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THREE NEW SPECIES AND A NOMENCLATURAL SYNOPSIS OF *URERA* (URTICACEAE) FROM MESOAMERICA¹

Alexandre K. Monro² and Alexander Rodríguez³

ABSTRACT

Ureria Gaudich. is unique among Mesoamerican Urticaceae in having bright, fleshy fruits. Within Mesoamerica, there is significant confusion over the application of many names, especially *U. corallina* (Liebm.) Wedd., *U. elata* (Sw.) Griseb., and *U. eggersii* Hieron. Three new species, *U. fenestrata* A. K. Monro & Al. Rodr. (Costa Rica and Panama), *U. guanacastensis* A. K. Monro & Al. Rodr. (Costa Rica), and *U. lianoides* A. K. Monro & Al. Rodr. (Mexico, Guatemala, Honduras, Nicaragua, Costa Rica, Panama, Peru, and Bolivia), are described and illustrated on the basis of staminate flowers, staminate inflorescences, stem, leaf morphology, and habit. The affinities of the new species are discussed. The first record of ant associations for the genus is documented in relation to *U. fenestrata*. In addition, a key is presented to the 10 species of *Ureria* recognized for Mesoamerica; nomenclatural review is given in which *U. mitis* (Vell.) Miq. is lectotypified; *U. baccifera* (L.) Gaudich. ex Wedd., *U. caracasana* (Jacq.) Griseb., *U. mitis*, and *Urtica nitida* Vell. are epitypified; and *Ureria denticulata* Miq., *U. eggersii*, *U. subpeltata* Miq., and *U. subpeltata* var. *morifolia* Miq. are neotypified; and a list is provided of more than 900 exsiccatae from 13 herbaria.

RESUMEN

Ureria Gaudich. es un género único entre las Urticáceas de Mesoamérica por presentar frutos lustrosos y succulentos. En Mesoamérica existe una confusión significativa en la aplicación de muchos de los nombres, especialmente en las especies *U. corallina* (Liebm.) Wedd., *U. elata* (Sw.) Griseb. y *U. eggersii* Hieron. Tres nuevas especies, *U. fenestrata* A. K. Monro & Al. Rodr. (Costa Rica y Panama), *U. guanacastensis* A. K. Monro & Al. Rodr. (Costa Rica) y *U. lianoides* A. K. Monro & Al. Rodr. (México, Guatemala, Honduras, Nicaragua, Costa Rica, Panamá, Perú, Bolivia), son descritas e ilustradas sobre la base de sus flores e inflorescencias estaminadas, tallo, morfología de hojas y hábito. Las afinidades de las nuevas especies son discutidas. Se registra por primer vez la asociación de una hormiga con el género, específicamente en *U. fenestrata*. Adicionalmente se presenta una clave para las 10 especies reconocidas por *Ureria* en Mesoamérica; se entrega una revisión en la cual *U. mitis* (Vell.) Miq. es lectotipificada; *U. baccifera* (L.) Gaudich. ex Wedd., *U. caracasana* (Jacq.) Griseb., *U. mitis* y *Urtica nitida* Vell. son epitypificadas; *Ureria denticulata* Miq., *U. eggersii*, *U. subpeltata* Miq. y *U. subpeltata* var. *morifolia* Miq. son neotipificadas; y se suministra una lista de más de 900 especímenes existentes en 13 herbarios.

Key words: Flora Mesoamericana, IUCN Red list, Mesoamerica, *Ureria*, Urticaceae.

The genus *Ureria* Gaudich. comprises shrubs, trees, and vines that occur most frequently in riparian and disturbed vegetation in Mesoamerica. Within the Urticaceae, *Ureria* is characterized by fleshy fruits (formed by the inflation of the tepals), penicillate or capitate stigmas, glabrous pistillodes, and hairs with bulbous bases that are stinging in some species. *Ureria* has a nearly pantropical distribution (Neotropics, Africa, Australasia, and the Pacific Islands) but is absent from Asia (pers. obs.). Currently, a single species, *U. kaalae* Wawra, has a Critically Endan-

gered (CR) status, according to IUCN Red List criteria (IUCN, 2001).

Within Mesoamerican Urticaceae, *Ureria* is unique in having bright fleshy fruits. It is also characterized by stems that frequently release a watery latex when cut (a trait shared with *Myriocarpa* Benth.) and, in some species, stinging, bulbous hairs. It is for these stinging hairs that the genus is most widely known, hence the widespread local name of “chichicaste,” which is derived from the Nahuatl word “tsijtsikast” meaning “to vibrate” (Bonilla A., pers. comm.). It is

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also from these stinging hairs that *Urera* derives its limited economic and medical importance: *U. baccifera* (L.) Gaudich. ex Wedd. is used as “living fences” in Guatemala and Costa Rica (Standley & Steyermark, 1952; Burger, 1977) and is also the focus of research for its anti-inflammatory properties (Badilla et al., 1999). In addition, *Urera* includes species that are used to treat arthritis (González, 1994; House et al., 1995), fever (House et al., 1995), hemorrhage (Guánchez, 1999), erysipelas (Guánchez, 1999), and syphilis (House et al., 1995), and species that are of moderate importance as food for Lepidoptera (Janzen & Hallwachs, 2005).

The genus *Urera* was first described by Gaudichaud-Beaupré in 1830, for which he proposed the subtribe Urerinnæ (as Urereae) of the family Urticaceae, which was later raised to tribal rank (Urereae) by Weddell (1856). This was subsequently renamed Urticeae by Friis (1989). *Urera* was expanded to include the monospecific genus *Scopocarpus* Wedd. by Friis (1989), and chloroplast DNA sequence data (*trnL-F*) suggests that *Urera* could be sister to *Poikilospermum* Zipp. ex Miq. within the Urticaceae (Monro, 2006).

Urera has attracted no monographic attention since Weddell (1856, 1869), and, to date, no subgeneric classification has been published (although Weddell did divide the species into unnamed groups according to inflorescence structure and distribution). Systematic work in *Urera* has largely resulted from localized floristic treatments in and adjoining Mesoamerica (Standley & Steyermark, 1952; Burger, 1977; Pool, 2001; Steinmann, 2005).

There are currently 138 published species epithets for the genus (The International Plant Names Index, 2008), of which 133 appear legitimate. Of these epithets, 16 have since been transferred to *Laportea* Gaudich., *Gyrotaenia* Griseb., *Dendrocnide* Miq., *Boehmeria* Jacq., and *Girardinia* Gaudich. by subsequent authors. Of the remaining 117 names, Friis (1989) estimates that there are ca. 35 good species and Pool (2001) estimates 35 to 75.

Within Mesoamerica, there are 25 specific epithets for 10 recognized species of *Urera*, and there is significant confusion over the application of many names, especially *U. corallina* (Liebm.) Wedd., *U. elata* (Sw.) Griseb., and *U. eggertii* Hieron. This, combined with a lack of regional keys, the similarity of form and habit, and the extent of overlapping variation in characters between species, has made the determination of collections difficult. The result is that a significant proportion of herbarium material from Mesoamerica is misidentified.

MATERIALS AND METHODS

This work was undertaken as part of the revision of Mesoamerican Urticaceae for the *Flora Mesoamericana* project. The definition of Mesoamerica is as given in the *Flora* (Davidse et al., 1994): a region bounded to its north by the Mexican states of Yucatán, Campeche, Tabasco, Quintana Roo, and Chiapas, and to its south by the Panama–Colombia border. In addition, material from Mesoamerica and areas adjacent to Mesoamerica (Oaxaca and Veracruz [Mexico], Greater Antilles, Colombia, Venezuela, Ecuador, and Peru) from BM, C, F, GH, INB, K, LL, MEXU, MO, NY, P, PMA, TEX, and US was examined, resulting in 995 collections that were examined and determined, 850 from Mesoamerica. Determinations are listed in Appendix 1. The nomenclatural revision was based on the examination of the original published descriptions for all 24 accepted names, as well as type material.

The macro-morphological characters used most frequently by previous authors for the delimitation of species are leaf shape, leaf margin morphology, inflorescence morphology and structure, trichome distribution and morphology, fruit size and color, cystolith shape, and stigma shape. In this study, emphasis was also placed on stem morphology and habit, together with personal observations in the field that some species release a thin, watery latex when cut. Although no reference to this was found in the descriptions on collection labels, a number of collections had a dark stain on the rim of the cut stem. This was taken as an indication that these collections may have released a watery latex, and it is for this reason that this was noted in the observations made and in the descriptions below. All material was examined using a stereomicroscope at $\times 64$ to $\times 400$ magnification, and up to 138 observations were made for each specimen sampled. These observations were then used as a guide to delimit taxa within a morphological species concept and in the preparation of a key to the identification of the Mesoamerican species. Once species were delimited, they were then matched to type material.

TAXONOMIC TREATMENT

Urera Gaudich., Voy. Uranie 496. 1826 [1830].
TYPE (designated by Britton & Wilson, 1924: 243): *Urera baccifera* (L.) Gaudich. ex Wedd., Ann. Sci. Nat., Bot., sér. 3, 18: 199. 1852.

Scopocarpus Wedd., Prodr. (DC.) 16(1): 98. 1869. TYPE: *Scopocarpus manni* Wedd.

KEY TO THE MESOAMERICAN SPECIES OF *URERA*

Distributions for each species are given to country level within Mesoamerica, with the exception of Mexico and species that are only known from a single country, in which case they are given to state level. Global distributions in the key are given to regional level (e.g., South America, West Indies), following *Flora Mesoamericana* protocols (Davidse et al., 1994). Some of the characters in the following keys, e.g., cystoliths, are only visible in dried material. Several types of hairs (i.e., bulbous, straight, and curved) are found on the surface of the leaves and young stems of Mesoamerican *Urera*. Here I define bulbous hairs as those with a swollen and inflated base giving the base a bulbous or bottle-shaped appearance.

- 1a. Leaves lobed; stem releasing white latex when cut 7. *U. laciniata*
 1b. Leaves not lobed; stem releasing latex or not; when released, latex gray (never white).
 2a. Stem and leaves with spines; leaves coarsely dentate, the teeth spaced every ca. 0.5–1 cm; achene 2–3.2 mm; tepals covering the basal 1/4 or less of achene prior to the inflation of tepals 1. *U. baccifera*
 2b. Stem and leaves lacking spines; leaves dentate, crenate, or entire, when toothed the teeth spaced < 0.5 cm apart; achene 0.75–2 mm; tepals covering 3/4 or more of the achene prior to the inflation of the tepals.
 3a. Adaxial surface of leaves sparsely pubescent or glabrous.
 4a. Leaf margin shallowly crenate, crenate-serrate, sinuate, or entire; hairs never urticating.
 5a. Shrub or small tree; leaf-bearing section of stem never hollow.
 6a. Ratio of leaf length to width less than 4:1; abaxial leaf surface without domatia in the axils of the secondary veins; mature fleshy fruits pink or orange to orange-red 4. *U. glabriuscula*
 6b. Ratio of leaf length to width greater than 4:1; abaxial leaf surface with domatia in the axils of the secondary veins; mature fleshy fruits red 5. *U. guanacastensis*
 5b. Shrub, lax shrub, or vine; leaf-bearing section of stem hollow, ca. 5–10 mm diam.
 7a. Young shoots pubescent to densely pubescent, the hairs 0.125–1 mm; staminate flowers ca. 1.25 × 1.25 mm immediately prior to anthesis 8. *U. lianoides*
 7b. Young shoots sparsely pubescent or glabrous, the hairs when present 0.125–0.25 mm; staminate flowers ca. 2 × 2.5 mm immediately prior to anthesis 3. *U. fenestrata*
 4b. Leaf margin prominently serrate, crenate, or dentate; hairs urticating or not urticating.
 8a. Young stem glabrous or sparsely pubescent, the hairs ≤ 0.25 mm; stem coarsely sulcate, frequently fenestrate; stems, leaves, and petioles lacking bulbous hairs; staminate inflorescence to 110 mm; mature fleshy fruits red-pink 3. *U. fenestrata*
 8b. Young stem sparsely to densely pubescent, the hairs > 0.5 mm; stem coarsely sulcate but never fenestrate; stems, leaves, and petioles with or without bulbous hairs; staminate inflorescence to 80 mm; mature fleshy fruits orange or orange-pink.
 9a. Tertiary venation of abaxial leaf surface cream to pale green, noticeably paler than lamina; stipules forked or not forked; stem sparsely pubescent 6. *U. killipiana*
 9b. Tertiary venation of abaxial leaf surface darker or rarely paler than the lamina, where paler than the lamina pale brown to orange-brown in color; stipules not forked; stem densely pubescent.
 10a. Leaves ovate or cordiform, never obovate or lanceolate; hairs urticating
 2. *U. caracasana*
 10b. Leaves obovate, lanceolate, elliptic, or ovate, never cordiform; hairs urticating or not 9. *U. simplex*
 3b. Adaxial surface of leaves pubescent to densely pubescent.
 11a. Leaves bullate; staminate peduncle unbranched at base for 40–80 mm; pistillate peduncle unbranched at base for 27–98 mm 10. *U. verrucosa*
 11b. Leaves not bullate; staminate and pistillate peduncles unbranched at base for < 25 mm.
 12a. Leaves ovate or cordiform, never obovate or lanceolate; hairs urticating 2. *U. caracasana*
 12b. Leaves obovate, lanceolate, elliptic, or ovate, never cordiform; hairs urticating or not 9. *U. simplex*

1. *Urera baccifera* (L.) Gaudich. ex Wedd., Ann. Sci. Nat., Bot., sér. 3, 18: 199. 1852. Basionym: *Urtica baccifera* L., Sp. Pl., ed. 2, 2: 1398. 1763. TYPE: Plumier, Pl. Amer.: tab. 260. 1760 (lectotype, designated by de Rooij [1975: 302]). EPITYPE: Jamaica. Stony Hill, 13 Mar. 1898, *Fawcett 7177* (epitype, designated here, BM!).

