New Species and Combinations in Mesoamerican *Randia* (Rubiaceae: Gardenieae)

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ABSTRACT. *Randia nicaraguensis* Lorence & Dwyer from Nicaragua is described and illustrated. Two new combinations are proposed for Mesoamerican Gardenieae: *Randia genipifolia* (Standley & Steyermark) Lorence, based on *Duroia genipifolia* Standley & Steyermark, and *Randia armata* (Swartz) DC. subsp. *panamensis* (Standley) Lorence, based on *Randia panamensis* Standley.

Randia L. (Gardenieae) is a genus of over 90 species distributed in the New World tropics and subtropics, ranging from northern Mexico and Texas through Mexico, Central America, and the Caribbean into South America (Lorence & Dwyer, 1987). During the course of preparing the Rubiaceae treatment for *Flora Mesoamericana*, collections representing an undescribed species from Nicaragua were encountered. In addition, two new combinations are proposed in Mesoamerican *Randia*.

Randia nicaraguensis Lorence & Dwyer, sp. nov. TYPE: Nicaragua. Estelí: 4.9–7.6 km NE of Hwy. 1 at Estelí along road to Yalí, ca. 13°08–09′N, 86°19–20′W, 1100 m, 14 Nov. 1979, *W. D. Stevens & A. Grijalva 15553* (holotype, MO-2872306; isotypes, F, HNMN, MEXU, MO). Figure 1.

Species *Randiae monanthae* Bentham affinis, sed foliis supra glabris, subtus secus costam et venas sparsius strigillosis, hypanthio et calyce strigilloso vel glabrato, calycis lobis subulatis 0.5–1 mm longis, tubo corollino 15–18 mm longo extus glabro, corollae lobis 10–16 × 6–7 mm glabris differt.

Dioecious, deciduous small tree or shrub 2–8(–12) m tall, the trunk 12–25 cm diam., spiny, the bark gray, exfoliating, the crown narrow, the twigs terete, 2–4.5 mm diam., usually armed with 1–2 (less commonly 3–4) stout spines at or near apex, the spines (3–)4–12 mm long, slightly recurved, the lateral twigs (short shoots) usually decussate, 2–10 cm long, 2–5 mm diam., glabrous, sparsely lenticellate, the bark thin, brown, peeling. Leaves clustered beyond spines on swollen, unbranched twig tips, shortly petiolate or subsessile; petioles 4–15 × 1–1.2 mm, strigillose, winged from the decurrent lamina, adaxially sulcate; lamina obovate, obovate-elliptic, or elliptic, 4–10 × 2–5 cm, chartaceous or subcoriaceous, drying dark greenish brown, adaxially glabrous, abaxially strigillose on costa and 2° and 3° veins, the base attenuate and decurrent, the apex obtuse or rounded, the 2° veins 6–7(–8) pairs, the venation adaxially impressed and visible to 4°, abaxially prominulous and visible to 5°; stipules on short shoots persistent, broadly deltoid or ovate-deltoid, 2–6 × 2–4 mm, brown, externally glabrous or sparsely strigillose, often white punctate, the margins scarious, internally densely villous-sericeous with white hairs, colleters absent, stipules on long shoots similar but broadly deltoid, 2–3 × 2 mm, tardily deciduous. Flowers of both sexes terminal, solitary or paired, 4–5-merous, subtended by stipule-like bracts. Staminate flowers with strigillose pedicels 2–4 mm long, 1.5 mm diam., hypanthium broadly obconical, 2–3 mm long and wide, strigillose or glabrate, calyx cup 1–2 mm deep, externally strigillose or glabrate, internally strigillose, margin with 5 sparsely strigillose subulate teeth 0.5–1 mm long; corolla with white or yellow lobes and green tube when fresh, fragrant, salverform, the tube 15–18 × 3–4 mm medially, externally glabrous, internally sparsely villous in upper half, the lobes ovate, 10–16 × 6–7 mm basally, apically acute to obtuse, both sides glabrous; stamens attached in upper ¼ of tube, the anthers linear, 5–6 mm long; style 16 mm long, glabrous, the stigma slightly bilobed, slightly exserted. Pistillate flowers with hypanthium obconical-ellipsoid or cylindrical-ellipsoid, 10–14 × 5–6 mm, strigillose or glabrate, the calyx cup 3–5 mm deep, glabrate on both sides, often splitting along one side, the margin with 5 sparsely puberulent subulate teeth 0.5–1 mm long; corolla salverform, the tube 10–15 × 3–4 mm medially, externally glabrous, internally villous distally, the lobes broadly ovate, 8–15 × 6–8 mm, apically acute to obtuse, both sides glabrous; anthers attached near middle of tube, linear, 3.5 mm long; style 15 mm long, glabrous, the stigma lobes 4 mm

