recondita* is restricted to wet forests of central Costa Rica (Fig. 2), primarily at 700–1700 m elevation on the Pacific slope from the Cordillera de Guanacaste to the Cordillera Central, with one low-elevation, Atlantic-slope collection from the Río Barbilla region, Cordillera de Talamanca (*Herrera 2278*) and another isolated collection from the Osa Peninsula (*Aguilar 4524*).

Characterization. This species is recognized by the acuminate and decurrent, gray-green-drying leaves and the paniculate inflorescence of reduced or aborted cymes. It is generally a larger tree as compared to *M. segoviarum* Standley & Steyermark, with which it is sympatric in Costa Rica. It has been identified in the past as *M. schippii* Lundell "vel. sp. aff.," but differs from *M. schippii* by its shorter petioles, branched, pedunculate (rather than fasciculate) inflorescences, and higher-elevation habitat. Another similar species, currently identified in Costa Rica as *M. guyanensis* Klotzsch ex Reissek, differs by its much larger, usually darker drying leaves, fasciculate inflorescences, and lower-elevation habitat. The five species of *Maytenus* recognized for Costa Rica can be distinguished by the following key:

1a. Leaves distinctly serrulate with gland-tipped teeth; base of peduncle densely covered with ferrugineous, laciniate bracteoles; plants from > 2000 m . . . . . *M. woodsonii* Lundell

1b. Leaves entire or indistinctly toothed; ferrugineous bracteoles sparse or lacking; plants from 0 to 1700 m.

2a. Largest leaves 12–20 cm; plants from below 500 m elev.

3a. Leaves and fruits drying dark gray to brownish black; inflorescence ± racemose or fasciculate from a short peduncle; fruits obovoid, not inflated; plants mostly from P. N. Manuel Antonio and Osa Peninsula, near sea level . . . . . *M. guyanensis*

3b. Leaves and fruits drying pallid gray-green, mottled; inflorescence fasciculate, mostly without peduncle; fruits globose inflated; Palmar Norte, 450 m. . . . . *M. grisea*

2b. Largest leaves ≤ 11 cm; plants from 40 to 1700 m.

4a. Leaf apex narrowly acuminate, sometimes mucronate, the base markedly decurrent, the leaves drying dark gray-green to greenish tan; inflorescence paniculate-cymose; fruits short-pedicellate from an obvious rachis; plants mostly of cloud forest, (150–)700–1700 m . . . . . *M. recondita*

4b. Leaf apex acute to rounded, often retuse, the base acute, the leaves drying light gray to tan; inflorescences fasciculate; fruits arising from a knob; plants mostly of drier slopes below cloud forest, 40–1100 m . . . . . *M. segoviarum*

Anthers on flowering material of *Maytenus recondita* also bearing young fruits appear (on close examination) not to bear pollen. Although the relative length of stamens and style does not differ strikingly in staminate and pistillate flowers, as in the above-discussed species of *Gymnosporia*, *M. recondita* must also be dioecious.

A series of collections from Costa Rica (*U. Chavarría 179*, INB; *Chávez 248*, INB; *Ezpinoza 1186*,

INB; *G. Herrera 850*, INB; *A. Rodríguez 188*, INB) is here specifically excluded from the concept of *Maytenus recondita*. This entity shares the elevational range, inflorescence type, and leaf color of *M. segoviarum*, but has a leaf shape more similar to that of *M. recondita*. It is not yet decided whether these collections represent a sixth species for Costa Rica, hybrids between *M. recondita* and *M. segoviarum*, or simply variation within *M. segoviarum*.

Etymology and history. The epithet recondita ("hidden, unpretentious") was chosen for this species because its primary distinction is its reduced but nevertheless branched inflorescence. In addition, although the species has been well collected and distributed to various herbaria for many years, it is unremarkable and has remained undescribed. This species was first collected in April 1938 (*Skutch 3765*).

Crossopetalum enervium Hammel, sp. nov. TYPE: Costa Rica. Heredia: Llanura de San Carlos, S base of Cerros Sardinal, Chilamate de Sarapiquí, 10°27′N, 84°04′W, 70–100 m, 2 June 1985 (fl, fr), *Grayum & Jacobs 5351* (holotype, CR; isotypes, F, MO, LL + 3, dist. from MO as *C. eucymosum*). Figure 4.

Differt a species affinibus foliorum nervis lateralibus inconspicuis, apprime a *C. standleyi* foliis latioribus sed brevioribus, inflorescentiis ut videtur simplicioribus, a *C. gomezii* foliis multo minoribus.