Urera armigera (C. Presl) Miq., Fl. Bras. (Martius) 4: 192. 1853. Basionym: *Urtica armigera* C. Presl, Bot. Bemerk. (C. Presl): 110. 1844 [1845]. TYPE: Brazil. “near Rio de Janeiro,” *J. Lhotsky s.n.* (lectotype, designated by de Rooij [1975: 302], PR not seen).

Urera denticulata Miq., Fl. Bras. (Martius) 4: 192. 1853. TYPE: Brazil. Minas Gerais: Viçosa, rd. E from Chacha valley, Fazenda da Crecuma, 10 May 1930, *Y. Mexia 4679* (neotype, designated here, BM!; isotype, MO not seen).

Urera baccifera var. *horrida* (Kunth) Wedd., Arch. Mus. Hist. Nat. 9: 151. 1856. Basionym: *Urtica horrida* Kunth, Nov. Gen. Sp. [HBK] (quarto ed.) 2: 41. 1817. *Urera horrida* (Kunth) Miq., Fl. Bras. (Martius) 4: 192. 1853. TYPE: Colombia. “Santander, Magdalena prope Angostura de Carare,” *Humboldt & Bonpland 1639* (lectotype, designated by de Rooij [1975: 302], P!).

Urera nitida Vell., Fl. Flumin. Icon. 10: t. 20. 1827 [1831]. TYPE: Fl. Flumin. Icon. 10: tab. 20. 1827. EPITYPE: Brazil. Mato Grosso do Sul: Mpio. Paraguai, Serra des

Araras, Fazenda Currupira, 15°10'S, 56°5'W, 24 Jan. 1995, *Dubs 1770* (epitype, designated here, K!; duplicates, E not seen, ESA not seen).

Urtica grandidentata Liebm., Kongel. Danske Vidensk. Selsk. Skr. (Trondheim) ser. 5, 2: 296. 1851. TYPE: Costa Rica. Cartago: "Irasú," Jan. 1848, A. Ørsted 14283 (lectotype, designated by de Rooij [1975: 302], C!).

An epitype is selected for *Urera baccifera* because the type illustration, although accurate, is not sufficient to support the unambiguous fixing of the name to this species. *Fawcett 7177* was chosen because it includes flowering and vegetative material that conforms to Linnaeus' (1763) description "Urtica foliis alternis, cordatis" and is from the West Indies, as was the Plumier material that formed the basis of the type illustration.

An epitype is selected for *Urtica nitida* because the type illustration, although accurate, is not sufficient to support the unambiguous fixing of the name to this species. *Dubs 1770* was chosen because it includes flowering and vegetative material that conforms to Vellozo's description and is from Brazil, as was the material that formed the basis of the type illustration.

A neotype is selected for *Urera denticulata* because, although de Rooij (1975: 302) cites *Martius s.n.* at M as lectotype for *U. denticulata*, no such collections could be traced either at M (M. Esser, pers. comm.) or BR (P. Stoffelen, pers. comm.). The collections database from the Field Museum's Department of Botany (Field Museum of Natural History, 2006), which includes the negatives of photographs of European type material taken by Macbride, does, however, include a negative (no. 8845) cited as being from a Martius collection that represents type material of *U. denticulata* at M. Such a negative cannot be considered isotype material, but it does indicate the existence of a type specimen existing prior to World War II. It may be that de Rooij based his lectotypification on this photograph or that he did see the type collection at M prior to 1975, and that this collection has since been lost. The specimen designated as neotype was selected because it includes good leaf, stem, and fruiting material and is from the same country and state as the material cited in Miquel's description.

Local names. Bringa mosa (Panama: *C. Whitefoord & A. Eddy 249*, BM), chichicaste (Guatemala: *J. A. Steyermark 38770*, F; Honduras: *P. C. Standley 20526*, F; El Salvador: *P. C. Standley 22344*, F; Nicaragua: *P. C. Standley 11202*, F), chichicaste cuyanigua (El Salvador: *P. C. Standley 21880*, GH, US), chichicaste nigra (El Salvador: *S. Calderón 1539*, NY), cow itch (Belize: *P. H. Gentle 2781*, F, GH, NY,

US), nigua, niguilla (El Salvador: *P. C. Standley 22394*, GH), ortiga (Costa Rica: *R. Anderson & S. Mori 147*, F; Panama: *P. C. Standley 30536*, US), ortiga de los caballos (Mexico: *A. Schott 796*, BM, F), rascate bien (Honduras: *A. Molina R. 868*, F, GH).

Habitat and distribution. Evergreen or seasonal forest, riparian vegetation, from sea level to 1400 m, Mexico to Panama, Colombia, Peru, Bolivia, Brazil, Paraguay.

Comments. This species most closely resembles *Urera laciniata* Goudot. ex Wedd. These species can be distinguished from each other based on the presence of latex and spines and leaf margin morphology as follows: (1) for *U. baccifera*, leaf-bearing stem releasing gray but never white latex when cut, leaf margin coarsely dentate; (2) for *U. laciniata*, leaf-bearing stem releasing white latex when cut, leaf margin deeply lobed or lacinate.

Selected specimens examined. BELIZE. **Cayo:** Chiquibul, Las Cuevas, 16°43'N, 88°59'W, *A. K. Monro 671* (BM, BRH, MO). BOLIVIA. **Cochabamba:** *A. M. Bang, N. L. Britton & H. H. Rusby 1209* (A, BM, GH, MO). COSTA RICA. **Alajuela:** Río Sarapiquí at bridge on rd. to Colonia Virgen del Socorro, 9 mi. SE of San José–Puerto Viejo hwy., 10°16'N, 84°11'W, *T. B. Croat 68307* (BM, MO). EL SALVADOR. **La Libertad:** Cordillera de Balsamó, San Julián rd., towards the Pacific, 13°41'00"N, 89°38'32"W, *A. K. Monro et al. 3676* (BM, ITIC, LAGU, MO). GUATEMALA. **Izabal:** Montañas del Mico, 4–5 km W of Santo Tomás de Castilla, *W. D. Stevens et al. 25612* (BM, MO). HONDURAS. **Atlántida:** 15°42'N, 86°51'W, *R. L. Liesner 26275* (MO). NICARAGUA. **Río San Juan:** Near Caño Chontaleño 20 km NE of El Castillo, *D. Neill & P. C. Vincelli 3589* (BM, MO). PANAMA. **Darién:** Río Cocalito, *C. Whitefoord & A. Eddy 249* (BM, MO). PARAGUAY. **Canindeyú:** Karapa, Salto a 5 km del puesto, *G. Marín, B. Jiménez & M. Chocarro P. 763* (BM, FMB). PERU. **Pasco:** Oxapampa, Distr. Huancabamba, Sector Grapanazu, limite Parque Nac. Yanachaga-Chemillen, *R. Rojas, K. Meza, J. Ligan, E. Camavilca & M. Villaran 1832* (BM, MO).

2. *Urera caracasana* (Jacq.) Griseb., Fl. Brit. W. I. 154. 1859. Basionym: *Urtica caracasana* Jacq., Pl. Hort. Schoenbr. 3: 71. 1798. TYPE: Jacquín, Pl. Hort. Schoenbr. 3: t. 386. 1798. EPITYPE: Venezuela. Araugua: Tovar, 1854–1855, *A. Fendler 1275* (epitype, designated here, K!).

Urera alceifolia (Poir.) Gaudich., Voy. Uranie, Bot. 497. 1826 [1830]. Basionym: *Urtica alceifolia* Poir., Encycl. (Lamarck) Suppl. 4: 227. 1816. TYPE: French Guyana. Cayenne: s.d., *Martin s.n.* (lectotype, designated by de Rooij [1975: 304], P!).

Urtica tiliifolia Kunth, Nov. Gen. Sp. [HBK] (quarto ed.) 2: 34. 1817, as "tiliaefolia." TYPE: Colombia. Bolívar: Río Magdalena, *Humboldt & Bonpland 1633* (lectotype, designated by de Rooij [1975: 306], P!).

Urera jacquini var. *ulmifolia* (Kunth) Wedd., Arch. Mus. Hist. Nat. 9: 145. 1856. Basionym: *Urtica ulmifolia*

- Kunth, Nov. Gen. Sp. [HBK] (quarto ed.) 2: 141. 1817. TYPE: Colombia. Bolívar, *Humboldt & Bonpland 1427* (lectotype, designated by de Rooij [1975: 306], P!).
- Urera mitis* (Vell.) Miq., Fl. Bras. (Martius) 4(1): 191. 1853. Basionym: *Urtica mitis* Vell., Fl. Flumin. 10: tab. 19. 1827 [1831]. *Urera caracasana* var. *mitis* (Vell.) Wedd., Prodr. (DC.) 16: 90. 1869. TYPE: Fl. Flumin. Icon. 10: tab. 19 (lectotype, designated here, tab. 19!). EPI-TYPE: Brazil. Amazonas: Marapata, Municipality of Carauary, 25 May 1933, *B. Krukoff 4568* (epitype, designated here, BM!).
- Urera corallina* (Liebm.) Wedd., Prodr. (DC.) 16: 90. 1869. Basionym: *Urtica corallina* Liebm., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5, 2: 295. 1851. TYPE: Costa Rica. Alajuela: Monte Aguacate, *Örsted 14282* (lectotype, designated by de Rooij [1975: 304], further designation here, C sheet “26/2003/2”!).
- Urera capitata* Wedd., Ann. Sci. Nat., Bot., ser. 3, 18: 201. 1852. TYPE: Bolivia. Yungas: Dec. 1846, *Weddell 4317* (holotype, P!).
- Urera subpeltata* Miq., Fl. Bras. (Martius) 4(1): 189, pl. 66. 1853. *Urera jacquinii* var. *subpeltata* (Miq.) Wedd., Arch. Mus. Hist. Nat. 9: 145. 1856. *Urera caracasana* var. *subpeltata* (Miq.) Wedd., Prodr. (DC.) 16: 90. 1869. TYPE: Brazil. Bahia: 1839, *Blanchet 927* (neotype, designated here, BM!; isotype, G not seen).
- Urera subpeltata* var. *morifolia* Miq., Fl. Bras. (Martius) 4(1): 190. 1853. TYPE: Brazil. Pará: Santarem, July 1850, *R. Spruce s.n.* (neotype, designated here, BM!).
- Urera jacquinii* var. *miquelii* Wedd., Arch. Mus. Hist. Nat. 9: 145. 1856. *Urera caracasana* var. *miquelii* Wedd., Prodr. (DC.) 16: 90. 1869. TYPE: Peru. *Gay s.n.* (holotype, P not seen).
- Urera acuminata* Miq., Fl. Bras. (Martius) 4(1): 190. 1853, nom. illeg. non *Urera acuminata* (Poir.) Gaudich.

Jacquin's original description of *Urera caracasana* is based solely on staminate material. Original material for the name has not been located at BM or LINN, and any material that may have been at W has probably been destroyed (material could not be traced at W). Based on the type illustration, it is not possible to distinguish between *U. caracasana* and *U. corallina* (Liebm.) Wedd. on sterile characters alone. Material examined that had been determined as *U. corallina* (including the holotype) by Weddell and as *U. caracasana* did not uncover any significant morphological differences. An epitype is selected because the type illustration, although accurate, is not sufficient to support the unambiguous application of the name to this species.

A lectotype is designated for *Urtica mitis* Vell. because Vellozo (1827) does not refer to the plate as type material as his description predates the type concept. Tabulae 19 can be considered original type material. An epitype is selected for *Urera mitis* because the type illustration, although accurate, is not sufficient to support the unambiguous fixing of the name to this species. The epitype was selected because it includes both leaves and inflorescences

and is from the same country and region as the holotype.

A neotype is selected for *Urera subpeltata* var. *morifolia* because although de Rooij (1975: 306) cites *Spruce 633* (M) as lectotype, no Spruce collection fitting this description could be traced either at M (M. Esser, pers. comm.) or BR (P. Stoffelen, pers. comm.). Miquel (1853: 190), in his original description, cites two collections from the Brazilian Amazon, “Martius in silvis amazonicis, ad Barra do Río Negro” and “Spruce ad Santarem,” neither of which could be traced either at M (M. Esser, pers. comm.) or BR (P. Stoffelen, pers. comm.). A Spruce collection was, however, located at BM with the annotation, “In vicinibus Santarem, Prov. Pará.” This is selected as neotype on the basis that the collection is from the same collector, country, and state and includes good leaf, pistillate, and immature fruit material.

A neotype is selected for *Urera subpeltata* because although de Rooij (1975: 306) cites *Martius s.n.* at M as lectotype for *U. denticulata*, no such collections could be traced either at M (M. Esser, pers. comm.) or BR (P. Stoffelen, pers. comm.). The specimen designated as neotype was selected because it includes good leaf, stem, and pistillate and staminate material and is from the same country and state as the material cited in Miquel's 1853 description.