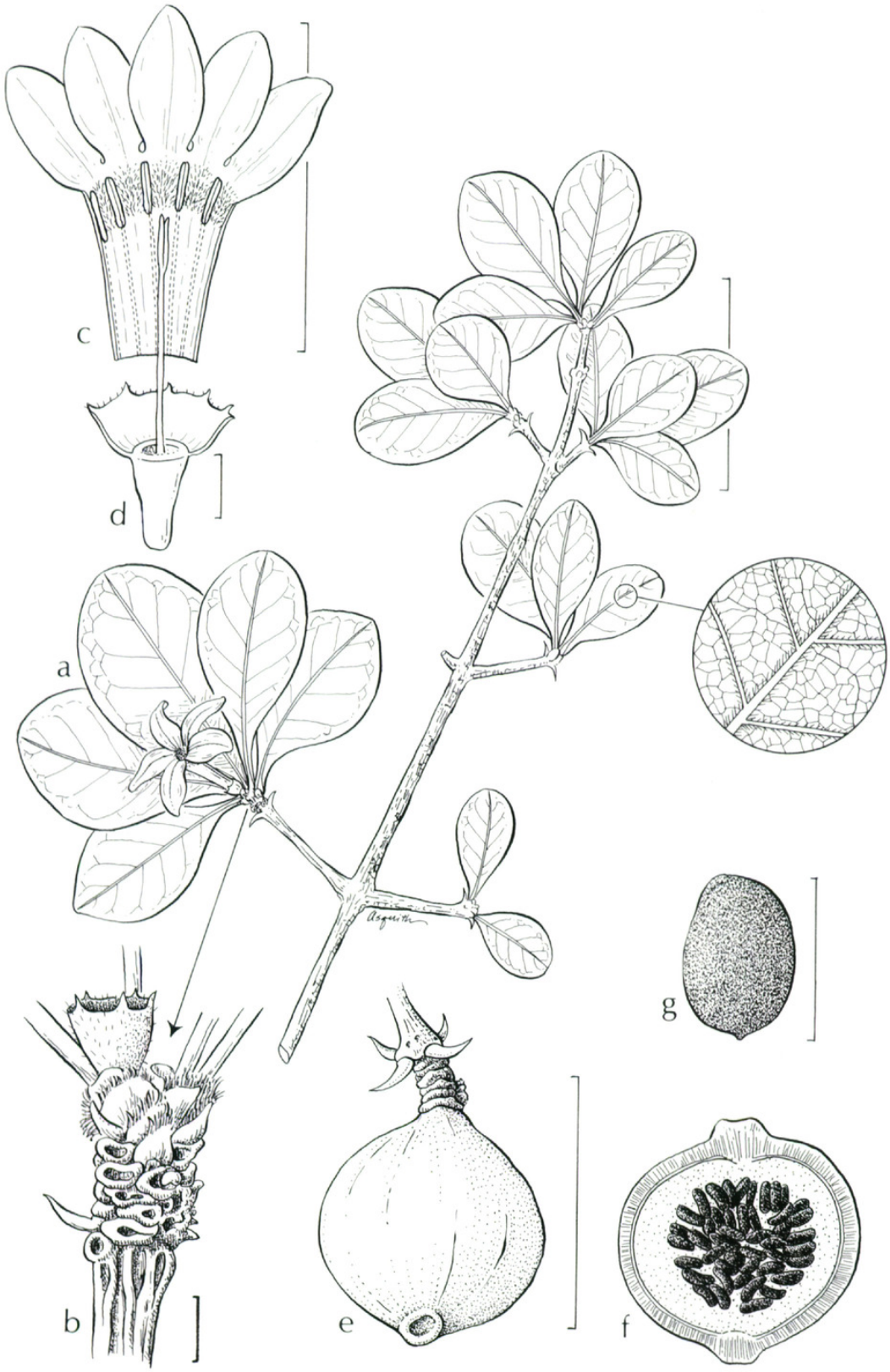

Figure 1. *Randia nicaraguensis* Lorence & Dwyer. —a. Habit, staminate plant. —b. Detail of twig apex. —c. Staminate corolla, opened. —d. Pistil of staminate flower. —e. Fruit. —f. Fruit, longitudinal section. —g. Seed. a–d, *Moreno 21531;* e–g, *Moreno 18530.* Bars = 5 cm in a, e, f; 4 mm in b, d; 37 mm in c; 8 mm in g.

long. Fruits hard, spheroidal or obovoidal-spheroidal, (35–)45–70 mm diam., brownish or grayish, smooth, glabrate, apex umbonate, the calyx lobes not persistent, the wall 3–5 mm thick, the pedicel thickened, 5–10 × 10–12 mm; seeds tan, irregularly discoidal or triangular-discoidal, 7–9 mm diam., imbedded in dark brown pulp.

Distribution. Known only from Nicaragua in the Departments of Boaco, Carazo, Chontales, Estelí, León, Managua, Matagalpa, Nueva Segovia, and Rivas.

Habitat and phenology. This new species occurs from near sea level to 850 m elevation in tropical deciduous forest (bosque seco tropical), savannas with *Crescentia alata*, gallery forest along rivers (bosque de galería), less commonly in tropical semideciduous forest (selva mediana perennifolia) or mangrove vegetation, and rarely in tropical montane mesic forest (bosque mesófilo) up to 1850 m elevation. Flowering specimens have been collected from May to July and fruiting specimens from June to April. In Nicaragua *Randia nicaraguensis* is known by the following vernacular names: "comida de ardilla," "cruceto," and "jicarillo."

Among its Mexican and Central American congeners, *Randia nicaraguensis* is closely allied to *R. monantha* Bentham, which ranges from southern Mexico and Guatemala along the Pacific slope to Costa Rica. The latter species differs by its densely strigillose-hirtellous leaves, strigillose hypanthium and calyx with longer, linear-subulate or foliaceous calyx lobes 2–7 mm long, and larger, externally hirtellous or strigillose corolla with a tube 50–65 mm long and lobes 25–28 × 5–6 mm.