Shrubs or small trees 1–5(–8) m; twigs sharply quadrate-ribbed, glabrous. Leaves opposite, 6–10 × 1.8–4 cm, elliptic, the apex acute to acuminate, apiculate, the base acute and decurrent, distantly but sharply serrate, glabrous; main lateral veins 4–6, loop-connected well below the margin, very indistinct above and below; petioles ca. 3–5 mm; stipules minute, caducous extensions of the twig angles. Inflorescences ca. 1–1.5 cm long, mostly 3–7(–25)-flowered, usually only 1-branched, axillary to extra-axillary cymes, glabrous or rarely puberulent; bracts and bracteoles small but ± foliaceous, gland-tipped; peduncles 7–13 mm, the pedicels 1.5–3 mm. Flowers small, 4-merous; sepals ca. ½ the size of the petals, rounded; petals ca. 1–1.5 mm, ± orbicular, the usually wine-red margins slightly crenate; stamens yellow, borne from just inside the margin of a flat, circular or quadrate disc; filaments ca. 0.1–0.2 mm. Fruits drupaceous, 0.7–1.4 × 0.6–0.7 cm, obovoid, red to black; seeds tuberculate.

Additional specimens examined. COSTA RICA. **Alajuela**: Cordillera de Tilarán, Monteverde Reserve, Peñas Blancas river valley, ca. 10°20′N, 84°45′W, 800–1100 m, 22 Feb. 1989 (fl), *Bello & Cruz 724* (INB, MV), 29 Nov. 1986 (fl, fr), *Haber ex Bello 6480* (CR); Reserva Forestal de San Ramón, 800–1000 m, 4 May 1985 (fr), *E. Rojas s.n.* (USJ); Llanura de San Carlos, Pital, Yucatán, 10°34′40″N, 84°11′00″W, 100 m, 4 Oct. 1994 (fr), *Estrada 246* (INB); Llanura de Guatuso, 3 km NW of Florencia 10°23′N, 84°28′W, 250 m, 28 Dec. 1993 (fl, fr), *Haber & Guindon 11759* (CR, F, INB, LL, MO, US); 8 km NE of Villa Quesada, near Artezalea, 550 m, 17 Feb. 1966 (fr), *Molina et al. 17271* (CR, F); Pueblo Nuevo, 1100 m, 15 Apr. 1939 (fl, fr), *A. Smith 1902* (F). **Guanacaste:** Cordillera de Guanacaste, P. N. Guanacaste, Volcán Cacao, ca. 10°55′45″N, 85°28′15″W, 1100 m, 11 Feb. 1995 (fl), *Alfaro 114* (INB), 2 June 1990 (fr), *Bello 2232* (INB), 11 Apr. 1991 (fl, fr), *Chávez 543* (CR, INB), 14 July 1991 (fr), *Chávez 585* (CR, INB), 8 Feb. 1995 (fl, fr), *B. Gamboa 48* (CR, INB, MO), 10 Feb. 1995 (fl, fr), *Lobo 50* (INB), 3 June 1990 (fr), *Maas 14* (INB), 2 June 1990 (fr), *Obando 15* (CR); P. N. Rincón de La Vieja, 800 m, 27 Jan. 1983 (fl), *Garwood et al. 726* (F). **Heredia:** Llanura de San Carlos, near Tirimbina E of the Río Sarapiquí, 10°24′N, 84°07′W, 150–250 m, 12–15 Aug. 1971 (fr), *Burger & Burger 8053* (CR, F). **Puntarenas**: Cordillera de Tilarán, Monteverde area, Hoge Middle, 13 Mar. 1979 (fl), *Koptur SK-102* (CR); Cordillera de Talamanca, P. I. La Amistad, Estación Altamira, 09°02′10″N, 83°01′20″W, 1350 m, 14 Apr. 1995 (fl), *Angulo 164* (INB); Las Alturas and vicinity, 1700 m, 26 Aug. 1974 (fr), *Maas 1484* (CR, F).

Distribution. *Crossopetalum enervium* is apparently endemic to Costa Rica, where it is known from both the northern and southern parts of the country in wet to very wet forest from ca. 100 to 1700 m elevation (Fig. 2). A study of shrub and treelet species at Monteverde (Koptur et al., 1988), includes phenological data about this species (as *C. eucymosum*), vouchered by the above cited Koptur collection (Haber, pers. comm.); fruits take about 3 months to mature and then may remain on the plant up to 5 months. Most collections are from the northern half of the country in the Cordilleras de Guanacaste and Tilarán and from the Caribbean lowlands to the east. A few collections with slightly more prominent venation, approaching that of *C. standleyi*, come from an outlying population in the extreme south of the country on the Pacific slopes of the Cordillera de Talamanca very close to Panama. Although not yet known from Panama, this new species must certainly occur there.