De Rooij (1973: 306) cites *Makin s.n.* (not traced) as type (holotype?) for *Urera jacquinii* var. *miquelii*. Weddell (1856), however, cites only Claude Gay's collection from Peru in his description and this is maintained as holotype.

Local names. Chichicaste (El Salvador: *E. Sandoval 1854*, BM; Nicaragua: *P. C. Standley 10712*, F), chichicaste blanco picante (El Salvador: *E. Sandoval & R. Chinchilla 504*, MO), chichicaste cujanigua de altura (El Salvador: *E. Sandoval & R. Chinchilla 1182*, MO), chichicaste rojo picapica (El Salvador: *O. Martinez s.n. (ISF225)*, MO), pan caliente (Honduras: *C. Nelson et al. 3955*, BM), migirillo (Costa Rica: *A. Sanchez 10*, F), miguito (Costa Rica: *J. A. Echeverria C. 268*, F), ortiga (Costa Rica: *J. A. Echeverria C. 268*, F), pan caliente (El Salvador: *M. L. van Severen 113*, F), zulsimtezla (Mexico: *A. Méndez G. 8945*, BM).

Habitat and distribution. Cloud forest, shade coffee forest, pine forest, *Quercus* L.–*Liquidambar* L.–*Pinus* L. forest, from sea level to 2300 m. Mexico (Chiapas), Belize, Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, Panama, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brazil, and Argentina.

Comments. Herbarium material of this species is commonly determined as *Urera corallina*. This species

most closely resembles *U. verrucosa* (Liebm.) V. W. Steinm. The two species can be distinguished from each other based on leaf texture and inflorescence peduncle size as follows: (1) for *U. caracasana*, leaves chartaceous, staminate peduncle branched to base or unbranched at base for 2–13 mm, pistillate peduncle branched to base or unbranched at base for 2–20 mm; (2) for *U. verrucosa*, leaves bullate, staminate peduncle unbranched at base for 40–80 mm and densely pubescent, pistillate peduncle unbranched at base for 27–98 mm.

Selected specimens examined. ARGENTINA. **Jujuy:** San Pedro, Sierra Sta. Barbara, S. *Venturi* 9633 (K). BELIZE. **Cayo:** Caracol Maya ruins, 14 km W of Las Cuevas, 16°45'N, 88°07'W, T. *Hawkins* 1132 (BM, MO). BOLIVIA. **Cochabamba:** Carrasco, ca. 11 km below Sehuenas, J. R. I. *Wood* 10275 (BM, K). BRAZIL. **Roraima:** Ilha de Maracá, SEMA Ecological Reserva, S of Cachoeira de Fumaça, W. *Milliken* 546 (K). COSTA RICA. **Puntarenas:** W. *Haber* & W. *Zuchowski* 9294 (MO). ECUADOR. s. loc., *Eggers* 15611 (K). **Pichincha:** new Alluriquin–Quito rd., Km 4, P. J. M. *Maas* & L. *Cobb* 4770 (K). EL SALVADOR. **La Libertad:** Mpio. Antiguo Cuscatlan, “Laderas de La Laguna,” P. *Lemus* s.n. “WB-01217” (BM, LAGU, MO). GUATEMALA. **Jutiapa:** D. *Dunn* et al. 23234 (MO). HONDURAS. **Ocotepeque:** Alrededores de Belén Gualcho, C. H. *Nelson*, E. *Romero*, A. *Rubio* & M. *Pereira* 3955 (BM, MO). MEXICO. **Chiapas:** Rancho Puy Ukum, sobre la carr. a 2 km de Bochil, Mpio. de Bochil, A. *Méndez* G. 8945 (BM, MEXU). NICARAGUA. **Jinotega:** “El Recreo,” 4 km al N de Sta. Gertrudis, P. *Moreno* & J. C. *Sandino* 7897 (BM, HNMN). PANAMA. **Chiriquí/Bocas del Toro:** Along Continental Divide on trail in Zona Palo Seco, 08°47'N, 82°13'W, S. *Knapp* & J. *Mallet* 9169 (BM, MO, PMA, SCZ). PERU. **Loreto:** Río Itaya, T. B. *Croft* 18829 (K). VENEZUELA. **Falcón:** Sierra de San Luis, ca. del Puente de Jobo entre Curimagua y San Luis, J. A. *Steyrmark* 99249 (K).

3. *Urera fenestrata* A. K. Monro & Al. Rodr., sp. nov. TYPE: Costa Rica. Guanacaste: Monte-verde, Cordillera de Tilarán, Pacific slope, above Quebrada Cuecha, 1540–1600 m, 6 May 1976, V. J. *Dryer* 179 (holotype, F!; isotype, CR!). Figure 1A–E.

Species nova *Urerae caracasanae* (Jacq.) Griseb. similis, sed ab ea floribus staminatis tetrapartitis, ramulis petiolisque spinosis ramulis saepe fenestratis atque foliorum nervis laterilibus per 2/3 longitudinis visibilibus differt.

Shrub, lax shrub, vine, or small slender tree, dioecious (?). Main stems arching 2–10 m, stems not releasing white latex when cut; without spines; young shoots glabrous or sparsely pubescent, the hairs 0.125–0.25 mm, erect, straight to weakly curved; internodes of leaf-bearing sections of stem 9–30 × 4–10 mm, pale brown to red-brown, coarsely sulcate, hollow, and frequently fenestrate when ≥ 5 mm diam. Stipules 5–18 mm, lanceolate, not forked, pubescent; petioles 52–350 × 1.5–1.75 mm, glabrous or sparsely

pubescent, the hairs 0.25–0.5 mm; leaf blade 103–320 × 64–220 mm, ovate, broad-ovate, or broad-elliptic, chartaceous; adaxial surface sparsely pubescent or glabrous, the hairs 0.375–0.675 mm, weakly appressed, weakly curved or crooked; the cystoliths punctiform to oblong, radially arranged; abaxial surface sparsely pubescent to pubescent, the hairs 0.25–0.5 mm, appressed, weakly curved; the cystoliths oblong, parallel to veins; primary veins 3, primary to quaternary or hexternary veins visible to the naked eye, the lateral primary veins visible for 2/3 of the leaf length; domatia not present in the axils of the secondary veins; base cordate or obtuse; margins entire or weakly crenate to serrate; apex subcuspidate to cuspidate. Peduncular bracts 2–3 mm; bracteoles 0.375–0.5 mm; staminate inflorescences 1 to 16 per stem, peduncle branched to base or unbranched from base for 2–21 mm, pubescent, the hairs to 0.125 mm, the whole inflorescence 15–110 mm, bearing 160 to 350 flowers in a symmetrical cyme with 3 or 4 orders of dichotomous branching; the flowers borne in clusters of 10 to 35, pedicellate to subsessile, the pedicels when present to 0.5 × 0.125 mm. Pistillate inflorescences 1 to 4 per stem, the peduncle branched to base or unbranched at base for 2–26 mm, pubescent, the hairs ca. 0.125 mm, erect, straight, the whole inflorescence 10–80 mm (47–80 mm in fruit), broader than long (or as long as broad), bearing 224 to 750 flowers in a symmetrical cyme with 5 orders of dichotomous branching, the flowers borne in clusters of 3 or 4, pedicellate to subsessile, the pedicels when present to 0.25 × 0.125 mm, glabrous. Staminate flowers 2–2.5 × 1.25–1.5 mm immediately prior to anthesis; tepals 4, ca. 3 mm; stamens 2.5–3 mm; pistillode ca. 0.5 mm diam., glabrous. Pistillate flowers ca. 1 × 0.5 mm, the lateral tepals 0.5–0.675 mm, asymmetrically ovate; the dorsal tepal 0.50–0.675 mm, ovate, with a subapical dorsal thickening, the ventral tepal ca. 0.375 mm, ovate; stigma penicillate, erect. Fruit prior to inflation of tepals ca. 1.25 × 1 mm; basal 3/4 of achene obscured by tepals, the laterals ca. 1 mm, the dorsal tepal 0.675–0.75 mm, the ventral ca. 0.5 mm; achene 0.75–1 × 0.75 mm, asymmetrically elliptic, keel-shaped, surface smooth. Fruit when ripe with tepals inflated and berry-like, ca. 1.5 × 1 mm, red-pink, red-violet, pink, or orange when fresh.

Local names. Ortiga (A. *Smith* 100, F, NY).

Habitat and distribution. *Urera fenestrata* is found in premontane, montane, and cloud forest, frequently in disturbed shaded areas close to streams or small rivers, at 800–3000 m. It occurs on the Pacific and the Caribbean slopes of the Cordillera de Tilarán in Costa Rica and the Cordillera de Talamanca in Costa Rica and Panama.

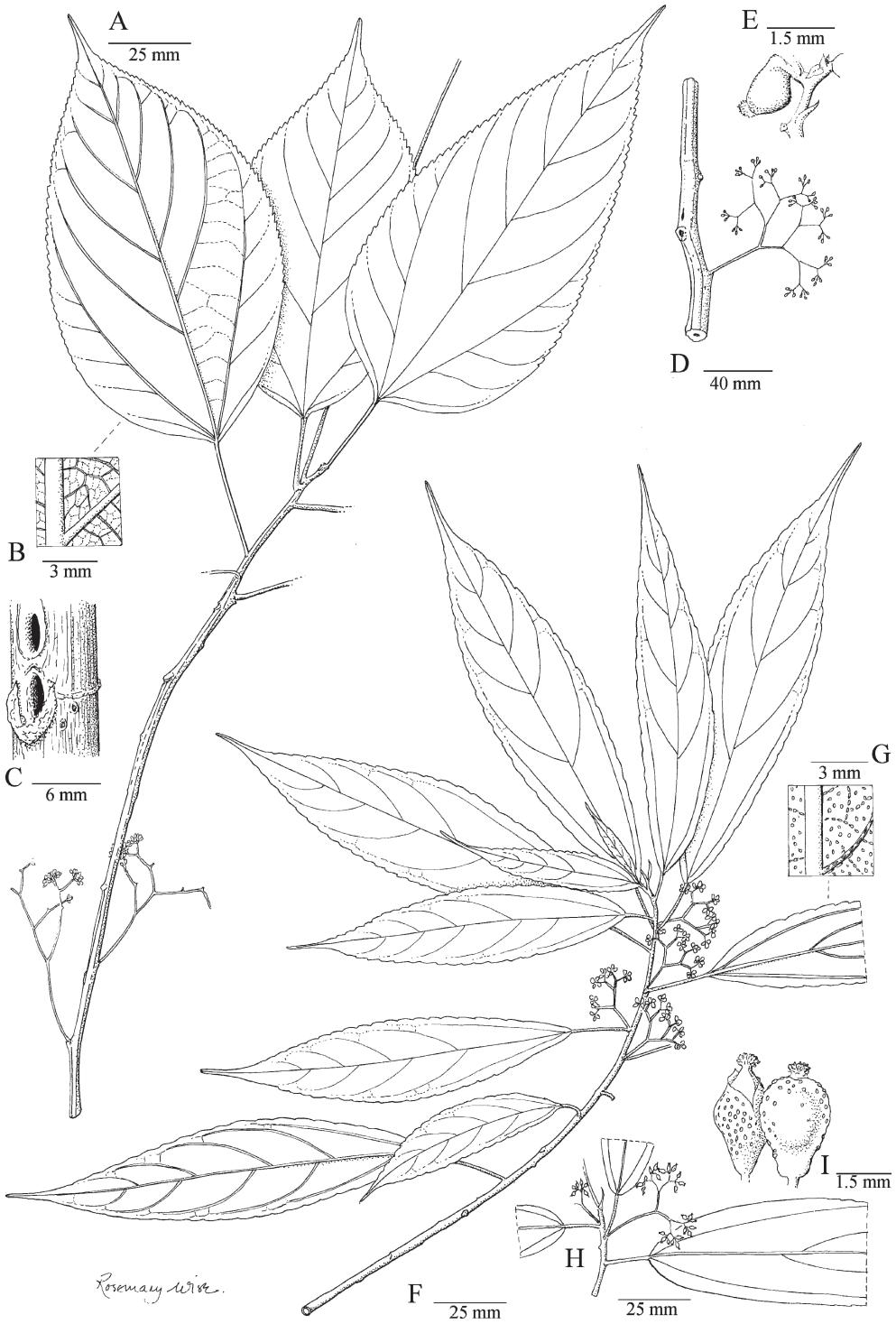


Figure 1. A–E. *Urea fenestrata* A. K. Monro & Al. Rodr. —A. Habit, with staminate inflorescences. —B. Leaf abaxial surface. —C. Stem. —D. Pistillate inflorescence. —E. Pistillate flower. (A, B: Dryer 179 [F]; C–E: Kirkbride & Duke 770 [NY]). F–I. *U. guanacastensis* A. K. Monro & Al. Rodr. —F. Habit, with staminate inflorescences. —G. Leaf adaxial surface. —H. Pistillate inflorescences. —I. Immature fruit. (F–I: Delgado 24 [MO]).

IUCN Red List category. Conservation for *Urera fenestrata* must be considered as Least Concern (LC) according to IUCN Red List criteria (IUCN, 2001), owing to the fact that the species has been collected 28 times in several localities in Costa Rica and Panama.

Etymology. From the Latin “fenestratus,” meaning “windowed,” referring to the stems which, when greater than or equal to 5 mm diam., become characteristically windowed.