Paratypes. NICARAGUA. **Boaco**: Camino Boaquito–Santa Lucía, hacienda Penas Blancas, 4 km al E de Boaco, 400–600 m, 26 Dec. 1984, *Grijalva & Soza 4195* (MO); El Ojo de Agua, carretera a Santa Lucía, 1 km al E de El Papaturro, 180–200 m, 30 July 1981, *Moreno 10108* (MO); 2 km al N de Boaquito, camino a Santa Lucía, carretera 47, 12°28′N, 85°44′W, 200–300 m, 20 July 1981, *Moreno 10116* (MO); 2 km al N de Boaquito, 12°28′N, 86°44′W, 260–280 m, 2 June 1983, *Moreno 21546* (MO), 2 km al N de Boaquito, 12°28′N, 85°44′W, 300 m, 9 Oct. 1981, *Moreno 11892B* (MO); 4 km al S de Boaquito, San Antonio, 12°26′N, 85°44′W, 200 m, 21 Oct. 1982, *Moreno 18073* (MO); Hacienda San Antonio, carretera a Boaquito, 12°26′N, 85°44′W, 200 m, 14 July 1983, *Moreno 21531* (MO), 17 Jan. 1984, *Moreno & Robleto 22817* (MO); 6 km NE de Boaco, 12°29′N, 85°42′W, 500 m, 10 July 1983 (fr), *Grijalva & Sandino 2767* (MO); sobre el Río Boaco o Fonseca, 3 km al SE de Boaquito, 12°26′N, 85°43′W, 200 m, 7 Nov. 1983, *Moreno 22491* (MO); San Lorenzo, 2 km al E, Sierra Espino, 12°23′N, 85°39′W, 500–600 m, 11 Nov. 1982, *Moreno 18530* (MO); 3 km N of Tecolostote, along Río San Lorenzo, 12°16′N, 85°39′W, 120 m, 7 June 1984, *Stevens 22924* (MO), *22929* (MO). **Carazo**: Filetes El Gallo, 7 km SE de La Trinidad, 100–200 m, 13 June 1983, *Grijalva 2651* (MO); Río Paso Carreta, NW de Boquita, 11°42′N, 86°23′W, 13 July 1982, *Sandino 3237* (MO); La Palma, Chacocente, 12 Dec. 1984, *Aranda 128* (MO). **León**: El Guayabal, 100 m, 9 May 1984, *Castro 127* (MO); Laguna de Asososca, ca. 6 km al NW de Puerto Momotombo, 12°26′30″N, 86°40′W, 200 m, 14 July 1984, *Grijalva et al. 3872* (MO); along Hwy. 12 ca. 1 km SE junction with Hwy. 28 (1st quebrada SE of junction), 30 m, 6 Oct. 1979, *Stevens 14657* (MO); W of Quebrada Las Ruedas, NW of El Transito, 12°05′N, 86°43′W, 15–30 m, 10 Dec. 1977, *Stevens 5452* (MO); along Hwy. 1 ca. 1 km SE of Hwy. 28, 12°15′N, 86°43′W, 30 m, 17 Dec. 1978, *Stevens 11181* (MO); Estero Brasil, ca. 2 km S of Hwy. 32 on road to Velero, 12°10′N, 86°45′W, < 10 m, 28 May 1980, *Stevens et al. 17275* (MO); de Larreynaga 5 km al NW del Cerro Pelón, 12°32′43″N, 86°35′24″W, 100 m, 2 Nov. 1993, *Vega & Quezada 146* (MO). **Managua**: Las Maderas, Comarca La Reforma, ca. 2 km NE del poblado Las Maderas, 200 m, 31 Oct. 1984, *Grijalva & Aranda 4095* (MO); 4.5 km NNW of Highway 12 on ridge of Sierra de Mateare, 12°07′N, 86°23′W, 430 m, 8 July 1978, *Stevens 9244* (MO 2 sheets); Río Pacora, ca. 10 km SE de San Francisco Libre, 12°31′N, 86°14′W, ca. 60 m, 11 Mar. 1983, *Grijalva 2389* (MO); sobre el camino hacia San Francisco del Carnicero, 2 June 1983, *Rocha 8* (MO). **Chontales**: 5 km SE de Camoapa, Tolinapa, 300–400 m, 15 Nov. 1982, *Moreno 18641* (MO). **Estelí**: 7 km from Hwy. 1 (km 193) on rd. to Pueblo Nuevo from Quebrada Jamailí to near summit of Cerro El Pedrero, 13°21′N, 86°27′W, 600–700 m, 3 July 1977, *Stevens 2612* (MO); "Cucamonga," Carretera Panamericana Km 160–161, 800–850 m, 7 Mar. 1982, *Moreno 15913* (MO); en la Laguna de Miraflores, camino a Estelí–Miraflores, 1850 m, 29 Aug. 1982, *Martinez S. & Grijalva 1912* (MEXU, MO); Estelí, Carretera N, 815–850 m, 29 Sep. 1983, *A. Laguna 302* (MO); Cuesta de Cucamonga, 13°15′N, 86°22′W, 830 m, 17 Apr. 1981, *Moreno 8352* (MO); Km 167 on Hwy. 1, 15.8 km N of entrance to Estelí, 13°15′N, 86°22′W, 825–850 m, 30 Dec. 1977, *Stevens 5776* (MO); Isiquí, 14 June 1984, *Laguna 397* (MO). **Matagalpa**: camino viejo a Jinotega, ca. 5 km al NW de la ciudad de Matagalpa, Río Waswalí, 22 July 1983, *Grijalva & Ortiz 2810* (MO). **Nueva Segovia**: camino entre Ococona y Llanos de Santa María, 13°44′N, 86°40–41′W, 15 May 1982, *Sandino 2961* (MO). **Rivas**: at convegence of Río La Pita and Río Escalante, at border of Depts. of Carazo and Granada, 20 m, 3 Aug. 1978, *Stevens 9690* (MO).