Characterization and relationships. This species is distinctive for the very faint (when dry) lateral veins and the delicate, subumbellate inflorescences. In leaf size and certain aspects of the inflorescence and fruit, this species is most like *Crossopetalum standleyi* (Lundell) Lundell (basionym *Myginda standleyi*; *Standley 68938*, isotype, F), from which it differs by its wider and slightly shorter leaves, markedly obscure venation, and the subumbellate cymes with relatively long primary peduncles. Both *C. standleyi* and *C. enervium* have

Figure 4. *Crossopetalum enervium* Hammel. —A. Shoot with immature fruit. —B. Flowers. —C. Fruits. (A, B from *Gamboa 48*; C from *Bello 2232*.)

obovate fruits and short anther filaments. *Crossopetalum enervium* is also similar to the type of *C. riparium* (Lundell) Lundell (*Lundell 1476*, F) in its smallish leaves and delicate, glabrous inflorescences. The inflorescences of the latter species, however, are more distinctly branched, and its leaves dry brownish (rather than gray-green), and are less serrate and more prominently nerved than

those of *C. enervium*. The stamens are nearly sessile on the type of *C. riparium*. Both *C. riparium* and *C. standleyi* (originally described from Guatemala) are restricted to northern Central America. That the close relatives of this new species are from north of Costa Rica is to be expected; the genus is basically Central American and West Indian, with only one species reported from South America (Gentry, 1993). One collection of *C. enervium*, *Chávez 543*, has slightly puberulent inflorescences.

Among Costa Rican *Crossopetalum*, the new species is most similar to *C. gomezii* Lundell, which differs by having much larger leaves with very prominent venation. It has been confused with the most common Costa Rican species, formerly known as *C. eucymosum* (Loesener & Pittier) Lundell, here considered a synonym of the older *C. parviflorum* (Hemsley) Lundell:

Crossopetalum parviflorum (Hemsley) Lundell, Wrightia 3(1): 8. 1961. *Euonymus parviflorus* Hemsley, Diag. Pl. Nov. Mex. p. 6. 1878. TYPE: Nicaragua. Chontales: *R. Tate 292* (photo, US).

Crossopetalum eucymosum (Loesener & Pittier) Lundell, Wrightia 3(1): 7. 1961. Syn. nov. *Myginda eucymosa* Loesener & Pittier, Contr. U.S. Natl. Herb. 12: 175. 1909, Pl. 18. TYPE: Guatemala. Alta Verapaz: Cahabon River, *Pittier 239* (US).

Crossopetalum parviflorum has much larger, more open, pubescent inflorescences, larger flowers with longer stamens, and leaves that dry brownish instead of gray and have more obvious secondary venation. The five Costa Rican species of *Crossopetalum* can be distinguished by the following key:

1a. Leaves pubescent, mostly less than 1.5 cm wide, acute; plants from near sea level on the dry Pacific coast . . . . . *C. uragoga* (Jacquin) Kuntze
1b. Leaves glabrous, mostly more than 2 cm wide, acuminate or acute; plants from higher or at least wetter habitats.
  2a. Fruits cylindrical; leaves acute at apex, conspicuously toothed; flowers nearly sessile at the end of a short peduncle . . . . . *C. tonduzii* (Loesener) Lundell
  2b. Fruits obovoid; leaves acuminate at apex; flowers both pedicellate and pedunculate.
    3a. Inflorescence pubescent, openly cymose-branched; largest leaves mostly 10(–13) cm long, inconspicuously toothed, drying brownish; filaments nearly ½ length of petals . . *C. parviflorum*
    3b. Inflorescence glabrous (very rarely pubescent in *C. enervium*), little branched, appearing almost umbellate; leaves larger or smaller, drying gray; filaments much less than ½ length of petals.
      4a. Leaves inconspicuously toothed, the largest at least (12–)15 cm long; lateral nerves conspicuous below . . . . . *C. gomezii*
      4b. Leaves conspicuously toothed, the largest mostly 6(–7) cm long; lateral nerves very indistinct below . . . . . *C. enervium*

Etymology and history. The epithet "enervium" is chosen in reference to the inconspicuous lateral venation of the leaves in dry specimens. Here again "reconditum" was a serious contender for the honors; this rarely collected species has actually been in collections for quite long, the earliest known gathering being that of *Austin Smith 1902*, in 1939. That collection and others, including the type, were distributed as *Crossopetalum eucymosum*, wherein the new species has, until now, remained hidden.

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