Discussion. This species is characterized by the gnarled, windowed, leaf-bearing stem sections and the ovate, entire or subentire to weakly indented leaves. *Urera fenestrata* has most frequently been determined as *U. elata* or *U. caracasana* and may be distinguished from them as follows: (1) for *U. caracasana*, stems when greater than or equal to 5 mm diam. hollow, but never fenestrate, lacking spines; petiole lacking spines; the leaf margins serrate, serrate-dentate, or crenate-serrate to dentate; staminate flowers (4)5-parted; (2) for *U. elata*, stems when greater than or equal to 5 mm diam. hollow, but never fenestrate, small spines present; petiole with small spines; the leaf margins serrate, serrate-dentate, or dentate; staminate flowers 4-parted; (3) for *U. fenestrata*, stems when greater than or equal to 5 mm diam. hollow, fenestrate with prominent ca. 5 mm windows, lacking spines; petioles lacking small spines; the leaf margins entire or weakly crenate to serrate; staminate flowers 4-parted.

Both authors have observed ants of the genera *Crematogaster* Lund. and *Pheidole* Westwood (Formicidae, Myrmicinae) occupying the hollow stems of this species in the field. Collections of these ant species are available at the Instituto Nacional de Biodiversidad entomology collections.

Paratypes. COSTA RICA. **Alajuela:** La Palma de San Ramón, *A. M. Brenes* 136 (5544) (CR, F, NY); La Palma de San Ramón, *A. M. Brenes* 220 (4208) (CR, F); rd. to Finca Los Ensayos off hwy. 15, ca. 7.5 mi. N of Zarcero, *T. B. Croat* 43488 (MEXU, MO); Cordillera de Talamanca, *V. J. Dryer* 44 (CR); Cordillera de Tilarán, *V. J. Dryer* 179 (CR), 233 (CR), 234 (CR); Cantón de San Ramón, Reserva Santa Elena, Cordillera de Tilarán, 100 m NW of Station, *D. Penneys* 19 (INB); Vara Blanca de Sarapiquí, N slope of Central Cordillera, betw. Poás & Barba volcanoes, *A. F. Skutch* 3602 (NY); Cordillera Central near San Juan de Laja, ca. 15 km N of Zarcero, *L. O. Williams*, *A. Molina R.*, *T. P. Williams* & *D. N. Gibson* 28972 (F, NY); Reserva Forestal de Grecia, cuenca superior del Río Rosales, *G. Herrera C.*, *G. Umaño* & *H. Gómez* 542 (BM, INB, MO); above Quaker settlement at Monteverde, *J. Uitley* & *K. Uitley* 2352 (MO). **Cartago:** Cantón de Paraíso, Reserva Forestal Río Macho, Río Pejivalle, *E. Alfaro* 1799 (INB); Tapantí Hydroelectric Reserve along Río Grande de Orosí, *T. Croat* 36151 (CR); Orosí, farhweg von Río Macho, in westlicher Richtung zum Stausee, *P. Döbbeler* 5162 (CR); Tapantí I.C.E. Reservation,

9 mi. from bridge over Río Grande de Orosí, *A. Gentry* 2043 (MO); a la vera del Río Turrialba, camino entre Pacayas y Santa Cruz de Turrialba, *J. Gómez-L.* 8078 (CR); Tausito, S of Tres Ríos, cerros de la Carpintera, *R. Khan*, *M. Tebbs* & *A. R. Vickery* 1318 (BM); ca. S of Tapantí, along Río Grande de Orosí, *R. W. Lent* 806 (CR); Tausito, *R. W. Lent* 3803 (F, NY); Parque Nacional Tapantí, Sector Dos Amigos, *G. Mora* 543 (INB); Reserva Forestal Río Macho, Sector El Embalse, *G. Mora* 643 (INB); Reserva Forestal Río Macho, sendero atrás da casa a direito, *V. Nilsson* & *R. Manfredi* 393 (CR); El Empalme, Interamericana Sur, *L. J. Poveda* 306 (CR); El Guarco, Parque Nac. Tapantí-Macizo de la Muerte, Cerro de la Muerte, 600 m N de Chespirito, *D. Solano* 77 (INB); Turrialba, camino a Moravia, antes del Río Pacuare, *L. O. Williams* & *J. J. Córdoba* 4668 (CR); **Guanacaste:** Palmira, fog zone, *A. Smith* 100 (F, NY). **Heredia:** Parque Nac. Braulio Carrillo, Zurquí station, just above Los Guarumos trail, *B. Boyle* 2450 (BM, CR); Parque Nac. Braulio Carrillo, sector Zurquí, *I. A. Chacón* 1881 (CR); La Palma, Río Bajo de Honduras, Braulio Carrillo Natl. Park, *N. Garwood*, *M. Gibby*, *R. J. Hampshire* & *C. J. Humphries* 386 (BM, CR); Quebrada el Mochote, borde de Cerro Zurquí, *L. D. Gómez*, *I. A. Chacón*, *G. Herrera*, *M. M. Chavarria* 21040 (CR); Porrosatí de Barva, *A. Jiménez* & *R. Rodríguez* 323 (CR); Cantón de Heredia, Cordillera Central, headwaters of Río Santo Domingo, N slope of Volcán Barva, *M. Grayum* 7237 (INB); S slope of Volcán Barva, *W. H. Hatheaway* 1354 (CR); Parque Nac. Braulio Carrillo, Estación Barva, *G. Rivera* 258 (INB), *G. Rivera* 259 (INB); Río Porrosatí, 50 m N de parada de buses de Paso Llano, *G. Rivera* 432 (INB); S slopes of Volcán Barba betw. Río Cirueles & Sacramento, *J. Uitley* & *K. Uitley* 2319 (NY); Parque Nac. Braulio Carrillo, sendero hacia Quebrada Zrquí, *Zamora* 625 (CR). **Limón:** Cantón de Talamanca, Cordillera Talamanca, camp Río Lori, *J. Bittner* 1882 (INB), 1894 (INB). **Puntarenas:** Cantón de Buenos Aires, Estación Tres Colinas, finca Benito Acuña, *E. Alfaro* 745 (INB); Cantón de Coto Brus, Zona Protectora Las Tablas, Las Tablas, sendero Echandi, *E. Alfaro* 1260 (INB); Cantón de Coto Brus, Zona Protectora Las Tablas, I Camp. ACLA, camino a Cerro echando, *E. Alfaro* 1569 (CR); near the Continental Divide ca. 2–5 km E & SE of Monteverde, *W. C. Burger* & *J. L. Gentry* 8639 (CR), 8752 (CR). **Puntarenas–Alajuela border:** 2–5 km E & SE of Monteverde, *W. C. Burger* & *R. L. Liesner* 8639 (F); Reserva Santa Elena, Monteverde, *D. S. Penneys* 19 (CR). **San José:** Vásquez de Coronado, Parque Nac. Braulio Carrillo, sendero frente a Estación Zurquí, *L. Acosta* 480 (CR, INB), *L. Acosta* 486 (CR, INB); valley of Río Hondura (below La Palma), NE of San Jerónimo, *W. C. Burger* & *R. G. Stolze* 4912 (CR, F); Río Claro valley (Río La Hondura drainage), below La Palma, NE of San Jerónimo, *W. C. Burger* & *R. G. Stolze* 7646 (F); bosquecillos residuales entre las Nubes y Cascajal de Coronado, *J. Gómez-Laurito* 5535 (CR); near quebrada Bajo Máquina, 3 km NE of Cascajal, *R. W. Lent* 2500 (BM); Acosta Palmichal, Zona Protectora Cerros de Escazú, El Cedral, ca. de la casa, *S. Lobo* 661 (CR); Cantón de Aserri, Zona Protectora Cerros de Escazú, Cerros Escazú–La Carpintera, la cima del Cerro Daser, Alto Hierba Buena, *J. F. Morales* & *L. Bohs* 3787 (INB); Cerro Cedral, falda NW, *J. F. Morales* 5866 (CR, INB); Tarrazú, San Carlos, Bajos de La Virgen, confluencia ríos Negro y Blanco, Albergue Ríos Paraíso, *A. Quesada* 1161 (CR); Turrubares, San Luis, San Rafael, Finca de Melvin Chavarria, *A. Rodríguez* 9313 (INB); Alto de la Palma, ca. de 6 km N of San Jerónimo, *J. Uitley* & *K. Uitley* 635 (CR). PANAMA. **Bocas del Toro:** Chiriquí trail betw. quebrada Higuera & Gutierrez, *J. H. Kirkbride* & *J. A. Duke* 770 (NY); Caribbean slopes of Cerro Fábrega at foot of “Falso

Fábrega," A. K. *Monro* & S. *Cafferty* 4855 (BM, INB, MO, PMA), 4856 (BM, INB, MO, PMA). **Chiriquí:** vic. of Gualaca ca. 10.7 mi. from Planes de Hornito, La Fortuna rd. to dam site, *T. Antonio* 5111 (BM); betw. Bambito & Cerro Punta, *T. B. Croat* 10593 (MO); betw. Palo Alto & top of ridge (divide) near Cerro Pate Macho above Río Palo Alto, *W. D'Arcy et al.* 12658 (BM); Boquete, Bajo Chorro, *M. E. Davidson* 349 (F); near Fortuna Dam, *R. J. Hampshire* & *C. Whitefoord* 214 (BM), 203 (BM); lower reaches of trail to Cerro Pando, *A. K. Monro*, *S. Knapp*, *J. Mallet*, *A. Mallet*, *I. Mallet* & *V. Mallet* 3520 (BM, MO); quebrada Velo, *R. E. Woodson* & *R. W. Schery* 257 (MO); vic. of Bajo Mona & quebrada Chiquero, *R. E. Woodson* & *R. W. Schery* 593 (GH, MO); Bajo Mona, mouth of quebrada Chiquero, along Río Caldera, *R. E. Woodson*, *P. H. Allen* & *R. J. Seibert* 1005 (MO, NY).

4. *Urera glabriuscula* V. W. Steinm., *Acta Bot. Mex.* 71: 22. 2005. TYPE: Mexico. Veracruz: Mpio. San Andrés Tuxtla, Volcán San Martín, 1300 m, 2 Apr. 1985, *Cedillo T.* 3175 (holotype, IEB!; isotype, MEXU not seen).

Local names. K'anál zulzimtez (Mexico: *A. Méndez G.* 9054, BM).

Habitat and distribution. Montane forest, deciduous and evergreen forest, *Liquidambar–Taxodium* Rich. forest from 100–2800 m. El Salvador, Mexico (Chiapas, Oaxaca, Tabasco, Veracruz), Guatemala.

Comments. *Urera glabriuscula* is most similar to *U. lianoides* in its glabrous or sparsely pubescent leaves that are entire or discretely divided. The two species can be distinguished from each other based on habit, stem, stipule, staminate flower, and achene morphology as follows: (1) for *U. glabriuscula*, shrub or small tree, leaf-bearing section of stem never hollow, with internodes less than 20 mm; stipule apex minutely forked; pistillode 0.75 mm diam.; achene surface verrucate; (2) for *U. lianoides*, vine or scrambling shrub, leaf-bearing section of stem hollow at ca. 5–10 mm diam. with internodes greater than 20 mm; stipule apex not forked; pistillode 0.375 mm diam.; achene surface smooth.

Selected specimens examined. GUATEMALA. **Quezaltenango:** *J. A. Steyermark* 34292 (F). MEXICO. **Chiapas:** Mpio. Maragritas, Tenejapa, Colonia Maravilla, *A. Méndez G.* 9054 (BM, MEXU). **Oaxaca:** *Héctor M. Hernández y A. Chacón* 487 (MO). **Tabasco:** Mpio. Teapa, en Cerro Madrigal a 500 m al E de Puyacatengo, Universidad Autónoma Chapingo, *E. M. Martínez S.*, *J. Calónico Soto*, *A. M. Hanan-Alipi*, *M. A. Hernández*, *A. Martínez* & *N. Peregrino* 34699 (BM, MEXU). **Veracruz:** *A. Gentry*, *E. Lott* & *UNAM tropical botany class* 32227 (BM, MO).

5. *Urera guanacastensis* A. K. *Monro* & *Al. Rodr.*, sp. nov. TYPE: Costa Rica. Guanacaste: Parque Nacional Guanacaste, Cantón de Liberia, Estación Cacao, 10°55'45"N, 85°28'15"W, 1100 m,

3 June 1990, *R. Delgado* 24 (holotype, INB!; isotype, MO!). Figure 1F–I.

Species nova *Urerae simplicis* Wedd. similis, sed ab ea ramulis glabris, foliis angustioribus supra parce pubescentibus vel galbris subtus domatiis praeditis, pedicellis florum staminatorum brevioribus atque fructu rubro differt.