Randia genipifolia (Standley & Steyermark) Lorence, comb. nov. Basionym: *Duroia genipifolia* Standley & Steyermark, Publ. Field Mus. Nat. Hist., Bot. Ser. 22: 186. 1940. TYPE: Guatemala. Izabal: Río Dulce, between Livingston and 6 mi. up river, on N side (right side going up river), sea level, 14 Apr. 1940, *J. A. Steyermark 39382* (holotype, F 1035218, photo PTBG).

Randia gentlei Lundell, Wrightia 4: 125. 1969. Syn. nov. TYPE: British Honduras (Belize). Toledo Distr.: Edwards Rd. beyond Columbia, 24 May 1951, *P. H. Gentle 7343* (holotype, TEX-LL, photos MEXU, PTBG; isotypes, F, S (2 sheets not seen), TEX-LL (2 sheets), US (photos MEXU, PTBG)).

Duroia L.f., also a member of the Gardenieae, ranges from southern Central America to South America and comprises over 30 species (Andersson, 1992; Dwyer, 1980). As in the related genus *Randia*, species of *Duroia* are also dioecious shrubs or small trees with large, baccate fruits containing numerous seeds. *Duroia* differs from *Randia* in having calyptrate, circumscissile, and deciduous stipules, 5–9(–12)-merous flowers, a 1–4-locular ovary with 5–6 parietal placentas sometimes joined in the center, and triporate monad pollen grains.

Examination of the type of *Duroia genipifolia* and additional collections from Guatemala and Belize shows this species is clearly referable to the genus *Randia* based on its 5-merous flowers, unilocular ovary with two large, bilobed parietal placentas, and pollen grains united in permanent tetrads. Examination of the type of *Randia gentlei* reveals it to be conspecific with *R. genipifolia* and thus synonymous. This species is currently known from only a few collections collected in the Caribbean lowlands of Belize and Guatemala.

The Subspecies of *Randia armata* in Mesoamerica

Taylor and Lorence (1993) discussed the status and typification of *Randia armata* (Swartz) DC., a widespread and morphologically variable spiny shrub or small tree characteristic of moist and dry forests from Mexico and the Lesser Antilles to South America (Paraguay). *Randia panamensis* Standley, based on a specimen from Bocas del Toro, Panama, shares a number of morphological characters with *R. armata*. Indeed, the two species were combined in Dwyer's Rubiaceae treatment for *Flora of Panama* (Dwyer, 1980: 444).

Examination of numerous collections of *R. armata* and *R. panamensis* for a treatment of *Randia* for the *Flora Mesoamericana* project suggests that these two entities are better treated as subspecies: subsp. *armata*, which ranges from central western Mexico to the Lesser Antilles and South America; and subsp. *panamensis*, which is restricted to Panama. These two subspecies are modally distinct and in most cases are separable by the characters given in the key below. However, these features occasionally intergrade in certain collections. For example, both *Croat 5749* and *9131* from Barro Colorado Island, Panama, have stipules and calyx lobes that are intermediate between the two subspecies, but the armed twigs and longer pedicels are characteristic of subspecies *armata*. The collection *Sytsma 1714* from Río Guanche in Colón, Panama, has spheroidal fruits and calyx lobes characteristic of subspecies *panamensis*, but its stipules and distinct pedicels are characteristic of subspecies *armata*. Whether these deviating collections are the result of introgressive hybridization remains to be determined by field studies.

Randia armata (Swartz) DC. subsp. **panamensis** (Standley) Lorence, comb. et stat. nov. Basionym: *Randia panamensis* Standley, Publ. Field Columbian Mus., Bot. Ser. 4: 288. 1929. TYPE: Panama. Bocas del Toro: region of Almirante, Flat Rock, Jan.–Mar. 1928, *G. Proctor-Cooper 213* (holotype, F 579675, photos MEXU, PTBG).

Distribution and habitat. Subspecies *panamensis* is known only from Panama in the provinces of Coclé, Colón, Darién, Panamá, and San Blas. It occurs from 0 to 700 m elevation in lowland tropical moist and wet forest, riparian forest, and premontane wet forest, rarely in cloud forest from 1250 to 1450 m.

Additional collections studied. PANAMA. **Chiriquí:** Burica Peninsula, Rabo de Puerco, 8 km W of Puerto Armuelles, 50–150 m, 18 Feb. 1973, *Croat 21943* (MO). **Coclé:** Alto Calvario, Rivera sawmill, 600–800 m, 12 May 1977, *Folsom 3176* (MO); 12 mi. from Llano Grande, 700 m, 8°47′N, 80°28′W, 11 Dec. 1983, *Churchill et al. 4050* (MO); Caribbean side of [Continental] Divide at El Copé, 8°45′N, 80°35′W, 200–400 m, 3 Feb. 1983, *Hamilton & Davidse 2621* (MO, PTBG). **Colón:** Santa Rita Ridge trail beyond Santa Rita Ridge Rd. (Hwy. R20D), 400–800 m, 22 May 1975, *Mori & Crosby 6345* (MO); E of Santa Rita Ridge, 11 Jan. 1968, *Correa A. 593* (MO); trail from end Santa Rita Ridge Rd. to Río Piedras, 600 m, 16 Feb. 1980, *Antonio 3738* (MO); Santa Rita Ridge, 20 km from Transisthmic Hwy., Río Gatun drainage, 400 m, 9°25′N, 79°37′W, 22 Oct. 1981, *Knapp & Schmalzel 1766* (MO); Río Guanche, 9°30′N, 79°39′W, 0–75 m, 16 Oct. 1980, *Sytsma 1714* (MO); Río Guanche, 2.5 km upriver from bridge on rd. to Portobelo, 3 June 1975, *Mori et al. 6440* (MO). **Comarca de San Blas:** road from El Llano to Cartí, Pacific side, 79°00′W, 9°20′N, 350 m, 13 Feb. 1983, *Hamilton & Stockwell 2885* (MO); San Blas, trail from El Llano to Cartí–Tupile, Continental Divide, 400–200 m, 22 Feb. 1973, *Kennedy 2586* (MO); El Llano–Cartí Road, km 19.1, 9°19′N, 78°56′W, 9 Nov. 1984, *de Nevers & Herrera 4248* (MO, PTBG), 350 m, 18 Nov. 1984, *de Nevers 4308* (MO, PTBG); Cerro Habu, trail from Río Sidro, 800–1400 ft., 78°49′W, 9°23′N, 18 Dec. 1980, *Sytsma et al. 2639* (MO); trail to Cerro Obu (Habu of maps) from Río Urgandi (Río Sidra), 100–300 m, 9°23′N, 78°48′W, 24 June 1986, *de Nevers et al. 7967* (MO, PTBG). **Darién:** Parque Nacional del Darién, Estación Rancho Frío at N base of Cerro Pirre, ca. 9 km S of El Real, 8°01′N, 77°44′W, 70–270 m, 8 Oct. 1987, *Hammel et al. 16108* (COL, MO, PTBG); Parque Nacional del Darién, trocha hacia Cerro Pirre, 8°00′N, 77°45′W, 500–700 m, 8 Feb. 1991, *Herrera et al. 898* (MO, PTBG); Parque Nacional del Darién, ridge between N and S branches of Río Pucuro, across from old Tacarcuna village, 8°01′N, 77°16′W, 600–1000 m, 21 Oct. 1987, *Hammel et al.*