Shrub to small tree, dioecious (?), main stems arching, 2–4 m, not releasing white latex, without spines; young shoots glabrous; internodes of leaf-bearing sections of stem 3–10 × ca. 2 mm, pale grey-brown, not hollow, lacking a dark stain on the cut portion of the stem. Stipules 5–12 mm, narrowly lanceolate, forked, sparsely pubescent; petioles 6–90 × ca. 0.5 mm, glabrous to sparsely pubescent toward leaf base, the hairs 0.25–0.375 mm, strongly appressed, straight; leaf blade 55–230 × 8–55 mm, narrowly lanceolate, lanceolate to oblanceolate, chartaceous to subcoriaceous; adaxial surface sparsely pubescent to glabrous, the hairs most frequent toward the leaf base, hairs 0.375–0.5 mm, weakly appressed, straight; the cystoliths punctiform, inflated, densely scattered; abaxial surface glabrous; the cystoliths punctiform to oblong, occasionally appearing inflated, scattered and parallel to the veins; primary veins 3, primary to tertiary and occasionally quaternary veins visible to the naked eye, the lateral primary veins finer than midrib and visible for 1/3 of leaf length; domatia present in the axils of the secondary veins, composed of hairs; base obtuse; margins asymmetrically discretely crenate to serrate; apex pungent to subacuminate. Peduncular bracts 1–2 mm; bracteoles 0.25–0.5 mm, staminate inflorescences ca. 15 per stem, peduncle unbranched from base for 6–9 mm, pubescent, the hairs to 0.25 mm, the whole inflorescence 5–40 mm, bearing ca. 110 flowers in a weakly asymmetrical to symmetrical cyme with 4 or 5 orders of dichotomous branching; the flowers subsessile, borne in clusters of 5 to 7; pistillate inflorescences 2 to 21 per stem (4 to 7 in fruit), the peduncle branched to base or unbranched at base for 2–12 mm (6–17 mm in fruit), sparsely pubescent, the hairs ca. 0.1 mm, erect, straight; the whole inflorescence 5–40 mm (23–30 mm in fruit), longer than broad (or as long as broad), bearing 30 to 250 flowers (59 to 67 in fruit) in a symmetrical cyme with 4 or 5 orders of dichotomous branching, flowers pedicellate, borne in clusters of 3, rarely 2 to 4, the pedicels subsessile to 0.25 × 0.175 mm, glabrous. Staminate flowers 1–1.25 × 1.50–1.75 mm immediately prior to anthesis; tepals 4, ca. 2 mm; stamens and pistillode not seen. Pistillate flowers 0.4–0.6 × 0.25–0.6 mm, lateral tepals ca. 0.4 × 0.25 mm, ovate; dorsal tepal ca. 0.4 × 0.25 mm, ovate, the ventral tepal ca. 0.4 × 0.25 mm, ovate; stigma penicillate, erect. Fruit prior

to inflation of tepals with achene entirely obscured by tepals, the laterals ca. 1.75 mm, the dorsal ca. 1 mm, the ventral ca. 0.675 mm, achene 1–1.375 × 0.75–1.25 mm, elliptic, surface smooth, fruit when ripe with tepals inflated and berry-like, 1–1.25 × ca. 2 mm, red.

Habitat and distribution. *Ureera guanacastensis* is found in montane and cloud forest, disturbed and undisturbed forest, at 820–1350 m, known only from the Cordillera de Guanacaste in the Cantón de Liberia, Guanacaste Conservation Area in Costa Rica.

IUCN Red List category. Conservation for *Ureera guanacastensis* is considered as Near Threatened (NT) according to IUCN Red List criteria (IUCN, 2001). This is based on an evaluation of the potential distribution of *U. guanacastensis*, the threat to its habitat within that area, and the number of existing records for the species. Extrapolating from the 12 collection localities of *U. guanacastensis* plotted on Google Earth, this species' potential distribution covers an area of ca. 680 km². All 12 records are from forest localities (Google Earth, 2008; collection label data) that form part of Costa Rica's protected areas' network. Currently, ca. 50% of the potential distribution is deforested (Google Earth, 2008) and no records exist from deforested localities. We therefore assume that ca. 50% of the original population has been lost and that the future of this species is dependent on the maintenance of Costa Rica's Protected Areas Network.

Etymology. *Ureera guanacastensis* is named after the Guanacaste Conservation Area, where all known records of this species have been collected.

Discussion. *Ureera guanacastensis* is characterized by narrowly lanceolate, lanceolate, or oblanceolate, glabrous to sparsely pubescent leaves that frequently possess domatia on the abaxial surface composed of a cluster of hairs in the axils of the secondary veins, and by the red color of the mature fleshy fruits (not unique within the genus). It is most likely to be confused with *U. simplex* Wedd., from which it may be distinguished by leaf width, pubescence, and the presence of domatia, as well as by the length of the staminate pedicels and color of the fruit as follows: (1) for *U. guanacastensis*, young stems glabrous; leaves 8–38 mm wide, abaxial surface very sparsely pubescent to glabrous, abaxial surface with domatia in the axils of the secondary veins; pedicels of staminate flowers less than 0.5 mm; mature, fleshy fruit red; (2) for *U. simplex*, young stems pubescent, frequently densely so; leaves 37–210 mm wide, adaxial surface pubescent, frequently densely so, abaxial surface lacking

domatia; pedicels of staminate flowers greater than 1 mm; mature, fleshy fruit orange.

Paratypes. COSTA RICA. **Guanacaste:** Cantón de Liberia, Parque Nac. Guanacaste, Cordillera de Guanacaste, Estación Cacao, sendero Maritza, *L. Angulo 88* (INB); Estación Cacao, bosques primarios y orillas de bosque, *W. E. Bello 2237* (INB); Estación Cacao, *C. Chávez 95* (INB); Parque Nac. Rincón de La Vieja, Cordillera de Guanacaste, Estación Las Pailas, *R. Espinoza 771* (INB); Estación Cacao, sendero a casa de Fran, *B. Gamboa 45* (CR, INB); Estación Mengo, Volcán Cacao, sendero entre Estación y potrero Los Naranjos, *W. B. Hammel & E. Chavarría 17536* (BM); Estación Mengo, sendero el Potrero, lado sur, *II INBio 183* (BM, INB); Estación Cacao, cerro Cacao, sendero a Casa Fran, *W. A. Mora 37* (INB); Estación Cacao, cerro Cacao, *M. Moraga 60* (INB); Estación Cacao, Cerro Cacao, *W. F. Quesada 275* (INB); Sector Las Pailas, Río Colorado, Aguas Arriba, *G. Rivera 651* (INB); Cordillera de Guanacaste, sendero a laguna Santa María, *W. G. Rivera 1152* (INB).

6. *Ureera killipiana* Standl. & Steyerl., *Fieldiana*, Bot. 24: 427. 1952. TYPE: Guatemala. Quetzaltenango: Volcán Junil, 1700 m, 8 Aug. 1934, A. F. Skutch 982 (holotype, F!; isotype, GH!).

Local names. Chichicaste (Guatemala: *P. C. Standley 76980*, F), chichicaste común (Guatemala: *P. C. Standley 64714*, F), nigüita (Guatemala: *P. C. Standley 75549*, F).

Habitat and distribution. Disturbed vegetation, montane forest, riversides, from 900–3000 m, Mexico (Hidalgo, Queretaro, Oaxaca, Tabasco, Chiapas), Guatemala, and El Salvador.

Comments. *Ureera killipiana* is most frequently determined as *U. eggersii* (= *U. simplex*) or *U. caracasana*. These species can be distinguished from each other based on venation, stipule morphology, and stem indumentum as follows: (1) for *U. killipiana*, young stems sparsely pubescent, stipule apex forked or not forked, the secondary veins of the abaxial leaf surface without domatia in their axils, tertiary venation of abaxial leaf surface noticeably paler than the lamina; (2) for *U. caracasana*, young stems densely pubescent, stipule apex not forked; the secondary veins of the abaxial leaf surface frequently with domatia (flap-like or tufts of hairs) in their axils, tertiary venation of abaxial leaf surface darker or of the same color tone as the lamina; (3) for *U. simplex*, young stems densely pubescent, stipule apex not forked; the secondary veins of the abaxial leaf surface without domatia in their axils, tertiary venation of abaxial leaf surface darker or of the same color tone as the lamina.

Selected specimens examined. EL SALVADOR. **San Salvador:** *S. Calderon 727* (GH, NY). GUATEMALA. **San Marcos:** San Marcos, Finca Armenia, *Dwyer 15338* (MO). MEXICO. **Chiapas:** Ocozocoautla de Espinosa, *T. B. Croat*

40599 (MO). **Hidalgo:** Puerto Obscuro near Km 328 on hwy. betw. Santa Ana & Chapulhuacán, Jacala Distr., *H. E. Moore* 5049 (BM). **Oaxaca:** *B. Hammel & M. Merello* 15457 (MO). **Queretaro:** 3–4 km al S de La Parada, Mpio. de Jalpan, *B. Servin* 557 (BM). **Tabasco:** *C. L. Gilly & E. Hernandez* X. 320 (GH, MEXU).

7. *Urera laciniata* Goudot. ex Wedd., *Ann. Sci. Nat., Bot.*, sér. 4, 18: 203. 1854. TYPE: [Colombia] Nouvelle Grenade. “Quindui” [Quindío?], La Bolsa, 1844, *J. Goudot s.n.* (lectotype, designated by de Rooij [1975: 308], P #00281783!).

Urtica girardinoides Seem., *Bot. Voy. Herald* 194. 1854. TYPE: Panama. 1846–1849, *B. Seemann* 494 (lectotype, designated by de Rooij [1975: 308], BM!).

Both epithets, *Urera laciniata* and *Urtica girardinoides*, were published in 1854. According to Stafleu and Cowan (1988: 139), the probable month of publication for Weddell’s publication is March, while that for Seemann’s publication is July (Stafleu & Cowan, 1985: 476), thereby giving priority to *Urera laciniata*.

Local name. Pringamoza (Panama: *J. A. Duke* 9266, MO).

Habitat and distribution. *Urera laciniata* has been collected from riverside scrub and from sea level to 1200 m. Its range extends from Honduras, Nicaragua, Costa Rica, Panama, Colombia, and Peru to Bolivia.

Comments. The deeply lobed lacinate leaves and large (2–2.5 mm) asymmetrical fruit are unique amongst Mesoamerican *Urera*, and this species is unlikely to be confused with any other.

Selected specimens examined. BOLIVIA. **La Paz:** Franz tamayo, Parque Nac. Madidi, senda Azariamas–San Fermín sector Mutún, E Ticona, *A. Araujo M., V. Torrez, C. Perez, G. Jove & A. Urbano* 149 (BM, MO). COSTA RICA. **San José:** *A. F. Skutch* 4266 (GH, MO, NY). HONDURAS. **Gracias a Dios:** *J. Saunders* 1204 (NY). NICARAGUA. **Jinotega:** Caño Litutus, Río Bocay, *W. D. Stevens, J. H. Beach, J. Schal & O. M. Montiel* J. 16650 (BM, MO). PANAMA. s. loc.: 1846–1849, *B. C. Seemann* 494 (BM). PERU. **Junin:** Cataract El Tiro, *A. K. Monro, R. T. Pennington & A. Daza* 3993 (BM, MOL).

8. *Urera lianoides* A. K. Monro & Al. Rodr., sp. nov. TYPE: Costa Rica. Alajuela: San Miguel Oeste, Naranjo, subiendo por ladera sur del Cerro Espíritu Santo hasta bosque residual en el flanco noreste del mismo, 10°05′20″N, 84°24′20″W, 1000–1200 m, 24 Nov. 1988, *G. Herrera* 2326 (holotype, INB!; isotypes, BM!, MO!). Figure 2A–F.

Species nova *Urerae glabriusculae* V. W. Steinm. similis, sed ab ea habitu lianiformi, parte foliifera caulis 5–10 mm in

diametro cava, stipulis apice integris non furcatis, pistillodio minore atque achenio laevi differt.

Vine, scrambling shrub, dioecious (?); main stems cane-like, to 25 m, young shoots pubescent to densely pubescent, the hairs 0.25–1 mm, erect or weakly appressed, weakly curved or crooked, occasionally straight; internodes of leaf-bearing sections of stem 21–84 × 3.5–10 mm, red-brown, occasionally yellow-green, hollow where 5–10 mm diam., lacking a dark stain on the cut portion of the stem. Stipules 4–12 mm, narrowly ovate or lanceolate, not forked, sparsely pubescent to pubescent; petioles 11–90 (–170) × 0.75–1.5 mm, sparsely pubescent to pubescent, the hairs 0.125–1 mm, appressed, occasionally erect, curved, occasionally crooked or straight; leaf blade 72–280 × 29–110 mm, narrowly ovate, obovate, elliptic, or oblanceolate, always longer than wide, chartaceous and occasionally bullate; adaxial surface sparsely pubescent, the hairs 0.5–0.75 mm, appressed, weakly curved or crooked; the cystoliths punctiform, oblong or occasionally fusiform, occasionally inflated, randomly scattered and occasionally parallel to veins, rarely arranged radially around a hair base; abaxial surface pubescent, the hairs 0.125–0.5(1) mm, appressed or erect, weakly curved, occasionally straight; the cystoliths fusiform, occasionally oblong, parallel to the veins, occasionally randomly scattered; primary veins 3, occasionally 5, primary to quaternary veins visible to the naked eye, the lateral primary veins visible for 1/2–2/3 of the leaf length; domatia not present in the axils of the secondary veins; base subcordate or obtuse, occasionally cuneate; margins dentate, occasionally crenate-dentate or nearly entire; apex cuspidate. Peduncular bracts 1.25–2 mm; bracteoles 0.25–0.5 mm. Staminate inflorescences 1 to 12 per stem, peduncle branched to the base or unbranched from the base for 4.5–9 mm, densely pubescent, the hairs to 0.25 mm, the whole inflorescence 19–56 mm, bearing 192 to 384 flowers in an asymmetrical cyme with 4 or 5 orders of dichotomous branching; flowers borne in clusters of 6 to 12, sessile; pistillate inflorescences ca. 6 per stem, unbranched base of peduncle 7–13 mm, 5–11 mm in fruit, densely pubescent, the hairs 0.125–0.25 mm, erect, straight; the whole inflorescence 12–40 mm (12–45 mm in fruit), broader than long, bearing 112 to 448 flowers in an asymmetrical cyme, with 4 to 6 orders of dichotomous branching; the flowers borne in clusters of 3, pedicellate, the pedicels 0.5–0.675 × 0.125–0.25 mm, glabrous. Staminate flowers ca. 1.25 × 1.25 mm immediately prior to anthesis; tepals 4, 1–1.5 mm; stamens ca. 1.75 mm; pistillode ca. 0.375 mm diam., glabrous. Pistillate flowers 0.5–1 × 0.375–0.5 mm, white to yellow-green; lateral tepals 0.375–0.75 mm, asym-

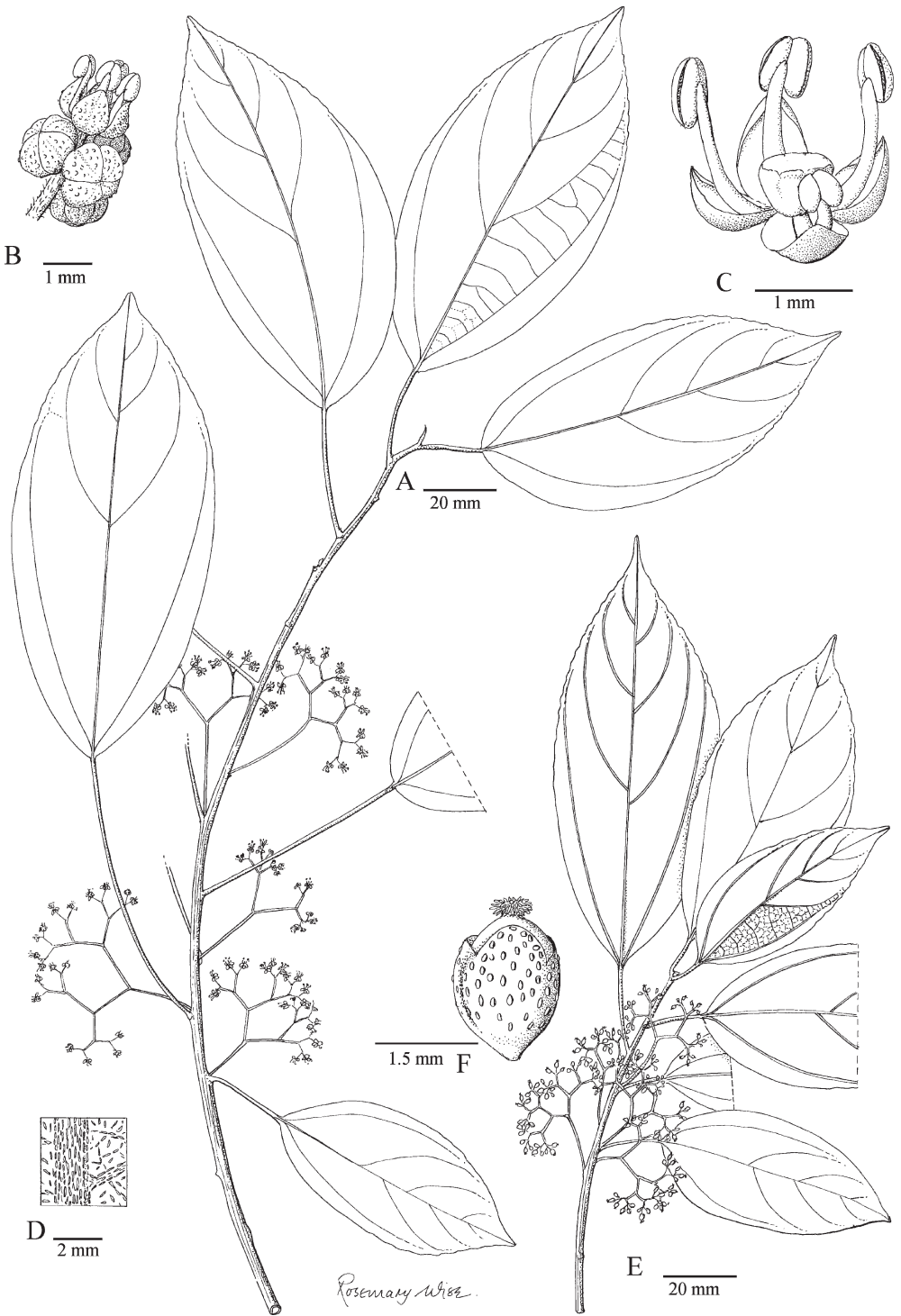


Figure 2. *Urera lianoides* A. K. Monro & Al. Rodr. —A. Habit with staminate inflorescences. —B. Cluster of staminate flowers. —C. Staminate flower at anthesis. —D. Leaf abaxial surface with cystoliths. —E. Habit, with pistillate inflorescences. —F. Immature fruit. (A–D: Johnson 1600 [GH]; E, F: Shank & Molina R. 4405 [NY]).

metrically ovate, dorsal tepal 0.25–0.75 mm, ovate, with a subapical dorsal thickening; ventral tepal 0.25–0.75 mm, ovate, stigma penicillate. Fruit prior to inflation of tepals ca. 1.5×0.75 mm; basal 3/4 of achene obscured by tepals, lateral tepals ca. 1 mm, dorsal tepals ca. 0.75 mm, ventral tepals ca. 0.5 mm; achene 1.25–1.5 \times 1–1.25 mm, asymmetrically elliptic, keel-shaped, surface smooth. Fruit when ripe, with tepals inflated and berry-like 1.5–2.25 \times 1.25–1.75 mm, orange when fresh.

Habitat and distribution. The new species is found in premontane, montane, and cloud forest, in disturbed and undisturbed forest, from sea level to 1300(1900–2500) m. Mexico (Chiapas), Guatemala, Honduras, Nicaragua, Costa Rica, Panama, Peru, and Bolivia.

IUCN Red List category. Conservation for *Ureria lianoides* must be considered as Least Concern (LC) according to IUCN Red List criteria (IUCN, 2001), owing to the fact that the species has been collected 50 times in several localities across Central and South America.

Etymology. From the English “liana” or “vine,” derived from the French, “lier,” which, in turn, is derived from the Latin “ligare” or “to tie,” referring to the liana-like habit of this species.

Discussion. *Ureria lianoides* is distinguished by its scandent habit, hollow stems, sparse non-urticating hairs, and orange, mature, fleshy fruit. Material of *U. lianoides* from Chiapas differs from other collections of this species in having densely pubescent young stem and abaxial leaf surfaces, with very short hairs (0.5 mm or less). This species corresponds to “sp. A” in the treatment of *Ureria* in the *Flora de Nicaragua* (Pool, 2001: 2495). *Ureria lianoides* most closely resembles *U. glabriuscula* with which it shares a distribution in Chiapas, Mexico. The two species can be distinguished from each other as follows: (1) for *U. lianoides*, a vine or scrambling shrub, ca. 5–10 mm diam., leaf-bearing stem section hollow, with internodes greater than 20 mm; stipule apex not forked; pistillode 0.375 mm diam.; achene surface smooth; (2) for *U. glabriuscula*, a shrub or small tree, ca. 5–10 mm diam., leaf-bearing stem section never hollow, with internodes less than 20 mm; stipule apex minutely forked; pistillode 0.75 mm diam.; achene surface verrucate.

Paratypes. BOLIVIA. **Beni:** Provincia Ballivian, Pilón Laja, 130 km de San Borja, *M. Moraes* 670 (K). **La Paz:** Provincia Nor Yungas, ca. 2 km al S de Coroico, *S. G. Beck* 21926 (K); Santa Fé Tacana, al lado de la parcela permanente de Santa Fé, *G. Bourdy* 1746 (K). **Tarija:** Provincia Arce, 108 km de Tarija hacia Bermejo, *R. Ehrlich* 494 (K). COSTA RICA. **Alajuela:** Cantón de San Ramón,

Reserva Biológica Monteverde, Cordillera de Tilarán, Refugio de Eladio, Valle del Río Peñas Blancas, *E. Bello* 5181 (INB); La Palma de San Ramón, *A. M. Brenes* 5793 (F, NY); Mata Cartago, La Palma de San Ramón, *A. M. Brenes* 6308 (F, NY); quebrada Azul (San Carlos), *A. M. Brenes* 23063 (NY); Guatuso, Parque Nac. Volcán Tenorio, El Pilón, colectado en bosque primario a orillas de sendero Los Misterios del Tenorio, *J. L. Chávez* 874 (INB); Cantón de Los Chiles, Refugio Natural de Vida Silvestre Caño Negro, Río Frío, Finca Betel, *K. Flores & M. Flores* 130 (INB); Reserva Biológica Monteverde, Río Peñas Blancas, Finca Wilson Salazar, vertiente Atlántica, *W. Haber & E. Bello* 7403 (INB, MO); Reserva Monteverde, Poco Sol 13 km S Fortuna, *W. Haber & W. Zuchowski* 9377 (BM, INB); Upala, Bijagua, El Pilón, cabecera del Río Celeste, *G. Herrera* 1293 (BM, INB); N side of Volcán Arenal, *R. W. Lent* 2922 (F); Upala, Zona Protectora Miravalles, 3 km W of Bijagua, ridges above Río Zapote, *D. S. Penneys & W. Haber* 710 (INB); Parque Nac. Rincón de La Vieja, Colonia La Libertad, Finca Julio Soto, *G. Rivera* 1485 (INB); Colonia Blanca, Finca Río Negro, *G. Rivera* 1563 (INB); San Carlos, Parque Nac. Arenal, Cerro Chato, sendero que lleva a la Laguna, *A. Rodríguez, V. H. Ramírez, G. de La O & G. Soto* 6254 (INB); Colegio Agropecuario, Santa Clara, Cantón de San Carlos, *A. S. Weston, D. F. Weston & J. Weston* 3104 (MO). **Cartago:** Cantón de Turrialba, Valle del Reventazón, Carolina, Moravia de Chirripó, *P. Campos* 176 (INB); 1/2 km S of Chitaría, near rd. #CR233, *R. W. Lent* 237 (NY). **Guanacaste:** Cantón de Tilarán, Cordillera de Tilarán, 1–2 km W of Lago de Cote, 13 km N of Tilarán, continental divide on SE, slope of Volcán Tenorio, *W. Haber & W. Zuchowski* 11624 (INB). **Heredia:** L. R. Holdridge’s Finca La Selva, Río Puerto Viejo at quebrada El Sura & quebrada El Salto, ca. 1 mi. above jet. Río Sarapiquí, *G. B. Rossbach* 3690 (GH); roadside bank about 35 km NE of Alajuela, *R. J. Taylor* 4536 (NY). **Limón:** Level areas betw. Siquerres & Río Pacuare, steep hills S of the railroad bridge over the Río Pacuare, *W. C. Burger & R. L. Liesner* 6952 (NY); borde de lago Dabagri hasta Río Llei, *L. D. Gómez et al.* 23129 (BM); Costado Oeste de lago Dabagri hasta Río Llei, *L. D. Gómez et al.* 23172 (BM); vecino al puente sobre el Río Toro Amarillo, 5.5 km al SO de Guápiles, *A. Jimenez M.* 1067 (F); pantanosos-yolillosos de Suerre y Dos Bocas, drenajes de los Ríos Parismina y Reventazón, *P. J. Shank & A. Molina* R. 4265 (GH); pantanosos-yolillosos de Goldengrove, drenaje de Río Reventazón, *P. J. Shank & A. Molina* R. 4405 (F). **Puntarenas:** Cantón de Osa, Refugio Forestal Golfo Dulce, Península de Osa, Los Mogos, Bahía Chal, entrada Chocuaco, *R. Aguilar* 3591 (INB); foothills of Cordillera de Talamanca, just N of Santa Elena on Fila Cotón, S of Agua Caliente, *G. Davidse, G. Herrera Ch. & M. H. Grayum* 28277 (BM); Osa, Ballena, entrando por Puertecito, hasta el Cerro Escalera, *J. González & C. Aragón* 2327 (INB); Cantón de Coto Brus, Parque Internacional La Amistad, Cordillera de Talamanca, Estación Pittier, Agua Caliente, *E. Navarro* 211 (INB); cantón de Osa, Península de Osa, Rancho Quemado, *F. Quesada* 167 (INB); deep forest near airport, 4 mi. W of Rincón de Osa, Osa Península, *P. H. Raven* 21623 (MO); Canton de Osa, Refugio Forestal Golfo Dulce, Península de Osa, Rancho Quemado, Fila Guerra, Rincón, finca del Grupo de Conservación, *M. Segura* 4 (INB); Reserva Biológica Monteverde, Cordillera de Tilarán, San Luis de Monteverde, bosques en la cuenca del Río San Luis, *K. Taylor* 118 (INB); Rincón de Osa, area N of airport, *J. Uteley & K. Uteley* 1173 (F). **San José:** Canton de Pérez Zeledón, Cordillera de Talamanca, Las Nubes, Santa Elena, *E. Alfaro* 329 (INB); W part of montañas Jamaica, ca. 3 km NE of Bijagua de