16341 (COL, MO, PTBG); Cerro Tacarcuna, S slope, 1250–1450 m, ridge top forest below summit, 26 Jan. 1975, *Gentry & Mori 13923* (MO); Ensenada del Guayabo, 18 km SE of Jaqué, 13 Jan. 1983, *Garwood et al. 205* (MO); N slopes and flatlands of Río Jaqué Valley, along Quebrada Luka, 7°27′N, 78°05′W, 0–300 m, 24 Jan. 1982, *Knapp & Mallet 3131* (MO); Río Cuasi, main stream, 0–2.5 mi. S of Tres Bocas, 28 Apr. 1968, *Kirkbride & Duke 1139* (MO). **Panamá:** Cerro Jefe, 15 Apr. 1971, *Croat 14433* (MO); Camino de Llano a Cartí, 14–18 km de la carretera a Chepo, 400 m, 20 Feb. 1973, *Correa et al. 1881* (MO); El Llano–Cartí Road, 10 km from Interamerican Hwy., 5 Oct. 1974, *Mori & Kallunki 2332* (MO), 8 mi. from Pan-American hwy., 09°15′04″N, 79°00′04″W, 225–275 m, 16 Feb. 1987, *McPherson 10486* (MO, PTBG); 8 km N of El Llano on El Llano–Cartí Road, E of Río Terable, 450 m, 9°15′N, 78°50′W, 19 Aug. 1981, *Knapp 945* (MO); 25 km NE of Cerro Azul on Río Piedras, Gorgas Memorial Labs yellow fever research camp, 550 m, 20–22 Nov. 1974, *Mori & Kallunki 3288* (MO); Mtns. above Torti Arriba, 2 Dec. 1977, *Folsom et al. 6591* (MO); Serrania de Maje, S of Choco village of Ipeti, Río Ipeti drainage system, 8°47′N, 78°27′W, 500–600 m, 11 Dec. 1981, *Knapp & Sytsma 2379* (MO); Río Piratí, foothills of Serrania de Majé, 9°00′N, 78°35′W, 100–150 m, 16 May 1982, *Knapp & Mallet 5146* (MO, PTBG); Río Maje, near Bayano Lake, 30–60 m, 4 May 1976, *Croat 39593* (MO, PTBG).

Key to the Subspecies of *Randia armata*

1a. Twigs usually armed with spines, rarely unarmed; stipules 2–6 mm long, acute apically, not strongly venose or becoming fibrous with age; calyx lobes not strongly venose, usually not persisting in fruit; flowers and fruits with pedicel (3–)5–12 mm long; fruits ellipsoidal . . *R. armata* subsp. *armata*

1b. Twigs generally unarmed, rarely with a few short spines; stipules 5–12 mm long, acuminate or aristate apically, with prominent parallel veins, becoming fibrous with age; calyx lobes with prominent parallel veins or at least costa, often reflexed and persisting in fruit; flowers and fruits sessile or the pedicels 1–3(–8) mm long; fruits spheroidal . . . . . *R. armata* subsp. *panamensis*

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