Turrubares, Carara reserve, *M. H. Grayum et al.* 5878 (BM); Zona Protectora La Cangreja, Mastatal de Puriscal, *J. F. Morales* 727 (INB); Acosta, Colorado, Fila San Jerónimo, Río Colorado, *J. F. Morales* 7383 (INB); Acosta, Aserri, Agua Buena, cabeceras Quebrada Laja, *J. F. Morales et al.* 9937 (INB); vic. of El General, *A. F. Skutch* 2863 (GH, MO, NY). GUATEMALA. **Petén:** Dolores, ca. 100 m del cementario, lado N, *R. Tún O.* 1323 (BM, F). **Suchitepequez:** Finca Mocá, *A. F. Skutch* 1479 (GH). HONDURAS. **Atlántida:** Vic. of La Ceiba, bank of Danto river, slopes of Mount Cangrejil, *T. G. Yuncker, J. M. Koepfer & K. A. Wagner* 8454 (GH, MO, NY). **Cortés:** Aldea de Corinto y alrededores frontera con Guatemala, 55 km al O de Puerto Cortés, *C. Nelson, E. Vargas, M. Erazo, M. García & M. Sierra* 2926A (BM, MO). **Olanchito:** Vaguada del Río de la población de Culmí, *C. Nelson & E. Romero* 4738 (MO). MEXICO. **Chiapas:** 2–4 km below Ixhuatán along rd. to Pichucalco, Muni. of Solosuchiapa, *D. E. Breedlove* 19906 (MO); long gravel rd. betw. Palenque & Bonampak, 60 mi. SE of Palenque, *T. B. Croat* 40192 (MEXU, MO); along gravel rd. betw. Palenque & Bonampak, 88–90 mi. SE of Palenque, *T. B. Croat* 40230 (MO); along hwy. 195, betw. Chiapa de Corzo & Pichucalco, ca. 6 mi. NW of Pueblo Nuevo Solistahuacán, along mirador overlooking Caribbean slope, Selva Negra lookout point at trail to Colonia Pinabeto, vic. Km 99, *T. B. Croat & D. P. Hannon* 65180 (MO); Crucero Corozal, camino Palenque–Boca Lacantum, Mpio. Ococingo, *E. Martínez S.* 15439 (BM); a 14 km al NW de Crucero Corozal sobre el camino Palenque–Boca Lacantum, Mpio. Ococingo, *E. Martínez S.* 16642 (BM). **Veracruz:** camino Bastonal–Tebanca, Mpio. Catemaco, *R. Cedillo T.* 3439 (BM); Estación Biológica Los Tuxtlas, *B. Hammel, M. Merello & S. Sinaca* 15492 (MO). NICARAGUA. **Chontales:** On ridge top of Cordillera Amerisque, *A. Gentry, W. D. Stevens, A. Grijalva P. & P. P. Moreno* 43950 (MO). **Granada:** Volcán Mombacho, Hacienda UPE–Pancasán (antes del cráter), *A. Grijalva, O. Vanegas & R. M. Rueda* 2924 (BM); NE del Volcán Mombacho, en el emplame de los caminos a Sta. Isabel y a Cutirre, *P. Moreno* 2602 (BM, MO); Volcán Mombacho, subiendo por la Finca Las Delicias, 1.5 km de la hacienda, *P. P. Moreno* 4103 (MO); NW slopes of Volcán Mombacho, 10 km S of Granada, *M. Nee & J. Miller* 27693 (MO); NW de Volcán Mombacho, cafetales de Finca Cutirre y camino que lleva S del volcán, *J. C. Sandino* 1273 (BM, MO). **Zelaya [Región Autónoma del Atlántico Sur]:** along the rd. betw. Nueva Guinea & Verdún, *J. S. Miller & J. C. Sandino* 1094 (MO); Monkey Point, Caño el Pato, 1.5 km sobre la ribera del Caño, *P. P. Moreno* 12397 (MO). PANAMA. s. loc.: *S. Hayes* 683 (K); Canal area, vic. of Madden Dam, *P. H. Allen* 2008 (F, NY); Barro Colorado Island, *S. Aviles* 106 (F); rd. S-11, NW of Escobal, *T. B. Croat* 12466 (BM, NY); rd. along Río Piña–Río Media divide, NW part of Canal Zone (area W of Limon Bay, Gatun Locks & Gatun Lake), *I. M. Johnston* 1706 (GH); rd. along W side of Gatun lake, NW part of Canal Zone (area W of Limón Bay, Gatun Locks & Gatun Lake), *I. M. Johnston* 1706 (GH); 12 mi. S of Colón, *E. L. Tyson et al.* 4478 (GH). **Bocas del Toro:** Ridge N of Campamento Luchio, *A. K. Monro & E. Alfaro* 4506 (BM, INB, MEXU, MO, PMA); Río Cricamola, betw. Finca St. Louis & Konkintoë, *R. E. Woodson, P. H. Allen & R. J. Seibert* 1923 (GH, NY); 10–15 mi. inland S from mouth of Changuinola River, *W. H. Lewis, J. D. Dwyer, T. S. Elias & K. R. Robertson* 867 (GH, K, UC, US). **Chiriquí:** Bajo Chorro, Boquete Distr., *M. E. Davidson* 349 (MO). **Coelé:** Foothills of Cerro Pilon, near El Valle, *J. Duke & M. Correa* 14670(1) (MO); El Valle from potato farm above village to Cerro Pilon, *J. Dwyer & M. Correa* 7923 (BM). **Colón:** From

Portobelo hwy. to 4 km up Río Guanche, *S. Knapp* 1016 (BM); Río Guache, *K. J. Systma* 1617 (BM). **Darién:** Parque Nac. Darién, Serranía de Sapo, límite del Parque hasta la cima, *H. Herrera & J. Polanco* 795 (BM). **Panamá:** Piriati, S of Pan-American Hwy., *C. Hamilton* 558 (BM). PERU. **Madre de Dios:** Parque Nac. del Manu, Río Manu, Cocha Cashu Station, *J. Terborgh & R. B. Foster* 6488 (K).

9. *Urera simplex* Wedd., Prodr. (DC.) 16(1): 90. 1869. TYPE. Colombia. Cundinamarca: “ad salto de Tequendama,” Mar. 1856, *Triana s.n.* (holotype, P 00281785!).

Urera eggersii Hieron., Bot. Jahrb. Syst. 20: 3. 1895. TYPE. Ecuador. Pichincha: 20 km W of Santo Domingo de los Colorados, 1000 ft., 25 Nov. 1961, *P. C. D. Cazalet & T. D. Pennington* 5150 (neotype, designated here, K!; isotypes, B not seen, NY not seen).

Urera rzedowskii V. W. Steinm., Acta Bot. Mex. 71: 37. 2005. TYPE. Mexico. Veracruz: Mpio. San Andrés Tuxtla, 8 km al N de San Andrés Tuxtla, Laguna Encantada, 18°28'N, 95°10'W, 350 m, 4 Apr. 1981, *J. I. Calzada* 8105 (holotype, IEB not seen; isotype, ENCB not seen).

Urera tuerckheimii Donn. Sm., Bot. Gaz. 23(1): 14. 1897. TYPE. Guatemala. Alta Verapaz: Pansamalá, 1160 m, May 1887, *H. von Tuerckheim* 1243 (holotype, US not seen; isotype, NY!).

A neotype was selected for *Urera eggersii* because the type collection cited by Hieronymus, *Eggers 14466* (B), was destroyed in enemy action during World War II and only photographs of the holotype could be located (F, MO). The neotype was selected on the basis that it includes good leaf and fertile material and was from the same country as the holotype.

Local names. Bilsimtezla (Mexico: *A. Méndez T.* 6738, BM), chenek'mut (Mexico: *A. Méndez T.* 4863, BM), chichicaste (Guatemala: *P. C. Standley* 68232, F; Mexico: *M. Heath & A. Long* MA 44, BM), chichicaste huevo de cangrejo (El Salvador: *E. Sandoval & H. Rivera* 1252, MO), sakil zulsimtez laa (Mexico: *A. Méndez T.* 6238, BM), tzotzniz zul simtez (*A. Méndez T.* 9066, BM), zulsimtezla (Mexico: *A. Méndez T.* 7022, BM).

Habitat and distribution. Disturbed and undisturbed forest, cloud forest, and humid scrub from sea level to 2500 m. Mexico (Chiapas, Tabasco, Veracruz), Belize, Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, Panama, Colombia, Ecuador, Peru, Bolivia, Brazil.

Comments. Material of this species has frequently been determined and referred to (*Flora of Guatemala*, *Flora de Nicaragua*, and *Flora Costaricensis*) as *Urera elata*, *U. eggersii*, or *U. tuerckheimii*. Examination of type material of these species indicates that *U. elata* is a species endemic to Jamaica, while *U. eggersii* and *U. tuerckheimii* are conspecific with *U. simplex*. Pool

(2001) indicates *U. tuerckheimii* (= *U. simplex*) may correspond to *U. aurantiaca* Wedd. from South America (Argentina, Bolivia, Paraguay); however, comparison of the holotypes suggests that the two species are distinct, with *U. aurantica* characterized by ovate or cordiform leaves and relatively short pistillate inflorescences and known only from South America (Argentina, Bolivia, Brazil, and Paraguay). Some collections of *U. simplex* from Costa Rica and Panama, e.g., *Kennedy 1939* (GH) and *Folsom y Page 5984* (PMA), are unusual in the possession of narrowly oblanceolate pubescent leaves, while some material from Chiapas (*Purpus 7039*, NY) is characterized by densely pubescent leaves. *Urera simplex* most closely resembles *U. elata*. The two species can be distinguished from each other based on petiole morphology and inflorescence peduncle size as follows: (1) for *U. simplex*, petiole lacking small spines; staminate flowers 5-parted, occasionally 4-parted; (2) for *U. elata*, petiole with small spines; staminate flowers 4-parted.

Selected specimens examined. BELIZE. **Stann Creek:** Middlesex, *W. A. Schipp 400* (BM, F, GH, NY). BOLIVIA. **La Paz:** N Yungas, valle de Huarinillas, Estación Biológica Tunquini, *S. G. Beck 24612* (K, LPB). BRAZIL. **Amazonas:** *E. Ule 5465* (K). COLOMBIA. **Putumayo:** Umbria, *G. Klug 1741* (K). COSTA RICA. **Puntarenas:** Cantón de Golfito Dos Brazos de Río Tigre, Jiménez, orilla de Quebrada Pizote, *G. Cordero 95* (BM, INB, MO). ECUADOR. **Pichincha:** *P. C. D. Cazalet & T. D. Pennington 5073* (K). EL SALVADOR. **Ahuachapán:** Finca L'Esperanza, Jujutla, *A. K. Monro et al. 2997* (BM, ITIC, LAGU, MO). HONDURAS. **Olancho:** Catacamas, Río Catacamas, slope of Sierra de Agalto, *S. Blackmore & G. L. A. Heath 1916* (BM). MEXICO. **Chiapas:** Finca Mexiquito, *C. A. Purpus 7039* (BM, F, MO, NY). NICARAGUA. **Matagalpa:** Macizo de Peñas Blancas, Finca San Sebastian, *O. Téllez V., R. Riviere, W. D. Stevens, O. M. Montiel J., M. Guzmán & D. Castro 5181* (BM, MEXU). PANAMA. **Comarca de San Blas:** Udirbi Reserve, along park boundary, *J. F. McDonagh et al. 257* (BM, MO). PERU. **Huanuco:** Vic. of Tingo María cliffs above Río Monzon, *M. E. Mathias & D. Taylor 5343* (K).

10. *Urera verrucosa* (Liebm.) V. W. Steinm., Acta Bot. Mex. 71: 39. 2005. Basionym: *Urtica verrucosa* Liebm., Kongel. Dansk. Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5, 2: 295. 1851. *Urera caracasana* var. *tomentosa* (Wedd.) Wedd., Prodr. 16: 90. 1869, nom. illeg., superfl. TYPE: Costa Rica. Cartago: Irasú, *Oersted 14284* (holotype, C!).

Local names. Chichicaste (Mexico: *E. Kerber 333*, BM).

Habitat and distribution. Montane forest, shade coffee farms, *Pinus-Quercus-Liquidambar* forest, from 500–2800 m. Mexico (Chiapas, Veracruz), Guate-

mala, Honduras, El Salvador, Costa Rica, Panama, Peru, and Bolivia.

Comments. *Urera verrucosa* most closely resembles *U. caracasana*. The two species can be distinguished from each other based on leaf texture and inflorescence peduncle size as follows: (1) for *U. verrucosa*, leaves bullate; staminate peduncle unbranched at base for 40–80 mm, densely pubescent; pistillate peduncle unbranched at base for 27–98 mm; (2) for *U. caracasana*, leaves chartaceous; staminate peduncle branched to base or unbranched at base for 2–13 mm; pistillate peduncle branched to base or unbranched at base for 2–20 mm.

Selected specimens examined. BOLIVIA. **La Paz:** *M. Lewis 882155* (K). COSTA RICA. **Cartago:** N of Cartago, Río Reventada, *R. Khan, M. Tebbs & A. R. Vickery 959* (BM). EL SALVADOR. **Ahuachapán:** Lago de Ninfas, Cordillera Grande de Apaneca, NW of Juayua, *G. Davidse, K. Sidwell, A. Monro, M. A. Renderos & C. Cortez 37383* (BM, ITIC, LAGU, MO). GUATEMALA. **Chimaltenango:** On hwy. CA1 betw. turnoff to Patzún & Sololá, 14.8 mi. NNW of turnoff to Patzún, 23.5 mi. SSE of turnoff to Sololá, *T. B. Croat & D. P. Hannon 64732* (BM, MO). MEXICO. **Veracruz:** Orizaba, *M. Botteri 288* (BM). PANAMA. **Chiriquí:** 3 km NW of Cerro Punta, along dirt rd. on rte. to Las Nubes, *B. Hammel 1363* (BM, MO, NY). PERU. **San Martín:** *T. D. Pennington & A. Daza 16676* (K, MOL).

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- . 1869. *Urera*. Pp. 199–203 in A. de Candolle (editor), *Prodromus* (DC.), Vol. 16. Paris.
4. *U. glabriuscula* V. W. Steinn.
5. *U. guanacastensis* A. K. Monro & Al. Rodr.
6. *U. killipiana* Standl. & Steyermark.
7. *U. laciniata* Goudot. ex Wedd.
8. *U. lianoides* A. K. Monro & Al. Rodr.
9. *U. simplex* Wedd.
10. *U. verrucosa* (Liebm.) V. W. Steinn.
- Acosta, L.* 480 (3), 486 (3); *Aguilar, I.* 387 (10); *Aguilar, R. et al.* 3591 (8); *Alclos S., J.* 92 (9); *Alerasquilla, L.* 180 (10); *Alfaro, E.* 329 (8), 745 (3), 1260 (3), 1569 (3); *Allen, P. H.* 911 (cf. 2), 926 (1), 1471 (10), 2008 (8), 3617 (9), 6315 (1), 6325 (9), 6330 (2), 6946 (10), 855 (cf. 2); *Anderson, R. & Mori, S.* 147 (1); *Angulo, L.* 88 (5); *Antonio, T.* 611 (1), 1118 (9), 1738 (9), 3528 (2), 4988 (9), 5111 (3); *Araquistain, M.* 3182 (9); *Araquistain, M. & Castro, D.* 1905 (1); *Araquistain, M. & Moreno, P. P.* 1502 (2), 2009 (1), 2235 (1), 2285 (1), 2358 (9), 2473 (9), 2605 (9), 2790 (9), 2863 (1); *Atwood, J. T. & Moore, A. D.* 304 (2), 489a (1); *Aviles, S.* 32 (9), 106 (8).
- Baker, C. F.* 2011 (2); *Baker, R.* R53 (2); *Bangham, W. N.* 211 (9); *Barkley, F. A. & Barkley, E. D.* 40130 (1); *Barkley, F. A. & Hernandez R., J.* 40263 (1); *Barkley, F. A. & Leiva-Welchez, L.* 39579 (2); *Barkley, F. A. & Smith, M. L.* 40859 (9); *Barrelier, M.* 11 (9); *Bello, E.* 2237 (5), 3143 (2), 5181 (8); *Bittner, J.* 1882 (3), 1894 (3); *Blackmore, S. & Heath, G. L. A.* 1916 (9); *Botteri, M.* 288 '854' (10); *Boyle, B.* 2450 (3); *Breedlove, D. E.* 9107 (1), 9994 (4), 10003 (5), 19906 (8), 20207 (9), 23388 (4), 24109 (9), 24249 (4), 24998 (9), 34570 (4), 51467 (5); *Breedlove, D. E. & Raven, P. H.* 13559 (4), 13583 (9); *Breedlove, D. E. & Smith, A. R.* 19905 (9), 21681 (9), 31520 (4); *Breedlove, D. E. & Thorne, R. F.* 30986 (10); *Brenes, A. M.* 136 (5544) (3), 220 (4208) (3), 339 (9), 3480 (9), 3596 (9), 5524 (2), 5793 (8), 6039 (2), 6308 (8), 6764 (9), 23063 (8); *Brown, E.* 6 (2); *Bunting, G. S. & Licht, L.* 1137 (1); *Burch, D.* 4603 (9); *Burger, W. C.* 4161 (1); *Burger, W. C. & Antonio, T.* 10956 (9), 10993 (1); *Burger, W. C. & Baker, R.* 10013 (1); *Burger, W. C. & Burger, M.* 7678 (9), 8496 (9); *Burger, W. C. & Gentry, J. L.* 8639 (3), 8752 (3), 8836 (9), 8984 (9), 9092 (7); *Burger, W. C. & Liesner, R. L.* 6605 (2), 6879 (1), 6952 (8); *Burger, W. C. & Matta U., G.* 4819 (9); *Burger, W. C. & Stolze, R. G.* 4912 (3), 5608 (9), 5904 (2); *Burger, W. C. et al.* 10502 (1), 10563 (1).
- Cabrera, E. et al.* 2666 (4); *Cafferty, S. & Monro, A. K.* 16 (9); *Calderón, S.* 727 (5), 850 (2), 1510 (2), 1539 (1), 1687 (2), 1775 (2), 1809 (2); *Calónico S., J. et al.* 21101 (4), 21242 (4); *Campos, P.* (8); *Carlson, M. C.* 391 (10), 2056 (1); *Chacón, I. A.* 1881 (3); *Chavarria, U.* 303 (2); *Chavelas, P. et al.* ES-2280 (9); *Chávez, C.* 95 (5); *Chávez, J. L.* 874 (8); *Chickering, A. M.* 126 (9); *Chorley, M. & R. Atkinson* 88 (2); *Christopherson, E. D.* 178 (10); *Chrysler, M. A.* 5612 (2); *Conrad, J. et al.* 2796 (4), 2815 (9); *Cooper, G. P. & Slater, G. M.* 178 (9); *Cordero, G.* 95 (9); *Correa, M. D. et al.* 2368 (2); *Cosentino, K.* 83 (9); *Cowan, C. P.* 1721 (9), 3064 (9), 3109 (9), 3151 (9); *Cowan, C. P. et al.* 3951 (9); *Cowell, J. F.* 257 (1); *Croat, T. B.* 10593 (3), 10597 (10), 12333 (9), 12466 (8), 15895 (9), 15897 (9), 23728 (9), 24254 (9), 26599 (9), 35138 (9), 36151 (3), 36777 (9), 40192 (8), 40230 (8), 40599 (5), 40862 (9), 40956 (8 aff.), 43488 (3), 43886 (9), 47437 (10), 49785 (7), 66252 (9), 66612 (2), 66795 (2), 68307 (1), 68317 (9), 78493 (2), 78524 (9), 78545 (9); *Croat, T. B. & Hannon, D. P.* 63356 (cf. 2), 64732 (10), 65180 (8), 65332 (9), 65354 (4); *Croat, T. B. & Porter, D. M.* 15663 (9); *Croat, T. B. & Zhu, G.* 76527 (9); *Cruz, R.* 31 (1), s.n. 'WB-1176' (10).
- D'Arcy, W. G.* 4239 (9), 10767 (9), 10998 (10); *D'Arcy, W. G. & Hammel, B.* 12235 (9); *D'Arcy, W. G. & Sytsma, K.* 14516 (cf. 2); *D'Arcy, W. et al.* 12658 (3); *Darío, M.* 461 (9); *Darwin, S. et al.* 2148 (1); *Davidse, G. et al.* 28277 (8), 37383 (10), 37493 (1); *Davidson, C. & Donahue, J.* 8353 (9);

APPENDIX 1. Index to Exsiccatae. Collections are listed alphabetically by collector name and then in ascending numerical order. Species are numbered as in the list provided here.

LIST OF SPECIES

1. *Urera baccifera* (L.) Gaudich. ex Wedd.
2. *U. caracasana* (Jacq.) Griseb.
3. *U. fenestrata* A. K. Monro & Al. Rodr.

- Davidson, C. 7202 (9); Davidson, M. E. 349 (3), 484 (9), 487 (10); Deam, C. C. 85 (1); Delgado, R. 24 (5), 76 (9); Delprete, P. 5150 (9); Döbbele, P. 5162 (3); Douglas, W. & Krukoff, B. A. 3522 (2), 4001 (2); Dryer, V. J. 179 (3), 233 (3), 234 (3), 1646 (10); Duke, J. A. 9020 (10), 9266 (7), 11844 (9), 12008 (7); Dunlap, V. C. 174 (2), 241 (9); Dunn, D. et al. 23234 (2); Dwyer, J. D. 2414 (2), 2895 (9), 15338 (5), 15365 (2); Dwyer, J. D. & Correa, M. 7923 (8), 14670 (1) (8); Dwyer, J. D. & Correa A., M. D. 7503 (10), 7964 (9); Dwyer, J. D. et al. 4837 (9).
- Ebinger, J. E. 812 (9), 967 (2); Echevarria C., J. A. 207 (10), C. 268 (cf. 2); Edwards, J. B. 107 (1), P-107 (1); Espinoza, R. 771 (5).
- Fernández, R. & Acosta-Zamudio, N. 2204 (4); Flores, K. & Flores, M. 130 (8); Folsom, J. P. 5932 (1); Folsom, J. P. et al. 2240 (3), 5571 (9); Fonseca Z., A. 79 (2), 113 (9); Fosberg, F. R. 27335 (7); Frankie, G. W. 79c (2), 138c (9).
- Gamboa, B. 45 (5); García, A. R. & Martínez, E. 47 (1); Garwood, N. C. et al. 386 (3), 1134 (1), 2728 (9); Gaumer, G. F. 501 (1), 936 (1); Gentle, P. H. 2118 (9), 2781 (1), 2808 (9), 2819 (9); Gentry, A. 2043 (3), 6246 (9), 6648 (1), 7897 (9), 8427 (9); Gentry, A. et al. 43950 (8), 43976 (9), 79328 (9); Gilly, C. L. & Hernández X., E. 320 (5); Gómez L. 5535 (3), 8078 (3); Gómez P. 2207 (9), 21040 (9), 23129 (8), 23172 (8); González, J. & Aragón, C. 2327 (8); Grayum, M. H. & R. Evans 9866 (9); Grayum, M. H. 7237 (cf. 3); Grayum, M. H. et al. 5878 (8); Grijalva, A. & Burgos, F. 1547 (9); Grijalva, A. 1916 (2); Grijalva, A. et al. 2906 (2), 2924 (8); Guadalupe J., S. & Lessette F., F. 33 (2).
- Haber, W. ex Bello, E. 6403 (1); Haber, W. & E. Bello 7403 (8); Haber, W. & Zuchowski, W. 9293 (9), 9294 (2), 9377 (8), 10889 (10), 10907 (9); Haber, W. et al. 11279 (9), 11296 (cf. 2); Hall, J. S. & Bockus, S. M. 7564 (2); Hamilton, C. & Stockwell, H. 3537 (9); Hamilton, C. 558 (8); Hammel, B. & Chavarría, E. 17536 (5); Hammel, B. 1363 (10), 1578 (10), 2149 (2), 2676 (9), 3016 (10), 4769 (9); Hammel, B. et al. 6840 (9); Hampshire, R. J. & Whiteford, C. 125 (9), 133 (1), 203 (3), 214 (3); Hampshire, R. J. et al. 632 (9); Hancock, W. s.n. (678139) (10); Harmon, W. E. & Dwyer, J. D. 3384 (9); Hatch, W. R. & Wilson, C. L. s.n. (864375) (9); Hatheway, W. H. 1354 (10); Hawkes, J. G. et al. 2150 (9); Hawkins, T. 983 (9), 1119 (1), 1132 (2); Hayes, S. 84 (1), 86 (1), 750 (9); Heath, M. & Long, A. MA44 (9), MA53 (9); Henrich, J. E. & Stevens, W. D. 345 (2); Hensold, N. 1008 (9); Herrera, G., C. 354 (9), 360 (1), 1293 (8), 2326 (8); Herrera, G., C. et al. 542 (3), 2926 (2); Herrera, H. & Guillen, O. 627 (9); Herrera, H. & Polanco, J. 795 (8); Herrera, H. 916 (9); Heyde, H. T. & Lux, D. 4067 (10); Holm, R. W. & Illis, H. H. 124 (2); Howard, R. et al. 460 (2); Huft, M. 1933 (9).
- Ibáñez G., A. 30 (9); II INBio 183 (5).
- Jiménez M., A. 1067 (8), 2215 (2); Jiménez M., A. & Rodríguez, R. 323 (3); Jiménez, Q. & Elizondo, L. H. 746 (9); Jiménez, Q. 876 (9); Johnston, I. M. 1600 (8), 1706 (8); Johnston, J. R. 1279 (10).
- Kellerman, W. A. 6553 (10); Kennedy, H. 1939 (9); Kernan, C. 430 (9); Khan, R. et al. 915 (1), 959 (10), 1318 (3); Kirkbride Jr., J. H. 47 (10), 152 (2); Kirkbride Jr., J. H. & Duke, J. A. 770 (3); Knapp, S. 1016 (8), 1435 (9); Knapp, S. & Mallet, J. 9169 (2); Knapp, S. & Monro, A. K. 9255 (9); Knees, S. G. 2706 (9).
- Lao, E. A. & Gentry, A. 450 (9); Lems, K. 640913 (9); Lemus, P. s.n. 'WB-1178' (2), s.n. 'WB-1217' (2); Lent, R. W. 228 (2), 237 (8), 806 (2), 2067 (9), 2500 (3), 2605 (10), 2922 (8), 3648 (9), 3803 (3); León, J. 796 (9), 939 (9); Lewis, B. B. 265 (1); Lewis, W. H. et al. 867 (8), 941 (1), 2087 (9); Liesner, R. L. & Lockwood, R. 2443 (1); Liesner, R. L. 1706 (9), 1733 (1), 1929 (9), 3038 (2), 3127 (9); Liesner, R. L. et al. 15437 (9), 26275 (1); Livingston 38 (9); Llodge, C. W. s.n. (13 July 1936) (2); Lobo, S. 661 (3); Long, L. E. 130 (1); Lundell, C. L. 6475 (2); Luteyn, J. L. & Kennedy, H. 4149 (10).
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